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THIRD FIVE-YEAR REVIEW REPORT FOR H.O.D. LANDFILL SUPERFUND SITE ANTIOCH, LAKE COUNTY, ILLINOIS

Prepared by

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

Richard C. Karl, Director
for **Superfund Division**

Date 9/24/2015

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LIST OF ACRONYMS

amsl	Above Mean Sea Level
BLRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DCE	Dichloroethylene
EC	Environmental Covenant
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
ESI	Expanded Site Inspection
FYR	Five-Year Review
GPD	Gallons per Day
ICs	Institutional Controls
IDPH	Illinois Department of Public Health
IEPA	Illinois Environmental Protection Agency
MCLs	Maximum Contaminant Levels
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCOR	Preliminary Closeout Report
ppb	Parts Per Billion
PRP	Potentially Responsible Party
RAOs	Remedial Action Objectives
RD/RA	Remedial Design/Remedial Action
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SVOCs	Semi-Volatile Organic Compounds
UAO	Unilateral Administrative Order
UECA	Uniform Environmental Covenants Act
ug/L	Microgram Per Liter
UU/UE	Unlimited Use and Unrestricted Exposure
VOCs	Volatile Organic Compounds
WMII	Waste Management of Illinois, Inc.

EXECUTIVE SUMMARY

This is the third Five-Year Review (FYR) for the H.O.D. Landfill Superfund Site (Site). The purpose of this FYR is to determine whether the remedy is, and will continue to be, protective of human health and the environment. The triggering action for this statutory FYR was the signing of the previous FYR on September 23, 2010.

The Site is located in the Village of Antioch (Village), east of McMillen Road and north of Route 173 in Lake County, Illinois. The Site is 121.5 acres and includes a closed 51-acre landfill, with two fill areas. The Village currently owns a portion of the Site and Waste Management of Illinois, Incorporated (WMII) owns the rest. WMII is currently leasing 40 acres of the Site to the Community High School District 117 to use for athletic fields. Permitted waste disposal activities began at the Site in 1963 and continued through 1984. During its time of operation, the landfill received solid waste and liquid hazardous waste. The primary contaminant found in groundwater at the Site is vinyl chloride, although subsequent investigations have revealed elevated levels of zinc, lead, cadmium, trichloroethylene, and total 1,2-dichloroethylene (DCE) in the groundwater; arsenic and semi-volatile organic compounds (SVOCs) in sediment; and methane gas with detectable concentrations of various volatile organic compounds (VOCs) in the landfill.

The components of the remedy for the Site were selected in the 1998 Record of Decision (ROD) and 2003 Explanation of Significant Differences (ESD) and included landfill cap improvements, enhanced gas collection and treatment, enhanced leachate collection, leachate treatment, monitored natural attenuation (MNA) of groundwater, and institutional controls (ICs). The ICs include deed restrictions to limit future use of the Site, along with groundwater use restrictions to prohibit private well installation and consumption for properties adjoining the Site. The Site achieved construction completion on June 29, 2001.

The remedy at the H.O.D. Landfill Site currently protects human health and the environment because it is functioning as intended. The landfill cap, landfill gas management system, and leachate collection and storage system are functional and meeting the objectives outlined in the ROD and ESD. An ordinance requires owners within the Village to use the Village's public water supply, but does not expressly prohibit the installation of private wells near the landfill Site. In order for the remedy to be protective in the long term, the following actions need to be taken: record environmental covenants (ECs); revise the IC Plan; address the leachate collection system to ensure it is functioning optimally; and monitor vinyl chloride in groundwater to assess whether improvements in the leachate collection system reduce releases from the landfill. Long-term protectiveness requires full implementation of and compliance with deed restrictions that prohibit interference with the landfill cap and other remedy components and prohibit well drilling or consumption of groundwater at the Site.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: H.O.D Landfill		
EPA ID: ILD980605836		
Region: 5	**State:** Illinois	**City/County:** Antioch/Lake County
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the site achieved construction completion?** Yes, on June 29, 2001	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Karen Mason-Smith		
Author affiliation: Remedial Project Manager		
Review period: September 29, 2014 through September 23, 2015		
Date of site inspection: October 30, 2014		
Type of review: Statutory		
Review number: 3		
Triggering action date: September 23, 2010		
Due date *(five years after triggering action date)*: September 23, 2015		

Five-Year Review Summary Form (continued)

Issues/Recommendations				
Issues and Recommendations Identified in the Five-Year Review:				
OU(s): 01/Sitewide	**Issue Category:** Remedy Performance			
	Issue: The leachate collection system is not functioning optimally. The system is designed to extract leachate, reduce leachate elevations within the landfill, and create an inward gradient of groundwater flow toward the center of the landfill.			
	Recommendation: Determine the cause(s) for the leachate collection system not functioning optimally and implement the appropriate actions to resolve the issue.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	09/30/2018
OU(s): 01/Sitewide	**Issue Category:** Remedy Performance			
	Issue: Vinyl chloride concentrations in groundwater are increasing and exceed the groundwater cleanup standards in the ROD in one or more monitoring wells, including well US03D, and well US03S was not sampled in April 2014.			
	Recommendation: Vinyl chloride and other VOCs should be monitored in wells US03D, US03S and other wells to assess whether improvements in the leachate collection system reduce releases from the landfill. If improvements to the leachate collection system do not address the issue, additional measures to address the contamination, such as modifying in-situ geochemical conditions to enhance biodegradation, should be evaluated.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	09/30/2020
OU(s): 01/Sitewide	**Issue Category:** Institutional Controls			
	Issue: ICs have not yet been fully implemented at the Site.			
	Recommendation: WMII and the Village should submit a revised IC Plan and record ECs reciting the restrictions the ROD requires. The Village should revise its groundwater ordinances to prohibit the installation of drinking water wells near the Site.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	09/30/2018

Protectiveness Statement(s)	
Operable Unit: 01/Sitewide	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The remedy at the H.O.D. Landfill Site currently protects human health and the environment because it is functioning as intended. The landfill cap, landfill gas management system, and leachate collection and storage system are functional and meeting the objectives outlined in the ROD and ESD. An ordinance requires owners within the Village to use the Village's public water supply, but does not expressly prohibit the installation of private wells near the landfill Site. In order for the remedy to be protective in the long term, the following actions need to be taken: record ECs; revise the IC Plan; address the leachate collection system to ensure it is functioning optimally; and monitor vinyl chloride in groundwater to assess whether improvements in the leachate collection system reduce releases from the landfill. Long-term protectiveness requires full implementation of and compliance with deed restrictions that prohibit interference with the landfill cap and other remedy components and prohibit well drilling or consumption of groundwater at the Site.	

I. INTRODUCTION

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

The United States Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, 42 U.S.C.§ 9621(c), and the National Contingency Plan (NCP). CERCLA Section 121(c) states:

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

EPA interpreted this requirement further in the NCP at 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which states:

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

EPA conducted this FYR on the remedy implemented at the H.O.D. Landfill Superfund Site in Antioch, Lake County, Illinois. EPA is the lead agency for developing and implementing the remedy for the Site. The Illinois Environmental Protection Agency (IEPA), as the support agency representing the State of Illinois, has reviewed all supporting documentation and provided input to EPA during the FYR process.

This is the third FYR for the Site. The triggering action for this statutory review is the previous FYR, which was completed on September 23, 2010. The FYR is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE). The Site consists of one operable unit (OU), which is addressed in this FYR. Background information about the Site is provided in Appendix A.

II. PROGRESS SINCE LAST REVIEW

Table 1: Protectiveness Determinations/Statements from the 2010 FYR

OU #	Protectiveness Determination	Protectiveness Statement
01/ Sitewide	Short-term Protective	The remedy is functioning as intended and is currently protective of human health and the environment, in the short-term. The final remedy has been fully implemented and MNA is working to reduce groundwater contamination. In 2009, vinyl chloride was not detected in the shallow groundwater monitoring wells. The 2009 analytical data also shows that MNA is providing an effective remedy for exceedances in the deep sand and gravel aquifer. The Village ordinances effectively limit the use of contaminated groundwater at and near the landfill Site. However, other ICs still need to be implemented. The Site fence, landfill cap and gas management system, leachate collection and storage system are functional and meeting the objectives outlined in the ROD. Long-term protectiveness of the remedy requires full implementation of and compliance with, IC restrictions that prohibit interference with the landfill cap and prohibit well drilling or consumption of affected groundwater until groundwater cleanup standards are achieved.

Table 2: Status of Recommendations from the 2010 FYR

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Party	Original Milestone Date	Current Status	Completion Date (if applicable)
01/ Sitewide	Settling on the tennis courts pavement in the western area of the landfill	Fill settled areas beneath the asphalt pavement or remove the tennis courts in the redeveloped western portion of the landfill.	WMII	EPA	09/30/2011	Completed	July 31, 2015
01/ Sitewide	Settling in the western area of the landfill	Monitor areas of ground settlement in the redeveloped western portion of the landfill to evaluate issues (e.g. drainage, compaction, cracks) that could impact the pavement and cap. Reseed all sparse vegetation areas at the site to prevent erosion.	WMII	EPA	Monthly monitoring ongoing during O&M inspections	Completed	March 15, 2011
01/ Sitewide	Sparse vegetation around the concrete vault in the northeastern area of the landfill	Reseed all sparse vegetation areas at the Site to prevent erosion.	WMII	EPA	06/30/2011	Completed	March 15, 2011
01/ Sitewide	The inward gradient is lagging behind in areas where leachate wells are present (GW29, LP10, GW21, GWF2, and GWF10).	Continue to increase the leachate withdrawal rates from the leachate wells to ensure the inward gradient is met by August 28, 2012.	WMII	EPA	Ongoing during O&M inspections	Ongoing	N/A
01/ Sitewide	Oxygen is leaking into the gas management system at several locations including GW-15, GW-17, GW-25, GW-32, LP-2, LP-3, and MH-3.	Evaluate the gas extraction wells/vaults for oxygen leakage.	WMII	EPA	Ongoing during O&M inspections	Completed	March 15, 2011
01/ Sitewide	Not all of the ICs are in place.	Review WMII's draft IC Work Plan to evaluate the effectiveness of existing and proposed ICs for land and groundwater use restrictions, determine whether additional ICs are needed, and prepare a long-term stewardship plan.	EPA	EPA	09/30/2011	Ongoing	N/A

Recommendation 1 – Settling at tennis courts and elsewhere around the Site

- Settlement remains a minor issue at the Site. During the October 30, 2014 Site inspection, further settlement was documented at the tennis courts (see Appendix C photos). Ground settlement is typical for landfill areas and does not pose any imminent danger to human health or the environment, nor does it inhibit the current remedy at the Site. Currently, on-site WMII contractors monitor settlement. Ground settling affected the asphalt surface of the tennis courts, created cracks in the asphalt pavement and slight ponding, and rendered many of the courts unusable. The Community High School District 117 is leasing 40 acres of the Site and removed the tennis courts in July 2015 and placed three inches of soil as fill material to the area.

Recommendation 4 – Maintaining an inward gradient to the landfill

- Average leachate elevations remain above 761 feet above mean sea level (amsl). The goal was for leachate head levels to fall below this elevation by 2012 in order to maintain an inward gradient into the Site. While leachate elevations in most wells at the Site have dropped, few have dropped below 761 feet amsl and few show signs that this level will be achieved in the immediate future. Further construction upgrades and maintenance of the leachate extraction system are likely necessary to achieve the goal.

- According to the 2014 Annual O&M Report, groundwater elevations in the shallow wells outside the landfill ranged from 763 to 764 feet amsl. Leachate elevations within the landfill averaged approximately 766 feet amsl, indicating that an inward gradient toward the landfill has not been achieved.

- WMII reports in Section 2.0 of the 2013 Annual O&M Report that a jumper line has been installed to address the apparent blockage between leachate wells GW-23 and GW-24. WMII also reports an apparent blockage between GW-32 and GW-33R. This issue has not been addressed based on the Site visit in October 2014. EPA recommends that WMII install another jumper line to address the blockage between leachate wells GW-23 and GW-24. Please see *Section III – Five-Year Review Process - Data Review* for more information on the inward gradient at the Site.

Recommendation 5 – Evaluation of the gas extraction system for oxygen leakage

- This issue has been addressed based on the 2013 Annual O&M Report (SCS 2014). There is no mention of higher than normal oxygen levels in the gas extraction system.

Recommendation 6 – Reviewing ICs to assure human health and environmental risks are minimal

- EPA reviewed WMII's draft IC Plan (referred to as the draft IC Work Plan in Table 2), which included proposed restrictive covenants for both its and the Village's portions of the Site, and the Village of Antioch's groundwater ordinances. At present, ICs have not been fully implemented at the Site; only the required fencing and signage were installed, while the use restrictions in covenants and ordinances remain uncompleted. Accordingly, EPA expects to request revisions to the proposed covenants and to work with the Village regarding a revised ordinance prohibiting groundwater extraction. Additional discussion is provided in the *Institutional Controls* section below.

Remedy Implementation Activities

Operation and maintenance (O&M) is the only remedial implementation that has taken place since the last FYR.

Institutional Controls

ICs in the form of deed restrictions, governmental controls (Village ordinances), and access restrictions are required by the 1998 ROD and Unilateral Administrative Order (UAO) to restrict property use, maintain the integrity of the remedy, and assure long-term protectiveness for areas which do not allow for UU/UE. A summary of the implemented and planned ICs for the Site is listed in Table 3 and ICs are further discussed below. A map showing the area in which the ICs apply is included in Appendix B.

Section II (2) of the Statement of Work (SOW) for the UAO states that the remedy includes deed restrictions to prohibit any disturbance of the Site, during and after remedy implementation, which will impair the remedy's effectiveness or result in exposure to unacceptable levels of contaminants for human or environmental receptors. Section II (2) of the SOW required the owner Respondents, the Village and WMII, to submit to EPA for review and approval a draft of the necessary restrictions in the form of one or more restrictive covenants.

In July 2010, WMII submitted a draft IC Plan, including draft ECs derived from Illinois's version of the Uniform Environmental Covenants Act (UECA) (Illinois' current model UECA covenant is included in Appendix G). One of the proposed covenants was prepared on the Village's behalf, to address the Village-owned portion. The ECs would notify a potential purchaser about past landfill activities on the property, and restrict future Site uses by: (1) restricting groundwater use; (2) prohibiting interference with the remedy, including the landfill cap; and (3) prohibiting residential use of the property. Citing the ROD, WMII also stated that the use of groundwater on the Site and its vicinity is restricted and is prohibited by Village Code Sections 8-1-1 and 8-2-3-1 (see Appendix F) (formerly Antioch Water Works and Sewage Ordinance Sections 50.008, 52.009, and 52.011). In the draft IC Plan, WMII also stated that controls had been imposed to restrict Site access, including fencing, signs, and gates.

