

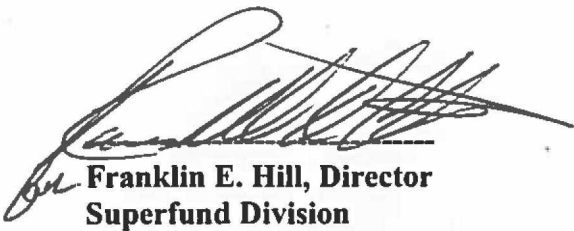
**SIXTH FIVE-YEAR REVIEW REPORT FOR
LEE'S LANE LANDFILL SUPERFUND SITE
JEFFERSON COUNTY, KENTUCKY**



AUGUST 2018

Prepared by

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Date

Table of Contents

LIST OF ABBREVIATIONS AND ACRONYMS	iv
I. INTRODUCTION	1
Site Background.....	1
FIVE-YEAR REVIEW SUMMARY FORM.....	3
II. RESPONSE ACTION SUMMARY	3
Basis for Taking Action.....	3
Response Actions.....	4
Status of Implementation	6
Systems Operations/Operation and Maintenance (O&M).....	10
III. PROGRESS SINCE THE PREVIOUS REVIEW	10
IV. FIVE-YEAR REVIEW PROCESS	13
Community Notification, Community Involvement and Site Interviews.....	13
Data Review.....	13
Site Inspection.....	19
V. TECHNICAL ASSESSMENT	19
QUESTION A: Is the remedy functioning as intended by the decision documents?.....	19
QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?	20
QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?.....	20
VI. ISSUES/RECOMMENDATIONS	20
OTHER FINDINGS.....	21
VII. PROTECTIVENESS STATEMENT	22
VIII. NEXT REVIEW	22
APPENDIX A – REFERENCE LIST.....	A-1
APPENDIX B – CURRENT SITE STATUS.....	B-1
APPENDIX C – SITE CHRONOLOGY	C-1
APPENDIX D – SITE MAPS.....	D-1
APPENDIX E – PRESS NOTICE.....	E-1
APPENDIX F – INTERVIEW FORMS.....	F-1
APPENDIX G – SITE INSPECTION CHECKLIST	G-1
APPENDIX H – SITE INSPECTION PHOTOS.....	H-1
APPENDIX I – ADDITIONAL SITE BACKGROUND INFORMATION.....	I-1

Tables

Table 1: Groundwater MCLs and Health Risk-Based Levels	5
Table 2: Summary of Planned and/or Implemented Institutional Controls (ICs).....	7
Table 3: Impacted Parcels - Owners	7
Table 4: O&M Costs Over the FYR Period.....	10
Table 5: Protectiveness Determinations/Statements from the 2013 FYR Report.....	11
Table 6: Status of Recommendations from the 2013 FYR Report	11
Table 7: Groundwater Sampling Data for Five Metals, 2012 to 2017.....	16
Table C-1: Site Chronology	C-1

Figures

Figure 1: Vicinity Site Map	2
Figure 2: Parcel Identification Map	9
Figure 3: Detailed Site Map	18
Figure D-1: 2011 and 2013 Soil Sampling Locations	D-1
Figure D-2: Copy Summary of EPA Vapor Intrusion Results – November 2014.....	D-2

LIST OF ABBREVIATIONS AND ACRONYMS

AOC	Administrative Order on Consent
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
CSM	Conceptual Site Model
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
IC	Institutional Control
KDEP	Kentucky Department for Environmental Protection
KDHMWM	Kentucky Department of Hazardous Materials and Waste Management
LEL	Lower Explosive Limit
LFG	Landfill Gas
$\mu\text{g L}$	Micrograms per Liter
$\mu\text{g m}^3$	Micrograms per Meter Cubed
mg kg	Milligrams per Kilogram
MCL	Maximum Contaminant Level
MSD	Louisville and Jefferson County Metropolitan Sewer District
NA	Not Analyzed
ND	Not Detected
NS	Not Sampled
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PHA	Public Health Assessment
ppm v	Parts per Million by Volume
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
UUUE	Unlimited Use and Unrestricted Exposure
VOC	Volatile Organic Compound

I. INTRODUCTION

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

The U.S. Environmental Protection Agency is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the sixth FYR for the Lee's Lane Landfill Superfund site (the Site). The triggering action for this policy review is the completion date of the previous FYR. The FYR has been prepared 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). OU1 addresses the soil and groundwater remedy. This FYR addresses OU1.

EPA Remedial Project Manager (RPM) Donna Seadler led the FYR. Participants included EPA Community Involvement Coordinator Angela Miller, Jim Kirby from the Kentucky Department for Environmental Protection (KDEP), and Johnny Zimmerman-Ward and Kirby Webster from Skeo (EPA FYR support contractor). The Louisville and Jefferson County Metropolitan Sewer District (MSD), one of the Site's potentially responsible parties (PRPs), was notified of the initiation of the FYR. The review began on 10/4/2017. Appendix A includes a list of documents reviewed. Appendix B includes Site status information. Appendix C includes the Site's chronology of events.

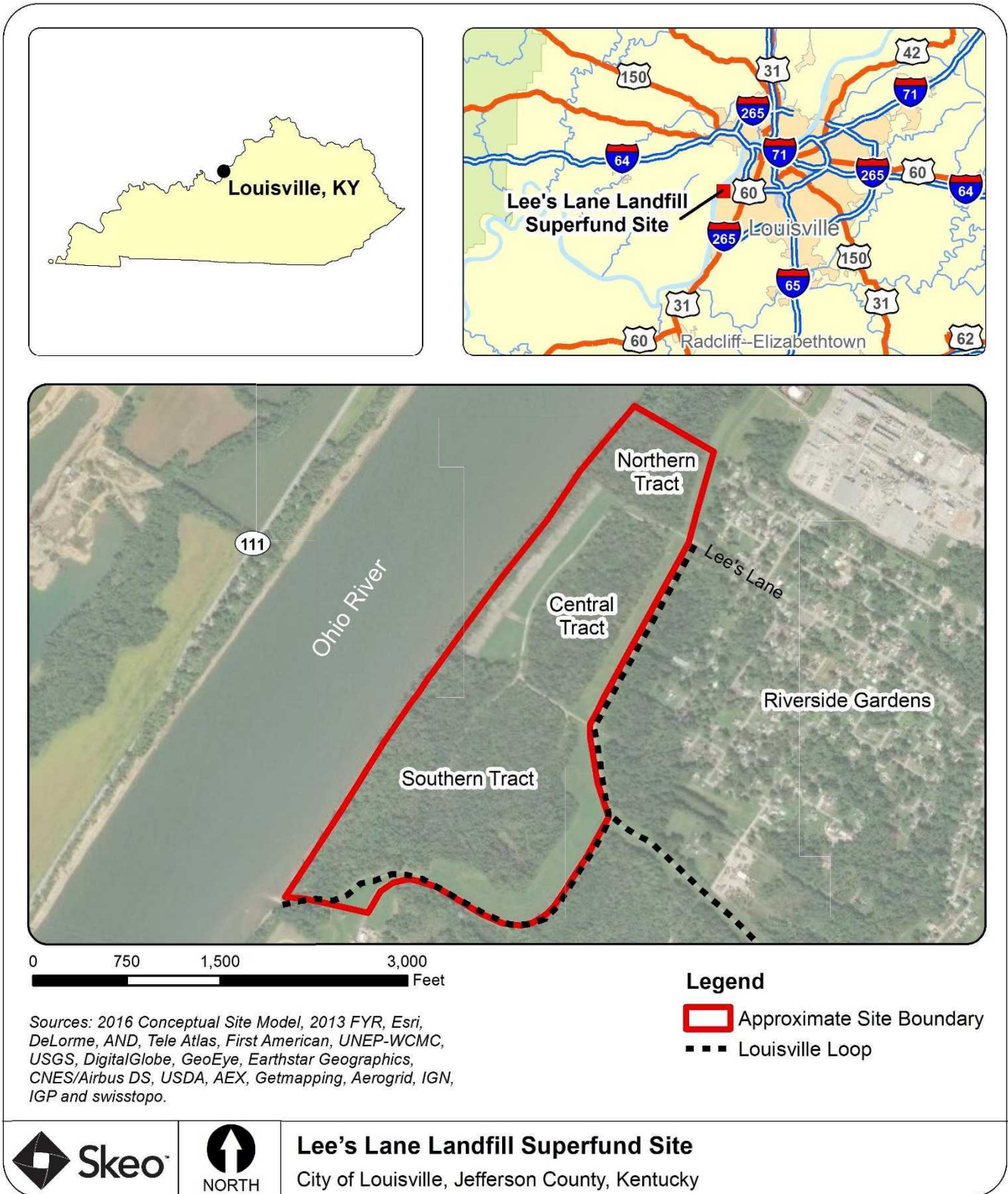
Site Background

The 112-acre site is located in Louisville, Kentucky. Quarrying operations began on site as early as the 1940s (Figure 1). From 1948 to 1975, a landfill operated on site. Industrial firms in and around Louisville disposed of at least 212,400 tons of municipal and industrial wastes at the landfill.

The Site is divided into three areas – the Northern Tract, the Central Tract and the Southern Tract. The Northern Tract and the Central Tract have areas of level to gently sloping land, specifically at the location of the engineered cap and rip-rap bank stabilization. The eastward portions of these tracts include areas of depressions and subsidence. The Southern Tract contains two large depressions with steep slopes in addition to areas of lesser depressions and subsidence. Elevations on site range from 383 feet above mean sea level along the Ohio River to 461 feet above mean sea level at the top of the Louisville Levee. Vegetation consisting of brush and shallow-rooted woodlands covers the majority of the Site, making accessibility difficult except where trespassers have cut trails or where access roads exist. The Site is not currently in use, except by trespassers on all-terrain vehicles and on foot.

The Louisville Loop recreational trail runs along the top of the Louisville Levee, along the eastern border of the Site. There is no barrier between the trail and the Site. The trail is accessed via gates that restrict access by motorized vehicles. A residential area (Riverside Gardens) is located to the east of the Site. The Ohio River is located to the west of the Site. North and south of the Site are industrial areas.

Figure 1: Vicinity Site Map



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

The water table is approximately 40 feet below the surface. The alluvial aquifer is unconfined. Shale forms an aquitard between the alluvial aquifer and the deep limestone aquifers. Flow in the aquifer is predominantly toward the Ohio River. During periods of high river flow, groundwater flow direction may reverse. The Site lies within the 100-year floodplain of the Ohio River. The EPA has identified more than 30 PRPs at the Site, including the Hofgesang Foundation, Louisville Jefferson County Metropolitan Sewer District, Louisville County Metro Government, and a number of businesses.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Lee's Lane Landfill		
EPA ID: KYD980557052		
Region: 4	State: Kentucky	City/County: Louisville Jefferson
SITE STATUS		
NPL Status: Deleted		
Multiple OUs? No	Has the Site achieved construction completion? Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name: Donna Seadler (EPA) and Johnny Zimmerman-Ward and Kirby Webster (Skeo)		
Author affiliation: EPA and Skeo		
Review period: 10 4 2017 - 8 1 2018		
Date of site inspection: 1 17 2018		
Type of review: Policy		
Review number: 6		
Triggering action date: 9 25 2013		
Due date (<i>five years after triggering action date</i>): 9 25 2018		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1974, the Lee's Lane Landfill permit expired. Due to repeated compliance violations, it was not renewed. In 1975, nearby residents reported flash fires in their basements: methane, apparently from the landfill, was being ignited by the pilot lights of their hot water heaters. The Commonwealth of Kentucky closed the landfill and local authorities evacuated and purchased seven nearby homes because of the

presence of explosive levels of methane. The EPA proposed the Site for listing on the Superfund National Priorities List (NPL) in December 1982. The EPA finalized the Site's listing on the NPL in September 1983. Appendix I provides additional site background information.

The Site's Remedial Investigation Report, finalized in April 1986, identified two potential public health concerns: 1) elevated chromium levels in the groundwater at and upgradient of the Site; and 2) the potential release of methane and hazardous gases to the air and subsurface. Since elevated chromium concentrations were detected in upgradient wells and no downgradient off-site impacts were evident, groundwater remediation was not considered at that time.

Based on the detection frequency and chemical, biological and toxicological properties of contaminants identified by the remedial investigation, lead, arsenic, benzene and chromium were selected as critical contaminants for further evaluation.

