131659

SUPERFUND PROGRAM PROPOSED PLAN

Ohio River Park Site

Operable Unit Three
Neville Island
Allegheny County, Pennsylvania

February 1998

INTRODUCTION

The United States Environmental Protection Agency Region III (EPA) has identified the Preferred Alternative to address hazardous contamination in **groundwater**, **surface water**, and **sediment** at the Ohio River Park Superfund Site ("Site") located on Neville Island in Allegheny County, Pennsylvania (see Figure 1). The major components of EPA's Preferred Alternative (Alternative 3 in this Proposed Plan) include **monitored natural attenuation**, and **institutional controls**. (Terms in bold print are defined in the Glossary.)

This Proposed Plan is based on site-related documents contained in the **Administrative Record** for the Site including the **Remedial Investigation**, the **Baseline Risk Assessment**, the **Ecological Risk Assessment**[1], the **Feasibility Study**, and the **Intrinsic Remediation Demonstration**. The Administrative Record is at the following locations:

Coraopolis Memorial Library
State and School Streets
Coraopolis, PA 15108
(412) 264 - 3502

U.S. EPA-Region III Docket Room
Ms. Anna Butch
841 Chestnut Building, 9th Floor
Philadelphia, PA 19107
(215) 566-3157

EPA and the Commonwealth of Pennsylvania encourage the public to review and comment on the Preferred Alternative, the Proposed Plan, and other documents in the Administrative Record file. The public comment period begins on February 25, 1998 and closes on March 26, 1998. On March 17, 1998, at 7:00 p.m., EPA will hold a public meeting to discuss the Proposed Plan at the Neville Township Municipal Building, 5050 Grand Avenue, Neville Island, PA. Written comments, postmarked no later than March 26, 1998, should be sent to:

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[1] The ERA consists of Sections 1.0 - 3.0 of the Draft Ecological Risk Assessment prepared by the Potentially Responsible Party (PRP) as supplemented by EPA's Data Interpretation, dated November 18, 1994.

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Interested persons are encouraged to submit their comments on the Proposed Plan and the other documents in the Administrative Record to EPA during the public comment period. Although EPA has selected a preferred alternative, no final decision has been made. EPA may modify the Preferred Alternative, select another response action or develop another alternative, if public comment warrants such an action or if new material is presented. EPA, the lead agency, in consultation with the Pennsylvania Department of Environmental Protection (PADEP), the support agency, will make its final selection of a remedy for the Site in a **Record of Decision (ROD).**

This Proposed plan fulfills the public notification requirements of Sections 113(k)(2)(B), 117(a), and 121(f)(1)(G) of the **Comprehensive Environmental Response, Compensation, and Liability Act** of 1980, as amended (CERCLA) 42 U.S.C. §§ 9613(k)(2)(B), 9617(a), and 9621(f)(1)(G).

SCOPE AND ROLE OF RESPONSE ACTIONS

EPA has divided the Site into three areas or Operable Units. The first operable unit includes approximately 31 acres owned by the Neville Land Company (NLC), and located north of Grand Avenue and west of the Coraopolis Bridge (see Figure 2). This operable unit is referred to as Operable Unit 1 (OU-1) of the Site. OU-1 includes buried waste and soil contamination. EPA determined in its record of Decision issued on September 30, 1996 that the required remedial action for OU-1 includes capping, surface water runoff controls, monitoring, and institutional controls. Through a Consent Decree entered on December 31, 1997, NLC and its parent, Wilmington Securities, Inc. (WSI), agreed to implement the remedy. The second operable unit is an approximately one-acre area on the southeast corner of the Site that includes an approach roadway for the Coraopolis Bridge and a meadow along the Back Channel of the Ohio River. This area is referred to as "the Bridge Portion of the Site" or Operable Unit 2 (OU-2) and is owned by Allegheny County. EPA determined that no cleanup action is required for OU-2 in its Record of Decision signed on March 31, 1993. Operable Unit 3 (OU-3) of the Site pertains to the same area as OU-1, but includes groundwater, surface water, and sediment contamination.

The primary objective of the remedy described in this Proposed Plan is to reduce or eliminate the potential for human or ecological exposure to contaminated groundwater in the OU-3 portion of the Site and in other areas potentially impacted by the Site. The preferred cleanup outlined in this Proposed Plan will comprehensively address the threats posed by the release of hazardous substances from the Site.

SITE BACKGROUND AND HISTORY

The Site consists of approximately 31 acres on the western end of Neville Island, approximately 10 miles downstream from the City of Pittsburgh. 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.

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 930 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 approximately four-mile radius of the Site is 18,058 people.

The Site consists primarily of open fields surrounded by trees and underbrush which form a perimeter adjacent to the river. The major structures on the Site include a maintenance building, asphalt-covered parking lots, roadways, and old concrete foundations.

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 Agricultural 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 used for disposal of tar acid, tar decanter, and occasionally agricultural chemical wastes have been identified. Figure 3 and 4 show the approximate disposal locations of various wastes at the Site. PC&C operations ceased in 1965-66. PC&C merged into Wilmington Securities, Inc., the parent corporation of the Neville Land Company (NLC).

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, some materials were reburied at the Site. After this discovery, Allegheny County transferred the title to the land back to NLC. A small portion of the property, which was acquired from another source to complete the park, was not transferred to NLC. Subsequently, by deed dated May 12, 1997, Allegheny

County transferred this property to NLC.

Based on information and data collected by Allegheny County, the NLC, Pennsylvania Department of Environmental Resources Protection (PADER, now the Pennsylvania Department of Environmental Protection (PADEP), and EPA from 1977 through 1989, EPA proposed to include the Site on the National Priorities List of Superfund sites on October 16, 1989 and subsequently placed the Site on the list on August 30, 1990. In October 1991, EPA and Neville Land Company, the owner of the Site, entered into an Administrative Order on Consent in which Neville Land Company agreed to conduct a Remedial Investigation/Feasibility Study of the Site with EPA and State oversight. The Remedial Investigation Report (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 in April 1995 describing the remedial action objectives and comparing cleanup alternatives for the Site.

During the Spring of 1996, NLC proposed to submit additional data showing that natural attenuation processes (NA), which NLC called "intrinsic remediation", would be an appropriate remedy for contaminants in the plume at the Site. EPA agreed to postpone the issuance of the ROD for the groundwater remedy pending completion of this study. In 1996 and 1997 NLC presented two submissions of the Intrinsic Remediation Demonstration study (IRD), and an additional document entitled the Groundwater Quality Beneath the Ohio River Back Channel (BC study). In this documentation NLC evaluated results of groundwater sampling collected on the Site and away from the Site, including locations beneath the Ohio River Back Channel and data from the sentinel well located across the Back Channel. The evaluation of these results included modeling of the biological, physical, and chemical mechanisms involved in the natural attenuation process, which lead to reduction of the total mass of contaminants dissolved in groundwater. Based on this evaluation the IRD projected the fate and transport of contaminants in the plume.

NATURE AND EXTENT OF CONTAMINATION

The ROD for OU-1 is based on the May 1994 RI report. This RI Report shows that Semi-volatile Organic Compounds (SVOCs) are in soils across the entire Site with the highest levels in the south central portion of the Site. These are mostly Polyaromatic Hydrocarbons (PAHs), at concentrations up to 449 parts per million (ppm). Among the twelve Volatile Organic Compounds (VOCs) detected in the groundwater at the Site, benzene is the contaminant of greatest concern. It was detected throughout the plume at concentrations up to 50 ppm. Other groundwater contaminants, although not as commonly detected as benzene, included phenol (up to 85 ppm), 2-chlorophenol (up to 6.7 ppm), methylphenol (up to 76 ppm), and 2,4,6-trichlorophenol (2,4,6-TCP) (up to 210 ppm). The groundwater contaminant plume is located beneath the trench areas in the southeastern portion of the Site. The results of the groundwater investigation presented in the RI report, did not provide a comprehensive data set to define the horizontal and vertical extent of this plume nor a proper evaluation of the contaminants fate and mobility. This information is especially critical to evaluate and define the potential impact to the Coraopolis drinking water wells, which produce water from the aquifer underlying the Site, located 500 feet south and on the opposite bank of the Ohio River Channel. Consequently, EPA limited the OU-1 ROD to the soil and buried waste in order to permit NLC to collect additional data which would define the extent of contamination and enable an adequate characterization of the occurrence and effectiveness of NA processes at the Site.

