

FOURTH FIVE-YEAR REVIEW REPORT FOR
Moyer's Landfill Superfund Site
Montgomery County, Pennsylvania



Prepared by

U.S. Environmental Protection Agency
Region III
Philadelphia, Pennsylvania

Paul Leonard, Director
Superfund and Emergency Management Division
U.S. EPA, Region 3

Date

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LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
BTAG	Biological Technical Assistance Group
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminants of Concern
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
ICs	Institutional Controls
MCLs	Maximum Contaminant Levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PADEP	Pennsylvania Department of Environmental Protection
PADER	Pennsylvania Department of Environmental Resources
PCBs	Polychlorinated biphenyls
POTW	Publicly Owned Treatment Works
PPA	Prospective Purchaser Agreement
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act of 1986
TAL	Target Analyte List
TBC	To be considered
TCE	Trichloroethylene
USACE	U.S. Army Corps of Engineers
UU/UE	Unlimited Use and Unrestricted Exposure

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 (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fourth FYR for the Moyer's Landfill Superfund Site (Site). The triggering action for this statutory review is the completion date of the previous FYR dated June 27, 2017. 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 two Operable Units (OUs), both of which will be addressed in this FYR. OU1 consists of a landfill cap and appurtenances. OU2 consists of a leachate collection system which discharges to the local Publicly Owned Treatment Works (POTW).

The EPA remedial project manager (RPM) led the FYR effort. Additional participants included EPA human health and ecological risk assessors, an EPA hydrogeologist and representatives of the Pennsylvania Department of Environmental Protection (PADEP). The review began on August 2, 2021.

Site Background

The Site is a 65-acre inactive, privately-owned landfill located at Moyer Road in Lower Providence Township, Montgomery County, Pennsylvania, about twenty-seven (27) miles northwest of Philadelphia (Appendix C, Site Location Map). The Site is bounded on the north and west by Evansburg State Park, on the east by a farmhouse with barns and a housing development (Valley High Estates), and on the south by the housing development as well as undeveloped land (Appendix D, Site Layout Map). Currently located on the Site are leachate collection tanks and a wooden storage shed in the southern part of the Site.

The Skippack Creek, which flows through Evansburg State Park, is located about 350 feet northwest of the Site (Appendix D, Site Layout Map). The Skippack Creek then discharges into the Perkiomen Creek which eventually discharges into the Schuylkill River (Appendix C, Site Location Map). Surface water runoff from the landfill slopes historically flowed westerly into the Skippack Creek prior to EPA involvement at the Site. Currently, surface water runoff is routed off the landfill cap and directed towards stormwater drainage basins around the perimeter of the landfill.

Groundwater at the Site occurs in an aquifer which generally has poor water yields, particularly at shallow depths. Wells drilled into the deeper portion of the aquifer are often artesian due to the dense, relatively impermeable layer of bedrock overlying the deep system. Most of the residents in

the vicinity of the Site are on public water. However, there are approximately ten residential wells along Moyer Road and Visitation Road, which are east of the Site and are upgradient from the landfill. Groundwater from the Site flows to the west and southwest, towards the Skippack Creek, and there are no residential wells between the Site and the Skippack Creek.

The Site was operated as a municipal landfill from the early 1940s until April 1981, during which time it received municipal waste, sewage and industrial sludges. The landfill accepted a variety of solid and liquid hazardous wastes, including polychlorinated biphenyls (PCBs), dioxins, solvents, paints, low-level radioactive wastes, and incinerated materials in bulk form and/or containerized waste in drums.

Originally, there was no management of leachate from the landfill and leachate either seeped into groundwater or discharged directly to the Skippack Creek. In the early 1970s, the Pennsylvania Department of Environmental Resources (PADER), the predecessor to the Pennsylvania Department of Environmental Protection (PADEP), developed and implemented more comprehensive landfill regulations. As a result, a leachate collection system was constructed and began operating in 1972. However, leachate still overflowed continuously from several collection pits located on the property. In 1981, PADEP closed the facility. The Site was listed on the National Priorities List (NPL) on September 8, 1983.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Moyer's Landfill		
EPA ID: PAD980508766		
Region: 3	State: PA	City/County: Lower Providence Township, Montgomery County
SITE STATUS		
NPL Status: Deleted		
Multiple OUs? Yes	Has the site achieved construction completion? Yes	
REVIEW STATUS		
Lead agency: EPA		

Author name (Federal or State Project Manager): Irene Shandruk
Author affiliation: EPA Region 3
Review period: August 2021 – June 2022
Date of site inspection: 11/15/2021
Type of review: Statutory
Review number: 4
Triggering action date: 6/27/2017
Due date (five years after triggering action date): 6/27/2022

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In the early 1980s, on-site leachate and seep samples were collected and analyzed. The samples contained eighty-six (86) priority pollutants and sixteen (16) metals; nearly all were contaminants of concern. The landfill surface showed a number of leachate seep locations which served as a continuous source of contamination to ground and surface waters. The remedial investigation/feasibility study (RI/FS) identified the following contaminants which were above screening levels in the leachate seeps: arsenic, barium, lead, manganese, nickel, zinc, beta radiation, trichloroethylene (TCE), toluene, xylene, di-n-octylphthalate, 2-hexanone, 2-butanone, bis (2-ethylhexyl) phthalate, acetic acid and methylester. Air monitoring did not identify evidence of impacts to air from the Site.

The major potential contaminant transport path providing exposure of human receptors to the landfill contaminants is the groundwater flow beneath the Site. Volatilization of organic and/or inorganic contaminants to ambient air, with the contaminated air moving off-site, has not been observed at the Site. Surface water runoff mixed with contaminated leachates emanating from the deposited wastes may affect surface waters of Skippack Creek, and, consequently, may have a possible impact on human health and aquatic environment.

Potential receptors include nearby users of groundwater for drinking and all other purposes, persons using local surface waters for recreational purposes, food grown in nearby fields, and persons consuming animals grazed on nearby fields, as well as on-site workers. Residential wells adjacent to the Site were not contaminated at the time of sampling, and there are no nearby residential wells in the direct path of leachate flow, which use water for drinking or any other purposes.

Response Actions

The Record of Decision (ROD) for the Site was issued on September 30, 1985. The ROD stated the Remedial Action Objectives (RAOs) in the following manner: “The overall strategy is to mitigate and minimize harm to the public health and the environment. This should include minimizing further upper aquifer contamination and the possibility of direct contact with the waste. Leachate

control is an integral part of the overall remedy to eliminate the continuing migration of contaminants across the Site and off the Site to Skippack Creek. Therefore, EPA selected a remedy to prevent direct contact with the landfill waste and prevent off-site migration of contamination via surface water and groundwater, as described below.”

The 1985 ROD selected a primary and a contingent remedy. The primary remedy included a gas generation/recovery system. However, the gas generation/recovery system was later determined not to be feasible due to diminishing gas generation, thus the contingency alternative was implemented. The major components of the contingency remedy include:

- Site preparation for installation of a landfill cap: grading, flattening of steep slopes, retaining walls and installation of rip-rap at areas that are most likely to be eroded;
- Construction of the landfill cap;
- Gas venting and gas monitoring;
- Surface water collection and discharge to Skippack Creek;
- Security/fencing measures;
- Leachate collection and on-site treatment that will meet the 10^{-6} risk level in the groundwater and discharge requirements in Skippack Creek; and
- Operation and Maintenance of the remedy including ground and surface water monitoring, maintenance of the cap, and treatment of leachate on-site.

At the time the ROD was signed in 1985, no infrastructure was available to discharge the leachate to a POTW. Subsequently, a sewer main was made available in close proximity to the Site. Because of this changed condition, and in anticipation of a remedy change to address the leachate present at the Site, the leachate treatment portion of the remedy was designated as OU2 and the landfill cap and associated elements of the remedy were designated as OU1.