The Remedial Investigation Report concluded that concentrations of critical contaminants do not represent a significant threat to the environmental receptors at the Site. Biota in continued direct contact with elevated contaminant levels in selected "hot spot" soil areas could experience symptoms of chronic toxicity. However, no acute toxicological effects would be expected at contaminant levels documented at that time.

Response Actions

In October 1980, the Jefferson County Department of Public Works designed and installed a landfill gas (LFG) collection system between the landfill and Riverside Gardens.

In February 1980, Kentucky Department of Hazardous Materials and Waste Management (KDHMWM) discovered approximately 400 drums within the landfill about 100 feet from the Ohio River bank on a 10-foot vertical rise above the river. In September and October 1981, landfill owners removed the drums under a court order. The wastes were removed from the drums and transported to an approved hazardous waste disposal facility. The remaining non-hazardous drummed materials and empty drums were buried on site in the landfill.

The EPA signed the Site's Enforcement Decision Document and the Site's Record of Decision (ROD) on September 25, 1986. While the ROD did not define remedial action objectives (RAOs), it did define public health objectives:

1. Construct a groundwater monitoring program that will serve as an early warning system should site conditions change.
2. Control the vertical and lateral subsurface migration of methane and other gases.
3. Institute a routine monitoring program that will serve to detect any undesirable and possibly dangerous levels of methane and or toxic vapors migrating into the Riverside Gardens neighborhood.
4. Institute an ambient air monitoring program.

The EPA's 1986 Enforcement Decision Document and 1986 ROD selected the following remedy:

1. Provision for a properly operating gas collection system.
2. Consideration of a possible future alternate water supply.
3. Cleanup of surface waste area.
4. Bank protection controls.

5. Establishment of an alternate cleanup limit for the groundwater at the Site.
6. Institutional controls, which will be fully identified during remedial design, will be implemented. These controls may include, but will not be limited to:
 - a. Cautionary signs.
 - b. Installation of a gate at the Putnam Street access point.

Note: These physical access controls were referred to as institutional controls in RODs issued during this time. However, the EPA currently has a more limited institutional control definition which includes only legal and administrative measures.
7. Operation and maintenance activities, which will include:
 - a. Groundwater, gas and air monitoring.
 - b. Inspection of the gas monitoring wells, gas collection system, capped waste areas and the rip-rap along the Ohio River bank.

No groundwater remedy was selected in the 1986 Enforcement Decision Document. In previous reports, groundwater concentrations had been compared to alternate concentration limits. In the 2013 FYR, the EPA determined groundwater concentrations would be compared to groundwater maximum contaminant levels (MCLs) and other EPA health risk-based levels to establish whether groundwater is capable of posing a risk for ingestion, inhalation and dermal contact. Table 1 lists the current groundwater MCLs for Site COCs, or health-risk based levels where MCLs were not available. Since 2013, toxicity values have not changed for these compounds. While some EPA default exposure inputs for drinking water have been updated, the EPA has determined that the MCLs and health-risk based levels are all still health protective.

Table 1: Groundwater MCLs and Health Risk-Based Levels

Groundwater Contaminant of Concern (COC)	2018 EPA Groundwater MCLs and 2013 Health Risk-Based Levels (µg/L)
Arsenic	10 ^a
Barium	2,000 ^a
Beryllium	4 ^a
Cadmium	5 ^a
Chromium (Total)	100 ^a
Copper	1,300 ^a
Iron	24,000 ^b
Lead	15 ^a
Manganese	900 ^b
Mercury	2 ^a
Selenium	50 ^a
Zinc	10,000 ^b
Benzene	5 ^a
<i>Notes:</i>	
a. National Primary Drinking Water Regulations, located at: https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations (accessed 4/20/2018).	
b. EPA Region 4 site-specific health risk-based level, as listed in the 2013 FYR.	
µg/L = micrograms per liter	

Status of Implementation

In 1988, the EPA prepared a Close-Out Report for deletion of the Site from the NPL. The report documented that remedial actions at the Site began in March 1987 and finished in October 1987. The actions summarized in the report included:

- **Surface Waste Cleanup Implementation of Institutional Controls**
Numerous site records contain reference to “hot spots.” An August 9, 2018 review of historical documents by the EPA identified that the 1986 Remedial Investigation Report specifies the surface soil sampling locations which contain elevated levels of chromium as “hot spots.” These locations, shown on a map in the Remedial Investigation Report, are not in the area with the engineered cap. It is likely that these areas only received a covering of clay soil (not capped by EPA definition). The earlier documents also state that the drums found were to be disposed of off-site. There is an engineered cap of about 3 acres on the Site, where the drums that were found during investigations were buried. Security gates were installed at the floodwall entrance and at Putman Lane. Cautionary signs were posted at the entrance points to the Site.
- **Construction of the Rip-rap Slope**
Based on additional site investigation, it was decided to limit the horizontal extent of the rip-rap to the boundaries of the central tract.
- **Monitoring Well Installation**
Ten gas monitoring wells and two groundwater monitoring wells were installed at or in the vicinity of the Site.
- **Gas Collection System Inspection and Repair**
The gas collection system was inspected and evaluated. Repair refurbishment needed was completed.
- **Alternate Water Supply Hookup**
Based on groundwater modeling by the EPA, the EPA concluded that all private wells within a 1,500-foot zone around the Site should be abandoned. The EPA recommended connecting all residents using private wells within 1,500 feet of the Site to an alternate water supply. Field surveys confirmed there were two operating private wells within the 1,500-foot zone. These wells were connected to the existing municipal water supply in the subdivision.

In July 1991, the EPA signed an Administrative Order on Consent (AOC) with MSD to conduct remedy operation and maintenance (O&M) activities. The EPA deleted the Site from the NPL in April 1996.

Recurring issues with the LFG collection system have been documented in previous FYR reports. In 2010, the LFG system was deemed inoperable, having exceeded its useful life.

In early April 2011, the EPA collected soil samples from four on-site locations to determine if hazardous constituents were present at levels exceeding EPA regional screening levels (RSLs) for residential soils. All reported arsenic values exceeded the residential RSL for arsenic (0.39 milligrams per kilogram, or mg/kg). The range of detections for arsenic was 2.9 mg/kg to 4.5 mg/kg. The report stated that the detected arsenic concentration range is typical for soils derived from weathered sedimentary rock and is not thought to be indicative of contamination at the Site. Three of the four locations had contamination above residential RSLs of other contaminants. The EPA concluded that more sampling is necessary to identify remaining contamination.

In April 2012, MSD conducted a gas monitoring well one-year review. MSD evaluated gas concentration trends from samples collected in the gas monitoring wells. The report concluded that consistent methane levels below the lower explosive limit (LEL) in the monitoring wells indicated that

operation of the landfill’s gas collection system was not required at that time to prevent migration of methane gas at dangerous levels. However, the EPA and KDEP were uncertain regarding the conclusiveness of the evaluation. No action was taken and the system remained in place and operating.

The 2013 FYR Report identified eight items requiring further evaluation. Data collected in response to these items is summarized in the data review section of this FYR and in the 2016 Conceptual Site Model (CSM), prepared by the Lee’s Lane Landfill Group and MSD. The CSM is further discussed in the data review section.

Institutional Control (IC) Review

The 1986 Enforcement Decision Document referred to institutional controls and the 1986 ROD mentioned institutional considerations. However, the controls mentioned are physical access controls of the Site, which do not meet the definition of institutional controls as legal and administrative instruments. The 2016 CSM recommended the implementation of use restrictions prohibiting the development of the landfill for residential purposes. Table 2 summarizes the status of institutional controls at the Site and Table 3 lists the Site parcels and owners. In 2015, Hofgesang Foundation stated that it is willing to work with the EPA to establish institutional controls for the Site.

Table 2: Summary of Planned and/or Implemented Institutional Controls (ICs)

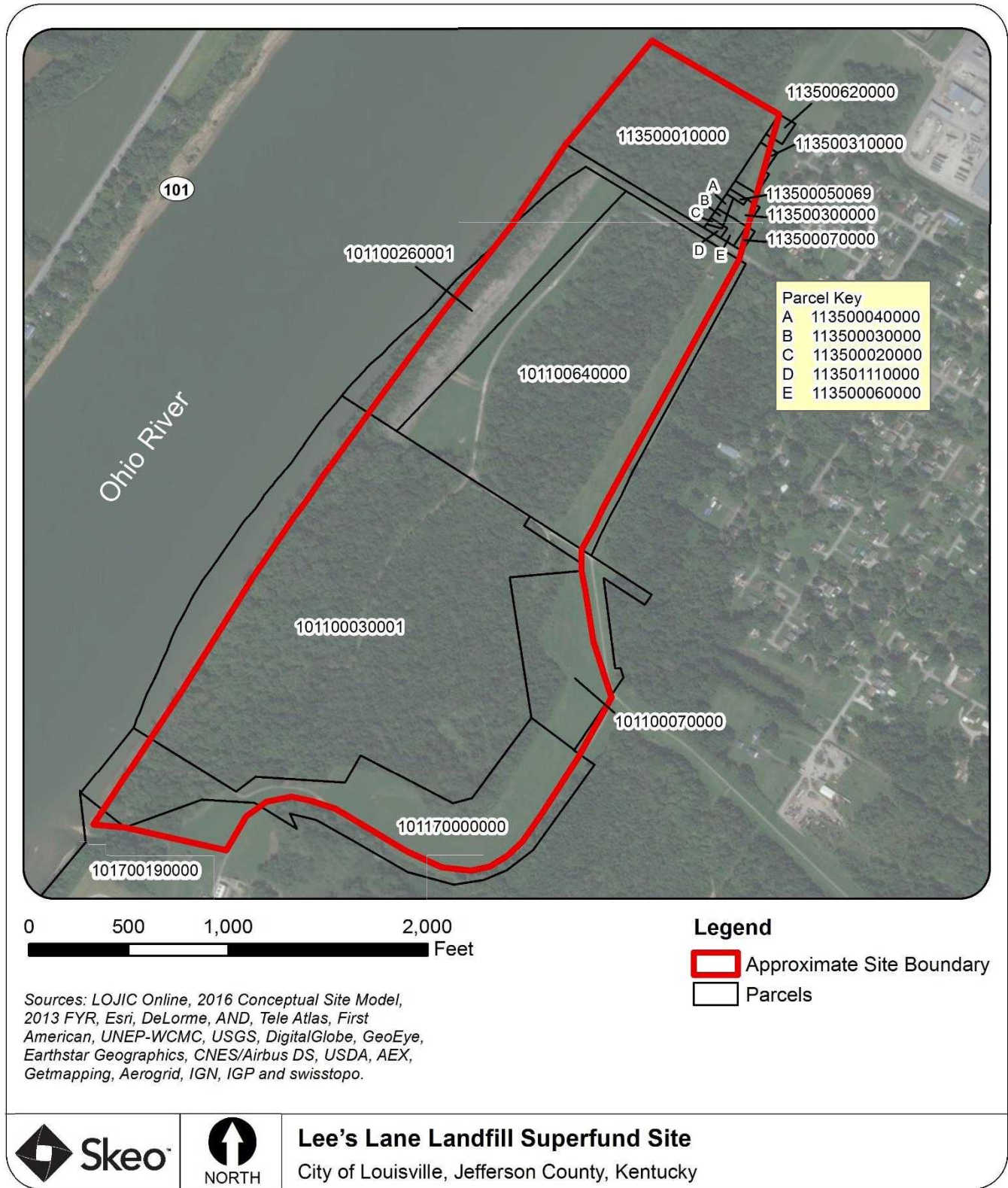
Media, Engineered Controls, and Areas That Do Not Support UU/UE Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	No	All (see Table 3)	Preclude drilling wells or using groundwater.	To be determined
Soil	Yes	No	All (see Table 3)	Restrict activities that could impair the integrity of the remedy and restrict land use.	To be determined

Table 3: Impacted Parcels - Owners

Impacted Parcel	Owner	Impacted Parcel	Owner
113500010000	The Hofgesang Foundation	113501110000	Louisville/Jefferson County Metro Go
113500620000	Greater City Realty Corp.	113500060000	Louisville/Jefferson County Metro Go
113500310000	Louisville/Jefferson County Metro Go	101100260001	The Hofgesang Foundation
113500050069	Greater City Realty Corp.	101100640000	Hofgesang Foundation Inc
113500300000	Louisville/Jefferson County Metro Go	101100030001	Gernert C T Inc

113500070000	Louisville Jefferson County Metro Go	101700190000	Louisville Gas & Electric Co
113500040000	Greater City Realty Corp.	101100070000	Louisville Jefferson County Metro Go
113500030000	Greater City Realty Corp.	101170000000	Louisville Jefferson County Metro Go
113500020000	Greater City Realty Corp		
Source: https://www.lojic.org/lojic-online (Accessed 7/10/2018)			

Figure 2: Parcel Identification Map



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

Systems Operations/Operation and Maintenance (O&M)

The July 1991 O&M Plan for Post Removal Site Control designated the O&M activities for the Site. These activities were anticipated to be conducted quarterly, unless otherwise specified in the O&M Plan. Activities include:

- Site Inspections
 - Gas collection system
 - Groundwater monitoring wells
 - Gas monitoring wells
 - Institutional controls
 - Area-wide site conditions (i.e., settlement, erosion, unauthorized dumping)
- Air Quality Monitoring
 - Ambient air sampling
 - Gas monitoring well sampling
- Gas Collection System Balancing and Maintenance
- Groundwater Quality Monitoring
 - Groundwater monitoring well sampling
 - Private well sampling
- River Bank Protection Controls
 - Rip-rap slope and drainage swales
 - Surveying
- Landfill Surface and Cap Monitoring and Maintenance
 - Capped area adjacent to Ohio River and “hot spot” areas
 - Mowing

The EPA performed O&M activities from July 1988 to June 1989. In July 1991, the EPA issued an AOC under which MSD agreed to perform certain O&M activities at the Site for 29 years. In April 1994, KDEP entered into an Intergovernmental Response Agreement with the EPA. Under the agreement, KDEP assumed responsibility for oversight of MSD’s O&M activities. MSD is conducting all required O&M activities. The 1986 Enforcement Decision Document estimated annual O&M costs of \$188,667. Table 4 shows the O&M expenses reported by MSD since the 2013 FYR Report. The increased costs in 2015 are primarily associated with the preparation of the CSM. Based on the CSM, some O&M activities may be altered. Current O&M activities should be summarized in an updated O&M Plan.