EPA has reviewed the draft IC Plan and the proposed covenants, and has opened discussion with WMII and the Village regarding their sufficiency. EPA is working with WMII, IEPA and the Village of Antioch to ensure effective implementation of the ICs. Table 3 summarizes the status of ICs for the Site.

Table 3: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
WMII Property – sections of the H.O.D. Landfill capped with solid waste landfill cover identified in Figure 1 (Appendix B).	Yes	Yes	02-08-300-012; 02-08-300-011	Ensure continued integrity of containment; prohibit interference with landfill cap construction, O&M, monitoring and efficacy of the remedy.	Proposed covenant under UECA is under review and planned to be approved and recorded by 09/30/2018.
Village of Antioch Property - H.O.D. Landfill capped with solid waste landfill cover identified in Figure 1 (Appendix B).	Yes	Yes	02-08-400-005; -006; -007,	Ensure continued integrity of containment; Prohibit interference with landfill cap construction, O&M, monitoring and efficacy of the remedy.	Proposed covenant under UECA is under review and planned to be approved and recorded by 09/30/2018.
Groundwater - current area that exceeds groundwater cleanup standards on and off the Site identified in Figure 1 (Appendix B).	Yes	Yes	Village of Antioch	Prohibit private extraction and use of groundwater that Site may affect. Require properties within the Village limits that abut the public water works and sewerage systems to connect to the municipal water supply system.	Village Codes 8-1-1 and 8-2-3-1 are under review and planned to be updated by 09/30/2018; Proposed covenant under UECA is under review and planned to be approved and recorded by 09/30/2018.
Soils - Area of soil adjacent to landfill treated to industrial cleanup standards identified in Figure 1 (Appendix B).	Yes	Yes	Site	Prohibit interference with landfill cap construction, O&M, monitoring and efficacy of the remedy.	Proposed covenant under UECA is under review and planned to be approved and recorded by 09/30/2018.

Current Compliance

Based on the Site inspection and data, EPA is not aware of any inappropriate land or groundwater uses at the Site. WMII has taken actions to protect the remedy and restrict access to the Site. EPA is unaware of any evidence that any Site or media uses are inconsistent with the stated objectives of the ICs and cleanup goals.

IC Follow-up Actions Required

Additional IC activities are required to ensure the effectiveness of ICs and long-term protectiveness of the remedy. The draft IC Plan should be finalized and any additional ICs activities completed as needed

such as preparing updated maps depicting current conditions in areas that do not allow for UU/UE, and review of recording and title work to ensure the restrictions are still recorded, and that no prior-in-time encumbrances exist on the Site that are inconsistent with the ICs. Actions should be taken to strengthen the Village Ordinances to prevent use of the groundwater and ensure compliance. Residences and other buildings should be encouraged to connect to the Village water supply. The draft ECs pursuant to the Illinois UECA at 765 ILCS Ch. 122 should be finalized, signed, and recorded. The UECA provides numerous statutory benefits including a standard process for creating, modifying, transferring, recording, and enforcing environmental covenants.

Long-Term Stewardship

Long-term protectiveness at the Site requires compliance with use restrictions embodied in effective ICs to ensure the remedy continues to function as intended. Compliance with effective ICs will be ensured by implementing, maintaining, monitoring and enforcing effective ICs as well as maintaining the Site remedy components. To assure this, long-term stewardship procedures were incorporated into the O&M Plan, which includes a provision for regular inspection of ICs at the Site and annual reporting to EPA that the required ICs are in place and effective. EPA requires WMII to provide an update on the status of ICs and reuse/redevelopment activities at the Site in the annual O&M reports, to address long-term stewardship monitoring.

System Operation/Operation and Maintenance Activities

The primary O&M activities that have occurred at the Site during this FYR period are sod maintenance and leachate extraction and disposal. From January 2011 through June 2014, approximately 3.7 million gallons of leachate have been extracted from the Site and disposed of. Annual volume removed, as reported by WMII, is shown below:

Year	Leachate removed (gallons)
2011	1,449,201
2012	1,282,500
2013	565,500
2014	435,500
Total	3,732,701

Annual System O&M Costs

The ROD estimated annual O&M costs to be $434,400 for a 30-year timeframe. The actual annual O&M cost from 2010 to 2014 is $201,628 – approximately one-half of the ROD's estimated costs – as detailed below:

General O&M (cap repair, snow removal, etc.)	$8,030
Electricity	$14,343
GW/SW/Leachate Sampling and Reporting	$57,348
Leachate Management and Repair	$64,096
Landfill Gas System Maintenance	$32,768
Administrative	$25,043
Total O&M Costs/Year	$201,628

III. FIVE-YEAR REVIEW PROCESS

Administrative Components

EPA notified IEPA of the FYR's initiation on September 29, 2014. Karen Mason-Smith, EPA's Remedial Project Manager (RPM) for the Site, led the FYR.

The review, which began on September 29, 2014, consisted of the following components:

- Community Notification and Involvement;
- Document Review;
- Data Review;
- Site Inspection;
- Interviews; and
- Five-Year Review Report Development and Review.

Community Notification and Involvement

The RPM and Susan Pastor, the Community Involvement Coordinator for the Site, met in September 2014 to initiate activities to involve the community in the FYR process. A notice was published in three Lake County, Illinois Sun-Publication local newspapers: the "Herald News," "Beacon News," and "Courier News" on October 23, 2014 (see Appendix I). The notices stated that EPA was conducting a five-year review and invited the public to submit any comments to EPA. The FYR report will be made available at the Site information repository located at the Antioch Public Library at 757 North Main Street (Route 83) in Antioch, Illinois.

Document Review

This FYR consisted of a review of relevant documents, including O&M records and monitoring data. Applicable groundwater, surface water, sediment, leachate and air cleanup standards were also reviewed, as listed in the 1998 ROD and 2003 ESD. The list of documents reviewed is provided in Appendix H.

Data Review

The major data streams for this FYR were the H.O.D. Landfill Operations, Maintenance, and Monitoring Annual Report for 2013 (2013 O&M Report, SCS 2014) and 2014 (2014 O&M Report, July 2015). The sections below summarize the information included in those reports.

The ROD requires WMII to regularly monitor groundwater wells, leachate wells, the landfill cap, the landfill gas management system, and surface water on a quarterly basis. On May 17, 2007, EPA approved a revised monitoring program which called for a reduced monitoring schedule, based on a reduction in some of the contaminants of concern at the Site. The list of groundwater monitoring well locations and analytical parameters required for the monitoring program is presented in the groundwater analytical tables in the 2014 Annual OMM Report for the H.O.D. Landfill (August 2015, SCS Engineers). Details of O&M monitoring at the Site are included below.

Groundwater Monitoring

Groundwater monitoring is conducted semi-annually at 16 groundwater monitoring points for groundwater samples and elevations. Additionally, groundwater elevations are measured annually at 15 other wells. Groundwater monitoring results are presented in annual and semi-annual monitoring reports. Groundwater monitoring well US03D is in the deep sand and gravel aquifer, and is impacted with chlorinated solvents such as cis 1,2-DCE, trans 1,2-DCE and vinyl chloride. The federal maximum contaminant level (MCL) for vinyl chloride in drinking water, which is also the Illinois Groundwater Quality Standard for Class I (drinking water) aquifers, is 2 parts per billion (ppb). The Baseline Risk Assessment (BLRA) of the Remedial Investigation (RI) identified the contaminant vinyl chloride as a significant health risk.

Vapor intrusion has not been evaluated because it is very unlikely to be an issue at this Site for the following reasons. The vinyl chloride contamination is located in a deep (80+ feet) monitoring well (US03D). There are no complete pathways to the surface or structures and no shallow VOC contamination. In addition, a gas system is in place to prevent any landfill gas migration from the Site. Finally, the contamination is located on the west side of Sequoit Creek with groundwater flow towards the Site, away from Sequoit Industrial Park. The RI lists three zones: shallow sand and gravel aquifer, intermediate clay rich diamict aquifer, and the deep sand and gravel aquifer. Monitoring well US03D is located in the deep sand and gravel aquifer.

Historical concentration trends show that vinyl chloride levels in well US03D were 35 micrograms per liter (ug/L) in 1994, and 15 ug/L in 1998. The 1998 ROD projected that vinyl chloride levels in well US03D would decrease below the MCL by 2009 using the MNA remedy. During the period 2000 to 2005, vinyl chloride concentrations in well US03D ranged from approximately 10 to 18 ug/L and increased in 2006 to 35 ug/L, exceeding the MCL and Illinois cleanup levels for drinking water. Vinyl chloride concentrations in well US03D during the 2011-2014 annual groundwater samples ranged from 33 to 42 ug/L, indicating a long-term increase in vinyl chloride concentration at this location.

WMII hypothesized in the 2013 Annual O&M Report that an increase in vinyl chloride concentration is evidence of degradation of other chlorinated compounds (SCS, 2014), to demonstrate that the MNA remedy is an effective remedy for constituents of concern in the deep sand and gravel aquifer. Given that cis-1,2-DCE concentrations are also increasing in well US03D since 2000 and other chlorinated compounds are largely absent, this hypothesis is tenuous. Increasing concentrations of vinyl chloride and 1,2-DCE in well US03D provide evidence that containment is not fully effective. This is a potentially significant conclusion that should be monitored closely and may require a more aggressive remedial action in the near future to ensure protectiveness of the remedy, unless contaminant concentrations rebound, in which case EPA will consider whether high concentrations pose a renewed threat to human health and the environment, and consider whether an active treatment component should be included in the final remedy.

Monitoring well US03S was not sampled in April 2014. Because well US03S has contained vinyl chloride in the past, the well should be monitored to assess releases from the landfill. VOC concentrations in US03S and US03D should be monitored over time to assess whether improvements in leachate collection reduce releases from the landfill. If improved leachate collection does not address the issue, additional measures to address the contamination, such as modifying in-situ geochemical conditions to enhance biodegradation, should be evaluated.

Surface Water Monitoring

Surface water monitoring, which includes sample collection and elevation measurements, is conducted semi-annually at two locations along Sequoit Creek. The creek flows along the west and south boundaries of the landfill. Surface water monitoring results are presented in annual and semi-annual monitoring reports. Surface water samples were collected upstream (SW01) and downstream (SW02), during the first and second semi-annual sampling events. During the October 2014 sampling event, there was no water at SW01. A surface water sample was obtained from an area of ponded water approximately 200 feet to the east of SW01, or upstream. The surface water sampling results do not show a significant impact to Sequoit Creek during this FYR reporting period.

Leachate Monitoring

Leachate elevation monitoring is conducted quarterly at 35 leachate extraction wells. Additionally, leachate contaminant concentrations in the leachate collection tank are measured semi-annually and annually for characterization and disposal purposes. Leachate monitoring results are presented in annual and semi-annual monitoring reports. Leachate volumes removed during this FYR period (2011 through 2014) are reported in *Section II, Progress Since Last Review, System Operation/Operation and Maintenance Activities.*

WMII noted in the 2013 Annual O&M Report that leachate extraction has been hindered by blockages at two locations in the leachate force main (SCS, 2014). These locations are depicted on the Site Map in Appendix B. A bypass installed in December 2013 was present at one location during the 2014 Site inspection. This bypass does not appear to have resolved the issue, because leachate removed during the first half of 2014 is less than one-half of the total leachate removed in 2013. The second blockage should be resolved and additional efforts should be made to enhance leachate extraction and generate an inward gradient to the landfill.

The Pre-Design Investigation and Remedial Design/Remedial Action Workplan (RMT, 1999) projected a range for leachate extraction rate of 4,000-6,000 gallons per day (GPD), which would slowly decrease as pumping continued. Leachate extraction volume from January through June 2014 averaged 1,061 GPD. WMII projected in 2000 that average leachate elevation in the landfill would be 761 ft amsl. In most locations, leachate levels from 2000 through 2014 were above the proposed remedial design goal of an average of 761 feet amsl.

An inward gradient is assessed by comparing a group of shallow wells southwest of the landfill with a group of leachate wells within the landfill (SCS, 2014). Groundwater elevations in the shallow wells outside the landfill ranged from about 763 to 764 ft amsl. Leachate elevations within the landfill averaged approximately 766 ft amsl, indicating that an inward gradient toward the landfill has not been achieved. The inward gradient continues to lag behind in some of the leachate wells and the Site still has not achieved the inward gradient required in the 2000 Remedial Design.

Landfill Gas Monitoring

Landfill gas monitoring is conducted quarterly at 36 landfill gas extraction wellheads for landfill gas samples and elevations. Landfill gas monitoring results are presented in semi-annual and annual O&M monitoring reports. With regard to the perimeter probes, methane gas was not identified at any of the gas probes (GP3A, GP4A, GP5A, GP6, GP7 and GP8) during the quarterly monitoring events that were performed in January, June, September and December 2014. Monitoring of the ambient air points (AA1, AA2 and AA3) was performed during June and December 2014. No methane was identified at any of the ambient air locations during this reporting period.

Landfill Gas-to-Energy System

The landfill gas-to-energy system that operated at the Site since 2003 was taken offline in June 2013 due to the cost associated with its maintenance. The system was disconnected in late 2013 and scheduled for complete decommissioning in 2014 (SCS 2014). As of the October 30, 2014 Site inspection, it had not been deconstructed, but remained offline. Landfill gas is currently flared without energy recovery.

Site Inspection

The inspection of the Site was conducted on October 30, 2014. In attendance were Karen Mason-Smith of EPA; Chris Dietrich of SulTRAC (EPA's support contractor); Michael Peterson of WMII; and O&M contractor Michael Prattke of SCS Engineers. The purpose of the inspection was to assess the protectiveness of the remedy.

A photographic log was also generated during the inspection and is included as Appendix C. The Five-Year Review Inspection Checklist was completed and is included as Appendix D. During the inspection the following items were inspected:

- Landfill gas to energy system (non-operational);
- Flare station and leachate collection bay;
- General fill laydown area;
- Landfill cap, well fields and athletic fields;
- Buffer zone, adjacent areas, perimeter fence; and
- Entrance area and access road.

Aside from the decommissioned landfill gas-to-energy system, everything at the Site appeared to be operating according to the Site O&M Plan. Deviations from and deficiencies within the remedy were not visually observed. The facilities, equipment, and buildings were in good working order.

Minor issues that were noted during the inspection included:

- A temporary above-ground leachate collection line was present. WMII indicated that the underground line had become clogged and that the above-ground line was a temporary solution that would be replaced by underground lines shortly.
- An abandoned flare station is adjacent to the operational flare station and should be demolished. WMII indicated that the non-operating flare will be demolished at a future date.
- The landfill gas-to-energy system has been taken offline and could be decommissioned or demolished.
- Continued settling was observed at the tennis courts. During the inspection, WMII noted that the school district may demolish the courts and repurpose them to turf or grass fields. WMII should address any settling issues in the area during the construction process for the new land use. (Note: the school district subsequently removed the tennis courts in July 2015 and placed three inches of soil as fill material to the area.)

