4th FIVE-YEAR REVIEW REPORT
OHIO RIVER PARK SUPERFUND SITE
NEVILLE TOWNSHIP
ALLEGHENY COUNTY, PENNSYLVANIA

EPA ID#: PAD980508816

U.S. Environmental Protection Agency Region 3
1650 Arch Street
Philadelphia, Pennsylvania

March 2018

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U.S. EPA, Region III

MAR 20 2018

Date

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LIST OF ABBREVIATIONS & ACRONYMS

2,4,6-TCP	2,4,6-Trichlorophenol
ARAR	Applicable or Relevant and Appropriate Requirement
BLRA	Baseline Human Health Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
COC	Contaminant of Concern
EPA	Environmental Protection Agency
FS	Feasibility Study
FYR	Five-Year Review
HI	Hazard Index
IC	Institutional Control
MCL	Maximum Contaminant Level
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NLC	Neville Land Company
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PADEP	Pennsylvania Department of Environmental Protection
PAH	Polycyclic Aromatic Hydrocarbon
PC&C	Pittsburgh Coke and Chemical Company
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RMU	Robert Morris University
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SVOC	Semi-Volatile Organic Compound
SWRAU	Sitewide Ready for Anticipated Use
VOC	Volatile Organic Compound

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

This is the fourth FYR for Ohio River Park Superfund Site (Site). The triggering action for this statutory review is the signature date of the previous FYR (March 27, 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.

The Site consists of the following three operable units (OUs) which will be addressed in this FYR:

- OU1: Soil and Buried Waste;
- OU2: Coraopolis Bridge Soil; and
- OU3: Site-wide Groundwater.

The Site FYR was led by EPA Remedial Project Manager (RPM) Frank Klanchar. EPA participants included hydrogeologist Mindi Snoparsky, toxicologist Nancy Rios, Biological Technical Assistance Group biologist Bruce Pluta, community involvement coordinator (CIC) Amanda Miles, and Pennsylvania Department of Environmental Protection (PADEP) Environmental Protection Specialist Annette Paluh. The review began on April 27, 2017.

Site Background

The approximately 32-acre Site is located on the western tip of Neville Island, approximately 10 miles downstream of Pittsburgh, Pennsylvania in the Ohio River (Figure 1). Land use on the eastern end of the island is highly industrial. The center of the island and areas closest to the Site are largely residential and commercial.

Beginning in the mid-1930s until the mid-1950s, nearby industries and community members used a portion of the Site for the disposal of domestic trash and construction debris. Some illegal dumping of municipal wastes also occurred. Industrial waste disposal activities continued at the Site from 1952 through the 1960s.

Following construction of remedial cap components on the Site, Neville Land Company (NLC) began redevelopment activities at the Site, opening the Island Sports Center in 1998. Robert Morris University (RMU) purchased the properties that makes up the Site in two allotments in 2003 and 2004 to expand their athletic facilities. RMU has expanded the offerings of the Island Sports Center and has continued to maintain public use of the facilities and programs.

Today, the Site is home to a 5-acre building housing two indoor ice skating rinks, outdoor inline/ice rink facilities, a golf dome and golf training facility, a running track with center field space, a shot put training area, sports equipment shops, dining facilities, paved parking areas and a mini-golf course (Figure 2). The track and field area and associated bleachers are located west of the golf dome. A portion of the outdoor track is located on top of the Site's large capped area. An approximate 1-acre portion of the Site currently houses the Neville Island end of the Coraopolis Bridge and a RMU boathouse with parking area.

Several municipalities along the Ohio River use groundwater as a source of drinking water. The nearest municipality is Coraopolis. The Coraopolis well field is located downstream, approximately 750 feet southwest from the western boundary of the Site, along the Back Channel. The well field consists of seven wells that produce an average water flow of 127 cubic feet per minute.

The Site was listed on EPA's National Priorities List (NPL) on August 30, 1990.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Ohio River Park Superfund Site		
EPA ID: PAD980508816		
Region: 3	**State:** PA	**City/County:** Neville Island/Allegheny
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**		
Author name (Federal or State Project Manager): Frank Klanchar		
Author affiliation: EPA Region 3		
Review period: 4/27/2017 - 2/28/2018		
Date of site inspection: 9/21/2017		
Type of review: Statutory		
Review number: 4		
Triggering action date: 3/27/2013		
Due date *(five years after triggering action date)*: 3/27/2018		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Table 1 lists the primary contaminants associated with potential human health risk at the Site based on the results of the Remedial Investigation (RI). The Baseline Human Health Risk Assessment results indicated that contamination at the Site would present a risk above EPA's acceptable level to the following populations:

- People using water from on-Site wells for drinking, showering, and bathing;
- People eating contaminated fish; and
- Children and construction workers accidentally ingesting uncovered on-Site soil.

TABLE 1 – PRIMARY CONTAMINANTS AT THE SITE	
	Substance
Volatile Organic Compounds (VOCs)	• benzene • 1,2-dichloroethane • 1,1,2- trichloroethane
Semi-Volatile Organic Compounds (SVOCs)	• benzo(a)pyrene • benzo(a)anthracene • dibenz(a,h)anthracene • 4-methylphenol • 2,4-dichlorophenol • 2,4,6-trichlorophenol (2,4,6-TCP)
Pesticides	• dieldrin • alpha-benzene hexachloride • gamma-chlordane
Inorganics	• manganese • beryllium • arsenic • mercury

Response Actions

The remedy for the Site is contained in three Records of Decision (ROD) issued in March 1993 (OU2), September 1996 (OU1), and September 1998 (OU3). The selected remedy addresses the following operable units:

- OU1: Soil and Buried Waste;
- OU2: Coraopolis Bridge Soil; and
- OU3: Site-wide Groundwater.

The Remedial Action Objectives (RAOs) provided in the OU1 ROD and the OU3 ROD included:

- For on-Site soil exposure, control future land use and apply engineered systems (e.g., localized capping) if necessary to ensure that risks to on-Site workers or visitors are maintained within or below a target range of 10^{-4} to 10^{-6}.
- For erosion of surface soil, restrict the movement of soil, both on and off site, by providing engineered runoff control systems and maintaining stable land surfaces over the entirety of the Site.
- For buried waste, implement specific actions to reduce the mobility of potentially hazardous constituents, limiting their potential future effect on ground water quality and on the concentration of waste material contaminants in surface and subsurface soil surrounding the waste trench areas.
- To reduce or eliminate the potential for human or ecological exposure to contaminated groundwater in the OU3 portion of the Site and in other areas potentially impacted by the Site.

March 1993 ROD – Coraopolis Bridge Soil (OU2)

EPA issued the first ROD for the Site on March 31, 1993. The selected remedy was "No Action" for soil at the Bridge Portion of the Site in a one-acre area where a new bridge was to be constructed to replace the existing Coraopolis Bridge. There were no remedial action objectives. The 1993 OU2 RI/FS did not identify any human

health cancer risks or non-cancer hazards in excess of acceptable levels, nor did it identify any ecological risks from exposure to soil at OU2. The new Coraopolis-Neville Island Bridge was completed in 1995.

September 1996 ROD – Soil and Buried Waste (OU1)
EPA issued the ROD for OU1 on September 27, 1996. The remedy selected included the following remedial components:

- Capping of concentrated waste areas with a multi-layer cap designed in accordance with Pennsylvania residual waste management regulations.
- Capping of areas not covered with the multi-layer cap and not covered with adequate vegetative cover with an erosion cap consisting of either asphalt or concrete paving, or a vegetative soil layer.
- Installing a surface water control system to control transport of surface soil both on and off site.
- Abandoning the existing on-site oil well in accordance with Pennsylvania oil and gas well regulations.
- Installing a passive gas collection system to ensure the integrity of the cap.
- Long-term monitoring of ground water, surface water, and sediment.
- Implementing institutional controls to prohibit residential development on site, to prohibit any use incompatible with a multi-layer cap and to prohibit the use of ground water from the Site.

The 1996 OU1 ROD selected two indicator chemicals: benzo(a)anthracene and benzo(a)pyrene. The multi-layer cap would be placed over areas containing concentrations of these indicator contaminants of concern (COCs) in excess of the concentrations indicated in Table 2.

TABLE 2 – SOIL INDICATOR COC CLEANUP GOALS

Soil COC	1996 OU1 ROD Performance Standard (µg/kg)
Benzo(a)anthracene	7,800
Benzo(a)pyrene	780

September 1998 ROD – Site-wide Groundwater (OU3)
EPA issued the ROD for OU3 on September 17, 1998 as a permanent remedy for controlling groundwater at the Site. The selected remedy consisted of the following remedial components:

- Monitoring of natural attenuation processes to measure changes in contaminant concentrations in the ground water plume at the Site until cleanup levels are achieved.
- Deed restrictions preventing residential use of groundwater at the Site.

Table 3 presents the groundwater cleanup levels selected in the 1998 OU3 ROD.

TABLE 3 – GROUNDWATER COC CLEANUP LEVELS

Groundwater COC	1998 OU3 ROD Cleanup Levels (µg/L)
Benzene	5[1]
2,4,6-TCP	61[2]

Notes:
[1] - Safe Drinking Water Act MCL
[2] - Risk-based concentration for tap water (10^{-5} risk)

Status of Implementation

March 1993 ROD – Coraopolis Bridge Soil (OU2)
The selected remedy for OU2 of "No Action" for soil did not require implementation of any remedial action.