Table 4: O&M Costs Over the FYR Period

Year	Total Cost (rounded to the nearest \$1,000)
2013	\$63,000
2014	\$77,000
2015	\$147,000
2016	\$69,000
2017	\$75,000

III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the previous FYR as well as the recommendations from the previous FYR and the status of those recommendations.

Table 5: Protectiveness Determinations/Statements from the 2013 FYR Report

OU #	Protectiveness Determination	Protectiveness Statement
1	Protectiveness Deferred	A protectiveness determination of the remedy cannot be made at this time without further information. Recommended actions to obtain this information include: obtaining additional soil and groundwater data to update the Site characterization; and, completing a data review and evaluation to evaluate health risks associated with current site conditions. Additionally, the LFG collection system needs to be functional in order to remove landfill gases. It is expected that these actions will take approximately 12 months to complete, at which time a protectiveness determination will be made.

Table 6: Status of Recommendations from the 2013 FYR Report

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1	The 1986 ROD did not identify a groundwater remedy.	Review groundwater data and determine if a groundwater remedy needs to be established, along with groundwater cleanup goals, in a decision document.	Completed	The 2016 CSM review of groundwater data and data from new groundwater wells confirms that no groundwater remedy is necessary and the current monitoring is sufficient.	4/1/2016
1	The 1986 ROD did not identify Resource Conservation and Recovery Act capping requirements.	Evaluate capping requirements and incorporate them into a decision document, if necessary.	Completed	The 2016 CSM evaluated capping requirements. It recommended a one-time, detailed inspection of the full Site to inventory and delineate locations of exposed waste, which was completed as summarized in the Site Inspection Completion Report. No new decision document is needed.	7/27/2017
1	The LFG collection system is currently not working as designed and may no longer be in an optimal location. Also, it was not selected as the remedy in the 1986 ROD.	Determine next steps for installing an updated LFG collection system and install the new system. Select the LFG collection system as the remedy if it was meant to be the remedy.	Ongoing	The methane data review conducted during the CSM process confirmed there has been no new release of methane from the Site. The LFG system does not appear to be necessary any longer. The EPA will initiate shutoff of the system, and monitor for rebound over a two year period. As long as results remain below the LEL, no additional action is required.	NA
1	The 1986 ROD did not include institutional controls.	Evaluate the need for institutional controls in conjunction with current groundwater sampling efforts. Consider institutional controls for the capped landfill area.	Under Discussion	As noted in the 2016 CSM, groundwater and land use institutional controls are necessary, but recreational use does not need to be restricted.	NA

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
		Identify institutional control requirements in an enforceable document, if necessary.			
1	Although prior risk assessments indicated minimal risk, data gaps have been identified that suggest a re-evaluation is needed.	Conduct an updated data review and evaluation.	Completed	The 2016 CSM reevaluated risk and found that there is no adverse human health or ecological risk present under the modified trespasser scenario.	4/1/2016
1	Groundwater is not adequately characterized and new wells are needed to obtain sufficient data.	Install new groundwater wells to appropriately characterize contamination and groundwater flow. Address contamination as appropriate. Evaluate contaminant levels and ecological impacts at the discharge point to the Ohio River. Evaluate data to determine if additional sampling needs to be conducted for soil vapor intrusion.	Completed	KDEP installed five new wells in 2014. The 2016 CSM summarized groundwater monitoring data to date and confirmed that groundwater quality has remained stable and the potential for groundwater exposure by any identifiable receptors has been eliminated. The 2016 CSM also summarized data collected to evaluate the soil vapor intrusion pathway.	4/1/2016
1	Soil contamination is insufficiently characterized.	Identify location of any remaining soil contamination through soil sampling and address contamination, as appropriate.	Completed	KDEP conducted soil sampling in 2013. The detailed site inspection by the PRP contractor with KDEP and EPA oversight confirmed that no additional soil cover is needed.	7/27/2017
1	Trespassing results in surface erosion and exposure.	Identify whether additional measures are needed to discourage trespassers and implement as appropriate.	Completed	Between 2012 and 2014, MSD installed additional fencing, signage and a locked gate to deter trespassing.	4/1/2016

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

A public notice was made available by a posting in the *Louisville Courier-Journal*, on 3/16/2018 (Appendix E). It stated that the FYR was underway and invited the public to submit any comments to the EPA. The results of the review and the report will be made available at the Site's information repository, Shively Library, located at 3920 Dixie Highway in Louisville, Kentucky.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date. The interviews are summarized below. Completed interview forms are included in Appendix F.

Interviewees included EPA staff Donna Seadler and Kevin Koporec, Jim Kirby with KDEP, and Heather Dodds with MSD. Interviewees generally agree that the cleanup and maintenance at the Site has progressed as planned. MSD appropriately maintains the capped areas, wells, the gas collection system, rip-rap and signage. Despite actions to deter trespassing, trespassing continues to occur. EPA staff stated that it would be ideal to have a reuse that involved an owner or tenant being at the Site regularly to keep trespassers from frequenting the Site, and especially areas of buried waste. KDEP staff stated that the Site is not ready for reuse at this time and that further assessment of the gas collection system should be conducted to determine if it needs to be updated or removed. KDEP staff also stated that a determination of the source of carbon tetrachloride vapors should be identified and that they recommend an Environmental Covenant be placed on the Site under state law.

Data Review

This section summarizes data collected since the previous FYR.

Soil

In an effort to identify remaining soil contamination, KDEP collected 31 surface and subsurface soil samples from 28 locations on the Site in April 2013 (see Figure D-1). The soil samples included five from the Northern Tract, 11 from the Central Tract and 15 from the Southern Tract. CSM Table 4.2 provides the 2013 soil sampling results. Four locations had surface soil (0-0.05 inches) contaminant concentrations above the recreational trespasser risk-based screening levels. Site-specific cleanup levels for soil were developed by site PRPs in response to the EPA and KDEP comments on the draft CSM. The contaminants that exceeded the screening levels were polycyclic aromatic hydrocarbons, a polychlorinated biphenyl, a phthalate and lead. The 2017 Site Inspection Completion Report updated the human health risk assessment presented in the CSM. The 2017 site inspection confirmed that the areas where exceedances of risk-based screening levels were observed are difficult to access, so the likely frequency of any potential exposure would be much less than the previously agreed upon 58 days per year for the trespasser scenario and the 50 days per year for the recreational scenario. As such, the 2017 Site Inspection Completion Report revised the risk evaluation using 12 days per year exposure under both scenarios. Using these agreed upon exposure assumptions, no soil data locations exceed the EPA's health risk range for either excess cancer risk or noncancer hazard quotient. Using an updated (2017) EPA cancer slope for benzo[a]pyrene, the excess cancer risk is even lower than previously stated.

Ambient Air

MSD monitors ambient air twice per year at the locations shown on Figure 3. Table 6.3 in the CSM summarizes ambient air monitoring from 2012 to 2015. Carbon tetrachloride exceeded the EPA's RSL in April 2015 at air monitoring station U1. No other contaminants that were measured and have RSLs

exceeded RSLs during this time. April 2016 to October 2017 ambient air reports indicate that methylene chloride, toluene, vinyl chloride and total xylenes have not exceeded RSLs at any location during this time period. Benzene slightly exceeded the RSL at air monitoring station A2 in April 2016.

Soil Gas

MSD monitors soil gas twice per year at the locations shown on Figure 3. Table 6.2 in the CSM summarizes volatile organic compound (VOC) results for gas probes from September 2012 to April 2015. Chloroform exceeded the EPA's soil gas RSL during every event at locations G-1 and G-4. Carbon tetrachloride exceeded the EPA's RSL during every event at location G-4. Chloroform and tetrachloroethene exceeded the EPA's RSL sporadically during this time at location GMW-1. Tetrachloroethene exceeded EPA's RSL in 2012 at location GMW-2. Table 6.7 in the CSM summarizes carbon tetrachloride results for gas probes. Between 2012 and 2015, four probes exceeded RSLs at least once. The maximum exceedance during this period was 15.727 micrograms per meter cubed ($\mu\text{g m}^3$) at G-4R in fall of 2013. April 2016 to October 2017 soil gas summaries were reviewed using the semiannual reports. No exceedances were observed during this time for the chemicals that are reported on.

Table 5.1 in the CSM summarizes methane concentrations at gas probes until April 2015. In addition, April 2016 to October 2017 soil gas summaries were reviewed using the semiannual reports. The Kentucky Action Level of 5% LEL, which is 50,000 parts per million by volume (ppmV), has not been exceeded during this FYR period. The last time the LEL was exceeded was at G-1 in April 2007, with a measured value of 86,900 ppmV. GMW-3 had a value of 26,606 ppmV in April 2016, but the value has since decreased.

In 2013, the EPA conducted vapor intrusion analysis using data from the 13 existing gas probes and five temporary gas probes LLL-1 through LLL-5 located east of the Site between the Site and Riverside Gardens. This sampling is further discussed in the next section.

Vapor Intrusion

In an effort separate from the regular MSD soil gas monitoring, the EPA's June 2013 soil gas sampling along the site perimeter identified 7 constituents above screening levels which, if found at those levels in residential homes, would be health risk-based levels: benzene, 1,3-butadiene, carbon tetrachloride, chloroform, tetrachloroethylene, trichloroethylene, and vinyl chloride. In response, the EPA conducted several rounds of vapor intrusion sampling (from June 2014 to July 2015) at 33 homes in the adjacent Riverside Gardens community to determine whether gases from the landfill were migrating into homes. While some of the air samples had exceedances of preliminary screening levels, further assessment of air concentrations from inside, outside, and beneath the houses showed that there were no unacceptable health risks due to vapor intrusion.

Groundwater

In 2014, KDEP installed five new groundwater monitoring wells (MW-101 through MW-105). The Site now has seven groundwater monitoring wells (see Figure 3). MW-4 and MW-5 are adjacent to MW-104 and MW-105, respectively. MW-4 and MW-5 are screened in the deeper part of the aquifer; MW-104 and MW-105 are screened in the upper part of the same aquifer.

The three monitoring wells (MW-A, MW-B and MW-2) in the residential area of Riverside Gardens were closed and properly abandoned in 2010 after municipal water service was provided to the neighborhood. Sampling conducted prior to the wells' closure found that none of the 13 contaminants of concern (COCs) were present at concentrations exceeding their current MCLs or health risk-based

levels. Based on recommendations from the 2016 CSM, and groundwater sampling conducted after the CSM, KDEP and the EPA agreed in July 2016 to continue groundwater sampling for arsenic, manganese, iron, barium and lead.

Table 7 presents the Site's groundwater sampling data from the previous five years for the five COCs that are currently sampled (arsenic, manganese, iron, barium and lead). As shown in Table 7, these five inorganic contaminants continue to be routinely detected in groundwater at the landfill, with no apparent increasing or decreasing trends in concentration.