Interviews

During the FYR process, EPA interviewed the PRPs/owners (WMII, Village of Antioch) and lessee (Antioch Community High School District 117), who are involved in Site activities or aware of the Site. The interviews' purpose was to document any perceived problems or successes with the remedy to date.

Interviews were conducted at various times from October 2014 through August 2015, and are summarized below. WMII's complete response to interview/survey questions is included in Appendix E. The Village and Community High School District 117 did not complete a written interview, but were interviewed by telephone.

The WMII Site Manager (Mike Peterson) reported that his overall impression of the Site is that it is in good condition. WMII has no perceived problems with the remedy at the Site. The Village Administrator (Jim Keim) and Assistant Superintendent (Jennifer Nolde) for Community High School District 117 reported disappointment with reuse/redevelopment of the Site due to the amount of settling of the landfill cap in the area where the community's athletic fields are located. The Village and School District 117 reported concerns that many of the athletic fields have been unusable, and also reported some relationship issues with Waste Management. Each stakeholder interviewed agreed that this Site could share lessons learned with other communities. Overall, EPA has determined that the remedy at the Site is working in the short term, due to no known risks to human health and the environment. EPA made a commitment to the Community High School and Village officials to continue monitoring the Site and working with WMII to ensure that the Site is protective in the short and long term.

IV. TECHNICAL ASSESSMENT

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

Answer: Yes, with respect to those components that have been implemented.

Remedial Action Performance
The general remedial action goals in the ROD are: a) preventing direct contact (dermal contact or ingestion) with impacted soil and landfill contents; b) minimizing infiltration and contaminant leaching to groundwater; c) controlling surface water runoff and erosion; d) collecting and treating contaminated leachate to prevent further migration of contaminants from the source area; and collecting and flaring landfill gas. A review of the data and the Site inspection indicate that the remedy is functioning as the ROD and the ESD intended.

The ROD intends that the landfill cap on the 24.2-acre "old landfill" and the 26.8-acre "new landfill" remain in place indefinitely to prevent exposure to underlying solid and hazardous waste. However, increasing concentrations of vinyl chloride and 1,2-DCE in well US03D provide evidence that containment is not fully effective.

System Operations/Operation and Maintenance
Operating procedures, as implemented, are expected to maintain the remedy's effectiveness.

Opportunities for Optimization
There have been no opportunities for optimization of the remedy at the Site.

Early Indicators of Potential Issues
Increasing concentrations of vinyl chloride and cis- and trans-1,2-DCE in well US03D suggest that containment at the landfill is not entirely effective. If the leachate collection and inward gradient at the landfill issues are not resolved, this may lead to increased concentrations of contaminants in the groundwater which may impact the Village's drinking water wells.

Implementation of Institutional Controls and Other Measures

The IC component of the remedy is not yet complete. The ROD called for (1) prohibiting installation of private wells in the Village of Antioch, (2) fencing and signage around the landfill, and (3) maintaining restrictive covenants to the deeds for Site. The 2003 ESD eliminated the requirement to secure the landfill with fencing and signage. However, while they may operate to limit exposure to groundwater contamination associated with the Site, the Village Ordinances do not expressly prohibit the installation of private wells within the Village. Furthermore, restrictive covenants for the parcels comprising the Site have not yet been recorded.

Actions should be taken to strengthen the Village Ordinances and ensure compliance. Residences and other buildings should be encouraged to connect to the Village water supply. The ECs should be finalized and recorded. The IC Plan should be revised.

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

Yes. The exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy section have not changed to the extent that they would affect the protectiveness of the remedy.

Vapor intrusion has not been evaluated because it is very unlikely to be an issue at this Site for the following reasons. The vinyl chloride contamination is located in a deep (80+ feet) monitoring well (US03D). There are no complete pathways to the surface or structures and no shallow VOC contamination. In addition, a gas system is in place to prevent any landfill gas migration from the Site. Finally, the contamination is located on the west side of Sequoit Creek with groundwater flow towards the Site, away from Sequoit Industrial Park. The RI lists three zones: shallow sand and gravel aquifer, intermediate clay rich diamict aquifer, and the deep sand and gravel aquifer. Monitoring well US03D is located in the deep sand and gravel aquifer.

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

No. No additional information has come to light that would affect the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed and the Site inspection, the remedy is functioning as intended by the ROD and ESD. All immediate threats at the Site have been addressed through implementation of the remedy. Actions should be taken to strengthen the Village Ordinances and ensure compliance. Residences and other buildings should be encouraged to connect to the Village water supply. The ECs should be finalized and recorded. The IC Plan should be revised to address the additional IC activities to be completed. Additional actions should be taken to address the leachate collection system as increasing concentrations of vinyl chloride and 1,2-DCE in well US03D provide evidence that containment is not fully effective. These increasing concentrations of VOCs in well US03D outside the southwest corner of the landfill highlight potential issues that may affect the future protectiveness of the remedy. No other information has been identified that would call into question the protectiveness of the remedy.

V. ISSUES/RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 4: Issues and Recommendations/Follow-up Actions

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness?	
						Current	Future
01/ Sitewide	The leachate collection system is not functioning optimally. The system is designed to extract leachate, reduce leachate elevations within the landfill, and create an inward gradient of groundwater flow toward the center of the landfill.	Determine the cause(s) for the leachate collection system not functioning optimally and implement the appropriate actions to resolve the issue.	PRP	EPA	09/30/2018	N	Y
01/ Sitewide	Vinyl chloride concentrations in groundwater are increasing and exceed the groundwater cleanup standards in the ROD in one or more monitoring wells, including well US03D, and well US03S was not sampled in April 2014.	Vinyl chloride and other VOCs should be monitored in wells US03D, US03S and other wells to assess whether improvements in the leachate collection system reduce releases from the landfill. If improvements to the leachate collection system do not address the issue, additional measures to address the contamination, such as modifying in-situ geochemical conditions to enhance biodegradation, should be evaluated.	PRP	EPA	09/30/2020	N	Y
01/ Sitewide	ICs have not yet been fully implemented at the Site.	WMII and the Village should submit a revised IC Plan and record ECs reciting the restrictions the ROD requires. The Village should revise its groundwater ordinances to prohibit the installation of drinking water wells near the Site.	PRP	EPA	09/30/2018	N	Y

VI. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement	
Operable Unit: 01/Sitewide	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The remedy at the H.O.D. Landfill Site currently protects human health and the environment because it is functioning as intended. The landfill cap, landfill gas management system, and leachate collection and storage system are functional and meeting the objectives outlined in the ROD and ESD. An ordinance requires owners within the Village to use the Village's public water supply, but does not expressly prohibit the installation of private wells near the landfill Site. In order for the remedy to be protective in the long term, the following actions need to be taken: record ECs; revise the IC Plan; address the leachate collection system to ensure it is functioning optimally; and monitor vinyl chloride in groundwater to assess whether improvements in the leachate collection system reduce releases from the landfill. Long-term protectiveness requires full implementation of and compliance with deed restrictions that prohibit interference with the landfill cap and other remedy components and prohibit well drilling or consumption of groundwater at the Site.	

VII. NEXT REVIEW

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

APPENDIX A

APPENDIX A – EXISTING SITE INFORMATION

A. SITE CHRONOLOGY

Event	Date
Operation of Site as dump by Cunningham Cartage and Disposal Company	1963-1965
Operation of Site as dump by H.O.D. Disposal, Inc.	1965-1972
Operation of Site as dump by C.C.C. Disposal, Inc. & WMII	1972-1984
WMII submits CT-RCLA 103(c) Hazardous Waste Site Notification Form	June 1981
EPA conducts PA/SI and ESI	1983-1989
Landfill closed and soils capped under IEPA oversight	1989
Site placed on NPL	02/21/1990
AOC to conduct RI/FS	08/20/1990
EPA approves PRP RI Reports and Baseline Risk Assessment	02/14/1997
FS Reports and Proposed Plan	07/22/1998
ROD	09/28/1998
UAO to perform RD/RA	04/14/1999
EPA approves Final RD/RA Construction Report	08/09/2000
RA construction begins	08/28/2000
RA construction completed	06/29/2001
PCOR	06/29/2001
Landfill cap upgraded; fence installed; leachate collection begins; conveyances and storage system initiated; gas collection and treatment system completed	2002
RMT Inc. begins construction of gas-to-energy system for Antioch High School	December 2002
Risk Assessment and Exposure Pathway Analysis for End Use Plan submitted	August 2003
ESD	08/28/2003
EPA signs Ready for Reuse (RfR) Determination	11/12/2003
Startup of gas-to-energy system for Antioch High School	December 2003
Preparation for implementation of End Use Plan	July 2004
Site Inspection for first YR	07/28/2005
EPA Approves WMII's Request for Reduction in Groundwater, Surface Water, and Leachate Monitoring Frequency for some parameters	05/14/2007
Revised Performance Verification Plan for H.O.D. Landfill Site	April 2008
First Semi-annual O&M for Groundwater, Surface Water and Leachate	Spring 2008
First Annual O&M for Groundwater, Surface Water and Leachate	03/29/2010
Site inspection for second FYR	05/17/2010
Gas-to-energy system taken offline	June 2013
Site Inspection for third FYR	10/30/2014

B. BACKGROUND

Physical Characteristics

The H.O.D. Landfill Superfund Site occupies approximately 51 acres of landfilled area out of a total of approximately 121.5 acres of property making up the entire facility. The Site is located north of Route 173 and east of McMillen Road in Antioch, Illinois, and is bordered on the south and west by Sequoit Creek. Sequoit Acres Industrial Park, a large industrial park area which has supported light-industry since the 1950s, is located west of the Site bordering Sequoit Creek. Silver Lake is located approximately 200 feet southeast of the Site, and Antioch High School is approximately 0.25 miles southwest of the Site (Appendix B, Site Map).

Although the landfill area is continuous, it consists of two separate landfill areas, identified as the "old landfill" and the "new landfill." The two landfill areas have been legally delineated under an IEPA permit. The "old landfill" consists of 24.2 acres situated on the western third of the property. The "new landfill" consists of 26.8 acres located immediately east of the "old landfill." The location of the two landfill sections is shown on the Site Map in Appendix B.

Hydrology/Geology

The Site is bordered on the south and west by Sequoit Creek. Silver Lake is located approximately 200 feet southeast of the Site. A large seasonal wetland area extends south of the Site from Sequoit Creek. Surface drainage around the Site is generally toward the Fox River. The Fox River is approximately 5 miles west of the Site. Surface water from the Site flows toward Sequoit Creek. Sequoit Creek flows west from Silver Lake along the southern boundary of the Site, then flows north along the western boundary Site. Sequoit creek turns west approximately 250 feet north of the northwestern corner of the Site, and flows approximately two miles before discharging into Lake Marie. Lake Marie discharges into the Fox River.

Landfill cover is continuous across the filled areas of the Site, and ranges in thickness from a total of 49 to 87 inches based on borings and test pits performed during the RI. Refuse was generally encountered the existing landfill cover. The landfill cover supports a healthy vegetative layer. Since the closure and capping of the Site in 1989, precipitation has resulted in erosional rills and gullies in some areas of the landfill cover. Several areas of differential settlement and stressed vegetation have developed since cap construction.

Land and Resource Use

The Site was classified by IEPA as a municipal solid waste landfill, with permitted waste disposal activities beginning at the Site in approximately 1963, and continuing through approximately 1984. Currently, the landfill is inactive and fenced with access restrictions. The Site was closed and capped under an IEPA permit in 1989, and designated ready for reuse by EPA with partial access for recreational use in 2003. The Village Codes 8-1-1 and 8-2-3-1 (formerly Antioch Water Works and Sewage Ordinances Sections 50.008, 52.009 and 52.011) requires properties within the Village limits that abut the public water works and sewerage system to connect to the municipal water supply system. However, the Village's ordinances do

not currently prohibit the installation of private wells, or the use of private well water (Appendix F). The EPA and IEPA will work with the Village to address updating its groundwater ordinances in a manner that ensures long-term remedy protectiveness.

A portion of the Site is zoned as "M2," according to the Village, which covers special use manufacturing and industrial purposes, including landfills. The Village has zoned Sequoit Acres Industrial Park as an "M1" (light industrial) area.

The current and projected land uses for the area surrounding the landfill portion of the Site are for ecological and recreational reuse purposes. EPA identified the Site as an EPA Headquarters' Superfund Redevelopment Initiative Pilot Site in 2003. The reuse framework for the Site includes environmental education areas, wetlands restoration, athletic fields and recreational areas. Since EPA issued the RfR Determination for the Site on November 12, 2003, a portion of the Site has been rezoned for recreational purposes by the Village, and is used as a park. The park contains a playground, athletic fields (e.g., soccer and baseball fields), tennis courts, other recreational fields, and ancillary facilities. Access roads, a Site water supply pipe, walking paths, surface water drainage piping and other features (e.g., catch basins, manholes, culverts and concrete vault covers), irrigation piping, electrical conduits and transformers were also installed.

In 2003, a landfill gas-to-energy system was constructed at the Site as a beneficial use by utilizing methane gas collected from the landfill to supply heat and electricity to Antioch Community High School District 117. The School District took the landfill gas-to-energy system off line in June 2013, due to costs associated with necessary system upgrades outweighing the system's benefits. The gas-to-energy system was decommissioned in 2014. Since the gas-to-energy system was operated independently from the gas management system at the Site, landfill gas will continue to be collected and exclusively burned in the pedestal flare.

Approximately 40 private wells and 6 public water supply wells in the vicinity are used for drinking water and other domestic purposes. The Village has two drinking water supply wells (VW-3 and VW-5) located west and southwest of the landfill. Village well VW-3 was installed on the western side of the Site, and is approximately 900 feet from WMII's monitoring well US-3D; WMII samples it semi-annually.

History of Contamination

Three distinct companies have owned and operated the Site:

- Cunningham Cartage and Disposal Company (1963 - 1965)
- H.O.D. Disposal, Inc. (1965 - 1972)
- C.C.D. Disposal, Inc. (1972 - present, including period following merger with WMII)

Murrill Cunningham, owner, operator and president of the Cunningham Cartage and Disposal Company, operated a 20-acre landfill (much of the "old landfill" area) at the Site from 1963 until August 1965. John Horak and Charles Dishinger then purchased the Site and operated it under the name of H.O.D. Disposal Inc. In December 1972, the 20-acre landfill was conveyed to C.C.D. Disposal Inc., and C.C.D. Disposal Inc. purchased the adjacent 60-acres of land to the east of the Site. WMII merged with H.O.D. Disposal Inc. in December 1972, and merged with C.C.D. Disposal Inc. in June 1973, thus gaining ownership of the entire Site. An eastern portion

of the Site is currently owned by the Village of Antioch. WMII operated the landfill from 1973 until 1984 when the Site stopped accepting waste.[1] During the time WMII operated the landfill, portions of the "new landfill" area were opened and began accepting waste.