September 1996 ROD – Soil and Buried Waste (OU1)
On December 31, 1997, a Consent Decree between Neville Land Company and Wilmington Securities, Inc., the Potentially Responsible Parties (PRPs) for the Site, and EPA for implementation of the OU1 remedy was approved and entered by the Court. The OU1 remedy construction began in February 1998 and continued until March 2000. The PRPs installed additional monitoring wells in the fall of 2000 and 2003. Remedial construction activities for OU1 consisted of the following:

- Abandonment of one oil well and several additional monitoring wells no longer deemed necessary.
- Construction of a multi-layer cap and gas collection/venting system.
- Construction of an erosion cap over areas without suitable cover or areas disturbed for future development.
- Construction of a stormwater runoff and erosion control system, including vertical barrier walls.
- Implementation of institutional controls to prohibit residential development at the Site, to prohibit any use incompatible with a multi-layer cap, and to prohibit the use of groundwater from the Site. Permanent warning signs were posted at the banks of the Ohio River to warn potential fisherman against eating bottom-feeding fish.

The PRPs abandoned the on-site oil well in accordance with applicable and relevant provisions of the Pennsylvania oil and gas well regulations.

The PRPs constructed the multi-layer cap over historic waste disposal trenches in three areas: one over a large area in the south-central portion of the Site and two smaller areas in the north-central portion of the Site (Figure 3). The multi-layer cap consists of the following components:

- A cap subgrade layer of engineered fill to provide a suitable and firm foundation for the barrier and adequate slope for drainage, including a liner subgrade layer free of materials that might damage the barrier layer.
- A barrier layer of 40-mil thick high-density polyethylene liner.
- A cap drainage layer of synthetic drainage net (geonet), overlain with geotextile to minimize intrusion of the overlying vegetative soil cover.
- A 3-foot-thick vegetative soil layer, with the top 6 inches consisting of vegetative fill material (loamy soil). Vegetated areas were then seeded and mulched.
- For portions of the multi-layer cap that support roadways, parking areas, pavement or structures, the cover over the initial liner cover consists of well-compacted coarse aggregate or engineered fill.
- A passive gas collection system, consisting of gravel-filled trenches leading to vent pipes to relieve gas that might build up beneath the liner.

The PRPs covered the entire portion of OU1 that was disturbed by construction with an erosion cap. The erosion cap in development areas consisted of either asphalt or concrete paving over a prepared subgrade surface, or a 10-inch-minimum-thickness vegetative soil layer. The remaining portions of OU1, outside the limits of the multi-layer cap, have an erosion cap only where vegetative cover suitable to resist erosion did not already exist.

The PRPs installed a riprap toe buttress to address the erosion features and potential erosion features along riverbank slopes. The buttress consisted of angular large rock over a layer of geotextile. Crews hydroseeded steep slopes on the western tip of the island and covered the slopes with erosion resistant matting. A series of berms, inlets and pipes collected excess surface water runoff from the multi-layer cap and other developed areas and directed it into the surrounding Ohio River Main Channel and the Ohio River Back Channel.

Prior to the remedial action, ribbons of a tar-like substance were identified at the surface of a slope failure. Tar appeared to be migrating in a thin layer in the interface between native soil and the overlying fill. To prevent migration of this substance, a minor modification was made to the design and an in-ground vertical barrier system was installed. The primary barrier is a cement-bentonite slurry wall, which extends through the fill to native soil, immediately inside the southern limit of the largest of the three multi-layer caps. Cement-bentonite provided high shear strength characteristics, which was necessary since the barrier was near a steep slope. Crews installed a secondary barrier wall to a depth of at least 2 feet below the base of where the tar-like material had been found. The secondary barrier consisted of a trench lined with 40-mil high-density polyethylene and filled with clean fill. Lastly, the exposed tar-containing materials were removed from the face of the slope and consolidated the materials within the limits of the multi-layer cap.

September 1998 ROD – Site-wide Groundwater (OU3)

The OU3 ROD established a plan for monitored natural attenuation that relied on quarterly groundwater monitoring from points along the shoreline on the Back Channel side of Neville Island, along the shoreline on the Main Channel, beneath the Back Channel at the downgradient edge of the benzene plume, at an upgradient well, and at the Coraopolis public water supply sentinel well. Monitoring well locations are shown in Figure 3.

In spring 2003, Neville Land Company's (NLC) consultant AECOM (formerly URS Corporation), replaced monitoring well ERT-24M with URS-24S, which is located near the old well. The screen of the new well was placed at the same depth in the shallow aquifer as the screen of well ERT-24M.

Sampling for monitored natural attenuation began in 2004. Results of the monitored natural attenuation sampling indicate that no contaminated water has reached the Coraopolis well field across the Back Channel.

NLC performed maintenance activities and stabilized slopes along the Ohio River Back Channel near monitoring well DM-24D and other wells in June 2004. Contractors placed 1,400 tons of large riprap along approximately 90 linear feet of shoreline to prevent bank erosion and protect the monitoring wells.

The Site achieved construction completion status when the Preliminary Close Out Report (PCOR) was signed on September 22, 1999.

Institutional Controls

The 1996 OU1 ROD called for implementation of institutional controls to prohibit residential development of the Site, to prohibit any use incompatible with the multi-layer cap and to prohibit the use of groundwater at the Site.

The 1998 OU3 ROD called for implementation of institutional controls to prohibit groundwater use for residential purposes and posting of signage warning people not to eat bottom-feeding fish caught in the area. The PRP installed 16 signs at approximately 300-foot intervals along the Ohio River Main Channel and Back Channel shorelines. In addition, the PRP installed 39 signs to deter visitors from accessing the slopes and riverbanks, as these areas did not receive additional fill placement or covering.

The current status of institutional controls for the Ohio River Park Superfund Site is contained in Table 4, and the deed and institutional control information pertaining to the Site is listed in Table 5.

In 2002, the PRP also recorded a restrictive covenant with the Allegheny County Recorder of Deeds to:

- Prohibit residential development of the Site.
- Prohibit any use incompatible with a multi-layer cap.
- Prohibit the use of ground water from the Site.

The Site's 2002 restrictive covenant prohibits the use of on-site ground water. RMU currently uses only municipal water supplies for irrigation and facility use.

TABLE 4 - SUMMARY OF PLANNED AND/OR IMPLEMENTED ICs					
Media or areas to be addressed by Institutional Controls	**ICs Needed**	**ICs Called for in the Decision Documents**	**Impacted Parcel(s)**	**IC Objective**	**Title of IC Instrument Implemented and Date (or planned)**
OU1; Soil and Land Surface/Groundwater	Yes	Yes (1996 ROD)	Unified Parcel 1	1) Prohibit residential development; 2) Prohibit land use incompatible with multi-layer cap; and 3) Prohibit groundwater use	2002 Restrictive Covenant
OU3; Groundwater/Fish Tissue	Yes	Yes (1998 ROD)	Unified Parcel 1; Unified Parcel 2	1) Prohibit groundwater use for residential purposes; and 2) Warn against consumption of potentially contaminated fish	2002 Restrictive Covenant

TABLE 5 - DEED DOCUMENTS FROM ALLEGHENY COUNTY RECORDER OF DEEDS				
Date	**Type of Document**	**Description**	**Book #**	**Page #**
8/11/1998	Deed	Transfer of property from NLC to Allegheny County for construction of new Coraopolis Bridge	10269	473
9/6/2002	Corrective Deed and Restrictive Covenant	Clarifies property descriptions for Parcel 1 and Parcel 2, includes notification of NPL listing and records institutional controls for the Site	11452	377
8/29/2003	Special Warranty Deed	Transfer of property from NLC to RMU and includes references to 2002 restrictive covenant requirements	11766	418
9/3/2004	Deed	Transfer of property from NLC to RMU as a charitable contribution and includes references to 2002 Restrictive Covenant requirements	12182	254
9/7/2004	Deed	Transfer of property from NLC to RMU	12184	246

Operation & Maintenance (O&M) and Groundwater Monitoring

NLC is responsible for groundwater monitoring at the Site. O&M activities are performed jointly by NLC and RMU in accordance with the approved Operations and Maintenance Plan, Revision 2 (April 2008), prepared by

URS Corporation. O&M activities include semi-annual inspections of post-construction care activities such as: erosion inspection and damage repair, tar seep reconnaissance, multi-layer cap systems and erosion cap systems maintenance, storm water management system maintenance, groundwater monitoring well maintenance, and passive gas collection and venting system maintenance. Repair or maintenance activities are conducted as warranted based on site conditions.

AECOM has been retained by NLC to conduct the O&M activities and groundwater monitoring for the Site. AECOM also provides engineering oversight and support. RMU uses in-house personnel and several contractors to address their O&M areas of responsibility which include: employee training, security devices (fencing and warning signs), and the multi-layer cap and erosion cap system. AECOM prepares the annual monitoring report for the Site, which is provided to EPA and PADEP.

Groundwater Monitoring

The groundwater monitoring program is specified in the EPA approved Long-Term Site Environmental Monitoring Plan, Revision 2 (March 2008), prepared by URS Corporation. The current long-term monitoring program for groundwater quality includes sampling at seven monitoring wells that are categorized as conventional or BarCad wells (URS-24S, DM-24D, ERT-6M, ERT-27S, DM-59, the Sentinel Well and DM-57). See Table 6. BarCad wells are used to sample groundwater from the aquifer below the Ohio River Back Channel. There are three conventional wells along the Back Channel shoreline (ERT-27S, DM-24D and URS-24S) and two BarCad wells (ERT-6M and DM-59) in the Back Channel. Sampling of BarCad well DM-59 is being performed at EPA's request for informational purposes only and not as a point of compliance. The sentinel well is located on the Coraopolis side of the Back Channel, across from the western end of Neville Island.