The IRD, which was submitted to EPA in October 1996, was methodically designed to collect and evaluate NA evidence. As a result of active consultations with EPA and PADEP, the IRD was revised in February 1997, and then additional response letters were added on February 27, 1997, and on August 20, 1997. Additionally, a supplemental study (BC study) which complemented the IRD was completed on August 20, 1997. All this documentation is referred to collectively as the IRD study. The IRD demonstrates that the observed NA is occuring at rates sufficient to be protective of human health and the environment. The study pinpoints the extent and fate of the plume by sampling, evaluating, and modeling biological, physical and chemical aspects of NA. The study is divided into two separate, but related components: 1) evaluation of the extent and stability the plume, and 2) evaluation of fate and transport of the plume, in its relation to the Coraopolis well field. Within each of these components, a number of tasks were performed as listed below:

1. Tasks Associated with Evaluating Extent and Stability of the Plume:
   Evaluation of existing monitoring well operability and initial (May 1996) sampling
   Drilling and installation of nine new monitoring wells
   Groundwater sampling and analysis of 37 monitoring wells
   Assessment of past and present plume configuration
   Analysis of redox reactions based on electron acceptor relationships

2. Tasks Associated with Fate and Transport of the Contaminants:
   Analysis of aquifer parameters
   Water level monitoring
   Flow net analysis
   Pumping test at Coraopolis well field
   Development of a three-dimensional groundwater flow model
   Solute transport modeling
   Evaluation of mass balance
   Evaluation of mass loading to surface water
   Sampling aquifer beneath the Back Channel

The IRD characterized the nature and the extent of contamination as follows:

Aquifer

To characterize the relation of the aquifer at the Site to the Coraopolis well field, a pumping and recovery test was conducted using production wells from the Coraopolis Municipal well field. The well field consists of three primary supply wells (wells 2, 6, and 8) and four backup wells. The annual average production rate for the system is approximately 850,000 gallons per day (gpd). To evaluate the potential influence of the contaminated plume at the Site on the municipal wells during higher than average production rates the pumping rates during the test were higher than daily water production at the well field. The results of the test indicate that the aquifer at the Coraopolis well field exhibits the characteristics of a partially confined or leaky confined alluvial aquifer with a low storage capacity and transmissivity. The observations show no measurable hydraulic connection between the Coraopolis well field and the Site, under extreme pumping conditions. Groundwater fluctuations in the Site wells closely match fluctuations in the Ohio River, indicating the high degree of hydraulic interconnection and dominating relationship between the river and the aquifer. To further evaluate whether the groundwater pumping at the Coraopolis well field has the potential to capture groundwater originating at the Site, the IRD includes a three-dimensional groundwater flow model called the FTWORK model. The FTWORK model shows that the Ohio River is the source of virtually all of the water captured by the Coraopolis well field. Although sensitivity analysis shows that a theoretical flow path is possible between groundwater at the Site and the Coraopolis well field, this possibility exists only under certain short-term hydraulic conditions. Even in this case, the relative contribution of water from the site would be less than 0.2 percent. In reality, such a scenario is unlikely because the constant fluctuations in the Ohio River and direct hydraulic connection between the river and the aquifer result in a dominant flow downstream, not toward the Coraopolis well field.

The Extent of the Plume

After reviewing the revised IRD, EPA and PADEP encouraged NLC to supplement this document with an additional study to determine southern extent of the plume. NLC responded with the BC study, which includes the results of 13 groundwater samples collected in August 1997 at nine locations south of the western tip of Neville Island beneath the Ohio River Back Channel (Figure 5). The locations of the borings were approved by EPA and PADEP. Because benzene and phenolics are the most prevalent compounds in the plume, benzene and 2,4,6-TCP were used as indicator parameters for defining the extent of the plume. Benzene was detected in one location at concentrations of 6.7 ppb and 1.0 ppb. Other VOCs detected were toluene (four samples), xylenes (one sample), carbon disulfide (one sample), and 2-hexanone (one sample), all at concentrations below **Maximum Contaminant Levels** (MCLs). Two phenolic compounds were detected at estimated concentrations of only 1/10 the method detection limit. 4-Methylphenol was detected in one sample and 2,4-dimethyl phenol was detected in three samples. No other phenolic compounds were detected. The distribution of the benzene concentrations in the Back Channel in the mid-depth portion of the aquifer (Figure 6) and the deeper portion of aquifer (Figure 7) confirms that the plume is limited to the southern shore of the Site with little contamination migrating to the south. The concentrations and distribution of xylenes, toluene, and phenolics are also consistent with the ORS plume, as defined by the RI and IRD.

The results of the IRD include the primary evidence proving that both the area of the plume and the concentrations of its main contaminants are reduced or stabilized in time. The IRD study focussed on two components of the plume: benzene and 2,4,6-TCP, which are treated as indicators of the plume. Additionally, to allow comparison with historical data, the IRD groundwater sampling includes the same constituents of the plume (VOCs and SVOCs) as the RI Report. The comparison of RI and IRD results is presented in Tables 1 and 2. The tables show virtually no change in the plume character based on the number and type of constituents detected between 1993 and 1996. The benzene plume, located on the trench area, is elliptical in shape and elongated southeast-northwest in the shallow, mid-depth, and deep ground water. Its area decreased steadily over time, and the current plume is smaller than benzene plumes in 1981, 1984, 1987, and 1993 (Figures 8, 9, 10 ,and 11). The comparison of the probable area of coal coking sludge disposal, which is the main source of benzene, and the boundary of 1996 benzene detections (Figure 12) confirms the spacial stability of the plume. The concentration and distribution of VOCs and phenolics (Figure 13), showed a pattern similar to the results of RI Report.

Natural Attenuation of the Plume

A major task of the IRD was to demonstrate the presence and extent of active biodegradation processes within the plume, the effectiveness of biodegradation in controlling the development of the plume, and establishing rates of biodegradation. The ultimate objective of this portion of the study was the development of a predictive model for fate and transport of the plume that can be used to demonstrate the long-term effectiveness of the intrinsic remediation processes occurring at the Site as a principal element of the ground water remedy for the Site. This task was accomplished by: 1/ assessing plume configuration and characterizing its dynamic development, using direct sampling for key contaminants and their degradation products; and by 2/ verifying the occurrence of active biodegradation processes within and at the boundaries of the plume by measurement and comparison of the relationships of specific geochemical indicators, concentrations, and degradation products.

Biodegradation processes rely on naturally occurring microbes which use chemical compounds as a source of energy. Biodegradation is accomplished by a series of chemical reactions taking place in very slowly flowing groundwater. The order of these reactions depends mostly upon the amount of energy that they produce; those reactions that produce the greatest amount of energy occur first. As the higher energy reaction ends, the next lower energy reaction will occur. The first reaction uses oxygen (aerobic reaction) and it occurs as long as there is enough dissolved oxygen. This process is then followed by a series of reactions (anaerobic reactions) in which nitrate, manganese, ferric iron, sulfate, and carbon dioxide sequentially assume the role of oxygen. As a result of these microbially mediated reactions, the substances which can be utilized as a source of energy are depleted in the groundwater within the plume, and the concentration of the by-products of NA reactions grows. The IRD study analyzed the following parameters:

dissolved oxygen, nitrate, sulfate, dissolved manganese, dissolved iron, methane, and carbon dioxide. The study found that along the margins of the plume there is a zone of the depleted dissolved oxygen (Figure 14). The existence of this zone proves aerobic degradation along the margins of the plume. The depletion of dissolved oxygen to concentrations less than 0.5 mg/L within the body of the plume indicates that further biodegradation of organic constituents in the plume interior is taking place by anaerobic processes. Evidence of these anaerobic processes is in the form of metabolic by-products that accumulate in the vicinity of the plume and migrate downgradient of the plume over time. By-products of anaerobic degradation present at the Site include dissolved manganese, dissolved iron, carbon dioxide, and alkalinity. Both authors of the IRD and the EPA's expert, Dr. John Wilson of the EPA Robert S. Kerr Environmental Research Laboratory in Ada, Oklahoma who used his own computer model to project fate of contaminants at the Site, agree that sulfate makes an excellent tracer of the plume location and NA reactions taking place within the plume. The present 300 to 400 foot separation that exists between the leading edge of the benzene plume and the zone of elevated sulfate, and dissolved manganese and dissolved iron (NA by-products) is a measurable demonstration of the attenuating effect biodegradation has had on constraining migration of the plume by destruction of organic constituents.

While this demonstration focussed on the natural attenuation of benzene, all of the other organic constituents present in the groundwater at the Site (2,4,6-TCP, toluene, ethylbenzene, and xylenes) also biodegrade and, therefore, follow similar if not the same natural attenuation processes as benzene. The selection of benzene as the primary focus of the study was appropriate given the limited occurrence of these other compounds in the plume.

SUMMARY OF SITE RISKS

Following the RI Report, 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. Both documents, however, presented the risk before remedial action for OU-1 started.

Baseline Human Health Risk Assessment: The BLRA assesses the toxicity, or degree of hazard, posed by contaminants related to the Site, and involves describing the routes by which humans and ecological receptors could come into contact with these substances. Separate calculations are made for those substances that can cause cancer (carcinogenic) and for those that can cause non-carcinogenic, but adverse, health effects.

The National Oil and Hazardous Substances Pollution Contingency Plan ("NCP") established acceptable levels of carcinogenic risk for Superfund sites ranging from one excess cancer case per 10,000 people exposed to one excess cancer case per one million people exposed. This translates to a risk range of between one in 10,000 and one in one million additional cancer cases. Expressed as scientific notation, this risk range is between 1.0E-04 and 1.0E-06. Remedial action is warranted at a site when the calculated cancer risk level exceeds 1.0E-04. However, since EPA's cleanup goal is generally to reduce the risk to 1.0E-06 or less, EPA also may take action where the risk is within the range between 1.0E-04 and 1.0E-06.

The NCP also states that sites should not pose a health threat due to non-carcinogenic, but otherwise hazardous, chemicals. EPA determines a non-carcinogenic threat by the ratio of the contaminant concentration at the Site that a person may encounter to the established safe concentration. If the ratio, called the **Hazard Index (HI)**, exceeds one (1.0), there may be concern for the potential non-carcinogenic health effects associated with exposure to the chemicals. The HI identifies the potential for the most sensitive individuals to be adversely affected by the noncarcinogenic effects of chemicals. As a rule, the greater the value of the HI above 1.0, the greater the level of concern.

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

- VOCs (benzene; 1,2-Dichloroethane; and 1,1,2-Trichloroethane);
- SVOCs (Benzo[a]pyrene; Dibenzo[a,h]anthracene; 4-Methylphenol; 2,4-Dichlorophenol; and 2,4,6-Trichlorophenol);
- pesticides (Dieldrin, α-BHC, and γ-Chlordane); and
- inorganic elements (manganese, beryllium, arsenic, and mercury).

The following groups of individuals could be exposed to Site contaminants either currently and/or in the future and were evaluated in the BLRA:

- future residents living on the Site and using either groundwater or publicly- supplied water;
- off-site residents using groundwater or water from the river that came from the Site and using the Site recreationally;
- solely recreational users of the Site;
- future commercial or industrial workers at the Site using either groundwater or publicly-supplied water;
- trespassers.