Although WMII owned and operated the Site since approximately June of 1973, EPA identified other PRPs for the Site, including the Village, which has been an owner of a portion of the landfill since approximately January of 1975; and several private entities who arranged for the disposal of hazardous substances at the Site.

Groundwater samples were collected from on-site monitoring wells on July 10, 1984. Analysis of the samples revealed the presence of elevated concentrations of zinc, lead and cadmium. Analysis of surface water samples did not reveal elevated levels of analyzed parameters. In January 1986, IEPA collected groundwater samples from four residential wells located east of the Site. The samples were analyzed for nitrates, organic compounds and trace metals. The results of the chemical analysis indicated no trace metals or organic compounds. Leachate containing volatile organic compounds (VOCs) and semi-VOCs contaminated the soil and groundwater. The RI found vinyl chloride in concentrations as high as 40 ppb in monitoring well US3D, which is adjacent to, and southwest and downgradient of the waste boundary at the Site, in the deep sand and gravel aquifer. The Maximum Contaminant Level (MCL) for vinyl chloride is 2 ppb.

Initial Response

The EPA proposed adding the Site to the NPL on September 18, 1985, based on a Site Inspection which found elevated levels of zinc, lead and chromium in the groundwater (*See* 50 Federal Register 37,956 (1985)). WMII challenged the proposed listing during the public comment period, disagreeing with the hazard ranking score and the description of hydrogeological conditions at the Site. Following its review of all the comments, EPA performed an Expanded Site Inspection (ESI) at the Site.

The ESI led EPA to rescore the Site, based in part on a lowered estimate of the level of zinc releases, and on newly discovered releases to groundwater of TCE, trans-1-2-dichloroethylene and total-1-2-dichloroethylene. EPA added the Site to the NPL on February 21, 1990 (*See* 55 Federal Register 6162 (1990)). In August 1990, EPA and WMII signed an AOC under which WMII would conduct the RI/FS at the Site. In May 1990, WMII retained the contractor Montgomery Watson (formerly Warzyn) to support WMII's RI/FS effort by preparing the Work Plan for a Preliminary Site Evaluation Report/Technical Scope and subsequently performing the RI.

Basis for Taking Action

WMII completed the RI/FS in June 1998. The main threat to human health identified in the BLRA of the RI/FS is through the ingestion of vinyl chloride-contaminated groundwater. Vinyl chloride, a VOC and a carcinogen, has been detected in a nearby monitoring well that is offsite on the southwestern portion of the landfill (US03D), and in a drinking water supply well (VW4)

[1] In June 1981, WMII submitted a Hazardous Waste Site Notification Form to EPA, as required by Section 103(c) of CERCLA. The form indicated solvents, heavy metals cutting oils and hydraulic oils were disposed of at the Site in addition to municipal waste.

which was the closest Village well to the Site, at levels above the 2 ppb MCL and above the Illinois Pollution Control Board groundwater Quality Standards for drinking water aquifers. The NCP requires remediation of drinking water sources with contaminant levels above MCLs. The contaminated Village well (VW4) was decommissioned in 1997, and replaced with VW7 which was farther west of the Site.

Based on results of the BLRA, ingestion of vinyl chloride presented the only significant health risk associated with the Site. The Ecological Risk Assessment concluded that, overall, contaminant concentrations are such that risks to plants, aquatic life and terrestrial wildlife are estimated to be minimal.

In addition, on September 23, 1998, the Agency for Toxic Substances and Disease Registry (ATSDR) and the Illinois Department of Public Health (IDPH) released a jointly-prepared Public Health Assessment for the Site. In December 1998, ATSDR released a follow-up health consultation, which concluded that the contamination at the Site was not an apparent public health hazard, provided that the vinyl chloride contamination on the Site had not migrated offsite.

C. REMEDIAL ACTIONS

Remedy Selection

EPA issued a ROD on September 28, 1998, to address the groundwater contamination at the Site. The selected remedy included the following:

- ICs and access restrictions
- waste cap improvements
- enhanced gas collection and treatment
- enhanced leachate collection
- leachate treatment
- groundwater monitored natural attenuation

In addition, EPA developed the following RAOs in the ROD to address the risks identified in the 1997 BLRA. These RAOs were based on current and reasonably anticipated future land and groundwater use:

1. ICs in the form of Village Ordinances that reduce exposure to Site contaminants by requiring residents to connect to the municipal water supply system, and by prohibiting the installation of private wells within Village limits;

2. Access restrictions that include upgrading the existing fencing, constructing new fencing to completely enclose the Site, posting warning signs, and installing locking gates;

3. Restrictive covenants on deeds to the Site to ensure the continued integrity of the waste containment remedy by preventing or limiting Site use and development. Waste cap improvements would include removing vegetation; stockpiling topsoil to be reused as vegetation layer soils; consolidating the off-property waste at the northern edge of the "old landfill" onto Site property; re-grading, placing and compacting the

clay soils; placing an un-compacted vegetative layer of soil; and re-establishing the vegetation. The cap was to be comprised of two feet of compacted clay with one foot of clean topsoil above to support vegetation;

4. Enhanced gas collection and treatment requiring trenching in areas of the Site for placement of pipe and new wells, placement of backfill around these new features, localized cap reconstruction, and construction of the blower and flare station;

5. Enhanced leachate collection, including removal of the cap in areas of pipe placement, installation of additional leachate/gas extraction wells and header piping, backfilling, relocating of excavated waste, and reconstruction of the cap;

6. Pumping untreated leachate directly from the collection system and transporting it via tanker trucks to the publicly-owned treatment works for treatment under an industrial discharge permit for the Site; and

7. Monitored natural attenuation for groundwater in surficial sand and in the deep sand and gravel aquifers located beneath the Site, and the installation and monitoring of groundwater wells downgradient of the Site.

EPA subsequently issued an Explanation of Significant Differences (ESD) for the site on August 28, 2003, which modified the ROD with the following:

- Modifying access restrictions by removing the existing fence from the 120-acre site, and constructing and a maintaining a new fence restricting access to the operation and maintenance areas (which including two maintenance buildings, and a leachate collection pad and tank). In addition, warning signs were placed around the fenced operation and maintenance areas, and locking gates were installed in the fencing surrounding the areas. The gates are kept locked when the areas are not being subject to maintenance or inspection activities.

- Securing any equipment located outside of the fenced-in operation and maintenance area, such as flush-mounted gas/leachate collection vaults, that is necessary to maintain the landfill's integrity. In addition, locking mechanisms were installed on the vault covers and the covers are kept locked when not being inspected or subjected to O&M activities.

- Refining the restrictive covenants for the deeds to the Site to reflect uses that could be safely supported without affecting the remedy's integrity, as documented in the Exposure Pathway Analysis and Risk Assessment for the HOD Landfill End Use Plan, August 2003.

Remedy Implementation

In response to EPA's April 14, 1999 UAO, WMII implemented the approved RD/RA Work Plan and initiated construction activities at the Site. Remedial construction began on August 28, 2000. EPA determined that all remedial construction activities were performed according to specifications, and signed the Preliminary Closeout Report (PCOR) for the Site on June 29, 2001.

Construction Activities

The main activities of the remedial action were:

- A pre-design investigation, which supplemented the RI/FS to further define the nature and extent of contamination, the direction of groundwater flow, and the condition of landfill gas and leachate control systems;

- Removing a minimum of 12 inches of vegetative soil cover. This soil cover was later used for re-grading the Site;

- Re-grading the existing cover to provide controlled surface water drainage;

- Relocating waste found beyond the HOD property line to the waste reconsolidation areas on the Site, and filling the off-Site areas from which the waste was removed with clean soil to bring them to grade;

- Placing final cover soil over the landfill area so as to comply with the Illinois Administrative Code (IAC) 807 cover requirements. This cover consisted of a minimum 2-foot compacted low-permeability layer followed by a 1-foot vegetative soil layer;

- Installing the active landfill gas management system, which consisted of 35 extraction wells and a flare to combust the collected landfill gas;

- Installing an automated leachate collection system to provide for continuous operation. The system included thirty-five leachate extraction pumps installed in extraction wells which enabled leachate to be temporarily collected in a below-grade 30,000-gallon tank near the southwest corner of the Site, before being sent off-site for treatment and disposal;

- Constructing access roads around the perimeter of the Site; and

- Installing a 6-foot–high chain-link fence around the landfill area, which included a buffer area.

In addition to these actions, a municipal well (Village Well 4) near the Site was taken off line, and a new municipal well (Village Well 7) was installed on the western side of the Village.

Institutional and Access Controls

On August 14, 2007, EPA sent a letter requesting that WMII submit an IC Plan, and included a draft warranty deed with a declaration of restrictive covenants as an attachment for WMII's use. After EPA sent the letter, Illinois enacted its version of the UECA, which now provides the basis for a lawful environmental covenants intended to run with the land; the statutory language thus supersedes the draft warranty deed that EPA provided.

In July 2010, WMII submitted an IC Plan, including two draft restrictive covenants derived from IEPA's model covenant (Appendix G) under the UECA, one of which was for the area that WMII owns, and the other for the area the Village owns. The covenants would notify a potential purchaser of past landfill activities on the property, and would restrict future Site uses by: (1) restricting groundwater use; (2) prohibiting interference with the remedy, including the landfill cap; and (3) prohibiting residential use of the property. Citing the ROD, WMII also stated that the use of groundwater on the Site and its vicinity is restricted and is prohibited by Village Code Sections 8-1-1 and 8-2-3-1. In the draft IC Plan, WMII also stated that controls had been imposed to restrict Site access, including fencing, signs, and gates.

EPA has reviewed the draft IC Plan and the draft proposed covenants, and concludes that the covenants will require revisions, to ensure consistency with IEPA's model environmental covenant under the UECA. Additionally, the Village Ordinances do not expressly prohibit extraction of groundwater in the Site vicinity, and EPA cannot conclude that all residences that could be affected by Site-related groundwater contamination, are connected to the Village water supply. Thus, EPA expects to (1) propose edits to WMII's draft covenants so they can be recorded, and (2) work with the Village regarding modifying the existing ordinances, or adopting a new one, to ensure long-term protectiveness. In addition, EPA is continuing to work with WMII, IEPA and the Village of Antioch to ensure effective implementation of the ICs. EPA has communicated several times with WMII, IEPA and the Village of Antioch since the last FYR, including conference calls and emails during 2014 and 2015.

System Operation/Operation and Maintenance

WMII is conducting long-term monitoring and maintenance activities according to the 2001 Final O&M Plan and 2001 Performance Standards Verification Plan (PSVP). The PSVP includes the Quality Assurance Project Plan that EPA approved in 2001. O&M activities include inspections of the final cover systems and monitoring networks, general maintenance, and monitoring of landfill gas, leachate, groundwater and surface water.

In 2007, EPA approved WMII's Request for Reduction in Monitoring Frequency for Groundwater, Surface Water and Leachate at the Site, which reduced the monitoring schedule from quarterly to semiannually for some parameters; annually for other parameters; and eliminated various monitoring parameters. WMII continues to undertake O&M and monitoring activities at the Site; these are expected to continue for at least 10 more years. EPA will continue to oversee WMII's O&M of the remedy.

Groundwater Monitoring Program

The ROD specifies MNA as the remedy for groundwater. The list of groundwater monitoring well locations and analytical parameters required for the monitoring program is presented in the groundwater analytical data tables in the 2014 Annual O&M Report for H.O.D. Landfill (August 2015, SCS Engineers).

Landfill Cover

The existing landfill cover was reconstructed to be compliant with the IAC 807 cover requirements. The landfill cover consists of a minimum 2-foot low-permeability layer, followed by a minimum 1-foot vegetative soil layer. Regular site inspections include checking for

evidence of stressed or sparse vegetation, erosion, settlement, and burrowing animals. When a problem has been identified, WMII has made the necessary repairs to the cover. Documentation of the site inspections, and the repair or maintenance activities performed, is contained in the quarterly, semiannual and annual reports prepared by WMII.

Landfill Gas Collection, Conveyance and Treatment

An active landfill gas management system, consisting of 35 extraction wells and a blower, is installed and operating at the Site. The system conveys landfill gas through pipes to a utility flare where the gas is combusted. An enclosed flare is available for back-up purposes. The utility flare is designed to combust 200 through 300 cubic feet per minute (cfm). Typical gas flow delivered to the flare prior to 2003 was 250 cfm.

The landfill gas system was modified in 2003 to allow for the use of landfill gas to produce electricity and heat in the gas-to-energy system operating at Antioch High School. The gas-to-energy system was started up in December 2003 and reduced the amount of landfill gas sent to the flare by approximately 150 to 180 cfm. In addition, the methane concentration in the landfill gas for the monitoring period ranged from approximately 42 to 66 percent, which is within the expected range. However, the system was taken off line when it appeared that the costs of performing necessary upgrades outweighed the benefits of using the landfill gas as an energy source. The system has been decommissioned, but had not been completely removed at the time of the FYR Site inspection.

Landfill Leachate Collection, Conveyance, Storage and Disposal

The leachate collection system includes 35 extraction wells and a below-grade 30,000-gallon leachate collection tank located near the southwest corner of the Site. The system has been automated to provide for continuous operation. Leachate withdrawn from the landfill by the pneumatic pump system is temporarily stored in the below-grade tank following removal from the waste mass. PATS Service, Inc. (PATS), of New Munster, Wisconsin, transports the collected leachate via tanker truck to the City of Burlington, Wisconsin, Wastewater Treatment Plant.

End Use Plan and Redevelopment of the Site

The western two-thirds of the Site have been developed into athletic fields, tennis courts and ancillary facilities for the Community High School District 117. In August of 2003, WMII completed a post-closure risk assessment (Revised Risk Assessment) entitled *Exposure Pathway Analysis and Risk Assessment for the H.O.D. Landfill Final End Use Plan.* RMT, Inc. (RMT) prepared the Revised Risk Assessment for WMII to reassess potential risks associated with limited recreational uses, assuming that groundwater would not be used at the Site.

The Revised Risk Assessment was presented in the context of: Site history; changes to the Site since the ROD (including changes to the Site as a result of the prior remedial actions); and recent operations, maintenance, and monitoring at the Site. The Revised Risk Assessment incorporated Site data, including long-term monitoring data, along with changes to toxicity and potential exposure data since the 1994 BLRA. RMT reviewed available Site information for the Revised Risk assessment, including the RI Report, the BLRA, the FS, the Predesign Investigation, and the first three rounds of long-term monitoring data.

