4th FIVE-YEAR REVIEW REPORT FOR LINDANE DUMP SUPERFUND SITE ALLEGHENY COUNTY, PENNSYLVANIA

Prepared by

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Region 3
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AUG 22 2018

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Date

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LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DDT	p,p'-dichloro-diphenyl-trichloroethane
EPA	Environmental Protection Agency
FYR	Five-Year Review
GCL	Geosynthetic clay liner
HDPE	High-density polyethylene
IC	Institutional Control
LCS	Leachate collection system
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
MCL	Maximum contaminant level
PADEP	Pennsylvania Department of Environmental Protection
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
ROD	Record of Decision
RPM	Remedial Project Manager
TBC	To be considered
TOC	Total organic carbon
UU/UE	Unlimited use, unlimited exposure
VOC	Volatile organic compound
ug/L	Microgram per liter

I. INTRODUCTION

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

The 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 Substance Pollution Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fourth FYR for the Lindane Dump Superfund Site (Site). The triggering action for this **statutory** review is the completion date of the previous FYR: September 19, 2013. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one Operable Unit that includes a multi-layer soil and geosynthetic material cap; leachate and shallow groundwater collection and treatment; institutional controls (ICs); and groundwater monitoring. The Site was designated as construction complete in September 1999 and since then the remedy has been in operation.

Site Background

The Site is located in Harrison Township near Natrona Heights, Pennsylvania, in the Allegheny River Valley (see Attachment 1). Both Harrison Township and Natrona Heights are located in Allegheny County on the northwestern side of the Allegheny River. The Site is located approximately at river mile 25, some 20 road miles northeast of downtown Pittsburgh. Land surfaces in this area are generally steeply sloping toward the Allegheny River. The total Site area is approximately 62 acres and includes the Upper Project Area and Lower Project Area, as shown in Attachment 2.

ALSCO Community Park (located in the Upper Project Area) is a 14.3 acre recreational site owned by Harrison Township. This park is situated upon an area that was formerly an industrial waste disposal site. Park facilities include a tennis court, baseball fields, picnic areas, open space, and parking facilities. Residential areas are just north and east of the park. Population for Harrison Township was 10,461 in 2010 (U.S. Census Bureau, Census 2010). The property immediately to the south of the park (the Lower Project Area) consists of approximately 47.5 acres, and is owned by the Allegheny Ludlum Corporation. Between the Site and the river is an industrialized area involving recycling and steel manufacturing.

Land and Resource Use

The historical land use of the Site has involved mining and disposal activities that began in the mid to late 1800s. Pennsylvania Salt Manufacturing Company began the manufacture of chemicals at a location near the Site in 1850, and mined the Site for coal from the late 1800s through the mid 1900s. The company then used the Site for the disposal of various materials, which are described in detail in 'History of Contamination,' below. In 1965, the Site was sold to Allegheny Ludlum, which continued to use the Site for the disposal of materials including construction wastes, industrial waste treatment plant sludge, coke, rubber tires, and slag. This continued until the mid-1980s.

During 1976 and 1977, Harrison Township constructed the ALSCO Community Park on the Upper Project area. This tract was donated to Harrison Township by Allegheny Ludlum in 1972. Park construction included grading the entire Upper Project Area and placing slag over portions of the graded area. In addition, fill material (from an unknown source) was placed and graded onto the areas of the present-day tennis courts and ball diamond areas. The park facilities also include a sheltered picnic area and parking lot.

The current land use for the upper portion of the Site is the ALSCO Community Park, which was re-created and completed in 1999 during remedial activities. The lower portion of the Site is fenced, and is covered with an impermeable cap. A shallow groundwater and leachate collection system (LCS) and treatment facility is located on Karns Road, below the lower portion of the Site. The area surrounding the Site includes a mixture of residential, commercial, and industrial uses, including an Allegheny Ludlum scrap steel recycling facility located between the LCS and treatment facility and the Allegheny River, above the shallow groundwater unit. The area on the uphill (north) side of Karns Road is a steeply sloping wooded hillside to the residential neighborhood above and to the northeast of the Site.

The groundwater aquifer underlying the Site is currently not used as a drinking water source. Public water is provided to the residences to the north and west of the Site, as well as the nearest home located along Karns Road, southeast of the Site. The dominant groundwater flow direction is to the southeast towards the Allegheny River.

History of Contamination

In 1850, Pennsylvania Salt Manufacturing Company (the name was later changed to Pennsalt, then to Pennwalt, then Elf Atochem, and finally to Arkema Delaware Inc. [Arkema]), began to manufacture chemicals in Natrona. The area beneath the Site was extensively mined for coal during the latter part of the nineteenth century and the first half of the twentieth century. Early topographic maps indicate that the land surface at the Site was originally comprised of a steeply sloping ravine which drained toward the Allegheny River. Tailings from the mining operations and cinders (bottom ash) from steam and electrical power generation at the plant were placed at the Site from the mid-1800s through the early 1900s. Sulfuric acid was one of the first chemicals to be produced at the Pennsalt plant. This operation was discontinued prior to 1920. The resultant cinder and slag from this operation were disposed at the Site. Cryolite ore was also refined at the plant and ore tailings were disposed at the Site.

Alumina from bauxite was also produced at the plant until 1940. The resultant red mud residual, a very fine-grained material with a high iron content (30 to 60 percent Fe^2O^3), is contained at the Site.

Between 1947 and 1959, various organic and inorganic products were produced at the Pennwalt plant, including hexachlorocyclohexane (technical BHC) which was produced at the plant between 1947 and 1955. Also, for a one-year period during this time interval, p,p'-dichloro-diphenyl-trichloroethane (DDT) was produced at the plant (production ceased in the early 1950s). BHC filter cake residuals containing lindane and waste sulfuric acid containing DDT were disposed at the Site.

From 1959 to 1965, the Site was not used. No known filling operations occurred during this time. In 1965, Pennwalt sold the property to Allegheny Ludlum. From the mid-1960s to the mid-1980s, Allegheny Ludlum used the Site for the disposal of wastes including construction wastes, industrial waste treatment plant sludge, coke, rubber tires, and slag. The contaminants of concern at the Site include volatile organic compounds (VOCs) and organic pesticide constituents in groundwater and leachate.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Lindane Dump Superfund Site		
EPA ID: PAD980712798		
Region: 3	**State:** PA	**City/County:** Natrona Heights/Allegheny County

SITE STATUS	
NPL Status: Final	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA
Author name (Federal or State Project Manager): Brad White
Author affiliation: EPA Region 3
Review period: 6/13/2017 - 8/15/2018
Date of site inspection: 3/14/2018
Type of review: Statutory
Review number: 4
Triggering action date: 9/19/2013
Due date *(five years after triggering action date)*: 9/19/2018

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

The risks posed by the Site came from potential exposure to contaminated soils, groundwater and leachate. Under the worst-case scenario, the greatest increased cancer risk ($7x10^{-5}$, or 7 in 100,000) is for a child who ingests water from the seep flows at the Site. This risk falls within the discretionary range for taking action, $1x10^{-6}$ to $1x10^{-4}$. Additionally, federal maximum contaminant level (MCL) exceedances in the groundwater were observed for benzene and lindane (gamma-BHC). Based on these MCL exceedances, which EPA believed could pose a future threat to human health, a remedial action at the Lindane Dump Site was considered warranted by EPA to remediate the threat.

