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Five-Year Review Report

First Five-Year Review Report

for

Ohio River Park

Neville Township

Allegheny County, Pennsylvania

EPA ID Number PAD980508816

PREPARED BY:

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Region III
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Date

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List of Acronyms

BLRA	Basic Human Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DCE	1,2-dichloroethylene
EMP	Environmental Monitoring Plan
EPA	Environmental Protection Agency
FS	Feasibility Study
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NLC	Neville Land Co.
OU	Operable Unit
PADEP	Pennsylvania Department of Environmental Protection
PCBs	Polychlorinated Biphenyls
PC&C	Pittsburgh Coke & Chemical Co.
ppb	part per billion
ppm	part per million
RA	Remedial Action
RAC3	EPA Region 3 - Response Action Contract
RAO	Remedial Action Objective
RBC	EPA Region 3 Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SDWA	Safe Drinking Water Act
TBC	To Be Considered
TCE	Trichloroethylene
VOC	Volatile Organic Compounds

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Executive Summary

The remedy for the Ohio River Park site, Operable Unit 1, required the construction of multi-layer caps with gas/collection/venting systems over former disposal trenches, and a vertical barrier wall at a location where tar-like material had been observed emerging from a slope adjacent to the Ohio River back channel. Based on monitoring results of the surface water, groundwater, sediment and gas, the capping of waste has been effective in reducing the risk of direct contact exposure to the soil contamination and controlling the migration of contaminated soil. The multilayer caps are effective in limiting the further migration of contaminants to the groundwater, the surface water, and sediments. During the site inspection, the capped areas were covered by a good stand of well maintained grass. There was no erosion of the slopes and no tar seeps on the river banks. The surface water monitoring data did not indicate any difference in concentrations upstream or downstream of the site. Institutional controls have been enacted to discourage fisherman from eating bottom-feeding fish and the public from visiting the slopes and riverbanks. In addition, deed restrictions were imposed to prohibit residential development of the site, prohibit any use that is incompatible with a multi-layer cap, and prohibit the use of groundwater from the site. These institutional controls are effective.

Operable Unit 2, which includes a one-acre area at the Corapolis Bridge required no further cleanup action.

The remedy for the Ohio River Park site, Operable Unit 3, required monitoring for groundwater natural attenuation parameters. The Settling Defendants initiated this monitoring in 1999, however further implementation of this remedy was postponed because of the prolonged negotiations of the Consent Decree between the EPA and the Settling Defendants. The EPA projects that in 2003, following signing the Consent Decree and approving the updated Monitoring Plan for the Operable Unit 3 by the EPA, the natural attenuation monitoring will continue.

This is the first five-year review for the Ohio River Park site. The trigger for this five-year review was the initiation of the cap construction at the Site in February 1998.

The remedy for Operable Unit 1 is protective of human health and the environment. The remedy is functioning as intended. The remedy at Operable Unit 3 appears to be working and is expected to be protective of human health and the environment upon completion.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Ohio River Park, OU 1 and OU3		
EPA ID (from WasteLAN): PAD980508816		
Region: EPA Region III	State: Pennsylvania	City/County: Neville Township Allegheny County
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final Deleted Other (specify) _____		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs?* <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Construction completion date: 09 /27 /2000 OU1	
Has site been put into reuse? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe Other Federal Agency		
Author name: Romuald Roman w/ TtNUS, Inc		
Author title: Remedial Project Manager	Author affiliation: EPA Region 3	
Review period:** 12 /02 / 2002 to 03 / 17/ 2003		
Date(s) of site inspection: 01 / 16 / 2003		
Type of review: <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only		
Review number: <input checked="" type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) Other (specify)		
Triggering action: Actual RA Onsite Construction at OU #1		
Triggering action date (from WasteLAN): 02 / 03 / 1998		
Due date (five years after triggering action date): 02 / 03 / 2003		

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

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Five-Year Review Summary Form, cont'd.

Issues:

No issues were identified during the 5-year review.

Recommendations and Follow-up Actions:

Representatives of the Settling Defendants indicated that they felt that the monitoring for OU1 could be reduced since several parameters have been rarely detected and several of the monitoring wells have been showing non-detect levels of contamination. The Settling Defendants agreed to submit a proposal for a reduced level of monitoring to the EPA and PADEP. EPA and PADEP agreed to consider such a reduction.

Protectiveness Statement(s):

The remedy for OU1 is protective of human health and the environment. The remedy is functioning as intended. The remedy at OU3 is expected to be protective of human health and the environment upon completion. In the interim, exposure pathways that could result in unacceptable risks are being controlled.

Other Comments:

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1.0 INTRODUCTION

The purpose of the Five-Year Review is to determine whether the remedy at The Ohio River Park site ("the Site") is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify potential issues and provide recommendations if needed.

The U.S. Environmental Protection Agency (the "Agency" or "EPA") is preparing this Five-Year Review report pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Contingency Plan (NCP). CERCLA §121 states:

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

The agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

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

EPA Region 3, has conducted a five-year review of the remedial actions implemented at the Site. This review was conducted from December 2002 through January 2003. This report documents the results of the review. This five year review was conducted by EPA Region 3 with assistance from Tetra Tech NUS, Inc under Response Action Contract – EPA Region 3 (RAC3) EPA Contract No. 68-S8-3003, work assignment number 027-RXBF-034L. In addition, figures were provided by URS Corporation; the Engineer for the Settling Defendants .

This is the first five-year statutory review for the Site. The triggering action date for this review is February 3, 1998. The triggering action was the beginning of remedial action construction on the Northeast Development Area of Operable Unit 1. The Five-Year Review is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

EPA has divided the Site into three operable units (OUs). Operable Unit 1 (OU1) addresses remediation of buried wastes and contaminated soil for an approximately 31 acre portion of the Site. OU1 does not address remediation of groundwater at the Site. The OU1 Record of Decision (ROD) indicated the selected remedy would include capping, surface water runoff controls, monitoring and institutional controls. The remedial action (RA) for OU1 has been completed and is currently undergoing long-term monitoring.

Operable Unit 2, OU2, is a small portion (approximately 1 acre) of the Site that includes soils. OU2 is also known as the bridge portion of the Site because this area was used for construction of a bridge connecting Neville Island with Coraopolis, Pennsylvania. The OU2 Record of Decision (ROD) documented the selected RA for OU2 to be "No Further Action."

Operable Unit 3 (OU3) addresses groundwater contamination for the entire Site. The ROD for OU3 documented the selected RA to be monitored natural attenuation (MNA). The remedial design for OU3 is currently being prepared by the Settling Defendants . This five-year review addresses OU1 and OU3.

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2.0 SITE CHRONOLOGY

Table 1 lists the chronology of events for the Ohio River Park Site.

TABLE 1
CHRONOLOGY OF SITE EVENTS

Date	Event
1920s to 1970	Site owned by Pittsburgh Coke & Iron Co. [later named Pittsburgh Coke & Chemical Co. (PC&C)]
1930s to mid-1950s	The Site served as a landfill for municipal wastes from Neville Township
1949 to 1955	Agricultural Chemicals Division of PC&C manufactured pesticides
1952 to 1965	Trenches were dug to dispose of coking sludges, cement production wastes and pesticides.
1965-66	PC&C ceased operations.
1970	Property transferred to wholly owned subsidiary, Neville Land Co. (NLC)
1977	Site donated to Allegheny County
1977-79	Allegheny County developed the Site as a park.
1979	Allegheny County consultant reported on-Site groundwater and soil contained benzene; toluene; 2,4-D; 2,4,6-trichlorophenol; and 2,4-dichlorophenol, subsequently the land was returned to NLC.
August 1990	Site included on the National Priorities List of Superfund Sites
October 1991	EPA and NLC enter into an Administrative Order on Consent in which NLC agreed to conduct a Remedial Investigation/Feasibility Study (RI/FS).
March 31, 1993	Operable Unit 2 ROD signed
June 1994	Remedial Investigation Report submitted
November 1994	Ecological Risk Assessment approved
January 1995	Baseline Risk Assessment approved
September 23, 1996	Remedial Investigation/Feasibility Study Approved
September 27, 1996	OU1 ROD signed
December 31, 1997	Consent Decree requiring the Settling Defendants to implement the provisions of the OU1 ROD was entered in to the United States District Court of Western Pennsylvania.
January 29, 1998	Final design for the Northeast Development Area Approved
February 3, 1998	Construction on the Northeast Development Area of OU1 begins
February 1998 to September 1999	Remedial Construction for OU1
September 8, 1999	Final Design OU1 approved
September, 17 1998	Record of Decision, OU3 signed

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Date	Event
October 1998	Opening of the first phase of the Island Sports Center, a recreation facility open to the public, constructed on the Northeast Development Area. Additional phases of the Island Sports Center open as rest of the remedial and developmental construction is completed.
August 18, 1999	Pre-Certification Inspection
April 25, 2000	Environmental Monitoring Plan (Revision 2), OU1 approved
September 27, 2000	EPA accepts Construction Completion Report
November 13-30, 2000	First Quarterly Monitoring Sampling Event for OU1
January 2002	First Annual Environmental Monitoring and Operation and Maintenance Report submitted.
August 2, 2002	Amended Consent Decree requiring the Settling Defendants to implement the provisions of the OU3 ROD was entered in to the United States District Court of Western Pennsylvania.
September 10, 2002	Deed Restrictions required by the OU1 and OU3 RODs placed on Site

3.0 BACKGROUND

3.1 PHYSICAL CHARACTERISTICS

The Site consists of approximately 32 acres on the western end of Neville Island, approximately 10 miles downstream of the City of Pittsburgh (Figure 1). The Ohio River borders the Site to the north, and the Back Channel of the Ohio River borders it to the south. The Site is accessible from the mainland via the new Coraopolis Bridge, linking the Town of Coraopolis with Neville Island.

The groundwater in the sand/gravel aquifer beneath the Site discharges primarily to the Main and Back Channels of the Ohio River. However, this aquifer interconnects with groundwater beneath the river and on the shores. This aquifer is used as a source of drinking water by several municipalities which flank the Ohio River. The nearest one is the municipality of Coraopolis. The Coraopolis well field is located 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 of 127 cubic feet per minute.

The residents of Neville Island use drinking water provided by the West View Water Authority, which is located at the north (opposite to the Site) tip of the island. The intakes are from the Ohio River.

3.2 LAND AND RESOURCE USE

Prior to the remedial action (RA) and development, the Site was mostly an open area with open meadows sparsely covered with brush and was encircled by an abandoned asphalt biking path. Most of the manufacturing and municipal wastes were disposed at the south-central portion of the Site beneath the former parking lot, in the meadows, and along the Back Channel river banks. Steep river ledges at the western part of the Site were created by piles of foundry sand.

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As a result of the remedial action the Site is currently developed as the Island Sports Center, which includes skating rinks, a miniature golf course, batting cages, a restaurant, and an indoor golf driving range. The Site also includes parking lots to support these facilities. The development primarily centers around the Coraopolis Bridge area. The western part of the Site is an open mowed field. The steep banks of the Ohio River are wooded. Figure 2 presents the current land use of the Site.

Land use on Neville Island is generally industrial/commercial, although there are some residential areas. The middle section of the island east of the Site and west of Highway I-79 is mostly residential and commercial while the eastern end of the island is heavily industrialized. Most of Neville Island's residents live in the area between the Coraopolis Bridge and Highway I-79. The nearest residence is located approximately 450 feet from the Site. According to the 1990 census, the population within an approximate four-mile radius of the Site is 18,058 people.