The Revised Risk Assessment considered the following exposure pathways:

- Inhalation of airborne chemicals from the landfill;
- Dermal absorption of chemicals in surface soil;
- Dermal absorption of chemicals in surface water;
- Dermal absorption of chemicals in sediment;
- Incidental ingestion of chemicals in sediment;

RMT first considered whether any of the possible exposure pathways were likely to be complete. Based on post-remediation site conditions and the proposed final end use of the Site, RMT determined that it was not necessary to re-evaluate the following pathways in the Revised Risk Assessment, based on the following reasons:

- Inhalation of airborne chemicals from the landfill: Anyone spending time on or near the landfill area could potentially be exposed to either low concentrations of chemicals in landfill gas (LFG) that diffuses through the cover, or low concentrations of chemicals from the LFG flare. The BLRA evaluated exposure for nearby residents to fugitive LFG emissions without the gas extraction system and flare, using modeled air concentrations for off-site locations. These results showed no unacceptable risks. The gas/leachate extraction system at the Site maintains negative pressure (vacuum) within the landfill to draw LFG from the waste mass to the flare, or to the energy system for Antioch High School (which was operating at the time). By collecting, using, or combusting the LFG, the extraction system greatly reduces the potential for off-site exposures to fugitive LFG emissions. In addition, the flare has been designed to exceed federal regulatory requirements of a minimum 98 percent destruction efficiency of non-methane organic compounds. Therefore, the emissions from the flare were considered negligible.

- Inhalation of airborne chemicals volatilized from surface water: Inhalation of airborne volatile organic compounds (VOCs) could occur for recreational users spending time near, or in, Sequoit Creek. However, exposure was not expected to be significant because of the extremely low levels of VOCs found in the creek and the low frequency and short duration of human visits to the creek.

- Inhalation of airborne chemicals from surface soil VOCs or fugitive dust: As part of the remedy construction, WMII covered areas of known surface soil contamination with soil from the borrow area. In addition, maintaining a vegetative cover is a required part of the Site remedy. Therefore, volatilization or fugitive dust generation was not expected from the current surface soil under recreational site use or routine maintenance activities.

- Dermal absorption of chemicals in surface soil and/or incidental ingestion of chemicals in surface soil: WMI added soil during the remedy construction to cover areas of known surface soil contamination. Therefore, skin contact with any impacted soil or the ingestion of buried impacted soil was not expected under recreational site use or routine maintenance activities. RMT also calculated a 9×10^{-9} (nine in one billion) cancer risk associated with soils at the Site, considerably lower than EPA's threshold for concern.

As a result, RMT only evaluated the following exposure pathways in the Revised Risk Assessment:

- Dermal absorption of chemicals in surface water: Recreational site users, especially children, could wade or play in the creek, resulting in skin contact with surface water in the creek;

- Dermal absorption of chemicals in sediment: Recreational site users, especially children, could wade or play in the creek, resulting in skin contact with sediment; and

- Incidental ingestion of chemicals in sediment: Recreational site users, especially children, could wade or play in the creek. Sediment could adhere to the skin of someone playing or wading in the creek, and some incidental ingestion of sediment could occur.

Each remaining exposure pathway is related to exposure to contamination in the creek; either in the water itself, or its sediment. Redeveloping the landfill for limited recreational use would not increase the risk of exposure to any contamination in the creek because the recreational uses did not affect it, or increase the likelihood of exposure there. Chemicals detected in the creek were at low concentrations and would not pose a risk to a child or teenager occasionally wading or playing in the creek.

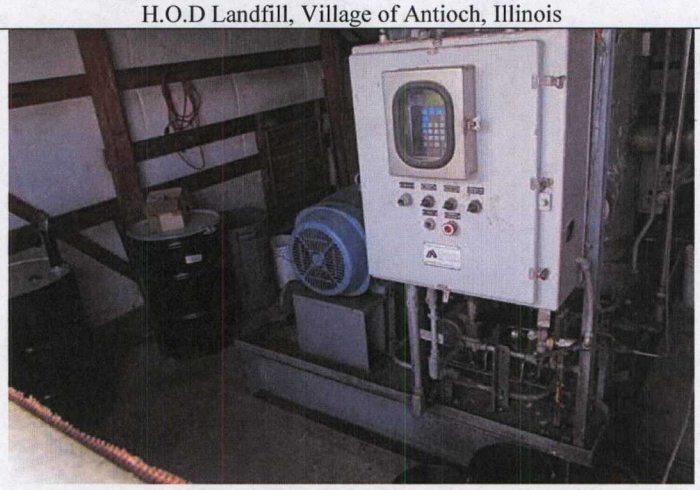
Thus, the Revised Risk Assessment determined that there were no potential exposure pathways or site-related chemicals that pose unacceptable risks to site users or that warrant further quantitative risk evaluation. Provided that the reuse activities did not negatively affect the remedy, the Revised Risk Assessment concluded that the Site was ready for use in a limited recreational capacity because all associated risks were substantially lower than EPA's levels of acceptable risk.

Based on the Revised Risk Assessment, EPA issued an ESD on August 28, 2003, which modified only that part of the original remedy from the ROD involving fencing, signs, and gates. The requirement for restrictive covenants on the Site deed, as set forth in the original ROD, was maintained to protect the integrity of the remedy, as well as limit certain Site use and development. The ESD also did not affect the prohibitions on groundwater use, as regulated by the Village's ordinances. By modifying the original remedy in the ESD regarding fencing, gates and signs, however, the Site was able to be put into productive reuse, while upholding the integrity of the remedy to remain protective of human health and the environment.

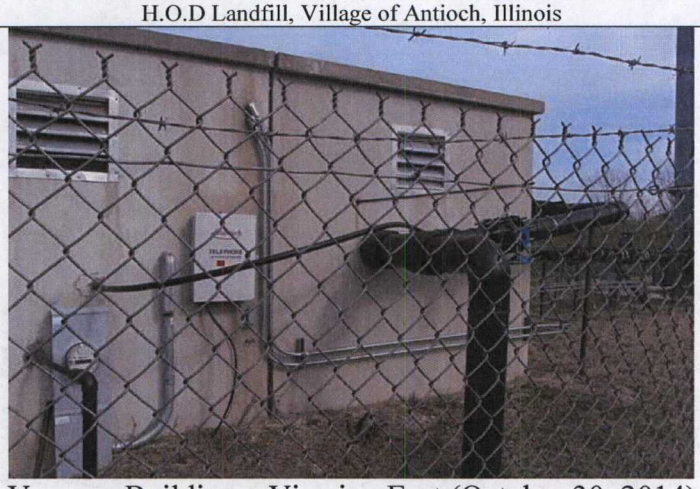
APPENDIX B – SITE MAPS

APPENDIX C – SITE INSPECTION PHOTO LOG

Gas to Energy Building - Viewing West (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois



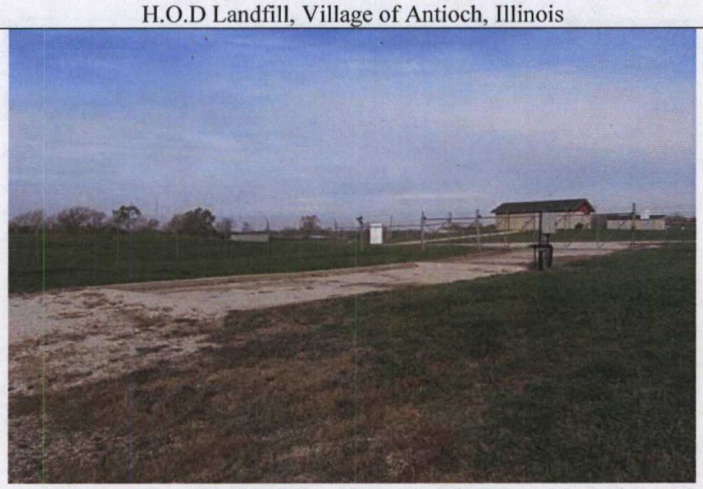
Gas to Energy Equipment – Interior View (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois



Vacuum Building – Viewing East (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

Flare Station – Viewing East (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

Vacuum Building – Interior View (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois



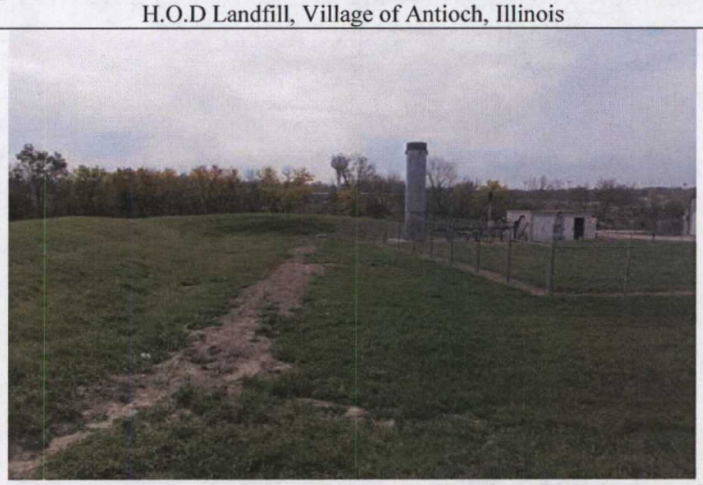
Condensate Pumping Pad – Viewing North East (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

Sample Probes – Viewing West (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

Excavated Leachate Line – Viewing North West (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

Soils From Leachate Line Excavation – Viewing West (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

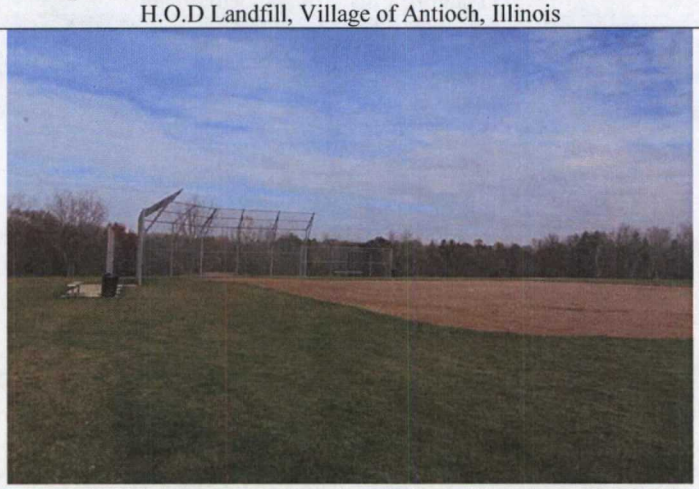
Fill Stockpile for Tennis Courts – Viewing South West (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois



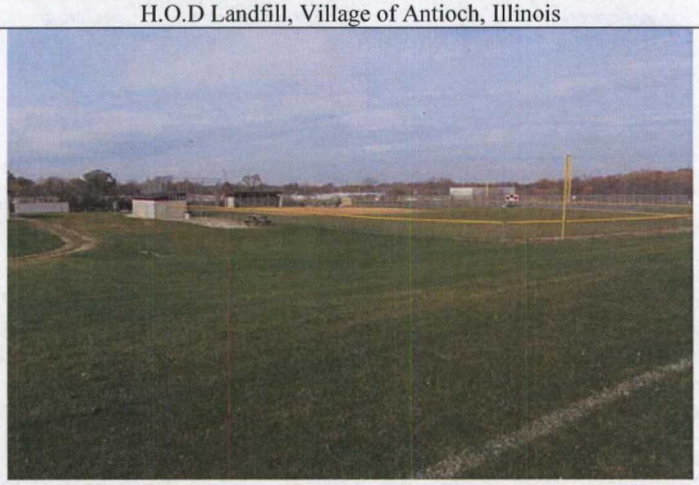
Condensate Line Excavation, Flare Station – Viewing South (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

Repaired Well Vault – Viewing South (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

Landfill Cap / Athletic Fields – Viewing North (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

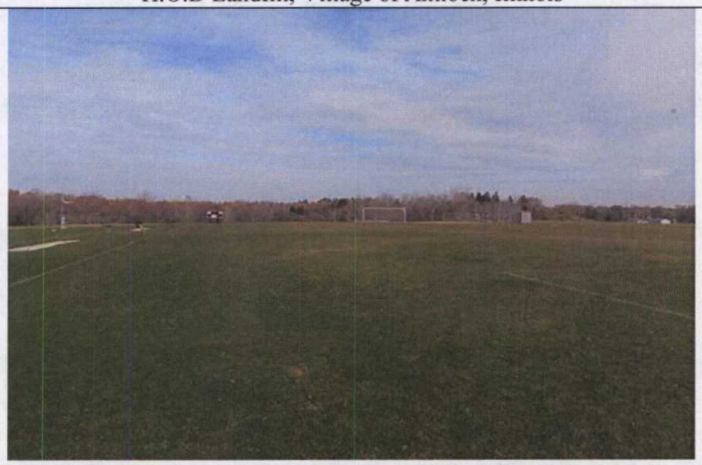


Baseball Diamond – Viewing West (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

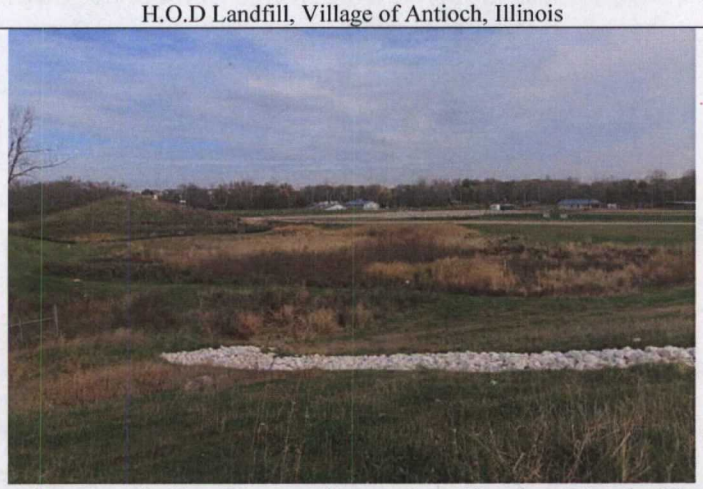


Baseball Diamond – Viewing East (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

Concession Stand / Restrooms – Viewing East (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

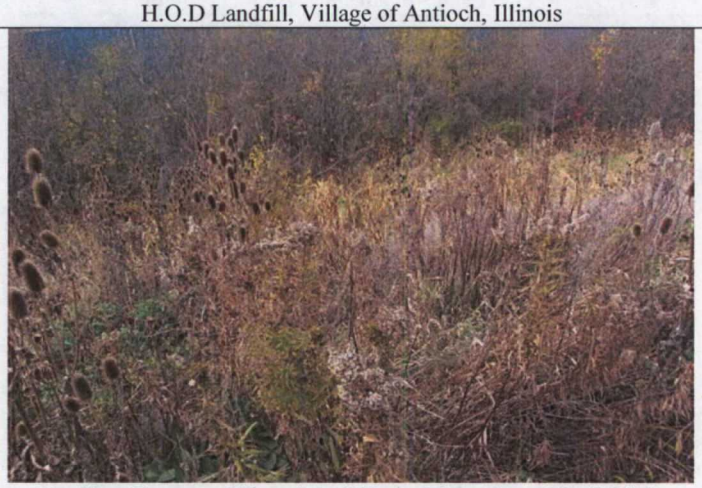


Soccer Fields – Viewing East (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