Response Actions

After the Site was listed on the NPL in 1983, Pennwalt initiated an interim response action that included construction of a leachate and shallow groundwater collection and treatment system. This interim treatment system consisted of pH adjustment and activated carbon adsorption of organic contaminants and was operated

until the long-term system was constructed in 1999. This allowed for the capture and treatment of contaminated leachate and shallow groundwater and eliminated its discharge via seeps at the lower portion of the Site.

The Record of Decision (ROD) was signed on March 31, 1992. The Remedial Action Objectives (RAOs) identified in the ROD included the following:

- Eliminate potential exposure to Site contaminants present in surface or near-surface soils; and reduce or eliminate infiltration of water through the fill area in the upper portion of the Site and part of the lower portion of the Site, which will reduce or eliminate the movement of contaminants from the fill area to the aquifer below the Site and help eliminate MCL violations in the seeps and groundwater.
- Eliminate any exposure to contaminants contained in the leachate and seeps.
- Prevent any intrusion which may compromise the integrity of the cap, and limit access to any area that is not capped.
- Ensure the effectiveness of the cap and leachate/shallow groundwater collection and treatment system, and monitor for MCL exceedances.

The components of the Selected Remedy included:

- Multi-layer clay and soil cap on 14 acres of the Upper Project Area and 4 acres of the Lower Project Area;
- Upgrading the interim leachate and shallow groundwater collection and treatment system;
- Institutional controls that include deed and access restrictions; and
- Long term groundwater monitoring.

Groundwater Cleanup Levels and Effluent Discharge Limits

The cleanup levels for groundwater are the MCLs listed in Table 1 and effluent discharge limits for the LCS and treatment system are presented in Table 2.

At the time the ROD was issued, groundwater in the alluvial aquifer and the shallow bedrock aquifer had contaminants that exceeded their respective MCLs; groundwater in the deeper bedrock aquifer did not have contaminants present above their MCLs. In the ROD, EPA waived the requirement in the Pennsylvania Hazardous Regulations [25 PA Code §§ 264.90-264.100, specifically 25 PA Code §§ 264.97(i) and §§ 264.100(a)(9)] to remediate all groundwater to background levels. EPA chose to waive this particular ARAR because of the technical impracticability of extracting all contaminated groundwater associated with the Site. The major reasons include:

1. Potential subsidence problems which could occur within the Site as a result of pumping the deep aquifer, which at the site is part of a mine pool. Subsidence could occur during pumping as the increased movement of the groundwater could contribute to potential instability of the waste material which makes up the majority of the fill area and the mineshafts which exist below the Site; and

2. The potential for additional migration of contaminants from within the fill area into the deep aquifer could be caused by the groundwater extraction process.

Table 1: Cleanup Levels for Groundwater

Chemical	Required Concentration	Basis
Gamma-BHC (Lindane)	0.2 µg/liter	MCL
Benzene	5 µg/liter	MCL

Table 2: Final Effluent Discharge Limits*

Parameter	Monthly Av. (mg/l)	Daily Max. (mg/l)
Flow (MGD)	0.0304	--
Suspended Solids	20	40
Alpha-BHC	0.01	0.02
Beta-BHC	0.01	0.02
Delta-BHC	0.01	0.02
Gamma-BHC	0.01	0.02
Benzene	0.01	0.02
4,4-DDT	0.0003	0.0005
pH	Between 6.0 and 9.0 Standard Units at all times	
Notes * Discharge limits established by PADEP in NPDES permit-equivalent, dated March 22, 1991, and confirmed in letter dated March 16, 1998		

Status of Implementation

In May 1998, actual onsite construction of the EPA-approved final remedy began. Upon mobilization, the ALSCO Park was officially closed and existing recreational area facilities were dismantled and removed. Construction of the remedy was completed in September 1999. Operation and maintenance of the remedy has been ongoing. Following is a brief description of the constructed remedy:

Landfill Cap

A key component of the Selected Remedy consists of the installation and long-term operation of a multi-layer cap over approximately 18 acres of the Site. The capping project also included installation of permanent stormwater management features (both subsurface and surface drainage features) including grass-lined and rip rap swales, a retention basin, and stormwater piping and manholes. The multi-layer cap cross section from bottom to top is as follows:

- Subgrade material, minimum 0.5 feet thick
- Geosynthetic Clay Layer (GCL)
- Geomembrane Layer-High Density Polyethylene (HDPE)
- Cover soil layer, comprised of a soil fill material, minimum 2.5 feet thick
- Topsoil layer, minimum 0.5 feet thick

Once capping was completed, the park facilities were restored. These facilities included two new asphalt tennis courts, two new ball fields, a utility building, pedestrian walk, asphalt parking area, and 150 new trees.

Leachate/Shallow Ground Water Collection and Treatment System

The second key component of the remedy consists of the installation and long-term operation of the LCS treatment system. The treatment system consists of a 9,100 square foot building downgradient of the Lower Project Area, located on the south side of Karns Road. Leachate and shallow groundwater from the landfill is collected via a series of subsurface trenches and pipes which discharge to a concrete sump (the LCS) The collected leachate and shallow groundwater is then pumped to the treatment system via piping underneath Karns Road. Treatment system components include: equalization, pH adjustment, filtration, air stripping, and carbon adsorption. The treated leachate is discharged to the Allegheny River in accordance with discharge requirements pursuant to a National Pollutant Discharge Elimination System (NPDES) permit equivalent.

Table 3: IC Summary Table

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
Cap – Lower Project Area	Yes	Yes	Lower Project Area	Use restrictions to protect integrity of surface cap and ongoing operation, maintenance, monitoring or other activities required by Consent Decree	Declaration of Restrictive Covenants, January 18, 2000
Surface water and groundwater – Lower Project Area	Yes	Yes	Lower Project Area	Prevent the use of surface water and groundwater	Declaration of Restrictive Covenants, January 18, 2000
Cap, surface and subsurface drainage features; surface water and groundwater	Yes	Yes	Upper Project Area	Use restrictions to protect the integrity of the cap and drainage features	Declaration of Restrictive Covenants, May 24, 1999

Systems Operations/Operation & Maintenance

Legacy Site Services, LLC (LSS), an agent of Elf Atochem (Arkema Inc.) is responsible for the long-term operation and maintenance of the LCS and treatment system, and the landfill cap. Both systems have long-term operation and maintenance (O&M) plans in place, which are fully described in the *Operation and Maintenance Plan for ALSCO Community Park/Lindane Site, revised February 2018.* O&M activities include continual operation of the LCS and treatment system, routine sampling, and landfill cap maintenance. APTIM has been retained by LSS to provide consulting services and assist in the implementation and management of O&M activities at the Site, including providing an operator for the treatment system. Lawn maintenance and landscaping activities at the Site are performed by a subcontractor.

APTIM operates and maintains the LCS and treatment system and performs routine collection of effluent and groundwater samples. LSS prepares the Quarterly Progress Reports in accordance with the 1993 Consent Decree and 2000 PADEP Memorandum of Agreement and Understanding. Included in the Quarterly Progress Reports are summaries of activities completed, as well as analytical results for bi-monthly effluent samples collected in accordance with the NPDES permit-equivalent for the Site, treatment system performance samples, and any other samples that were collected during the reporting period. APTIM prepares the Annual Post-Remedial Action Monitoring Reports for the Site. These reports satisfy the requirements of the Long-Term Monitoring Plan for the Landfill Cap, and the Long-Term Monitoring Plan for the Shallow Groundwater/Leachate Collection and Treatment System. All reports are provided to EPA and the Pennsylvania Department of Environmental Protection (PADEP).