On January 3, 2000, EPA issued an Explanation of Significant Differences (ESD) for OU2 which modified the ROD by replacing on-site leachate treatment with off-site leachate treatment at an existing POTW. This change better protected the surface waters and the environment from the potential failure of an undersized on-site treatment plant. In addition, routing the leachate to the POTW was shown to be more cost effective than building and operating an on-site leachate treatment facility.

On September 18, 2009, EPA issued a second ESD for both OU1 and OU2 to require Institutional Controls (ICs) as part of the remedy. ICs are non-engineered instruments, such as administrative and legal controls, that are necessary for the protection of the integrity of the remedial measures on-site to ensure long-term protection of human health and the environment. ICs play an important role in Superfund remedies because they reduce exposure to contamination by limiting land or resource use, guide human behavior at a site, and protect the integrity of the remedy’s components. The ESD required ICs to prevent disturbance of the landfill cap and associated remedy components and to protect the remedy and prevent exposure to contamination at the Site.

Status of Implementation

The ROD for this Site was issued in 1985 prior to the enactment of the Superfund Amendments and Reauthorization Act (SARA). This pre-SARA ROD does not contain the same information or level of detail as a more current ROD. The ROD stated the Remedial Action Objectives in the following manner: “The overall strategy is to mitigate and minimize harm to the public health and the environment. This should include minimizing further upper aquifer contamination and the possibility of direct contact with the waste. Leachate control is an integral part of the overall scheme in order to eliminate the continuing migration of contaminants across the Site and off the Site to the Skippack Creek.” EPA conducted remedial actions such as capping the landfill and collecting landfill leachate and routing it for treatment, as prescribed by the 1985 ROD and 2000 ESD. These actions prevent direct contact with the waste and contaminated leachate and prevent off-site migration of contamination via surface runoff and groundwater contamination.

The 1985 ROD identified a primary and a contingent remedy. The major components of the primary remedy were as follows:

- Soil cover with permeability of 10^{-4} to 10^{-5} cm/sec;
- Erosion and sedimentation control measures;
- Surface water diversion;
- Leachate collection, on-site treatment and discharge to surface water;
- Methane gas recovery and sale;
- Security/fencing measures;
- Groundwater monitoring; and
- All closure activities in compliance with Resource Conservation and Recovery Act (RCRA) at conclusion of gas generation phase (10 to 20 years)

The implementation of this remedy depended on the success of the gas generation/recovery program. The gas recovery system was not feasible, thus the contingent alternative was implemented. The major components of the contingent remedy include:

- Miscellaneous work preparatory to installation of RCRA cap: grading, flattening of steep slopes, retaining walls and installation of rip-rap at areas that are most likely to be eroded;
- Construction of RCRA cap;
- Gas venting and gas monitoring;
- Surface water collection and discharge to Skippack Creek;
- Security/fencing measures;
- Leachate collection and on-site treatment that will meet the 10^{-6} risk level in the groundwater and discharge requirements in the stream; and
- Operation and Maintenance: ground and surface water monitoring, maintenance of the cap and treatment of leachate on-site.

EPA via the U.S. Army Corps of Engineers (USACE) completed the design of the contingent remedy on April 20, 1989. EPA via the USACE began construction of the landfill cap. After construction began, local residents expressed concerns regarding truck traffic. In response, EPA then directed USACE to redesign the cap with a perimeter leachate collection trench. The landfill cap was redesigned to minimize the amount of fill needed for construction, thus reducing the truck traffic. Less cover, however, also led to steeper slopes for the redesigned landfill cap. The redesign was completed in

November 1992 and construction of the redesigned landfill cap was completed in November 1994.

EPA identified the leachate collection and treatment portion of the remedial action as OU2. In January 2000, EPA issued an ESD which changed the leachate treatment portion of the Remedial Action from on-site leachate treatment and discharge to Skippack Creek to leachate collection and conveyance for treatment at an existing Publicly Owned Treatment Works (POTW). The leachate conveyance system consists of recovery trenches, sumps, pumps, a maintenance shed, four holding tanks located in the southern part of the Site, also known as the South Valley, and monitoring wells. Using the POTW for leachate treatment was originally described in the ROD, but proved infeasible because the sewer line was not available near the Site when the ROD was issued. This change improved the protection of the surface waters and the environment from the potential failure of an on-site treatment plant. In addition, routing the leachate to the POTW was shown to be more cost effective than building and operating a leachate treatment facility. The construction of the OU2 remedial action was initiated in 2000 and completed in August 2002.

Table 1: Institutional Control Summary

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)
Landfill cap, gas vents, monitoring wells, leachate collection and conveyance system, and security measures	Yes	Yes	Remedial systems associated with the landfill	No disturbance or interference	Township ordinance

The township ordinance states:

“It shall be unlawful for any Owner, lessor, lessee or occupier of the Property, or any other Person to engage in any activities on the Property that would in any manner disturb or interfere with the environmental remedial systems at the Property, including, without limitation, the landfill cap, gas vents, monitoring wells, leachate collection and conveyance system, and security measures, such as fencing, that prevent access to the Property. The prohibited activities include, but are not limited to the following:

- A. Digging in or disturbance of the landfill cap, tampering with hardware or equipment associated with the gas vents, monitoring wells, leachate collection and conveyance systems or the security fencing.
- B. Any use of leachate generated at the Property including, without limitation, any activities that could cause exposure to contaminants in the leachate via ingestion, vapor inhalation or dermal contact.
- C. Digging in or disturbance of the landfill cap including, without limitation, any activities that could result in contact with contaminants in the soils at the Property through ingestion, inhalation or dermal contact.”

Systems Operations/Operation and Maintenance

Prior to May 2017, PADEP performed all operations and maintenance (O&M) activities on the Site. In May 2017, however, PADEP finalized a Prospective Purchaser Agreement (PPA) with a new property owner, Carmela Farms LLC. There were no changes in land use by the new property owner, but the PPA included specific provisions regarding some Site O&M activities that the new property owner would perform. The O&M Plan was updated in 2021 to reflect these changes, and they are outlined below. PADEP continues to report on O&M activities and issues, including those tasks which the property owner performs, to EPA no later than 60 days following the end of the calendar year.

- **Site Inspections:** Routine site inspections are conducted by PADEP and include observations of the fence line, road, landfill cap and functioning of the leachate collection system at least once per month. The leachate collection system is inspected specifically for integrity of the leachate holding tanks, the leachate level in the manholes, the flow meter reading, and the state of the discharge pipe.
- **Leachate Monitoring:** PADEP is responsible for monitoring, repair and maintenance of the entire leachate collection system. Monitoring leachate involves taking a monthly reading of the leachate volume discharged to the POTW, and reporting information on total gallons per month and average daily flow rate to the POTW by the fifteenth of each month. The leachate currently is permitted by the Oaks POTW to meet their pretreatment program standards.
- **Grass Cutting:** The property owner is responsible for this task. The grass at the Site is cut no less than once per year in order to discourage the growth of small trees and shrubs, and also to aid in the identification of soil erosion.
- **Cap Repairs:** The property owner is responsible for all erosion repairs not exceeding 1000sq/ft total. Large scale erosion repairs exceeding this threshold will be addressed by PADEP. This task is performed during the growing season, as needed, to ensure integrity of the landfill cap and to re-establish vegetation on any areas of bare soil to limit additional erosion.
- **Perimeter Road Repairs:** The property owner is responsible for keeping the access road in passable condition throughout the year. This includes conducting repairs and/or maintenance of the access road. Areas to be repaired should be noted during site inspections. This includes the “bridge crossings” over surface drainage features. Any major repairs needed to the access road will be conducted by PADEP at its discretion.
- **Fence Repairs:** The property owner is responsible for all fence maintenance and repairs.
- **Tree removal:** The property owner is responsible for tree removal. This task is limited to trees that have damaged the perimeter fence or have the potential to damage the landfill cap. Trees to be removed are identified during the Site inspections.
- **Sampling:** In 2017, EPA approved PADEP’s request for discontinuation of groundwater and ambient air sampling at the Site. This was based on years of low to no detections of contaminants of concern (COC). However, to continually evaluate the remedy’s protectiveness related to landfill gas emissions, PADEP will take methane gas readings prior to each five-year review. Sampling locations are limited to 2-3 locations and should be biased to the residential development bordering the Site. Additionally, PADEP will sample and analyze the leachate in the South Valley sump for volatile organics, target analyte list (TAL) metals, and cyanide, on a bi-annual basis. The leachate may also be

analyzed for other parameters requested by the POTW.