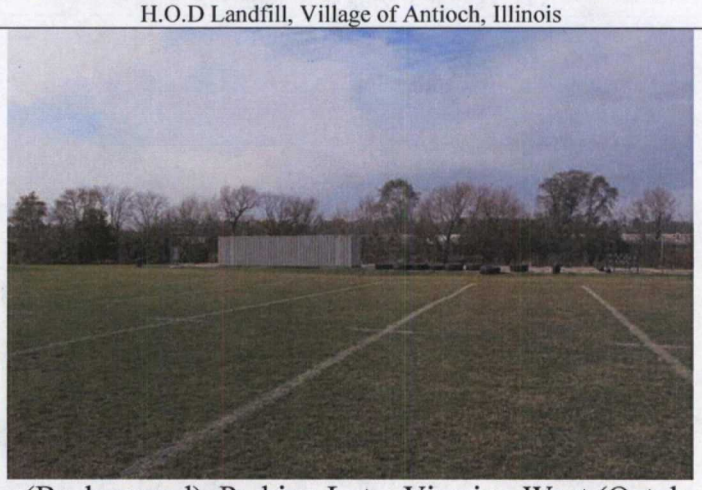


Village Park (Background), Let Down Channel – Viewing North (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

Let Down Chanel – Viewing North (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

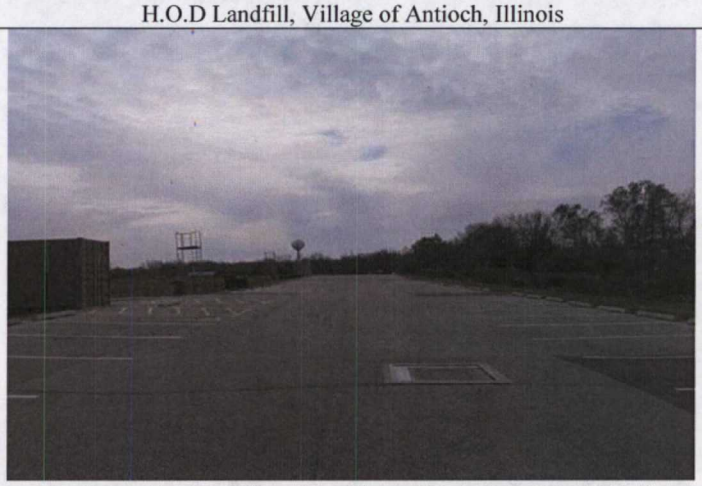


Buffer Zone – Viewing West (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

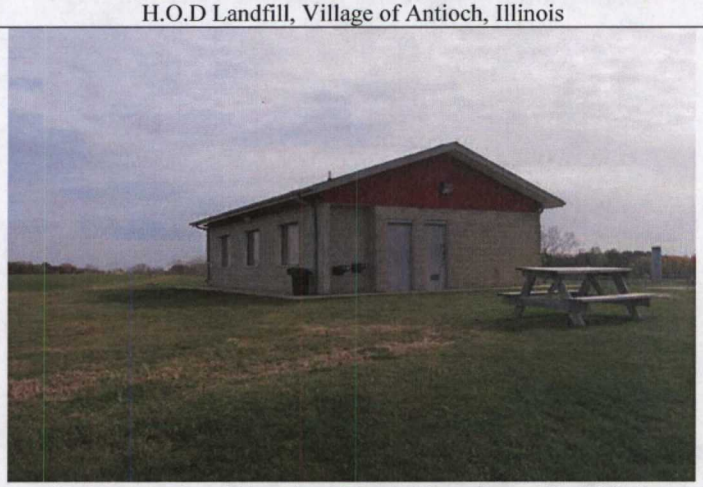


Buffer Zone (Background), Parking Lot – Viewing West (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

Settlement Crack in Tennis Court (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois



Parking Lot – Viewing East (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois



Restrooms – Viewing East (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

Fill Stockpiles – Viewing South (October 30, 2014)
H.O.D Landfill, Village of Antioch, Illinois

APPENDIX D – SITE INSPECTION CHECKLIST

Please note that O&M is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as system operations since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

I. SITE INFORMATION	
Site name: H.O.D Landfill Site	**Date of inspection:** October 30, 2014
Location and Region: Antioch, Lake County, Illinois in Region 5	**EPA ID: ILD980605836**
Agency, office, or company leading the five-year review: EPA, Region 5	**Weather/temperature:** Mostly Cloudy, Slight Wind, 51 Degrees Fahrenheit

Remedy Includes: (Check all that apply)

✓ Landfill cover/containment
✓ Access controls
✓ Institutional controls
__ Groundwater pump and treatment
✓ Surface water collection and treatment
✓ Other: Leachate / gas extraction system; leachate load out and gas collection system; and site maintenance (e.g., seeding, fertilizing, mulching)
✓ Monitored natural attenuation
__ Groundwater containment
__ Vertical barrier walls

Attachments: ✓ Inspection team roster attached ✓ Site map attached

II. INTERVIEWS ** (The Interviews section is on page 16, and in Appendix E in the 2015 H.O.D. Landfill FYR Report.) **

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

2. **O&M staff** _____ _____ _____
Name Title Date
Interviewed __ at site __ at office __ by phone Phone no. _____
Problems, suggestions; __ 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; __ Report attached _____

Agency _____

Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; __ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; __ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; __ Report attached _____

4. **Other interviews** (optional) __ Interview records are in Appendix E.

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: Documents and plans required to perform routine O&M activities are maintained at the site.

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: Copies of the Site-Specific Health and Safety Plan and lockout/tag-out plans are located on-site.

3. **O&M and OSHA Training Records** ✓ Readily available ✓ Up to date __ N/A
Remarks: Copies of applicable training records are maintained at the O&M contractor's office and at WMIL office.

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: Condensate water is collected at condensation tanks and is pumped into a tanker truck. The condensate is disposed at a local waste water treatment plant under agreement. Permits are not required under the O&M plan.

5. **Gas Generation Records** ✓ Readily available ✓ Up to date __ N/A
Remarks:

6. **Settlement Monument Records** __ Readily available __ Up to date ✓ N/A
Remarks: The O&M plan for the site does not require monitoring of settlement monuments.

7. **Groundwater Monitoring Records** ✓ Readily available ✓ Up to date __ N/A
Remarks _____

8. **Leachate Extraction Records** ✓ Readily available __ Up to date __ N/A
Remarks

9. **Discharge Compliance Records**
✓ Air ✓ Readily available ✓ Up to date __ N/A
✓ Water (effluent) ✓ Readily available ✓ Up to date __ N/A
Remarks

10. **Daily Access/Security Logs** __ Readily available __ Up to date ✓ N/A
Remarks: The site is accessible to the public for use as athletic fields. Locked gates are used during closed hours to limit access to the site.

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 ✓ Not readily available
✓ Funding mechanism/agreement in place
Original O&M cost estimate: **$434,000**

Total estimated annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
01/02/2010	01/31/2010	$201,628	__ Breakdown attached
01/01/2011	02/31/2011	$201,628	__ Breakdown attached
01/01/2012	01/31/2012	$201,628	__ Breakdown attached
01/01/2013	01/31/2013	$201,628	__ Breakdown attached
01/01/2014	01/31/2014	$201,628	__ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: N/A

V. ACCESS AND INSTITUTIONAL CONTROLS ✓ Applicable __ N/A

A. Fencing

1. **Fencing damaged** __ Location shown on site map ✓ Gates secured __ N/A
Remarks:

B. Other Access Restrictions

1. **Signs and other security measures** ✓ Location shown on site map __ N/A
Remarks:

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): Self-reporting and drive by monitoring.
Frequency: Frequency depends on the monitoring feature of the media, and is conducted annually, monthly, quarterly, semiannually and weekly for various parameters.
Responsible party/agency: Implementation is conducted by WMIL and Village of Antioch with oversight by EPA Region 5.

Contact	Mike Peterson, WMI	District Manager, Closed Landfill Sites	10/30/2014	(262) 532-4024
	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: WMIL still needs to file the deed at the county courthouse and submit an Institutional Control Plan (ICP).

2. **Adequacy** __ ICs are adequate ✓ ICs are inadequate __ N/A
Remarks: WMIL still needs to file the deed at the county courthouse and submit an Institutional Control Plan (ICP).

D. General

1. **Vandalism/trespassing** __ Location shown on site map ✓ No vandalism evident
Remarks

2. **Land use changes on site** __ N/A
Remarks: No land use changes have occurred on the site. Previously, the landfill cap area was raised six feet with general fill and converted to athletic playing fields by the Antioch School District. The site is still currently utilized as athletic playing field, however the School district may change some areas to meet demand. The Tennis court area is anticipated to be removed in whole due to settlement and replaced with turf and/or other surfacing.

3. **Land use changes off site** __ N/A
Remarks: There have been no changes to off Site land use since the last Five Year Report.

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: N/A

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: The landfill cover is considered to be in good condition. The Antioch School district placed approximately six feet of general fill over the cap. The fill was graded and currently used for athletic playing fields. As such the cap cannot be directly observed however land use and maintenance of the athletic fields are protective of the cap. There is minor settlement of up to a few inches observed in the athletic fields throughout the landfill area. It is possible that some of the settlement is related to improper placement and compaction of the general fill layer at the time of construction. The settlement does not appear to affect cap performance or surface water drainage at the site and is noted only as an inconvenience to on-going use and maintenance of the athletic fields. The tennis courts on the south side of the site were removed on July 31, 2015 and replaced with turf. Large scale settlement, pot holes, or ponding was not observed.

2. **Cracks** __ Location shown on site map ✓ Cracking not evident
Lengths_____ Widths_____ Depths_____
Remarks_____

3. **Erosion** G Location shown on site map ✓ Erosion not evident
Areal extent_____ Depth_____
Remarks_____

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: The vegetative cover consists of highly maintained turf that is used as athletic fields by the Antioch School District.

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_____

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 __ N/A
   Remarks_____

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

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

B. Surface Water Collection Structures, Pumps, and Pipelines __ Applicable ✓ N/A

1. **Collection Structures, Pumps, and Electrical**
   __ Good condition __ Needs Maintenance
   Remarks_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   __ Good condition __ Needs Maintenance
   Remarks_____

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

C. Treatment System __ Applicable ✓ N/A

1. **Treatment Train** (Check components that apply)
   __ Metals removal __ Oil/water separation __ Bioremediation
   __ Air stripping __ Carbon adsorbers
   __ Filters A clarifier is used to remove solids from treated groundwater prior to discharge.
   __ Additive (*e.g.*, chelation agent, flocculent) Nutrients (ammonium chloride and phosphoric acid)
   __ 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 <1,000,000 gallons per year
   __ 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

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.

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 HOD Landfill site is being implemented to contain the on-site waste materials, minimize gas emissions, and contain the contaminant plume. The source control remedial measures implemented at the site primarily include installation and maintenance of perimeter fencing, a landfill cap, and landfill gas extraction and flaring system. Continued maintenance of the perimeter fencing and cap is effective in prohibiting contact with contaminants in the waste. Operation of the landfill gas extraction and flaring system continues to remove contaminants from within the waste and does not present an air emission concern. These measures appear to be operating as designed. Natural attenuation is apparently effective in that the defined limits of groundwater contamination at the site have not increased.

The remedy at the site currently protects human health and the environment in the short term. 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, and there is no evidence of unacceptable levels of groundwater contaminants away from the Site property or unacceptable groundwater use in the area of the plume. However, in order for the remedy to be protective in the long term, the remedy must attain groundwater cleanup objectives. There are several subsurface areas where groundwater concentrations remain in excess of established clean-up levels.

The implemented remedy has not achieved applicable, or relevant and appropriate requirements, because long-term achievement of MCLs has not yet been accomplished. Groundwater monitoring data were reviewed and the lateral extent of the plume continues to remain on-site and is stable. There is no evidence of potential exposure to waste at the site; there is no cracking, sliding, or other indicators of cap breaches; and landfill gas is successfully being collected and adequately treated or disposed. There has been some settlement of the landfill cap over the past 10 years, especially on the west side of the landfill where some of the athletic fields, including the former tennis courts and soccer fields that were built during reuse and redevelopment of the Site in 2003-2007. However, those athletic fields were removed in July 2015 by the Community High School District 117, and three feet of soil was backfilled in those areas, along with seeding, to prevent erosion a breach of the cap at the Site.

The remedy appears to be functioning effectively and as designed. (See text in the Five-Year Review for more specific details)

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

The implementation and scope of O&M procedures appear adequate. (See text in the Five-Year Review for more specific details.)

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.

WMII and EPA have worked collaboratively to utilize the opportunity to optimize monitoring tasks at the Site. In 2006, WMII submitted a request to EPA for a revision to the Groundwater. Surface Water and Leachate Monitoring. EPA approved the request for reduced groundwater monitoring in 2007. (See text in the Five-Year Review for more specific details.)

WMII continues to make progress in beneficial use of the site. Most of the usable portions of the Site are currently being utilized as athletic practice fields for the Antioch School District. A Village of Antioch park borders the north of the site. The remaining bordering properties include wetlands to the east and mixed industrial/institutional facilities to the west and south. Antioch School District also maintained a gas to electric power generation system that utilized landfill gas to power turbines for the generation of electricity. The system was successful, however it was removed from service due to ongoing maintenance costs that exceeded the savings generated by the system.

APPENDIX E – INTERVIEW RECORDS

H.O.D. Landfill Superfund Site Five-Year Review
Comment and Information Survey

Name: Michael L. Peterson **Date:** 11/11/2014	**Organization:** Waste Management of Illinois, Inc. (WMII)
Telephone No: (262) 509-5638 **Fax No:** NA **E-Mail Address:** mpeterso2@wm.com	**Street Address:** W124 N9355 Boundary Road **City:** Menomonee Falls **State, Zip: Wisconsin,** 53051

1. What is your overall impression of the cleaned-up portions of this Superfund Site? (general sentiment)

Positive – The site is in good condition and it's nice to see the public being able to use a former landfill site for recreation.

2. Are you aware of any community concerns regarding the site administration related to completed clean-up activities? If so, please give details.

No

3. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give dates, details, and outcome(s) if known.

Except for a small fenced area where several landfill gas/leachate control systems are present, the site is open to the public. There have been no issues with vandalism or trespassing in that area. Furthermore, WMII is not aware of any recent vandalism, trespassing or emergency responses from local authorities.

4. Do you have any comments, suggestions, or recommendations regarding the site's management or operation? Please provide an update on the redevelopment/reuse portion of the Site. Are there any plans to address the settling that was observed at the tennis courts, athletic fields, etc., during the last five-year review site visit in 2010, on the redeveloped portion of the Site?