In a letter dated October 24, 2017 EPA approved several modifications to the groundwater monitoring program to reduce the sampling frequency and compounds analyzed. The modifications were based on historical data and frequency of contaminant detections. If conditions at the Site change, or additional monitoring data are necessary to ensure the continued protection of human health and the environment and overall effectiveness of the remedy, EPA will re-evaluate the groundwater monitoring program.

III. PROGRESS SINCE THE LAST REVIEW

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

Table 4: Protectiveness Determinations/Statements from the 2013 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Protective	The remedy at the Site is determined to be protective of human health and the environment. Exposure pathways that could result in unacceptable risks are being controlled, and institutional controls are preventing exposure to contaminated wastes, soils, and groundwater. Contaminated leachate and shallow groundwater is being controlled by the LCS, and it is being treated to a quality below the limits established by the NPDES permit-equivalent prior to discharge to the Allegheny River. Current data indicate the remedy is functioning as required to achieve cleanup goals. Operation and maintenance of the landfill cap, LCS, and treatment system, and sampling and monitoring of groundwater and treated effluent, is expected to continue until cleanup goals are met. ALSCO Community Park is regularly used by local residents and is well maintained.

There were no issues and recommendations in the last FYR.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was published in the *Valley News Dispatch* on March 2, 2018 stating that there was a FYR and inviting the public to submit any comments to the U.S. EPA. The results of the review and the report will be made available at the Site information repository located at https://epa.gov/superfund/lindane.

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

A representative of Harrison Township reports that there is little community interest in the Site, and that the Township office has not received any calls in recent memory. There are no complaints or reports of vandalism or trespassing on the Site to report. A portion of the capped area of the Site currently operates as ALSCO Community Park, with open space, baseball fields, and tennis courts. Although the Township is considering plans for changes to the park to increase use and community benefits, nothing specific has been proposed and no workplan is in place. The Township will communicate any proposals with EPA and LSS to ensure any changes are in compliance with the ICs and deed restrictions.

Officials from the Harrison Township Water Authority also report no issues or complaints with the Site. The Water Authority has been involved in water sampling efforts and interacts directly with the PRP contractors. The local authorities comment that they feel well informed and satisfied with the level of involvement and interaction with EPA.

A local resident contacted EPA to ask if the cracks in the tennis courts were scheduled to be repaired, and to inquire about modifying the courts for pickleball. The resident explained many people in the area, especially seniors, are playing pickleball instead of tennis. The resident described area tennis courts that had been adapted for pickleball by having additional lines painted on them, and wondered if this was an option with the tennis courts located at ALSCO Community Park.

PADEP made several observations and recommendations as part of their review of the Site. Those observations and recommendations generally pertain to the interpretation of Site conditions and updates to the Conceptual Site Model. EPA is evaluating the recommendations and will coordinate with PADEP on any follow-up actions that are taken.

LSS provides routine communication with EPA, PADEP, and with the Township officials as needed. Changes to schedules or procedures are discussed and approved prior to implementation.

Data Review

Leachate/Shallow Ground Water Collection and Treatment System Monitoring Results

The most recent quarterly progress report (available at the time this FYR was prepared), which covers the three-month period from October through December 2017, indicates the facility treated all collected leachate and shallow groundwater to the quality established by the NPDES permit equivalent issued by PADEP in 1991. Previous progress reports since the last FYR state the same. The system is in full operation 24 hours a day, and is staffed by an operator five days a week. An auto-dialer alarm system, which is part of the treatment system, is programmed to notify the operator in case of an emergency or operation problem.

Sample Data

Treatment system influent water quality is monitored on a monthly basis for system performance, and effluent water quality is monitored on a bi-monthly basis in accordance with NPDES permit-equivalent for the Site. Collection techniques are performed in accordance the Operation and Maintenance Manual prepared for the Site, revised February 2018. Collection techniques include the use of an auto-sampler, as well as manual sampling conducted by either the operator or sample technician. Sample results are provided to EPA and PADEP in the form of quarterly progress reports. In addition to providing sample analytical results, the progress reports highlight operation and maintenance activities, miscellaneous site activities, community relations, and projected activities.

- Influent. Monthly sampling is conducted on untreated influent, as well as between the lead and lag activated carbon vessels to monitor their performance and also determine when a carbon changeout is required. Compounds analyzed for include alpha-BHC, beta-BHC, delta-BHC, gamma-BHC (Lindane), and 4,4'-DDT.

Benzene, while not part of the routine influent analysis, was analyzed for in August 2017. A summary of influent concentrations over the last five years is provided below:

Table 5 Summary of LCS Influent Sampling Results (October 2013-December 2017)

Compound	Minimum concentration (ug/L)	Maximum Concentration (ug/L)	Average Concentration (ug/L)
alpha-BHC	0.96 (July 2014)	39.3 (August 2017)	11
beta-BHC	3 (December 2015)	22.1 (August 2017)	9
delta-BHC	1.6 (July 2014)	216 (August 2017)	44
Lindane	0.68 (July 2014)	70.2 (July 2017)	18
4,4'-DDT	not detected	Not detected	Not detected
Benzene	NA	3.5 (August 2017)	NA

▪ Effluent. In accordance with the NPDES permit-equivalent, six compounds, in addition to suspended solids, pH, and total volume are monitored prior to discharge to the Allegheny River. The compounds monitored include alpha-BHC, beta-BHC, delta-BHC, Lindane, 4,4'-DDT, and benzene. Based on the quarterly progress reports reviewed, concentrations of the alpha-BHC, beta-BHC, delta-BHC, Lindane, and benzene were either non-detect, or were detected at concentrations that were below the average and/or maximum allowed concentrations stipulated in the NPDES permit equivalent.

Effluent Volume

The monthly average volume of water treated per day since the last FYR has varied from 25,000 gallons to 66,000 gallons, with an average daily treatment volume of approximately 45,000 gallons. The NPDES permit equivalent lists a monthly average flow per day of 30,400 gallons; however, the RAO for the leachate/shallow groundwater collection and treatment system is to eliminate any exposure to contaminants contained in the leachate and seeps, which requires the capture and treatment of the maximum volume of leachate and shallow groundwater possible.

Groundwater and Surface Water Monitoring Requirements and Results

Water Level Measurements

Water levels are measured on a semi-annual basis from a network of piezometers to evaluate the effectiveness of the LCS. The piezometers are located upgradient and downgradient of the various collection trenches comprising the LCS, as shown in Attachment 3. By comparing the water table elevation in the piezometers to the elevations of the bottom of the 6-inch drainage pipes that are bedded in gravel within the LCS trenches, a horizontal zone of capture can be determined. The performance of the interim LCS was evaluated in detail in 1995 following installation of the network of piezometers to support the remedial design of the final remedy. The LCS was further evaluated in a 2007 report. The findings from both evaluations were that the bulk of shallow groundwater and leachate from the upgradient fill areas and shallow bedrock aquifer was being captured, while groundwater from the deeper bedrock aquifer was bypassing the LCS. The reports also determined the bulk of the contaminant mass emanating from the fill areas upgradient of the LCS was being captured.