PADEP reported the following O&M issues since the last FYR period:

- In 2018, severe erosion was reported due to failure of the Site's northern drainage feature (also known as the North Valley drainage feature) as well as the drainage feature of the Site's southern drainage feature (also known as the South Valley drainage feature) near the access road. PADEP's contractor developed new engineering controls to address these issues, which included reconstructing and widening the drainage features. Additionally, access roads were excavated, reconstructed in some areas, and regraded.
- In 2017-2018, several holes, created by trespassers, were discovered in the fence, and were repaired by the property owner. To further address the issue of trespassing, the property owner installed security cameras near the Site.
- In 2017-2018, the pump station in the South Valley continued to experience minor electrical issues which were promptly addressed by PADEP's contractor.
- In 2017-2018, due to issues with leachate monitoring, PADEP's contractor installed a magnetic flow meter, replaced malfunctioning pumps in the North and South Valley, and also replaced damaged leachate piping.
- In 2019, the south pump station failed. PADEP's contractor determined that the rail system installed to allow for easy placement and maintenance of the pumps had failed. The rail system was replaced and operation was restored.
- In 2020, there was severe erosion along the leachate conveyance line leading from the holding tanks to the POTW due to stormwater runoff. This impacted a residential property and a day camp. PADEP's contractor made the necessary repairs, which included removing sediment build-up and fortifying drainage channels. Follow-up inspections by PADEP confirmed that that these repairs addressed the erosion issue.
- In 2020, the Site lost power due to blown fuses but power was restored by the electric company.
- In 2021, circuit breakers controlling the heat tracing at the holding tanks had failed, which caused leachate in the piping network to freeze resulting in a crack in the piping. Circuit breakers, cracked piping, and insulation/jacketing around the piping were replaced.
- In 2021, following a large storm event, areas of severe erosion were discovered along the leachate conveyance line leading from the tank farm, which was caused by surface water runoff from the Site. These erosion issues impacted a downgradient residential property and day camp. The network of surface water drainage piping and storm grates were found to be fouled from debris and sediments washed out upgradient. This area was repaired in January 2022 which included the excavation of sediments and debris from the stormwater grates and drainage features, placement of additional large stone and rip rap around the drainage features to slow surface water and trap sediments, and placement of large concrete barriers to prevent overflow and direct surface waters into the drainage features.
- In 2022, PADEP's contractor discovered a crack in a corrugated surface water drainage pipe. A video inspection of the entire drainage pipe will be conducted with any necessary repairs expected to be completed by Spring 2022.

Although erosion and electrical issues continued to be recurring issues at the Site, PADEP promptly addressed each issue as it arose while continuing to make improvements to the drainage and electrical systems where appropriate.

The property owner has regularly conducted preventive maintenance by cutting back trees or branches that could pose a threat to the integrity of the fence, mowing the access road, and mowing

the entire Site. Finally, the property owner made minor repairs to the access road as was needed.

In 2020, PADEP completed well abandonment activities at the Site, decommissioning all five monitoring wells (MW-R1; MW-R2; MW-4S; MW-4D; and MW-5) due to years of low to no detections of COC's in the groundwater.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determination and statement from the last FYR. There were no issues and recommendations in the last FYR.

Table 2: Protectiveness Determinations/Statements from the 2017 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Protective	This third FYR for the Site finds that the remedy has been constructed in accordance with the requirements of the 1985 ROD and 2000 and 2009 ESDs and is functioning as designed. The immediate threats have been addressed though capping the landfill and collecting and properly disposing of the leachate. Since the Remedial Actions at both OUs are protective, the Site is protective of human health and the environment. Long-term protectiveness of the remedy will be maintained by continuing to perform O&M of the landfill cap and leachate collection system; monitoring of landfill gas; and enforcing the institutional controls.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by placing an advertisement in the *Times Herald* newspaper on January 18, 2022 (Appendix I), stating that there was a FYR and inviting the public to submit any comments to EPA. Additionally, postcards were mailed to residents in the Moyer's Landfill area in January to notify them of an upcoming FYR and inviting their participation in the interview process. The results of the review and the report will be made available at the Site information repository located at Lower Providence Community Library, 50 Parklane Drive, Eagleville, PA 19403.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date. The results of these interviews are summarized below.

PADEP: On November 15, 2021, the Site's project manager was interviewed by the EPA

Community Involvement Coordinator (CIC). The overall impression of the Site is that the remedy continues to be protective of human health and the environment. PADEP conducts routine activities at the site each month to check the security and fences, any indication of erosion, and access roads. During these routine activities, PADEP also takes discharge from the leachate tank and conducts readings of the leachate levels. The most recent monthly check-up was completed on November 15, 2021 during the FYR site inspection. There is continuous on-site O&M but there have not been any unexpected O&M difficulties or costs at the Site. One opportunity to optimize O&M has been to construct better repairs where needed. In relation to repairs at the Site, PADEP received notice in 2020 of some erosion occurring in downgradient areas off-site. The repairs were completed in January 2021 and additional preventative measures were installed to prevent future erosion.

Property Owner: On November 15, 2021, the property owner was interviewed by the EPA CIC. The property owner expressed that he has a good working relationship with PADEP concerning the Site. He also reported that there are constant O&M activities at the Site. Every September and October, he and his family fully cut the grass and weeds over and around the landfill. Every May and June they conduct spot cleaning around the landfill. About once a week, he and his family also cut back any overgrowth around the access roads. To keep up with the constant maintenance at the Site, the property owner has acquired several more tractors over the last five years and has more help from family members. As the number of tractors increased over the last five years, so has the budget for tractor repairs, maintenance, and gas, which are fully paid for by the owner. Finally, the property owner noted that there have not been any trespassers onto the property since the cameras were installed and that there are no other significant issues at the Site.

Lower Providence Township: On November 23, 2021, a representative of Lower Providence Township was interviewed via e-mail by the EPA CIC. It was noted that many current personnel at Lower Providence Township do not have extensive knowledge about the work at the Moyer's Landfill Site because much of the remedial work was completed several decades ago. The general sentiment was that the project appears to be successful because the Site has been stabilized and turned over to private ownership. The Township does not conduct any routine site inspection, but they occasionally hear from local residents asking about truck activity. The representative noted that the Township would like to know about any scheduled activities at the Site in the future so that the Township can be proactive and inform nearby residents.

Following the mailing of postcards to residents in the Moyer's Landfill area informing them of the upcoming five-year review and inviting their participation in the interview process, a member of the community contacted the CIC. The resident has been a member of the community for 15 years and has always been aware of the Site. Although the resident does not have specific knowledge about the clean-up at the Site, they are appreciative of EPA's remedial efforts over the years. From the resident's experience, other members of the community also feel that the Site is being well taken care of by the lead agencies and there are no overall concerns about the Site at this time. The resident asked the CIC some questions at the end of the interview. The resident inquired if EPA was monitoring the contamination at the Site and if there was any chance of the Site contaminating the public water source connected to their home. The CIC responded that based on the Fall 2021 Site visit, it appeared that the remedial work at the Site was continuing to function properly and protect human health and the environment. The CIC then followed up with the Site RPM to confirm this response. The CIC relayed to the resident in a follow-up voicemail that all public water is treated prior to reaching any home, and all groundwater monitoring data from the Site continues to show that there are no potential risks to human health.