Individuals could potentially be exposed to Site contaminants in various ways. The exposure routes evaluated in the risk assessment include:

- drinking, breathing while showering, and direct skin contact with groundwater and surface water;
- placing objects such as hands contaminated with Site soil and sediment in the mouth; and
- eating fish from the river.

Different combinations of the above routes of exposure were considered for various groups of individuals that could be exposed to Site contaminants. Table 1 below summarizes the total risk levels from all appropriate exposure routes calculated for each group of individuals.

Table 1 Human Health Risks at the Site		
Group of Individuals	**Cancer Risk**	**Hazard Index**
On-Site Residents consuming groundwater	4.54E-02	10,000
On-Site Residents on public water supply	3.70E-04	27.2
Off-Site Residents consuming groundwater from the Site	2.95E-04	1,710
Off-Site Residents consuming river water that came from the Site	3.40E-04	34.3
Recreational Site Users	2.51E-04	25.9
On-Site Workers consuming groundwater	1.48E-02	732
On-Site Workers on public water supply	1.45E-05	0.0234
Trespassers	3.37E-06	0.0321

In December 1997, EPA approved a 30-percent Remedial Design Report for OU-1 (30% RD), which presents the details of the multilayer cap, which will cover three trench disposal areas, and an erosion cap, which will cover the non-vegetated parts of the Site. The construction of the cap and erosion cover will drastically modify the BLRA's data by eliminating one path of exposure, through direct contact with soil contaminants, and by diminishing risk from other exposure pathways. This will make the health risk acceptable for recreational site users, workers and trespassers. The risk evaluation presented in the BLRA must be additionally modified by using more accurate numbers generated during the IRD assessment. Specifically, IRD estimates that the amount of site-contaminated groundwater that hypothetically can enter the Coraopolis wells is 0.2 percent, what is ten times less than the 2 percent predicted in the RI Report. It is expected that this percentage will be even smaller because the caps will significantly diminish rain infiltration through the contaminated soil and buried waste, and will stabilize the plume. EPA assumes, therefore, that covering the soils with caps and NA will result in achieving the EPA's acceptable risk level for off-site residents who use Coraopolis drinking water wells. In addition, the institutional controls presented in the ROD will eliminate the future possibility of residential development and/or use of groundwater at the Site. Permanent warning signs will also be posted at the Ohio River banks to warn potential fisherman against eating bottom-feeding fish. Consequently, EPA assumes that by implementing the above remedial action components, risk levels for all groups of Site users will be within the EPA accepted risk range.

Ecological Risk Assessment: 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) have 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 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. A pathway by which chemicals reach the river is groundwater, which is contaminated by several contaminants of ecological concern, particularly mercury, zinc, phenols and phthalates. Pesticides and chlorocarbons are also of concern. EPA projects that by capping the contaminated soils at the Site and stabilizing the plume, Site contribution to the degradation of the river will be significantly diminished.

SUMMARY OF ALTERNATIVES

The Feasibility Study discusses the full range of alternatives evaluated for the Site and provides supporting information relating to the alternatives in this Proposed Plan. This Proposed Plan includes a "No Action" alternative required by the NCP and two alternatives that are protective of human health and the environment, achieve state and federal regulatory requirements, and best achieve the cleanup goals for OU-3 at the Site. These alternatives are based on those presented in the Feasibility Study. Reviewers are encouraged to comment on the additional alternatives presented in the Feasibility Study as well as those included in this Proposed Plan.

Alternative 1: No Action

Present Worth Cost: $0
Time to Implement: 0

The NCP requires that EPA consider a "No Action" alternative for every Superfund site to establish a baseline or reference point against which each of the remedial action alternatives are compared. In the event that the other identified alternatives do not offer substantial benefits in the reduction of toxicity, mobility, or volume of the constituents of concern, the

No Action alternative may be considered a feasible approach. This alternative leaves the Site undisturbed and all current and potential future risks would remain.

Alternative 2: Groundwater Extraction and Treatment, Long-Term Monitoring, and Institutional Controls

Total Present Worth Cost: $9,990,000
Time to Implement: 30 years

Groundwater Extraction and Treatment: A groundwater extraction and treatment system would be designed and installed to contain the contaminated groundwater at the Site and prevent off-site migration of contamination. The groundwater extraction system would consist of five deep groundwater extraction wells, operating with a total flow rate of 200 gallons per minute (GPM). The location of the extraction system and wells would be determined during the remedial design. The groundwater treatment system would include a metal precipitation unit to extract high concentrations of inorganic contaminants followed by a 200 GPM air stripping system to remove the volatile organic contaminants. Before being discharged to the Ohio River, the air stripper effluent would be passed through an activated carbon bed to remove the residual organic contaminants, as well as pesticides and herbicides. The system would be designed to achieve State surface water discharge requirements. Groundwater extraction and treatment will continue at the Site until concentrations of the contaminants of interest, which include benzene and 2,4,6-TCP, meet MCL standards, established under the Safe Drinking Water Act (SDWA), for 12 consecutive quarters throughout the area of attainment. The area of attainment encompasses the edge of the waste trenches left in place at the southern shore of Neville Island and the downgradient benzene plume that extends beneath the Back Channel. When the pump-and-treat operation is suspended as a result of meeting MCLs for the contaminants of interest, a long-term post pump and treat monitoring program shall be designed and implemented. The monitoring frequency will be determined during the Remedial Action and based on the statistical evaluation of the data collected during the Remedial Action. In the event a statistical evaluation of three years of post pump and treat monitoring results demonstrates that any contaminant of interest is above its MCL, extraction and treatment shall resume.

A *long-term monitoring program* would be required to assess the effectiveness of the groundwater extraction and treatment system in controlling off-site migration of contaminated groundwater. This monitoring program will consist of three years of quarterly sampling with a potentially reduced frequency for some or all of the monitoring wells to semiannual or annual thereafter reliant upon the results of the initial 12 quarters. A statistical analysis, the method and approach which will be outlined in the Remedial Design, will be performed on the 12 quarters of data to determine the appropriate monitoring frequencey. For all sample results which are "not-detect", the detection limit concentration will be used when performing the statistical analysis. Although the exact location and number of groundwater monitoring points will be determined in the Remedial Design, the following number and general locations were used for cost-estimating purposes:

- eight on-site monitoring points located along the property line on the Back Channel side of the island;
- three off-site monitoring points, i.e., bar-Cad wells, located beneath the Back Channel and monitoring the downgradient edge of the benzene plume;
- one off-site monitoring point, i.e., bar-Cad well, located beneath the Main Channel; and
- the Coraopolis sentinel well.

The analytical requirements include:

- monitor on-site monitoring wells and the Coraopolis sentinel well for VOCs, metals, and NA parameters (Specific Conductivity, Redox Potential, Dissolved Oxygen, Ferrous Iron); and
- monitoring at the off-site monitoring wells for benzene, 2,4,6-TCP, sulfate, Iron II, Manganese II and Redox-Potential.

Water level measurements would also be required to evaluate the hydraulic performance of the extraction system.

Institutional controls would be implemented to restrict land and groundwater use at the Site and reduce the potential for human exposure to contamination. Deed restrictions would be required to eliminate the future possibility of residential development and/or use of groundwater at the Site. Permanent warning signs would also be posted along the Ohio River bank to warn potential fishermen against eating contaminated fish.

Alternative 3: Monitored Natural Attenuation, and Institutional Controls

Total Present Worth Cost: $1,010,000
Time to Implement: 30 years

This alternative is based upon components of Alternative 2 but does not include construction of a groundwater extraction and treatment system. This Alternative includes two elements:

A *long-term monitoring program* would be required to assess the effectiveness of NA and to trigger a contigency remedy in the event the monitoring results reveal that NA processes are not protective to human health and the environment. This monitoring program will consist of three years of quarterly sampling with a potentially reduced frequency for some or all of the monitoring wells to semiannual or annual thereafter based upon the results of the initial 12 quarters. A statistical analysis, the method and approach for which will be outlined in the Remedial Design, will be performed on the 12 quarters of data to aid in determining the appropriate monitoring frequency. For all sample results which are "not-detect", the detection limit concentration will be used when performing the statistical analysis. Although the exact location and number of ground water monitoring points will be determined in the Remedial Design, the following number and general locations were used for cost-estimating purposes:

- eight on-site monitoring points located along the property line on the Back Channel side of the island;
- three off-site monitoring points, i.e., bar-Cad wells, located beneath the Back Channel and monitoring the downgradient edge of the benzene plume;
- one off-site monitoring point, i.e., bar-Cad well, located beneath the Main Channel; and
- the Coraopolis sentinel well.

The analytical requirements include:

- monitor on-site monitoring wells and the Coraopolis sentinel well for VOCs, metals, and NA parameters (Specific Conductivity, EH, Dissolved Oxygen, ferrous iron); and
- monitoring at the off-site monitoring wells for benzene, 2,4,6-TCP, sulfate, Iron II, Manganese II and Redox-Potential.

In the event the statistical evaluation of the first three years of data indicates that NA processes continue to reduce the plume with no evidence of migration of benzene and 2,4,6-TCP, EPA may reduce the sampling frequency to semi-annual or annual thereafter for the following analytical requirements:

- on-site wells for benzene, 2,4,6-TCP, sulfate, Iron II, Manganese II, and Redox Potential;
- off-site wells for benzene, 2,4,6-TCP, and NA parameters (Specific Conductivity, EH, Dissolved Oxygen, Ferrous Iron); and
- the Coraopolis sentinel well for VOCs and metals.

However at anytime during the long-term monitoring program, if the collected data demonstrate that contaminants migrate off-site at levels that pose unacceptable human health or environmental risk, a contingency measure including the installation of the pump-and-treat system described in Alternative II must be implemented.