3.3 HISTORY OF CONTAMINATION

Prior to the 1940's, the predominant land use at the Site was agricultural. Beginning in the mid-1930's until the mid-1950's, a portion of the Site was used for municipal landfill operations including the disposal of domestic trash and construction debris. Industrial waste disposal activities were conducted at the Site from 1952 through the 1960's. Available information indicates that Pittsburgh Coke and Chemical Company ("PC&C") disposed of much of the industrial waste at the Site. PC&C began production of coke and pig iron on the eastern end of the island in 1929, operated a cement products plant during the 1930's, and produced coal coking by-products during the 1940's. Between 1949 and 1955, PC&C's Agriculture Chemicals Division manufactured pesticides. Two methods of waste disposal were used by PC&C at the Site: wet wastes were placed into trenches and dry wastes were piled on the surface. Fifty-four trenches have been identified as being used for disposal of tar acid, tar decanter, and occasionally agricultural chemical wastes. PC&C ceased operations in 1965-66. PC&C merged into Wilmington Securities, Inc., the parent corporation of the NLC.

3.4 INITIAL RESPONSE

In 1977, NLC donated the Site area to Allegheny County. Allegheny County began construction of a park on the Site in 1977 and completed the construction in 1979. The park was never opened to the public, however, and was subsequently dismantled. During the course of the work, approximately 13,000 cubic yards of various wastes were discovered at the Site. While most of these materials were excavated and removed from the Site, some materials were reburied. After this discovery, Allegheny County transferred the title to the land back to NLC.

Based on information and data collected from 1977 through 1989 by Allegheny County, EPA, the NLC, and the Pennsylvania Department of Environmental Resources (PADER), now the Pennsylvania Department of Environmental Protection (PADEP), the EPA proposed to include the Site on the National Priorities List of Superfund sites on October 16, 1989. The analytical data collected were used to evaluate the relative hazards posed by the Site using EPA's Hazard Ranking System (HRS). EPA uses the HRS to calculate a score for

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hazardous waste sites based upon the presence of potential and observed hazards. If the final HRS score exceeds 28.5, the Site may be placed on the National Priorities List, making it eligible to receive Superfund monies for remedial cleanup. This Site scored 42.24, and was placed on the list on August 30, 1990.

In October 1991, EPA and NLC (the owner of the Site) entered into an Administrative Order on Consent in which the NLC agreed to conduct a Remedial Investigation/Feasibility Study (RI/FS) of the Site with EPA and State oversight. *The Remedial Investigation (RI) Report for the Site, based on the 1992 and 1993 field sampling*, was approved by EPA in June 1994. The Ecological Risk Assessment was completed in November 1994 and the Baseline Human Health Risk Assessment was completed in January 1995. Based on these documents, NLC submitted a Feasibility Study (FS) in April 1995 describing the remedial action objectives and comparing cleanup alternatives for the Site. In April 1996, EPA presented a Proposed Plan, which utilized the Feasibility Study, and evaluated four alternatives to remediate contamination at the Site.

3.5 BASIS FOR TAKING REMEDIAL ACTION

The RI identified and evaluated Site-related contaminants, their potential migration routes, and exposure pathways for human and ecological receptors. The following discussion of contamination is based on the RI and is reflective of conditions at the time the RI was written.

Air Quality

EPA found trace amounts of naphthalene, 2-methylnaphthalene, and selected volatile organic compounds (VOCs) in the air both upwind and downwind of the Site. EPA believes that these contaminants are naturally present in the area and are not originating from the Site.

Surface Soil Contamination

Surface soil sampling detected semi-volatile organic compounds (semi-volatiles), including PAHs at concentrations up to 340 parts per million (ppm); pesticides including benzene hexachlorides; dioxin; polychlorinated biphenyls (PCBs) at concentrations typically less than 0.5 ppm; and metals including arsenic (43.3 ppm), beryllium (5.1 ppm) and chromium (106 ppm).

Subsurface Soil Contamination

Subsurface soil sampling detected VOCs, semi-volatiles including PAHs, pesticides, and metals. The VOC benzene was detected at concentrations up to 11 ppm. The highest total concentration of PAHs was 38 ppm. Alpha-BHC, a pesticide, was detected at concentrations of up to 7.9 ppm. The metals aluminum, beryllium, and manganese also were detected in the subsurface soil samples.

Buried Waste

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Waste material samples collected from a trench area contained VOCs (benzene at concentrations up to 8.9 ppm). These also were detectable amounts of pesticides and the herbicide, 2,4-D.

Surface Water

Surface water samples collected from the river contained metals and pesticides. The highest concentrations of metals were mercury at 0.79 parts per billion (ppb), chromium at 19 ppb, and copper at 87 ppb. The pesticide gamma-chlordane was detected at 0.024 ppb. EPA determined that the Site is a likely source of contamination to the Ohio River in the vicinity of Neville Island.

Sediment

EPA noted that the quality of sediment both upstream and downstream of the Site was similar. However, both upstream and downstream sediment sampling did reveal the presence of Site-related contaminants. Contaminants detected at levels of potential concern to human health were PCBs, dibenz(a,h)anthracene, arsenic, and chromium. Contaminants of potential ecological concern included heavy metals, pesticides, PCBs and PAHs.

Groundwater

Groundwater samples collected from the Site showed VOCs, semi-volatile, pesticide, and metals contamination. The VOCs, benzene and trichloroethane, were detected at concentrations up to 50 ppm and 18 ppb, respectively. The semi-volatile compound 2,4,6-trichlorophenol was detected at concentrations up to 210 ppm. Delta-BHC, a pesticide, was detected in one sample at 1.15 ppb. 2,4-D, an herbicide, was detected at concentrations up to 190 ppb. Cadmium and nickel were found at concentrations above the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and EPA Region III Human Health Risk-Based Concentrations.

In addition, the results indicated that dense non-aqueous phase liquids (DNAPLs), may be present.

Summary of Site Risks

Following the RI, analyses were conducted to estimate the human health and environmental hazards that could result if contamination at the Site is not cleaned up. These analyses are commonly referred to as risk assessments and identify existing and future risks that could occur if conditions at the Site do not change. The Baseline Human Health Risk Assessment (BLRA) evaluated human health risks and the Ecological Risk Assessment (ERA) evaluated environmental impacts from the Site.

Based on the results of the RI, the primary contaminants associated with potential human health risk at the Site include:

- VOCs including benzene, 1,2-dichloroethane, and 1,1,2-trichloroethane;

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- Semi-volatiles including benzo(a)pyrene, dibenz(a,h)anthracene, 4-methylphenol, 2,4-dichlorophenol, and 2,4,6-trichlorophenol;
- Pesticides including dieldrin, alpha-BHC, and gamma-chlordane;
- Inorganics including manganese, beryllium, arsenic, and mercury.

The results of the Baseline Human Health Risk Assessment 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;
- Children and construction workers accidentally ingesting on-Site soil

NLC and EPA collectively evaluated the ecological risks associated with the Site. Based on these evaluations, *contamination in all media (i.e., surface water, sediment, soil, and groundwater) has the potential to have significant adverse impacts on the aquatic ecosystem of the river. In surface water, concentrations of mercury, copper, and chromium (VI) are potentially harmful to the Main Channel of the Ohio River; while chromium and copper present an ecological risk to life in the Back Channel. Contaminants of ecological significance in the sediment adjacent to the Site in both the Main Channel and the Back Channel include heavy metals, pesticides, PCBs, and SVOCs, particularly phenols. In soil at the Site, metal contaminants including arsenic, copper, lead, manganese, mercury and zinc are present at levels that have a high potential to affect ecological receptors. Other soil contaminants, mostly PAHs and pesticides, were found above background levels and could also result in adverse impacts.*

Groundwater, which is a pathway by which soil contaminants reach the river, is contaminated by several contaminants of ecological concern, particularly mercury, zinc, phenols and phthalates. Pesticides and chlorocarbons are also of concern. Given the level of contamination in surface water and sediment, soil contaminants from the Site are suspected to have contributed to degradation of the river.

4.0 REMEDIAL ACTIONS

4.1 REMEDY SELECTION

Operable Unit 1

The ROD for OU1 stated that the remedy should "protect Site users from being exposed to the soil ... , that pose unacceptable human health risk either by the direct contact with contaminated waste/soil or by inhalation/ingestion of soil dust."

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As presented in the ROD, the remedy for OU1 is comprised of the following components:

- Capping of concentrated waste areas with a multilayer cap designed in accordance with Pennsylvania Residual Waste Management Regulations.
- Capping areas not covered with the multilayer cap and not covered with adequate vegetative cover with an erosion cap
- 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.
- Deed restrictions preventing residential use of the Site.
- Long-term monitoring of groundwater, surface water, and sediment.

Operable Unit 2

Operable Unit 2, which includes one-acre area at the Coraopolis Bridge required no further cleanup action.

Operable Unit 3

The objective of the ROD for OU3 is to perform a long-term monitoring program to assess the effectiveness of natural attenuation processes, and to implement institutional controls to restrict land and groundwater use at the Site and reduce the potential for human exposure to contamination. The ROD assumes that once the remedy for OU1 (the cap) is completed there will be no risk of direct exposure to the Site-related contaminants. Therefore, the remedy for OU3 does not include active treatment because natural attenuation processes can reduce groundwater contaminant concentrations to levels that protect human health and the environment within a reasonable time frame.

As presented in the ROD, the remedy for OU3 is comprised of the following components:

- Natural attenuation processes shall be allowed to reduce the concentrations of benzene and 2,4,6-trichlorophenol in groundwater beneath the Site to levels protective of human health and the environment. The EPA has determined that the appropriate cleanup levels for benzene and 2,4,6-trichlorophenol are 5.0 and 61 ppb, respectively.
- Monitoring of natural attenuation processes to measure changes in contaminant concentrations in the

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groundwater plume at the Site until the cleanup levels are achieved, with statistical evaluation of the monitoring data.

- Deed restrictions preventing residual use of groundwater at the Site until cleanup levels have been achieved and warning signs posted along the shoreline of the Site.

4.2 REMEDY IMPLEMENTATION

Remedy Implementation Operable Unit 1

Remedial construction of the remedy for OU1 started in February 3, 1998 and was completed on November 3, 1998. This work consisted of the following activities:

- Implementation of institutional controls
- Abandonment of wells
- Construction of a multi-layer cap and gas collection/venting system
- Construction of an erosion cap over areas that did not have suitable cover or areas disturbed for future development
- Construction of a stormwater runoff and erosion control system.

Due to the proposed development of the Island Sports Center, construction within an isolated portion of the Site (Northeast Development Area) was implemented concurrent to preparation of the Final Design for OU 1. The construction of the Northeast Development Area began on February 3, 1998 and continued until September of 1999. Additional monitoring wells were installed in the fall of 2000.

Institutional Controls

Institutional Controls consisted of installing permanent signs on the banks of the Ohio River to caution fisherman against eating bottom-feeding fish. A total of 15 signs were installed at approximate 300 foot intervals along the Ohio River and back-channel shore. In addition, a series of 39 signs were installed to deter visitors from the slopes and riverbanks, as these areas did not receive additional fill placement or covering. Finally, deed restrictions were imposed to 1) prohibit residential development of the Site, 2) prohibit any use that is incompatible with a multi-layer cap, and 3) prohibit the use of groundwater from the Site.

Well Abandonment

The on-Site oil well was properly abandoned in accordance with appropriate and relevant provisions of the Pennsylvania Oil and Gas Regulations. Numerous monitoring wells were also properly abandoned.

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Multi-Layer Cap and Gas Collection/Venting System

Site preparation for the multi-layer cap consisted of sediment and erosion controls, establishing an equipment decontamination area, removing trees and brush, and abandoning manholes, inlets and piping. In addition, areas were proof rolled to identify soft areas, and designated areas were pre-loaded and monitored with settlement plates to reduce the magnitude of post-construction settlement. Waste materials from Site preparation, such as residuals from well abandonment and decontamination activities, were consolidated beneath the subgrade layer of the multi-layer cap. The multilayer cap was constructed over historic waste disposal trenches. The multilayer cap consisted of the following components:

- A cap subgrade layer comprised of engineered fill, to provide a suitable and firm foundation for the barrier and adequate slope for drainage. This included a liner subgrade layer that was free of materials that might damage the barrier layer;
- A barrier layer (40-mil thick high density polyethylene liner);
- A cap drainage layer [synthetic drainage net (geonet), overlain with geotextile to minimize intrusion of overlying vegetative soil cover];
- A vegetative soil layer totaling three feet in thickness was placed. The bottom one foot was material free of large rocks, etc. that might damage the synthetic liner. Engineered Fill was then placed to 6 inches below the final grade. The top 6 inches was covered with 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.