The redevelopment/reuse portion of the site is operated under lease by the Village of Antioch School District (117). According to the terms of the lease, WMII is not responsible for construction, operation or maintenance of those developments (i.e., tennis courts, concession building, etc.). Settlement of the landfill was anticipated over time. WMII typically works with the High School to address maintenance issues when they arise to assure they are handled in accordance with the goals of the remedy for the site.
The High School plans to remove the tennis courts and cover the area with topsoil and expand the football practice field to this area. Note that there was a significant amount of fill brought in to bring this area up to the desired grade for the recreational use. There is approximately 7 additional feet of cover above the cap in the area of the tennis courts.
Operation and maintenance of the site is satisfactory.

(Form continued on next page)

Name: Mike Peterson **Organization:** Waste Management of Illinois, Inc. (WMII)
Date: 11/11/2014

5. Are you aware of any issues that may require changes to the completed remedial actions or the decision documents?

Leachate extraction calculations completed during the pre-design phase do not appear to accurately forecast the volume of leachate needed to be removed to establish an inward gradient (761 ft. MSL) with groundwater in the vicinity of the site. WMII continues to extract more leachate than forecast and leachate heads do not meet the maintenance levels at all locations. Fluctuations in leachate heads over time are likely due to other factors rather than pump(s) fault or maintenance.
Recreational concepts require additional consideration with respect to general landfill management principles – i.e. irrigation v. leachate minimization and grass maintenance (mowing short v. longer for evapotranspiration).

Given the site conditions, semi-annual reporting is no longer necessary. Annual reporting is appropriate, with continued supplemental evaluation of semi-annual groundwater data.

Leachate treatment by the Village of Antioch is not expected to be a viable long term solution. The leachate quality is relatively dilute and the volume high with regard to the capacity of the Village plant. Pre-treatment would significantly increase leachate management costs.

6. Have any problems or difficulties been encountered regarding property redevelopment, institutional controls or deed restrictions?

To date all parties have been able to work through issues to maintain the reuse of the site. The existing institutional controls appear to be adequate in prohibiting additional private water supply wells in the vicinity of the site.

7. Do you feel the completed remedies are functioning as expected? Why or why not?

Landfill Cap – yes, the landfill cap effectively eliminates the potential for direct contact with the waste at the site.

Landfill Gas Management System – yes, although gas quality and quantity continues to decrease over time. Gas migration or emissions are not an issue, as defined by the perimeter monitoring data (ambient air and probe).

Leachate Management – individual extraction wells are functioning as designed although pumping more leachate than expected. This results in higher O&M costs and increased maintenance. Fouling of limited sections of the leachate forcemain is occurring more rapidly than expected.

Groundwater – Natural attenuation is functioning as expected as VOC concentrations in groundwater are stable over time.

8. Are you aware of any issues, which may call into question the site's short-term or long-term protectiveness?

No, WMII is not aware of any issues with the quality of the water produced by the Village of Antioch wells. VOCs have not been quantified in samples from VW3 over the past 5 years.

9. Are you aware if there are any trends that indicate contaminant levels are increasing or decreasing?

Concentration of VOCs in groundwater are generally stable. Slight fluctuations in concentrations are typical of natural attenuation in groundwater.

VOCs (cis and trans DCE and VC) are only consistently reported in laboratory analysis of samples from one well in the DSGA (US03D). Other VOCs in samples from shallow wells is inconsistent and generally are not confirmed in subsequent sampling.

 (Form continued on next page)

Name: Mike Peterson
Date: 11/11/2014

10. Is there a continuous O&M presence? Please describe staff and frequency of site inspections and activities.

WMII provides a periodic O&M presence. There are weekly, monthly, quarterly, semi-annual and annual tasks that are performed by a number of WMII employees or outside contractors.

The site also has a process controller that was updated in 2014 that continuously monitors the leachate level in the holding tank, and the flare, blower, and compressor operation. If there is a problem with one of these components, a notification is sent by e-mail to a WMII technician to further evaluate the system(s). The system also notifies the leachate hauler when the holding tank needs to be pumped.

The WMII technician visits the site on a weekly basis, or as needed in response to the monitoring system. He also completes a monthly site inspection and monitoring of landfill gas quality at the flare.

Leachate is removed from the holding tank as needed by Pats Septic Tank Pumping and transported to the City of Burlington for disposal.

Liquid levels in the extraction wells are measured quarterly by WMII staff. Pump maintenance is scheduled as necessary, based on evaluation of the quarterly measurements.

Groundwater, leachate and surface water sampling performed semi-annually by outside contractor (EMT). Sample analysis is performed by a contract laboratory (Test America).

The data from the activities above is reviewed and summarized in semi-annual and annual reports prepared by an outside contractor (SCS Engineers). SCS also prepares an interim review of semi-annual data that is submitted to EPA and IEPA; that review includes comparison of data from that period to established site-wide protection standards.

11. Have there been any significant changes in O&M requirements, maintenance schedules, or sampling routines? If so, do they affect the protectiveness or effectiveness of the remedy?

The O&M requirements, maintenance schedules, and sampling routines have not changed since the last 5 year review.

It should be noted that the High School has decided to cease operation of the landfill gas to energy facility (June 2013) that was primarily constructed off-site – at the local High School. Components of the gas to energy system that were on-site (i.e., compressor, scrubber, etc.) and maintained by the school district have been taken out of operation. This change in operation of their system does not materially affect the operation of the landfill gas management system at the site, since the two systems were installed and operated independently in the past. The landfill gas is now managed entirely on-site (i.e., flaring). WMII has installed an updated continuous remote monitoring system in 2014 for the components that are currently in operation.

12. Have there been unexpected O&M difficulties or costs at the site? If so, please give details.

Increased leachate extraction rates have caused increased wear on the pumps and indirectly contributed to fouling in limited sections of the forcemain.

Landfill settlement was anticipated and is typical of solid waste landfills.

13. Do you have any other comments, concerns or recommendations regarding the project?

No.

(End of WMII's Interview Form)

(03/03/2015: Survey created by Karen L. Mason-Smith)

APPENDIX F – VILLAGE OF ANTIOCH ORDINANCES

Antioch, Illinois: Village Code

Title 8 – PUBLIC WAYS, PROPERTY AND UTILITIES

Chapter 1 - COMBINED WATERWORKS AND SEWERAGE SYSTEM

8-1-1: MANDATORY CONNECTIONS REQUIRED:

A. Use Of Public Water Supply And Sewer Required: It shall be the duty of the owner, occupant or party or parties in possession of any house, structure, factory, industrial or commercial establishment or any other building of any other character located on property abutting on the public waterworks and sewerage system, to cause such house, structure, factory, industrial or commercial establishment or any other building of any other character to be connected with the said waterworks and sewerage system within ninety (90) days from the date that water or sewerage facilities become available to such property, whichever is the event last to occur. (1976 Code § 52.009)

B. Mandatory Water Supply And Sewer Extensions: Any person required under the provisions of this chapter to connect to the public water system of the village or any person desirous of connecting to the public water system is required, at his expense, to extend any water line through the entire frontage or depth of the person's property as the case may be, to the end of the person's property line. It is the intent of this subsection to provide that all extensions of public water lines shall be to the end of any person's property, thus making future extensions more readily accessible to adjacent property owners. (1976 Code § 52.011)

C. Enforcement: A copy of this chapter, properly certified by the village clerk, shall be filed in the office of the recorder of deeds of Lake County, and shall be deemed notice to all owners of real estate of their liability for service supplied to any user of the service of the combined waterworks and sewerage system of the village on their properties, and it shall be the duty of the village clerk and such other officers of this village to take all action necessary or required by the laws of the state of Illinois thereunto enabling to file all claims and liens for money due to the village and to prosecute and enforce such claims in the manner, form and time as permitted by the laws of the state of Illinois. (1976 Code § 52.010)

Chapter 2 - SEWER USE AND PRETREATMENT

8-2-3-1: USE OF PUBLIC SEWERS REQUIRED:

A. It shall be unlawful for any person to place, deposit or permit to be deposited in any unsanitary manner on public or private property within the village or in any area under the jurisdiction of the village, any human or animal excrement, garbage or other objectionable waste.

It shall be unlawful to discharge to any natural outlet within the village, or in any area under the jurisdiction of the village, without the express approval from the village engineer (VE) that all state and federal effluent limitations have been met and there are no reasonable alternative methods of disposal.

B. Except as hereinafter provided, it shall be unlawful to construct or maintain any privy, privy vault, septic tank, cesspool or other facility intended or used for the disposal of sewage.

C. The owner of all the houses, buildings, or properties used for human occupancy, employment, recreation or other purpose situated within the village and abutting on any street, alley or right of way in which there is now located or may in the future be located any public sanitary sewer of the village, is hereby required

at his expense to install suitable toilet facilities therein, and to connect such facilities directly with the proper public sewer in accordance with the provisions of this chapter, within ninety (90) days after date of official notice to do so, provided that said public sewer is within two hundred feet (200') (61 m) of the property line. If such public sewer benefits other properties, the village board may enact a recapture ordinance and make best efforts to assure that the benefited property owners pay to the owner amounts as required. All public sewer extensions shall be made in accordance with section 8-2-2-2 of this chapter.

D. It shall be unlawful to discharge any sanitary waste, including, without limitation, any residential, commercial or industrial liquid waste product into any storm sewer, drainage facility, retention pond, detention pond or other stormwater control structure or device located within the village limits. (Ord. 13-01-02, 1-21-2013)

APPENDIX G – MODEL ENVIRONMENTAL COVENANTS

[Space above reserved for recording information]

This instrument was prepared by:

Name:
Address:

Please return this instrument to:

Name:
Address:

ENVIRONMENTAL COVENANT

1. This Environmental Covenant is made this _____ day of _____, 20__, by and among [Name of Current Fee Owner] (Grantor) and the Holders/Grantees further identified in paragraph 3 below pursuant to the Uniform Environmental Covenants Act, 765 ILCS Ch. 122 (UECA) for the purpose of subjecting the Property to the activity and use limitations described herein.

2. Property and Grantor.

A. Property: The real property subject to this Environmental Covenant is located at [street address, if any] in [City] _____ County, Illinois and is legally described in Appendix A, hereinafter referred to as the "Property".

B. Grantor: [Name of Current Fee Owner] is the current fee owner of the Property and is the "Grantor" of this Environmental Covenant. The mailing address of the Grantor is _____.

3. Holders (and Grantees for purposes of indexing).

A. Illinois EPA is a Holder (and Grantee for purposes of indexing) of this Environmental Covenant pursuant to its authority under Section 3(b) of UECA. The mailing address of the Illinois EPA is 1021 N. Grand Avenue East, P.O. Box 19276, Springfield, IL 62794-9276.

[**B.** Name of current fee owner is a Holder (and Grantee for purposes of indexing) of this Environmental Covenant pursuant to UECA. The mailing address of _____ is _____. Regardless of any future transfer of the Property, [Name of current fee owner] shall remain a Holder of this Environmental Covenant. [Name of current fee owner] is to be identified as both Grantee and Grantor for purposes of indexing.]

[**C.** Other entity, such as a Major PRP, is a Holder (and Grantee for purposes of indexing) of this Environmental Covenant pursuant to UECA. The mailing address of _____ is _____.]

4. **Agencies.** The Illinois EPA and the U.S. EPA are "Agencies" within the meaning of Section 2(2) of UECA. The Agencies have approved the environmental response project described in paragraph 5 below and may enforce this Environmental Covenant pursuant to Section 11 of UECA.

5. **Environmental Response Project and Administrative Record.**

A. This Environmental Covenant arises under an environmental response project as defined in Section 2(5) of UECA.

B. The Property is part of the _____ Site undergoing environmental remediation pursuant to [statutory authority]. Activity and use limitations are required under the plan for environmental remediation approved by the Agencies at the _____ Site. [Discuss actions or conditions that relate to or necessitate activity and use limitations]

Example: NPL Site: The Property is part of the _____ Site, which the U.S. EPA, pursuant to Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9605, placed on the National Priorities List, set forth at 40 C.F.R. Part 300, Appendix B. In a Record of Decision (ROD) signed by the U.S. EPA Region 5 Superfund Division Director on [date] and concurred by the Director of Illinois EPA on [date], the Agencies approved a plan for environmental remediation of the Site. In [Consent Decree,] [Settling Defendants] agreed to implement the remedial action plan in the ROD including _____. The remedial action plan requires implementation and compliance with land and groundwater activity and use limitations at the Site in order to [prevent unacceptable exposures from hazardous substances] remaining at the Site.

C. Grantor wishes to cooperate fully with the Agencies in the implementation, operation, and maintenance of all response actions at the Site.

D. The Administrative Record for the environmental response project at the ____ Site (including the Property) is maintained at _____ [NPL Site Example: at the U.S. EPA Superfund Record Center, 7th Floor, 77 West Jackson Blvd, Chicago, Illinois 60604. Persons may also contact Jan Ogden, IEPA, Bureau of Land, #24, 1021 N. Grand Avenue East, P.O. Box 19276, Springfield, IL 62794-9276 for the Administrative Record or other information concerning the Site.]

6. **Grant of Covenant. Covenant Runs With The Land.** Grantor creates this Environmental Covenant pursuant to UECA so that the Activity and Use Limitations and associated terms and conditions set forth herein shall "run with the land" in accordance with Section 5(a) of UECA and shall be binding on Grantor, its heirs, successors and assigns, and on all present and subsequent owners, occupants, lessees or other person acquiring an interest in the Property.

7. **Activity and Use Limitations.** The following Activity and Use Limitations apply to the use of the Property:

[EXAMPLES:

A. **Restricted Land Use: All uses of the Property are prohibited except those compatible with industrial land use. Examples of land uses that are prohibited include: residential uses; occupancy on a 24-hour basis; and uses to house, educate or provide care for children, the elderly, the infirm, or other sensitive subpopulations.**

B. **Restricted groundwater use:** **Except as required as part of an U.S. EPA or Illinois EPA approved response activity, construction of wells and activities that extract, consume, or otherwise use any groundwater are prohibited on the Property.**

C. **No interference with hazardous waste cap: Except as provided in a plan approved in writing by U.S. EPA, the following activities are prohibited in the hazardous waste cap portion of the Property described in Appendix B: a) any excavation or other intrusive activity that could affect the integrity of the hazardous waste cap (three feet of clay covered by a two foot layer of sand and four inches of topsoil); b) any disturbance of the [type] wastes underneath the cap; and/or c) any interference with or covering of the "capped iron (set)" permanent markers placed at the boundaries of the hazardous waste cap at the locations identified in Appendix B.**

8. **Right of Access**. Grantor consents to officers, employees, contractors, and authorized representatives of the Holders, Illinois EPA and U.S. EPA entering and having continued access at reasonable times to the Property for the following purposes:

A. Implementing, operating and maintaining the environmental response project described in paragraph 5 above;

B. Monitoring and conducting periodic reviews of the environmental response project described in paragraph 5 above including without limitation, sampling of air, water, groundwater, sediments and soils;

C. Verifying any data or information submitted to U.S. EPA or Illinois EPA by Grantor and Holders; and

D. Verifying that no action is being taken on the Property in violation of the terms of this instrument, the environmental response project described in paragraph 5 above or of any federal or state environmental laws or regulations;

Nothing in this document shall limit or otherwise affect U.S. EPA and Illinois EPA's rights of entry and access or U.S. EPA's and Illinois EPA's authority to take response actions under CERCLA, the National Contingency Plan ("NCP"), RCRA or other federal and state law.