2016 CSM Recommendations

The 2016 CSM recommended continuing the following activities at the Site:

1. Annual inspections of the soil cover and cap areas. A one-time, detailed inspection of the soil cover area should be done to identify areas of exposed waste [this was conducted in 2017].
2. Semiannual field measurements for methane and pressure at soil gas probes.
3. An evaluation to determine the source of carbon tetrachloride and 1,3-butadiene. Soil gas probes should be sampled for both compounds. Annual sampling for VOCs (including 1,3-butadiene) at permanent gas probes should be conducted. Temporary gas probes should be used to further evaluate the source of carbon tetrachloride. As part of the carbon tetrachloride investigation, 1,3-butadiene should be sampled to see if past 1,3-butadiene at locations Unit 015, Unit 023 and Unit 030 [Figure D-2] were false detections associated with sampling procedures.
4. Annual groundwater monitoring for the five metal COCs (arsenic, manganese, iron, barium and lead) at MW-4, MW-5, MW-101, MW-102, MW-103, MW-104 and MW-105.
5. Evaluation of the need for institutional controls at the Site by the site owners. Given that there were no exceedances of 1×10^{-4} or a hazard index of 1, the CSM concluded that institutional controls prohibiting recreational use were not needed. However, residential use should be prohibited.

Following up on recommendation #1, contractors, with the EPA and KDEP oversight, conducted the detailed inspection of soil cover to identify areas of exposed waste in December 2016. The results were summarized in a July 2017 report. The site inspection confirmed that most exposed waste at the Site consisted of scrap metal and tires, most of which was present in inaccessible areas. The report recommended continuing inspections and institutional controls in accordance with the Site's O&M Plan, with consideration given to additional vegetation.

Table 7: Groundwater Sampling Data for Five Metals, 2012 to 2017

		Arsenic	Manganese	Iron	Barium	Lead
MCL or health risk-based level (from 2013 FYR) (µg/L)		10	900	24,000	2,000	15
MW-4	Nov. 2012	ND	210	7,800	160	7.5
	Sept. 2013	11	210	8,500	180	ND
	Oct. 2014	15	230	8,900	180	ND
	Sept. 2015	10.3	202	8,040	155	ND
	Sept. 2017	10.7	241	9,210	198	ND
MW-5	Nov. 2012	45	400	13,000	1,900	ND
	Sept. 2013	42	300	8,900	1,300	ND
	Oct. 2014	38	340	12,000	1,600	ND
	Sept. 2015	23.4	180	5,380	384	ND
	Sept. 2017	41.6	252	9,470	914	ND
MW-101	Jun. 2014	ND	1,600	910	110	ND
	Mar. 2015	1.2 J	370	180	81	ND
	Jul. 2015	6.9 J	NA	NA	170	11
	Oct. 2015	ND	500	87	45	ND
	Mar. 2016	3.3	2,100	2,000	84	ND
	Jul. 2016	ND	1,900	1,300	100	NS
	Oct. 2017 ^a	<25	NS	NS	67	<5
MW-102	Jun. 2014	5.9 J	500	2,900	160	ND
	Mar. 2015	14	470	6,300	240	ND
	July 2015	270	NA	NA	2,200	41
	Oct. 2015	76	870	38,000B	700	17
	Mar. 2016	20	630	14,000	370	ND
	Jul. 2016	55	600	50,000	1,900	ND
	Oct. 2017 ^a	<25	NS	NS	1,100	<5
MW-103	Jun. 2014	9.2 J	1,600	8,400	550	ND
	Mar. 2015	19	760	15,000	1,200	ND
	Jul. 2015	29	NA	NA	1,100	25
	Oct. 2015	ND	1,500	5,700	110	6.8
	Mar. 2016	8.6	2,100	4,800	150	ND
	Jul. 2016	25	2,300	31,000	1,300	NS
	Oct. 2017 ^a	<25	NS	NS	130	<5
MW-104	Jun. 2014	270	1,100	21,000	310	ND
	Mar. 2015	250	1,000	29,000	480	ND
	Jul. 2015	300	NA	NA	740	130
	Oct. 2015	300	370	18,000	260	4.8
	Mar. 2016	250	1,700	47,000	570	33
	Jul. 2016	290	680	26,000	350	12
	Oct. 2017 ^a	380	NS	NS	280	<5

		Arsenic	Manganese	Iron	Barium	Lead
MCL or health risk-based level (from 2013 FYR) (µg/L)		10	900	24,000	2,000	15
MW-105	Jun. 2014	8.2 J	7,300	17,000	190	ND
	Mar. 2015	2.7	4,200	6,300	580	ND
	Jul. 2015	16	NA	NA	1,100	17
	Oct. 2015	3.3	3,900	50,000	530	9.9
	Mar. 2016	10	4,000	130,000	2,700	ND
	Jul. 2016	1.6	4,500	36,000	250	ND
	Oct. 2017 ^a	<25	NS	NS	210	<5

Notes:

- a. The 2017 October Report uses a different numbering nomenclature for identifying monitoring well samples. This table assumes MW-1 in the report is the sample from well MW-101, MW-2 is from MW-102, MW-3 is from MW-103, MW-4 is from MW-104 and MW-5 is from MW-105.

For samples with duplicates, the value recorded in this table is the higher of the two values.

Bold = values that exceed the cleanup goal.

Italics = detection limit is greater than cleanup goal.

J = estimated value

NA = not analyzed

NS = not sampled

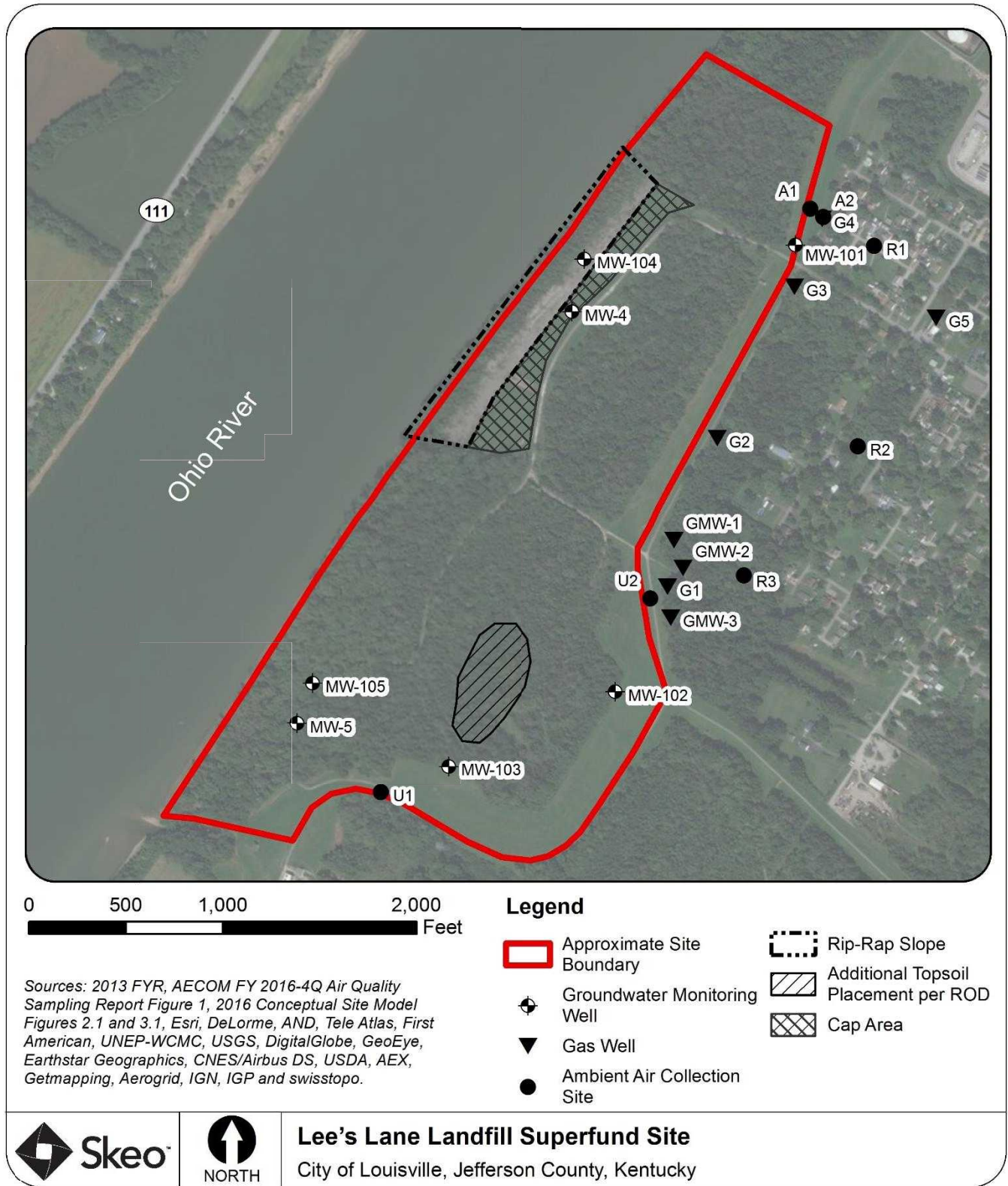
ND = not detected

B = blank contamination

µg/L = micrograms per liter

KDEP's 2016 Groundwater Report indicated that groundwater monitoring wells MW-102 and MW-103 continue to off-gas VOCs at levels of 100 percent of the LEL, thus making the use of electronic instruments down the monitoring well hole unsafe. The 2017 Groundwater Report indicates that low-flow sampling techniques would be accomplished using a bladder pump to avoid the possibility of igniting explosive gasses and to ensure the water was representative of actual groundwater conditions before sampling.

Figure 3: Detailed Site Map



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

Site Inspection

The site inspection took place on 1/17/2018. Participants included EPA RPM Donna Seadler, KDEP project manager Jim Kirby, and Johnny Zimmerman-Ward and Kirby Webster from Skeo (EPA FYR support contractor). The purpose of the inspection was to assess the protectiveness of the remedy. The site inspection checklist is included in Appendix G. Site inspection photos are included in Appendix H.

The Site was accessed from Lee's Lane, which is perpendicular to the Site. Access to the Site from Lee's Lane was restricted by a locked security gate. The Site can also be accessed from the south. The southern access is fenced, gated and controlled by Louisville Gas and Electric Company. The Site is accessed frequently by MSD for maintenance as well as by pedestrians using the Louisville Loop Trail, the paved trail that traverses the levee along the eastern edge of the Site. Vehicle traffic is limited, although all-terrain vehicle use appears to take place across the Site.

During the site inspection, participants toured the capped landfill area and rip-rap along the Ohio River, viewed the LFG collection system's wells and blower house, and drove throughout the Site to view groundwater sampling wells and the status of site vegetation. The Site was in good condition. Vehicle marks were noted in the snow. Trespassing and use of on-site trails has been reduced by MSD actions to intentionally reduce trespassing such as felling trees across trails. Potential reuse conversations are ongoing. MSD performs annual groundwater sampling at the Site and is responsible for site maintenance and inspections.

Site inspection participants visited the Site's document repository, Shively Library, located at 3920 Dixie Highway in Louisville, Kentucky. No documents related to the Site were identified at the library.

V. TECHNICAL ASSESSMENT

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

Question A Summary:

The review of documents, applicable or relevant and appropriate requirements, risk assumptions and the site inspection indicate that the Site's remedy was constructed in accordance with the requirements of the Site's Enforcement Decision Document. The LFG collection system function and necessity are currently unknown. Due to low levels of methane being detected over the last 10 years, the system should be shutdown but closely monitored for rebound for a period of time. Groundwater cleanup goals have not been documented in a decision document. The 2016 CSM review of groundwater data and data from new groundwater wells confirms that no groundwater remedy is necessary and the current monitoring is sufficient. The PRP Group prepared a 2016 CSM that summarized historical data and reviewed issues brought up during the 2013 FYR. It recommends continuing inspections and institutional controls in accordance with the Site's O&M Plan and giving consideration to additional vegetation. In addition, the source of the 1,3-butadiene and carbon tetrachloride concentrations in soil gas needs to be identified.

KDEP's 2016 Groundwater Report indicated that groundwater monitoring wells MW-102 and MW-103 continue to off-gas VOCs at levels of 100 percent of the LEL, thus making the use of electronic instruments down-hole unsafe. The 2017 Groundwater Report indicates a bladder pump was used to avoid the possibility of igniting explosive gases.