TABLE 6 – LONG-TERM MONITORING PROGRAM SUMMARY FOR NON-FYR YEARS

Well Type	Well	Sampling Frequency	Monitoring Parameters		
			VOCs	SVOCs	Ground Water Elevation
Conventional	URS-24S DM-24D	Semi-annually	X		X
	ERT-27S		X	X	X
	Sentinel well	Quarterly	X		X
BarCad	DM-57	Quarterly	X		
	ERT-6M DM-59	Semi-annually	X		

Beginning in 2012, and every five years thereafter (i.e. in year 2017, 2022, 2027, etc.), in addition to samples for VOCs and SVOCs, metals are sampled at the seven monitoring wells and natural attenuation parameters (NAPs) are monitored at DM-24D, DM-57, ERT-6M, ERT-27S, DM-59, and URS-24S in a single quarter to provide EPA with supplemental information for use when conducting FYRs. URS-24S, ERT-27S, and DM-59 are also sampled quarterly for VOCs beginning in 2012 and every five years thereafter. ERT-27S is also sampled quarterly for SVOCs. Table 7 provides a summary of this monitoring program. This groundwater monitoring program will continue until NLC is notified that no further groundwater quality monitoring is required or until this program is modified by EPA.

TABLE 7 -LONG-TERM MONITORING PROGRAM SUMMARY FOR 2012 AND EVERY FIVE YEARS THEREAFTER

Well Type	Well	Sampling Frequency	Monitoring Parameters				
			VOCs	SVOCs	Metals*	Natural Attenuation Parameters**	Ground Water Elevation***
Conventional	URS-24S	Quarterly	X		X	X	X
	ERT-27S	Quarterly	X	X	X	X	X
	DM-24D	Semi-annually	X		X	X	X
	Sentinel well	Quarterly	X		X		X
	URS-24S ERT-27S ERT-46S DM-26D DM-58M ERT-32S DM-58S	Three Quarters					X
BarCad	DM-57 DM-59	Quarterly	X		X	X	
	ERT-6M	Semi-annually	X		X	X	

*: Metals parameters are arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver. One quarter only.
**: Natural attenuation parameters are dissolved oxygen, carbon dioxide, sulfate, pH, iron (total, dissolved and ferrous), manganese (total and dissolved), specific conductance, alkalinity and temperature. One quarter only.
***: Three quarters only.

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/outcomes of those recommendations.

Protectiveness Determination/Statements from the 2013 FYR

OU #	Protectiveness Determination	Protectiveness Statement
OU1	Protective	The remedy for OU1 is protective of human health and the environment, and exposure pathways that could result in unacceptable risks are being controlled. Buried waste and contaminated soil are contained beneath a multi-layer cap and covered with up to 12 feet of additional clean soil fill. The surface of the site property has been extensively redeveloped with buildings, paved parking areas and carefully maintained landscaping and vegetative cover. Institutional controls prohibit residential land uses and digging in site soils without prior approval. There are no current potential exposure pathways. Groundwater monitoring data indicate that no additional contamination is migrating from soil to groundwater.

Protectiveness Determination/Statements from the 2013 FYR		
OU #	**Protectiveness Determination**	**Protectiveness Statement**
OU2	Protective	The remedy for OU2 is protective of human health and the environment. Soil contaminant concentrations were shown to be within the acceptable risk range in the 1992 OU2 Remedial Investigation/Feasibility Study, and EPA selected a No Action remedy. The approximately 1-acre OU2 area has been redeveloped with footers and an approach roadway for the Coraopolis Bridge. The exposure assumptions used in the selection of a No Action remedy remain valid and no exposure pathways that could result in unacceptable risks were identified at the time of the ROD or during this FYR period.
OU3	Short-term Protective	The remedy for OU3 currently protects human health and the environment in the short term, because exposure pathways that could result in unacceptable risks are being controlled. EPA selected a monitored natural attenuation remedy for contaminated site groundwater. Monitoring data indicate that groundwater contamination has been largely contained on the site property during this FYR period. Although ground water cleanup goals have not yet been achieved, natural attenuation is progressing at a reasonable rate, as anticipated. Institutional controls are in place prohibiting drilling and use of ground water at the Site. EPA revisited the vapor intrusion assessment performed as part of the 2008 FYR. The 2008 assumptions of the vapor intrusion assessment remain valid and the Site does not pose a vapor intrusion risk. No current potential exposure pathways exist. However, in order for the remedy to be considered protective in the long term, a cumulative risk assessment is needed once cleanup goals are achieved.

Status of Recommendations from the 2013 FYR					
OU #	**Issue**	**Recommendations**	**Current Status**	**Current Implementation Status Description**	**Completion Date (if applicable)**
OU3	The toxicity criteria for 2,4,6-TCP has changed since the signing of the 1998 OU3 ROD and only one well, ERT-27S, is routinely sampled for this COC.	Continue to monitor 2,4,6-TCP in well ERT-27S and perform confirmatory sampling at well URS-24S (the most recent well to have met 2,4,6-TCP cleanup goals) to ensure there are no potential issues related to the current toxicity criteria. Once cleanup goals are achieved, perform cumulative risk assessment to evaluate need for further remedial action.	Completed	Groundwater samples from URS-24S were analyzed for SVOCs twice in 2013 for the presence of 2,4,6-TCP. TCP was detected at a concentration below the lab reporting limit in 2nd/2013 and not detected in 4th/2013. These results support EPA's prior decision to stop monitoring for TCP at well URS-24S.	2/18/2014

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was placed in the *Allegheny County Times* on November 17, 2017 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 online at https://www.epa.gov/superfund/search-superfund-five-year-reviews and at the following information repositories:

EPA Administrative Records Room,
Attention: Administrative Coordinator
1650 Arch Street
Philadelphia, PA
(215) 814-3157
Hours: Monday through Friday, 8:00 am to 4:30 pm;
by appointment only.

Neville Township Municipal Building
5050 Grand Ave
Pittsburgh, PA 15225
Phone: (412) 264-1977

During the FYR process, EPA met with Timothy Kirsch of Robert Morris University (RMU), Marian Dietrich and Joseph Goberni of NLC, Mark Holsing of AECOM, and Annette Palah, a PADEP Project Officer.

Annette Paluh of PADEP commented that the Site monitoring has been performed according to proposed schedules and is satisfied with the continued level of involvement and interaction with EPA and RMU. Timothy Kirsch expressed that interest within the community remains low, and community members are pleased with the redevelopment and current Site use that benefits the community. He gave a brief tour of the facility and explained the current activities, concluding that there have been no issues on Site. Marian Dietrich of NLC commented that RMU has done a great job with the Site and the community is pleased with the redevelopment of the property and the current Site use.

Document Review

This FYR included a review of relevant documents including the 1993, 1996, and 1998 RODs, the 2013 Five-Year Review Report, and the Annual Monitoring and O&M Reports for the Site. A list of documents reviewed is included at the end of this Report.

Data Review

Data from the previous Five-Year Review was reviewed along with the annual monitoring and O&M reports provided by NLC. The data review discussion is divided into the following sections: Groundwater Monitoring and Monitored Natural Attenuation.

Groundwater Monitoring

AECOM, on behalf of NLC, sampled groundwater quarterly from 2013 through 2017 in accordance with the Long-Term Site Environmental Monitoring Plan, Revision 2 (March 2008). The laboratory program for 2013-2017 included lab analysis for VOCs, SVOCs, metals, and NAPs.

Benzene and 2,4,6-TCP have groundwater cleanup goals set forth in the OU3 ROD of 5 µg/L and 61 µg/L, respectively. Groundwater monitoring data for benzene in the years 2013 through 2017 is presented in Table 8. Figure 4 shows the well locations on a map with benzene and 2,4,6-TCP results for 2013 through 2017.

TABLE 8 – BENZENE CONCENTRATIONS IN WELLS (µg/L), 2013-2017

	Conventional Wells				*BarCad Wells*		
Sampling Date	**ERT-27S**	**URS-24S**	**DM-24D**	**Sentinel Well**	**ERT-6M**	**DM-57**	**DM-59**
Mar 2013	**150**	**4,200**	--	ND	--	ND	**1,000**
May 2013	**120**	**5,900**	ND	ND	ND	ND	**1,000**
Aug 2013	**130**	**7,200**	--	ND	--	ND	**1,100**
Oct 2013	**180**	**24,000**	ND	3.7 J/ND	ND	ND	**800**
Apr 2014	**88**	**5,800**	--	ND	--	ND	**530**
Jun 2014	**84**	**28,000**	ND	ND	ND	ND	**1,000**
Aug 2014	**250**	**21,000**	--	ND	--	ND	**1,900**
Nov 2014	**85**	**24,000**	ND	ND	ND	ND	**650**
Mar 2015	**88**	**2,000**	--	ND	--	ND	**1,200**
Jun 2015	**120**	**55,000**	ND	ND	ND	ND	**510**
Aug 2015	**100**	**30,000**	--	ND	--	ND	**1,200**
Oct 2015	**100**	**15,000**	ND	ND	ND	ND	**650**
Mar 2016	**58**	**570**	--	ND	--	ND	**340**
Jun 2016	**91**	**8,700**	ND	ND	ND	ND	**820**
Aug 2016	**94**	**11,000**	--	ND	--	ND	**300**
Nov 2016	**72**	**6,700**	ND	ND	ND	ND	**190**
Mar 2017	**57**	**3,300**	--	ND	--	ND	**270**
May 2017	**38**	**12,000**	ND	ND	ND	ND	**790**
Sep 2017	**58**	**28,000**	--	ND	--	ND	**800**
Dec 2017	**43**	**4,000**	ND	ND	ND	ND	4.8J

--: Not analyzed this quarter.
Bold Value: Detected concentration exceeds benzene cleanup goal of 5 µg/L.
J: Value estimated below practical quantitation level.
ND: Concentration not detected.