Data Review

Monitoring data provides information to assess whether the remedy is achieving the performance standards described in the ROD. Previously, PADEP had performed sampling of leachate, groundwater, vent gas, and ambient air at the Site. After years of low to no detection of COCs in the groundwater, EPA approved the discontinuation of groundwater monitoring at the Site in 2017. Additionally, after years of monitoring results showing no adverse impact on ambient air from landfill gas vents, as of the third FYR, PADEP and EPA had determined that ambient air monitoring was no longer needed as well. PADEP, however, has continued to monitor leachate discharge rates on a monthly basis, concentrations of COCs in leachate, and methane from passive gas vents. Leachate discharge rates are consistent with results from previous sampling events (see Appendix E). Methane gas results are discussed below (see Appendix F). Leachate sampling results are also discussed below and are shown in Appendix G.

Methane Gas

The 1985 ROD requires periodic monitoring of the landfill gas to demonstrate that the landfill gas is not migrating and causing a hazard to the nearby community. To do this, passive landfill gas vents at the perimeter of the landfill, near adjacent homes, are sampled once every five years to coincide with Site five-year reviews. Methane concentrations below the statutory limits of 100% of the Lower Explosive Limit (which is 5% by volume for methane) demonstrate that the landfill gas is not migrating and posing an explosive risk to nearby residents.

On September 17, 2021, PADEP completed methane sampling of eleven passive gas vents as marked on the figure shown in Appendix F. Readings were taken from sample ports located near the bottom of the vent pipes using a MultiRae PID, a portable multi-gas monitor. Table 3 shows there were no detectable levels of methane found at the gas vents along the perimeter of the site (locations 8, 9, 10 and 11). Three vents at the site's crest (locations 4, 6 and 7) had detectable methane levels less than 100% of the Lower Explosive Limit. Two readings were taken at location 4 since that location had the highest reading. Although these three vents had detectable methane, most of the landfill is generating very little methane gas. Since methane was not detected above its Lower Explosive Limit along the perimeter of the site nor anywhere on the landfill, the landfill gas is not migrating and causing a hazard to nearby residents.

Table 3: Summary of 2021 Gas Vent Methane Sampling

Location	Readings (% LEL)
1	0
2	0
3	0
4	21/50
5	0
6	6
7	5
8	0
9	0

10	0
11	0

Leachate

One component of the remedy is that leachate from the landfill is collected, held, and transported to the local POTW for treatment and discharge. During the November 15, 2021 site inspection, there was evidence that the leachate had overflowed from the South Valley manhole and had flowed downhill in the direction of the leachate holding tanks. The length of time that this overflow was occurring is unknown but was likely less than one month given the frequency of inspections conducted by PADEP.

In order to assess for potential ecological concerns due to the leachate overflow, the untreated leachate sampling results provided by PADEP were evaluated by EPA’s Biological Technical Assistance Group (BTAG) in comparison to the BTAG Freshwater Screening Values (<https://www.epa.gov/risk/freshwater-screening-benchmarks>). Contaminants which exceeded their respective surface water screening values in 2021 were aluminum, arsenic, barium, boron, iron, lead, and manganese. After discussion and review of inspection photos with the RPM, BTAG concluded that there is no evidence the leachate was able to travel the distance to the stream (Skippack Creek), and thus it was determined there is not an ongoing exposure pathway, as leachate is taken to the POTW for treatment and discharge. Continued monitoring of the area is recommended; if the reliability of the power source to the pump stations continues to be an issue, a secondary containment or back-up power source should be discussed.

The untreated leachate sampling results provided by PADEP were also evaluated by EPA’s toxicologist. The evaluation is shown in Appendix K. It is recommended that the landfill Owner/O&M workers be informed that they should avoid contact with leachate from the landfill within the South Valley manhole if exposures exceed 50 days/year for 6 hours a day.

Site Inspection

The inspection of the Site was conducted on November 15, 2021. In attendance were the EPA RPM, PADEP project manager, EPA CIC, EPA hydrogeologist, EPA toxicologist, and the property owner. The purpose of the inspection was to assess the protectiveness of the remedy.

A key component of the FYR at the Site is the physical inspection of the landfill cap, the leachate holding tanks, and the leachate collection system, fence, and landfill gas vents. During the November 15, 2021 inspection, the weather was about 45 degrees and partly cloudy. The inspection consisted of walking the perimeter fence line, inspecting the cap, inspecting the leachate holding tanks and collection system, and viewing construction of a new barn on the adjacent parcel associated with the property. No bulges or cracking of the landfill cap were evident during the inspection and no evidence of slope instability was observed. The vegetative cover appeared to be in satisfactory condition with the exception of a bare spot on a bench observed from the access road on the eastern part of the Site. Some ponding was observed on a couple of benches on the southern end of the cap. Mat-like vegetation was observed on portions of the grout bag spillways. The drainage basins appeared heavily vegetated. Beneath the fence along the west side of the Site, there was some erosion. A large gap was observed between the fence mesh and the ground in the South Valley by the leachate holding tanks. The access road in the South Valley leading to the leachate holding tanks was severely eroded. Finally, the pump in the South Valley was not operational during the time of the inspection as the flow meter did not indicate any flow

and the indicator lights at the pump station were off. Leachate discharge from the South Valley manhole appeared to have overflowed due to the pump station being off-line. The South Valley pump station was brought back online by PADEP's contractor on November 19, 2021. PADEP indicated that they were working to schedule their contractor to address the access road erosion issue.

V. TECHNICAL ASSESSMENT

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

Yes. The review of relevant documents and reports as well as the Site inspection indicate that the remedy is functioning as intended by the 1985 ROD and both the 2000 and 2009 ESDs. The landfill cap and drainage structures are functioning properly with some maintenance issues, such as erosion and excess vegetative growth. The leachate collection system continues to be maintained and operated with repairs and improvements being made when issues arise. Methane gas readings show there were no detectable levels of methane found along the perimeter of the Site, so it can be reasonably concluded that the landfill gas is not migrating beyond the landfill perimeter.

Institutional controls protecting the remedy and preventing use of the leachate from the Site are currently required by the 2009 ESD and implemented by a township ordinance. Site inspections confirm that the leachate is not being used, and that there have been no earth moving activities on-site other than maintenance of the remedy. Thus, ICs are proving to be effective in ensuring the protectiveness of the remedy. Access controls, such as the fence, are in place and continue to be monitored by PADEP.

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

Yes. Applicable or relevant and appropriate requirements identified in the 1985 ROD are still valid. These requirements were met during construction of the remedy and the remaining requirements are being achieved during O&M of the Site. While there have been changes in toxicity values and exposure assumptions since the 1985 ROD was issued, these changes do not affect the protectiveness of the remedy because: (1) contaminated material is contained beneath a cap, (2) sampling in residential wells near the perimeter of the landfill has shown no detectable levels of organic or inorganic contaminants, (3) residential wells are side gradient with groundwater flow away from residential areas, and (4) groundwater monitoring onsite has been discontinued and wells have been abandoned due to low or no detection of contaminants of concern in the source area. Therefore, the remedy remains protective of human health and the environment.