Vertical Barrier Walls

Prior to the remedial action, ribbons of tar-like substance were observed 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 prohibit the potential for continued migration of this substance, the design included an in-ground vertical barrier system. The location of the vertical barrier was based on the results of a Site investigation. The primary barrier was a cement-bentonite slurry wall, which extended through the fill to native soil, immediately inside the southern limit of the larger multi-layer cap. Cement-bentonite was selected to provide high shear strength characteristics, as the barrier was near a steep slope. A secondary barrier was constructed to a depth of at least 2 feet below the base of the encountered tar-like material. The secondary barrier consisted of a trench lined with 40-mil HDPE

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and filled with clean fill. The exposed tar-containing materials were removed from the face of the slope.

Erosion Cap

The objective of the erosion cap was to create a sustainable cover that would prevent mobility of soil by wind or water erosion. The entire portion of OU1 disturbed by construction was covered 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, based on a Site study. Erosion features and potential erosion features along the river bank slopes were addressed through the design of a rip-rap toe buttress to repair identified slope distress. The buttress consisted of angular large rock over a layer of geotextile. Steep slopes on the western tip of the island were hydroseeded and covered with erosion resistant matting. A series of berms, inlets, and pipes were constructed to collect excess surface water runoff from the multi-layer cap and other developed areas and direct it onto the surrounding Ohio River and Ohio River Back Channel. Outlet structures, such as gabion downchutes, are provided to transmit concentrated flows from the upper plateau to the Ohio River.

Environmental Monitoring Program

The monitoring program monitored contaminant concentrations in groundwater, surface water, sediment, and air from the cap venting system. The objectives of the monitoring program for OU1 are:

- Evaluate groundwater quality adjacent to the Site to assess the effectiveness of the remedy;
- Assess the quality of sediment in drainage systems to evaluate the performance of the erosion cap and stormwater runoff and erosion control structures;
- Evaluate the post-remediation environmental qualities in surface water; and
- Characterize the gas emission from passive gas vents of the multi-layer cap.

The environmental monitoring activities are being implemented in two stages: an initial monitoring program, and a long-term monitoring program. The initial monitoring program is being performed for a period of 3 years and involves quarterly monitoring of groundwater wells and gas vents and semi-annual monitoring of surface water, sediment, and on-Site surface water seeps. The initial monitoring program is currently in its third year of monitoring. The long-term monitoring program will then be implemented, which will involve annual monitoring. Unless otherwise approved by the EPA, the monitoring program will continue for a period of 30 years following the initial monitoring program.

The initial monitoring program includes quarterly monitoring of groundwater for VOCs, SVOCs, pesticides, herbicides, and selected inorganic constituents. This monitoring is being performed using 20 monitoring wells for water quality and five piezometers for water level measurements only. Monitoring wells DM-24D, DM-26D, DM-41M, DM-57, and DM-59 were installed during the fall of 2000. The remaining monitoring wells were

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installed prior to the Remedial Action.

Sediment monitoring involves semi-annual collection of samples from three locations in the surface water runoff and erosion control system and at one location in the Ohio River Back Channel. The sediment samples are analyzed for PAHs, pesticides, herbicides, and selected inorganic constituents.

Surface water monitoring involves collecting semi-annual samples from locations within the Ohio River and Back Channel, both upstream and downstream from the Site, as well as any surface water seeps that may be identified on the Site. Samples are to be collected only during normal flow conditions. The surface water samples are analyzed for VOCs, SVOCs, pesticides, herbicides, and selected inorganic constituents, and are evaluated to assess whether the Site is having any discernible impact on water quality within the Ohio River System.

Air monitoring involves collecting quarterly air samples within the vent pipes from the passive gas venting system beneath the large multi-layer cap area, at sampling ports along the Buckeye Pipeline alignment, and within the Golf Dome and adjacent Support Building. The air samples are analyzed for combustible gasses to identify the potential to create an explosion or fire hazard.

For the first 3 years, an annual report will be prepared to describe the results of the previous four quarters. At the conclusion of the initial monitoring program, a comprehensive report will be prepared to discuss the status of remediation. At a minimum, it will include an evaluation of the effectiveness of implemented remedial measures and present recommendations for modifications of the monitoring program to address long-term monitoring considerations.

To date, one Annual Monitoring Report has been completed, covering one complete year of monitoring, from the fourth quarter of 2000 to the third quarter of 2001. In addition, a letter report dated January 14, 2003 was prepared to summarize analytical results from the fourth quarter 2000 to the fourth quarter 2002. Sediment, surface water, gas, groundwater, and background soil samples were collected. Monitoring costs are estimated at \$250,000 per year based on discussions with NLC.

Remedy Implementation Operable Unit 3

The Settling Defendants initiated the MNA in 1999, however further implementation of this remedy was postponed because of the prolonged negotiations of the Consent Decree between the EPA and the Settling Defendants. The EPA projects that in 2003, following signing the Consent Decree and approving the updated Monitoring Plan for the Operable Unit 3 by the EPA, the natural attenuation monitoring will be completed.

The OU3 remedy will continue to monitor natural attenuation processes and to measure changes in contaminant concentrations in the groundwater plume until the cleanup levels are achieved. It is estimated that the Final Environmental Monitoring Plan may be approved by the EPA by September 2003.

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With regard to the institutional controls required by the OU3 ROD, a corrective deed, with appropriate restrictive covenants approved by the EPA, was recorded with the Allegheny County Recorder of Deeds on September 10, 2002, and a copy was sent to all persons in accordance with the Consent Decree.

4.3 SYSTEMS OPERATION/OPERATIONS & MAINTENANCE

Operation and maintenance activities were reported for the years 2000 and 2001. Site improvements during 2001 included rehabilitation of well ERT 24M, an overall upgrade of the plant cover of the multi-layer and erosion control caps, and the repair of the multi-layer drain sump. Repairs were completed on the security fencing. Mowing is on-going. Inspections were made for flood damage and tar seeps, and of the gas collection and venting system, but no actions were required. As agreed in a conference call with U. S. EPA and PADEP, formal semi-annual inspections began in July, 2001. Total maintenance costs for the year 2001 were estimated to be approximately \$10,000.

4.4 SITE REDEVELOPMENT

The construction of a sports center was coordinated with the remedial action at the Site. The Site's location and size made it suitable for the development of several acres of indoor and outdoor facilities. The construction to date has included a five-acre building housing two Olympic class indoor ice skating rinks, a golf training facility, a fitness center, and restaurant; a covered golf dome, an outdoor site appropriate for team sports such as soccer and baseball; and accompanying parking lots and sidewalks. Before construction could begin, the grade levels of several areas of the Site were raised with clean fill to bring them above the 100-year flood plain elevation.

The approximately 250-by-300-foot covered golf dome was situated on the eastern section of the seven-acre multilayer cap area. Prior to construction of the facility, settlement plates were placed on the fill and loaded with five or more feet of clean soil. Potential settlement was monitored for one to three months. The Site was then regraded to make it completely level. This involved placing from three to eight feet of clean fill (equivalent to an erosion layer) over the multilayer cap. By allowing at least three feet of clearance between the drainage layer of the cap, it was possible to run utility and sewer lines to the structure in clean soil. The foundation for the dome is anchored by concrete footers 2.5 feet deep by 10 to 12 feet long. These types of footers, which are usually narrower and deeper, were made wider and shallower to keep them in clean soil. The parking area is asphalt, and the field is built with synthetic turf. The turf design allows the surface to be used both with and without a cover. The playing field includes a drainage layer to accommodate the potential for precipitation when the cover is down. This drainage layer directs water to collection pipes and then to the sewer system.

The ice rink and restaurant are placed in an area of the Site where the OU1 ROD calls for at least a 10-inch erosion protection cover of clean soil (the erosion cap). Since this area was below the 100-year flood plain, an

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average of eight feet of fill was placed there to raise the elevation above the flood plain. This fill serves as the erosion cover and provides more than sufficient clearance of clean soil to allow for utility construction. (Reusing Superfund Sites: Commercial Use Where Waste is Left on Site, EPA 540-K-01-008, OSWER 9230.0-100, February, 2002)

The winter of 1998-99 was the first full season of operation for the two indoor ice rinks. On a typical busy day about 2,000 participants and spectators came for figure skating and ice hockey (Ohio River Park Case Study, Superfund Redevelopment Initiative, EPA 540/F-99/022, OSWER 9365.0-17FS, February 2000). The Island Sports Center has been the site of high profile events such as the Eastern Sectional Figure Skating Championships and the National Short Track Speed Skating Championships. The facility's Collegiate Rink also serves as home ice for the Pittsburgh Forge, a member of the Junior-A North American Hockey League.

5.0 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This was the first five-year review for the Site.

6.0 FIVE-YEAR REVIEW PROCESS

6.1 ADMINISTRATIVE COMPONENTS

The members of the PADEP, the NLC, contractors for the NLC (URS Corporation), managers of the Island Sports Center, and the contractor for EPA (TtNUS, Inc) were notified of the initiation of the five-year review in December 2002. The five-year review team was led by Mr. Romuald Roman C.I.H, the Remedial Project Manager (RPM) for the EPA, and by Ms. Dawna Yannacci, P.G., the PADEP RPM. TtNUS assisted in the review under contract to the EPA.

The review team established the review schedule whose components included the following:

- Community involvement
- Document review
- Data review
- Site inspection
- Five-Year Review report development and review

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6.2 COMMUNITY INVOLVEMENT

In January 2003, EPA Community Involvement Coordinator, Mr. Patrick Gaughan, conducted five interviews with local officials and residents regarding the Site. His responders expressed the following opinions:

1. Tom Cellente, Acting City Manager for Coraopolis:

- As a long time resident and a local manager, he is well aware of the Site. He believes this is a 'positive' situation, much better since EPA -Superfund forced the issue with the PRP to clean up the Site.
- *Developing the Island Sports Complex was a plus for the entire area. Mr. Cellente believes other areas up and down the river should look at this Site as an example of what good can come from a former industrial-city dumping area. He said that most of the communities were "scared to death" when EPA stepped into the Site with the Superfund process. However, EPA and the property owner have really brightened up the locale of the Site. He said: " This can be the linchpin for future development in the area."*
- When asked if there was any concern in Coraopolis about the potential of Site groundwater contamination moving toward the Coraopolis City water well field, Mr. Cellente responded that in his opinion EPA performs appropriate monitoring of the wells, and his city has confidence in EPA's *monitoring results*.

2. Dave Mashek, Public Relations Manager with William Green Associates, the consulting firm which is representing the PRPs:

- Mr. Mashek described positive results of the construction of the Island Sports Complex and the related clean-up.
- He said that Robert Morris University proposed to the PRPs to purchase 7 acres of land on the Site which the University intends to use for sport activities. Mr. Mashek expects that a proposed "Partnering" will benefit the residents and the University.

3. Mrs. Mary Reardon a resident living on Vonstein Road, which borders the Site:

- Mrs. Reardon thinks that the remediation process went very well. She is very happy with the outcome. Island Sports Complex brings additional people to area. She is happy the Site contamination that was left on-Site was 'layered' (i.e., capped) to protect people. She is happy the PRPs took much of the contamination off-Site.
- In her opinion EPA's Superfund program stepped into the Site and forced the PRP to do a clean-up or otherwise "the Site would look today like it was several years ago".

