EPA Region 5 Records Ctr.
280049

FIVE YEAR REVIEW REPORT

REFUSE HIDEAWAY LANDFILL SUPERFUND SITE
MIDDLETON, WISCONSIN

Town of Middleton,
Dane County, Wisconsin

PREPARED BY:

Wisconsin Department of Natural Resources
Division of Air and Waste
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9-18-07

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Acronyms

Agencies	WDNR and U.S. EPA
ARARs	Applicable or Relevant and Appropriate Requirements
CFR	Code of Federal Regulations
ESD	Explanation of Significant Differences
ES	Enforcement Standard, as provided for by Wisconsin Administrative Code NR 140, (Groundwater Quality Standards)
FS	Feasibility Study
gpm	gallons per minute
IC	Institutional Control
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
MMSD	Madison (WI) Metropolitan Sewerage District
NCP	National 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)
PCOR	Preliminary Closeout Report
POE	Point-of-Entry water treatment units (installed in nearby residences)
ppb	parts per billion
ppm	parts per million
PRP	Potentially Responsible Party
RA	Remedial Action
RD	Remedial Design
RHL	Refuse Hideaway Landfill
RI	Remedial Investigation
RI/FS	Remedial Investigation/ Feasibility Study
ROD	Record of Decision
Site	Refuse Hideaway Landfill Superfund Site
The State	The State of Wisconsin
U.S. EPA	United States Environmental Protection Agency
UU/UE	Unrestricted Use/ Unlimited Exposure
µg/L	micrograms per Liter, or parts per billion
VOCs	Volatile Organic Compounds
WDNR	Wisconsin Department of Natural Resources

Executive Summary

The Refuse Hideaway Landfill Site is a 23 acre landfill which accepted approximately 1.2 million cubic yards of municipal, commercial and industrial wastes. Landfill gas collection and leachate extraction systems and a landfill cap have been installed on Site and are currently in operation. The State of Wisconsin operates and maintains these systems and monitors for landfill gas migration, has provided bottled water to affected residences, has installed point-of-entry (POE) water treatment systems for two private water supply wells, has tested private water supplies within one mile of the landfill, has performed groundwater studies, and performs long-term groundwater monitoring at the Site.

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 data, other data reviews, and the May 22, 2007 Site inspection conducted for this five-year review, 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 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 would allow the continued presence of human exposure; and (3) restrict use of groundwater until groundwater cleanup standards are achieved throughout the plume area.

Remedy components have been operational since 1991. The review also confirms that no known exposure pathways exist that result in unacceptable health risks. The components of the remedies selected and updated in the 1995 Record of Decision, 1998 Explanation of Significant Differences, and 1998 Preliminary Closeout Report have been implemented and remain effective under the 2001 RHL Site RD/RA Consent Decree, and will include Institutional Controls that are currently in the process of being implemented. This is the first five year review for the RHL Site.

Five-Year Review Summary Form

Site name ***(from WasteLAN)***: Refuse Hideaway Landfill		
EPA ID ***(from WasteLAN)***: WID 980 610 604		
Region: 5	**State:** WI	**City/County:** Middleton, Dane County
SITE STATUS		
NPL status: ☒ Final ☐ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): ☐ Under Construction ☒ Operating ☐ Complete		
Multiple OUs?* ☐ YES ☒ NO	**Construction completion date: 9/30/1998**	
Has site been put into reuse? YES ☒ NO		
REVIEW STATUS		
Lead agency: ☐ EPA ☒ State ☐ Tribe ☐ Other Federal Agency _____		
Author name: Hank Kuehling		
Author title: Hydrogeologist; Project Manager	**Author affiliation:** WDNR	
Review period: August 30, 2006 to June 25, 2007		
Date(s) of site inspection: May 22, 2007		
Type of review: ☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion		
Review number: ☒ 1 (first) ☐ 2 (second) ☐ 3 (third) ☐ Other (specify) _____		
Triggering action: ☐ Actual RA Onsite Construction ☒ Actual RA Start ☐ Construction Completion ☐ Previous Five-Year Review Report ☐ Other (specify)		
Triggering action date ***(from WasteLAN)***: September 19, 2002		
Due date ***(five years after triggering action date)***: September 19, 2007		

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

Five-Year Review Summary Form, cont'd.

Issues:

a. Some landfill gas extraction wells occasionally exhibit low flows and varying pressure, possibly due to low spots present in the gas collection header pipe, the result of differential settling occurring in the landfill.

b. Visual inspections of the landfill surface revealed several small areas of low vegetative growth in the southern portion of the landfill near GW-1, GW-2, and GW-3.

c. Occasional low levels of methane were detected in the G-1, G-2, and G-11 gas monitoring wells.

d. Institutional Controls for the RHL site as required by the 1995 ROD are not in place. Also, ICs may be required for the down-gradient groundwater. Implementing, maintaining and monitoring effective ICs is required to assure protectiveness of the remedy.

Recommendations and Follow-up Actions:

a. Excavate and re-grade gas header piping from GW-4 to GW-1 and repair the line from GW -1 to DL-1.

b. Investigate low vegetative growth in the southern portion of the landfill in the vicinity of GW-1, GW-2, and GW-3 and re-seed, water, and fertilize if needed.

c. Low methane production should be monitored, especially after the repair noted in Recommendation a.

d. U.S. EPA and WDNR will prepare an IC Plan to plan for IC activities including IC evaluation activities, IC Implementation and long-term stewardship.

Protectiveness Statement:

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 data, other data reviews, and the May 22, 2007 Site inspection conducted for this five-year review, 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 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 would allow the continued presence of human exposure; and (3) restrict use of groundwater until groundwater cleanup standards are achieved throughout the plume area. Long-term protectiveness requires compliance with effective ICs. Long term protectiveness will be assured by conducting IC evaluation activities, and implementing ICs along with evaluating long-term stewardship procedures. Long-term stewardship will assure that effective ICs will be maintained and monitored.

Other Comments:

None.

1.0 INTRODUCTION

The Wisconsin Department of Natural Resources (WDNR) has conducted a five-year review of the remedial actions implemented at the Refuse Hideaway Landfill (RHL) Superfund Site in Middleton, Wisconsin. The U.S. Environmental Protection Agency (U.S. EPA) Region 5 was involved as the support agency for this five-year review. The review was conducted between August 2006 and June 2007, with the results documented in this report. The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. Methods, findings, and conclusions of the review are documented in five-year review reports. In addition, five-year review reports identify any issues or problems found during the review and make recommendations to address them.

This review is required by statute. Five-year reviews must be implemented consistently with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA 121(c), as amended, states:

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

The NCP Part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR) states:

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

This is the first five-year review for the RHL site, triggered by the Remedial Action Start date of September 19, 2002. Due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure, this five-year review is required.

2.0 SITE CHRONOLOGY

Table 1 - RHL Site Chronology

Date	Event
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 RI/FS at RHL, WDNR nominates the Site for U.S. EPA's Superfund National Priorities List (NPL) of hazardous waste sites.
October 14, 1992	RHL Site was declared "final" on U.S. EPA's NPL.
February 17, 1993	U.S. 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 downgradient 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	U.S. EPA completed an Explanation of Significant Difference (ESD) to document that (based on the 1998 groundwater data) it is not necessary to implement groundwater extraction and treatment.
September 30, 1998	U.S. 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	U.S. 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 RD.
September 19, 2002	U.S. 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.

3.0 BACKGROUND

3.1 Physical Characteristics

The RHL Site is located 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). 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.

3.2 Land and Resource Use

Municipal, commercial and industrial wastes were placed in the 1.2 million cubic yard landfill, which is 23 acres in area. The area surrounding RHL 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 improvements construction company, which serves as a storage area for trucks and construction equipment. A Christmas tree farm is located adjacent to the north and west sides of the landfill property. Over the past 5 years, residential development has increased in the area, being currently as close as 1/2 mile to the northeast of the Site. A six-unit retail/commercial condominium building was recently completed 1/4 mile to the south of the Site. A large residential subdivision has been proposed for the property southeast, east, and northeast of the Site, but has not yet been developed. A 300 acre former seed farm southwest and west of the Site has been purchased by Dane County for use as a park for recreational purposes only.

3.3 History of Contamination

The landfill operated for 14 years between 1974 and 1988. Approximately 1.2 million cubic yards of waste were disposed during its operational history. 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.

In 1986, as the landfill neared its capacity, preparatory work was initiated to shut down operations at the Site. The presence of leachate seeps in 1986 and operational problems at the Site prompted the WDNR to begin regulatory actions against the owner. 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. Site characterization and subsequent Site monitoring during remedy design, construction, and operation has confirmed that Polychlorinated Biphenyls (PCBs) are not present.

3.4 Initial Response

In early 1989, the State of Wisconsin undertook investigation and remediation of the Site and assumed responsibility for all operation and maintenance and groundwater monitoring activities. Costs for this work were paid by the State of Wisconsin's Environmental Fund.

In September 1989, the State implemented a number of actions designed to remediate the immediate problems of methane gas and leachate migration from the landfill, of private water supply contamination at three wells, and of groundwater contamination

attributable to the Site. WDNR installed landfill gas and leachate extraction systems, started long-term operation and maintenance of the gas and leachate extraction systems, repaired the landfill cap, monitored for methane gas migration, particularly at private homes, provided bottled water to affected residences in addition to having installed point-of-entry (POE) water treatment systems for two private water supply wells, tested private water supplies within one mile of the landfill (including tests for metals, semi-volatile compounds, pesticides and PCBs), performed groundwater studies (including model simulations and characterization of contaminant plume migration), and started long-term groundwater monitoring at the Site.

In 1991, the WDNR tried to enter into an agreement with a group of PRPs to undertake an RI/FS. After reviewing data from the Site, the WDNR recommended to U. S. EPA that the Site be included on the NPL. The site was listed on the NPL in October 1992. A Cooperative Agreement was signed between U.S. EPA and WDNR in April 1993 that allows the WDNR to act as lead agency in performing an RI/FS pursuant to Sec. 144.442, Wisconsin Statutes (now renumbered as Sec. 292.31 Wisconsin Statutes) and CERCLA. The RI/FS for this site was financed by the federal Superfund program. The WDNR secured a consultant, Hydro-Search, Inc., and the RI/FS began in October 1993.

The RI for RHL was completed in September 1994 and the FS was completed in February 1995. The WDNR issued a ROD in June 1995, which set forth the selected remedial action for the Site. The final Site remedy, as set forth in the ROD, included: a limited action for source control (landfill cap repair and upgrade), groundwater extraction and treatment with re-injection of the groundwater back into the aquifer, and the installation of individual water treatment units at selected residences, as necessary.

Based on information developed during the Remedial Design, U.S. EPA completed an Explanation of Significant Difference (ESD) in September 1998, documenting that groundwater extraction and treatment was not necessary. In September 1998, U.S. EPA also issued a PCOR that documented the completion of construction activities for the work required by the ROD.

3.5 Enforcement History

The presence of leachate seeps in 1986 and operational problems at the Site prompted the WDNR to begin regulatory actions against the owner. The Site was closed under court order in 1988 when VOCs were discovered in private wells southwest of the Site. In December 1988, the State entered Special Consent Order SOD-88-02A in court against the site owner John DeBeck. In January 1989, John DeBeck declared bankruptcy, and in March 1989, Dane County Circuit Court issued a Contempt Order to John DeBeck for failure to comply with the Special Consent Order. Because of the Site owner's bankruptcy status, WDNR hired a contractor in September 1989, using the State of Wisconsin Environmental Fund, to undertake investigation work at the Site with the eventual goal of implementing a Site remedy.