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

No. The Site is not in the 100 or 500-year FEMA flood zone. Therefore, flooding is not a concern for the Site. Erosion, however, has been a concern at the Site in the past and an increase in intensity and/or frequency of precipitation events should be taken into consideration when repairing damage due to erosion.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU1, OU2

OTHER FINDINGS

The following are recommendations that were identified during the FYR but do not affect current and/or future protectiveness:

- Drainage basins are heavily vegetated. There were no signs that drainage capacity was restricted by the vegetation but recommend monitoring for any signs of compromised drainage capacity such as rivulets emerging from basins or downgradient erosion. Additionally, due to the vegetation within the basins being defoliated, EPA was unable to identify if any invasive species had taken root. During the growing season, recommend visually inspecting the vegetation and removing any invasive species. EPA's BTAG can provide assistance.
- East side of cap has a bare spot which should be seeded to prevent any potential erosion. Recommendations on native seed mixtures can be provided by EPA's BTAG. EPA also recommends testing soil to determine what seed mixture will best germinate under current soil conditions.
- Some erosion was observed beneath the fence on the West side of the Site which EPA recommends filling.
- Portions of grout bag spillways are covered in mat-like vegetation. The coverage did not allow visual inspection of underlying condition of grout bags; however, there was no evidence of any scouring or erosion along or at the base of the spillways. EPA recommends monitoring spillways for any signs of compromised functionality.
- Some ponding was observed on South Valley benches. EPA recommends filling in places where vegetation may be sparse to prevent erosion.
- A large gap beneath the fence and ground was observed in South Valley by the tank farm which appeared large enough for a person to crawl beneath. A tire was observed on the other side of fence. EPA recommends adding mesh to seal gap.
- A large dead tree was observed swaying in the wind just along the fence on the East side. EPA recommends removing to prevent potential fence damage.
- Extensive erosion to South Valley access road was observed. PADEP, was in the process of scheduling their contractor to address the issue.
- Leachate discharge overflow was evident due to South Valley Pump Station being off. PADEP's contractor brought the station back to operational status on November 19, 2021. EPA recommends informing owner/O&M workers that they should avoid contact with leachate from the landfill within the South Valley manhole if exposures exceed 50 days/year for 6 hours a day. Additionally, continued monitoring of the area is recommended. If the power to the pump station continues to be unreliable, a secondary containment or back-up power source should be discussed.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement	
<i>Operable Unit:</i> OU1	<i>Protectiveness Determination:</i> Protective
<i>Protectiveness Statement:</i> The remedy at OU1 is protective of human health and the environment. The landfill cap and appurtenances prevent infiltration of precipitation and prevent exposure to the underlying waste. Institutional controls are in place to protect the integrity of the remedy. Long-term protectiveness of the remedy will be maintained by continuing to perform O&M of the landfill cap system and enforcing the institutional controls.	

Protectiveness Statement	
<i>Operable Unit:</i> OU2	<i>Protectiveness Determination:</i> Protective
<i>Protectiveness Statement:</i> The remedy at OU2 is protective of human health and the environment. The leachate collection system functions by collecting the leachate and properly disposing of it by discharging to the POTW. Long-term protectiveness of the remedy will be maintained by continuing to perform O&M of the leachate collection system and enforcing the institutional controls.	

Sitewide Protectiveness Statement	
<i>Protectiveness Determination:</i> Protective	
<i>Protectiveness Statement:</i> The remedy at the Site is protective of human health and the environment. The remedy was constructed in accordance with the requirements of the 1985 ROD and 2000 and 2009 ESDs and is functioning as designed. The threats have been addressed though capping the landfill and collecting and properly disposing of the leachate. Long-term protectiveness of the remedy will be maintained by continuing to perform O&M of the landfill cap and leachate collection system; monitoring of landfill gas; and enforcing the institutional controls.	

VIII. NEXT REVIEW

The next FYR report for the Moyer's Landfill Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

U.S. Environmental Protection Agency, Record of Decision, Moyer’s Landfill Superfund Site, Collegetown, Montgomery County, Pennsylvania, September 1985.

IMS Engineers Architects, Remedial Investigation – Feasibility Study, Moyer’s Landfill Site, Collegetown, Pennsylvania, January 1986.

Paul C. Rizzo Associates, Inc., Site Maintenance Plan, Moyer’s Landfill Superfund Site, Montgomery County, Pennsylvania, January 1991.

U.S. Army Corps of Engineers, Remedial Action Report, Moyer’s Landfill Superfund Site, Montgomery County, Pennsylvania, December 1996.

U.S. Environmental Protection Agency, Preliminary Close Out Report, Moyer’s Landfill Superfund Site, Lower Providence Township, Pennsylvania, September 2002.

U.S. Army Corps of Engineers, Remedial Action Report, Moyer’s Landfill Superfund Site, Montgomery County, Pennsylvania, April 2004.

U.S. Environmental Protection Agency, Third Five-Year Review Report, Moyer’s Landfill Superfund Site, Lower Providence Township, Pennsylvania, June 2017.

Commonwealth of Pennsylvania Department of Environmental Protection, Moyer Landfill NPL Site: 2017 - 2018 Operations and Maintenance Report, Lower Providence Township, Montgomery County Pennsylvania, March 2019.

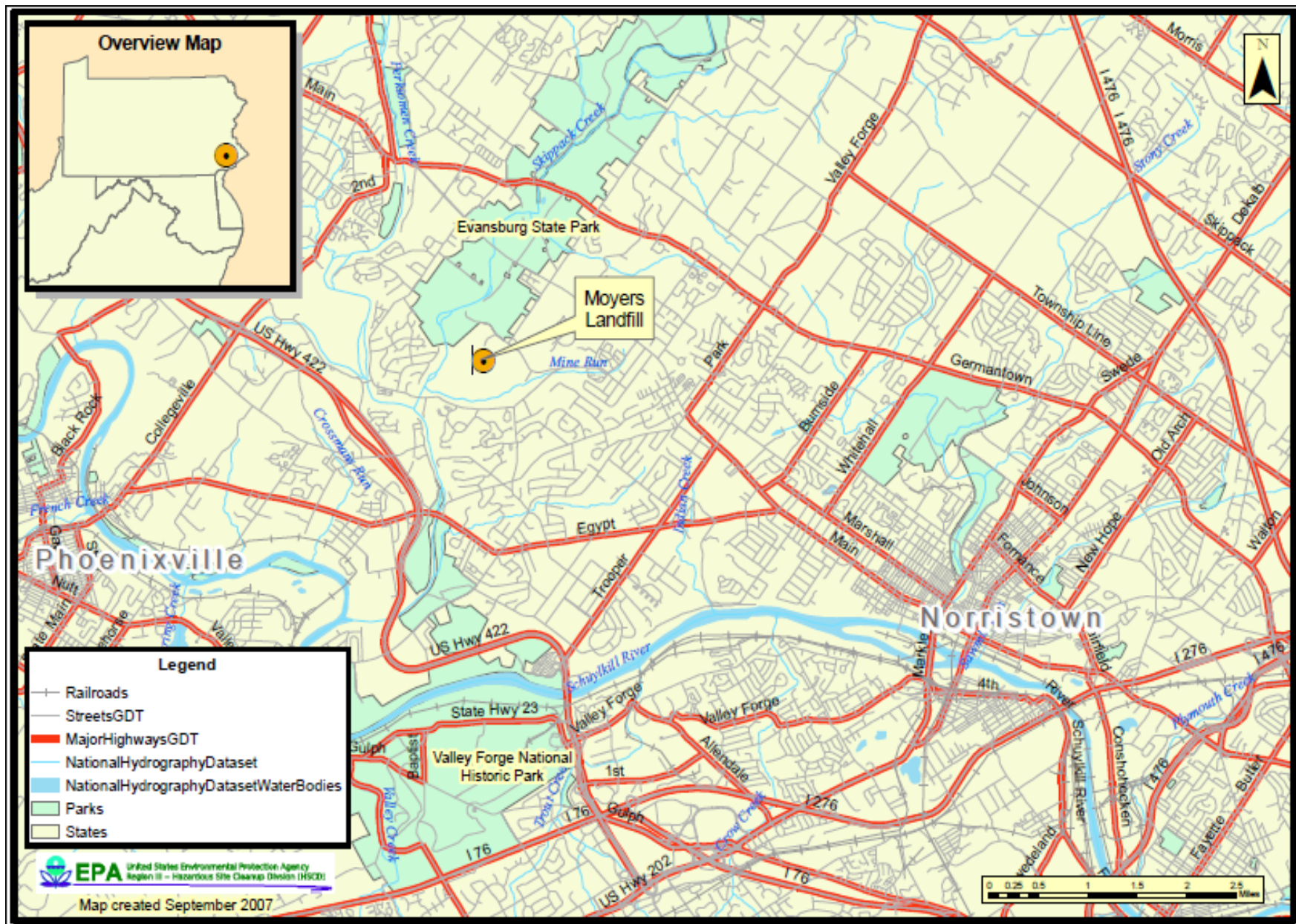
Commonwealth of Pennsylvania Department of Environmental Protection, Moyer Landfill NPL Site: 2019 - 2020 Operations and Maintenance Report, Lower Providence Township, Montgomery County Pennsylvania, February 2021.