Institutional controls would be implemented to restrict land and groundwater use at the Site and reduce the potential for human exposure to contamination. Deed restrictions would be required to eliminate the future possibility of residential development and/or use of groundwater at the Site. Warning signs shall be posted along the banks of the island to warn fishermen against eating fish. These signs shall be properly maintained as long as the fish in the Ohio River are found to have high levels of contaminants that can cause adverse human health effects. The exact wording of these signs shall be agreed upon during the Remedial Design by DEP and EPA.

COMPARATIVE EVALUATION OF ALTERNATIVES

Each of the three (3) remedial alternatives summarized in this plan has been evaluated with respect to the nine (9) evaluation criteria set forth in the NCP, 40 C.F.R. Section 300.430(e)(9). These nine criteria can be categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria. A description of the evaluation criteria is presented below:

Threshold Criteria:

1. *Overall Protection of Human Health and the Environment* addresses whether a remedy provides adequate protection and describes how risks are eliminated, reduced, or controlled.
2. *Compliance with Applicable or Relevant and Appropriate Requirements* (ARARs) addresses whether a remedy will meet all of the applicable, or relevant and appropriate requirements of environmental statutes.

Primary Balancing Criteria:

3. *Long-term Effectiveness* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals are achieved.
4. *Reduction of Toxicity, Mobility, or Volume through Treatment* addresses the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume of contaminants.
5. *Short-term Effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and environment that may be posed during the construction and implementation period until cleanup goals are achieved.
6. *Implementability* addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
7. *Cost* includes estimated capital, operation and maintenance costs, and present worth costs.

Modifying Criteria:

8. *State Acceptance* indicates whether, based on its review of backup documents and the Proposed Plan, the State concurs with, opposes, or has no comment on the preferred alternative.
9. *Community Acceptance* will be assessed in the Record of Decision following a review of public comments received on the Proposed Plan and supporting documents included in the Administrative Record.

1. Overall Protection of Human Health and the Environment

A primary requirement of CERCLA is that the selected remedial alternative be protective of human health and the environment. A remedy is protective if it reduces current and potential risks to acceptable levels under the established risk range posed by each exposure pathway at the Site.

Covering the Site with two types of caps, to be implemented under the Consent Decree with NLC and WSI consistent with the ROD for OU-1, will control exposure to contamination present at the Site and will significantly diminish the possibility of migration of contaminants from the Site. Both current and potential future users of the Site will not be exposed to unacceptable human health risks as indicated previously in Table 1 of this Proposed Plan. In addition, adverse ecological impacts, which are mainly caused by diluting buried waste and contaminated soil by rainwater, will cease because of the impermeable cap covering the trench areas. It is assumed that Alternative 1 would also protect off-site users of Coraopolis municipal water wells. This Alternative, however, lacks two important components: performance monitoring to evaluate the effectiveness of NA processes, and the contigency remedy to be implemented in the event NA processes fail to perform as anticipated. It is, therefore, theoretically possible that if the behavior of the plume changed, Alternative 1 would not protect off-site users from being exposed to contaminated drinking water. Because this alternative does not meet the threshold criteria of protection of human health and the environment, it will not be considered further in this analysis.

Both Alternatives 2 and 3 include a long-term monitoring program to ensure that Site-related contaminants are not migrating off-site at levels that pose an unacceptable risk to human health or the environment. Alternative 2 further reduces the potential for exposure by implementing a groundwater pump-and-treat system, which would provide active remediation of the groundwater. Under Alternative 3, implementation of the long-term monitoring would trigger the contingency requirement for the pump-and-treat system, in the event of changes in environmental conditions that could impact the effectiveness of NA processes. Both alternatives also include institutional controls to restrict use of the Site to prevent potential exposure to any remaining contaminants.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARS)[2]

Any cleanup alternative considered by EPA must comply with all applicable or relevant and appropriate federal and state environmental requirements. *Applicable* requirements are those substantive environmental standards, requirements, criteria, or limitations promulgated under federal or state law that are legally applicable to the remedial action to be implemented at the

[2] Under Section 121(d) of CERCLA, 42 U.S.C. § 9621 (d), and EPA guidance, remedial actions at CERCLA sites must attain legally applicable or relevant and appropriate federal and promulgated state environmental standards, requirements, criteria and limitations which are collectively referred to as "ARARs", unless such ARARs are waived under Section 121(d)(4) of CERCLA, 42 U.S.C. § 9621(d)(4).

Site. *Relevant and appropriate* requirements, while not being directly applicable, address problems or situations sufficiently similar to those encountered at the Site that their use is well-suited to the particular site. Alternatives 2 and 3 would comply with the following ARARs, as appropriate:

Chemical-Specific ARARs

Groundwater: Under the Safe Drinking Water Act, 42 U.S.C. § 300 f to 300 j-26, and its implementing regulations, 40 C.F.R. Part 141, standards for acceptable concentrations of contaminants in drinking water, MCLs, are established for public water supplies. The long-term monitoring program for Alternatives 2, and 3 will include monitoring the public water supply well that could be potentially impacted by migration of contaminated groundwater from the Site. On-site extraction and treatment of groundwater would be implemented under Alternative 2 to prevent migration of Site-related contaminants and exceedance of MCLs at the off-site public water supply wells. The goal of Alternatives 2 and 3 would be to achieve MCLs at the property line. In addition to monitoring contaminant concentrations, monitoring of NA indicators would be also necessary.

Surface Water: Water quality standards have been established for acceptable concentrations of contaminants in State waters and are set forth in 25 Pa. Code Chapter 93. The long-term monitoring program for Alternatives 2 and 3 will include monitoring to ensure that the river is not adversely impacted by migration of contaminants from the Site. On-site extraction and treatment of groundwater and monitored NA would be required under these alternatives to prevent migration at levels that pose a potential threat to human health or the environment based on the water quality standards or, where appropriate, risk-based calculations.

Action-Specific ARARs

Discharge of Treated Groundwater: The groundwater extraction and treatment component of Alternative 2 involves discharging treated water from the groundwater treatment system into surface water, namely the Ohio River. The more stringent of the substantive requirements of the Clean Water Act and the PA Clean Streams Law regarding discharges to surface waters would be applicable to such discharges, including 40 C.F.R. Part 122 (National Pollutant Discharge Elimination System), 40 C.F.R. Part 131 (Water Quality Standards), 25 Pa. Code Chapter 92 (NPDES: regarding establishment of discharge limits and monitoring) and 25 Pa. Code Chapters 16 and 93 (Water Quality Standards: regarding water quality criteria which must be used in the development of the discharge limits).

Groundwater Storage: Temporary storage requirements set forth in 25 Pa. Code Sections 129.56-57 are applicable to the temporary storage of pumped groundwater prior to removal of VOCs by the air stripper in Alternative 2.

Hazardous Waste Generation: Alternative 2 may result in the generation of wastes that would be regulated under current hazardous waste regulations. Any hazardous waste generated must be handled consistent with the requirements of 25 Pa. Code Chapter 262 Subchapters A (relating to hazardous waste determination and identification numbers), B (relating to manifesting requirements for off-site shipments of hazardous wastes), and C (relating to pre-transport requirements), and 25 Pa. Code Chapter 263 (relating to transporters of hazardous wastes), and 25 Pa. Code Chapter 264 subparts G, I and J (relating to storage of generated hazardous wastes in containers or tanks). In addition, 49 C.F.R. Section 171 is applicable to off-site transportation of hazardous wastes in Alternative 4.

3. Reduction of Toxicity, Mobility, or Volume through Treatment

Section 121(b) of CERCLA, 42 U.S.C. Section 9621(b), establishes a preference for remedial actions which include treatment that permanently and significantly reduces the toxicity, mobility, or volume of contaminants. Alternative 2 would require groundwater extraction and treatment to prevent off-site migration of groundwater that poses unacceptable risks to human health and the environment. The groundwater treatment process would reduce the toxicity, mobility, and volume of contaminants in the groundwater.

Alternative 3 relays on NA processes to reduce the mobility of the contaminants present in the concentrated waste buried in the trench areas. To predict the pace of NA and the fate of contaminants, Alternative 3 utilizes the results of extensive sampling and analysis, which was conducted at the Site to specifically investigate NA processes. Alternative 3 follows the interpretation of these data presented in two three-dimensional transport and fate models of the Site: one by NLC's contractor Dames & Moore, and the other by EPA's John T. Wilson, Ph.D. Both models conclude that the toxicity of contaminants will be reduced by NA, i.e., EPA's model predicts that 24 years of NA would be required to reduce the maximum concentration of benzene at the Site (210 ppm) to 1.7 ppm. Dames & Moore's modelling is more conservative and assumes that in 27 years NA would diminish concentration of benzene from 16 ppm to 4 ppm. Mobility of the plume will be reduced by implementing the ROD for OU-1, which will control infiltration through the concentrated pockets of waste by covering it with an impermeable cap. The volume of waste will be diminished by the NA processes.

4. Implementability

This evaluation criterion addresses the difficulties and unknowns associated with implementing the cleanup technologies associated with each alternative, including the ability and time necessary to obtain required permits and approvals, the availability of services and materials, and the reliability and effectiveness of monitoring. The groundwater extraction and treatment technologies required under Alternative 2 are readily available, however, the hydrogeologic conditions at the Site may make it difficult to effectively contain the plume of groundwater contamination. Additional studies to evaluate the ability to effectively extract groundwater at the Site would be performed during the remedial design.

5. Short-Term Effectiveness

There is a very low short-term risk potential posed by Alternatives 2 and 3 to workers and/or trespassers during construction and monitoring activities at the Site. However, these short-term risks would be minimized using standard safety measures.

6. Long-term Effectiveness and Permanence

Alternatives 2 and 3 provide a permanent and effective long-term remedy. EPA assumes that within 30 years Alternative 3 would clean up the Site to the MCL standards along the borders of the Site. Alternative 2 has a potential to decrease this time by implementing an active cleanup process. The cleanup time for groundwater, however, is not crucial, because the construction of the impermeable cap, required by the OU-1 ROD, will eliminate the major site-related risk which is caused by the direct contact with contaminants at the Site.