Between 1989 and 1991, the State worked on identifying PRPs to implement a final remedy for the Site. In March 1991, the State sent Special Notice and Information Request Letters to a group of PRPs. Subsequent negotiations failed to establish an agreement to undertake an RI/FS, and in September 1991, WDNR nominated the Site for U.S. EPA's Superfund National Priorities List (NPL) of hazardous waste sites.

After the Site was placed on the NPL, U.S. EPA issued a General Notice of Liability, also known as a CERCLA Section 122(a) Determination Letter, to Site PRPs in February 1993. Several agencies of the State of Wisconsin had been shown to have sent wastes to the RHL Site, so the State was one of the recipients of this letter.

In April 1993, a Cooperative Agreement was signed between the Agencies defining WDNR as lead agency for the RI/FS. Federal resources were obtained and in October 1993, WDNR secured a consultant to begin the RI/FS.

In April 1997, an Administrative Order on Consent (AOC) was signed with some of the PRPs for performance of the Remedial Design and O&M activities at the Site. In July 1998, the Remedial Design was completed which demonstrated that groundwater contamination had decreased below the1995 ROD action levels. Because contaminant levels had decreased, it was unnecessary to implement the groundwater extraction and treatment component of the selected remedy in order to protect human health and the environment. Based on the Remedial Design monitoring data, in September 1998, U.S. EPA issued an ESD to document the decision not to implement groundwater extraction and treatment at the Site.

In the 1980s, the owner of the Site property was Refuse Hideaway, Inc., as indicated on property deeds. John DeBeck, who died in August of 1998, was either the sole stockholder, or one of the stockholders, of this corporation. The corporation was dissolved by the Wisconsin legislature in 1990. With the continuing implementation of the remaining Remedial Action work, the State controls Site security and access. The State is currently investigating the history of ownership of the Site property in order to adequately implement Institutional Controls (ICs). Thomas DeBeck, son of John DeBeck, was also associated with Refuse Hideaway, Inc in an unknown manner. He is the owner of Speedway Sand & Gravel, Inc., a company that operates a construction equipment storage facility adjacent to the Site. This company continues to forward to the State the equivalent of the rent that was paid to the corporation, when it existed, as part of an agreement with the corporation. Forwarding of the rental amount is required by a March 17, 1989 contempt order issued to John W. DeBeck and Refuse Hideaway, Inc. Current ownership status of the Site property is unknown.

In May 2000, U.S. EPA issued a Special Notice letter to Site PRPs (including the State of Wisconsin) to undertake the remaining Remedial Action work at the Site. Between 2000 and 2001, negotiations resulted in the State offering to continue performing Remedial Action work as a Settling Performing Defendant using resources provided by other PRPs in the group. In August 2001, the Consent Decree (CD) for Remedial

Action was entered in U.S. District Court (Western District of Wisconsin) between U.S. EPA and the State of Wisconsin.

The CD provided for payment from other PRPs into the State's Environmental Fund for WDNR's continued implementation of RA work. The CD also established a Special Account for U.S. EPA to receive a lump-sum payment to serve as contingency in the event that unforeseen work by U.S. EPA is needed at the Site. WDNR has successfully continued effective implementation of the Site remedy since 2001 with no unusual fluctuations of State funding levels for the Fund. The U.S. EPA Special Account has not been utilized and remains at a level adequate for Site contingencies.

3.6 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 the 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 environmental exposure pathway is summarized below, with the current status as influenced by the operating remedy.

a. 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 collects landfill gas and reduces 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 also 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 2002 to 2006 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.

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.

b. 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 have current POE treatment systems that have been in operation since 1990 and are the responsibility of the State. The third well supplied a home and farm buildings that have been vacant since 1998 and have since been demolished. This five-year review 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 two existing POE units, groundwater does not currently pose a public health hazard to nearby residences 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. The two POE treatment units have been properly maintained by the State since 2000 and therefore remove all remnant contaminants from the water. Although VOCs are still being detected in the unfiltered water, sampling and analysis data over the past 6 years shows a reduction in the off-site 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.

As early as 1995, there was a proposal to develop more than 200 private homes on the parcel of land adjacent to Refuse Hideaway to the east and northeast. In recent years, there has been new residential development approximately 1 mile northeast of the Site, and several new residences have recently been constructed within 1/2 mile of the Site to the northeast. Because Site groundwater flows to the southwest, any private wells in areas to the north and east are and will be located upgradient of the existing contamination. Consistent with s.NR 812.12(3), Wis. Admin. Code., 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 around the Site to contact

WDNR for a specific well casing depth requirement. This ensures that any new well will avoid the zone of potentially contaminated groundwater.

One new well that supplies a commercial condominium building was recently installed 1/4 mile south of the Site. Consistent with its Site maintenance and monitoring procedures, WDNR was involved in the design of this well, and required additional well casing depth requirements to avoid the contamination in the shallower portion of the aquifer.

c. 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.

d. 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 five-year review, 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 ROD and modified in 1998, may present an imminent and substantial endangerment to public health, welfare, or the environment.

4.0 REMEDIAL ACTIONS

4.1 Remedy Selection

With the exception of the deed restriction/zoning modifications and warning signs, 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;
- operation and maintenance of the existing landfill gas extraction and destruction system and of the leachate extraction and off-site treatment and disposal system;
- groundwater monitoring on and near the Site;
- maintenance of existing POE systems at private wells; and
- installation of a POE system for any private well exhibiting contaminants with concentrations exceeding NR 140 Enforcement Standards (Federal MCLs).

The Remedial Action Objectives (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 ARARs;
- attain NR 140 PALs for all groundwater impacted by the RHL at and beyond the landfill boundary;
- reduce the potential for exposure to contaminants in groundwater; and,
- provide potable water to residences with contaminated water.

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 by the Wisconsin Division of Public Health and the WDNR to be protective of human health. The Preventive Action Level (PAL) is used to identify potential contamination problems. An exceedance of the PAL is not necessarily an indication of short or long term health hazards. These State groundwater goals are consistent with the NCP Section 300.430(a) (1) (iii) (F) which states that U.S. EPA expects to return groundwater at the Site to beneficial use wherever practicable, within a time frame that is reasonable given particular circumstances of the Site. In 1995, the contaminants of concern exceeded NR 140, Wis. Adm. Code Enforcement Standards (equal to Federal MCLs) beyond the landfill boundary. Iron and manganese also exceeded NR 140 Enforcement Standards; however, exceedances beyond the landfill boundary are primarily due to high concentrations occurring naturally in this area.

As noted previously in this document, groundwater extraction with re-injection of treated water was deemed unnecessary and an ESD was issued in 1998. As required by the 2001 Remedial Action Consent Decree, the State of Wisconsin is successfully implementing all other 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 is currently researching the ownership of the Site property and is pursuing the implementation (development and recording) of proprietary Institutional Controls that would run with the land.

Reviews every 5 years of remedy performance are necessary, and are required by CERCLA, in order to evaluate all remedial actions undertaken at the Site compared to the cleanup objectives. These reviews provide recommendations regarding improvements, additions, or adjustments to implemented remedial actions and examine a remedy's progress toward achieving cleanup objectives.

4.2 Remedy Implementation

a. 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 downgradient of the landfill in approximately 15 to 30 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 the groundwater contaminants will consistently meet the ROD's remedial action objectives.

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 Enforcement Standards (Federal MCLs) or that are imminently at risk of becoming contaminated above NR 140 ESs.

Table 2 provides a summary of data that shows the reduction of contaminant concentrations in groundwater that has occurred over the past 4 years. A discussion of the ongoing groundwater monitoring is included in Section 4.4.a of this report.

b. Source Control Action

i. 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 3 provides a summary of data that shows the amount of leachate that was collected at the Site over the past 4 years. The landfill cap is effective in reducing infiltration of precipitation, hence leachate production. A discussion of O&M of (and improvements to) the landfill cap, leachate collection, and landfill gas collection systems is included in Section 4.4.b of this report. Operational issues with the landfill cap are discussed in Section 8.0 of this report.

ii. 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 placed 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 4 provides a summary of data that shows contaminant concentrations that exist in Site leachate have always been within acceptable limits for treatment by the MMSD. A discussion of O&M of (and improvements to) the landfill cap, leachate collection, and landfill gas collection systems is included in Section 4.4.b of this report. Operational issues with leachate collection pumps and piping are discussed in Section 8.0 of this report.

iii. 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 five-year review and Table 5 provides a summary of data that shows that the collection efficiency for the landfill gas system has been within 80 to 88 percent for the past few years. A discussion of O&M of (and improvements to) the landfill cap, leachate collection, and landfill gas collection systems is included in Section 4.4.b of this report. Operational issues with landfill gas collection piping and the ground flare are discussed in Section 8.0 of this report.

4.3 Institutional Controls

Institutional controls (ICs) are required to ensure the protectiveness of the remedy. ICs are non-engineered instruments, such as administrative and legal controls that help to minimize the potential for human exposure to contamination and that protect the integrity of the remedy. ICs are required to assure the long-term protectiveness for any areas which do not allow for unlimited use or unrestricted exposure (UU/UE), and are required also to maintain the integrity of the remedy.

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. 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 15 to 30 years, and the landfill cap is required to remain intact in perpetuity. The Site property boundary is the area that will be covered by a restrictive covenant that will be recorded as required by the RA Consent Decree for the Site. The restrictions will state 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, with consultation by U.S. EPA. Compliance with these restrictions is necessary for the remedy to remain protective of human health and the environment. The Site property is currently zoned for agricultural use but is not being used for that purpose.

Initial IC evaluation activities have revealed that additional steps must be taken to evaluate the protectiveness of ICs. IC evaluation activities involve preparation of IC maps, performing title work to assess ownership and inconsistent encumbrances, and planning for IC implementation for on and off-site and long-term Site stewardship. The State has agreed to work with U.S. EPA to conduct IC evaluation activities to assure that all non UU/UE areas will be covered by ICs and that implementation of ICs will be effective.

IC evaluation activities are in progress. The State is currently researching the ownership of the Site property and is pursuing the implementation (development and recording) of these types of use restrictions. In addition, WDNR will be working with U.S. EPA to implement an approach to have Site ICs benefit from Wisconsin environmental restrictive covenant statutes, which provide for WDNR to enforce necessary land and water use restrictions or limitations pursuant to Wisconsin Administrative Code chapters NR 700-736 and s.292.12, Wis. Stats.

a. Land Use Restrictions. 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. employees. Other access is restricted by topography. The gate is checked as part of the Site operations contractor's weekly duties. The IC Plan will discuss obtaining Site boundary maps that outline the Site land and groundwater use

restriction boundaries for the RHL Site. These maps may include global positioning system (GPS) and metes and bounds maps that depict and describe areas where use restrictions are appropriate until the Site remedy performance standards are met. Conditional on the results of the land ownership research, a restrictive covenant on the Site property and on Site groundwater will be implemented and recorded with the Dane County Register of Deeds and will include a declaration that it runs with the land. Restrictions for the Site will prevent development and use of site real estate for purposes prohibited by State regulations, will prevent use of groundwater within the boundary of the Site property, and will assure the integrity of the landfill and other components of the remedial action. The State has examined property records at the Dane County Register of Deeds Office and has found no recorded encumbrances that may allow potential uses of the Site inconsistent with the restrictions to be recorded. Additional title work such as a title search or commitment may be performed at a later date to confirm and document these findings. If the land ownership research shows potential problems with the use of a restrictive covenant or inconsistent prior recorded land interests, other institutional control options will be considered.

b. Groundwater Use and Restrictions. The ROD states that groundwater use restrictions are necessary to prohibit use of the groundwater that may interfere with the remedy. Consistent with the Site inspection made by WDNR and U.S. EPA, there is no current groundwater use at the Site. The restrictive covenant that will be recorded for the Site property will prohibit use of the property that may cause exposure to contaminated groundwater that may present a health risk, will prohibit interference with the remedy, and will prohibit residential or commercial use on Site. According to the Site inspection made by WDNR and U.S. EPA, the uses of the Site are currently consistent with these restrictions.