Commonwealth of Pennsylvania Department of Environmental Protection, Moyer Landfill NPL Site: 2021 Operations and Maintenance Report, Lower Providence Township, Montgomery County Pennsylvania, February 2022.

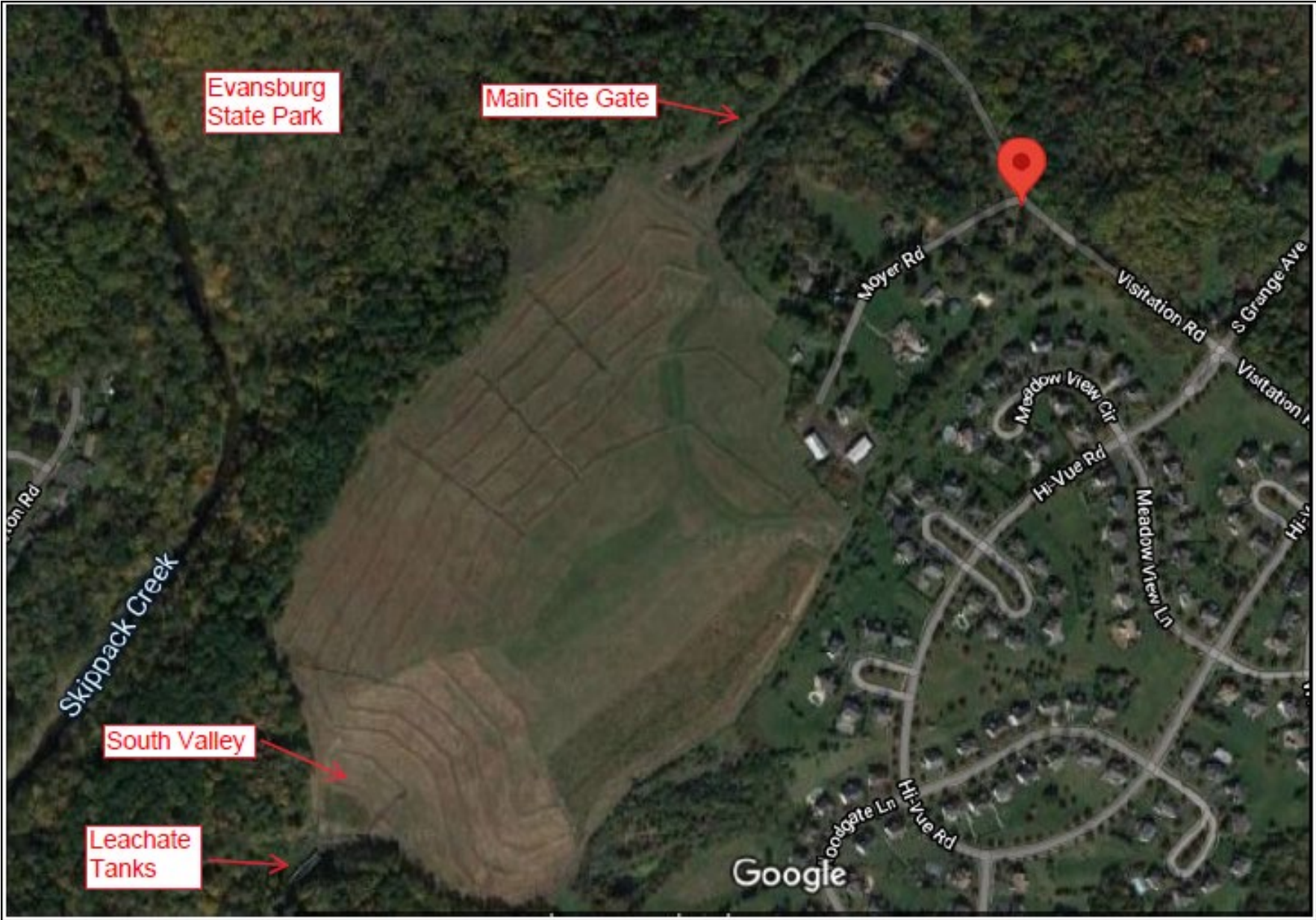
APPENDIX B – SITE CHRONOLOGY

Event	Date
Disposal in landfills	Early 1940s to April 1981
State ordered closure of landfill	Early 1981
NPL listing	December 30, 1982 (proposed) September 8, 1983 (final)
Remedial Investigation/Feasibility Study completed	September 30, 1985
Record of Decision	September 30, 1985
Remedial design complete	April 20, 1989
State Superfund Contract	September 1989
Site Maintenance Plan	January 1991
Construction complete for landfill cap, OU-1	November 24, 1994
Turned over to State for O&M	January 1998
First Explanation of Significant Differences (ESD)- off-site leachate treatment for OU-2	January 2000
Construction start for leachate treatment, OU-2	May 2000
Construction complete for OU-2	August 2002
Preliminary Close-out Report	September 17, 2002
Remedial Action Construction Report	April 4, 2004
First Five-year Review Report	September 26, 2007
Second ESD- Institutional Controls (ICs)	September 18, 2009
Five-year Review Addendum	July 12, 2011
Township ordinance implemented ICs	October 20, 2011
Second Five-year Review Report	August 10, 2012
Deleted from NPL	May 27, 2014
Third Five-year Review Report	June 27, 2017