Site conditions do not allow for unrestricted use. Institutional controls are needed to restrict the use of groundwater on the Site and to restrict land use.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

Question B Summary:

The exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection are still valid. The EPA toxicity values for benzo[a]pyrene were revised in 2017, and thus the cancer risks shown in the 2016 carcinogenic polycyclic aromatic hydrocarbons would be about 7-fold lower based on the 2017 Integrated Risk Information System assessment. The risks were already within the EPA's risk range, and now would be somewhat lower. Groundwater monitoring reports compare groundwater data to current MCLs, or risk-based screening levels. The 2016 CSM and 2017 Site Inspection Completion Report reviewed ecological and human health risk from exposure to soil for recreational users and trespassers.

The EPA completed a vapor intrusion study during this FYR period and determined that there are no unacceptable health risks from vapors migrating from beneath homes to indoor air. Vapors migrating from the landfill should probably be monitored periodically for some period of time to ensure that there continues to be no contribution to unacceptable risks from this exposure.

Trespassing has been an ongoing issue at the Site. Trespassing results in surface erosion and exposure of waste. Additional measures have been taken to discourage trespassers. Ongoing site inspections will determine if additional measures need to be taken.

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

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

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the FYR:
None

Issues and Recommendations Identified in the FYR:

OU(s): 1 (sitewide)	Issue Category: Institutional Controls			
	Issue: Site conditions do not allow for unrestricted use.			
	Recommendation: Implement groundwater and land use institutional controls.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	PRP	EPA/State	7/1/2020

OU(s): 1 (sitewide)	Issue Category: Changed Site Conditions			
	Issue: Groundwater monitoring wells MW-102 and MW-103 were off-gassing VOCs at levels of 100 percent of the LEL in 2016.			
	Recommendation: Identify the source of VOCs and determine if additional measures need to be taken.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	EPA	EPA	7/1/2020

OU(s): 1 (sitewide)	Issue Category: Changed Site Conditions			
	Issue: Airborne contamination (vapor intrusion) is not currently posing unacceptable health risks, but could do so if more contaminated vapors migrate from the landfill toward the residential neighborhood.			
	Recommendation: Monitor, for some period of time, the vapors migrating from the landfill toward the residential area.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	EPA	EPA	7/1/2020

OTHER FINDINGS

Several additional recommendations were identified during the FYR. These recommendations do not affect current and/or future protectiveness.

- Measures to reduce the frequency of trespassing would be helpful to limit long-term site management costs.
- Update the site repository with recent site documents and reports.
- Identify the source of the 1,3-butadiene and carbon tetrachloride concentrations in soil gas.
- Summarize current O&M activities in an updated O&M Plan.

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement
<i>Protectiveness Determination:</i> Short-term Protective
<i>Protectiveness Statement:</i> The remedy at the Site currently protects human health and the environment because there are currently no completed exposure pathways. However, in order for the remedy to be protective in the long term, the following actions need to be taken: implement groundwater and land use institutional controls, identify the source of VOCs and monitor soil vapor levels migrating from the landfill for effect on shutdown, and for each of these, determine if additional measures need to be taken.

VIII. NEXT REVIEW

The next FYR Report for the Lee's Lane Landfill Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

AECOM. Summary Analytical Report for Ambient Air and Gas Monitoring Sampling Event 59. Lee's Lane Landfill site. July 18, 2016.

AECOM. Summary Analytical Report for Ambient Air and Gas Monitoring Sampling Event 60. Lee's Lane Landfill site. January 5, 2017.

AECOM. Summary Analytical Report for Ambient Air and Gas Monitoring Sampling Event 61. Lee's Lane Landfill site. July 25, 2017.

AECOM. Summary Analytical Report for Ambient Air and Gas Monitoring Sampling Event 62. Lee's Lane Landfill site. December 21, 2017.

Certificate of Analysis. Kentucky Department of Waste Management. Lees Lane LF Superfund Project. Date reported: November 18, 2015.

Close-Out Report for Deletion of Lee's Lane Landfill Site. Louisville, Kentucky. United States Environmental Protection Agency. March 18, 1988.

Conceptual Site Model. Lee's Lane Landfill Site. Louisville, Kentucky. Prepared by Lee's Lane Landfill Group and the Louisville and Jefferson County Metropolitan Sewer District. April 1, 2016.

Fifth Five-Year Review Report for Lee's Lane Landfill. Louisville, Jefferson County, Kentucky. United States Environmental Protection Agency. Region 4. September 25, 2013.

Groundwater Sampling Report October 2017 Sampling Event. Lee's Lane Landfill. Lee's Lane. Louisville, Jefferson County, Kentucky. Kentucky Department for Environmental Protection. March 2018. Revision 2.

Lees Lane Landfill Groundwater Sampling Report March 15, 2016 Sampling Event. Prepared by Federal Section, Superfund Branch, Division of Waste Management. March 30, 2016.

Lees Lane Landfill Groundwater Sampling Report October 27, 2015 Sampling Event. Prepared by Federal Section, Superfund Branch, Division of Waste Management. January 11, 2016.

Lees Lane Landfill Groundwater Sampling Report July 19, 2016 Sampling Event. Prepared by Federal Section, Superfund Branch, Division of Waste Management. August 30, 2016.

Pace Analytical. Annual Groundwater. Louisville and Jefferson Co MSD. September 21, 2017.

Record of Decision. EPA Region 4. September 25, 1986.

Site Inspection Completion Report. Lee's Lane Landfill Site. Louisville, Kentucky. Prepared by Lee's Lane Landfill Group and the Louisville and Jefferson County Metropolitan Sewer District. July 27, 2017.

APPENDIX B – CURRENT SITE STATUS

Environmental Indicators

- *Current human exposures at the Site are under control.*
- *Current groundwater migration is under control.*

Are Necessary Institutional Controls in Place?

All Some None

Has EPA Designated the Site as Sitewide Ready for Anticipated Use?

Yes No

Has the Site Been Put into Reuse?

Yes No

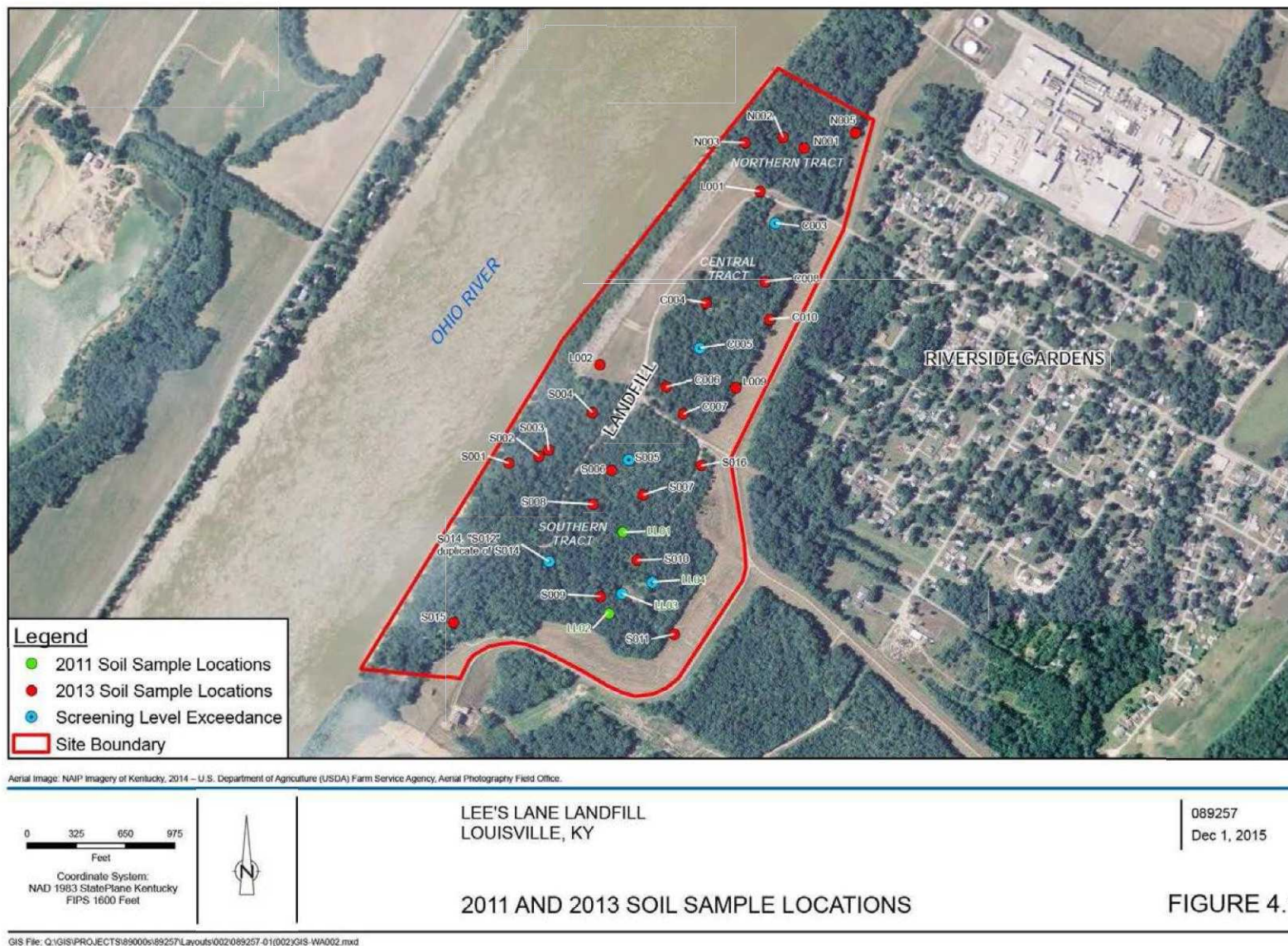
APPENDIX C – SITE CHRONOLOGY

Table C-1: Site Chronology

Event	Date
Residents complained of flash fires around water heaters due to migration of methane gas from the landfill	1975
The EPA conducted an initial site inspection	November 1, 1978
State installed the LFG collection system	October 1980
Landfill owners removed drums under court order	September and October 1981
The EPA proposed the Site for listing on the NPL	December 30, 1982
Site listed on the NPL	September 8, 1983
The EPA began the Site's combined remedial investigation/feasibility study	September 27, 1983
State conducted preliminary assessment	August 1, 1984
The EPA completed health assessment	November 25, 1985
The EPA completed combined remedial investigation/feasibility study The EPA signed Enforcement Decision Document and the ROD	September 25, 1986
The EPA began the remedial action The EPA began the first removal action	March 16, 1987
The EPA began the remedial design	March 20, 1987
The EPA completed the remedial action The EPA completed the first removal action	October 27, 1987
The EPA completed the Site's Close-Out Report	March 18, 1988
The EPA completed the remedial design	March 31, 1988
The EPA began the second removal action	September 14, 1988
The EPA completed the second removal action	September 27, 1988
The EPA signed an AOC that transferred O&M responsibilities to MSD	July 16, 1991
The EPA signed Site's first FYR Report	May 25, 1993
Consent decrees entered by court	August 4, 1993
Oversight of MSD's O&M activities transferred to Kentucky Environmental and Public Protection Cabinet	April 7, 1994
Site deleted from the NPL	April 25, 1996
Consent Decree entered by court	January 9, 1997
The EPA signed Site's second FYR Report	July 1, 1998
The EPA signed Site's third FYR Report	July 2, 2003
The EPA signed Site's fourth FYR Report	September 25, 2008
The EPA signed Site's fifth FYR Report	September 25, 2013
KDEP installed five new groundwater monitoring wells	2014
Lee's Landfill Group and MSD prepared a CSM	April 1, 2016
Lee's Lane Landfill Group and MSD prepared the Site Inspection Completion Report	July 27, 2017