The State has developed a groundwater plume contamination map (Figure 6) that shows areas affected by groundwater contamination. The groundwater down-gradient of the Site contains contaminants that exceed State of Wisconsin 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 requirement notice.

Restrictive covenants will be implemented on the Site. The restrictive covenant to be recorded by the State will declare that it runs with the land. The State has examined property records at the Dane County Register of Deeds Office and has found no recorded encumbrances that may allow potential uses of the Site inconsistent with the restrictions to be recorded. Additional title work such as a title search or commitment may be performed at a later date to confirm and document these findings. In addition, WDNR will be working with U.S. EPA to implement an approach to have Site ICs benefit from Wisconsin environmental restrictive covenant statutes, which provide for WDNR to enforce necessary land and water use restrictions or limitations pursuant to Wisconsin Administrative Code chapters NR 700-736 and s. 292.12, Wis. Stats. For the areas off of the Site impacted by groundwater contamination, proprietary controls such as restrictive covenants or other ICs such as governmental controls will be explored.

c. IC Plan. An IC Plan is required for this Site and will be developed by WDNR and U.S. EPA in accordance with the schedule included in this report as Table 8. That IC Plan will contain a schedule of regular reviews of ICs implemented and maintained by the State of Wisconsin as required by the 2001 Remedial Action Consent Decree. In developing the IC Plan, U.S. EPA and WDNR will review the implementation, maintenance, and monitoring of RHL ICs. The IC Plan will discuss obtaining a Site boundary map that outlines the Site land and groundwater use restriction boundaries for the RHL Site. Groundwater use restrictions may include existing or potential new off-site users of groundwater. Also long-term stewardship procedures shall be reviewed. This is to include planning for long-term stewardship to ensure effective ICs are maintained and monitored. A plan shall be developed (or the Site O&M plan updated) to include procedures to ensure long-term IC stewardship such as regular inspection of ICs at the site and annual certification to U.S. EPA that ICs are in place and effective. Also, use of a communications plan and use of one-call system shall be explored. An annual update on the status of the RHL ICs will be included with the annual reporting for the Site. The report will include compliance information regarding the implemented Site ICs. The IC Plan, implemented ICs, and future IC analysis memos will be reviewed by attorneys for the State of Wisconsin and U.S. EPA Region 5. The ICs will become part of the RHL Site Administrative Record. Restrictions will be appropriately communicated to the public as part of IC implementation.

Table 6 - Institutional Controls Summary Table
Refuse Hideaway Landfill; Middleton, Wisconsin

Media, Engineered Controls and Areas that do not support UU/UE* for Current Conditions	IC Objective	IC Instrument Implemented
RHL Site boundary (approx. 23 acres); On-site soil contamination. Multi-media landfill cap, landfill gas and leachate collection system, and ground flare. Property ownership unknown. There is no cracking, sliding, settlement of cap or other indicators of cap breaches. There is no evidence of exposure.	- Prohibits use of land within the Site property boundary and assures integrity of landfill cap, landfill gas and leachate collection system, ground flare, and 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.	Deed Restriction: Owner's Declaration of Restrictions on Current and Future Uses (to be implemented). Restrictive Covenant to restrict current and future use (not yet in place but is in process). WDNR is authorized to enforce State statutes Wisconsin Administrative Codes NR 700-736 and s.292.12, Wis. Stats. regarding long term effectiveness. An IC implementation and monitoring plan will be developed within six months to address the long term protectiveness of the remedy and prevent exposure to contaminants. WDNR monitors the Site to guarantee there is no disturbance of the Site cap, as required in Paragraphs 12, 47, and 48 of the RA Consent Decree, including removal of deep rooting vegetation.
RHL Site boundary (approx. 23 acres): Groundwater that exceeds groundwater cleanup standards. Groundwater monitoring wells, annual sampling and analysis. Property ownership unknown. The lateral extent of the plume continues to remain stable and contaminant levels continue to slowly decrease. There is no evidence of exposure.	- Prohibits use of groundwater underlying the Site, and assures integrity of landfill cap by preventing installation of new wells that could breach the cap. - Limit well installation to prevent groundwater use.	Deed Restriction: Owner's Declaration of Restrictions on Current and Future Uses (to be implemented). Restrictive Covenant to restrict current and future use (not yet in place but is in process). WDNR is authorized to enforce State statutes Wisconsin Administrative Codes NR 700-736 and s.292.12, Wis. Stats. regarding long term effectiveness. Any new wells on-site can not be installed without WDNR approval. An IC implementation and monitoring plan will be developed within six months to address the long term protectiveness of the remedy and prevent exposure to contaminants. WDNR monitors the Site to observe the decrease in contaminant levels, as required in Paragraphs 12, 47, and 48 of the RA Consent Decree.

Table 6 - Institutional Controls Summary Table
Refuse Hideaway Landfill; Middleton, Wisconsin

Media, Engineered Controls and Areas that do not support UU/UE* for Current Conditions	IC Objective	IC Instrument Implemented
Ground-water and Real Estate Use: Off-site groundwater. Point of Entry Treatment Systems and annual sampling and analysis. 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. There Is no evidence of an exposure.	- Prohibits use of untreated off-site groundwater that contains contaminants at levels above Wisconsin ESs. - Regulate well installation within a one mile radius of the Site to prevent use of untreated groundwater that contains contaminants at levels above Wisconsin ESs.	Proprietary Controls such as Deed Restrictions: Owner's Declaration of Restrictions on Current and Future Uses, or Alternative ICs such as governmental controls (under consideration). Restrictive Covenant or alternative ICs to restrict current and future use (not yet in place but will be evaluated). WDNR is authorized to enforce State statutes Wisconsin Administrative Codes NR 700-736 and s.292.12, Wis. Stats. regarding long term effectiveness. All proposed new wells within a one mile radius of the Site are required to have WDNR and Dane County Dept. of Human Services' Groundwater Protection Program approval before installation. An IC implementation and monitoring plan will be developed within six months to address the long term protectiveness of the remedy and prevent exposure to contaminants. WDNR monitors off-site groundwater to observe the decrease in contaminant levels and to ensure appropriate water treatment is being implemented where needed, as required in Paragraphs 12, 47, and 48 of the RA Consent Decree.

* Unlimited Use / Unlimited Exposure

4.4 System Operations/Operation and Maintenance (O&M)

WDNR oversees an environmental contractor that performs remedy repair, upkeep, and O&M of the gas and leachate systems and the landfill cover. Weekly activities being performed at the Site include operation, inspection, repair, and maintenance of the following: blower/flare control panel station, leachate tank, gas and leachate branch monitoring stations, flare inlet pipe, and the blower inlet pipe. Monthly activities that occur at the Site include operation, inspection, repair, and maintenance of the gas/leachate extraction wells, gas probes, well pumps/controls, branch monitoring stations, flare inlet pipe, buried control valves, compressor (oil change, etc.), pneumatic system, blower drive belts, and landfill surface (including fencing). Quarterly activities that occur at the Site include operation, inspection, repair, and maintenance of the gas/leachate branch valves, well valves, compressor valves, ground flare manual valve, compressed air filter, air dryer desiccant, and blower. Annual activities that occur at the Site include operation, inspection, repair, and maintenance of the well pumps, leachate lines, condensate driplegs, system cleanouts, tank load-out station, and site padlocks.

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. During the five year reporting period for this review, repairs and improvements were made to improve performance of the system. The leachate collection system continues to be operable, several leachate pumps were replaced in 2006, and leachate collection piping is cleaned annually.

a. 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.

A review of groundwater monitoring data collected since 2003 found that 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 some contaminants are still present at unacceptable levels near the landfill. Table 2 provides a summary of data for monitoring wells on and off-site that show a general downward trend of contaminant concentrations.

b. Source Area Response Operations

i. Landfill Cap. The clay and soil cap is inspected throughout the year for areas of erosion and stressed vegetation. Generally, the cover is well-vegetated, with no significant erosion. The cover is typically mowed on a biennial basis, or more frequently if necessary. In 2003, it was observed that differential settlement of waste fill material created low areas in the cover that allowed small areas of water to collect in the spring. In August 2003, three of these low areas were filled with fine-grained soil, regraded to match the surrounding grade, and reseeded. In addition, several linear mounds of dirt and associated erosion gullies on the south slope of the landfill were graded to blend in with surrounding grades and then reseeded. Since 2001, no stressed vegetation has been observed at the RHL Site.

ii. Landfill Leachate Collection and Transportation Off-Site for Disposal. Leachate header pipes are cleaned annually. In 2004, the following repairs and improvements were made to the system:

- replacement of the compressor motor;
- replacement of the compressor pump;
- replacement of a faulty valve; and
- replacement of an air hose at extraction well GW-4.

In 2005 and 2006, the following repairs and improvements were made to the system:

- new air-line filters at each of the leachate extraction wells were installed;
- new leachate pump (compressed air) meters were installed at each of the leachate extraction wells;
- a failed meter for the leachate system air compressor was replaced due to normal wear;
- a new pneumatic leachate pump was installed in extraction well GW-10 based on greater than expected leachate build-up; and,
- seven leachate pumps at other extraction wells were replaced.

Due to drought conditions that resulted in a water table commonly below pump activation levels in the winter months of 2006, some leachate pumps did not immediately activate after water levels rose with spring precipitation. Many pumps had significant scale build-up from approximately ten years of operation that hardened with drought conditions. An attempt was made to clean these pumps, but reinstalled cleaned pumps failed to function properly. Two pumps (GW-12 and GW-13) were destroyed during inspection and removal efforts because their casings had been damaged by differential landfill settling. Seven pumps were replaced in November 2006; all leachate pumps are now operational.

Since the start of the current 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 have been no problems noted in that procedure. Table 4 shows that operations at the RHL Site have been in compliance with MMSD requirements for the past few years.

iii. 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. Repairs and improvements made in 2005 resulted in improved performance of the system. In 2005 and 2006, the following repairs and improvements were made to the system:

- replacement of all air control valves at individual well heads due to normal wear;
- replacement of air sampling ports at gas extraction wells;
- replacement of a meter that measures cumulative operation time for the gas extraction blower;
- replacement of linkages for control valves CV-1 and CV-2. These control valves are used to redirect gas flow from the different branches of subsurface header pipes;
- replacement of the flame temperature recorder due to wear;
- the southern branch drip leg piping was partially excavated and inspected to determine if the drip leg was functioning properly. The drip leg was functioning properly and did not appear to be the source of south branch gas flow problems discovered in 2006;
- replacement of clogged pre- and post-blower flame arrestors, which operated normally since 1991 and had recently become clogged;
- replacement of a thermal (safety) valve in the flame trap assembly was replaced due to melting caused by a unique event of the combination of low methane concentration and increased oxygen;
- replacement of leaking gas extraction hoses at extraction well GW-5 and tightening the associated air-line fittings;
- replacement of a pressure switch on the air compressor;
- replacement of leaking flexible hose sections at extraction wells GW-12 and GW-13 headers with the addition of PVC elbows to lessen the stress on the hose sections;
- tightening of a loose hose connection at extraction well GW -9; and,
- replacement of a leaking pneumatic filter bowl assembly at extraction well GW-9.