During the current FYR period, benzene was not detected in any sampling event at wells DM-24D, ERT-6M and DM-57. There was one detection of benzene in the sentinel well (located at the far shore of the Ohio River Back Channel) between 2013 and 2017. The October 2013 sampling event found benzene at a concentration below the MCL cleanup goal. However, no other VOCs were detected in this sample and the benzene detection was considered suspect. The sentinel well was immediately resampled to corroborate the October 2013 sampling event and benzene was found to be non-detect, and subsequent sampling events also were non-detect for benzene.

Benzene continues to exceed the MCL cleanup goal in monitoring wells ERT-27S, URS-24S, and DM-59. Figure 5 illustrates the benzene groundwater plume. Benzene concentrations in ERT-27S continued to show a gradual decline during this FYR period with concentrations falling into the double digits during this FYR period. Monitoring well URS-24S continues to exhibit the highest benzene concentrations of all sampled wells, roughly four orders of magnitude greater than the MCL cleanup goal. Benzene concentrations in this well varied from a minimum of 570 µg/L in March 2006 to a maximum of 55,000 µg/L in June 2015. Concentrations seem to fluctuate seasonally with lower concentrations detected in the first half of the year and higher concentrations in the second half. These fluctuations are consistent with those observed over the last two FYR periods. The generally high benzene concentrations indicate that URS-24S is likely located in or very near a contaminant source area. The concentrations of benzene in DM-59 are tending to decline and the average concentration between 2013 and 2017 was 825 µg/L. Benzene was not detected in DM-57, ERT-6M, DM-24D, or the Sentinel Well during any of the quarters in this FYR period, demonstrating that there is not, nor is there expected to be, an impact from the Site on the Coraopolis water supply.

Only one well (ERT-27S) is routinely sampled for 2,4,6-TCP. During the current FYR period, concentrations of this SVOC fluctuated from a high of 690 µg/L in May 2013 to non-detect. Well URS-24S was sampled twice in 2013 per the recommendation from the 2013 FYR. 2,4,6-TCP was detected at a concentration below the lab reporting limit in May 2013 and non-detect in October 2013. Duplicate samples were both non-detect. These results supported EPA's prior decision to stop monitoring for 2,4,6-TCP at well URS-24S. Groundwater monitoring data for 2,4,6-TCP is presented in Table 9. 2,4,6-TCP concentrations in ERT-27S declined considerably from the previous FYR period. 2,4,6-TCP has largely been non-detect in ERT-27S since October 2013.

TABLE 9 – 2,4,6 -TCP CONCENTRATIONS IN WELLS (µg/L), 2013-2017

Sampling Date	ERT-27S	URS-24S*	Sampling Date	ERT-27S	URS-24S*
March 2013	**220**		August 2015	**190**	
May 2013	**690**	1.8 J/ND	October 2015	ND	
August 2013	2.2 J		March 2016	ND	
October 2013	ND	ND/ND	June 2016	10	
April 2014	**92**		August 2016	ND	
June 2014	**120**		November 2016	ND	
August 2014	ND		March 2017	ND	
November 2014	ND		May 2017	ND	
March 2015	ND		September 2017	ND	
June 2015	ND		December 2017	ND	

*: URS-24S is not routinely sampled in the long-term monitoring program
Bold Value: Detected concentration exceeds 2,4,6-TCP cleanup goal of 61 µg/L.
J: Value estimated below the practical quantitation level.
ND: Concentration not detected.

In addition to the detections of indicator COCs benzene and 2,4,6-TCP, sampling events also detected concentrations of other organic compounds above practical quantitation levels. These compounds included 2,4-dichlorophenol, 2,4-dimethylphenol, and naphthalene in monitoring well ERT-27S, and 2,4-dichlorophenol, methylene chloride, and phenol in monitoring well URS-24S. The concentrations of these compounds were compared to EPA's Risk-Based Screening Levels (RSLs) for tap water. Naphthalene was the only compound found to consistently exceed the RSL during this FYR cycle.

Groundwater elevation data was also monitored during the groundwater sampling events in 2013 through 2017. Based on the elevation data, groundwater flow in the shallow zone is radially outward from the central portions of the Site toward the main and back channels of the Ohio River. This pattern is seen across seasonal variations and is consistent with previous documented conditions.

Monitored Natural Attenuation

The 1998 OU3 ROD called for a statistical evaluation every three years (or at a frequency to be determined by EPA) to assess the progress of monitored natural attenuation toward achieving groundwater cleanup goals within a reasonable timeframe. EPA performed the last review in October 2012 as part of the previous FYR. The review demonstrated that natural attenuation processes were reducing benzene concentrations at an acceptable rate in monitoring well ERT-27S to achieve the MCL by 2034, and that the rate of decline of benzene in monitoring well URS-24S was slower and would not achieve the MCL by 2034. EPA noted in the 2013 FYR that the slower rate of attenuation in monitoring well URS-24S would continue to be monitored and did not pose a concern to EPA at that time.

In December 2017, EPA Region 3 performed an assessment of monitored natural attenuation for benzene in ERT-27S and URS-24S by updating the October 2012 statistical analysis with groundwater data from 2013-2016. EPA's Office of Research and Development (ORD) in Ada, Oklahoma conducted a QA/QC evaluation of the Region 3's statistical calculations and completed an independent evaluation of the Site data using the EPA statistical software package ProUCL. ORD concluded that Region 3's assessment was correct, under the assumption that using linear regression on log-transformed data was appropriate. ORD's independent evaluation using ProUCL software indicates that ERT-27S data are lognormally distributed and URS-24S data are not lognormally distributed.

ERT-27S
The natural attenuation results show that the rate of decline of benzene concentrations in well ERT-27S is lognormal and continues to progress towards achieving the MCL by 2034 (Figure 6). The ProUCL analysis conducted by ORD noted that there is a clear decreasing trend in benzene concentrations, though the data from the last few years seem to indicate a noticeably slower decreasing trend. More data points are needed to predict future benzene concentrations.

URS-24S
The rate of decline of benzene concentrations in well URS-24S has slightly improved since the October 2012 assessment and continues to be much slower than well ERT-27S. The current projections show that the current rate is not adequate to achieve the MCL by 2034 (Figure 7). The high and relatively consistent variability of the benzene concentration data indicate that there is likely a seasonal or some other cyclical effect happening. The high benzene concentrations indicate that URS-24S is likely located in or very near a contaminant source area. The ProUCL tests indicate that URS-24S data are not lognormally distributed. The ProUCL trend analyses for URS-24S indicates a decreasing trend similar to Figure 7, but with possible attainment of remedial goals in a significantly longer timeframe than in ERT-27S. However, ORD indicated that caution should be exercised when making Site decisions based on the simple extrapolation approach used to predict the future concentration values due to the very high uncertainty involved.

As contained in the selected remedy of the OU3 ROD, EPA will continue to perform a statistical evaluation of the monitoring data for the Site and determine the rate at which natural attenuation processes are reducing contaminant levels at the Site. If EPA determines that (1) the natural attenuation processes are not reducing contaminant concentrations at a rate that will achieve the cleanup levels in a reasonable time period (approximately 30 years) and (2) the contaminant levels present pose an unacceptable risk to human health and the environment, then EPA would require construction and operation of a ground water extraction and treatment system. At this time, these two conditions have not been met to necessitate a remedy change.

Site Inspection

The inspection of the Site was conducted on September 21, 2017. In attendance from the EPA were Frank Klanchar (RPM) and Amanda Miles (CIC), PADEP Project Officer Annette Paluh, Marian Dietrich and Joe Goberni of NLC, Tim Kirsch (RMU), and Mark Holsing (AECOM). A tour of the Site was conducted to inspect the areas where the multi-layer caps, erosion cap, and slurry wall were constructed, and the condition of stormwater runoff and erosion control features, monitoring wells, fencing, and signage along the perimeter of the Site. Two areas of slope erosion were observed along the back channel of the Ohio River in areas not previously disturbed by Site remediation. No wastes were observed in these areas. A restoration plan was developed by NLC to address these areas and this repair work was completed in October and November 2017. These slopes were repaired by vegetation clearing followed by placement of geotextile and rip-rap stone revetments over the affected areas. Otherwise, no issues with the physical condition of the features associated with the remedial action were observed. A new boathouse was constructed on the one-acre OU2 area of the Site by RMU in 2016 and is used by RMU to store and maintain their rowing boats and equipment. The structure was built on an existing concrete slab where additional fill was brought in to bring the building up to proper grade for drainage and a membrane barrier was installed under the slab of the new building to mitigate any potential for vapor intrusion. The Island Sports Center complex is impeccably maintained by RMU.