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- Mrs. Reardon is concerned about any flow of contaminated groundwater towards Coraopolis. She asked the EPA representative to continue to monitor that aspect of the clean-up.
4. Mrs. Fred Eckert, long-time resident, residence located directly across from the Site:
- Mrs. Eckert said that the Site is much better than it was:” No dumping, no smell, no dirt/dust coming off location.”
 - Sports Complex is a good neighbor. While she “doesn't get out of her house that much anymore”, she feels that the community is much better off now than before the Superfund clean-up.
5. Mr. William Nickles, Chairman, Board of Supervisors, Neville Township.
- Mr. Nickles is highly satisfied with the results of the clean-up and the development of the Site.
 - Township is concerned about tax structure if Neville Land Co. sells the Site to Robert Morris University. Township attorney has been working on that matter.
 - Mr. Nickles received no complaints about the Site. Since the EPA became involved, and and the Island Sports Complex constructed there have been no problems related to the Site.
 - Mr. Nickles wants EPA to continue its involvement in groundwater monitoring at the Site.

Following signature of this Five-Year Review Report a notice will be sent to a local newspaper announcing that the Five-Year Review Report for the Ohio River Park Site is complete. The results of the review and the report will be made available to the public at the Coraopolis Memorial Library.

6.3 DOCUMENT REVIEW

The five-year review consisted of a review of relevant documents including the RODs for OU1 and OU3 and monitoring data. The documents reviewed include the following:

- ROD for Operable Unit 1 Ohio River Park Site, September 1996.
- ROD for Operable Unit 3 Ohio Rive Park Site, September 1998
- Remedial Design Submittal Ohio River Park Site, Dames & Moore, July 1998.
- Remedial Construction Completion Report – Ohio River Park Site, Dames & Moore, September 1999.
- Annual Environmental Monitoring and Operation and Maintenance Report, Ohio River Park Site, OU1, URS, January 2002.
- Letter summary of OU-1 monitoring results, Ohio River Park Site, URS, January 14, 2003

6.4 DATA REVIEW

To date, one Annual Monitoring Report has been completed covering one complete year of monitoring from the

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fourth quarter of 2000 to the third quarter of 2001. In addition, a letter report dated January 14, 2003 was prepared to summarize analytical results from the fourth quarter 2000 to the fourth quarter 2002. Sediment, surface water, landfill gas, groundwater, and background soil samples were collected.

Groundwater Data

Groundwater sampling locations are presented on Figure 4. Compounds of particular interest due to their pervasiveness at the Site were benzene and 2,4,6-trichlorophenol. Overall, only five out of 19 wells had more than a few detections over the nine quarters. Readings tend to be scattered at some wells, while others show a downward trend. Benzene concentrations in the shallow, mid-level, and deep aquifer are presented on plan views on Figures 5, 6, and 7, respectively. These figures show the benzene groundwater plume (concentration contours) as it was depicted in 1996 plus historic and recent sampling results for benzene. The recent quarterly sampling results are indicated by a three digit code in which the first number is the quarter and the next two numbers represent the year. For instance, the first round of quarterly groundwater sampling occurred in the fourth quarter of 2000 and is indicated by the code 400. By comparing the historic plume with the recent groundwater results an indication of the groundwater plume movement can be ascertained.

Generally, Figures 5, 6, and 7 indicate that the benzene plume is not expanding, and the concentrations in many of the wells have decreased since the RI. On Figure 6, a comparison of the historical concentration contours with the recent results in wells ERT-24M and DM-59 have the tendency to indicate that the plume may be moving to the west. However, the historical concentration contours in the area of ERT-24M and DM-59 were not based on any sample results (only interpolation of the surrounding points) so it can not be concluded that the concentrations in this area have increased. What can be concluded, though, is that the outer edge of the plume has not appeared to move to the west based on the results in DM-57 and ERT-6M remaining fairly steady. Overall, the recent quarterly groundwater concentration data tends to fluctuate; however, there appears to be a slight downward trend in several of the wells. Benzene concentrations across the Site in cross section are presented on Figures 8 and 9. Other organics were detected during various quarters in various locations in groundwater.

Metals analyses in groundwater indicate that the results of the quarterly sampling are similar to the results of the RI, that is, they are mostly below Maximum Contaminant Levels (MCLs) (federal primary drinking water standards), except for a few isolated locations where they have been above the MCL sporadically since the RI.

Groundwater levels were also monitored quarterly, with the highest levels in the second quarter of 2002 and the lowest readings in the third quarter of 2002.

Sediment Data

The Environmental Monitoring Plan (EMP) for OU1 (Dames & Moore 2000) specifies three Site sediment locations (locations located around the erosion and multilayer caps) and one river sediment location in the semi

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annual (twice year) monitoring. The Site sediment sample locations (S-1, S-2, and S-3) are to determine if the contaminants are being released through erosion of the caps. The river sediment sample location (S-4) is to determine if the sediment concentrations are increasing in the Back Channel. Sediment sample locations are presented on Figure 2.

Site sediment location S-1 has not had enough sediment to sample; therefore no readings have been taken yet at that location. Neither of the two remaining Site locations contained sediment, therefore, as specified in the EMP, surface soil was analyzed. Sediment was sampled from the one river location, in the Back Channel of the Ohio River. Sediment samples are analyzed for PAHs, pesticides, herbicides, and metals.

The Site sediment results were compared to background soil concentrations. The background soil sample results were developed with soil samples collected from non-contaminated surficial soils that were imported to the Site as part of the RA. Eight background samples and one duplicate were collected through the third quarter of 2001 to establish the background soil concentrations. An additional sample was collected from soil imported during the Site maintenance in the fourth quarter of 2001, and background values for Site sediments were recalculated.

To date, Site sediment (surface soil) results compare favorably with background for PAHs, pesticides, herbicides, and metals over five monitoring periods, with the exception of one very slight exceedance of arsenic and slight exceedances for cadmium. Recent river sediment sample results are generally lower than RI river sediment sample results.

Surface Water Data

Surface water samples were collected semi-annually at four locations, two upstream and two downstream of the Site. Surface water locations are presented on Figure 2. Surface water samples were tested for VOCs, SVOCs, pesticides, herbicides, and metals. The most recent results, 4th Quarter of 2002, show no contaminants detected in any samples, with the exception of barium, which was below the practical quantification limit (PQL). Some prior quarters indicate a slight increase between upstream and downstream readings for chromium and lead, although well below MCLs.

Air Monitoring Data

To date, air samples were analyzed for combustible gas during nine quarters from eleven locations (Figure 3). With the exception of the 2nd Quarter 2002 reading, all readings at all locations have been zero. Although some 2nd Quarter 2002 readings were greater than zero, no readings exceeded the 25 PA Code Chapter 288.262 performance standard criteria of (1) 25% of the lower explosive limit in a structure within the Site, and (2) the lower explosive limit at the boundaries of the Site. No combustible gas was ever detected at the two sampling points inside the sports facilities.

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6.5 SITE INSPECTION

An inspection of the Site was conducted on January 16, 2003.

The inspection was attended by Mr. Romuald Roman, EPA Remedial Project Manger, Ms. Dawna Yannacci, PADER RPM, Ms. Marian Dietrich, Director of Risk Management, NLC, Mr. Bruce Crocker President and CEO of Island Sports Center, Mr. Dennis Guthrie, URS Corporation, and Mr. Daniel Witt, TtNUS, Inc.

The purpose of the inspection was to assess the protectiveness of the remedy, including the integrity of the multi-layer cap and erosion caps, the integrity of the monitoring wells and gas vents, and to verify the presence and condition of signs located along the shoreline warning fisherman not to eat bottom feeding fish and signs along the top of the slope to the river bank warning the public to stay off of the slopes. Photographs taken during the Site inspection are included in Appendix A.

No significant issues were identified at any time regarding the multilayer cap, erosion cap, monitoring wells, gas vents, or warning signs.

Metal fence posts were noted on the cap near the gas vents (most likely to protect the gas vents from mowing equipment). The metal posts were of concern due to the potential of such a device to puncture the geomembrane in the cap. The geomembrane in the multilayer cap is located a minimum of 3 feet below the ground surface and over much of the area is much deeper. Removal of one of the posts reveled that the post was only embedded in the soil approximately 8-12 inches; well away from the geomembrane. Observation of the other posts indicated that they would be embedded about the same depth, therefore it was concluded by the inspection team that the posts did not pose a threat to the integrity of the multilayer cap.

The institutional controls have been put in place by NLC including deed restrictions to prohibit residential development and use of groundwater from the Site. No development of the Site is allowed which is incompatible with the multilayer cap. During the Site visit, no activities were observed that would have violated the institutional controls. The multilayer cap and the erosion caps were undisturbed, and no uses of groundwater were observed.

7.0 TECHNICAL ASSESSMENT.

7.1 QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS?

Based on a review of the decision documents; surface water, groundwater, sediment and gas monitoring results; and the Site inspection, the remedy appears to be functioning as intended by the OU1 ROD.

The remedy for OU3 is currently in the design phase, and EPA expects that the natural attenuation monitoring will start in 2003.

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The following discussion pertains to OU1.

Multi-layer cap, erosion cap and gas collection/venting system

Multi-layer caps with gas/collection/venting systems were constructed over areas where waste disposal trenches were located. In addition, a vertical barrier wall was constructed at a location where tar-like material had been observed emerging from a slope adjacent to the Ohio River back channel. Based on monitoring results of the surface water, groundwater, sediment and gas, the capping of waste has been effective in reducing the risk of direct contact exposure to the soil contamination and controlling the migration of contaminated soil. The multilayer cap appears to be effective in limiting the further migration of contaminants to the groundwater, the surface water, and sediments based on the monitoring data. The information presented in Section 6 indicates that the benzene plume is not expanding and the concentrations in many of the wells have decreased since the RI. Based on the monitoring data since completion of the remedy for OU1 the benzene plume concentrations generally appear to be trending downward, therefore the caps appear to be effective in limiting further migration in the groundwater. Sediment was to be collected in storm water inlets around the erosion control and multilayer caps to monitor the concentration and movement of sediment from the capped areas. These sampling points did not contain sediment and were therefore not sampled. This indicates that the caps are effective in limiting erosion. During the Site inspection no erosion rills were observed anywhere in the capped areas and the areas were covered by a good stand of well maintained grass. The surface water monitoring data did not indicate any difference in concentrations upstream or downstream of the Site. Observation of the river bank in the vicinity of the vertical barrier wall did not reveal the presence of any tar seeps indicating that the barrier wall has been effective in containing the tar seeps.

Institutional Controls

Institutional controls have been enacted to discourage fishermen from eating bottom-feeding fish and the public from visiting the slopes and riverbanks. In addition, deed restrictions were imposed to 1) prohibit residential development of the Site; 2) prohibit any use that is incompatible with a multi-layer cap; and 3) prohibit the use of groundwater from the Site. The deed restrictions were filed in the Recorder of Deeds Office for Allegheny County, Pennsylvania on September 10, 2002. These institutional controls appear to be effective.

Optimization Opportunities

There were no opportunities for optimization observed during this review.

7.2 QUESTION B: ARE THE EXPOSURE ASSUMPTIONS, TOXICITY DATA, CLEAN-UP LEVELS, AND RAOs USED AT THE TIME OF THE REMEDY SELECTION STILL VALID?

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy or would suggest that the selected remedy for OU3 would not be protective.