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. The gas probe monitoring data indicates that landfill gas is migrating only a short distance in only one area and only seasonally from the landfill. Ground flare operational data have been assessed for this five-year review and Table 5 provides a summary of data that shows collection efficiency at 80 to 88 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. Operational issues with landfill gas collection piping and the ground flare are discussed in Section 8.0 of this report.

c. 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 approximately $100,000, but fluctuate depending on the degree of repair/upgrade to remedy components implemented throughout the year.

5.0 PROGRESS SINCE LAST FIVE YEAR REVIEW

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

6.0 FIVE YEAR REVIEW PROCESS

6.1 Administrative Components

The RHL Site five-year review was prepared by Harlan (Hank) Kuehling, Hydrogeologist and Project Manager for the Wisconsin Department of Natural Resources (WDNR). John V. Fagiolo, Remedial Project Manager with the U.S. EPA Region 5 Superfund Division also assisted in the review. The five-year review consisted of a Site inspection and review of relevant documents. The completed report will be made available in the Site information repository for public view.

6.2 Community Notification and Involvement

The completed five-year review report will be available in the Site information repository and the U.S. EPA website for public view. An advertisement notice regarding the five-year review process was placed in the Wisconsin State Journal newspaper for public review on May 12, 2007, and is included as an attachment to this report. No public comments regarding the five-year review have been received.

Community relations ongoing at the Site include participation by WDNR in meetings held by residential developers and local government officials to discuss the potential of development near the Site. As part of POE unit maintenance, WDNR regularly checks on residences that were supplied with POE units, and discusses any problems with those community members most near the Site. As part of weekly Site operations, the contractor performing the work for WDNR regularly observes the Site and surrounding areas and communicates regularly to WDNR regarding any potential problems.

6.3 Document Review

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

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

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

c. "Predesign And Additional Studies Report: Refuse Hideaway Landfill," dated July 1998.

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

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

f. Record of Decision, signed June 28, 1995.

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

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

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

j "Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources," Guidance # AP 42, Fifth Edition, dated November 1998.

k. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources; 2003 Annual Report," dated February 13, 2004.

l. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources 2004 Annual Report," dated January 24, 2005.

m. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources 2005 Annual Report," dated January 27, 2006.

n. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources 2006 Annual Report," dated January 23, 2007.

6.4 Data Review

The operation and maintenance monitoring program that is implemented at the RHL Site allows assessment of the operational effectiveness of the landfill gas collection and ground flare system and the leachate collection and treatment system. WDNR staff review monthly contractor reports on the 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 O&M data also indicate that the landfill continues to produce landfill gas amounts adequate to keep the system operating almost 100% of

each year. Gas generation rates are much higher and more consistent than predicted for this time in the life of the landfill.

Long-term maintenance and regular inspection of the landfill cap completed in 1989 is required and implemented to ensure that the remedy remains effective, and ensures containment of Site waste material. Landfill cap maintenance involves inspection and repair of any soil burrowing or erosion locations, and mowing of the landfill surface biennially or as needed. No cap maintenance has been needed since 2003 to control erosion and improve surface drainage.

When WDNR reviewed recent annual groundwater monitoring data compared against 1998 contaminant data, the Agency found 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). WDNR 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 29 ug/L in November 2006.

6.5 *Site Inspection*

The RHL Site is visited weekly by the operations contractor managed by WDNR (Liesch Environmental Services), the WDNR project manager at least once every 3 months, and by the U.S. EPA Remedial Project Manager once every few years.

A Site inspection for this five-year review was completed by WDNR and U.S. EPA on May 22, 2007. Hank Kuehling of WDNR and John Fagiolo of U.S. EPA performed the Site inspection. Site access is available through a locked gate which encloses the Site landfill and the treatment building. The five-year review Site inspection checklist was used as a guideline for the RHL Site inspection, and is included as Appendix C of this report. The capped landfill surface, as well as all extraction well heads located on the landfill cap surface, was visually inspected. The Site perimeter (fence line) was also visually inspected. The ground flare/blower building and all equipment contained therein was inspected. Representatives of the Agencies traveled by automobile to visually inspect monitoring well locations in outlying areas, including residential and commercial buildings near the Site. The operations contractor, Liesch Environmental Services, was consulted by telephone as needed to clarify any Site issues identified by the Agencies.

The landfill was found to be in good condition during the inspection with adequate grassy vegetation on the cap. There were no signs of excessive erosion, although

some slight wear was noticeable on the south side of the cap. The Site showed no signs of any vandalism or other disturbances. The access fence was properly in place, with the ground flare operating properly. All Site areas were clean and free of debris. All extraction and monitoring well locations appeared intact, including vehicular barriers and padlocks.

The completed Site Inspection Checklist is included as Appendix C. Issues discovered during the five-year review inspection are included in Section 8.0 of this report.

7.0 TECHNICAL ASSESSMENT

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

Yes. Except for Institutional Controls, components of the remedy selected by the 1995 ROD, as modified by the 1998 ESD, have been constructed and remain functional, operational, and effective. The implemented remedy does not yet achieve the Remedial Action Objectives because long-term achievement of the WDNR NR 140 groundwater Enforcement Standard (ES) within the site boundary is not yet accomplished and Institutional Controls have not yet been implemented. The remedy is considered protective in the short term, however, because there is no evidence that there is current exposure: there is no cracking, sliding, settlement of the cap or other indicators of cap breaches; landfill gas and leachate is successfully being collected and adequately treated or disposed of; and residential POE systems are adequately maintained. However, in order for the remedy to remain protective in the long term, ICs that prevent disturbance of the cap, landfill gas/leachate collection systems, and the ground flare must be in place. An IC implementation and monitoring plan will be developed within six months to address the long term protectiveness of the remedy and prevent exposure to existing contaminant levels. 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 should contain any soil contamination and ensure that no excess human health risks develop. Groundwater monitoring data was 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 downgradient 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 Institutional Controls 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 that prevent disturbance of the cap, landfill gas/leachate collection systems, and the ground flare, as envisioned in the 1995 ROD, must be put in place. An IC implementation and monitoring plan will be developed within six months to address the long term protectiveness of the remedy and prevent exposure to existing contaminant levels.

A restrictive covenant for the Site property is being developed by the State of Wisconsin to prevent development and use of land within the Site property, preventing use of groundwater on-site, preventing unacceptable use of groundwater off-site (if needed), to assure the integrity of the landfill and other components of the remedial action, and to restrict any land use that will interfere with the remedial action. These restrictive covenants are best efforts and are to remain in place to prevent property access and groundwater use in relation to the remedial action. If land ownership research shows potential problems with the use of a restrictive covenant or inconsistent prior recorded land interests, other institutional control options will be considered. Although the ICs are not fully implemented, the objectives of the ICs are being met. No inappropriate Site or media uses have been noted via the Site inspection or interviews.

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 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. The State is pursuing re-zoning of Site property consistent with IC requirements. WDNR and U.S. EPA will examine ways to benefit from State statutes Wisconsin Administrative Code [NR 700-736, NR 140, and Act 418], regarding long term effectiveness.

7.2 Question B: Are the assumptions used at the time of remedy selection still valid?

Yes. Changes in Standards To Be Considered: Standards outlined in the 1995 ROD as modified by the 1998 ESD are still valid at the RHL Site. When implemented, Site ICs will remain effective under: the 2001 RHL Site RA Consent Decree, documents specifying the manner in which the Settling Performing Party will perform the Remedial Action, and Site IC restrictive covenants that will be implemented.

Changes in Exposure Pathways: No changes in the Site conditions that affect exposure pathways were identified as part of the five-year review. There are no current or known planned changes in the Site land use. The groundwater monitoring program adequately assesses the Site groundwater plume.

Changes in Risk Assessment Methodologies: Risk assessment methodologies used at the RHL Site since the 1995 Record of Decision have not changed, and do not call into question the protectiveness of the remedy.

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

No.

Technical Assessment Summary. Except for Institutional Controls and achievement of ESs, according to data reviewed and the Site inspection, the remedy is substantially functioning as intended by the 1995 ROD, as modified by the 1998 ESD, the 2001 RHL Site RA Consent Decree, and the documents specifying the manner in which the Settling Performing Party will perform the Remedial Action. There have been no changes in the physical conditions at the Site, standards, contaminant toxicity or exposure pathways that would affect the protectiveness of the remedy. There is no additional information has been identified that would call into question the protectiveness of the remedy.

8.0 ISSUES

Because of all repair, replacement, and improvement activity that took place from 2003 to 2006, there are few technical issues at the RHL Site. Issues at the RHL Site have been identified from annual reports developed since 2002 and the May 22, 2007 Site inspection.

a. South branch extraction wells GW-1, GW-2, and GW -3 have occasionally exhibited low flows and varying pressure since August 2004. It is possible that low spots are present in the south branch of the gas collection header pipe, allowing liquid to pool and thus block gas flow. These low spots are apparently the result of differential settling occurring in this portion of the landfill. Corrective action has been taken, including pumping liquid out of the line at the GW-1, GW-2, and GW-3 locations and excavating and repositioning the header between GW-4 and GW-5, but these actions have not completely remedied the situation. This blockage to gas conveyance must be located and removed by restoring proper slope to the pipe.

b. Visual inspections of the landfill surface did not reveal significant erosion concerns or stressed vegetation, but low vegetative growth was observed in the southern portion of the landfill in the vicinity of GW-1, GW-2, and GW-3.

c. Little to no methane was detected in the G-1, G-2, and G-11 well nests. The highest readings were during the summer months with little to no methane detected during the winter months.

d. Institutional Controls for the RHL Site as required by the 1995 ROD are not in place.

Table 7 summarizes all issues identified in this five-year review that impact protectiveness.

Table 7- Issues that Impact Protectiveness
Refuse Hideaway Landfill; Middleton, Wisconsin

Issue	Currently Affects Protectiveness (Y/N) Y=Yes; N=No	Affects Future Protectiveness (Y/N) Y=Yes; N=No
1. Low flows at south branch gas/leachate extraction wells GW-1, GW-2, and GW-3, possibly due to low spots caused by differential landfill settling.	N	Y
2. Low vegetative growth in the southern portion of the landfill near GW-1, GW-2, and GW-3.	N	Y
3. Little to no methane detected in G-1, G-2, and G-11 well nests, especially during the winter months.	N	Y
4. Institutional Controls for the RHL Site as required by the 1995 ROD are not in place.	N	Y

9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

a. It is necessary to excavate and re-grade gas header piping from GW-4 to GW-1 and repair the line from GW-1 to DL-1.

b. Low vegetative growth in the southern portion of the landfill in the vicinity of GW-1, GW-2, and GW-3 should be investigated. It may be necessary to re-seed, water, and fertilize small portions the area.

c. Low methane production may be associated with the limited gas flow in the southern branch of landfill gas collection piping. It is possible that waste fill material in the landfill

has slowed its decomposition and may be generating less gas. The situation should be monitored, especially after the repair noted in Paragraph 9.0.a is completed.

d. The State is currently researching the ownership of the Site property and is pursuing the implementation (development and recording) of several use restrictions. The IC Plan will discuss obtaining Site boundary maps that outline the Site land and groundwater use restriction boundaries for the RHL Site. These maps may include global positioning system (GPS) and metes and bounds maps that depict and describe areas where use restrictions are appropriate until the Site remedy performance standards are met. Conditional on the results of the land ownership research, a restrictive covenant on the Site property and on Site groundwater use will be put in place and recorded with the Dane County Register of Deeds. The restrictive covenant to be recorded by the State will declare that it runs with the land. The State has examined property records at the Dane County Register of Deeds Office and has found no recorded encumbrances that may allow potential uses of the Site inconsistent with the restrictions to be recorded. Additional title work such as a title search or commitment may be performed at a later date to confirm and document these findings. If the land ownership research shows potential problems with the use of a restrictive covenant or inconsistent prior recorded land interests, other institutional control options will be considered, such as changing the zoning on and around the Site property from agricultural to industrial. The State will also develop a groundwater plume contamination map that shows areas affected by groundwater contamination on the Site and that they are within the groundwater use restriction boundary area. An IC Plan is required for this site and will be developed by WDNR and U.S. EPA.