9. **Reserved rights of Grantor**: Grantor hereby reserves unto itself, its successors, and assigns, including heirs, lessees and occupants, all rights and privileges in and to the use of the Property which are not incompatible with the activity and use limitations identified herein.

10. **No Public Access and Use**: No right of access or use by the general public to any portion of the Property is conveyed by this instrument.

11. **Future Conveyances, Notice and Reservation**:

A. Grantor agrees to include in any future instrument conveying any interest in any portion of the Property, including but not limited to deeds, leases and mortgages, a notice and reservation which is in substantially the following form:

THE INTEREST CONVEYED HEREBY IS SUBJECT TO AND GRANTOR SPECIFICALLY RESERVES THE ENVIRONMENTAL COVENANT EXECUTED UNDER THE UNIFORM ENVIRONMENTAL COVENANTS ACT (UECA) AT 765 ILCS CH. 122 RECORDED IN THE OFFICIAL PROPERTY RECORDS OF _____ COUNTY, ILLINOIS ON _____ AS DOCUMENT NO. _____, IN FAVOR OF AND ENFORCEABLE BY GRANTOR AS A UECA HOLDER, THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY AS A UECA HOLDER AND THE U.S. ENVIRONMENTAL PROTECTION AGENCY AS A UECA AGENCY.

B. Grantor agrees to provide written notice to Illinois EPA and U.S. EPA within 30 days after any conveyance of fee title to the Property or any portion of the Property. The notice shall identify the name and contact information of the new owner in fee, and the portion of the Property conveyed to that owner.

12. <u>Enforcement and Compliance</u>.

A. Civil Action for Injunction or Equitable Relief. This Environmental Covenant may be enforced through a civil action for injunctive or other equitable relief for any violation of any term or condition of this Environmental Covenant, including violation of the Activity and Use Limitations under Paragraph 7 and denial of Right of Access under Paragraph 8. Such an action may be brought individually or jointly by:

i. the Illinois Environmental Protection Agency;
ii. the Holders of the Environmental Covenant;
iii. U.S. Environmental Protection Agency;
[iv. Other federal agency such as U.S. Department of Energy or U.S. Department of Army when Site is a federal facility]; and
[v. Other Entity such as Municipality or Environmental Group.]

B. Other Authorities Not Affected. No Waiver of Enforcement. All remedies available hereunder shall be in addition to any and all other remedies at law or in equity, including CERCLA. Nothing in this Environmental Covenant affects U.S. EPA or Illinois EPA's authority to take or require performance of response actions to address releases or threatened releases of hazardous substances or pollutants or contaminants at or from the Property, or to enforce a consent order, consent decree or other settlement agreement entered into by U.S. EPA or Illinois EPA. Enforcement of the terms of this instrument shall be at the discretion of the Holders, the U.S. EPA and Illinois EPA and any forbearance, delay or omission to exercise its rights under this instrument in the event of a breach of any term of this instrument shall not be deemed to be a waiver by the Holders, U.S. EPA or Illinois EPA of such term or of any subsequent breach of the same or any other term, or of any of the rights of the Holders, U.S. EPA or Illinois EPA of such term or of any subsequent breach of the same or any other term, or of any of the rights of the Holders, U.S. EPA or Illinois EPA.

C. Former Owners And Interest Holders Subject to Enforcement. A fee owner, or other person that holds any right, title or interest in or to the Property remains subject to enforcement with respect to any violation of this Environmental Covenant by the owner or other person which occurred during the time when the owner or other person was bound by this Environmental Covenant regardless of whether the owner or other person has subsequently conveyed the fee title, or other right, title or interest, to another person.

13. **Waiver of certain defenses**: This Environmental Covenant may not be extinguished, limited, or impaired through issuance of a tax deed, foreclosure of a tax lien, or application of the doctrine of adverse possession, prescription, abandonment, waiver, lack of enforcement, or acquiescence, or similar doctrine as set forth in Section 9 of UECA.

14. **Representations and Warranties**: Grantor hereby represents and warrants to the Illinois EPA, U.S. EPA and any other signatories to this Environmental Covenant that, at the time of execution of this Environmental Covenant, that the Grantor is lawfully seized in fee simple of the Property, that the Grantor has a good and lawful right and power to sell and convey it or any interest therein, that the Property is free and clear of encumbrances, except those noted on **Appendix D** attached hereto, and that the Grantor will forever warrant and defend the title thereto and the quiet possession thereof. After recording this instrument, Grantor will provide a copy of this Environmental Covenant to all holders of record of the encumbrances including those entities noted on **Appendix D**.

15. **Amendment or Termination**. Except the Illinois EPA and U.S. EPA, all Holders and other signers waive the right to consent to an amendment or termination of the Environmental Covenant. This Environmental Covenant may be amended or terminated by consent only if the amendment or termination is signed by the Illinois EPA, U.S. EPA and the current owner of the fee simple of the Property, unless waived by the Agencies. If Grantor no longer owns the Property at the time of proposed amendment or termination, Grantor waives the right to consent to an amendment or termination of the Environmental Covenant.

16. **Notices**: Any notice, demand, request, consent, approval, or communication that either party desires or is required to give to the other shall be in writing and shall either be served personally or sent by first class mail, postage prepaid, addressed as follows:

To Grantor:

_____

_____

_____

To Holder:

_____

_____

_____

To Agencies:

U.S. Environmental Protection Agency
Superfund Division Director
77 West Jackson Boulevard
Chicago, IL 60604

Illinois Environmental Protection Agency
Chief, Bureau of Land
1021 N. Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

17. Recording and Notice of Environmental Covenant, Amendments and Termination.

A. The Original Environmental Covenant. An Environmental Covenant must be recorded in the Office of the Recorder or Registrar of Titles of the county in which the property that is the subject of the Environmental Covenant is located. Within 30 days after the Illinois EPA and U.S. EPA (whichever is later) sign and deliver to Grantor this Environmental Covenant, the Grantor shall record this Environmental Covenant in the office of the County Recorder or Registrar of Titles for the County in which the Property is located. .

B. Termination, Amendment or Modification. Within 30 days after Illinois EPA and U.S. EPA (whichever is later) sign and deliver to owner in fee any termination, amendment or modification of this Environmental Covenant, the owner shall record the amendment, modification, or notice of termination of this Environmental Covenant in the office of the County Recorder or Registrar of Titles in which the Property is located.

C. Providing Notice of Covenant, Termination, Amendment or Modification. Within 30 days after recording this Environmental Covenant, the Grantor shall transmit a copy of the Environmental Covenant in recorded form to:

i. the Illinois EPA;
ii. the U.S. EPA;
iii. each person holding a recorded interest in the Property, including those interests in Appendix D;
iv. each person in possession of the Property; and
v. each political subdivision in which the Property is located.

Within 30 days after recording a termination, amendment or modification of this Environmental Covenant, the owner in fee shall transmit a copy of the document in recorded form to the persons listed in items i to v above.

[Optional -- 18. Compliance Reporting. The owner in fee shall submit to Illinois EPA on an annual basis a written report confirming compliance with the Activity and Use Limitations provided in Paragraph 7. Reports shall be submitted on the first July 1 that occurs at least six months after the effective date of this Environmental Covenant, and on each succeeding July 1 thereafter. Owner shall notify the Illinois EPA as soon as possible of any actions or conditions that would constitute a breach of the Activity and Use Limitations in Paragraph 7.]

19. General Provisions:

A. Controlling law: This Environmental Covenant shall be construed according to and governed by the laws of the State of Illinois and the United States of America.

B. Liberal construction: Any general rule of construction to the contrary notwithstanding, this instrument shall be liberally construed in favor of the Grantor to effect the purpose of this instrument and the policy and purpose of the environmental response project and its authorizing legislation. If any provision of this instrument is found to be ambiguous, an interpretation consistent with the purpose of this instrument that would render the provision valid shall be favored over any interpretation that would render it invalid.

C. **No Forfeiture**: Nothing contained herein will result in a forfeiture or reversion of Grantor's title in any respect.

D. **Joint Obligation**: If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

E. **Captions**: The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon construction or interpretation.

20. **Effective Date.** This Environmental Covenant is effective on the date of acknowledgement of the signature of the Illinois EPA and U.S. EPA, whichever is later.

21. **List of Appendices:**

Appendix A – Legal Description and map of the Property
Appendix B – Legal Description and survey of cap
Appendix C – Location of monitoring wells
Appendix D – List of Recorded Encumbrances

[Signature Pages to follow]

[Use next sentence if Grantor is an organization rather than an individual]

[THE UNDERSIGNED REPRESENTATIVE OF THE GRANTOR REPRESENTS AND CERTIFIES THAT HE/SHE IS AUTHORIZED TO EXECUTE THIS ENVIRONMENTAL COVENANT.]

IN WITNESS WHEREOF, THIS INSTRUMENT HAS BEEN EXECUTED ON THE DATES INDICATED BELOW:

FOR THE GRANTOR:

<NAME OF CURRENT OWNER>

By_____ (signature)

[Name of signer] _____ (print)

[Title] _____ (print)

State of Illinois)
) SS.
County of _____)

On _____, 20 __, this instrument was acknowledged before me by, <Name>, [use following when Grantor is an organization] [<Title> of <Name of Grantor>, on behalf of <Grantor>].

_____(signature)
Notary Public
My Commissioner Expires _____

FOR THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

By_____ (signature)

_____ , Director
Illinois Environmental Protection Agency

State of Illinois)
)SS.
County of)

This instrument was acknowledged before me on _____, 20____, by _____, a delegate of the Director of the Illinois Environmental Protection Agency, a state agency, on behalf of the State of Illinois.

_____ (signature)
Notary Public
My Commission Expires _____

FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

On behalf of the Administrator of the
United States Environmental Protection Agency

By: _____
Richard C. Karl, Director
Superfund Division
U.S. Environmental Protection Agency, Region 5

STATE OF ILLINOIS)
) SS.
COUNTY OF COOK)

The foregoing instrument was acknowledged before me this ___ day of _____, 20__, by Richard C. Karl, Director, Superfund Division, Region 5 of the United States Environmental Protection Agency.

_____ (signature)
Notary Public
My Commission Expires _____

APPENDIX H – DOCUMENTS REVIEWED

REFERENCES

1. Baseline Risk Assessment for H.O.D. Landfill Site (WMII, 10/29/97)

2. Record of Decision for H.O.D Landfill Site (WMII, 09/28/1998)

3. Unilateral Administrative Order to perform Remedial Design/Remedial Action for the H.O.D. Landfill Site (EPA region 5, 04/14/1999)

4. Revised Risk Assessment for H.O.D. Landfill Site (WMII, August 2003)

5. Ready for Reuse Determination (RfR) Plan (RMT, 11/12/2003)

6. First Five-Year Review for H.O.D. Landfill Site (EPA Region 5, 09/30/05)

7. Second Five-Year Review for H.O.D. Landfill Site (EPA Region 5, 09/23/10)

8. Revised Performance Standards Verification Plan (RMT, April 2008)

9. H.O.D. Landfill Remedial Action Operation, Maintenance and Monitoring Annual Report for 2013 (SCS Engineers, June 2014)

10. H.O.D. Landfill Remedial Action Operation, Maintenance and Monitoring Annual Report for 2014 (SCS Engineers, July 2015)

11. Village of Antioch Water Works and Sewage Ordinance Limiting Groundwater Use Activities (Antioch Village Codes, September 2015)

APPENDIX I– COMMUNITY NOTIFICATION

IT'S TIME TO TRICK-OR-TREAT

List of Lake County communities and hours for trick-or-treating being held Saturday and Sunday, Oct. 25-26, and Thursday and Friday, Oct. 30-31.

Kids will be out trick-or-treating in Lake County beginning Oct. 25. | SUN-TIMES MEDIA FILE

Oct. 25

Antioch: Treat the streets in downtown, noon to 3 p.m.

Grayslake: Business Trick or Treat, 11 a.m. to 1 p.m.

Oct. 26

Beach Park: 2 to 5 p.m.

Gurnee: 2 to 5 p.m.

Hainesville: 3:30 to 7 p.m.

North Chicago: 2 to 5 p.m.

Park City: 2 to 4 p.m.

Round Lake Area: 1 to 5 p.m.

Wadsworth: 2 to 5 p.m.

Wauconda: Main Street, 3 to 6 p.m.

Waukegan: 1 to 4 p.m.

Zion: 2 to 5 p.m.

Oct. 30

Highland Park: Downtown, 4 to 6 p.m.

Oct. 31

Antioch: 4 to 7 p.m.

Buffalo Grove: 2 to 7 p.m.

Deerfield: 3:30-7 p.m.

Fox Lake: 4 to 7 p.m.

Grayslake: 4 to 7 p.m.

Hawthorn Woods: 4 to 8 p.m.

Highland Park: 3:30 to 7 p.m.

Highwood: 3:30 to 7 p.m.

Island Lake: 4 to 8 p.m.

Lake Bluff: 4 to 7 p.m.

Lake Forest: Downtown, 2 to 5 p.m.; and city wide from 4 to 8 p.m.

Lake Villa: 4:30 to 7 p.m.

Lake Zurich: 4 to 8 p.m.

Libertyville: Downtown, 11 a.m. to 3 p.m.; and village wide from 4 to 8 p.m.

Lincolnshire: 4 to 8 p.m.

Lindenhurst: 4 to 7 p.m.

Mundelein: 4 to 8 p.m.

Vernon Hills: 4 to 8 p.m.

Wauconda: 4 to 8 p.m.

Winthrop Harbor: 4 to 7 p.m.

EPA Begins Review of H.O.D. Landfill

Antioch, Illinois

The U.S. Environmental Protection Agency is conducting a five-year review of the H.O.D. Landfill Superfund site, 55 McMillan Road, Antioch. The Superfund law requires regular checkups of sites that have been cleaned up – with waste managed on-site – to make sure that the cleanup continues to protect people and the environment.

U.S. EPA's cleanup of vinyl chloride-contaminated groundwater consisted of landfill cap improvements, enhanced gas and leachate collection systems, leachate treatment, and groundwater monitored natural attenuation. Deed restrictions were put in place to regulate the use of the property and groundwater.

More information is available at the Antioch Public Library, 757 N. Main St. (state Route 83), and at www.epa.gov/region5/cleanup/hod. The review should be completed by September 2015.

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

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

Karen Mason-Smith
Remedial Project Manager
312-886-6150
mason-smith.karen@epa.gov

You may call U.S. EPA toll-free at 800-621-8431, 8:30 a.m. to 4:30 p.m., weekdays.

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