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Changes in Standards and To Be Considered (TBCs)

All ARARs cited in the ROD for OU1 have been met. There have been no changes in these ARARs and no new standards or TBCs that would affect the protectiveness of the remedy. The Pennsylvania Residual Waste Management Regulations, 25 PA Code Chapter 288, Subchapter C regarding the closure of landfills was considered relevant in the OU1 ROD. Many of the subsections of this chapter were amended on January 12, 2001, however, no changes were made that would effect the remedy for OU1.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

The exposure assumptions used to develop the human health risk assessment for the Ohio River Park Site are listed in both the OU1 and OU3 RODs. Changes in toxicity factors for contaminants of concern and changes to the standardized risk assessment methodology were not evaluated for this five-year review because the only *contaminant-specific performance standards presented in the OU1 and OU3 RODs are not based on concentrations derived from the Site specific risk assessment but in generic exposure criteria.*

In the OU1 ROD, areas of soil contamination in excess of 7800 ppb for benzo(a)anthracene and 780 ppb for benzo(a)pyrene were to be covered by the multilayer cap. *These remediation goals were not based on a concentration derived from the risk assessment but were based on the EPA Region III Risk- Based Concentration (RBC) table for industrial land use dated April 19, 1996. A review of the latest EPA Region III RBC table (October 9, 2002) indicates that these concentrations have not changed and are still applicable.*

Similarly, the groundwater cleanup levels listed in the OU3 ROD were based on National Primary Drinking Water Standards Maximum Contaminant Levels (MCLs) and EPA Region III RBCs. The OU3 ROD prescribes cleanup levels for benzene in the groundwater of 5 ppb which was based on the MCL. The cleanup level for 2,4,6-trichlorophenol is prescribed in the OU3 ROD to be 61 ppb based on tap water and a cancer risk of 10⁻⁵. The most recent MCLs (July 2002) and the most recent EPA Region III RBC table (October 9, 2002) were reviewed to determine if these levels had changed since the OU3 ROD was signed. These levels have not changed. Any changes in toxicity factors or risk assessment methodology would not affect the protectiveness of the remedies indicated in the OU1 and OU3 RODs.

7.3 QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT CALLS INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?

There is no other information that calls into question the protectiveness of the remedy as specified in the OU1 and OU3 RODs.

7.4 TECHNICAL ASSESSMENT SUMMARY

According to the data reviewed and the Site inspection, the OU1 remedy is functioning as intended by the OU1

AR303730

ROD and although the new monitoring plan hasn't been finalized, existing data indicates the MNA remedy selected for OU3 will be effective. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. A review of changes in toxicity factors or risk assessment methodology was not conducted for this five-year review. Although, a review of the cleanup goals indicated the source of these levels has not changed since the signing of the RODs. There is no other information that calls into question the protectiveness of the selected remedies.

8.0 ISSUES

No issues affecting protectiveness were identified during this Five-Year review.

9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Representatives of the Settling Defendants indicated that the monitoring for OU1 could be reduced since several parameters have been rarely detected and several of the monitoring wells have been showing non-detect levels of contamination. In February 2003, the Settling Defendants agreed to submit a proposal for a reduced level of monitoring to the EPA and PADEP. EPA and PADEP agreed to consider such a reduction.

10.0 PROTECTIVENESS STATEMENT

The remedy for OU1 is protective of human health and the environment. The remedy is functioning as intended. The remedy at OU3 appears to be working and is expected to be protective of human health and the environment.

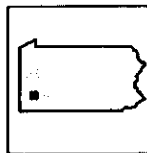
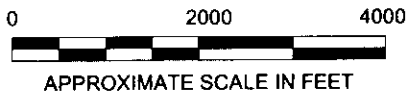
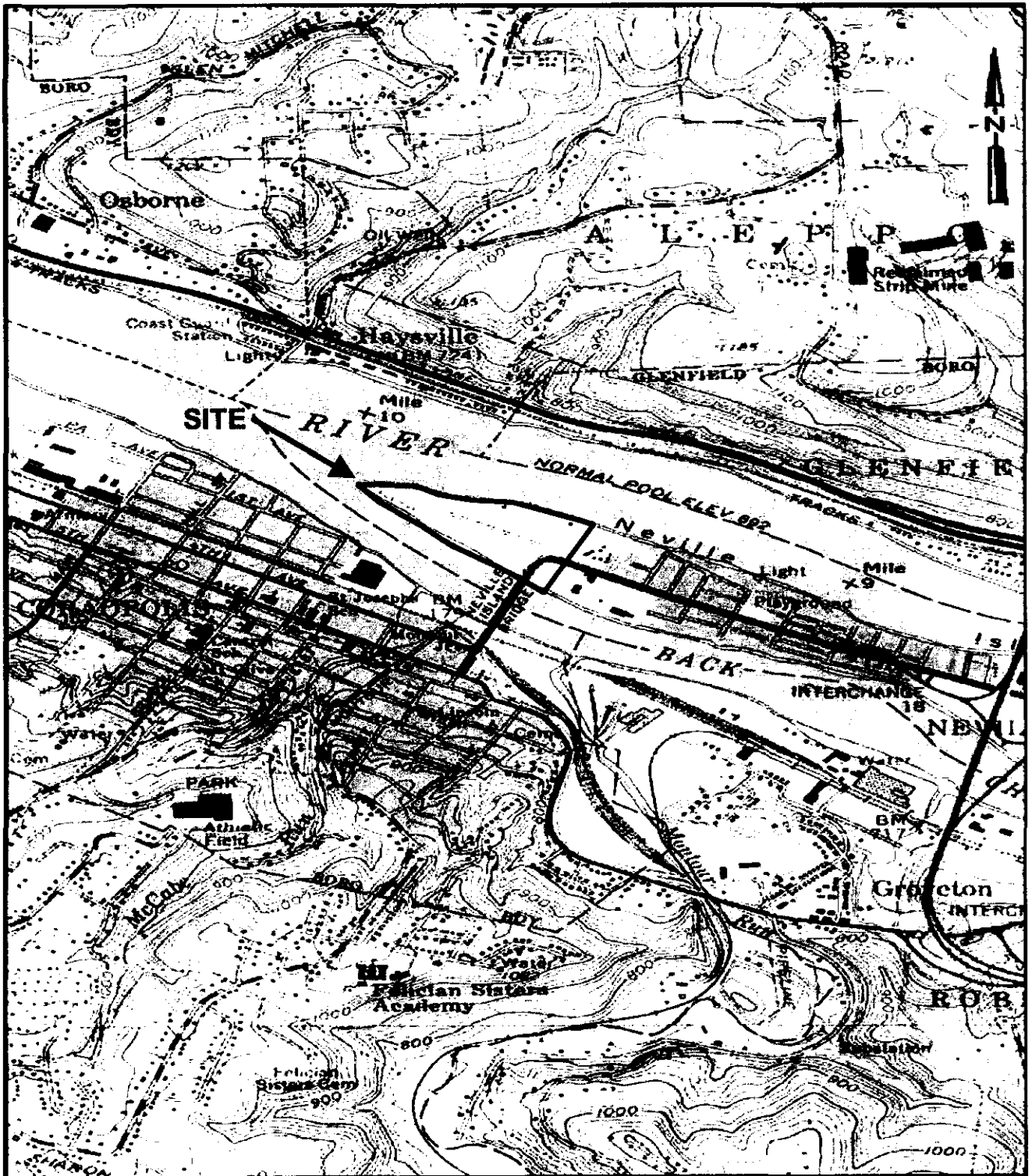
11.0 NEXT REVIEW

The next five-year review will be completed no later than five years from the signature date of this five-year review.

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FIGURES

AR303732



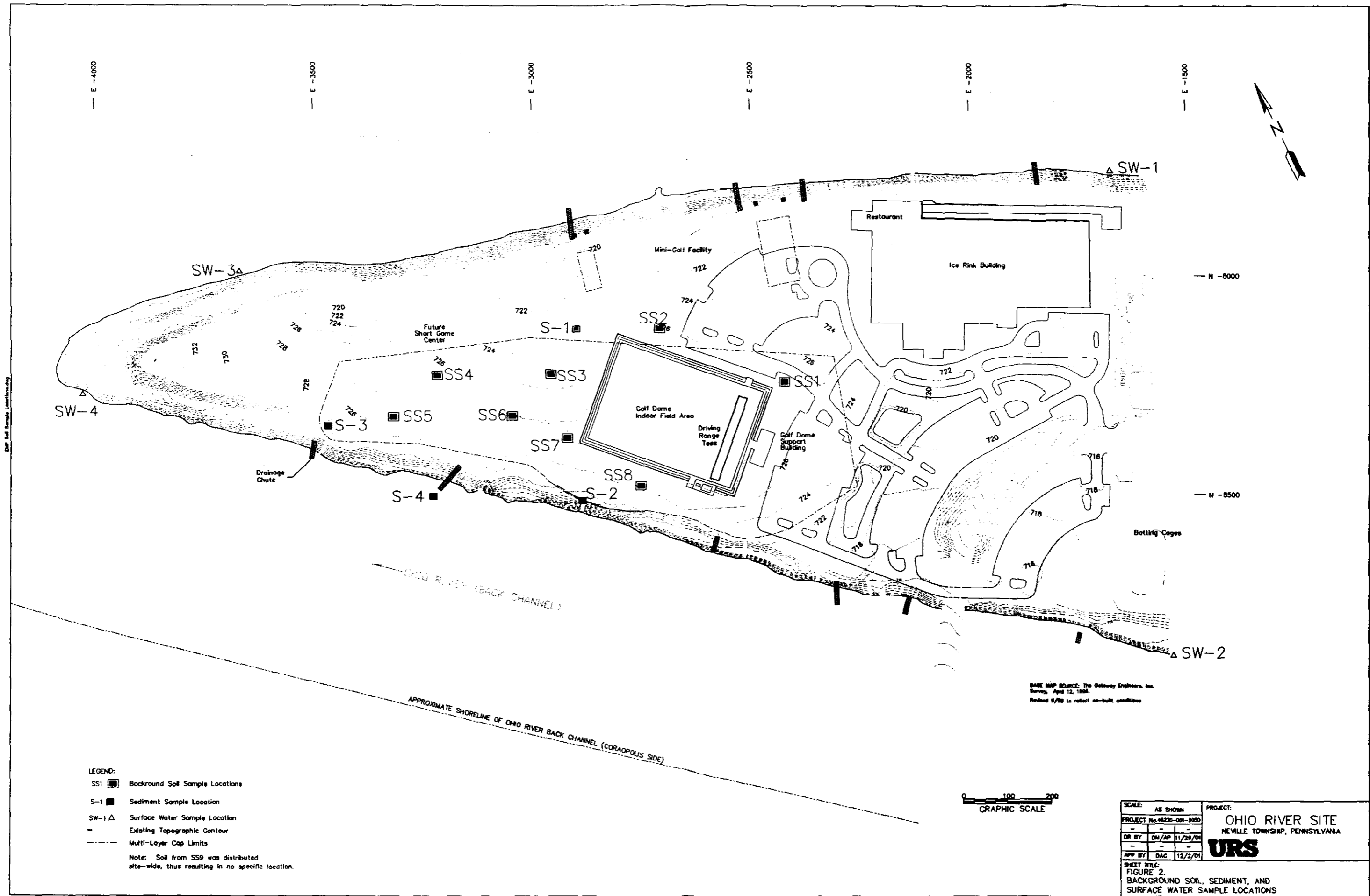
BASE MAP SOURCE: USGS 7.5 minute topographic quadrangle map
 Ambridge, PA 1960 (Photorevised 1990), Emsworth, PA 1960
 (Photorevised 1979), Oakdale, PA 1960 (Photorevised 1990) and
 Pittsburgh West, PA 1993

FIGURE 1
SITE VICINITY MAP
OHIO RIVER SITE
NEVILLE TOWNSHIP, PA 15225

URS

JOB NO. 46230-001-029

AR303733



E -4000 E -3500 E -3000 E -2500 E -2000 E -1500



N -8000

N -8500

BASE MAP SOURCE: The Gateway Engineers, Inc.
Survey, April 12, 1984.
Revised 8/98 to reflect on-built conditions

- LEGEND:
- SS1 ■ Background Soil Sample Locations
 - S-1 ■ Sediment Sample Location
 - SW-1 Δ Surface Water Sample Location
 - Existing Topographic Contour
 - - - Multi-Layer Cap Limits
- Note: Soil from SS9 was distributed site-wide, thus resulting in no specific location.