Table 8 summarizes the Recommendations and Follow-Up Actions needed to adequately address the issues shown in Section 8.0, with a schedule for implementation.

Table 8 - Recommendations and Follow-up Actions
Refuse Hideaway Landfill; Middleton, Wisconsin

Issue	Recommendations & Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N) Y=Yes; N=No	
					Current	Future
1. Low flows and varying pressure at GW-1, GW-2, and GW -3.	- Short Term: Pump liquid out of piping at GW-1, GW-2, GW-3 locations.	WDNR	U.S. EPA	Sept. 2008	N	Y

Issue	Recommendations & Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N) Y=Yes; N=No	
					Current	Future
1. (cont'd.) Low spots present in the south branch of the gas collection header pipe due to differential landfill settling.	- Long Term: - Excavate landfill cap to locate low spots.	WDNR	U.S. EPA	Dec. 2008	N	Y
	- Re-install piping with proper slope to the pipe, and restore that section of landfill cap.	WDNR	U.S. EPA	Dec. 2008	N	Y
2. Low vegetative growth was observed in the southern portion of the landfill in the vicinity of GW-1, GW-2, and GW-3.	- Re-grade and seed, water, and fertilize the area.	WDNR	U.S. EPA	Nov. 2008	N	Y
3. Little to no methane was detected in the G-1, G-2, and G-11 well nests, especially during the winter months	- Document methane production to determine if decomposition of waste fill material is naturally slowing.	WDNR	U.S. EPA	Dec. 2008	N	Y
4. Institutional Controls for the RHL site as required by the 1995 ROD are not in place. Also, ICs may be required for the down-gradient groundwater. Implementing, maintaining and monitoring effective ICs is required to assure protectiveness of the remedy.	- Provide an IC Plan, including special consideration of the homes downgradient of the Site that have POE units. The IC Plan will outline a course of action for IC activities including IC evaluation activities, IC implementation, and long-term stewardship.	U.S. EPA and WDNR	U.S. EPA	Mar. 2008	N	Y

10.0 PROTECTIVENESS STATEMENT(S)

The remedy at the Refuse Hideaway Landfill Site currently protects human health and the environment in the short term because: 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 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 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 would allow human exposure; and (3) restrict use of groundwater until groundwater cleanup standards are achieved throughout the plume area. Long-term protectiveness requires compliance with effective ICs. Long-term protectiveness will be assured by conducting IC evaluation activities and implementing ICs, along with evaluating long-term stewardship procedures. Long-term stewardship will assure that effective ICs will be maintained and monitored.

11.0 NEXT REVIEW

U.S. EPA performs statutory reviews on remedies selected that result in hazardous substances, pollutants or contaminants remaining at sites above levels that allow for unlimited use and unrestricted exposure. Since hazardous substances, pollutants or contaminants are contained and will potentially remain above State of Wisconsin and U.S. EPA regulatory standards in the future, the RHL Site will require ongoing Five-Year Reviews. Therefore, another report is scheduled to be completed five years after the signature date of this five-year review, in 2012.

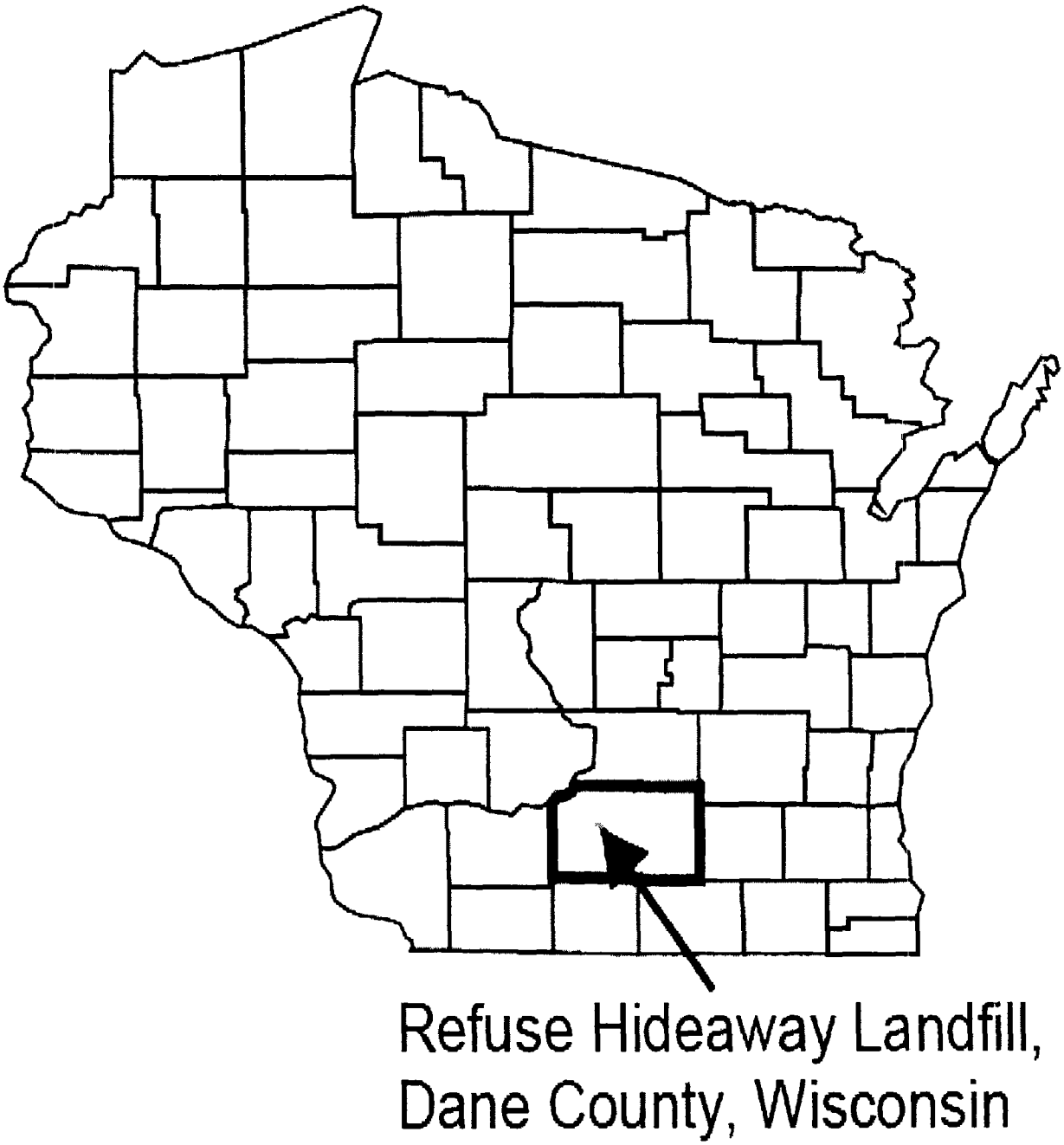

FIGURE 1: Site Location Map; State of Wisconsin

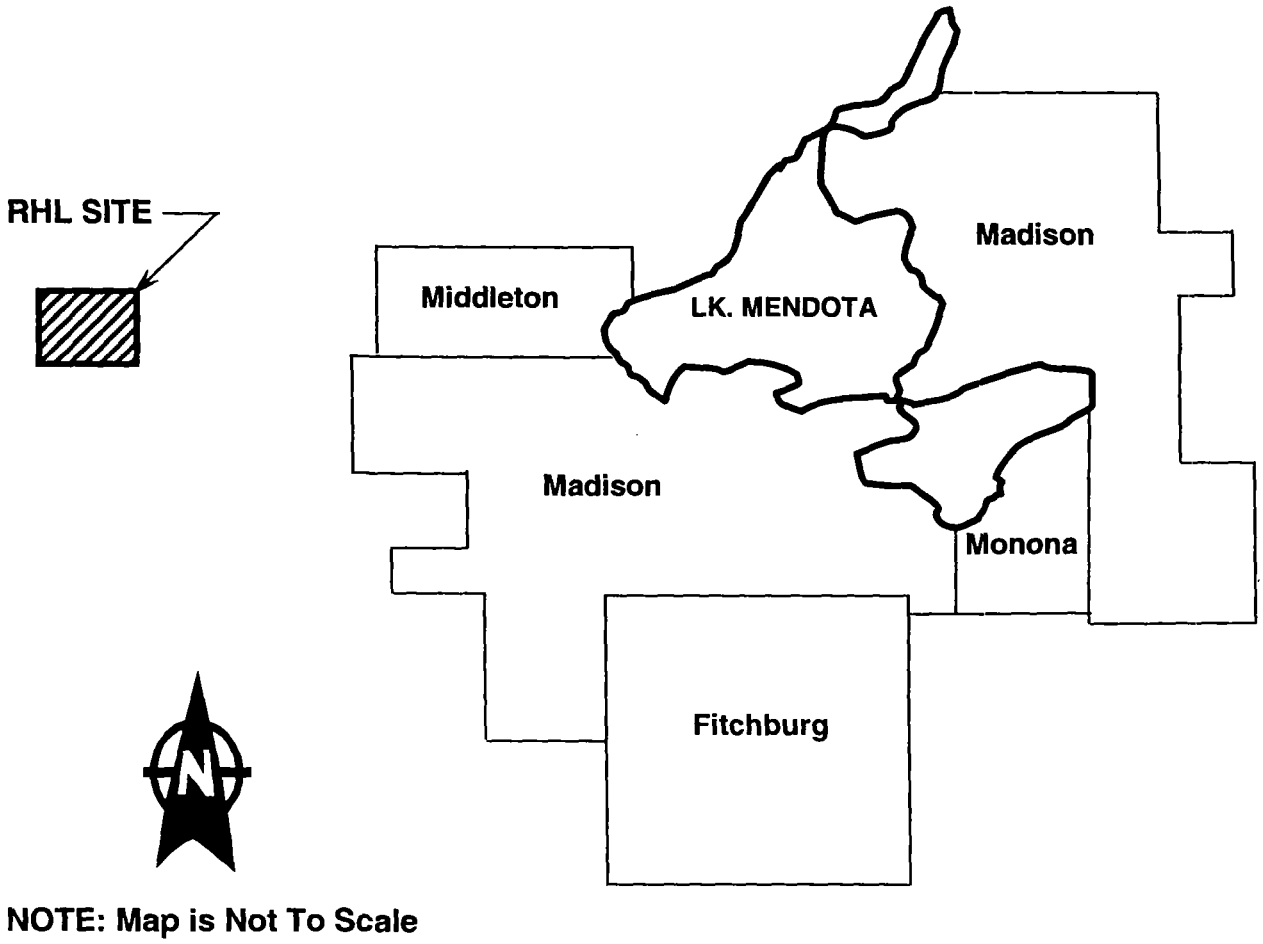

FIGURE 2: - Site Location Map (Local)