Data in the annual reports since the last FYR indicate the LCS continues to function as designed and drains the shallow groundwater. As shown in the cross-sectional diagrams provided in the annual monitoring reports, each of the collection trenches are lower in elevation than the water table of the corresponding piezometers used to monitor each collection trench, indicating the collection system is functioning properly. By depressing the shallow groundwater table, the LCS is also suppressing the occurrence of groundwater seeps along Karns Road in the vicinity of the LCS and thereby preventing exposure to Site contaminants.

Groundwater Quality

Groundwater quality monitoring was conducted semi-annually at the Site during this FYR period, and the sample results were reported in the annual post remedial action monitoring reports. The following groundwater monitoring wells are sampled to monitor constituents bypassing the LCS:

- PN-7 – screened in alluvium/top of bedrock.
- PN-7S – screened in shallow bedrock
- PN-8 – screened in alluvium/top of bedrock
- PN-10WT – screened in alluvium/top of bedrock
- PN-10S – screened in shallow bedrock

The following well is located upgradient of the LCS and is indicative of constituents entering the LCS:

- PN-8S – screened in shallow bedrock

Compounds analyzed for include VOCs (benzene, chlorobenzene, 1,2-dichlorobenzene, and 1,4-dichlorobenzene), organic pesticides (alpha-BHC, beta-BHC, delta-BHC, Lindane, and 4,4'-DDT), and TOC. Following is a discussion of the groundwater sample results for this FYR period, as well as overall constituent trends.

VOCs

Chlorobenzene was the only VOC detected during the groundwater quality monitoring events conducted during this FYR period, and was present in monitoring wells PN-8, PN-8S, PN-10S, and PN-10WT but at concentrations below the MCL of 100 ug/L.

Concentration trends since the remedial action began indicate the chlorobenzene concentration is slightly decreasing in PN-8S, decreasing in PN-10S and PN-10WT, and remaining relatively constant in PN-8.

Organic Pesticides

During this FYR period, alpha-BHC, beta-BHC, delta-BHC, and Lindane were detected in monitoring wells PN-8, PN-8S, PN-10S, and PN-10WT. The compound 4,4'-DDT was not detected in any of the wells. Table 6 provides a summary of the range of concentrations of organic pesticides detected during this FYR period.

Table 6 Summary of Groundwater Sampling Results (October 2013-April 2017)

Well	4,4'-DDT (ug/L)	Alpha-BHC (ug/L)	Beta-BHC (ug/L)	Delta-BHC (ug/L)	Lindane (ug/L)	Chlorobenzene (ug/L)	TOC (mg/l)
MCL (ug/L)	200	0.2	0.2	NA	0.2	100	NA
PN-7	ND	ND	ND	ND	ND	ND	ND
PN-7S	ND	ND	ND	ND	ND	ND	ND - 1.2
PN-8	ND	1.8 – 2.4	0.74 – 1.5	4.0 – 5.2	2.8 – 3.4	50.3 – 68.3	2.1 – 2.7
PN-8S	ND	ND – 4.2	0.062 – 0.78	0.13 – 2.8	0.11 – 1.7	1.0 – 32.9	11.2 – 26.4
PN-10S	ND	0.83 – 1.1	0.37 – 0.69	1.5 – 2.2	1.2 – 1.6	20.6 – 28.8	2.1 – 2.9
PN-10WT	ND	0.14 – 0.37	0.095 – 0.28	0.17 – 0.49	0.23 – 0.52	ND – 1.6	1.8 – 2.3

Surface Water Sampling

Surface water samples are collected quarterly from the influent line to the Harrison Township Water Authority treatment plant to monitor for the presence of Lindane. All samples collected during this FYR period were non-detect (<0.025 ug/L) for Lindane.

Site Inspection

The inspection of the Site was conducted on March 14, 2018. EPA representatives in attendance included the EPA Remedial Project Manager, Community Involvement Coordinator, and Biological Technical Support Group BTAG. Also in attendance were the Legacy Site Services Principal Engineer and Project Manager, APTIM Project Manager, and APTIM Plant Operator.

The purpose of the inspection was to assess the protectiveness of the remedy, including the condition of a secure fence to restrict access; the integrity of the landfill cap, vegetative cover and surface water features; the condition of ALSCO Community Park; and the overall condition of the LCS and treatment system. There were no significant issues with the physical condition of the remedial components. Minor issues that are being addressed included cracks in the tennis courts and slight deformation of a gabion basket in the stormwater detention basin.

EPA's site inspection checklist can be found in Attachment 4.

V. TECHNICAL ASSESSMENT

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

Yes. The review of decision documents, annual post remedial action monitoring reports, quarterly progress reports, ARARs, risk assumptions, interviews, and Site inspection indicate the remedy is functioning as intended by the 1992 ROD.

Remedial Action Performance

The capping of contaminated soils has achieved the RAO to eliminate potential exposure to Site contaminants present in surface or near-surface soils, and has reduced or eliminated infiltration or rainwater and surface water

in the Upper and Lower Project Area. The capped areas are well vegetated and there are no seeps evident in the capped areas. Surface drainage channels are free and clear and are moving surface runoff away from the capped areas.

The network of collection trenches that make up the LCS are designed to act as a fixed-head leachate and shallow groundwater capture system. Multiple pairs of piezometers have been installed on the upgradient and downgradient sides of the trenches to measure the water table elevation and determine if it is being locally depressed by the LCS. As described in the 1995 "*Interim Leachate Collection System Performance Evaluation"* and shown in the cross-sectional diagrams provided in the annual monitoring reports during this FYR period, each of the invert elevations (the bottom of the drainage pipe) of the drainage pipes are lower in elevation than the water table of the corresponding piezometers used to monitor each collection trench, indicating the LCS is functioning properly. As a result, seeps below the Lower Project Area have been significantly reduced or eliminated and the potential for human exposure to contaminated seeps has been eliminated.

Lindane continues to be detected at concentrations above the MCL of 0.2 ug/L in a number of groundwater monitoring wells; these wells will continue to be sampled as part of long-term operation and maintenance activities. Benzene is no longer detected in monitoring wells downgradient of the LCS at concentrations above the MCL of 5 ug/L.

Sample collection from the deeper bedrock monitoring wells, including PN-7D, PN-8D, and PN-10D, is not required under the long-term monitoring program. At the time of the remedial investigation, the samples collected from the deeper bedrock aquifer monitoring wells were either non-detect for contaminants, or there were trace detections. However, LSS has agreed to include these wells in an upcoming groundwater monitoring event to ensure that Site conditions have not changed and contamination is not impacting deeper groundwater.

Implementation of ICs and Other Measures

The ICs specified in the ROD are in place in the form of restrictive covenants to provide use restrictions, protect the integrity of remedial components, and prevent the use of groundwater and surface water. The Declaration of Restrictive Covenants for the Upper Project Area was recorded on May 24, 1999 and the Declaration of Restrictive Covenants for the Lower Project Area was recorded on January 18, 2000.

The access controls specified in the ROD are in place and maintained. A secure fence that surrounds the Lower Project Area and treatment building is in good condition. Monitoring wells are secured with padlocks which were recently replaced due to age.