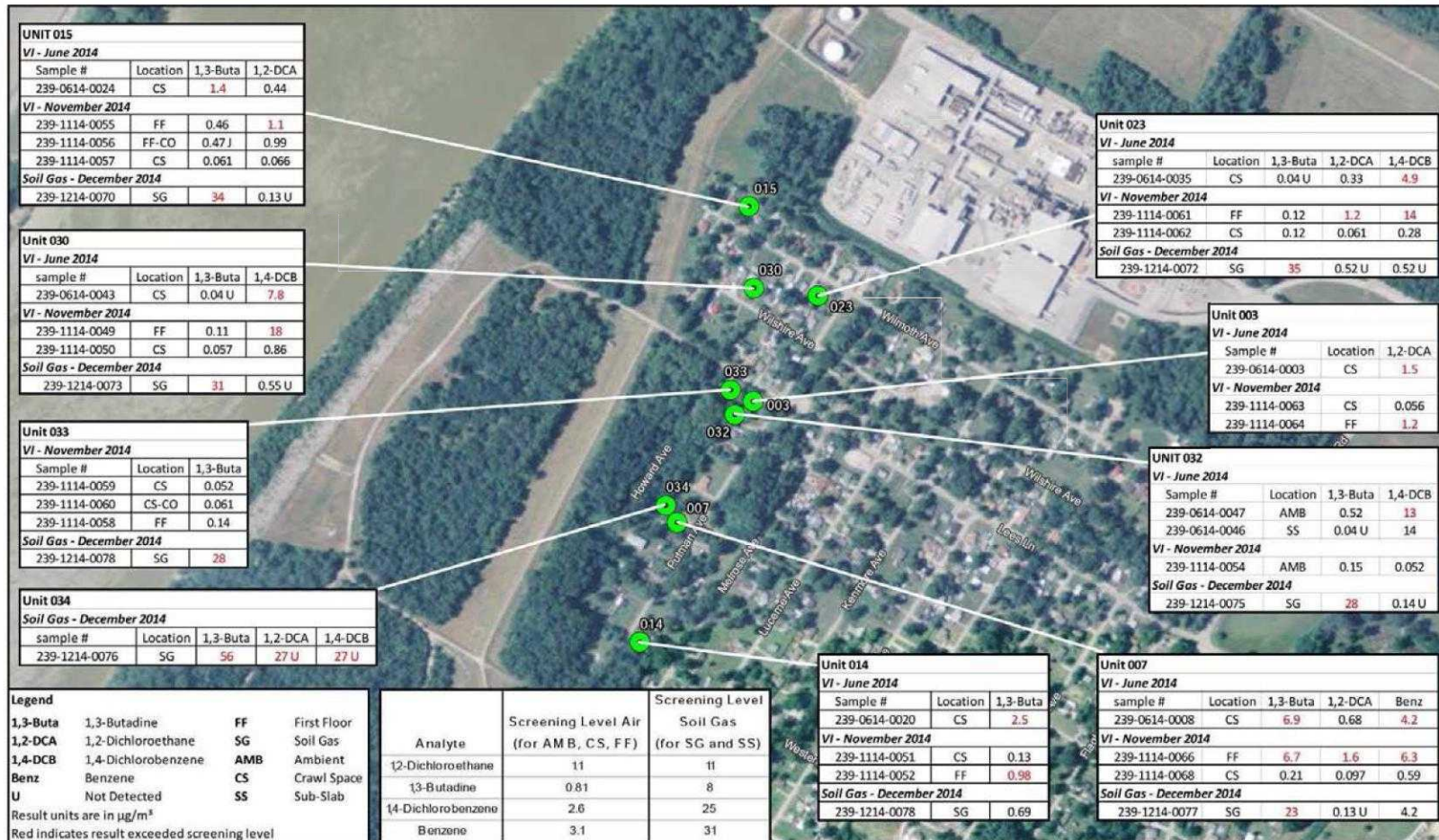
APPENDIX D – SITE MAPS

Figure D-1: 2011 and 2013 Soil Sampling Locations¹



¹ Figure 4.1 from the 2016 CSM.

Figure D-2: Copy Summary of EPA Vapor Intrusion Results – November 2014²



Aerial Image: ESRI Basemap Imagery, Acquisition Date Unknown, Accessed 2015.



LEE'S LANE LANDFILL
LOUISVILLE, KY

089257
Dec 1, 2015

COPY SUMMARY OF EPA VI RESULTS - NOVEMBER 2014

FIGURE 6.6

GIS File: Q:\GIS\PROJECTS\89000s\89257\Layouts\002\089257-01\002\GIS-WA003.mxd

² Figure 6.6 from the 2016 CSM.

APPENDIX E – PRESS NOTICE

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**The U.S. Environmental Protection Agency, Region 4
Announces the Sixth Five-Year Review for the Lee's Lane Landfill Superfund Site,
Louisville, Jefferson County,
Kentucky**

Purpose/Objective: The EPA is conducting a Five-Year Review of the remedy for the Lee's Lane Landfill Superfund site (the Site) in Louisville, Kentucky. The purpose of the Five-Year Review is to make sure the selected cleanup actions effectively protect human health and the environment.

Site Background: The 112-acre Site is located in southwest Louisville, Kentucky, next to the Ohio River. A sand and gravel quarry operated on site in the 1940s and 1950s. From the 1940s until 1975, a landfill at the Site accepted domestic, commercial and industrial wastes. Landfill operations resulted in the contamination of groundwater, surface water, sediment, soil and air. The EPA placed the Site on the Superfund program's National Priorities List (NPL) in 1983. Following cleanup, the EPA took the Site off the NPL in 1996.

Cleanup Actions: The Site's long-term remedy, selected in 1986, included gas and air monitoring to address the potential release of methane and hazardous gases. Groundwater monitoring established baseline conditions at the Site and serves as an early warning for any contamination migration. Cleanup efforts also put riprap in place to prevent erosion along the banks of the Ohio River, capped "hot spot" areas and removed exposed drums.

Five-Year Review Schedule: The National Contingency Plan requires review of remedial actions that result in any hazardous substances, pollutants or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure every five years to ensure the protection of human health and the environment. The sixth of the Five-Year Reviews for the Site will be completed by September 2018.

EPA Invites Community Participation in the Five-Year Review Process: The EPA is conducting this Five-Year Review to evaluate the effectiveness of the Site's remedy and to ensure that the remedy remains protective of human health and the envi-

ronment. As part of the Five-Year Review process, EPA staff is available to answer any questions about the Site. Community members who have questions about the Site or the Five-Year Review process, or who would like to participate in a community interview, are asked to contact:

Donna Seadler, EPA Remedial Project Manager

Angela Miller, EPA Community Involvement Coordinator

Phone: (404) 562-8870

Phone: (404) 562-8561 | (800) 241-1754 (toll-free)

Email: seadler.donna@epa.gov

Email: [\[er.angela@epa.gov\]\(mailto:er.angela@epa.gov\)](mailto:mill</p></div><div data-bbox=)

Mailing Address: U.S. EPA Region 4, 61 Forsyth Street, S.W., 11th Floor, Atlanta, GA 30303-8960

A copy of the completed Five-Year Review will be made available at the Site's local document repository, the Shively Branch of the Louisville Free Public Library, located at 3920 Dixie Highway in Louisville, Kentucky, and online at <http://www.epa.gov/superfund/lee-lane-landfill>.

APPENDIX F – INTERVIEW FORMS

Lee's Lane Landfill Superfund Site

Site Name: Lee's Lane Landfill

Five-Year Review Interview Form

EPA ID No.: KYD980557052

Subject Name: Donna Seadler, RPM

Affiliation: U.S. EPA, Region 4

Subject Contact Information: seadler.donna@epa.gov

Time: 10:00 a.m.

Date: 01/22/2018

Interview Format (circle one): Email

Interview Category: EPA Remedial Project Manager

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

Cleanup: From a Superfund perspective, looking at human health risk and ecological risk, it appears that work done under the cleanup was sufficient to manage the risk.

Maintenance: Louisville MSD has satisfactorily maintained the capped areas, wells, gas collection system, rip-rap, and signage at the site according to the 1991 agreement with EPA. MSD limits access via a locked gate, but the site is attractive to trespassers, who produce the primary maintenance issues at the site. MSD has also undertaken several measures not specifically required by the 1991 agreement, in order to deter the trespassers. These include installing a stretch of fencing (which was repeatedly cut through), and currently periodically felling trees across the site trails to limit accessibility.

Reuse: The site is located in a lovely riverfront location, and is adjacent to the Louisville Loop bicycle trail. If the city or state were willing to take ownership to develop a reuse, such as a recreational site, solar field or other appropriate use (or uses, since it's 112 acres), then it would be an incredible asset not just to the immediate community but to the City as well. It would also remove the stigma associated with the landfill.

2. What have been the effects of this Site on the surrounding community, if any?

I cannot say what the impacts of the Site were on the surrounding community at the time the landfill was active, but at this time the landfill contains physical hazards from exposed solid waste and is an eyesore in certain places. Trespassing on the site is discouraged, but difficult to prevent due to the size and location. There is a stigma for the community from the landfill which will not end unless the site is given a positive reuse.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities since the implementation of the cleanup?

This site received a Record of Decision (ROD) in 1986 and the cleanup was implemented in this time frame. I became the Remedial Project Manager (RPM) for the site in 2012. I held a public meeting in July of 2012 to learn more about the public's thoughts and at the time there were significant questions. However, as EPA and KDEP have worked to gather data and answer questions

with fact sheets, community meetings, and community information sessions, very little is heard from the community anymore.

4. What is your assessment of the current performance of the remedy in place at the Site?

I believe my answer to Question 1 responds to this.

5. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

There is insufficient risk at the site to require more work under Superfund to limit site access. However, the trespassing is what causes much of the maintenance expense. The ATV riders cause erosion, which must be filled and re-seeded to prevent exposure to the subsurface. Without a legitimate active use for the site, which would deter trespassers, this isn't likely to end.

6. Are you aware of any community concerns regarding the Site or the operation and management of its remedy? If so, please provide details.

I am aware of concerns that the community had in the initial years of my role as the RPM. Since that time, EPA and KDEP have collected significant data on soil, soil gas, groundwater and the potential for vapor intrusion in the homes. Several community meetings were held at those times to answer questions regarding the data and I believe most concerns were addressed.

7. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

I have no further comments regarding the current management and operation of the Site remedy, but I do hope the will is found to develop a positive reuse for this Site so that the community can move forward. This would also reduce the overall long term maintenance expenses for the site, which, after 2020, will be borne by KDEP under the current agreement.

Lee's Lane Landfill Superfund Site**Five-Year Review Interview Form**Site Name: Lee's Lane LandfillEPA ID No.: KYD980557052Subject Name: Kevin KoporecAffiliation: U.S.EPA Region 4

Subject Contact

Information:

Time: 04:30 p.m.Date: 02/16/2018Interview Format: EmailInterview Category: EPA

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

From my review of site reports and my few site visits, it appears to me that the cleanup and maintenance of the site has progressed as planned. From my knowledge of the site, it doesn't really have a reuse yet other than being a closed landfill. It would be ideal to have a reuse that involved an owner or tenant being at the site regularly to keep trespassers from frequenting the site especially in areas of buried waste.

2. What have been the effects of this Site on the surrounding community, if any?

Based on the chemical concentration data I have reviewed, there should not be any site-related adverse health effects for people who occasionally (once per month) trespass onto the site especially if they stay on the paved asphalt trail that is on the flood wall. [A risk evaluation was performed by a Responsible Party consultant with close oversight by U.S.EPA and KDEP]

3. What is your assessment of the current performance of the remedy in place at the Site?

It appears to me that the buried waste has stayed where it was placed (as expected for a closed landfill). Despite the presence of locked gates at the paved entrance and clear signage stating not to trespass onto the buried waste areas of the landfill, there appears to have been some erosion of vegetation soil cover caused by trespassers on ATVs or on foot.

4. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

The primary institutional controls should be to prevent development of the site as residential or other land uses which would have people on the landfill areas of the site on a daily, chronic basis. Also prevent use of groundwater for any use. From my observations of the site, these land uses and groundwater uses are being appropriately prevented.

I do not know what ICs (if any) are formally in place to prevent discourage trespassing onto the site, but as I stated above, it would be ideal to have a site owner or operator more present on the site in the future to help prevent trespassing. There has been some discussion between the PRPs and the regulators that placement of strategic plants and or large fallen trees at openings to obvious trails can help to reduce trespassing into interior areas of the closed landfill. Even though a low frequency of trespassing does not pose an unacceptable health risk, preventing trespassing altogether would reduce the need for site maintenance.

5. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

Until this closed landfill site property is more regularly frequented by a site owner or tenant (that would help to prevent site trespassing), periodic inspection should continue to occur to look for erosion in areas of buried waste, and to address those areas identified.

Lee's Lane Landfill Superfund Site**Five-Year Review Interview Form**Site Name: Lee's Lane LandfillEPA ID No.: KYD980557052Subject Name: Jim KirbyAffiliation: Kentucky DEPSubject Contact Information: Jim.Kirby@ky.gov

Information:

Time: 9:02 a.m.Date: 3/22/18Interview Format (circle one): In Person Phone Mail Other:Interview Category: State

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

Lee's Lane Landfill has had numerous unresolved issues from the start. Access control measures are inadequate or nonexistent. (i.e. The Louisville Loop transects the property). The majority of the site does not have an engineered cap, but is covered in thick, shallow-rooted vegetation. The efficiency of the gas collection system is unknown. This site is not ready for reasonably anticipated reuse at this time.