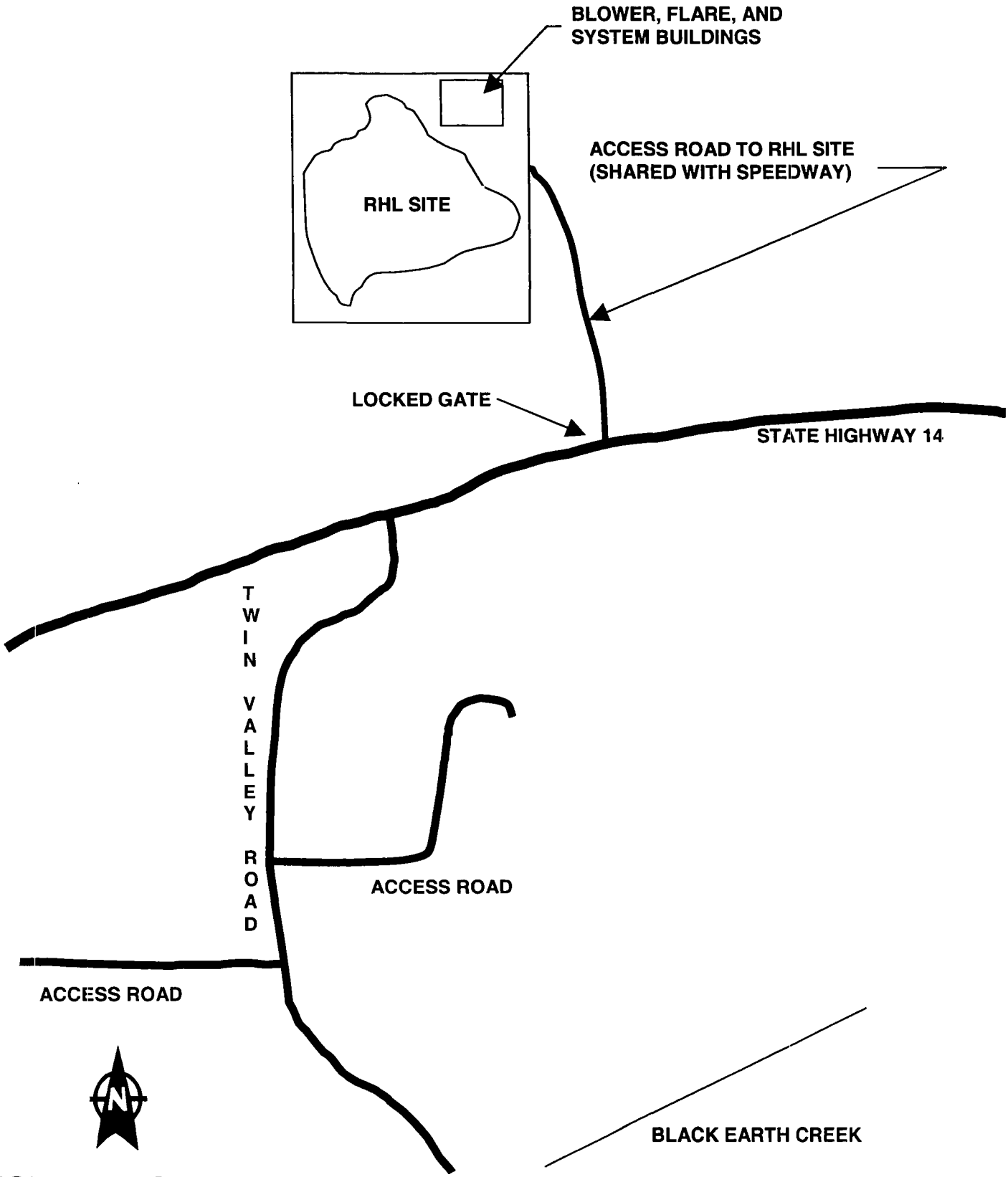

FIGURE 3: Site Layout

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.

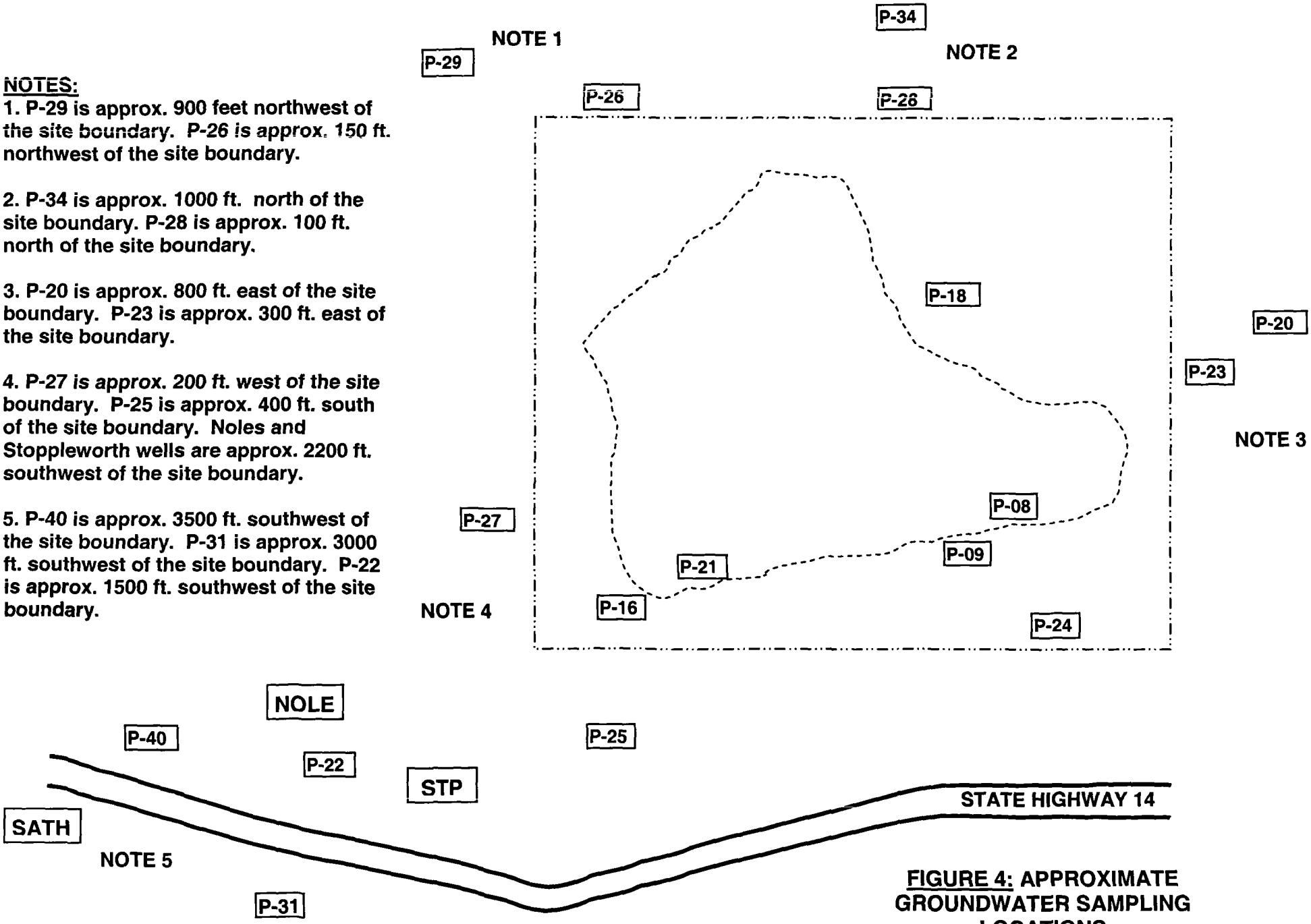

FIGURE 4: APPROXIMATE GROUNDWATER SAMPLING LOCATIONS (Not To Scale)