System Operation and Maintenance

The LCS treatment system has been operational since 1999. The system has performed as designed, as indicated in the twice-monthly effluent samples reported in quarterly progress reports. While Site contaminants remained present in the collected influent water, the treatment plant removed all contaminants to below the requirements established in the NPDES permit equivalent during this FYR period. The treatment plant is well maintained, clean, and there were no significant problems noted during this period other than general maintenance and repair of equipment.

LSS has made many improvements to the remedial components at the Site since the last FYR pertaining to system optimization and worker health and safety. A summary of the improvements is provided in Attachment 5.

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

Yes. The remedy as selected in the ROD for the Site was determined to be protective of human health and the environment because the landfill cap prohibits direct exposure to contaminated soil, the LCS prevents the

emergence of contaminated seeps, the treatment system removes contaminants prior to discharge to the Allegheny River, and ICs restrict access and land use.

Changes in Standards and To Be Considered (TBCs)

There have been no changes in ARARs or TBCs that affect the protectiveness of the implemented remedy.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

There have been no changes in exposure pathways, toxicity, or other contaminant characteristics at the Site since the last FYR.

Changes in Risk Assessment Methods

There have been significant changes in EPA's risk assessment guidance since 1992. These include changes in dermal guidance, inhalation methodologies, and exposure factors. However, the remedy remains protective because exposure pathways that could result in unacceptable risk are being controlled and ICs are in place.

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

No. No additional information was revealed during the performance of this FYR that calls into question the protectiveness of the remedy as specified in the ROD.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
Site-wide. There are no Issues/Recommendations identified in this FYR.

OTHER FINDINGS

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

- Cracks in tennis courts are in need of repair. LSS is working with a contractor to evaluate a more permanent repair.
- Continue working with Harrison Township to identify alternative or additional features for ALSCO Community Park to increase its use.

VII. PROTECTIVNESS STATEMENT

Sitewide Protectiveness Statement	
Protectiveness Determination: Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy at the Site is determined to be protective of human health and the environment. Exposure pathways that could result in unacceptable risks are being controlled, and institutional controls are preventing exposure to contaminated wastes, soils, and groundwater. Contaminated leachate and shallow groundwater is being controlled by the leachate collection system (LCS), and it is being treated to a quality below limits established by the National Pollutant Discharge Elimination System. Operation and maintenance of the landfill cap, LCS, and treatment system is expected to continue until cleanup goals are met.	

VIII. NEXT REVIEW

The next FYR report for the Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

2013 Annual Post-Remedial Action Monitoring Report, ALSCO Community Park/Lindane Site; CB&I, March 2014.

2014 Annual Post-Remedial Action Monitoring Report, ALSCO Community Park/Lindane Site; CB&I, March 2015.

2015 Annual Post-Remedial Action Monitoring Report, ALSCO Community Park/Lindane Site; CB&I, March 2016.

2016 Annual Post-Remedial Action Monitoring Report, ALSCO Community Park/Lindane Site; March 2017.

2017 Annual Post-Remedial Action Monitoring Report, ALSCO Community Park/Lindane Site; APTIM, January 2018.

Comprehensive Five-Year Review Guidance; U.S. EPA Office of Emergency and Remedial Response; June 2001.

Consent Decree for RD/RA, In the Matter of: Lindane Dump Superfund Site, Harrison Township, Allegheny County, Pennsylvania; Elf Atochem North America, Inc., Civil Action No. 93-01-218; July 23, 1993.

Five-Year Review Report, Lindane Dump Superfund Site, Harrison Township, Allegheny County; U.S. EPA Region III; September 19, 2008.

Final Effluent Limits, ALSCO Community Park Site, Harrison Township, Allegheny County, Pennsylvania; Letter from PADEP to Mr. Doug Loutzenhiser, Atochem, Inc.; March 22, 1991.

Final Effluent Limits, ALSCO Community Park Site, Harrison Township, Allegheny County, Pennsylvania; Letter from PADEP to Mr. Doug Loutzenhiser, Elf Atochem North America, Inc.; March 16, 1998.

Landfill Cap Completion Report; Natrona Lindane Site/ALSCO Community Park, Harrison Township, Pennsylvania; Eckenfelder Brown/Caldwell; June 1999.

Landfill Cap Final Remedial Design, Natrona Lindane Site/ALSCO Community Park, Harrison Township, Pennsylvania; Eckenfelder Inc; December 1997.

Leachate/Shallow Ground Water Treatment System Completion Report, Natrona Lindane Site/ALSCO Community Park, Harrison Township, Pennsylvania; Eckenfelder Brown/Caldwell; August 1999.

Leachate/Shallow Ground Water Treatment System Final Remedial Design, Natrona Lindane Site/ALSCO Community Park, Harrison Township, Pennsylvania; Eckenfelder Inc; December 1997.

Operation and Maintenance Plan for Leachate/Shallow Groundwater Collection and Treatment System and Landfill Cap, Rev. 1, Natrona Lindane Site/ALSCO Community Park, Natrona Heights, Pennsylvania; APTIM; February 2018.

Quality Assurance Project Plan for Operation and Maintenance Oversight and Split Sampling, Lindane Dump Site, Harrison Township, Allegheny County; Black & Veatch; September 20, 2004.

Quarterly Progress Reports, ALSCO Community Park/Lindane Site; Legacy Site Services, LLC.; January 2014 – April 2018.

Record of Decision, Lindane Dump Site. U.S. EPA Region III; March 31, 1992.

Supplemental Remedial Investigation Report, Natrona ALSCO Community Park, Harrison Township, Pennsylvania; Eckenfelder, Inc.; May 1989, rev. January 2000.