APPENDIX C – SITE LOCATION MAP



APPENDIX D – SITE LAYOUT MAP



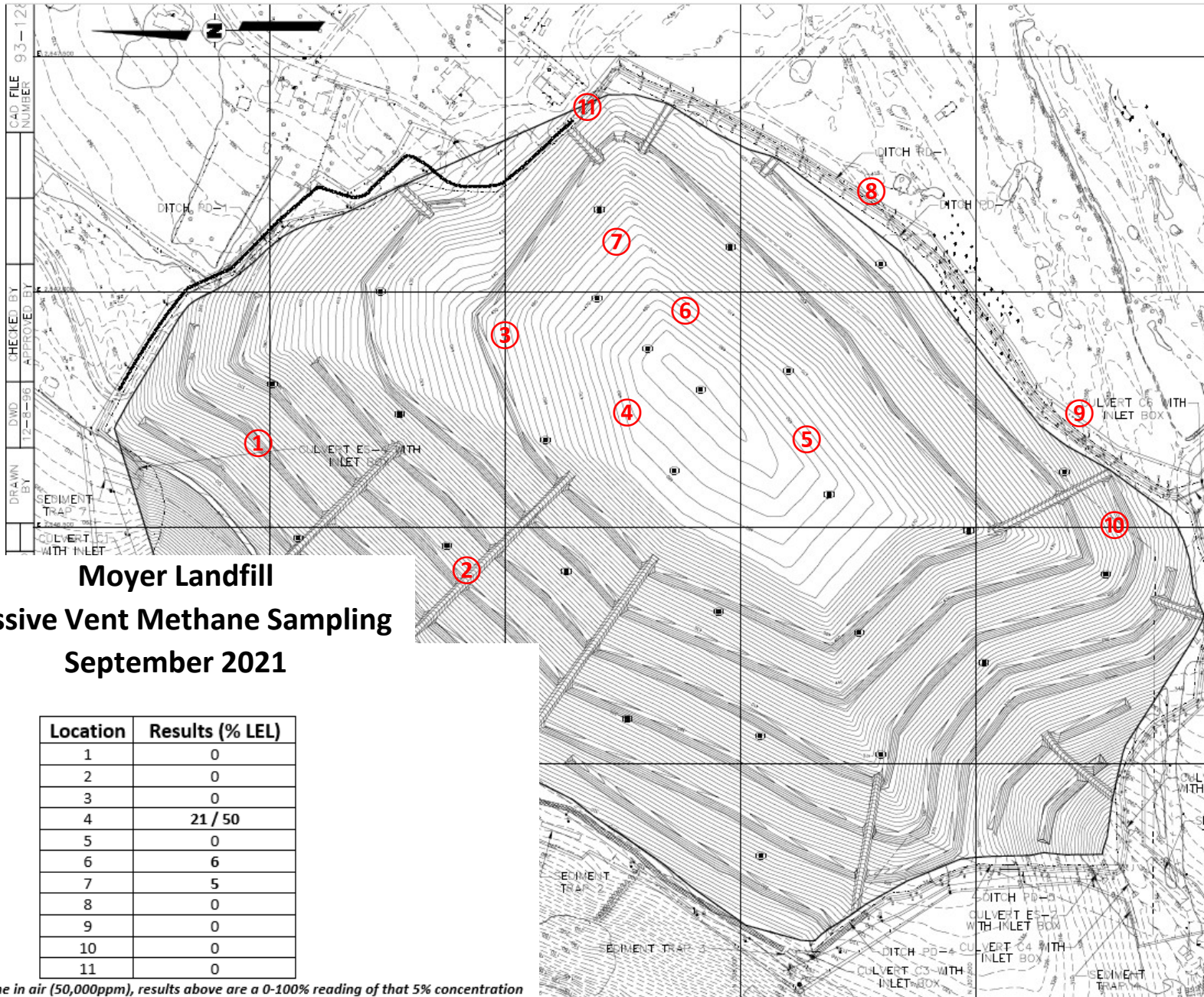
APPENDIX E – LEACHATE DISCHARGE RATES PROVIDED BY PADEP

DATE	Current Flow Reading (gpm*)	Total Discharge to Date (g)	Total Monthly Discharge (g)	Avg Daily Discharge Rate (g)
5/17/2017	12.6	21,135	0	0
6/16/2017	4.9	317,674	296,539	9,885
7/14/2017	0	317,674	0	0
8/16/2017	0	317,674	0	0
9/15/2017	3.68	576,789	259,115	8,637
10/12/2017	3.67	730,897	154,108	5,137
11/16/2017	4.98	1,040,325	1,040,325	34,678
12/15/2017	4.1	1,269,166	228,841	7,628
1/16/2018	16.34	1,624,935	355,769	11,859
2/16/2018	0	1,788,014	163,079	5,436
3/23/2018	0	1,788,014	0	0
4/17/2018	25.085	1,980,596	192,582	6,419
5/15/2018	10.6	2,416,942	436,346	14,545
6/18/2018	14.39	3,429,344	1,012,402	33,747
7/17/2018	5.57	3,747,641	318,297	10,610
8/17/2018	23.8	4,462,441	714,800	23,827
9/17/2018	20.32	5,111,216	648,775	21,626
10/15/2018	10.075	5,868,881	757,665	25,256
11/19/2018	19.9	6,487,512	618,631	20,621
12/14/2018	6.06	6,815,193	327,681	10,923
1/16/2019	10.45	7,265,200	450,007	15,000
2/15/2019	6.133	7,599,675	334,475	11,149
3/15/2019	6.237	7,852,839	253,164	8,439
4/16/2019	5.62	8,133,474	280,635	9,355
5/17/2019	4.42	8,343,412	209,938	6,998
6/14/2019	2.97	8,496,154	152,742	5,091
7/12/2019	22.99	8,757,777	261,623	8,721
8/15/2019	0	8,823,880	66,103	2,203
9/15/2019	4.75	8,861,519	37,639	1,255
10/16/2019	3.56	9,041,502	179,983	5,999
11/15/2019	0	9,121,039	79,537	2,651
12/16/2019	0	9,380,740	259,701	8,657
1/16/2020	13.78	10,204,955	824,215	27,474
2/14/2020	18.7	11,157,105	952,150	31,738
3/19/2020	15.5	12,041,378	884,273	29,476
April 2020 Reading not recorded due to COVID-19 travel restrictions in place				
5/14/2020	20.7	13,576,950	1,535,572	25,593
6/22/2020	4.1	13,955,146	378,196	12,607

DATE	Current Flow Reading (gpm*)	Total Discharge to Date (g)	Total Monthly Discharge (g)	Avg Daily Discharge Rate (g)
7/17/2020	16.4	14,256,781	301,635	10,055
8/14/2020	14.33	14,692,328	435,547	14,518
9/16/2020	4.25	15,013,709	321,381	10,713
10/13/2020	4.28	15,171,768	158,059	5,269
11/13/2020	15.46	15,570,941	399,173	13,306
12/11/2020	17.52	16,229,390	658,449	21,948
1/15/2021	13.85	17,023,810	794,420	26,481
3/11/2021	15.6	18,061,313	1,037,503	17,292
4/16/2021	12	18,794,188	732,875	12,215
5/14/2021	4.85	19,094,799	300,611	5,010
6/17/2021	4.56	19,317,761	222,962	3,716
7/16/2021	3.75	19,484,292	166,531	2,776
8/19/2021	3.065	19,645,481	161,189	2,686
9/17/2021	7.15	19,770,916	125,435	2,091
10/15/2021	0	20,069,976	299,060	4,984
11/15/2021	0	20,069,976	0	0
12/16/2021	3.85	20,238,995	169,019	2,817
1/14/2022	8.1	20,476,930	237,935	3,966

*gpm = gallons per month

APPENDIX F – PASSIVE GAS VENT METHANE SAMPLING PROVIDED BY PADEP



*LEL for methane is 5% volume in air (50,000ppm), results above are a 0-100% reading of that 5% concentration

*Readings were taken from sample port location near bottom of vent pipe (where applicable)

*Multiple readings were collected from location 4 due to the results

APPENDIX G – LEACHATE SAMPLING RESULTS FROM 2013-2021 PROVIDED BY PADEP

Sampling Date and Location	Isopropylbenzene	Tetrahydrofuran	Chlorobenzene	Aluminum	Arsenic	Barium	Boron	Calcium	Copper	Iron	Lead	Magnesium	Manganese	Potassium	Sodium	Zinc	Ammonia	Total Cyanide	N-Nitrosomorpholine	bis(2-Ethylhexyl)phthalate
3/11/2021 South Valley Manhole		1.4		8630	23.6	303	210	52.5	25	23900	7.2	22.3	4060	11	51	77	Not Sampled	0.0035	4.1	
10/12/2017 South Valley Manhole		3.8				159	478	60		972		31.6	1264	18	107		18.39			
10/12/2017 North Valley Manhole	1.1	6.5			3.46	563	1066	93.8		590		41	1995	38.6	251	30	25.7			
6/13/2016 South Valley Manhole		4.2	0.71			161	494	64		618		33	1325	20.5	119	10	23.27			
4/23/2014 South Valley Manhole		3.7	1.9			131	280	62.6		1861	1.4	22.4	2023	12.5	80.9	24	227			
7/1/2013 South Valley Manhole																	5.22			14.1
6/13/2016 Seep (South Slope)		5.1		2069	22.7	939	1385	68.9		17300	2	45.1	7336	50.9	306	12	76.04			
<i>EPA's Surface Water Regional Screening Level***</i>	-	3400	-	20000	0.52	3800	4000	-	800	14000	150	-	430	-	-	6000	-	1.5	0.12	-

*Results reported in ug/L

** Shaded cells indicate compound not detected

*** Screening levels are not available for leachate, so surface water screening levels are provided for comparison

<https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>

APPENDIX H – INSPECTION PHOTOS



Overgrown drainage basin in South Valley



Overgrown drainage basin on West side



Overgrown drainage basin on West side.