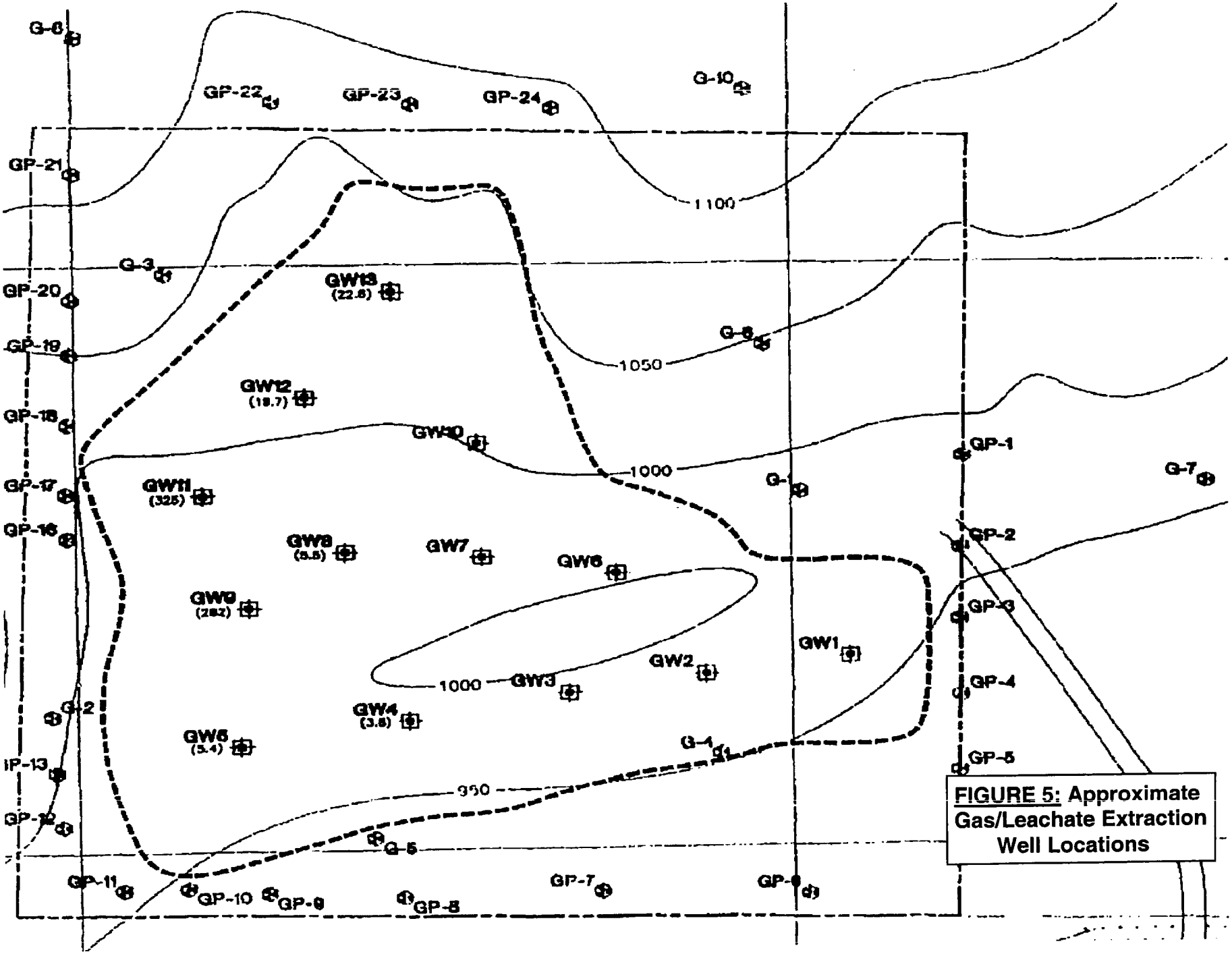

FIGURE 5: Approximate Gas/Leachate Extraction Well Locations

FIGURE 6 - Approximate Site Plume Boundary Map

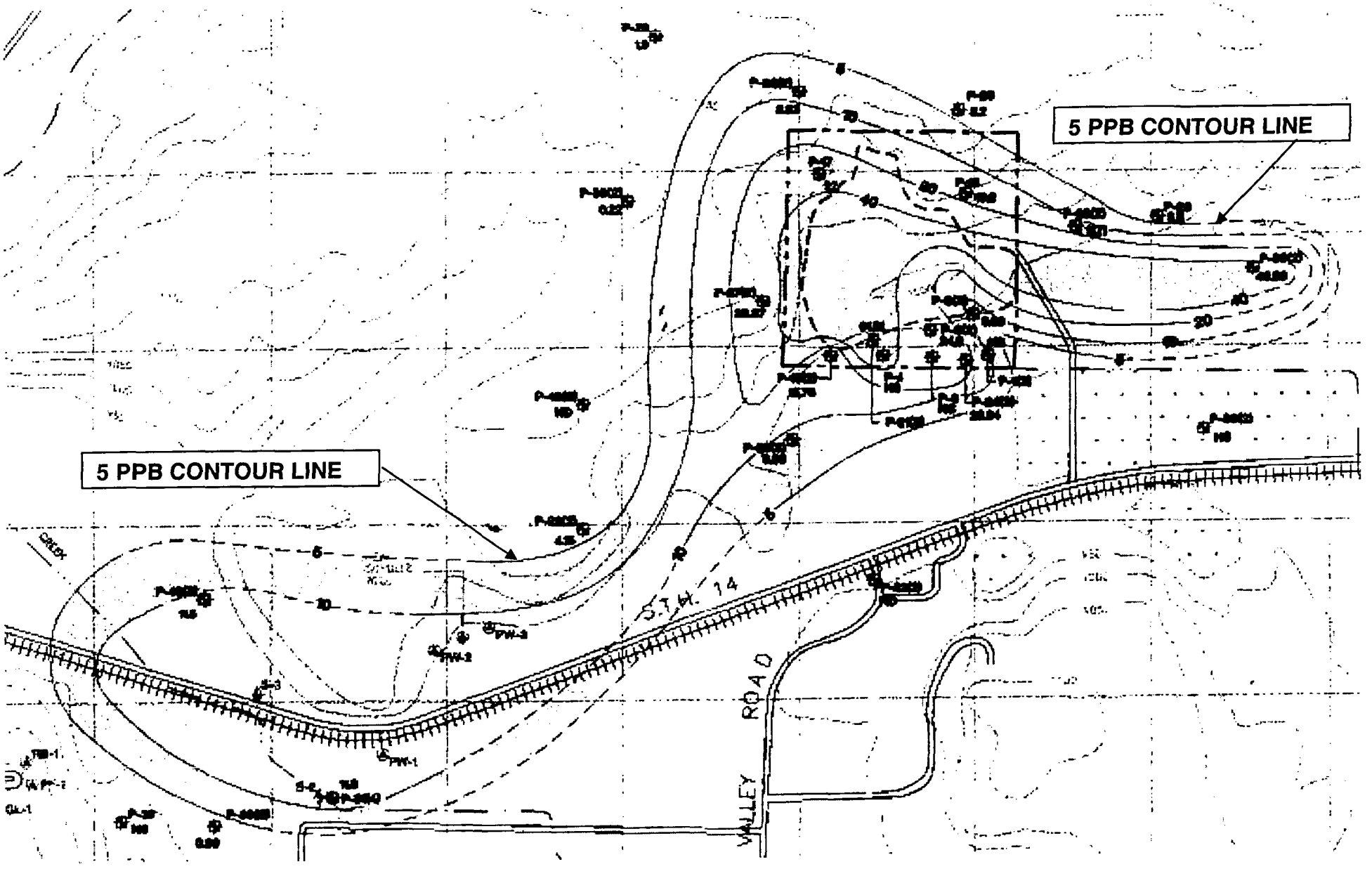

FIGURE 7: Approximate Institutional Control Area.
NOTE: Figure is not to scale.

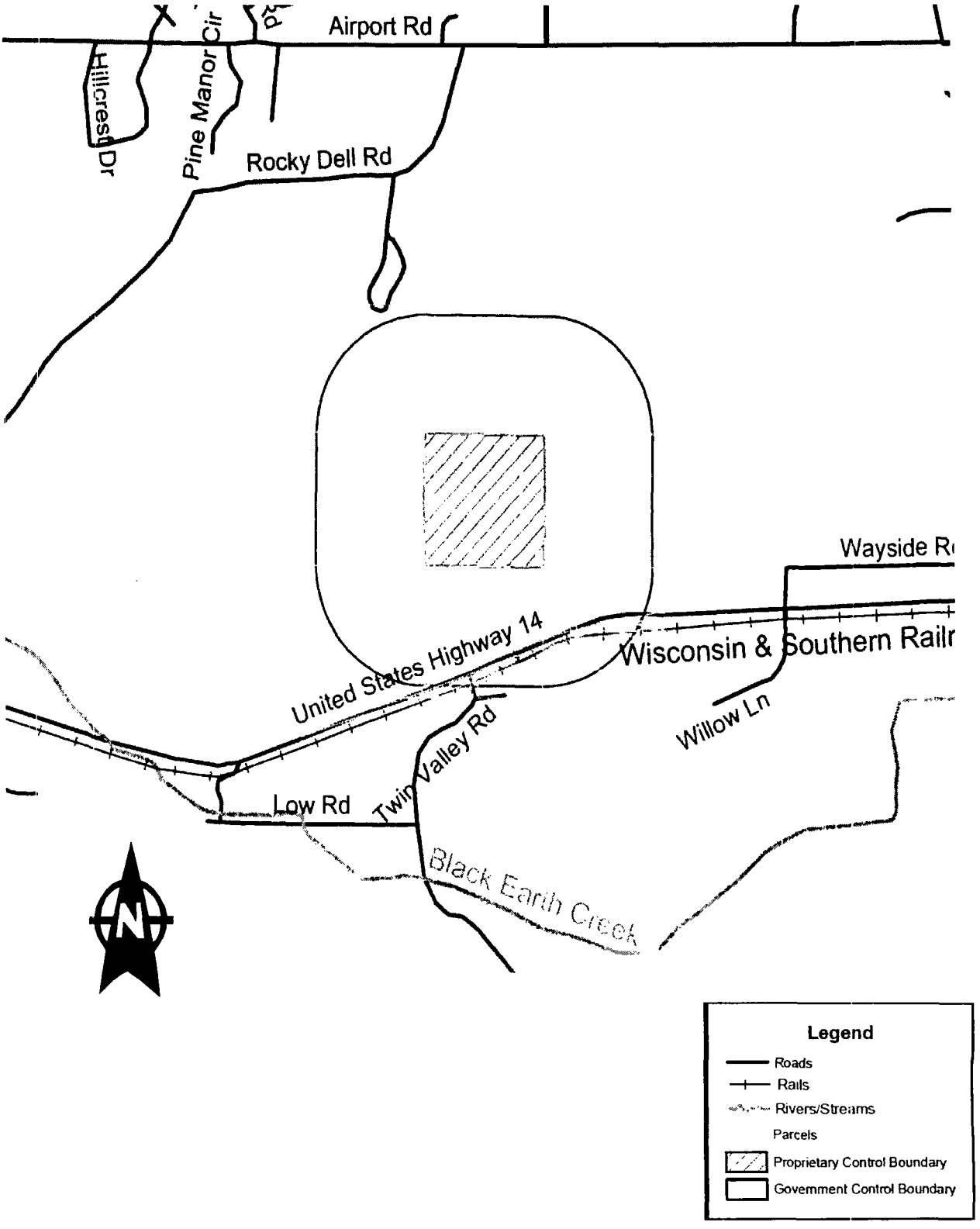

Table 2 - Summary of Groundwater Data [1]
Refuse Hideaway Landfill
Middleton, Wisconsin

Well Number	Contaminant [2]	Year	Concentration (ug/L, a.k.a. ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-08S [3]	Tetrachloroethylene [5]	1991	7	5
		1998	2.5	
		2006	1.3	
P-08D [4]	Trichloroethylene	1988	45	5
		1998	1.6	
		2006	0.91	
P-09S	Tetrachloroethylene	1988	70	5
		1991	16	
		1998	2.9	
		2006	0.93	
P-09D	1,2- Dichloropropane	1998	2.8	5
		2006	1.7	
	Benzene	1998	3.3	5
		2006	1.4	
	Trichloroethylene	1988	36	5
		2006	0.94	
	Vinyl Chloride	1991	32	0.2
		2006	0.9	
P-16S	Dichloromethane [6]	1988	1.0	5
		2006	1.2	
P-16D	1,2-Dichloropropane	1998	1.2	5
		2006	0.78	
	Benzene	1998	6.1	5
		2006	2.3	
	Dichloromethane	1998	1.0	5
		2006	1.2	
	Trichloroethylene	1998	11	5
		2006	2.5	
	Vinyl Chloride	1998	7.1	0.2
		2006	1.3	
P-18S	Tetrachloroethylene	1998	11	5
		2006	7.8	
	Trichloroethylene	1998	2.2	5
		2006	1.4	
P-20SR [7]	Tetrachloroethylene	1998	3.7	5
		2006	2.6	
P-21D	1,2-Dichloropropane	1998	2.1	5
		2006	0.54	
	Benzene	1998	1.8	5
		2006	0.66	
	cis 1,2-Dichloroethene	1998	120	70
		2006	27	

Table 2 - Summary of Groundwater Data [1]
Refuse Hideaway Landfill
Middleton, Wisconsin

Well Number	Contaminant [2]	Year	Concentration (ug/L, a.k.a. ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-21D (cont'd.)	Dichloromethane	1988	3.7	5
		2006	1	
	Vinyl Chloride	1998	16	0.2
		2006	3.1	
P-22S	Tetrachloroethylene	1998	2.9	5
		2006	0.68	
P-22E	Tetrachloroethylene	2005	1.31	5
		2006	3.9	
	Trichloroethylene	2005	0.62	5
		2006	1.1	
P-22D	Tetrachloroethylene	1998	6.4	5
		2005	2.4	
		2006	3.1	
	Trichloroethylene	1998	1.8	5
		2005	0.65	
		2006	0.66	
P-23S	Tetrachloroethylene	1998	4.6	5
		2006	1.6	
P-23D	Tetrachloroethylene	1988	2.3	5
		2006	1	
P-24E	Vinyl Chloride	2004	4.1	0.2
		2006	5.7	
P-24D	Vinyl Chloride	1998	2.2	0.2
		2006	3.2	
P-26S	Tetrachloroethylene	1998	33	5
		2006	16	
	Trichloroethylene	1998	5.1	5
		2006	2.3	
	Vinyl Chloride	1998	4	0.2
		2006	0.56	
P-26D	Tetrachloroethylene	1998	17	5
		2006	1.8	
P-27S	Tetrachloroethylene	1998	30	5
		2006	10	
	Trichloroethylene	1998	4.7	5
		2006	1.7	
P-27D	Tetrachloroethylene	1998	54	5
		2006	10	
	Trichloroethylene	1998	8.4	5
		2006	2.1	
P-29S	Chloromethane	1994	0.6	
		2006	0.32	

Table 2 - Summary of Groundwater Data [1] Refuse Hideaway Landfill Middleton, Wisconsin				
Well Number	Contaminant [2]	Year	Concentration (ug/L, a.k.a. ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-29S (cont'd.)	Tetrachloroethylene	1998	0.9	5
		2006	0.75	
P-31IA	Tetrachloroethylene	1998	13	5
		2006	4.8	
	Trichloroethylene	1998	3.3	5
		2006	1.4	
P-31IB	Tetrachloroethylene	1998	13	5
		2006	5.3	
	Trichloroethylene	1998	3.6	5
		2006	1.6	
P-34S	Dichloromethane	1995	2	5
		2006	1.9	
P-40I	Tetrachloroethylene	1998	9.2	5
		2006	4.6	
	Trichloroethylene	1998	2.5	5
		2006	1.3	
NOLES [8] (formerly Schultz)	*Dichloromethane*	*1996*	*0.14*	5
		2006	4.1	
SATHER	Dichloromethane	1996	0.14	5
		2006	4.3	
STOPPLEWORTH [8]	Tetrachloroethylene	2004	3.3	5
		2006	2.9	
	Trichloroethylene	2004	0.85	5
		2006	0.63	

TABLE 2 FOOTNOTES

[1] The summary of groundwater data is for those contaminants that continue to be present at potentially unacceptable levels as shown in the 2006 annual report for the site.