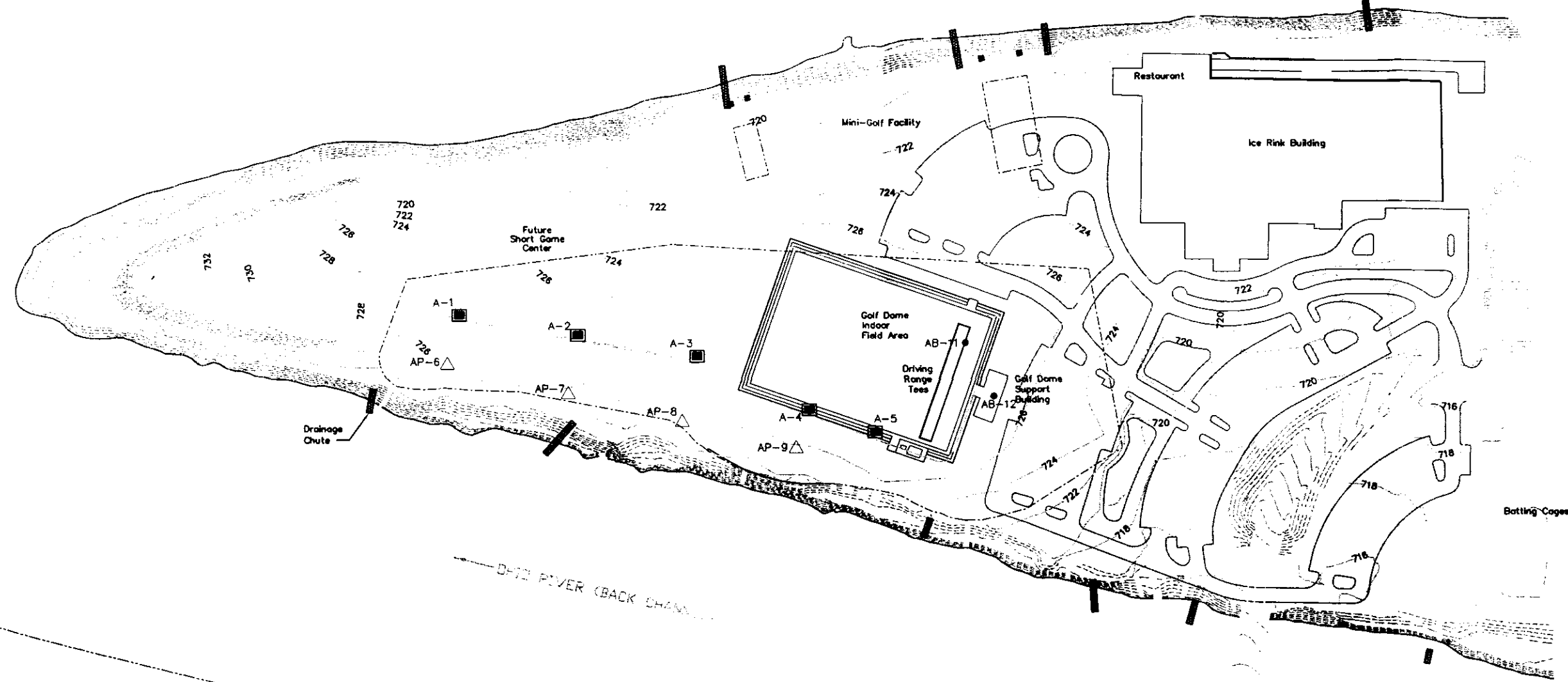


SCALE:	AS SHOWN	PROJECT:	OHIO RIVER SITE
PROJECT No.	04230-01-0000		NEVILLE TOWNSHIP, PENNSYLVANIA
DR BY	GM/MP 01/29/01		URS
APP BY	DAC 12/2/01		
SHEET TITLE:			
FIGURE 2. BACKGROUND SOIL, SEDIMENT, AND SURFACE WATER SAMPLE LOCATIONS			

APPROXIMATE SHORELINE OF OHIO RIVER BACK CHANNEL (CORAOPOUS SIDE)

AR303734

E -4000 E -3500 E -3000 E -2500 E -2000 E -1500



N -8000

N -8500

Drainage Chute

OHIO RIVER (BACK CHANNEL)

APPROXIMATE SHORELINE OF OHIO RIVER BANK CHANNEL (CORAOPOLIS SIDE)

BASE MAP SOURCE: The Gateway Engineers, Inc.
Survey: April 12, 1998.
Revised 8/99 to reflect as-built conditions.

- LEGEND:**
- A-3 Cap Vent Air Monitoring Station Location and Identification
 - AP-6 Pipeline Air Monitoring Station Location and Identification
 - AB-11 Building Air Monitoring Station Location and Identification
 - Existing Topographic Contour
 - Multi-Layer Cap Limits



SCALE:	AS SHOWN	PROJECT:	OHIO RIVER SITE
PROJECT No.	48230-001-0000		NEVILLE TOWNSHIP, PENNSYLVANIA
DR BY	DM/AP 11/29/01	URS	
APP BY	DAG 12/2/01		
SHEET TITLE:			
FIGURE 3.			
GAS EMISSIONS MONITORING LOCATIONS			

\\P:\proj\2\Drawings\Monitoring Stations.dwg

AR303735

E -4000

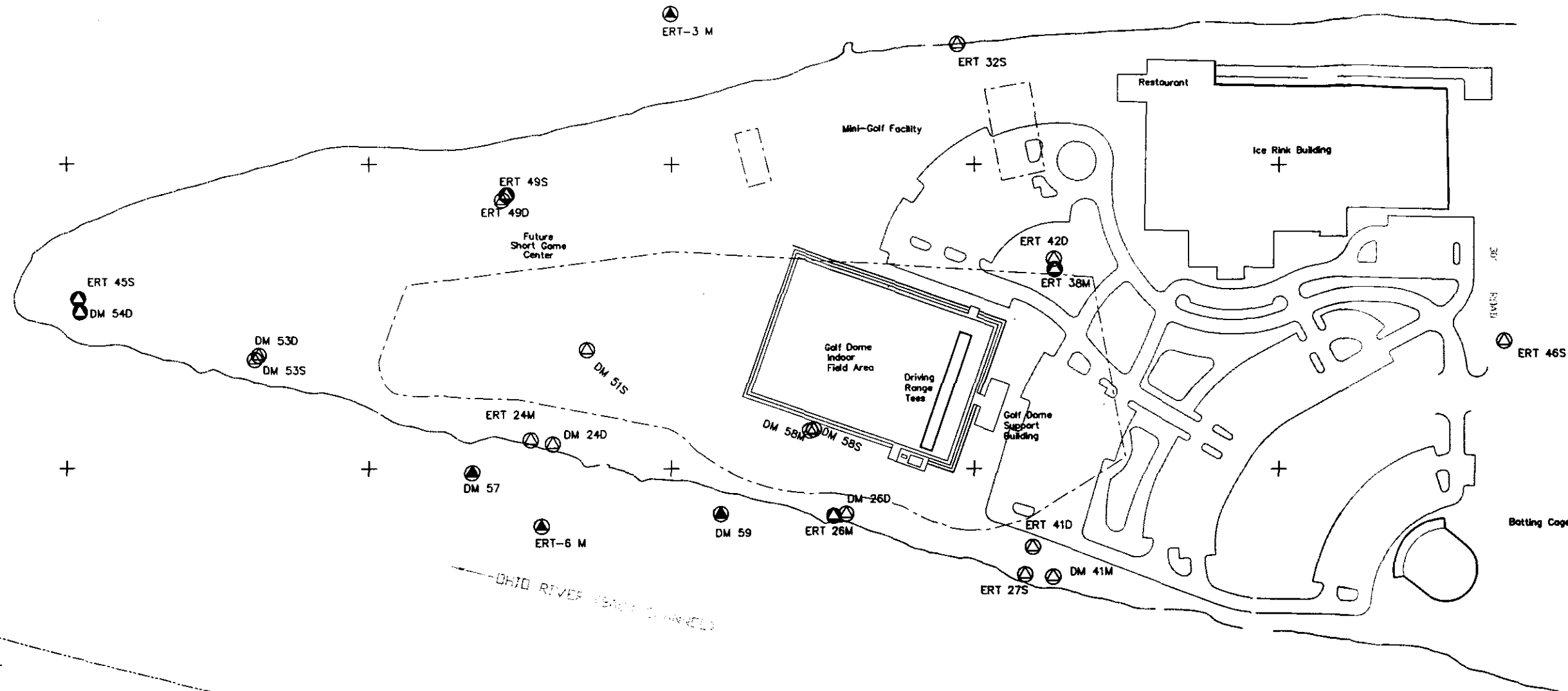
E -3500

E -3000

E -2500

E -2000

E -1500



SENTINEL WELL

OHIO RIVER BACK CHANNEL (CORADPOLIS SIDE)

BASE MAP SOURCE: The Gateway Engineers, Inc.
Survey, April 12, 1986.
Revised 9/98 to reflect as-built conditions.

- LIMITS OF CAPPED AREA
- ⊙ WATER LEVEL MEASUREMENT ONLY
- ⊕ CONVENTIONAL MONITORING WELL
- ⊖ BARCAD MONITORING WELL



SCALE:	AS SHOWN	PROJECT:	OHIO RIVER SITE
PROJECT No.	48330-001-029		NEVILLE TOWNSHIP, PENNSYLVANIA
DR BY:	DM/AP	DATE:	11/29/01
APP BY:	DAG	DATE:	12/2/01
SHEET TITLE:		URS	
FIGURE 4. GROUNDWATER SAMPLING LOCATIONS			



E -4000

E -3500

E -3000

E -2500

E -2000

E -1500

ERT 49S	
RI:	ND/ND
IRD:	ND
401:	NA
102:	NA
202:	NA
302:	NA
402:	NA
102:	NA
202:	NA
302:	NA
402:	NA

ERT 45S	
RI:	ND/ND
401:	NA
102:	NA
202:	NA
302:	NA
402:	NA
102:	NA
202:	NA
302:	NA
402:	NA

DM 53S	
IRD:	ND
400:	ND
101:	ND
201:	ND
301:	ND
401:	ND
102:	ND
202:	ND
302:	ND
402:	ND/ND

MW-4S	
RI:	15,000/100,000

DM 51S	
IRD:	410
401:	DRY
102:	DRY
202:	DRY
302:	DRY
402:	DRY
102:	DRY
202:	DRY
302:	DRY
402:	DRY

ERT 32S	
IRD:	410
400:	ND
101:	ND
201:	ND
301:	ND
401:	ND
102:	ND/ND
202:	ND
302:	ND
402:	ND

ERT 46S	
RI:	ND/ND
IRD:	ND
400:	ND
101:	ND
201:	ND
301:	ND
401:	ND
102:	ND
202:	ND
302:	ND
402:	ND

DM 58S	
400:	87
101:	350
201:	75
301:	320
401:	180
102:	ND
202:	ND
302:	1,100
402:	220

ERT-18S	
RI:	67,000
IRD:	37,500

ERT-22S	
IRD:	550

DM-56S	
IRD:	250

DM-50S	
IRD:	9.8

ERT 25S	
IRD:	17,000

ERT 27S	
RI:	2,900/110
IRD:	6,200
400:	760
101:	880
201:	750
301:	1,200
401:	950
102:	630
202:	560
302:	700
402:	310

- LIMITS OF CAPPED AREA
- ⊕ CONVENTIONAL MONITORING WELL
- ⊕ BENZENE CONCENTRATION (μg/L)
- J ESTIMATED BELOW THE PQL
- ND BELOW DETECTION LIMIT
- NA NOT ANALYZED
- IRD: Results From: Intrinsic Remediation Demonstration of the Ohio River Site, Dames & Moore, 1996 (μg/L)
- RI: Results From: Remedial Investigation Report of the Ohio River Site, ENSR, 1994 (μg/L)

BASE MAP SOURCE: The Railway Engineers, Inc.
Survey, April 12, 1988.
Revised 9/88 to reflect as-built conditions