2. What is your assessment of the current performance of the remedy in place at the Site?

The remedy selected in the ROD was ALTERNATIVE 3 - SURFACE WASTE AREA CLEANUP, BANK PROTECTION CONTROLS, GAS COLLECTION AND VENTING SYSTEM, AND MONITORING. The Gas Collection and Venting System were working at 50% efficiency at that time. It is currently unclear how efficiently the system is working. As such it is unclear what the current performance of the remedy is. Additional sampling conducted after the last Five Year Review produced soil gas concentrations which may indicate the remedy employed to mitigate vapor migration may not be sufficient. Further assessment of the gas collection system should be conducted.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years?

Yes. Numerous complaints at public meetings and via emails.

4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities.

Yes. Groundwater sampling and soil sampling. Results have been provided under separate cover. We have had numerous communications with USEPA technical issues and the feasibility of redevelopment.

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy?

No.

6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

No. An Environmental Covenant should be in place and is not.

7. Are you aware of any changes in projected land use(s) at the Site?

There have been discussions about redeveloping the site; however, at this time there is no specific changes planned.

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

The technical issues with the site should be addressed. Specifically a determination if the gas collection system needs to be updated or removed and a determination of the source of the Carbon Tetrachloride vapors.

9. Do you consent to have your name included along with your responses to this questionnaire in the FYR report?

Yes.

Lee's Lane Landfill Superfund Site**Five-Year Review Interview Form**Site Name: Lee's Lane LandfillEPA ID No.: KYD980557052Subject Name: Heather DoddsAffiliation: Louisville MSDSubject Contact Information: 5026898284 / heather.dodds@louisvillemad.org

Information:

Time: 10:04 amDate: 02/01/2018Interview Format (circle one): In Person Phone Mail Other: emailInterview Category: O&M

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

The project appears to have successfully improved conditions at the site.

2. What is your assessment of the current performance of the remedy in place at the Site?

The project seems to be protective of human health and the environment.

3. What are the findings from the monitoring data? What are the key trends in contaminant levels that are being documented over time at the Site?

Methane continues to test below the LEL of 5%. Groundwater quality has not changed significantly since the project was instituted.

4. Is there a continuous on-site O&M presence? If so, please describe staff responsibilities and activities. Alternatively, please describe staff responsibilities and the frequency of site inspections and activities if there is not a continuous on-site O&M presence.

Site-specific monthly and quarterly inspections are scheduled and performed. Monthly, the blower building is PM'd according to the O&M manual and documented in MSD's asset management system. Quarterly, a field inspection is conducted and the results sent to USEPA and KDEP; any follow-up work required is documented in MSD's asset management system. Additionally, MSD maintains the flood protection system in Louisville, including the levee which runs through the site and the flood pump station at the southern end of the site. MSD maintenance and operations staff use the paved levee trail on top of the levee as access to the flood pump station and routinely report issues with the site when they are observed.

5. Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

No changes have been made.

6. Have there been unexpected O&M difficulties or costs at the Site since start-up or in the last five years? If so, please provide details.

Site security continues to be an issue. Details of evidence of trespassing have been provided in quarterly field observations.

7. Have there been opportunities to optimize O&M activities or sampling efforts? Please describe changes and any resulting or desired cost savings or improved efficiencies.

O&M activities and sampling efforts continue in accordance with the O&M manual and the agreed order.

8. Do you have any comments, suggestions or recommendations regarding O&M activities and schedules at the Site?

No.

9. Do you consent to have your name included along with your responses to this questionnaire in the FYR report?

Yes.

Contact	_____	_____	_____	_____
	Name	Title	Date	Phone No.
Problems suggestions <input type="checkbox"/> Report attached: _____				
4. Other Interviews (optional) <input type="checkbox"/> Report attached: _____				
Donna Seadler, EPA RPM; Kevin Koporec, EPA				
Heather Dodds, MSD				
III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)				
1. O&M Documents				
<input type="checkbox"/>	O&M manual	<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
<input type="checkbox"/>	As-built drawings	<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
<input type="checkbox"/>	Maintenance logs	<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
Remarks: <u>The O&M Plan needs to be updated to reflect current site conditions.</u>				
2. Site-Specific Health and Safety Plan				
		<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
<input type="checkbox"/>	Contingency plan emergency response plan	<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
Remarks: _____				
3. O&M and OSHA Training Records				
		<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
Remarks: _____				
4. Permits and Service Agreements				
<input type="checkbox"/>	Air discharge permit	<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
<input type="checkbox"/>	Effluent discharge	<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
<input type="checkbox"/>	Waste disposal, POTW	<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
<input type="checkbox"/>	Other permits: _____	<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
Remarks: _____				
5. Gas Generation Records				
		<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
Remarks: _____				
6. Settlement Monument Records				
		<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
Remarks: _____				
7. Groundwater Monitoring Records				
		<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
Remarks: _____				
8. Leachate Extraction Records				
		<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
Remarks: _____				
9. Discharge Compliance Records				
<input type="checkbox"/>	Air	<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
<input type="checkbox"/>	Water (effluent)	<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A
Remarks: _____				
10. Daily Access/Security Logs				
		<input type="checkbox"/>	Readily available	<input type="checkbox"/>
		<input type="checkbox"/>	Up to date	<input checked="" type="checkbox"/> N A

Remarks: _____							
IV. O&M COSTS							
1.	O&M Organization						
	<input type="checkbox"/> State in-house	<input type="checkbox"/> Contractor for state					
	<input type="checkbox"/> PRP in-house	<input type="checkbox"/> Contractor for PRP					
	<input type="checkbox"/> Federal facility in-house	<input type="checkbox"/> Contractor for Federal facility					
	<input checked="" type="checkbox"/> <u>MSD</u>						
2.	O&M Cost Records						
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date					
	<input type="checkbox"/> Funding mechanism agreement in place	<input type="checkbox"/> Unavailable					
	Original O&M cost estimate: _____ <input type="checkbox"/> Breakdown attached						
	Total annual cost by year for review period if available						
	From: <u>01 01 2013</u> Date	To: <u>12 31 2013</u> Date	<table style="width: 100%; border: none;"> <tr> <td style="width: 30%; padding: 5px;"><u>\$63,000</u></td> <td style="width: 10%; padding: 5px;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="padding: 5px;">Total cost</td> <td></td> </tr> </table>	<u>\$63,000</u>	<input type="checkbox"/> Breakdown attached	Total cost	
<u>\$63,000</u>	<input type="checkbox"/> Breakdown attached						
Total cost							
	From: <u>01 01 2014</u> Date	To: <u>12 31 2014</u> Date	<table style="width: 100%; border: none;"> <tr> <td style="width: 30%; padding: 5px;"><u>\$77,000</u></td> <td style="width: 10%; padding: 5px;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="padding: 5px;">Total cost</td> <td></td> </tr> </table>	<u>\$77,000</u>	<input type="checkbox"/> Breakdown attached	Total cost	
<u>\$77,000</u>	<input type="checkbox"/> Breakdown attached						
Total cost							
	From: <u>01 01 2015</u> Date	To: <u>12 31 2015</u> Date	<table style="width: 100%; border: none;"> <tr> <td style="width: 30%; padding: 5px;"><u>\$147,000</u></td> <td style="width: 10%; padding: 5px;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="padding: 5px;">Total cost</td> <td></td> </tr> </table>	<u>\$147,000</u>	<input type="checkbox"/> Breakdown attached	Total cost	
<u>\$147,000</u>	<input type="checkbox"/> Breakdown attached						
Total cost							
	From: <u>01 01 2016</u> Date	To: <u>12 31 2016</u> Date	<table style="width: 100%; border: none;"> <tr> <td style="width: 30%; padding: 5px;"><u>\$69,000</u></td> <td style="width: 10%; padding: 5px;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="padding: 5px;">Total cost</td> <td></td> </tr> </table>	<u>\$69,000</u>	<input type="checkbox"/> Breakdown attached	Total cost	
<u>\$69,000</u>	<input type="checkbox"/> Breakdown attached						
Total cost							
	From: <u>01 01 2017</u> Date	To: <u>12 31 2017</u> Date	<table style="width: 100%; border: none;"> <tr> <td style="width: 30%; padding: 5px;"><u>\$75,000</u></td> <td style="width: 10%; padding: 5px;"><input type="checkbox"/> Breakdown attached</td> </tr> <tr> <td style="padding: 5px;">Total cost</td> <td></td> </tr> </table>	<u>\$75,000</u>	<input type="checkbox"/> Breakdown attached	Total cost	
<u>\$75,000</u>	<input type="checkbox"/> Breakdown attached						
Total cost							
3.	Unanticipated or Unusually High O&M Costs during Review Period						
	Describe costs and reasons: <u>The increased costs in 2015 are primarily associated with the preparation of the CSM.</u>						
V. ACCESS AND INSTITUTIONAL CONTROLS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N A							
A. Fencing							
1.	Fencing Damaged	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Gates secured <input type="checkbox"/> N A				
	Remarks: _____						
B. Other Access Restrictions							
1.	Signs and Other Security Measures		<input type="checkbox"/> Location shown on site map <input type="checkbox"/> N A				
	Remarks: <u>Signage is in good condition and widespread.</u>						
C. Institutional Controls (ICs)							

1.	Implementation and Enforcement	
	Site conditions imply ICs not properly implemented	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N A
	Site conditions imply ICs not being fully enforced	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N A
	Type of monitoring (e.g., self-reporting, drive by): _____	
	Frequency: _____	
	Responsible party agency: _____	
	Contact _____	_____
	Name	Title
		Date
		Phone no.
	Reporting is up to date	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N A
	Reports are verified by the lead agency	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N A
	Specific requirements in deed or decision documents have been met	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N A
	Violations have been reported	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N A
	Other problems or suggestions: <input type="checkbox"/> Report attached	
2.	Adequacy <input type="checkbox"/> ICs are adequate <input checked="" type="checkbox"/> ICs are inadequate <input type="checkbox"/> N A	
	Remarks: <u>Restrictions prohibiting the development of the landfill for residential purposes are necessary.</u>	
D. General		
1.	Vandalism/Trespassing <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No vandalism evident	
	Remarks: <u>Trespassing is evident sitewide.</u>	
2.	Land Use Changes On Site <input type="checkbox"/> N A	
	Remarks: <u>None.</u>	
3.	Land Use Changes Off Site <input type="checkbox"/> N A	
	Remarks: <u>None.</u>	
VI. GENERAL SITE CONDITIONS		
A. Roads	<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N A	
1.	Roads Damaged <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N A	
	Remarks: _____	
B. Other Site Conditions		
	Remarks: _____	
VII. LANDFILL COVERS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N A		
A. Landfill Surface		
1.	Settlement (low spots) <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Settlement not evident	
	Area extent: _____	Depth: _____
	Remarks: <u>The capped area is well maintained. Historical landfill is wooded with uneven ground surface.</u>	
2.	Cracks <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Cracking not evident	
	Lengths: _____	Widths: _____
		Depths: _____
	Remarks: _____	