[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.

[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 with Point of Entry Water Treatment Systems.

Table 3
Summary of Landfill Leachate Production
Refuse Hideaway Landfill
Middleton, Wisconsin

Year	Gallons of Leachate Collected
2003	184,600
2004	232,000
2005	75,314
2006	175,336
Total	667,250

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

Table 4 - Summary of Contaminants in Landfill Leachate
Refuse Hideaway Landfill; Middleton, Wisconsin

	PARAMETER										
	Cadmium	Total Chromium	Hexavalent Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc	Cyanide
Permitted Levels =>	**250**	**10000**	**500**	**1500**	**5000**	**20**	**2000**	**300**	**3000**	**8000**	**100**
DATE											
9/30/2003	<0.88	54		8	<2.2	<0.030	150	<8.0	<1.8	54	
10/9/2003			<260,000								5.8
2/23/2004	<0.53	30	<270	24	<1.3	<0030	93	<4.8	6.5	40	16
8/5/2004	<0.17	21	<27	4.1	1.9	<0.028	54	6.5	0.21	19	15
11/4/2004	<1.7	33	<2.7		2.8	<0.30		13	<0.49		5.4
12/21/2004	<1.7	52	<2.7	8.6	5.4	<0028	180	21	<0.49	36	91
3/31/2005	0.68	15	<2.7	6.9*	12	<0.028					5.5
6/30/2005	<1.00	12.8	<40	6.20	1.70	<0.07	40.5	16.7	<1.00	458	7
9/21/2005	<1.00	17.8	<40	13.5	8.30	<0.07	46.5	20.1	4.20	95.1	<5
11/16/2005	<1.00	14.2	<40	3.04	<1.50	<0.07	44.6	31.6	5.20	<10.0	10
2/9/2006	<1.00	16.3	<40	<3.00	<1.50	<0.07	59.3	28.8	<1.00	17.9	17
5/18/2006	<1.00	24.4	<40	3.40	<1.50	<0.07	38.3	21.1	1.32	8.0	9

Notes:

Blank cell indicates parameter not analyzed.

All values are shown in ug/L = micrograms per liter, or parts per billion.

Table 5 - Collection Efficiency of Landfill Gas Collection System
Refuse Hideaway Landfill; Middleton, Wisconsin

Gas Extraction Well	Avg.% Methane at Well for Time Period	Month-Year	Avg. % Methane at Blower (Vacuum)	
GW1	18.6	Jul-03	40.6	**July 2003 to June 2004**
GW2	37.3	Aug-03	40.8	
GW3	48.2	Sep-03	36.2	
GW4	39.7	Oct-03	34.1	
GW5	54.4	Nov-03	39.4	
GW6	34.6	Dec-03	37.4	
GW7	43.6	Jan-04	33.2	
GW8	53.9	Feb-04	34.4	
GW9	61.6	Mar-04	35.0	
GW10	28.3	Apr-04	33.9	Avg. Approximate% Methane Delivered by System to Flare
GW11	56.4	May-04		
GW12	42.0	Jun-04	37.6	
GW13	41.2			
Avg% Methane at Wells →	43.06 %	Avg.% Methane at Blower →	36.60 %	36.60 / 43.06 = 0.85 x 100% = 85 %
GW1	53.2	Jul-04	41.5	**July 2004 to June 2005**
GW2	54.3	Aug-04	43.5	
GW3	51.2	Sep-04	46.7	
GW4	38.0	Oct-04	43.9	
GW5	45.6	Nov-04	45.4	
GW6	44.3	Dec-04	35.8	
GW7	31.0	Jan-05	32.0	
GW8	35.6	Feb-05	33.0	
GW9	40.1	Mar-05	41.0	
GW10	31.6	Apr-05	34.0	Avg. Approximate% Methane Delivered by System to Flare
GW11	44.3	May-05	30.0	
GW12	34.2	Jun-05	17.3	
GW13	40.7			
Avg % Methane at Wells →	41.85 %	Avg.% Methane at Blower →	37.01 %	37.01 / 41.85 = 0.88 x 100 % = 88 %
GW1	32.4	Jul-05	27.3	**July 2005 to June 2006**
GW2	32.4	Aug-05	23.6	
GW3	26.3	Sep-05	23.6	
GW4	17.8	Oct-05	16.6	
GW5	39.8	Nov-05	26.9	
GW6	38.5	Dec-05	19.6	
GW7	26.8	Jan-06	17.4	
GW8	31.0	Feb-06	17.8	
GW9	35.5	Mar-06	19.4	
GW10	13.0	Apr-06	22.3	Avg. Approximate% Methane Delivered by System to Flare
GW11	35.0	May-06	32.7	
GW12	15.5	Jun-06	29.0	
GW13	28.2			
Avg % Methane at Wells →	28.60 %	Avg.% Methane at Blower →	23.02 %	23.02 / 28.60 = 0.80 x 100 % = 80 %

Appendix A - List of Documents Reviewed

Five Year Review Report

Refuse Hideaway Landfill Superfund Site
Middleton, Wisconsin

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

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

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

c. "Predesign And Additional Studies Report: Refuse Hideaway Landfill," dated July 1998.

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

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

f. Record of Decision, signed June 28, 1995

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

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

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

j. "Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources," Guidance # AP 42, Fifth Edition, dated November 1998.

k. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources; 2003 Annual Report," dated February 13, 2004

l. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources 2004 Annual Report," dated January 24, 2005.

m. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources 2005 Annual Report," dated January 27, 2006.

n. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources 2006 Annual Report," dated January 23, 2007.

Appendix B - Five Year Review Advertisement

WDNR Conducting 5-Year Review of Refuse Hideaway Landfill

The Wisconsin Department of Natural Resources (WDNR) is conducting a 5-Year Review of remediation activities at the Refuse Hideaway Landfill Superfund Site. This review will continue until July 2007. The purpose of the review is to determine if the control of the sources of contamination of the site has remained effective and if no new problems have occurred. The U.S. Environmental Protection Agency (EPA) is also involved as the support agency for this 5-Year review.

The site is a 23 acre landfill located in a semi-rural portion of the Town of Middleton that was the disposal site for municipal, commercial, and industrial waste landfill. In 1988 the property owner closed the landfill under a court order and in 1989 WDNR (using the State of Wisconsin's Environmental Fund) undertook the continued remediation and investigation of the site as well as all operation and maintenance activities. The State implemented a number of actions to remediate the release of groundwater contaminants and landfill gas from the landfill, including installation and long term operation and maintenance of landfill gas and leachate extraction systems, repairs of the landfill cap, and long term groundwater monitoring. From 1991 to 1994 WDNR and EPA listed the site on the Superfund National Priorities List, negotiated with Potentially Responsible Parties (PRPs), and completed a Remedial Investigation / Feasibility Study. A Record of Decision was issued in June 1995, and in 1998 a Remedial Design was completed. In 2001, a Consent Decree for Remedial Action was executed that provided payment from some PRPs to establish an account to keep the remedy maintained and operating. WDNR has operated and maintained the remedy since then.

The public is invited to comment on the current condition of the landfill. Written and oral comments must be submitted no later than June 15, 2007, and should be directed to:

Hank Kuehling
Hydrogeologist and Project Manager
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711
harlan.kuehling@wisconsin.gov
Phone: (608) 275-3286

Appendix C - Completed Site Inspection Checklist

Site Inspection Checklist

I. SITE INFORMATION	
Site name: REFUSE HIDEAWAY LANDFILL	**Date of inspection: MAY 22, 2007**
Location and Region: MIDDLETON, WISCONSIN. U.S. EPA REGION 5	**EPA ID: WID980610604**
Agency, office, or company leading the five-year review: WISCONSIN DEPT. OF NATURAL RESOURCES	**Weather/temperature: SUNNY, WINDY, 73 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:** **Josh Davenport** **Liesch Env. Services Project Mgr.** _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☒ by phone Phone no. 608-223-1532

   Problems, suggestions:
   Individual was contacted for clarification regarding monthly and annual reports on Landfill Gas collection and ground flare systems. Individual was contacted to confirm that all appropriate O&M and OSHA training and safety documents are readily available at the local Liesch Environmental Services office in Madison, Wisconsin. WDNR consults with Liesch at a minimum monthly.

   b. **O&M staff:** **Frank Perugini** **Env. Sampling Corp. Owner** _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☒ by phone Phone no. 414-427-5033

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

   ☐ 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 _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions:
NOTE: Interviews were not conducted with any local regulatory authorities and response agencies. No comments were received by WDNR as a result of the May 12, 2007 public notice, and no problems were reported to WDNR in the past 5 years.
☐ Report attached _____

4. **Other interviews** (optional)

John Fagiolo, U.S. EPA Remedial Project Manager. The U.S. EPA RPM was present for the May 22, 2007 site inspection. WDNR interviewed the RPM regarding guidance and current U.S. EPA policies for conducting a five year review. In addition, WDNR interviewed the RPM to determine if any problems or other issues for the RHL site were brought to U.S. EPA'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 during the site inspection in an updated form, located on site in a weather proof container in the enclosed building for the site air compressor.**

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 during the site inspection in an updated form, located on site in a weather proof container in the enclosed building for the site air compressor.**

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 is the annual agreement for acceptance of landfill leachate by the Madison Metropolitan Sewerage District (MMSD) for treatment. This agreement is updated and revised annually.**

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 (Liesch). 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 the O&M contractor (ESC). 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 O&M contractor (Liesch). 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 (Liesch). 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 : **2002** (Date) To: **2007** (Date) ; **Approx. $100,000 annually, average** (Total cost) ☐ Breakdown attached

NOTE: **Average site annual costs are approximately $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. From 2002 to 2007, the average annual cost for O&M and site sampling contracts that were awarded was approx. $70,000 per year .**

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 State 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) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☒ No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☒ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☒ N/A
Other problems or suggestions: ☐ Report attached

NOTE: **Institutional Controls have not yet been implemented. The State of Wisconsin is currently researching the ownership of the site property and is pursuing the implementation (development and recordation) of land use restrictions such as restrictive covenants and deed notices.**

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

Remarks: **Institutional Controls have not yet been implemented. The State of Wisconsin is currently researching the ownership of the site property and is pursuing the implementation (development and recordation) of land use restrictions such as restrictive covenants and deed notices.**

D. General

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

Remarks: _____

2. **Land use changes on site** ☒ None ☐ N/A

Remarks: **No Land Use changes have occurred on the site.**

3. **Land use changes off site** ☐ None ☐ N/A

Remarks: **a. 300 acres of land west of the RHL site is currently owned by Dane County, which has designated it for recreational use only so that it will not be developed for residential purposes.**
b. A new retail/commercial building with business tenants has been constructed within the last year approximately 1/4 mile south of the site.

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_**Four low areas were filled, graded, and seeded in 2003.** _____

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_An erosional gulley was filled, regraded, and seeded in 2003_____

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.**

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 PALs 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 and institutional controls are not yet implemented. 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, ICs that prevent disturbance of the cap, landfill gas/leachate collection systems, and ground flare must be in place.

Except for institutional controls, the remedy selected by the 1995 ROD as modified by the 19998 ESD 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 implementation 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.