ATTACHMENT 1

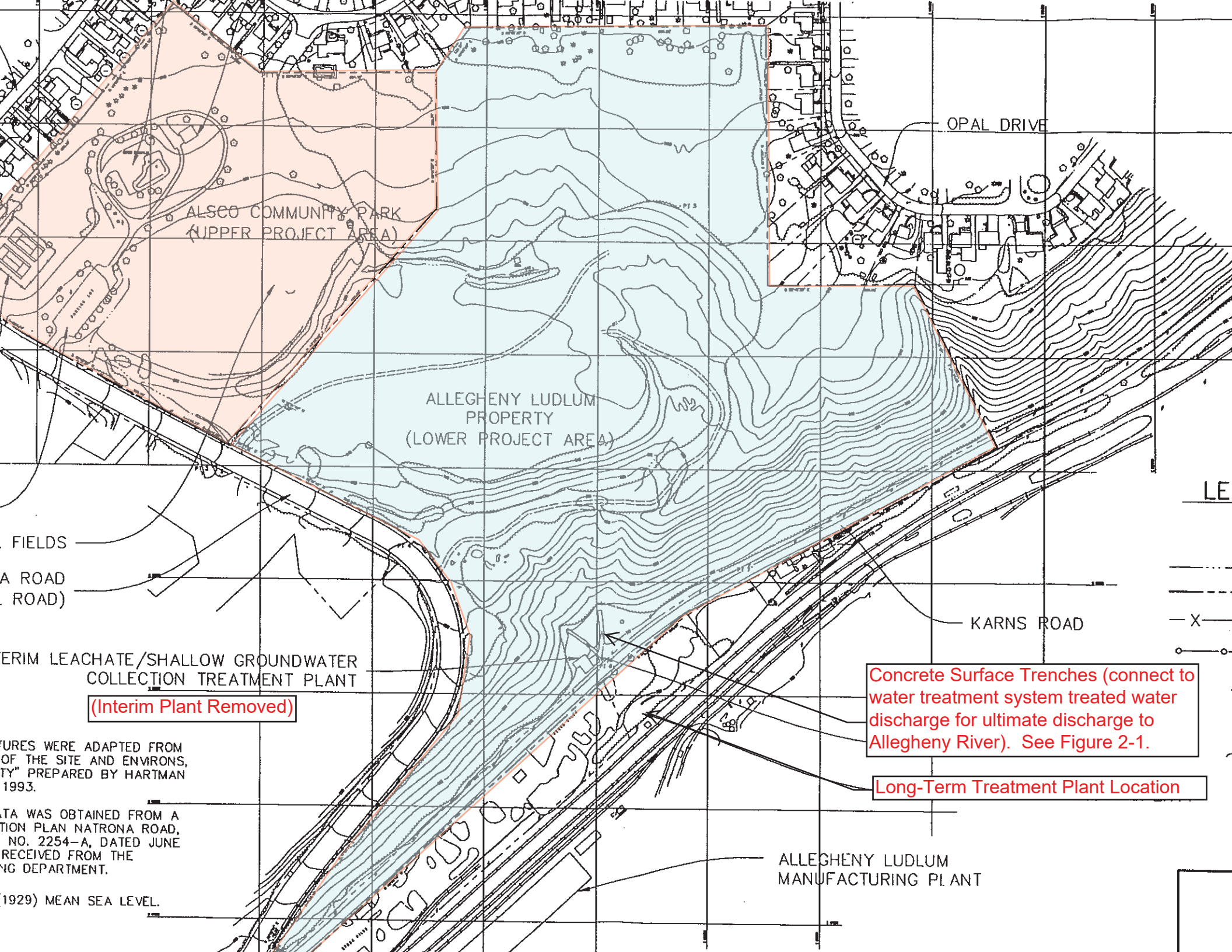
SITE LOCATION

Feet
0 250 500 1,000 1,500

Site Location Map
Lindane Dump Site
Harrison Township
Allegheny County, PA

ATTACHMENT 2

SITE LAYOUT


OPAL DRIVE
ALSCO COMMUNITY PARK
(UPPER PROJECT AREA)
ALLEGHENY LUDLUM
PROPERTY
(LOWER PROJECT AREA)
FIELDS
A ROAD
ROAD)
KARNS ROAD
ERIM LEACHATE/SHALLOW GROUNDWATER
COLLECTION TREATMENT PLANT
(Interim Plant Removed)
Concrete Surface Trenches (connect to water treatment system treated water discharge for ultimate discharge to Allegheny River). See Figure 2-1.
Long-Term Treatment Plant Location
ALLEGHENY LUDLUM
MANUFACTURING PLANT
URES WERE ADAPTED FROM
OF THE SITE AND ENVIRONS,
TY" PREPARED BY HARTMAN
1993.
TA WAS OBTAINED FROM A
TION PLAN NATRONA ROAD,
NO. 2254-A, DATED JUNE
RECEIVED FROM THE
NG DEPARTMENT.
(1929) MEAN SEA LEVEL.

ATTACHMENT 3

MONITORING WELLS AND PIEZOMETERS, LEACHATE COLLECTION SYSTEM

LEGEND:

PZ-3D — APPROXIMATE LOCATION OF PIEZOMETER OR MONITORING WELL

NOTE:

PIEZOMETER AND MONITORING WELL LOCATIONS ARE APPROXIMATE.

APPROXIMATE SCALE

0 100 200 FEET

REFERENCE:

GOOGLE EARTH AERIAL PHOTOGRAPH, DATED 4/17/2016.

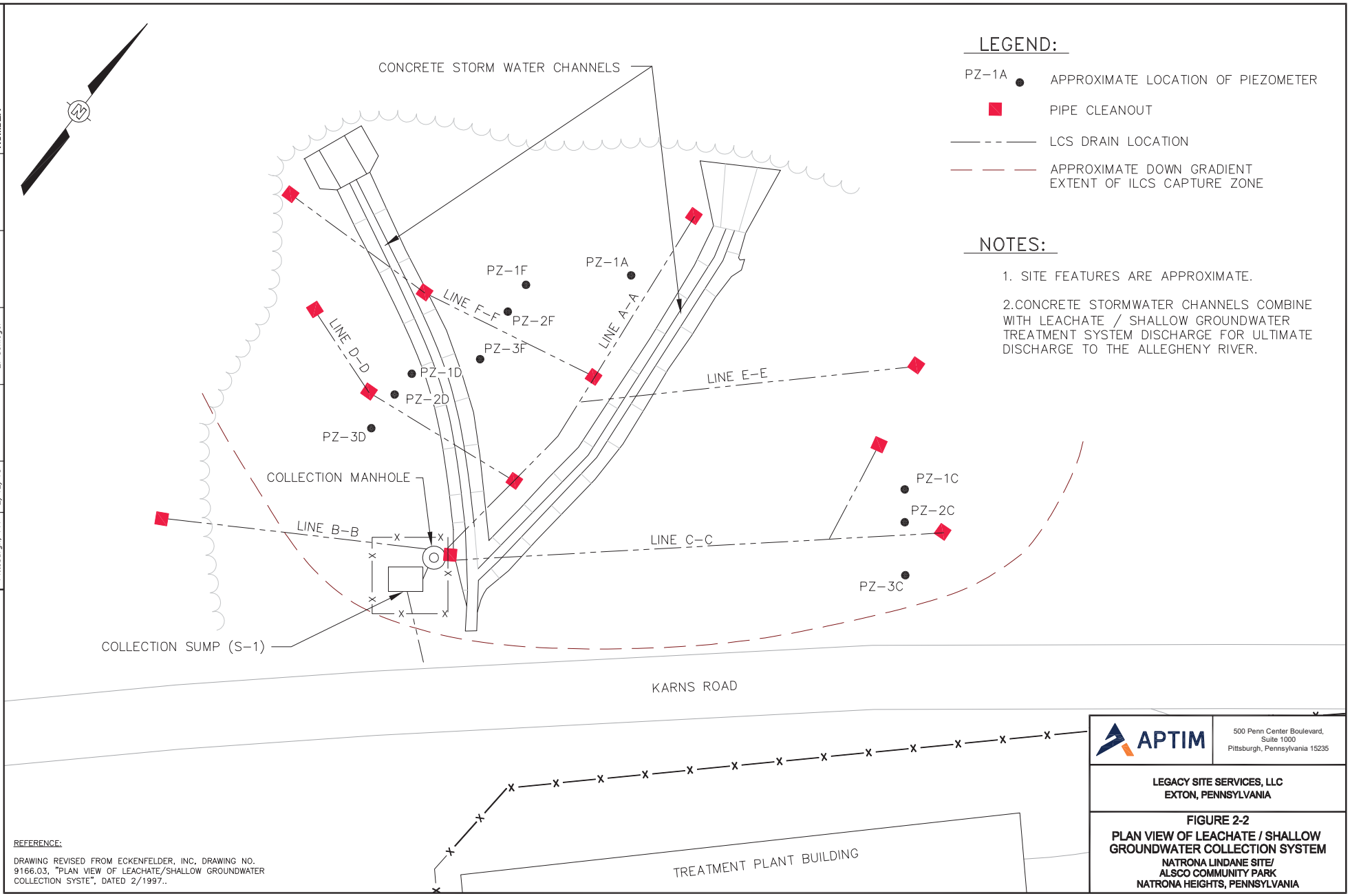
OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	2/12/18	--	E. Schlegel	--	--	125189-B66