V. TECHNICAL ASSESSMENT

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

Yes. The review of documents, ARARs, risk assumptions, and the results of the Site inspection indicate the remedy is functioning as intended by the March 1993, September 1996, and September 1998 RODs.

Soil and Buried Waste (OU1)
The OU1 remedy has been fully implemented and is functioning as intended by the decision documents. Placement of a multi-layer cap over buried wastes and contaminated soils, and placement of an additional cap to prevent erosion over the remainder of the Site prevents exposure. Construction of site infrastructure for Island Sports Center was closely coordinated with the remedy to make sure the multi-layer cap would not be compromised by any settlement. In addition, extra clean fill above the quantity required by the remedy was placed over the entire Site to allow placement of footers and running of utility and sewer lines without coming near the surface of the cap. RMU expanded the Island Sports Center facilities and continues to maintain the property as a public resource as well as an athletic facility for the University. Due to the placement of up to 12 feet of clean fill over top of the cap and the fact that the Site surface is covered by infrastructure, paved parking areas or well-maintained vegetative cover, there is no potential for exposure to waste left in place at the Site.

Coraopolis Bridge Soil (OU2)
The 1993 ROD selected a "No Action" remedy for soil at the Bridge Portion of the Site. The one-acre OU2 area houses the footers for the Coraopolis Bridge and Grant Avenue, RMU boathouse, paved parking area, and landscaping. There is no potential for exposure at OU2.

Site-wide Groundwater (OU3)
The OU3 remedy is well underway and functioning as intended by the decision documents. Groundwater is being monitored in accordance with the 2008 Long-Term Site Environmental Monitoring Plan, and institutional controls are in place and effective at prohibiting groundwater use and protecting the remedy. Groundwater data demonstrates that Site contamination is restricted to the shallow portion of the aquifer in the area under the largest multi-layer cap and the area immediately southwest of the cap near the Ohio River back channel.

Monitoring results for the current FYR period are non-detect for site-related contamination in monitoring wells DM-24D, DM-57, and ERT-6M (wells located on the southern shoreline of the island and in the Back Channel of the Ohio River just downgradient of the southern shoreline), and for the sentinel well (located on the far side of the Back Channel before the Coraopolis well field). Benzene continues to exceed the MCL cleanup goal of 5 µg/L in monitoring wells ERT-27S, URS-24S, and DM-59.

EPA performed a statistical analysis of the progress of natural attenuation of benzene in monitoring wells ERT-27S and URS-24S in December 2017. The results indicate that contamination is continuing to progress towards achieving the MCL by 2034 in well ERT-27S. The rate of decline in well URS-24S is not progressing as rapidly, however it is possible that MCLs could be attained in this well in about two decades or so. Further monitoring and analysis of data is necessary to confirm predictions. Benzene concentrations in well URS-24S continue to show a declining trend and do not pose an unacceptable risk to human health since appropriate institutional controls are in place. Thus, the conditions in the OU3 ROD that would necessitate a remedy change from monitored natural attenuation to groundwater extraction and treatment at the Site are not met. EPA will continue to perform a statistical evaluation of the monitoring data for the Site and determine the rate at which natural attenuation processes are reducing contaminant levels at the Site

Only one well, ERT-27S, is routinely sampled for 2,4,6-TCP. Monitoring results for the current FYR period show this SVOC was non-detect in 13 of the 20 sampling rounds, with a consistent pattern of non-detections since October 2013.

The institutional controls required in the 1998 OU3 ROD have been implemented in the 2002 restrictive covenant that prohibits groundwater use at the Site and RMU maintains signs around the shoreline of the site property warning against the consumption of fish. All water used by RMU at the Island Sports Center, including water for irrigation and the ice rinks, is obtained through the municipal water supply.

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

Yes. The RAOs used at the time of remedy selection are still valid. Implementation of the multi-layer cap and institutional controls described in the 1996 OU1 ROD has achieved the RAO to control future land use and apply engineered systems to maintain risks to on-site workers or visitors within or below an acceptable range. The 1996 OU1 ROD selected two indicator chemicals, benzo(a)anthracene and benzo(a)pyrene and established concentrations of 7,800 µg/kg and 780 µg/kg, respectively, as performance standards to determine the extent of the multi-layer cap. The toxicity criteria for these chemicals were updated based on the new IRIS Profile and the current RSLs for benzo(a)anthracene and benzo(a)pyrene are 1,100 mg/kg and 110 mg/kg, respectively. While these concentrations are more stringent, all areas of the Site are developed and covered by a multi-layer cap, erosion cap, buildings, or paving which eliminates exposure to soils.

Implementation of the erosion cap and riprap drainage systems described in the 1996 OU1 ROD, as well as placement of additional fill over the entire Site, has achieved the RAO to contain soils, prevent erosion of soil, and maintain stable land surfaces over the entirety of the Site. Implementation of the multi-layer cap and the installation of a slurry wall along the southern boundary of the cap area has achieved the RAO for buried waste to reduce mobility of contamination and to limit its effects on groundwater and soil.

EPA selected groundwater cleanup levels based on Safe Drinking Water Act MCLs and risk-based calculations. The MCL for benzene (5 µg/L) remains unchanged since the signing of the 1998 OU3 ROD. The cleanup goal of 61 µg/L for 2,4,6-TCP is based on the EPA Region 3 risk-based concentration for tap water representing a cancer risk of 10^{-5}. The 10^{-5} risk-based cleanup goal for 2,4,6-TCP has decreased to 41 µg/L; also since the signing of the 1998 OU3 ROD, an oral reference dose has become available and based on a non-cancer hazard index of 1.0, the non-cancer-based tap water value is 12 µg/L. Consequently, the non-cancer health-based RSL is more stringent than the 10^{-5} risk-based RSL of 41 µg/L. No MCL for 2,4,6-TCP was promulgated at the time of the signing of the 1998 OU3 ROD. Therefore, no ARAR was available and EPA selected the cleanup goal based on risk.

The cleanup goal for 2,4,6-TCP was re-evaluated by an EPA Region 3 toxicologist. Although the current non-cancer RSL is more stringent than the ROD cleanup goal or the current risk-based RSL, the remedy is still protective because exposure is prevented and the remaining well (ERT-27S) sampled for 2,4,6-TCP has been largely non-detect since October 2013.

EPA conducted a vapor intrusion assessment in 2008 and determined that vapor intrusion was not a concern at the Site. However, EPA revisited the potential for vapor intrusion at the Site during the FYR since a new structure was constructed in 2016. The new building (boathouse) was constructed on the one-acre OU2 area of the Site. The evaluation concluded that the potential for vapor intrusion is unlikely since the building is located more than 400 feet from the groundwater plume area and a membrane barrier was installed under the building slab prior to construction. No other structures have been constructed on the Site during the current FYR period that would warrant a vapor intrusion assessment.

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

No. There is no other information that calls into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

There were no issues identified at the Site during this Five-Year Review. As a result, there and no recommendations or follow-up actions.

VII. PROTECTIVNESS STATEMENT

Protectiveness Statement(s)	
Operable Unit:01	*Protectiveness Determination:* Protective
Protectiveness Statement: The remedy for OU1 is protective of human health and the environment and exposure pathways that could result in unacceptable risks are being controlled. Buried waste and contaminated soil are contained beneath a multi-layer cap and covered with up to 12 feet of additional clean soil fill. The surface of the Site property has been extensively redeveloped with buildings, athletic areas, paved parking areas, and impeccably maintained landscaping and vegetative cover. Institutional controls prohibit residential land uses and digging in Site soils without prior approval. There are no current exposure pathways. Groundwater monitoring data indicate that no additional contamination is migrating from soil to groundwater.	

Protectiveness Statement(s)	
Operable Unit:02	*Protectiveness Determination:* Protective
Protectiveness Statement: The 1993 ROD selected a "No Action" remedy for soil at the Bridge Portion of the Site. The one-acre OU2 area houses the footers for the Coraopolis Bridge and Grant Avenue, RMU boathouse, paved parking area, and landscaped areas.	

Protectiveness Statement(s)	
Operable Unit:03	*Protectiveness Determination:* Protective
Protectiveness Statement: The remedy for OU3 currently protects human health and the environment because exposure pathways that could result in unacceptable risks are being controlled. EPA selected a monitored natural attenuation remedy for contaminated Site groundwater. Monitoring data indicate that groundwater contamination is largely contained on the Site property during this FYR period. Although groundwater cleanup goals have not yet been achieved, natural attenuation is progressing at a reasonable rate, as anticipated. Institutional controls are in place prohibiting drilling and use of groundwater at the Site. No new structures have been constructed on the Site during the current FYR period that would warrant a vapor intrusion assessment. The 2008 assumptions of the vapor intrusion assessment remain valid and the Site does not pose a vapor intrusion risk. No current exposure pathways exist.	

Sitewide Protectiveness Statement
Protectiveness Determination: Protective
Protectiveness Statement: Because the remedial action for all operable units are protective, the Site's remedy is protective of human health and the environment.

Government Performance Results Act (GPRA) Measure Review

As part of this Five-Year Review, the GPRA Measures were reviewed. The GPRA Measures and their respective statuses are as follows:

Environmental Indicators
Human Exposure (HE) Survey Status: Current human exposure is controlled and protective remedy in place.
Groundwater Migration (GM) Status Survey: Contaminated groundwater migration under control.

Site-wide RAU
The Site was determined to be Site-Wide Ready for Anticipated Use (SWRAU) on June 27, 2008.