7. Cost

The evaluation of costs of each alternative generally includes the calculation of direct and indirect capital costs and the annual operation and maintenance (O&M) costs, both calculated on a present worth basis. The total present worth cost of Alternatives 2 and 3 has been calculated for comparative purposes and is presented in Tables 2 and 3.

Table 2
Estimated Cost of Alternatives
(during first three years after implementation)

Alternative	Total Present Worth Cost
2	$1,700,000
3	$200,000

Direct capital costs include costs of construction, equipment, building and services, and waste disposal. Indirect capital costs include engineering expenses, start-up and shutdown, and contingency allowances. Annual O&M costs include labor and material; chemicals, energy, and fuel; administrative costs and purchased services; monitoring costs; costs for periodic site review (every five years); and insurance, taxes, and license costs. For cost estimation purposes, a period of 30 years has been used for O&M. Alternative 2 is not only much more expensive during the initial three years of operation, but the following years of O&M will require significantly higher expenses.

Table 3 Estimated Cost of Alternatives during 27 following years	
Alternative	Total Present Worth Cost
2	$8,290,000
3	$810,000

The actual duration of operation for the groundwater extraction and treatment system would depend on the ability to successfully limit off-site migration of Site-related contaminants. The actual cost for each alternative is expected to be in a range from 50 percent (50%) higher than the costs estimated to 25 percent (25%) lower than the costs estimated. The evaluation was based on the FS cost estimates, as modified by EPA.

8. State Acceptance

The Commonwealth of Pennsylvania is currently reviewing this Proposed Plan. PADEP has reviewed the supporting documents and provided support to EPA throughout the Superfund process at this Site.

9. Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be discussed in the "Responsiveness Summary" of the Record of Decision for the Site.

PREFERRED REMEDIAL ALTERNATIVE

Based on the comparison of the nine evaluation criteria for each of the alternatives in this Proposed Plan, EPA's preferred alternative is *Alternative 3: Monitored Natural Attenuation and Institutional Controls.* Alternative 3 meets the threshold criteria of overall protection of human health and the environment and compliance with ARARs. In considering the balancing criteria, EPA believes Alternative 2 can be readily implemented, achieves long-term effectiveness and permanence at a reasonable cost, minimizes the short-term impacts, and effectively reduces the mobility of Site contaminants.

THE ROLE OF COMMUNITY IN THE SELECTION PROCESS

This Proposed Plan is being distributed to solicit public comment on the appropriate cleanup action for the Site. EPA relies on public input so that the remedy selected for each Superfund site meets the needs and concerns of the local community. EPA is providing a 30-day public comment period beginning on February 25, 1998 and ending on March 26, 1998, to encourage public participation in the selection process. EPA will conduct a public meeting during the comment period in order to present the Proposed Plan and supporting information, answer questions, and accept both oral and written comments from the public. The public meeting will be held on March 17, 1998, at 7:00 p.m at the Neville Township Municipal Building, 5050 Grand Avenue, Neville Island, Pennsylvania.

EPA will summarize and respond to comments received at the public meeting and written comments post-marked by March 26, 1998, in the Responsiveness Summary section of the Record of Decision, which documents EPA's final selection for cleanup. To obtain additional information relating to this Proposed Plan, please contact either of the following EPA representatives:

Patrick Gaughan (3HS43)
Community Involvement Facilitator
U.S. EPA - Region III
303 Methodist Bldg.
Wheeling, WV 26003
Phone: 304-234-0238

Romuald Roman (3HS22)
Remedial Project Manager
U.S. EPA - Region III
841 Chestnut Bldg.
Philadelphia, PA 19107
Phone: 215-566-3212

GLOSSARY

Administrative Order On Consent: A legal agreement signed by EPA and an individual, business, or other entity through which the respondendent agrees to pay for correction of violations, take the required corrective or clean-up actions, or refrain from an activity.

Administrative Record: An official compilation of documents, data, reports, and other information that was considered or relied upon in an Agency's decision making process. In the case of a Superfund site, the Administrative Record is developed to support the Agency's selection of a final remedy for the site. The record is placed in the **information repository** to allow public access to the material.

Applicable, Relevant and Appropriate Requirements (ARARs): Applicable requirements are those clean-up standards under Federal or State law that specifically address a hazardous substance, pollutant, remedial action, or other circumstance at a CERCLA site.
Relevant and Appropriate requirements are those same standards mentioned above that, while not "applicable" at the CERCLA site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site.

Aquifer: An underground layer of porous rock, sand, etc. containing water, into which wells can be sunk.

Baseline Risk Assessment (BLRA): The qualitative and quantitative evaluation performed in an effort to define the risk posed to human health and/or the environment by the presence or potential presence of specific pollutants.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The Act created a Trust fund, known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites.

delta isomer: A structural form of a chemical, usually presenting specific physical or chemical properties.

Feasibility Study: Analysis of the practicability of the potential cleanup alternatives for a Superfund site.

Floodplain: The area along the banks of the river that is inundated by water during periods of flooding.

Groundwater: Water found beneath the earth's surface that fills pores between soil, sand, and gravel particles to the point of saturation. Groundwater often flows more slowly than surface water. When it occurs in sufficient quantity, groundwater can be used as a water supply.

Hazard Index (HI): The ratio between the average daily dose of a toxicant received by a human population and the reference dose. The reference dose is an average daily lifetime dose believed to be without adverse effects in human populations.

Intrinsic remediation: see Natural Attenuation.

Intrinsic Remediation Demonstration (IRD): A study presenting a technical evaluation of natural attenuation processes and potential of migration of groundwater contaminants at the Ohio River Park.

Maximum Contaminant Levels (MCLs): Standards for drinking water set by the Federal and State laws and regulations.

National Priorities List (NPL): EPA's list of the nation's top priority hazardous waste sites that are eligible to receive federal money for response under Superfund.

Natural Attenuation: Naturally-occuring processes in soil and groundwater that act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants.

Operable Unit (OU): A portion of a Superfund site, or a part of the remedy, which is undertaken independent of the reminder of the Site. Separate Records of Decision (see below) are generally prepared for an each operable unit at a site where the site is broken down into more than one major project.

Parts per million (ppm): The concentration of a contaminant in the air or water presented as the ratio of volumes.

Parts per billion (ppb): A concentration of contaminant in the air or water presented as the ratio of volumes.

Plume: A discharge of a contaminant(s) from a point of origin, for example, a plume of contaminated groundwater migrating from a landfill.

Polyaromatic Hydrocarbons (PAHs): Chemicals containing at least one benzene ring, common in coke by-products.

Record of Decision (ROD): A legal document that describes the final remedial actions selected for a Superfund site, why the remedial actions were chosen and others were not chosen, how much they will cost, and how the public responded.

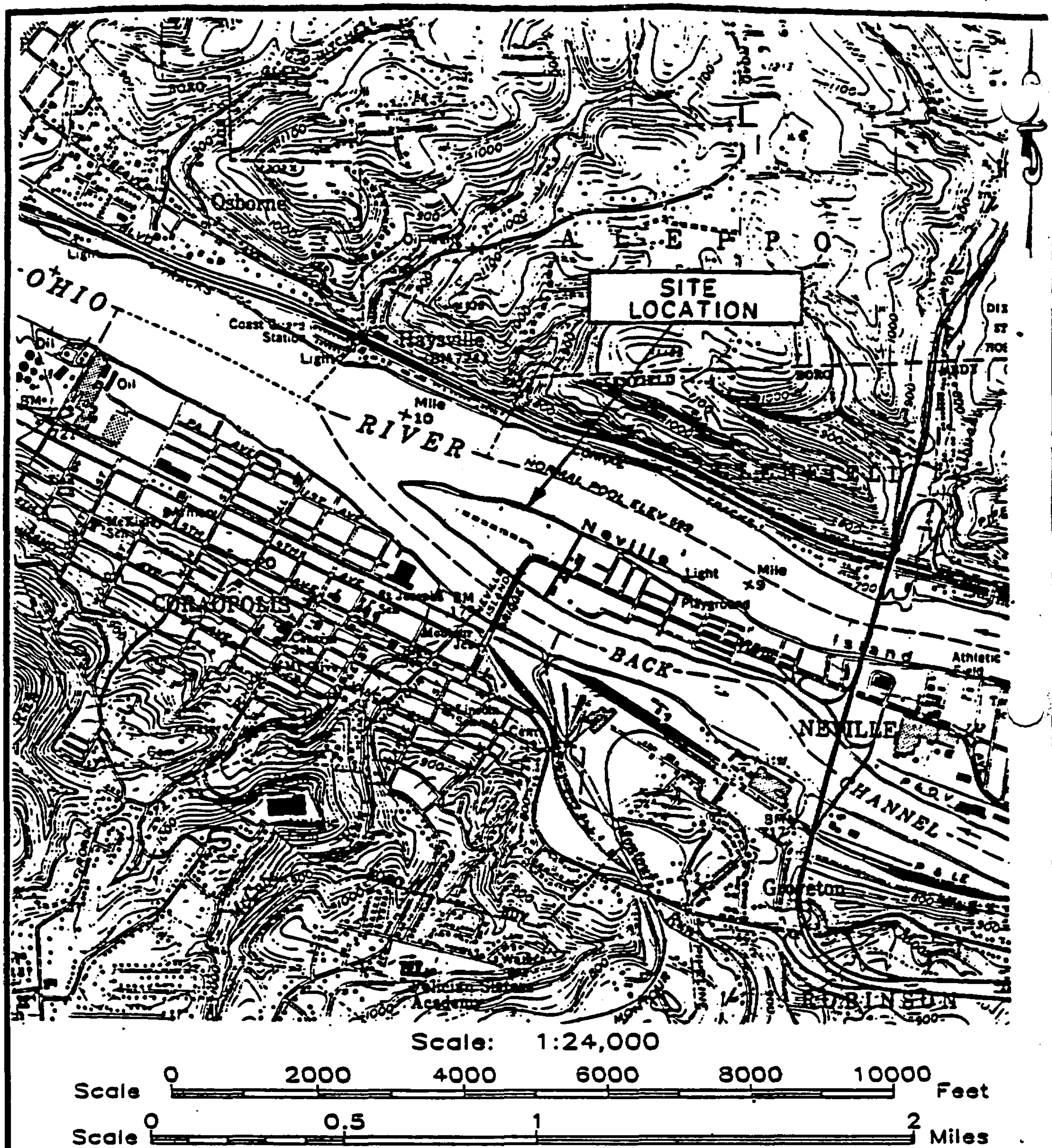
Remedial Investigation (RI): An in-depth study designed to gather the data necessary to determine the nature and extent of contamination at a Superfund site, establish criteria for cleaning up the site, identify preliminary alternatives for remedial actions, and support the technical and cost analyses of the alternatives. The remedial investigation is usually done with the feasibility study. Together they are usually referred to as the "RI/FS".