3.	Erosion	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Erosion not evident
	Area extent: _____		Depth: _____
	Remarks: _____		
4.	Holes	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Holes not evident
	Area extent: _____		Depth: _____
	Remarks: _____		
5.	Vegetative Cover	<input checked="" type="checkbox"/> Grass	<input checked="" type="checkbox"/> Cover properly established
	<input type="checkbox"/> No signs of stress	<input type="checkbox"/> Trees shrubs (indicate size and locations on a diagram)	
	Remarks: <u>Historical landfill soil cover was not properly established. Material from historical dumping has been uncovered.</u>		
6.	Alternative Cover (e.g., armored rock, concrete)	<input type="checkbox"/> N A	
	Remarks: <u>Rip-rap slope is functioning as designed.</u>		
7.	Bulges	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Bulges not evident
	Area extent: _____		Height: _____
	Remarks: _____		
8.	Wet Areas/Water Damage	<input checked="" type="checkbox"/> Wet areas water damage not evident	
	<input type="checkbox"/> Wet areas	<input type="checkbox"/> Location shown on site map	Area extent: _____
	<input type="checkbox"/> Ponding	<input type="checkbox"/> Location shown on site map	Area extent: _____
	<input type="checkbox"/> Seeps	<input type="checkbox"/> Location shown on site map	Area extent: _____
	<input type="checkbox"/> Soft subgrade	<input type="checkbox"/> Location shown on site map	Area extent: _____
	Remarks: _____		
9.	Slope Instability	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map
	<input checked="" type="checkbox"/> No evidence of slope instability		
	Area extent: _____		
	Remarks: _____		
B. Benches			
	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> 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	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N A or okay
	Remarks: _____		
2.	Bench Breached	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N A or okay
	Remarks: _____		
3.	Bench Overtopped	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N A or okay
	Remarks: _____		
C. Letdown Channels			
	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N A	
	(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill		

cover without creating erosion gullies.)			
1.	Settlement (Low spots)	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement Depth: _____
	Area extent: _____		
	Remarks: _____		
2.	Material Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation Area extent: _____
	Material type: _____		
	Remarks: _____		
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion Depth: _____
	Area extent: _____		
	Remarks: _____		
4.	Undercutting	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of undercutting Depth: _____
	Area extent: _____		
	Remarks: _____		
5.	Obstructions	Type: _____	<input type="checkbox"/> No obstructions
	<input type="checkbox"/> Location shown on site map	Area extent: _____	
	Size: _____		
	Remarks: _____		
6.	Excessive Vegetative Growth	Type: _____	
	<input type="checkbox"/> No evidence of excessive growth		
	<input type="checkbox"/> Vegetation in channels does not obstruct flow		
	<input type="checkbox"/> Location shown on site map	Area extent: _____	
	Remarks: _____		
D. Cover Penetrations <input checked="" type="checkbox"/> Applicable <input checked="" type="checkbox"/> N A			
1.	Gas Vents	<input type="checkbox"/> Active	<input type="checkbox"/> Passive
	<input type="checkbox"/> Properly secured locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> N A
	Remarks: <u>Not present in capped area.</u>		
2.	Gas Monitoring Probes	<input type="checkbox"/> Properly secured locked	<input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> N A
	Remarks: <u>Not present in capped area.</u>		
3.	Monitoring Wells (within surface area of landfill)		
	<input checked="" type="checkbox"/> Properly secured locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> N A
	Remarks: _____		
4.	Extraction Wells Leachate		
	<input type="checkbox"/> Properly secured locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition

<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input checked="" type="checkbox"/> N A
Remarks: _____		
5. Settlement Monuments	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed <input checked="" type="checkbox"/> N A
Remarks: _____		
E. Gas Collection and Treatment	<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N A
Remarks: <u>Gas collection system is present and operating, but effectiveness of function is uncertain.</u>		
1. Gas Treatment Facilities	<input type="checkbox"/> Flaring	<input type="checkbox"/> Thermal destruction <input type="checkbox"/> Collection for reuse
	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks: _____		
2. Gas Collection Wells, Manifolds and Piping	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks: _____		
3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance <input type="checkbox"/> N A
Remarks: _____		
F. Cover Drainage Layer	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N A
1. Outlet Pipes Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N A
Remarks: _____		
2. Outlet Rock Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N A
Remarks: _____		
G. Detention/Sedimentation Ponds	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N A
1. Siltation	Area extent: _____	Depth: _____ <input type="checkbox"/> N A
	<input type="checkbox"/> Siltation not evident	
Remarks: _____		
2. Erosion	Area extent: _____	Depth: _____
	<input type="checkbox"/> Erosion not evident	
Remarks: _____		
3. Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N A
Remarks: _____		
4. Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N A
Remarks: _____		
H. Retaining Walls	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N A
1. Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
	Horizontal displacement: _____	Vertical displacement: _____
	Rotational displacement: _____	
Remarks: _____		

2.	Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
Remarks: _____			
I. Perimeter Ditches/Off-Site Discharge		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N A
1.	Siltation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident
Area extent: _____		Depth: _____	
Remarks: _____			
2.	Vegetative Growth	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N A
<input type="checkbox"/> Vegetation does not impede flow			
Area extent: _____		Type: _____	
Remarks: _____			
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
Area extent: _____		Depth: _____	
Remarks: _____			
4.	Discharge Structure	<input type="checkbox"/> Functioning	<input type="checkbox"/> N A
Remarks: _____			
VIII. VERTICAL BARRIER WALLS		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N A
1.	Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
Area extent: _____		Depth: _____	
Remarks: _____			
2.	Performance Monitoring	Type of monitoring: _____	
<input type="checkbox"/> Performance not monitored			
Frequency: _____		<input type="checkbox"/> Evidence of breaching	
Head differential: _____			
Remarks: _____			
IX. GROUNDWATER/SURFACE WATER REMEDIES		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N A
A. Groundwater Extraction Wells, Pumps and Pipelines		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N A
1.	Pumps, Wellhead Plumbing and Electrical		
<input type="checkbox"/> Good condition <input type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs maintenance <input type="checkbox"/> N A			
Remarks: _____			
2.	Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances		
<input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance			
Remarks: _____			
3.	Spare Parts and Equipment		
<input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided			
Remarks: _____			
B. Surface Water Collection Structures, Pumps and Pipelines		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N A

1.	Collection Structures, Pumps and Electrical
	<input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance
	Remarks: _____
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances
	<input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance
	Remarks: _____
3.	Spare Parts and Equipment
	<input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided
	Remarks: _____
C. Treatment System <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N A	
1.	Treatment Train (check components that apply)
	<input type="checkbox"/> Metals removal <input type="checkbox"/> Oil water separation <input type="checkbox"/> Bioremediation
	<input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers
	<input type="checkbox"/> Filters: _____
	<input type="checkbox"/> Additive (e.g., chelation agent, flocculent): _____
	<input type="checkbox"/> Others: _____
	<input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance
	<input type="checkbox"/> Sampling ports properly marked and functional
	<input type="checkbox"/> Sampling maintenance log displayed and up to date
	<input type="checkbox"/> Equipment properly identified
	<input type="checkbox"/> Quantity of groundwater treated annually: _____
	<input type="checkbox"/> Quantity of surface water treated annually: _____
	Remarks: _____
2.	Electrical Enclosures and Panels (properly rated and functional)
	<input type="checkbox"/> N A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance
	Remarks: _____
3.	Tanks, Vaults, Storage Vessels
	<input type="checkbox"/> N A <input type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs maintenance
	Remarks: _____
4.	Discharge Structure and Appurtenances
	<input type="checkbox"/> N A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance
	Remarks: _____
5.	Treatment Building(s)
	<input type="checkbox"/> N A <input type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair
	<input type="checkbox"/> Chemicals and equipment properly stored
	Remarks: _____
6.	Monitoring Wells (pump and treatment remedy)

<input type="checkbox"/> Properly secured locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs maintenance <input type="checkbox"/> N A Remarks: _____
D. Monitoring Data
1. Monitoring Data <input checked="" type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality
2. Monitoring Data Suggests: <input checked="" type="checkbox"/> Groundwater plume is effectively contained <input checked="" type="checkbox"/> Contaminant concentrations are declining
E. Monitored Natural Attenuation
1. Monitoring Wells (natural attenuation remedy) <input type="checkbox"/> Properly secured locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N A Remarks: _____
X. OTHER REMEDIES
If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.
XI. OVERALL OBSERVATIONS
A. Implementation of the Remedy
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). <u>The remedy was designed to monitor groundwater and air contamination and collect LFGs. Groundwater, soil gas and air monitoring are ongoing.</u>
B. Adequacy of O&M
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. <u>MSD conducts O&M activities adequately. The O&M Plan needs to be updated to reflect current site conditions.</u>
C. Early Indicators of Potential Remedy Problems
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. <u>None.</u>
D. Opportunities for Optimization
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. <u>Ongoing discussions include opportunities for optimization.</u>

APPENDIX H – SITE INSPECTION PHOTOS



Locked entrance on Lee's Lane



Signage and fencing looking north from Lee's Lane to the Northern Tract



Capped area with Ohio River beyond rip-rap and tree line



Signage and trespassing trail on the northern end of the Central Tract



Example of site signage



Monitoring well on capped area with Ohio River beyond the tree line



Trail on the Central Tract, seen from the southern end of the Central Tract



Eastern side of the Southern Tract, seen from the levee



Blower house for gas extraction system near Lee's Lane, on northeast corner of the Central Tract



Louisville Loop on levee looking south from Lee's Lane; Site on right with Louisville Gas & Electric stack in background

APPENDIX I – ADDITIONAL SITE BACKGROUND INFORMATION

In 1971, Kentucky permitted the Southern Tract of the landfill under its Solid Waste Program.

The EPA identified approximately 30 PRPs. This list of PRPs includes MSD. In November 1978, the Surveillance and Analysis Division of the Kentucky Division of Waste Management collected samples from residential wells in Riverside Gardens to determine the potential effects of the landfill on groundwater quality. As a result of the study, the Division reported that there was no indication of contaminated groundwater migration from the landfill to the residential wells near the landfill.

Between 1975 and 1979, 44 gas observation wells were installed in and around the landfill and in Riverside Gardens. Samples from these wells indicated that the source of the methane and associated toxic gas was the decomposition of landfill wastes.

In early 1981, the Kentucky Natural Resources and Environmental Protection Cabinet installed 11 shallow groundwater monitoring wells at the Site. The EPA later sampled five of these wells. Analyses of the samples indicated that on-site groundwater contained inorganic contaminants, including arsenic, lead and chromium, at elevated concentrations. However, the results were believed to be affected by the presence of sediment in the wells, apparently due to improper well installation.

During the Site's remediation investigation and feasibility study, the EPA developed a public health assessment (PHA) in 1985. It concluded that the primary public health concern at the Site was elevated chromium levels found in on-site groundwater. It also concluded that there was no evidence of an off-site public health or environmental problem related to the Site at that time. The PHA did not indicate the need for groundwater remediation. It did identify the need for long-term groundwater monitoring and ambient air monitoring to establish baseline conditions and to serve as an early detection system if site conditions changed. The PHA recognized that the existing gas collection system was mitigating gas migration while noting the potential need for system repair or replacement. The PHA recommended implantation of a routine subsurface gas monitoring program outside the collection system and in Riverside Gardens (the residential area to the east of the Site). The PHA also noted that unless access to the Site was controlled, surface wastes should be removed and soils containing elevated levels of chromium and lead should be covered.

The EPA's 1986 Remedial Investigation Report described contaminant distribution as follows:

- On-site surface water contained very low levels of contaminants.
- On-site soils and sediments were similar to the off-site background sample collected in Riverside Gardens, suggesting the use of local soils as cover material. In two areas where "hot spot" soil samples were collected, the estimated concentrations of lead and chromium were 2,000 mg/kg each. These areas were located along the access road in the Central Tract and are believed to be the result of indiscriminate dumping, since the concentrations found were not representative of overall soil concentrations. Soil samples were collected to identify contaminants posing direct contact and runoff hazards. Eight of the 11 soil sampling locations were selected because the surface was crusted, discolored or moist, or because the area showed an obvious lack of vegetation.
- On-site groundwater contained low levels of organic compounds and some inorganic contaminants. The major inorganic contaminants included arsenic (87 micrograms per liter, or $\mu\text{g/L}$), barium (1,100 $\mu\text{g/L}$), cadmium (22 $\mu\text{g/L}$), chromium (640 $\mu\text{g/L}$), lead (150 $\mu\text{g/L}$), manganese (44,000 $\mu\text{g/L}$) and iron (190,000 $\mu\text{g/L}$). The off-site concentrations of these

contaminants were all below the MCL set in the Interim Primary Drinking Water Regulations. Two metal contaminants – manganese and iron – were found at levels above MCLs. Manganese was detected at 610 µg L in the Louisville Gas and Electric well and at 370 µg L in an Indiana public water supply well. Iron was detected at 8,900 µg L in an Indiana public water supply well, but was below background in both industrial wells. Neither manganese nor iron is considered to have significant health effects.

Because of community concerns regarding health issues, the Agency for Toxic Substances and Disease Registry requested that the Kentucky Department for Public Health review cancer morbidity rates in the area surrounding the Site in August 2011. The Kentucky Department for Public Health review looked at cancer rates from 1999 to 2008 in the 40216 zip code. Zip code 40216 covers over 14 square miles in Jefferson County, of which a small portion is Riverside Gardens. Based on 2000 Census data, approximately 2,074 cases of cancer would be expected. The number of cancers observed was 2,963. The Centers for Disease Control and Prevention guidelines recommend an expected cancer exceedance rate of 2 to 3 times before an environmental investigation is considered. The ratio in this case was 1.43. While somewhat elevated, it did not meet the threshold for further investigation.