VIII. NEXT REVIEW

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

REFERENCE LIST

2017 Annual Monitoring Report; OU-1 and OU-3, Ohio River Park Superfund Site (AECOM), March 2018.

2016 Monitoring Report; OU-1 and OU-3, Ohio River Park Superfund Site (AECOM), February 2017.

2015 Monitoring Report; OU-1 and OU-3, Ohio River Park Superfund Site (AECOM), February 2016).

2014 Monitoring and O&M Report; OU-1 and OU-3, Ohio River Park Superfund Site (URS Corporation), February 2015.

2013 Monitoring and O&M Report; OU-1 and OU-3, Ohio River Park Superfund Site (URS Corporation), February 2014.

Comprehensive Five-Year Review Guidance, U.S. EPA, OSWER No. 9355.7-03B-P, June 2001.

Five Year Review, Ohio River Park Superfund Site (EPA), March 2013.

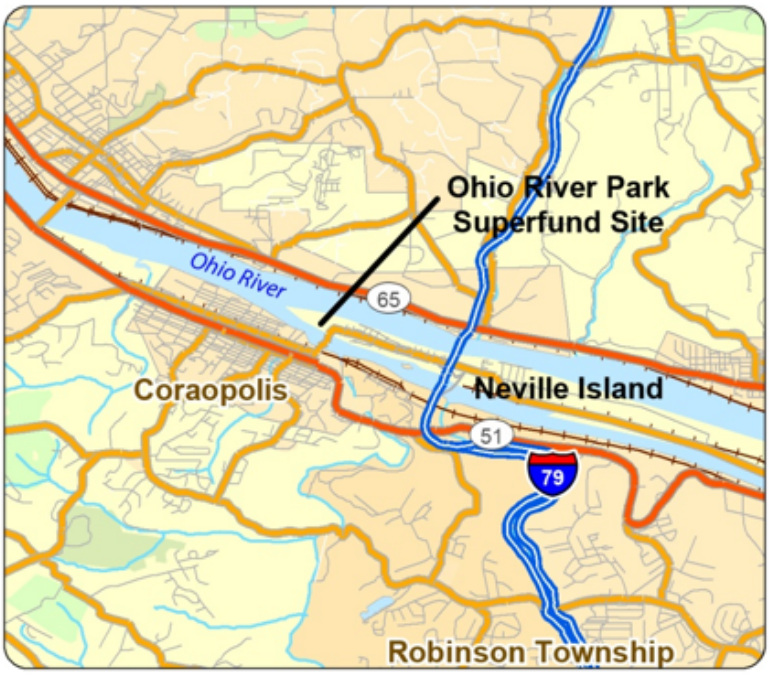
Long-Term Environmental Monitoring Plan – Revision II, Ohio River Park Site, Neville Township, Pennsylvania, (URS Corporation), March 2008

Record of Decision for OU2 (EPA), March 31, 1993.

Record of Decision for OU1 (EPA), September 27, 1996.

Record of Decision for OU3 (EPA), September 17, 1998.

Review of Statistical Calculations for the Ohio River Park Superfund Site. Memorandum prepared by David S. Burden, Ph.D., Director of the Groundwater Technical Support Center, EPA Office of Research and Development, Ada, OK. January 31, 2018.



0 250 500 1,000
Feet

NORTH

EPA United States Environmental Protection Agency	OHIO RIVER PARK SUPERFUND SITE NEVILLE ISLAND, ALLEGHENY COUNTY, PENNSYLVANIA		SITE LOCATION MAP		FIGURE: 1
	JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:

NORTH

0 250 500 1,000 Feet

1. Track & Field Area
2. Mini Golf Course
3. Golf Dome & Training Facility
4. Ice Rinks & Inline Skating Facilities (includes shops, clinics & eateries)
5. Coraopolis Bridge
6. RMU Boathouse (constr. 2016)

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OHIO RIVER PARK
SUPERFUND SITE
NEVILLE ISLAND, PENNSYLVANIA

DETAILED SITE FEATURES MAP

FIGURE: 2

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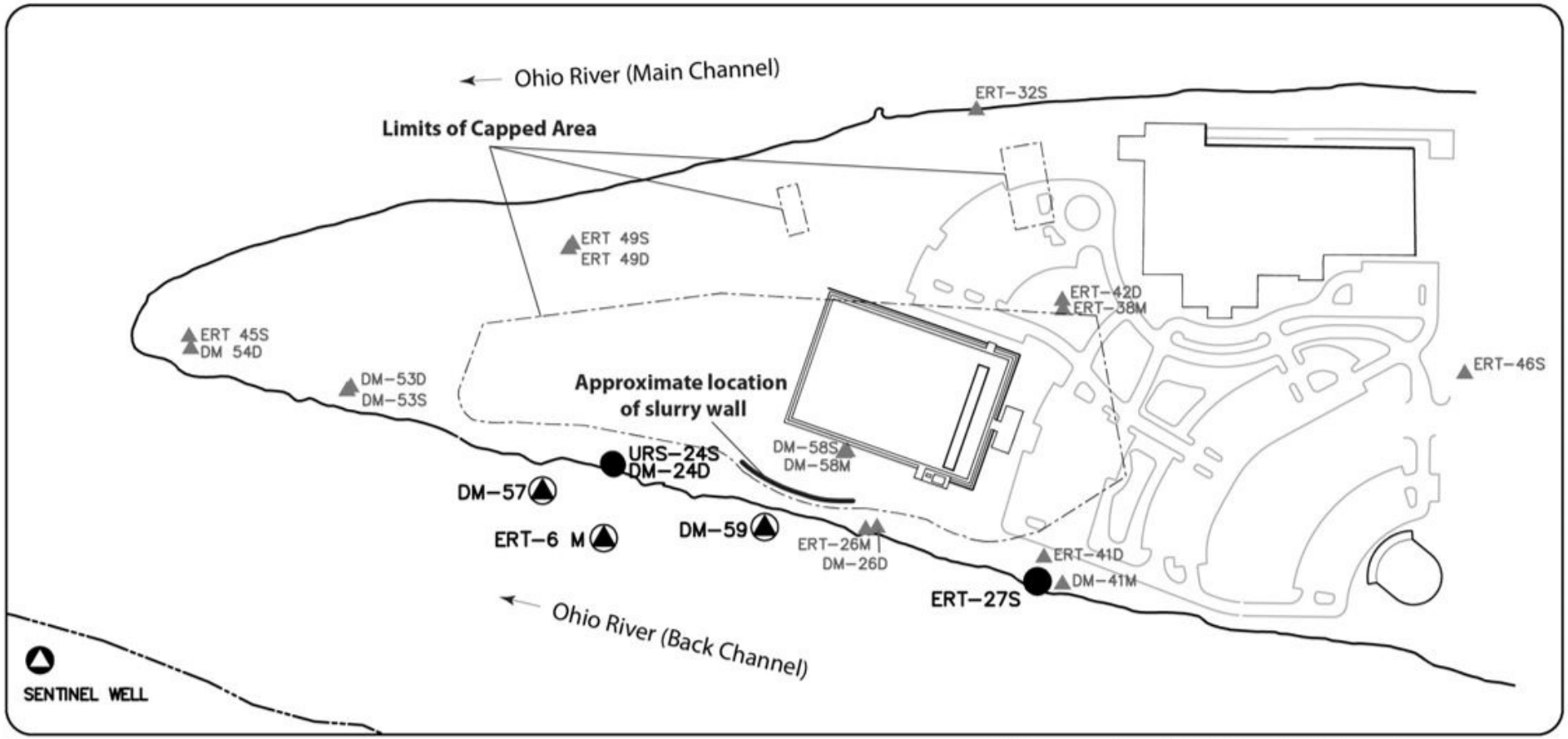