Semi-Volatile Organic Compounds (SVOCs): Chemicals that tend not to vaporize at room temperature.

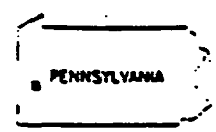
Sentinel well: A monitoring well located on the potential route of contaminant migration toward a water suply well (or wells) to provide a first alert regarding possible contamination.

Superfund: The program operated under CERCLA and SARA that funds and carries out the EPA hazardous waste emergency and long-term remedial activities.

Volatile Organic Compound (VOC): Any organic compound which participates in atmospheric photochemical reactions except for those organic compounds designated by the EPA Administrator as having negligible photochemical reactivity.



REFERENCE:
Ambridge, Pennsylvania, USGS 7.5 Minute Quadrangle



QUADRANGLE LOCATION

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FIGURE 1
SITE LOCATION MAP
OHIO RIVER SITE
NEVILLE TOWNSHIP, PENNSYLVANIA

Drawn	MSH	Date:	8/9/93	Project Number	Rev
Appr'd	KB	Revised	8/10/93	4920-003	0

4920504

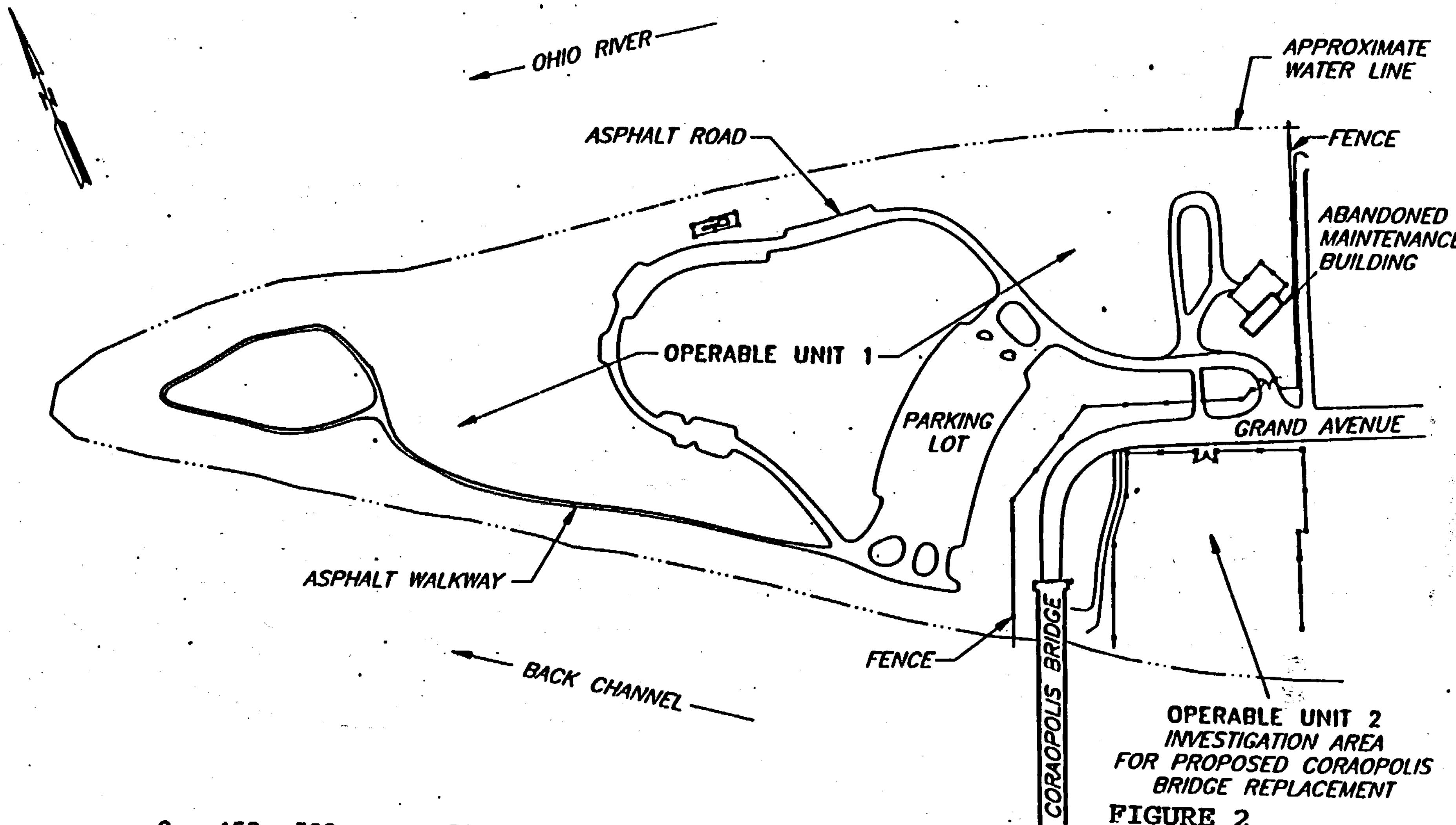

FIGURE 2

NOTE:

OPERABLE UNIT 2 CONSISISTS FENCED AREA SOUTHEAST OF GRAND AVENUE AND IS THE PROPOSED LOCATION FOR THE CORAOPOLIS BRIDGE REPLACEMENT. THIS AREA HAS BEEN PREVIOUSLY INVESTIGATED BY ALLEGHENY COUNTY.

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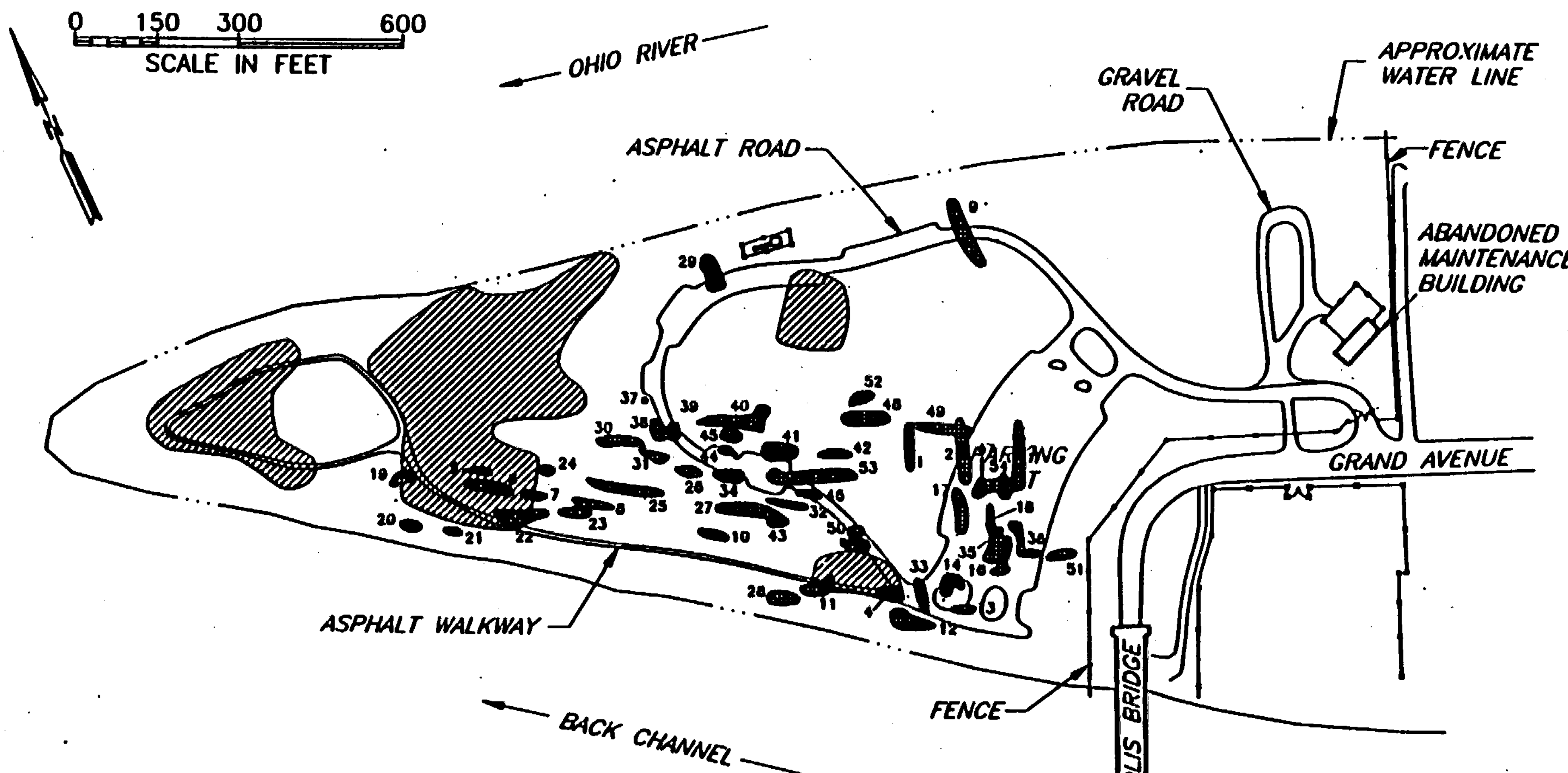
AREA OF INVESTIGATION
OHIO RIVER SITE RI/FS
NEVILLE TOWNSHIP, PENNSYLVANIA

Drawn	MSH	Date:	8/11/93	Project Number:	Rev.:	
Appr'd	KB	Revised:	–	4920-003	A	

492049a



LEGEND:

19 — FORMER DISPOSAL TRENCH NUMBER AND LOCATION

END DUMPING AREAS

NOTE:

THE FORMER DISPOSAL TRENCH AND END DUMPING LOCATIONS ARE INFERRED AND WERE IDENTIFIED USING THE AERIAL PHOTOGRAPH DATA PRESENTED AS TABLE 4-5.