SCALE:	AS SHOWN	PROJECT:	OHIO RIVER SITE
PROJECT No.	48230-001-033		NEVILLE TOWNSHIP, PENNSYLVANIA
DR BY	DM/AF 7/28/01	URS	
APP BY	DAG 12/2/01		
SHEET TITLE:			
FIGURE 5			
BENZENE C			
			AR303737

\\pghen2\p

0000 - 3

E - 3500

E - 3000

E - 2500

E - 2000

0000 - 3



ERT 24M	
400:	NA
101:	56,000
201:	46,000
301:	69,000**
401:	350,000*
102:	27,000/26,000
202:	20,000
302:	70,000
402:	84,000

DM 58M	
400:	ND
101:	ND
201:	11
301:	ND
401:	ND
102:	ND
202:	ND
302:	ND
402:	ND

ERT 3M	
RI:	3J/ND
IRD:	ND
400:	ND
101:	ND
201:	ND
301:	ND
401:	ND
102:	ND
202:	ND
302:	ND/ND
402:	ND

ERT 38M	
RI:	ND/ND
IRD:	NA
401:	NA
102:	NA
202:	NA
302:	NA
402:	NA
102:	NA
202:	NA
302:	NA
402:	NA

DM 57	
400:	2J/2J
101:	2J
201:	3.2J/3.1J
301:	4.4J/3.9J
401:	1.3J
102:	ND
202:	ND/ND
302:	4.2J
402:	3.1J

ERT 6M	
RI:	ND/ND
IRD:	ND
400:	ND
101:	ND
201:	ND
301:	ND
401:	ND
102:	11
202:	ND
302:	ND
402:	ND/ND

NBC-3S	
IRD:	6.7

NBC-5S	
IRD:	ND

NBC-6S	
IRD:	ND

NBC-8S	
IRD:	ND

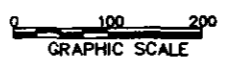
ERT 41M	
RI:	6,000/4,400
IRD:	16,000

DM 59	
400:	24,000
101:	73,000
201:	29,000
301:	18,000
401:	18,000/34,000
102:	29,000
202:	7,400
302:	10,000
402:	3,800

ERT 26M	
RI:	50,000/29,000
IRD:	5,800
400:	NA
101:	NA
201:	NA
301:	NA
401:	NA
102:	NA
202:	NA
302:	NA
402:	NA

DM 41M	
400:	ND
101:	ND
201:	ND
301:	ND
401:	ND
102:	ND
202:	ND
302:	ND
402:	ND

- BENZENE CONCENTRATION CONTOUR (µg/L) (1996 DATA)
(Source: Intrinsic Remediation Demonstration of the Ohio River Site, Dames & Moore, 1996)
- LIMITS OF CAPPED AREA
- CONVENTIONAL MONITORING WELL
BENZENE CONCENTRATION (µg/L)
- BARCAD MONITORING WELL
BENZENE CONCENTRATION (µg/L)
- ESTIMATED BELOW THE PQL
- BELOW DETECTION LIMIT
- NOT ANALYZED
- IRD: Results From: Intrinsic Remediation Demonstration of the Ohio River Site, Dames & Moore, 1996 (µg/L)
- RI: Results From: Remedial Investigation Report of the Ohio River Site, ENSR, 1994 (µg/L)
- GEOPROBE SAMPLING LOCATION
(Source: Groundwater Quality Beneath the Ohio River Back Channel, Dames & Moore, 1997 (µg/L))
- *: RESULT FROM QUARTER FOLLOWING ACID CLEANING OF THE WELL SCREEN
- **: RESULT FROM QUARTER WHEN ACID CLEANING OF THE WELL SCREEN OCCURRED



BASE MAP SOURCE: The Gateway Engineers, Inc.
Survey, April 12, 1998.
Revised 6/98 to reflect as-built conditions.

SCALE:	AS SHOWN	PROJECT:	OHIO RIVER SITE NEVILLE TOWNSHIP, PENNSYLVANIA
PROJECT No:	46230-001-026		
DR BY:	DM/AP	7/26/01	
APR BY:	DAG	12/2/01	
SHEET TITLE:		FIGURE 6. BENZENE CONCENTRATIONS IN MID-LEVEL AQUIFER	



AR303738

E -4000 E -3500 E -3000 E -2500 E -2000 E -1500



DM 54D
6/96: ND
400: NA
101: NA
201: NA
301: NA
401: NA
102: NA
202: NA
302: NA
402: NA

DM 24D
400: 62
101: 1J
201: 20
301: 1.6J
401: ND
102: ND
202: ND
302: 7
402: ND

ERT 49D
RI: ND/ND
IRD: ND
400: ND
101: ND
201: ND
301: ND
401: ND
102: ND
202: ND
302: ND
402: ND

ERT-40D
RI: 480
IRD: 309

ERT-18D
IRD: 210,000

ERT 42D
RI: ND/ND
IRD: ND
400: ND
101: ND/ND
201: ND/ND
301: ND
401: ND
102: ND
202: ND
302: ND/ND
402: ND

DM 53D
IRD: ND
400: ND
101: ND/ND
201: ND
301: ND
401: ND
102: ND
202: ND
302: ND
402: ND

NBC-2D
IRD: ND

NBC-3D
IRD: 1

NBC-5D
IRD: ND

NBC-6D
IRD: ND

NBC-8D
IRD: ND

NBC-1D
IRD: ND

ERT-6D
RI: 44
IRD: 11.9

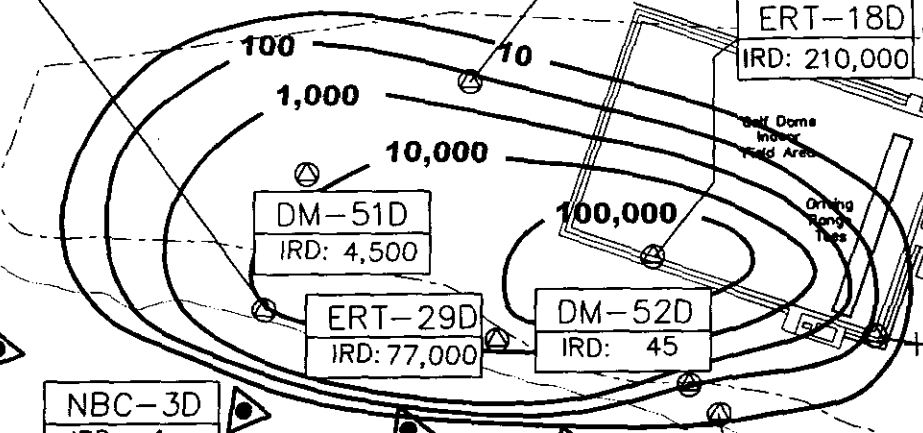
NBC-7D
IRD: ND

NBC-4D
IRD: ND

DM 26D
400: 13
101: ND
201: ND
301: ND/ND
401: ND/ND
102: ND
202: ND
302: ND
402: ND

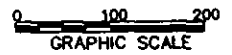
NBC-9D
IRD: ND

ERT 41D
RI: 16
IRD: ND
401: ND
102: ND
202: ND
302: ND
402: ND
102: ND
202: ND
302: ND
402: ND



- BENZENE CONCENTRATION CONTOUR (µg/L) (1996 DATA)
(Source: Groundwater Quality Beneath the Ohio River Back Channel, Dames & Moore, 1997)
- LIMITS OF CAPPED AREA
- CONVENTIONAL MONITORING WELL
BENZENE CONCENTRATION (µg/L)
- ESTIMATED BELOW THE PCL
- BELOW DETECTION LIMIT
- NOT ANALYZED
- Results From: Intrinsic Remediation Demonstration of the Ohio River Site, Dames & Moore, 1996 (µg/L)
- Results From: Remedial Investigation Report of the Ohio River Site, ENSR, 1994 (µg/L)
- GEOPROBE SAMPLING LOCATION
(Source: Groundwater Quality Beneath the Ohio River Back Channel, Dames & Moore, 1997 (µg/L))

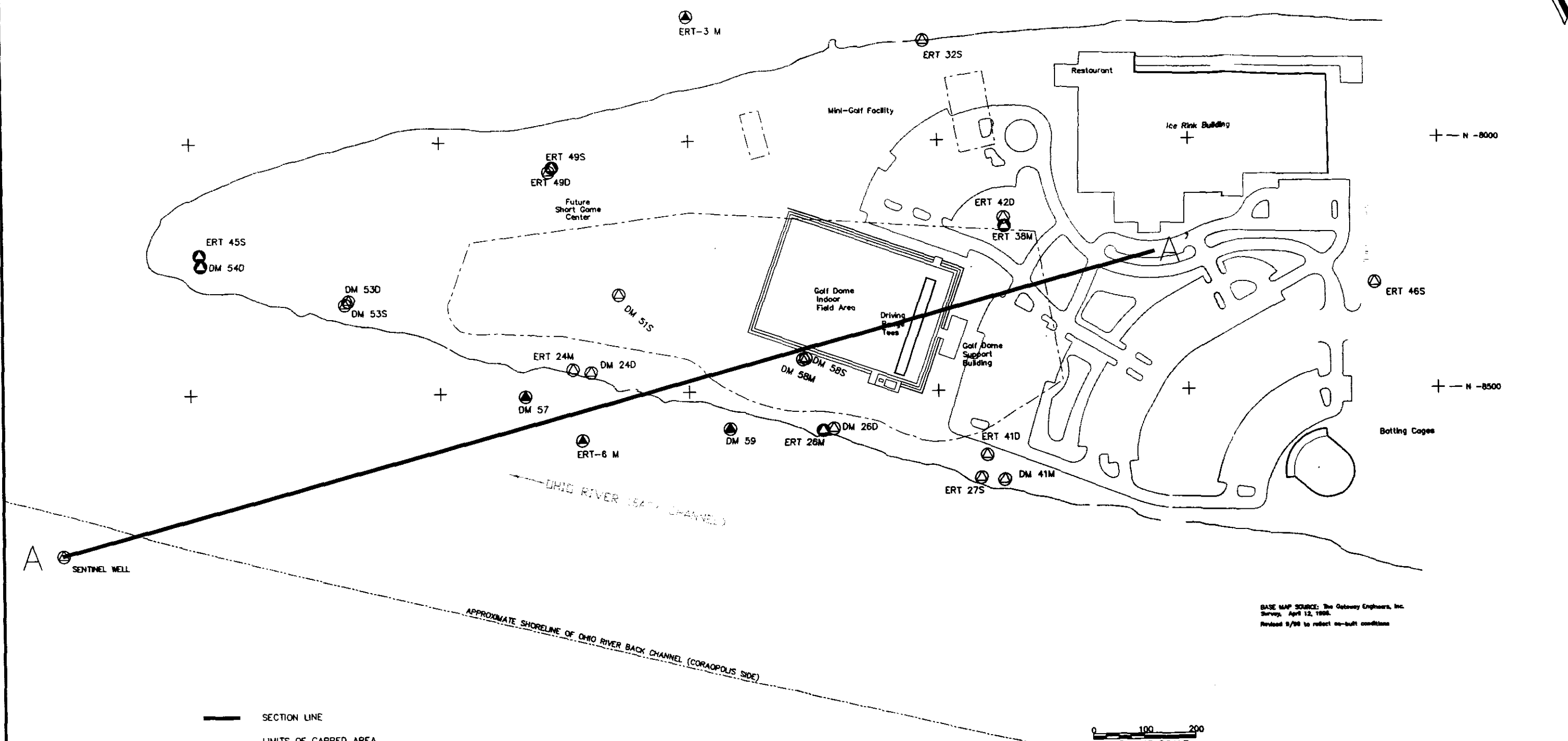
BASE MAP SOURCE: The Gateway Engineers, Inc.
Survey, April 12, 1994.
Revised 8/00 to reflect re-built conditions