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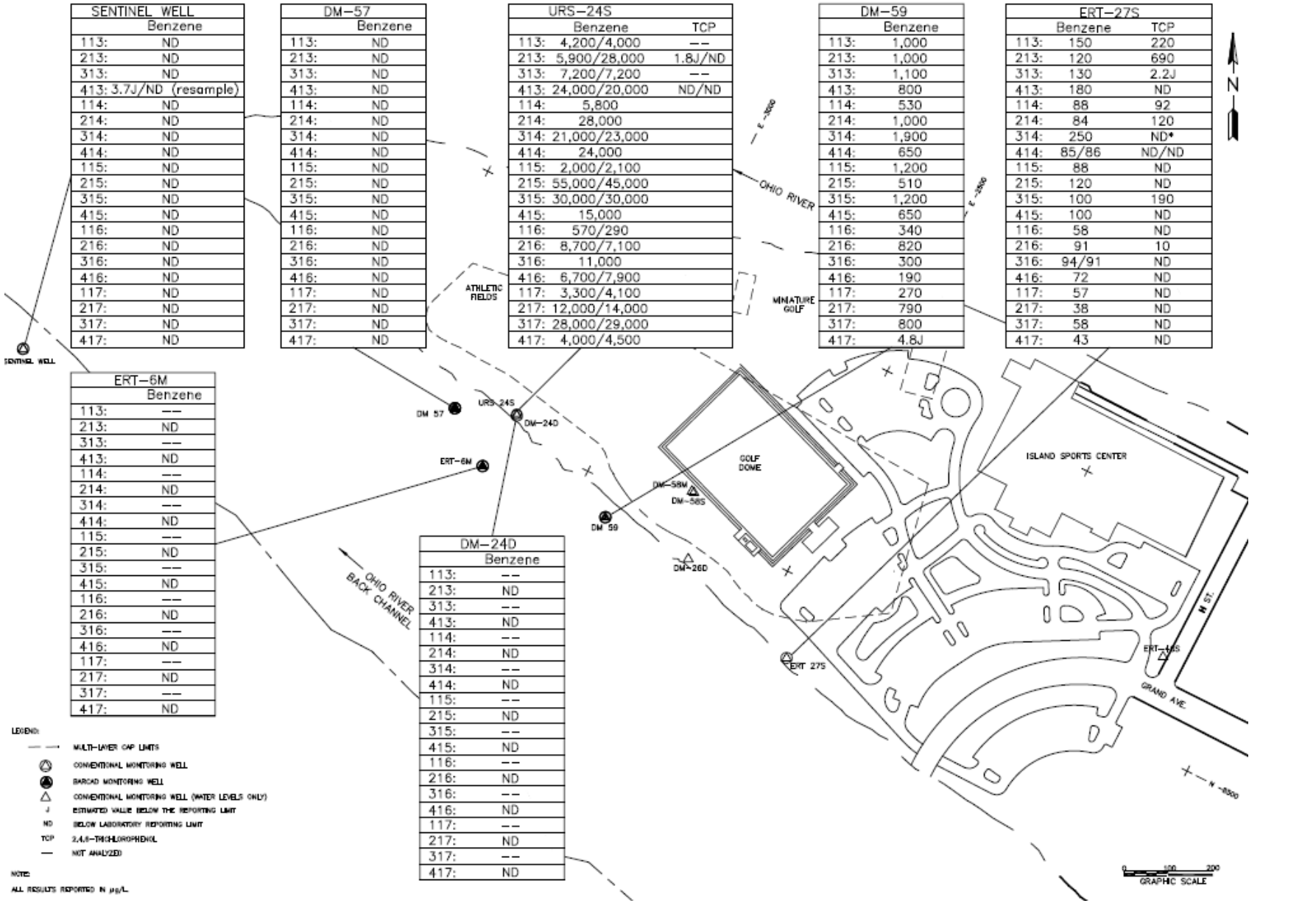
OHIO RIVER PARK
SUPERFUND SITE
NEVILLE ISLAND, PENNSYLVANIA

SITE REMEDIAL FEATURES MAP

FIGURE: 3

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:



SENTINEL WELL	Benzene
113:	ND
213:	ND
313:	ND
413:	3.7J/ND (resample)
114:	ND
214:	ND
314:	ND
414:	ND
115:	ND
215:	ND
315:	ND
415:	ND
116:	ND
216:	ND
316:	ND
416:	ND
117:	ND
217:	ND
317:	ND
417:	ND

DM-57	Benzene
113:	ND
213:	ND
313:	ND
413:	ND
114:	ND
214:	ND
314:	ND
414:	ND
115:	ND
215:	ND
315:	ND
415:	ND
116:	ND
216:	ND
316:	ND
416:	ND
117:	ND
217:	ND
317:	ND
417:	ND

URS-24S	Benzene	TCP
113:	4,200/4,000	--
213:	5,900/28,000	1.8J/ND
313:	7,200/7,200	--
413:	24,000/20,000	ND/ND
114:	5,800	
214:	28,000	
314:	21,000/23,000	
414:	24,000	
115:	2,000/2,100	
215:	55,000/45,000	
315:	30,000/30,000	
415:	15,000	
116:	570/290	
216:	8,700/7,100	
316:	11,000	
416:	6,700/7,900	
117:	3,300/4,100	
217:	12,000/14,000	
317:	28,000/29,000	
417:	4,000/4,500	

DM-59	Benzene
113:	1,000
213:	1,000
313:	1,100
413:	800
114:	530
214:	1,000
314:	1,900
414:	650
115:	1,200
215:	510
315:	1,200
415:	650
116:	340
216:	820
316:	300
416:	190
117:	270
217:	790
317:	800
417:	4.8J

ERT-27S	Benzene	TCP
113:	150	220
213:	120	690
313:	130	2.2J
413:	180	ND
114:	88	92
214:	84	120
314:	250	ND*
414:	85/86	ND/ND
115:	88	ND
215:	120	ND
315:	100	190
415:	100	ND
116:	58	ND
216:	91	10
316:	94/91	ND
416:	72	ND
117:	57	ND
217:	38	ND
317:	58	ND
417:	43	ND

ERT-6M	Benzene
113:	--
213:	ND
313:	--
413:	ND
114:	--
214:	ND
314:	--
414:	ND
115:	--
215:	ND
315:	--
415:	ND
116:	--
216:	ND
316:	--
416:	ND
117:	--
217:	ND
317:	--
417:	ND

DM-24D	Benzene
113:	--
213:	ND
313:	--
413:	ND
114:	--
214:	ND
314:	--
414:	ND
115:	--
215:	ND
315:	--
415:	ND
116:	--
216:	ND
316:	--
416:	ND
117:	--
217:	ND
317:	--
417:	ND

LEGEND:

- MULTI-LAYER CAP LIMITS
- CONVENTIONAL MONITORING WELL
- BARCAD MONITORING WELL
- CONVENTIONAL MONITORING WELL (WATER LEVELS ONLY)
- J: ESTIMATED VALUE BELOW THE REPORTING LIMIT
- ND: BELOW LABORATORY REPORTING LIMIT
- TCP: 2,4,6-TRICHLOROPHENOL
- --: NOT ANALYZED

NOTE:
ALL RESULTS REPORTED IN µg/L

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OHIO RIVER PARK
SUPERFUND SITE
NEVILLE ISLAND, PENNSYLVANIA

GROUNDWATER SAMPLING RESULTS BY WELL LOCATION, 2013-2017

FIGURE: 4

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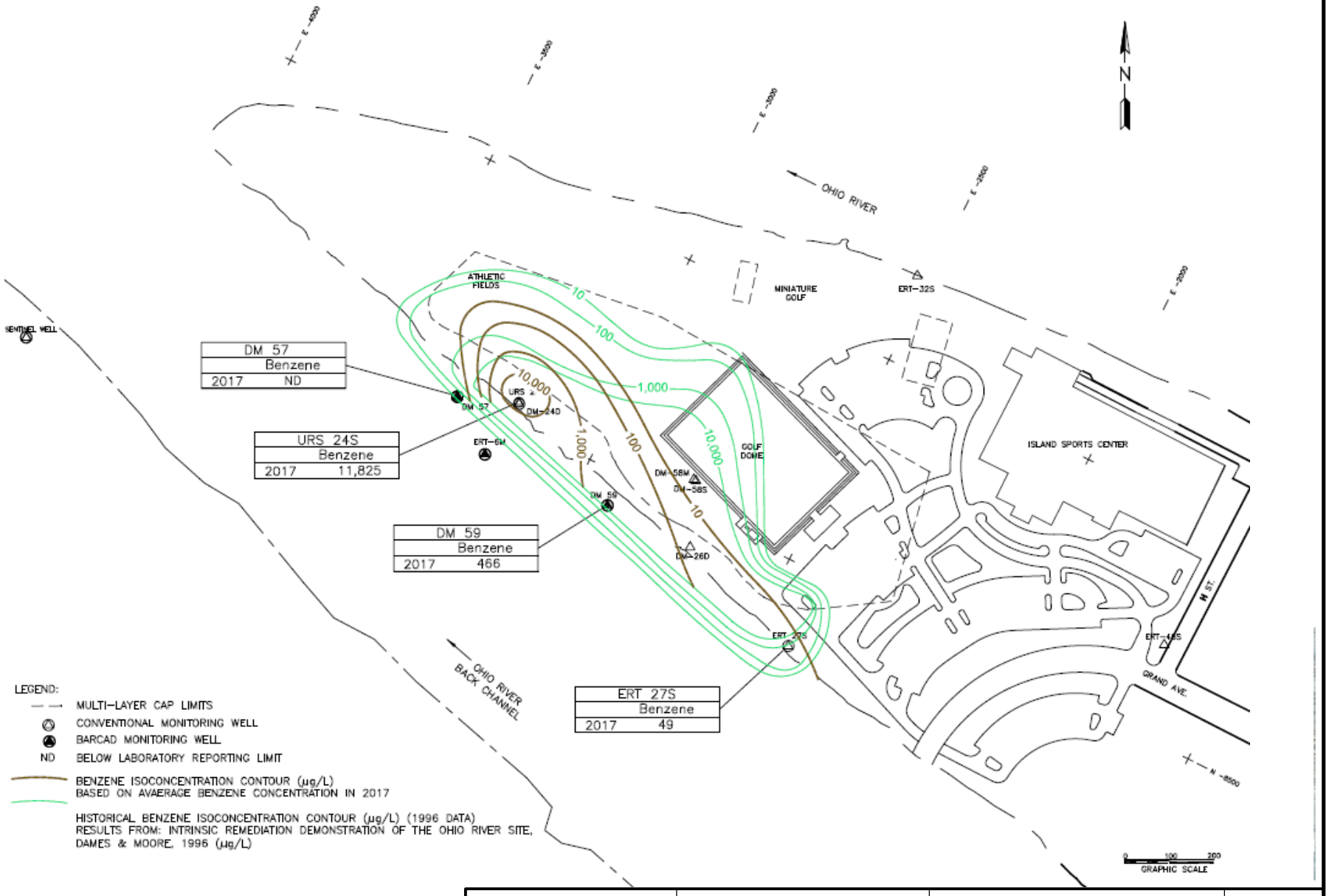