THIS FIGURE WAS PREPARED USING THE REPORT ENTITLED: "DETAI... DESCRIPTION OF THE NEVILLE ISLAND SITE," AUGUST, 1981, ERT, INCO... RATED.

FIGURE 3

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APPROXIMATE LOCATIONS OF FORMER TRENCHES AND FOUNDRY SAND PILES
OHIO RIVER SITE RI/FS
NEVILLE TOWNSHIP, PENNSYLVANIA

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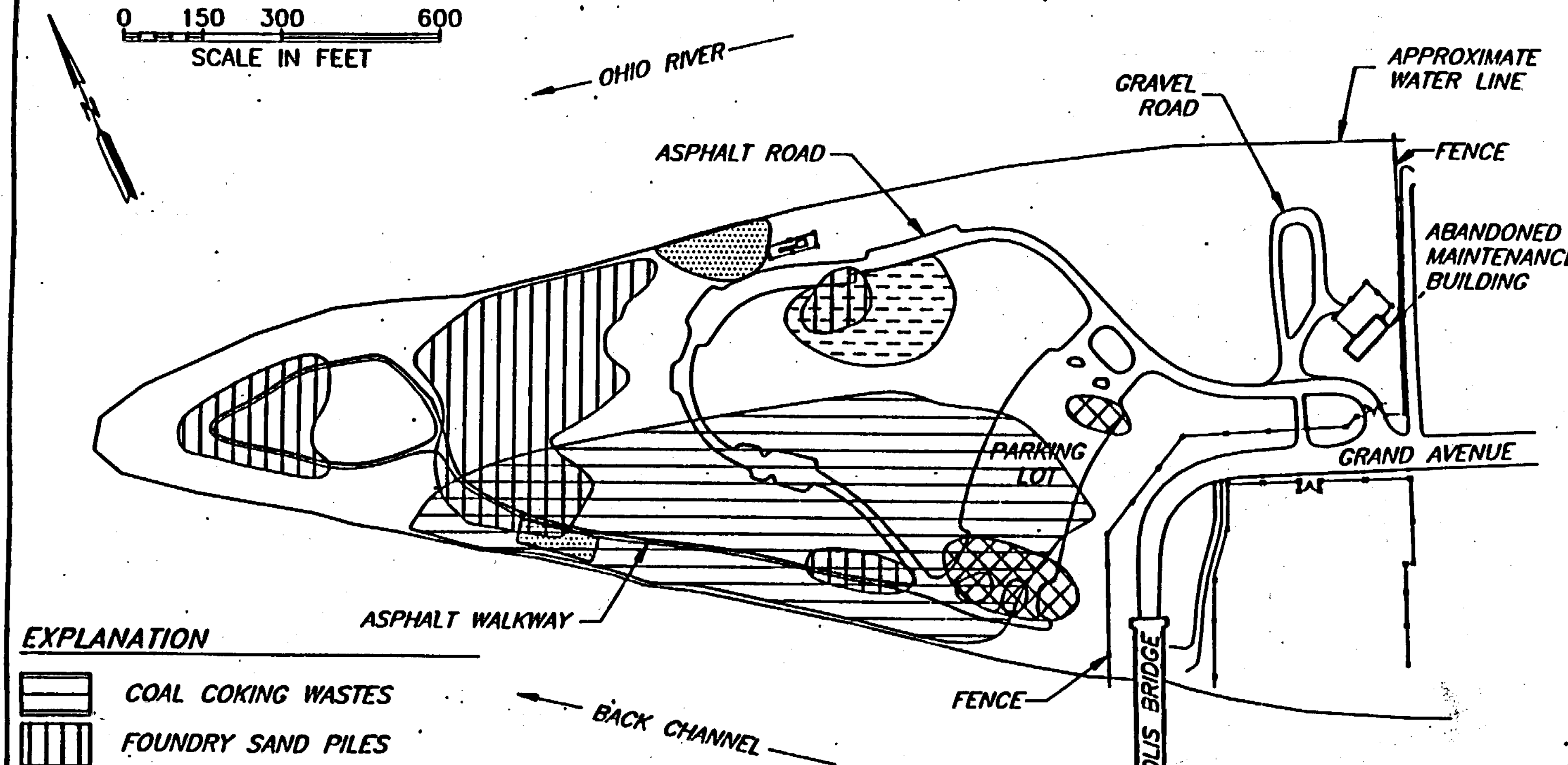
Appr'd:	KB	Revised:	8/11/93	4920-003	A

492007a



EXPLANATION

- COAL COKING WASTES
- FOUNDRY SAND PILES
- DESULFURIZATION WASTES
- CALCIUM CARBONATE WASTES
- MUNICIPAL WASTES

NOTE:

PERIOD OF DISPOSAL: 1952 TO 1965

THE WASTE DISPOSAL BOUNDARIES AND THE TYPES OF WASTES DISPOSED OF ARE BASED ON HISTORICAL DATA ACQUIRED FROM PC&C ANNNUAL REPORTS, EMPLOYEE INTERVIEWS, AERIAL PHOTOGRAPHS, AND OHIO RIVER PARK SUBCONTRACTOR REPORTS. THE DISPOSAL BOUNDARIES AND THE WASTE TYPES ARE INFERRED.

THIS FIGURE WAS PREPARED USING THE REPORT ENTITLED: "DETAILED DESCRIPTION OF THE NEVILLE ISLAND SITE," AUGUST, 1981, ERT, INCORPORATED.

FIGURE 4

ENSR™
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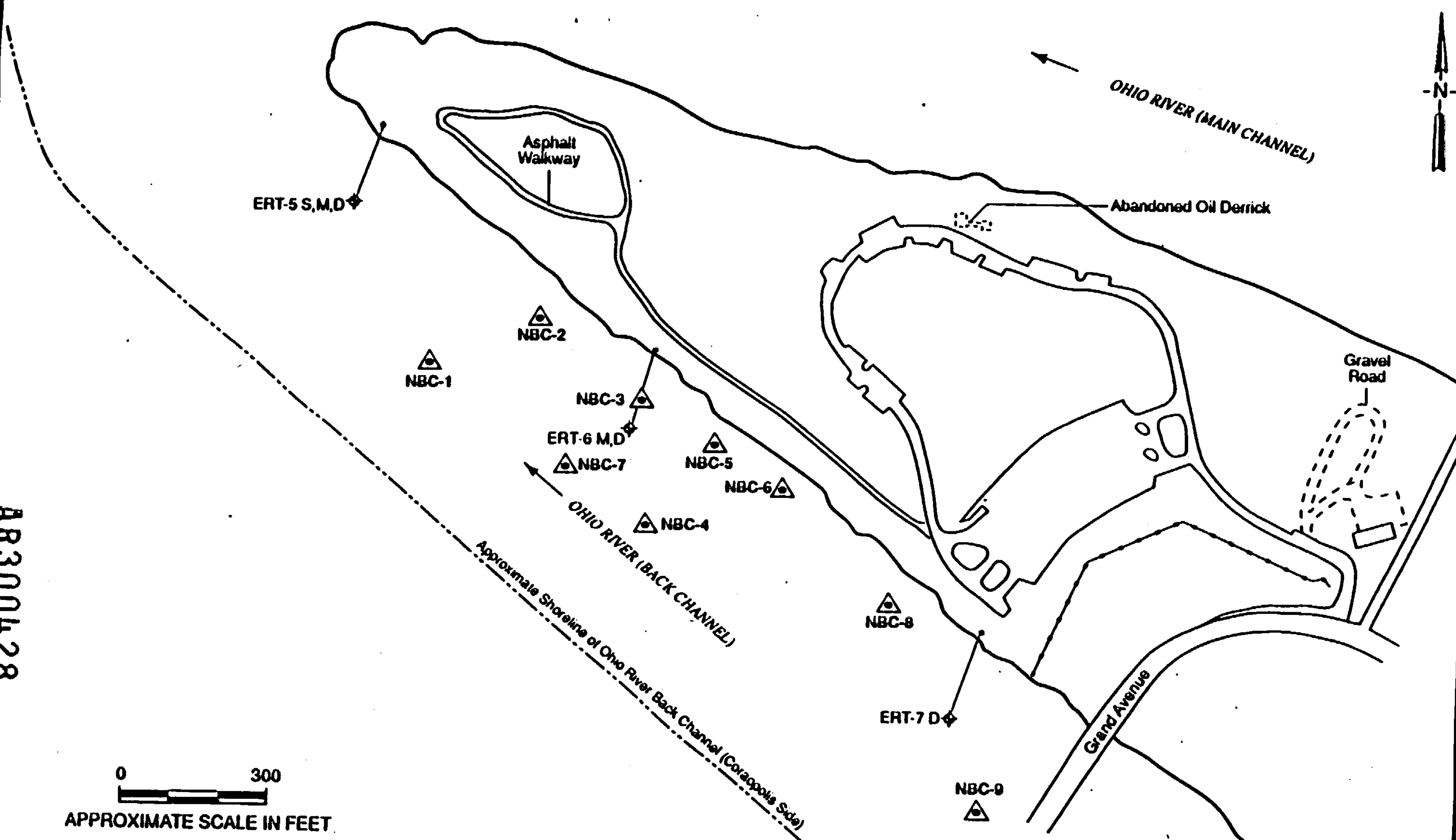
APPROXIMATE LOCATION AND TYPES OF WASTE DISPOSAL AREAS
OHIO RIVER SITE RI/FS
NEVILLE TOWNSHIP, PENNSYLVANIA

Drawn	MSH	Date: 8/10/93	Project Number:	Rev.	
Appr'd	KB	Revised: 8/10/93	4920--003	0	

AR300427



LEGEND:

- Fence
- Barcad Monitoring Well Location
- Back Channel Sampling Location

BASE MAP SOURCE: Modified from: "Draft RI/FS Work Plan, Ohio River Site", February 1992; Gateway Engineers Flyover Survey File (preliminary) dated April 4, 1996.