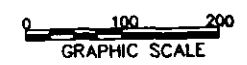
SCALE: AS SHOWN	PROJECT: OHIO RIVER SITE NEVILLE TOWNSHIP, PENNSYLVANIA
PROJECT No: 46230-001-076	URS
DR BY: DM/AP 7/26/01	
APP BY: DAG 12/2/01	
SHEET TITLE: FIGURE 7 BENZENE CONCENTRATIONS IN DEEP AQUIFER	

AR303739

E -4000 E -3500 E -3000 E -2500 E -2000 E -1500



BASE MAP SOURCE: The Gateway Engineers, Inc.
Survey, April 12, 1998.
Revised 8/98 to reflect as-built conditions

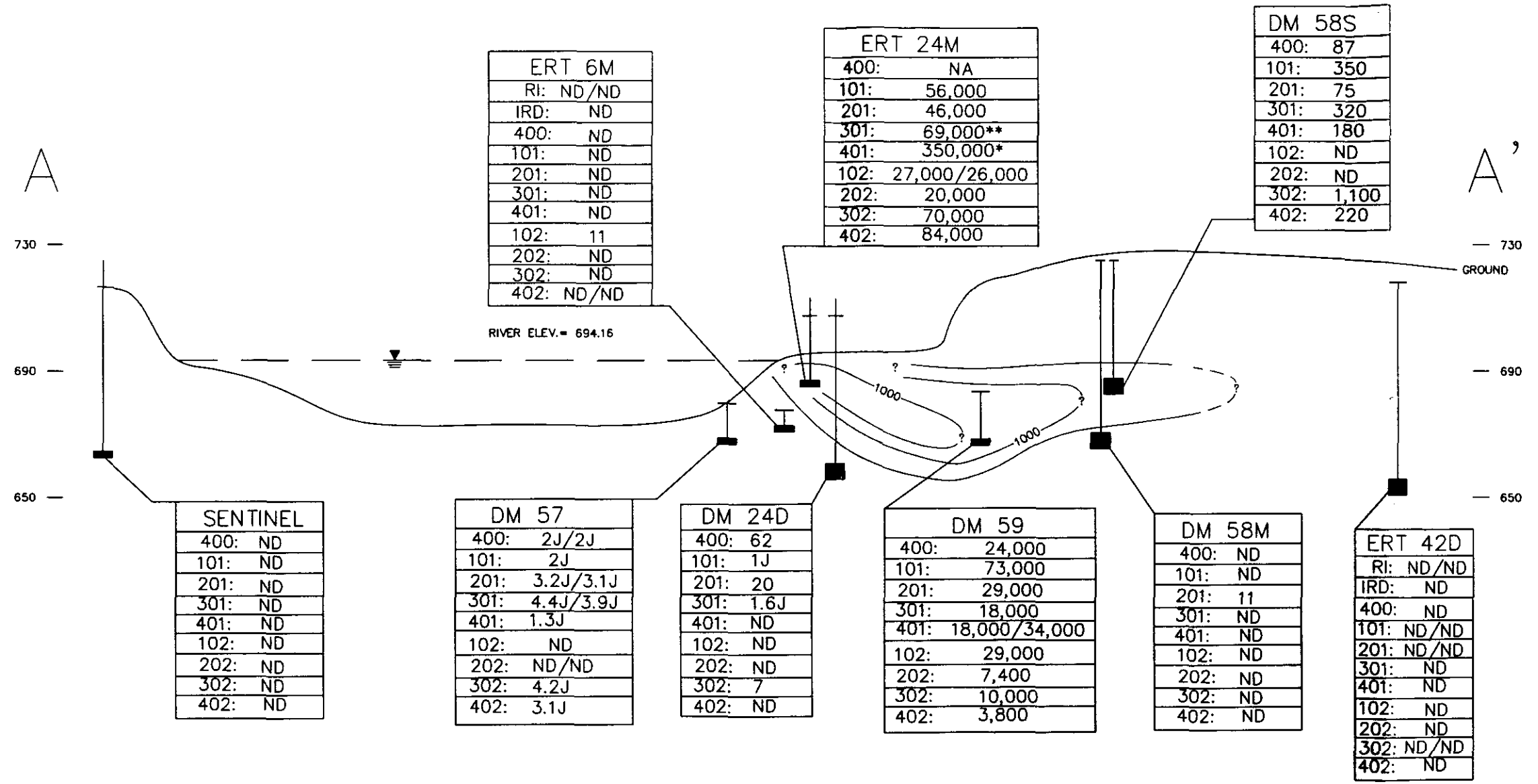


- SECTION LINE
- - - LIMITS OF CAPPED AREA
- ⊙ WATER LEVEL MEASUREMENT ONLY
- ⊕ CONVENTIONAL MONITORING WELL
- ⊗ BARCAD MONITORING WELL

SCALE: AS SHOWN		PROJECT:
PROJECT No. 48230-001-028		OHIO RIVER SITE
		NEVILLE TOWNSHIP, PENNSYLVANIA
DR BY	DM/HP	
	11/28/01	
APP BY	DAG	12/2/01
SHEET TITLE:		
FIGURE 8.		
CROSS SECTION - PLAN VIEW		

AR303740

\\pghen2\Info\Projects\Neville Island Park\Drawings\cross section plan view.dwg



ERT 6M	
RI:	ND/ND
IRD:	ND
400:	ND
101:	ND
201:	ND
301:	ND
401:	ND
102:	11
202:	ND
302:	ND
402:	ND/ND

ERT 24M	
400:	NA
101:	56,000
201:	46,000
301:	69,000**
401:	350,000*
102:	27,000/26,000
202:	20,000
302:	70,000
402:	84,000

DM 58S	
400:	87
101:	350
201:	75
301:	320
401:	180
102:	ND
202:	ND
302:	1,100
402:	220

SENTINEL	
400:	ND
101:	ND
201:	ND
301:	ND
401:	ND
102:	ND
202:	ND
302:	ND
402:	ND

DM 57	
400:	2J/2J
101:	2J
201:	3.2J/3.1J
301:	4.4J/3.9J
401:	1.3J
102:	ND
202:	ND/ND
302:	4.2J
402:	3.1J

DM 24D	
400:	62
101:	1J
201:	20
301:	1.6J
401:	ND
102:	ND
202:	ND
302:	7
402:	ND

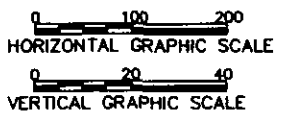
DM 59	
400:	24,000
101:	73,000
201:	29,000
301:	18,000
401:	18,000/34,000
102:	29,000
202:	7,400
302:	10,000
402:	3,800

DM 58M	
400:	ND
101:	ND
201:	11
301:	ND
401:	ND
102:	ND
202:	ND
302:	ND
402:	ND

ERT 42D	
RI:	ND/ND
IRD:	ND
400:	ND
101:	ND/ND
201:	ND/ND
301:	ND
401:	ND
102:	ND
202:	ND
302:	ND/ND
402:	ND

*: RESULT FROM QUARTER FOLLOWING ACID CLEANING OF THE WELL SCREEN
 **: RESULT FROM QUARTER WHEN ACID CLEANING OF THE WELL SCREEN OCCURRED
 J: ESTIMATED BELOW THE PQL
 ND: BELOW DETECTION LIMIT
 NA: NOT ANALYZED
 IRD: RESULTS FROM: INTRINSIC REMEDIATION DEMONSTRATION OF THE OHIO RIVER SITE, DAMES & MOORE, 1996 (µg/L)
 RI: RESULTS FROM: REMEDIAL INVESTIGATION REPORT OF THE OHIO RIVER, ENSR, 1994 (µg/L)
 -100- ISOCONCENTRATION CONTOUR (µg/L) (402 DATA)

NOTE: ALL DETECTIONS ARE IN # g/L



VERTICAL EXAGGERATION= 5x

SCALE: AS SHOWN	PROJECT: OHIO RIVER SITE NEVILLE TOWNSHIP, PENNSYLVANIA
PROJECT No. 4230-01-020	URS
DR BY: AP 1/8/03	
APP BY: DAG 1/8/03	
SHEET TITLE: FIGURE 9. CROSS SECTION	

AR303741

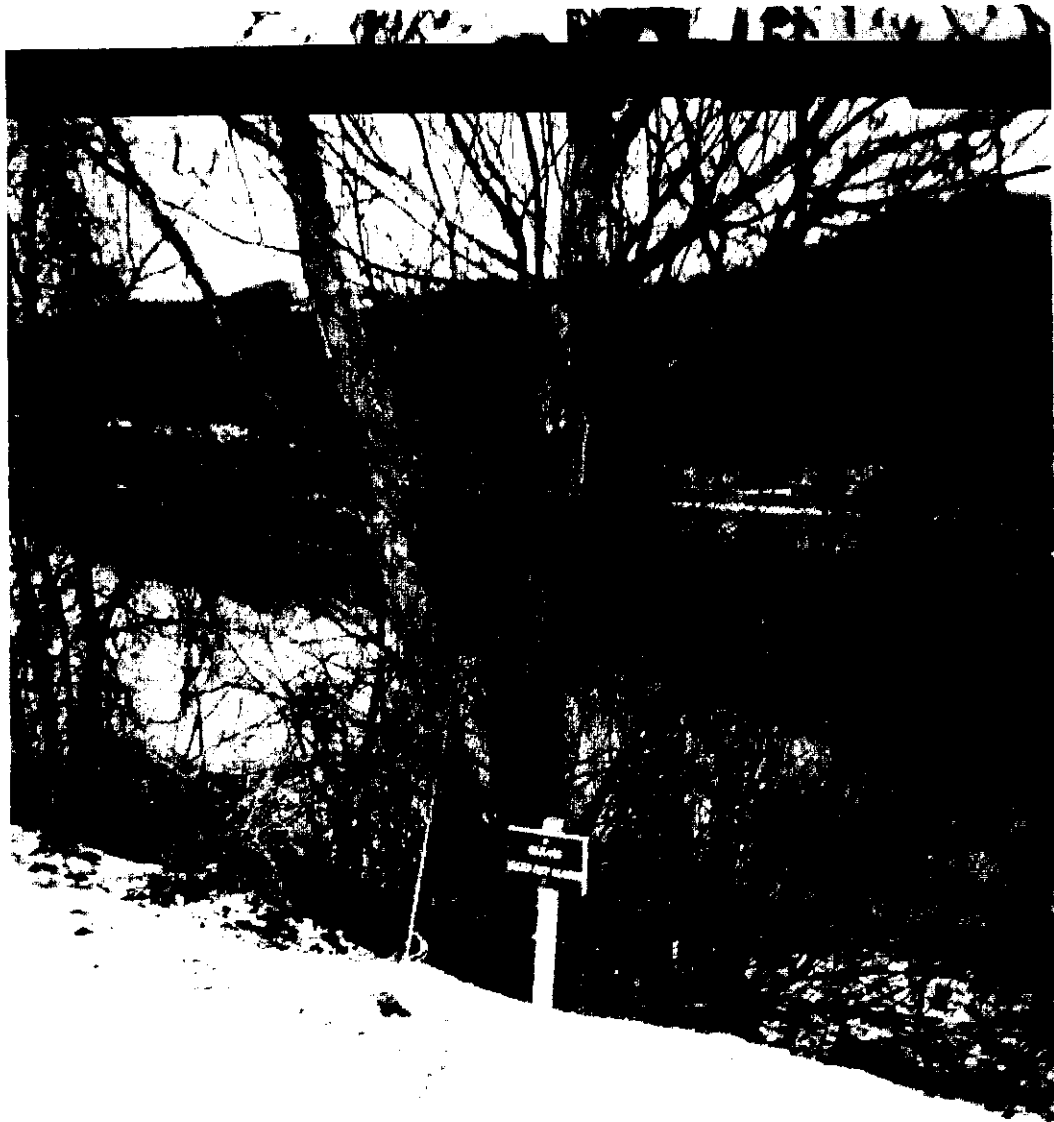
APPENDIX A

PHOTOGRAPHS FROM THE SITE INSPECTION

AR303742



AR303743



AR303744



AR303745



AR303746



AR303747



AR303748