APTIM
500 Penn Center Boulevard, Suite 1000
Pittsburgh, Pennsylvania 15235

LEGACY SITE SERVICES, LLC
EXTON, PENNSYLVANIA

FIGURE 2-3
PLAN VIEW WITH MONITORING WELL AND PIEZOMETER LOCATIONS
NATRONA LINDANE SITE
ALSCO COMMUNITY PARK
NATRONA HEIGHTS PENNSYLVANIA

O:\Project\125189\125189B13_recover.dwg
Plot Date/Time: 01/11/08 02:18pm Xref: .
Plotted by: greg.jones Image:



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	2/12/18	--	E. Schlegel	--	--	125189-B65

REFERENCE:

DRAWING REVISED FROM ECKENFELDER, INC, DRAWING NO. 9166.03, "PLAN VIEW OF LEACHATE/SHALLOW GROUNDWATER COLLECTION SYSTE", DATED 2/1997..

Xref: .
Image: .

O:\Project\125189\125189B9.DWG
Plot Date/Time: 01/11/08 01:33pm
Plotted by: greg.jones

APTIM
500 Penn Center Boulevard, Suite 1000
Pittsburgh, Pennsylvania 15235

LEGACY SITE SERVICES, LLC
EXTON, PENNSYLVANIA

FIGURE 2-2
PLAN VIEW OF LEACHATE / SHALLOW GROUNDWATER COLLECTION SYSTEM
NATRONA LINDANE SITE/
ALSCO COMMUNITY PARK
NATRONA HEIGHTS, PENNSYLVANIA

ATTACHMENT 4

SITE INSPECTION CHECKLIST

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION

Site name: Lindane Dump	**Date of inspection:** 3/14/18
Location and Region: Natrona Heights, 3	**EPA ID:** PAD980712798
Agency, office, or company leading the five-year review: EPA R.3	**Weather/temperature:** 25°F, light snow

Remedy Includes: (Check all that apply)

- [X] Landfill cover/containment
- [X] Access controls
- [X] Institutional controls
- [X] Groundwater pump and treatment
- [ ] Surface water collection and treatment
- [ ] Other _____
- [ ] Monitored natural attenuation
- [ ] Groundwater containment
- [ ] Vertical barrier walls

Attachments: [ ] Inspection team roster attached [ ] Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Gary Shelby (Name) — Project Manager (Title) — 3/14/18 (Date)
   Interviewed [X] at site [ ] at office [ ] by phone Phone no. _____
   Problems, suggestions; [ ] Report attached _____

2. **O&M staff** Rich Gabonsh (Name) — Plant operator (Title) — 3/14/18 (Date)
   Interviewed [X] at site [ ] at office [ ] by phone Phone no. _____
   Problems, suggestions; [ ] Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency Harrison Township
Contact Faith Payne (Name) | Secretary (Title) | 3/13/18 (Date) | _____ (Phone no.)
Problems; suggestions; ☐ Report attached _____

Agency Harrison Township Water Authority
Contact Chuck Craig (Name) | General manager (Title) | 3/14/18 (Date) | _____ (Phone no.)
Problems; suggestions; ☐ Report attached _____

Agency _____
Contact _____ (Name) | _____ (Title) | _____ (Date) | _____ (Phone no.)
Problems; suggestions; ☐ Report attached _____

Agency _____
Contact _____ (Name) | _____ (Title) | _____ (Date) | _____ (Phone no.)
Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Report attached.

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

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

   Remarks: Recently updated / revised

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks:

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

   Remarks:

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☒ Effluent discharge — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Other permits _____ — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks: NPDES Permit - Equivalent

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks:

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks:

8. **Leachate Extraction Records** — ☐ Readily available — ☒ Up to date — ☐ N/A

   Remarks: influent volumes to treatment plant

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☒ Water (effluent) — ☐ Readily available — ☒ Up to date — ☐ N/A

   Remarks: 2x monthly sampling → reported quarterly

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks: visitors did sign in.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☒ PRP in-house ☒ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate _____ ☐ Breakdown attached N/A

Total annual cost by year for review period if available

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

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

Describe costs and reasons: _____

N/A

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

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A
Remarks Fencing around treatment building in good condition, some w/ fence around Lower Property Area.

B. Other Access Restrictions

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

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) self reporting, landfill inspections
Frequency semi-annual inspections, operator on site daily
Responsible party/agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.

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

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

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks
use restrictions recorded on multiple deeds

D. General

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

2. **Land use changes on site** ☒ N/A
Remarks

3. **Land use changes off site** ☒ N/A
Remarks

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A
Remarks

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS ☐ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent 8' x 8' Depth < 6"
   Remarks minor settlement at gabion basket / outfall into stormwater basin.

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths 20' Widths ~ 2" Depths ~ 6"
   Remarks Tennis Courts have significant cracks

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
   Areal extent _____ Depth _____
   Remarks _____

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

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

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

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

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

Remarks_____

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

B. Benches ☐ Applicable ☒ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☒ N/A or okay
Remarks_____

2. **Bench Breached** ☐ Location shown on site map ☒ N/A or okay
Remarks_____

3. **Bench Overtopped** ☐ Location shown on site map ☒ N/A or okay
Remarks_____

C. Letdown Channels ☒ Applicable ☐ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☒ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

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

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

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

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

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

D. Cover Penetrations ☐ Applicable ☒ N/A

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

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

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

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

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

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

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

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks _____

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

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks _____

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

1. **Siltation** Areal extent _____ Depth _____ ☐ N/A
   ☒ Siltation not evident
   Remarks _____

2. **Erosion** Areal extent _____ Depth _____
   ☒ Erosion not evident
   Remarks _____

3. **Outlet Works** ☒ Functioning ☐ N/A
   Remarks _____

4. **Dam** ☒ Functioning ☐ N/A
   Remarks _____

H. Retaining Walls ☐ Applicable ☒ N/A

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

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

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

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

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

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

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

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

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

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

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

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

1. **Pumps, Wellhead Plumbing, and Electrical**
☒ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks

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

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

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

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

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

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

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
   - ☒ Metals removal ☐ Oil/water separation ☐ Bioremediation
   - ☒ Air stripping ☒ Carbon adsorbers
   - ☒ Filters
   - ☒ Additive (*e.g.*, chelation agent, flocculent)
   - ☐ Others
   - ☒ Good condition ☐ Needs Maintenance
   - ☒ Sampling ports properly marked and functional
   - ☒ Sampling/maintenance log displayed and up to date
   - ☒ Equipment properly identified
   - ☐ Quantity of groundwater treated annually ~ 60 million gallons @ 45K/day
   - ☐ Quantity of surface water treated annually
   - Remarks

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

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

4. **Discharge Structure and Appurtenances**
   - ☐ N/A ☒ Good condition ☐ Needs Maintenance
   - Remarks did not observe – Allegheny River.