Erosion under fence on West side



Bare area on East side



Grout bag on East side covered in vegetation



Grout bag on East side covered in vegetation



Ponding on benches in South Valley



Ponding on benches in South Valley



Gap between South Valley fence and ground



South Valley pump station off



Overflow of leachate discharge from South Valley manhole



South Valley access road erosion



South Valley access road erosion



Leachate holding tanks

APPENDIX I – PUBLIC NOTICE

EPA PUBLIC NOTICE

EPA REVIEWS CLEANUP MOYER'S LANDFILL SUPERFUND SITE

The U.S. Environmental Protection Agency (EPA) is reviewing the cleanup that was conducted at the Moyer's Landfill Superfund Site located in Collegeville, Pennsylvania. EPA conducts Five-Year Reviews to ensure that cleanups continue to protect public health and the environment. EPA conducted the previous Five-Year Review in 2017 and concluded that the site is protective of human health and the environment. EPA will make the findings from this Five-Year Review available in June 2022.

To access site information, including the Five-Year Review, visit:
www.epa.gov/superfund/moyers

For questions or to provide site-related information for the review, contact:
Katie Page, EPA Community Involvement Coordinator
215-814-2409 or page.katherine@epa.gov

APPENDIX J – POSTCARD

Moyer's Landfill Superfund Site

Site Update | January 2021

INTERESTED IN PROVIDING FEEDBACK?

EPA conducts interviews with community members living near Superfund sites to encourage meaningful community participation during the Superfund process. Contact Katie to schedule an interview!

Findings from the current review will be available by June 2022. For more information, scan the QR Code with your smartphone or visit the website.

epa.gov/superfund/moyers



The U.S. Environmental Protection Agency (EPA) is reviewing the cleanup that was conducted at the Moyer's Landfill Superfund Site located in Collegetown, PA. EPA conducts five-year reviews to ensure that cleanups continue to protect public health and the environment.

EPA conducted a site visit on November 15, 2021 to inspect the landfill, review monitoring data, and assess the protectiveness of the landfill.

The site was deleted from the National Priorities List in May 2014 after all appropriate cleanup actions were completed. The landfill cover was constructed in 1994 and is currently in the operation and maintenance stage.

EPA conducted the last review in 2017 and concluded that the remedy was protective and working as designed.

EPA Contacts

Irene Shandruk
U.S. EPA Region 3
Remedial Project Manager
(215) 814-2166
shandruk.irene@epa.gov

Katie Page
U.S. EPA Region 3
Community Involvement
Coordinator
(215) 814-2409
page.katherine@epa.gov



**APPENDIX K – SOUTH VALLEY MANHOLE LEACHATE EVALUATION
BY EPA’S TOXICOLOGIST**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103

SUBJECT: Moyers Landfill
2021 South Valley Manhole Leachate

FROM: Linda Watson, Toxicologist
Technical Support Branch (3HS41)

TO: Irene Shandruk, RPM
Remedial Project Manager

DATE: December 14, 2021

I have reviewed the 2021 leachate data from the South Valley Manhole and screened the data using several different screening levels based on potential scenarios including Resident, Teenage/Adult Recreators-Trespasser as well as Workers (Grass Cutter/Landfill Maintenance).

Initial screening was performed using EPA’s Regional Screening Level (RSL) for tapwater multiplied by 10 to account for the difference in media (tapwater vs surface water). Since screening levels are not available for leachate, surface water was used to estimate screening levels for leachate which were based on exposure to Recreator/Trespassers and Workers. Screening levels were determined using EPA’s RSL Calculator.

[Regional Screening Levels \(RSL\) | Superfund Risk Assessment | US EPA \(ornl.gov\)](#)

Below are the initial screening results where contaminants concentrations were compared to Surface Water RSL’s. All contaminants are below screening levels with the exception of arsenic, iron, manganese and n-nitrosomorpholine.

<i>Contaminant</i>	<i>Leachate Concentration (ug/L)</i>	<i>EPA’s Surface Water RSL</i>
Tetrahydrofuran	1.4	3400
Aluminum	8630	20000
<i>Arsenic</i>	23.6	0.52
Barium	303	3800
Boron	210	4000
Copper	25	800
<i>Iron</i>	23900	14000
Lead	7.2	150
<i>Manganese</i>	4060	430
Zinc	77	6000
Total Cyanide	0.0035	1.5
<i>N-nitrosomorpholine</i>	4.1	0.12

Since surface water RSL's are derived using tap water RSL's which are based on a residential drinking water use scenario, comparing surface water RSL's to leachate concentrations is an extremely conservative and unlikely evaluation since leachate consumption would not be the same as a residential drinking water scenario. In an effort to evaluate the mediums as close as possible, the Recreator Surface Water scenario used in the EPA RSL Calculator was used to determine screening levels for leachate. Site-specific parameters that more closely represent potential future scenarios (Adult/Teenage Recreator/Trespasser and Grass Cutter/Landfill Maintenance Worker) were applied into the calculator.

At the November 15, 2021 site visit, I recall the owner stating he mows the grass on the landfill. He did not specifically state how many hours per day he mows the grass but did say it could take several weeks for him to complete mowing the entire landfill. Although it is highly unlikely any receptor (Recreator/Trespasser/Worker) would consume/ingest the leachate, the RSL Calculator does include an incidental ingestion rate of (IR=0.0985 liters/hour) and the potential for dermal contact. Using several potential hypothetical scenarios for exposure, the Calculator estimated the below screening levels.

	<i>Adult/Teen Recreator/Trespasser EF=50 days/yr ET=2 hours</i>	<i>Worker Grass Cutter EF=100 days/yr ET=6 hours</i>	<i>Worker Grass Cutter EF=50 days/yr ET=6 hours</i>	<i>Worker Grass Cutter EF=25 days/yr ET=6 hours</i>
Arsenic	43.5	7.3	14.5	29
Iron	1,260,000	210,000	420,000	841,000
Manganese	9300	1550	3110	6220
N-nitrosomorpholine	10.5	1.79	3.58	7.4

EF=Exposure Frequency

ET=Exposure Time

When screening the leachate concentrations against the above screening levels, all concentrations are below the calculated screening levels for the Adult/Teen Recreator/Trespasser. However, when screening the Worker/Grass Cutter using several different exposure assumptions, arsenic, manganese and N-nitrosomorpholine exceed screening levels when compared to exposure frequencies at 100 and 50 days/year at 6 hours per day. However, all concentrations are below screening levels at an exposure frequency of 25 days/year for 6 hours per day.

Conclusions

I recommend informing the landfill Owner/Grass Cutter/Maintenance Worker be informed he should avoid contact with leachate from the landfill within the South Valley Manhole if exposures exceed 50 days/year for 6 hours a day.