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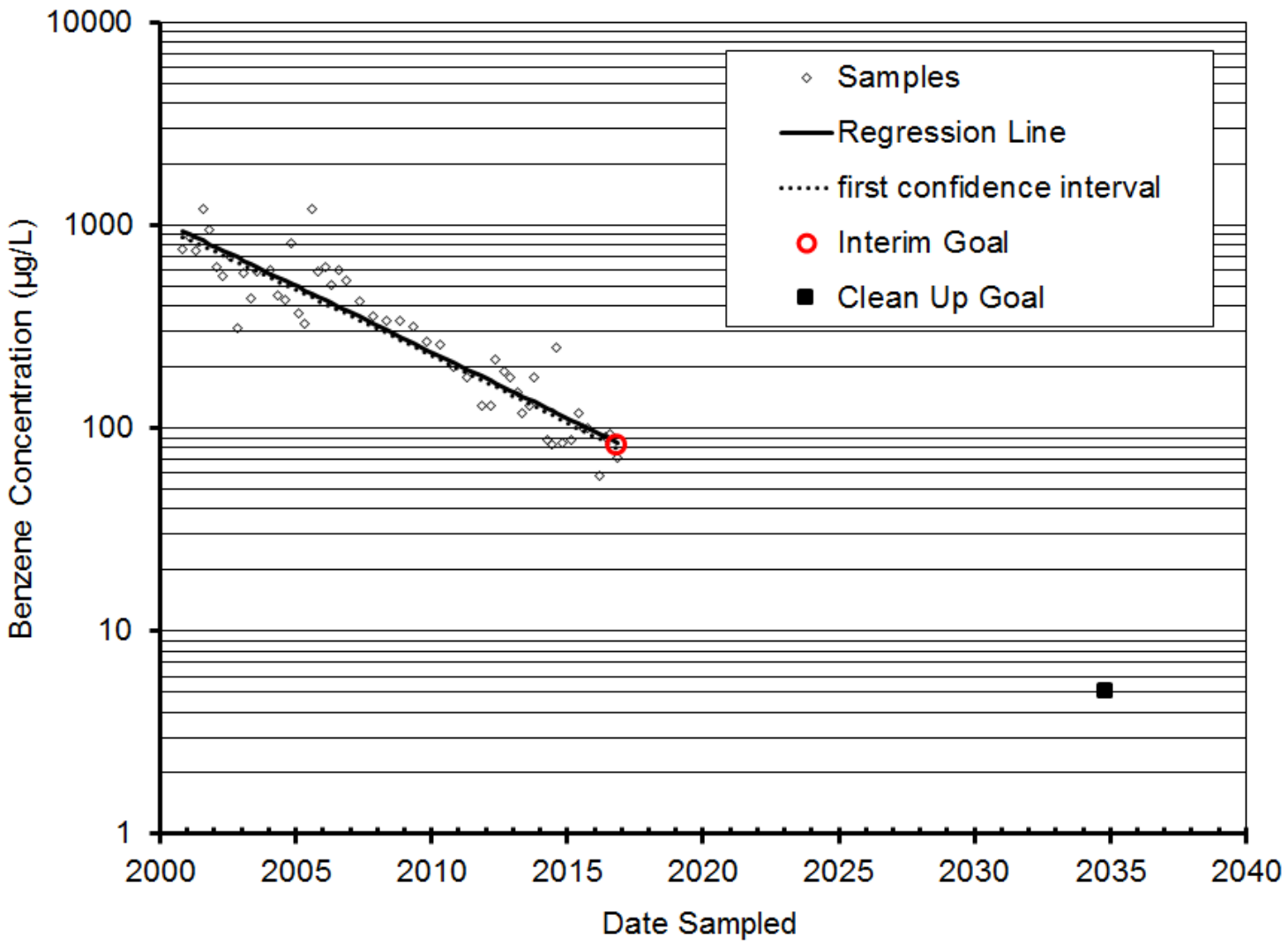
OHIO RIVER PARK
SUPERFUND SITE
NEVILLE ISLAND, PENNSYLVANIA

DISTRIBUTION OF DISSOLVED BENZENE IN SHALLOW ZONE (2017)

FIGURE: 5

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:



EPA United States Environmental Protection Agency

OHIO RIVER PARK
SUPERFUND SITE
NEVILLE ISLAND, PENNSYLVANIA

LINEAR REGRESSION OF BENZENE CONCENTRATIONS IN ERT-27S, 2000-2016

FIGURE: 6

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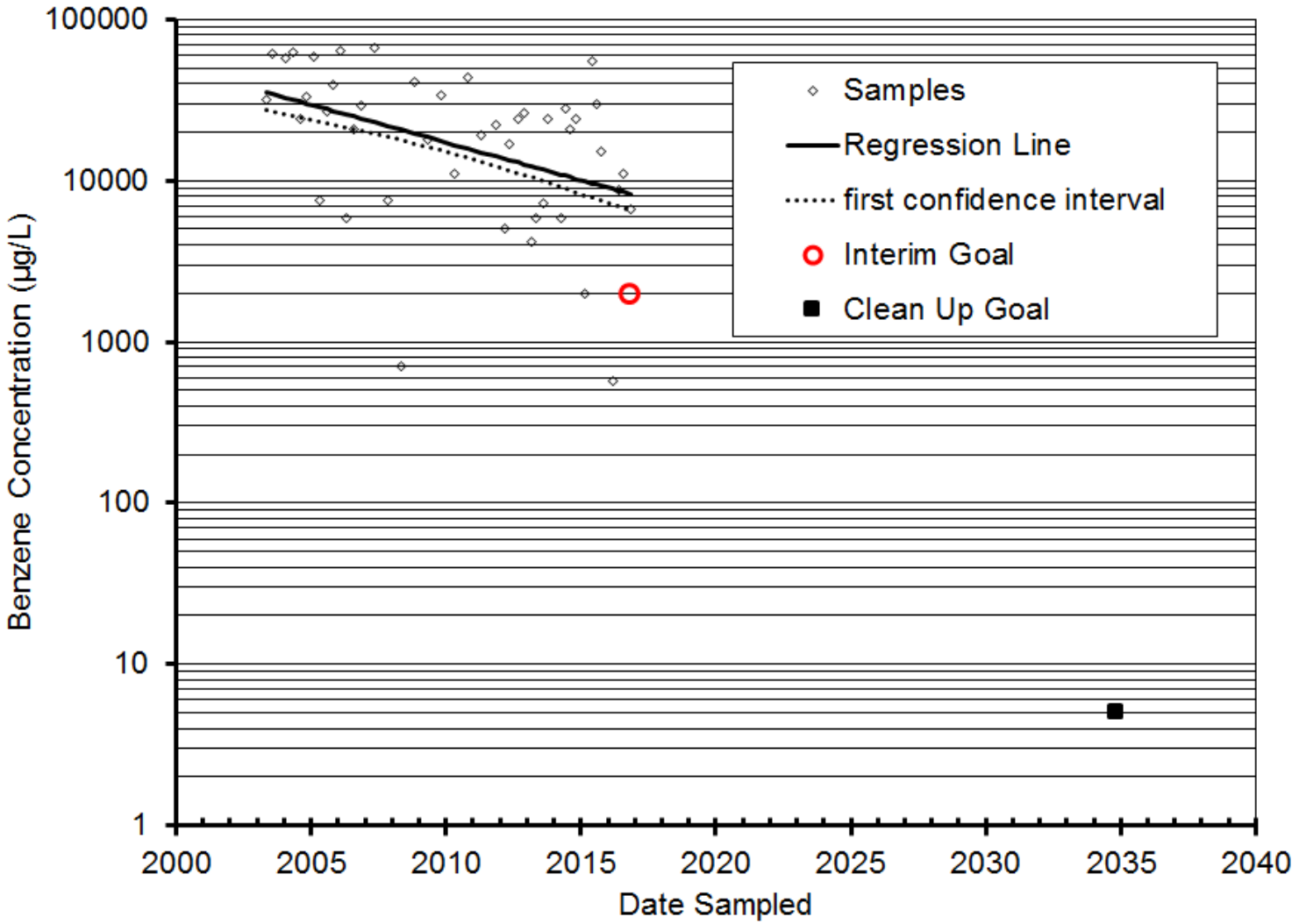

EPA United States Environmental Protection Agency	OHIO RIVER PARK SUPERFUND SITE NEVILLE ISLAND, PENNSYLVANIA		**LINEAR REGRESSION OF BENZENE CONCENTRATIONS IN URS-24S, 2003-2016**		FIGURE: 7
	JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:

APPENDIX A – SITE INSPECTION PHOTOGRAPHS
(Photos taken on June 20, 2017)

Figure 1 - Robert Morris University, Island Sports Center

Figure 2 – ISC Ice Rink Facilities from the Coraopolis Bridge Ramp

Figure 3 - ISC Parking Lots and Golf Dome

Figure 4 – New RMU Boathouse

Figure 5 - Golf Dome Parking Lot (capped area)

Figure 6 - Golf Dome (capped area)

Figure 7 - Approximate Location of Slurry Wall

Figure 8 - Southern Limits of Capped Area

Figure 9 - Track & Field (capped area)

Figure 10 - Northern Limits of Capped Area

Figure 11 - Mini-Golf Course

Figure 12 - Ohio River Back Channel (looking upstream) from Coraopolis Bridge