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

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

D. Monitoring Data

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

2. Monitoring data suggests:
   - ☐ Groundwater plume is effectively contained ☒ Contaminant concentrations are declining for the most part.

D. Monitored Natural Attenuation

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

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

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

Remedy designed to prevent occurrence of seep below lower Project Area and to capture contaminated leachate and shallow gw to the extent possible.

Cap designed to limit infiltration and prevent exposure to contaminated soil.

Treatment Plant designed to treat water to NPDES-equivalent standards

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.

I was provided a list of updates/improvements made to the system in recent past.
O&M is being conducted in accordance w/ O&M plan and is keeping the remedy protective.

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.

NA

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Discussed the use of warm season grasses w/ PRP as a way to reduce O&M costs and create more habitat for local fauna

ATTACHMENT 5

SUMMARY OF FACILITY IMPROVEMENTS

Description of Work	Details	Date Completed	Reason for Work
Fence Repairs	Replaced 2 loop caps, patched 10-foot hole cut in fabric, adjusted double drive gate.	June-13	Safety / Security
Bollard Installation	Installed four 6 5/8-inch OD bollards filled with concrete and set in concrete footers.	July-14	Safety
Tree Removal	Removed trees behind treatment plant building.	August-15	Safety / Preventative Maintenance
Asphalt Repairs - ALSCO Park Parking Lot, Lower Project Area Access road, Treatment Plant Parking Area	Swept area, patched asphalt, filled cracks with crack sealer, applied top coat sealer, and repainted stripes for parking area.	August-16	Safety / Routine Maintenance
HASP Plan Update	The HASP was updated on October 2016 based on findings from a routine safety audit.	October-16	Safety
Arc Flash Study	Arc Flash study completed by Henron Electric Resources DBA FTBA. Three foot distance from MCC marked on floor for clearance and to define arc flash hazard area.	March-17	Safety
HASP Training	APTIM Health and Safety Manager provided on-site training to plant operator. This included fall protection, confined space entry, lock-out / tag-out, arc flash, HAZCOM and leading indicators.	April-17	Safety
Rolling Stair Procurement	The mobile scaffold that had been used for equipment access was replaced with a rolling stair unit with handrails for safe access and performance of elevated maintenance activities.	April-17	Safety Improvement
PPE Assessment	Performed a PPE hazardous assessment of job tasks to confirm all required PPE is identified and available.	May-17	Safety
Arc Flash Training	Plant operator was trained by Henron Electric Resources DBA FTBA and was provided with certificate to document training.	May-17	Safety
Sump Pit Harness	Procured updated harness for operator use when working proximate to the open sump pit (fall protection devise).	May-17	Safety Improvement
Instituted Ladder and Extension Cord Routine Inspection Process	Ordered colored zip ties to implement monthly ladder and extension cord inspection system. Each color or color combination corresponds to a specific month. Colored zip ties are removed and new installed as each month's inspection is completed and equipment is cleared for safe use.	May-17	Safety
Safety Signage	Installed two Authorized Personnel Only signs inside of treatment plant doors and six Authorized Personel Only signs on perimeter fence. Installed two Not An Exit signs inside of plant operating room doors. The sump area was also marked as a Confined Space.	May-17	Safety
Air Sampling for Confined Space	Air monitoring samples were collected during granular media filter maintenance and media changeout (deemed the greatest respiratory exposure event for the project) in order to confirm that current PPE requirements are adequate. This was confirmed with the sample results.	June-17	Safety
Granular Media Filters Internals Rebuild	Granular media filter internals - inspection during media removal and repairs.	June-17	Operational/Process Improvement
Lock-out / Tag-out	A lock-out / tag-out kit was procured with the equipment required to implement LO/TO procedures (including locks, tags, etc.).	June-17	Safety
Installed Additional Electrical Outlets	Installed hard-wired outlets where needed for plant lighting and equipment in order to negate the routine use of extension cords in specific work areas.	June-17	Safety Improvement
Lone Worker Unit	Procured Lone Worker system from Premier Safety and programmed to contact local emergency response personnel in the event the plant operator goes down while working solo.	June-17	Safety Improvement
Sump Pit Engineering Review	Reviewed sump pit hoist and support beam specifications/size to confirm safe operation. Rated capacity for hoist beam is 200 lbs. (labeled on beam). Central cross beam deemed sufficient for fall protection and marked with orange paint to identify fall protection connection point. 1/4-inch bolts were replaced with 1/2-inch bolts based on structural review.	June-17	Safety
Arc Flash Equipment Purchase	Procured required gloves, hard hat with safety shield, etc. for safe operation of electrical equipment.	June-17	Safety
Fall Arrest System - EQ Tank	A catwalk and fall-protection system were installed on the EQ Tank for safe access to the top of the tank.	June-17	Safety Improvement
Sump Pit Rung Replacement	The ladder rungs integrally installed in the sump pit were found to be deteriorating. They were replaced prior to failure over time.	June-17	Safety / Maintenance

Description of Work	Details	Date Completed	Reason for Work
Rip Rap Placement under Fenceline	Rip rap stone was placed under the fence line at the retention basin emergency spillway in order to block access under the fence to the retention basin and lower project area.	July-17	Safety / Security
New Autodialer	Procured, installed and programmed new autodialer for alarm call-out and purchased cell phone for plant operator for alarm call-out.	July-17	Safety
New Emergency Lights	New emergency lights with battery backup were installed.	July-17	Safety / Maintenance
Piping Modifications	Pipe modifications between the EQ Tank and the Multi-Media Filters were completed for more effective routine pipe cleaning.	October-17	System Improvement
Monitoring Points' Lock Replacement	New keyed-alike padlocks were procured and installed at all of the active monitoring points (piezometers and monitoring wells), as old locks were rusted.	November-17	Security / Maintenance
Access to Monitoring Points	Clear vegetation around monitoring wells PN-7, 7S, 8S and 8N for improved access.	December-17	Safety
ALSCO Park Accessways	Cut low tree limbs at parking lot and walking paths at Alsco Park.	December-17	Safety
Treatment Plant Roof/Gutters	Cleaning of the treatment plant building roof and gutters in preparation for winter.	December-17	Preventative Maintenance
Drainage Improvements, PN10-WT	Rework of the drainage swale adjacent to PN10-WT to redirect water flow to existing drainage pump under roadway.	December-17	System Improvement
Monitoring Point Modification	Modification of monitoring well PN-10WT (i.e., raise 8” steel casing and internal 2” PVC pipe).	December-17	System Improvement
Bollard Reset	Reset one of four bollards dislodged by an outside entity to reestablish protection of building corner.	January-18	Safety
HASP Plan Update	The plan was further updated in February 2018 based on an overall O&M Plan update and to align with current Retia/Total and APTIM safety requirements.	February-18	Safety Improvement
O&M Plan Updates	The O&M Plan, including both the Long Term Monitoring Plan and the HASP, was completely updated and revised in order to align with current site operations, monitoring and inspection practices.	February-18	System Improvement

Note: The table above does not include routine treatment system equipment maintenance/repair, routine inspections (e.g., emergency generator, fire extinguishers), routine pipe cleaning and filter media changeouts, etc.