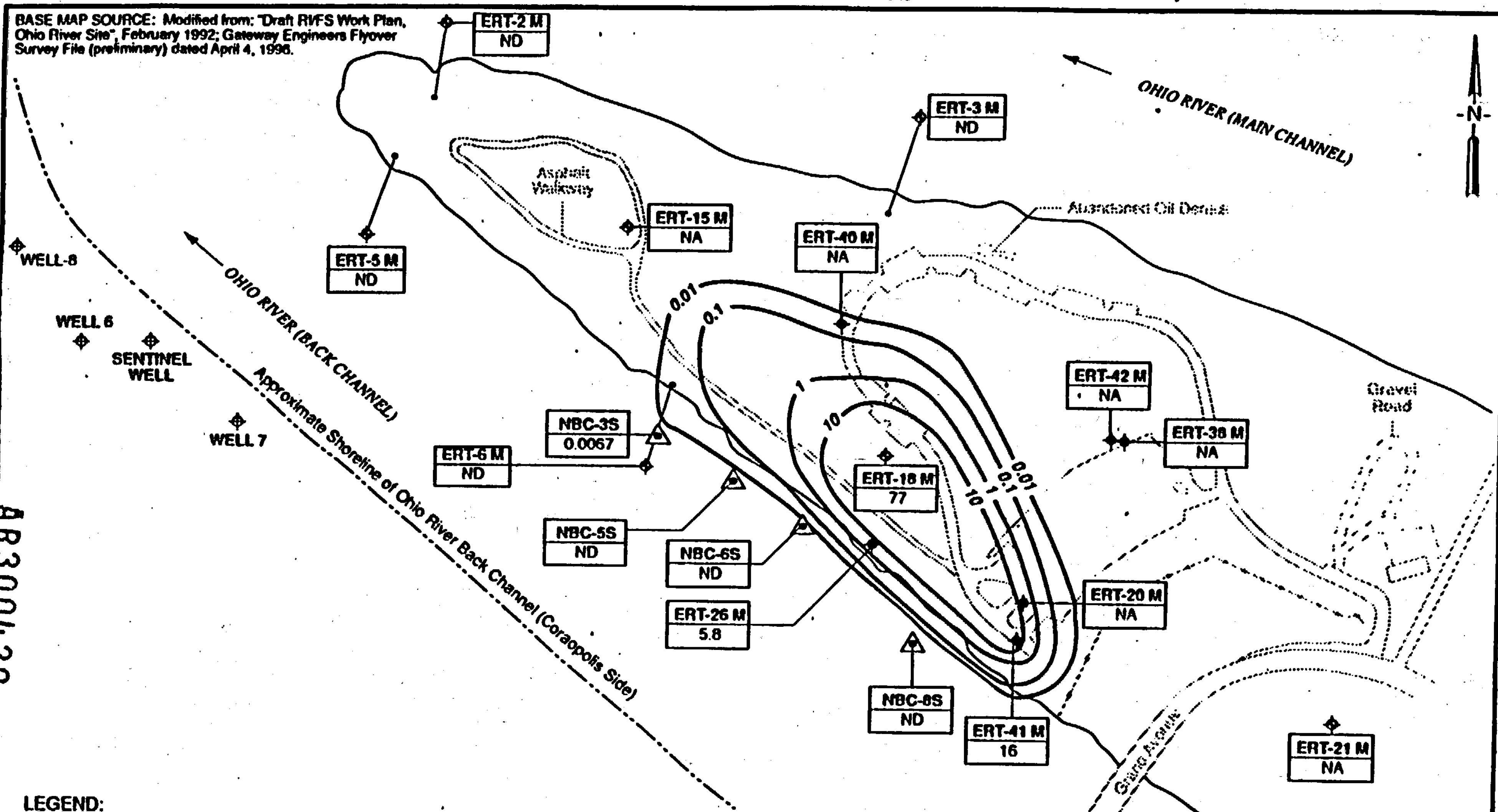
OHIO RIVER SITE

NEVILLE TOWNSHIP, PENNSYLVANIA

FIGURE 5

BACK CHANNEL SAMPLING LOCATIONS

JOB NO. 30087-007-121   ...s & Moore



LEGEND:

- Fence
- Barcad Monitoring Well Location
- Standard Monitoring Well Location
- Coraopolis Municipal Well Field
- M Mid-depth
- S Shallow
- Back Channel Sampling Location
- 5.8 Benzene Concentration (mg/L) (See Note)
- 10 Benzene Concentration Contour (mg/L)
- ND Not Detected
- NA Not Analyzed

0 300
APPROXIMATE SCALE IN FEET

NOTE: Ohio River Site wells sampled June 1996; Back Channel sampled July 1997.

OHIO RIVER SITE

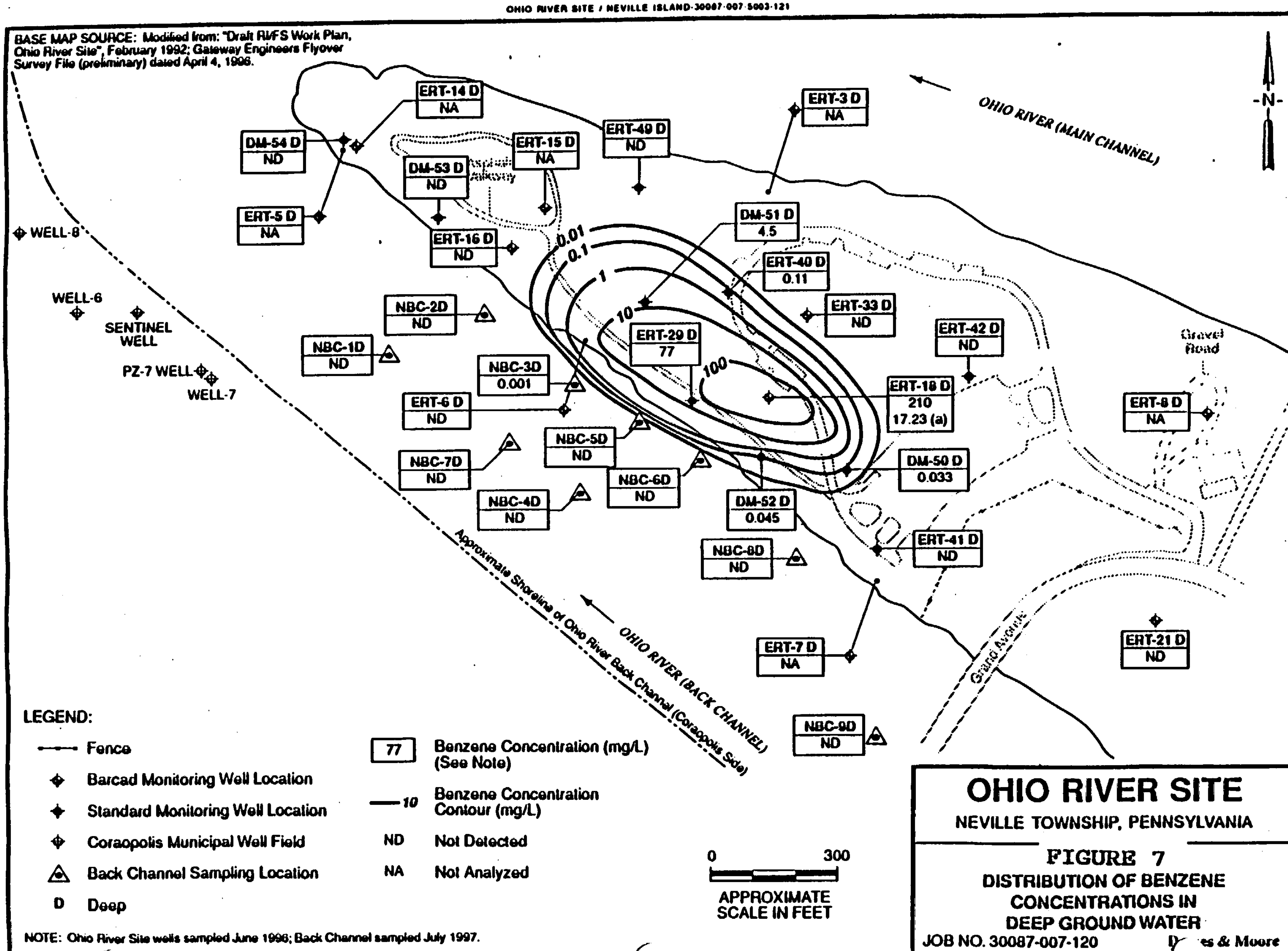
NEVILLE TOWNSHIP, PENNSYLVANIA

FIGURE 6

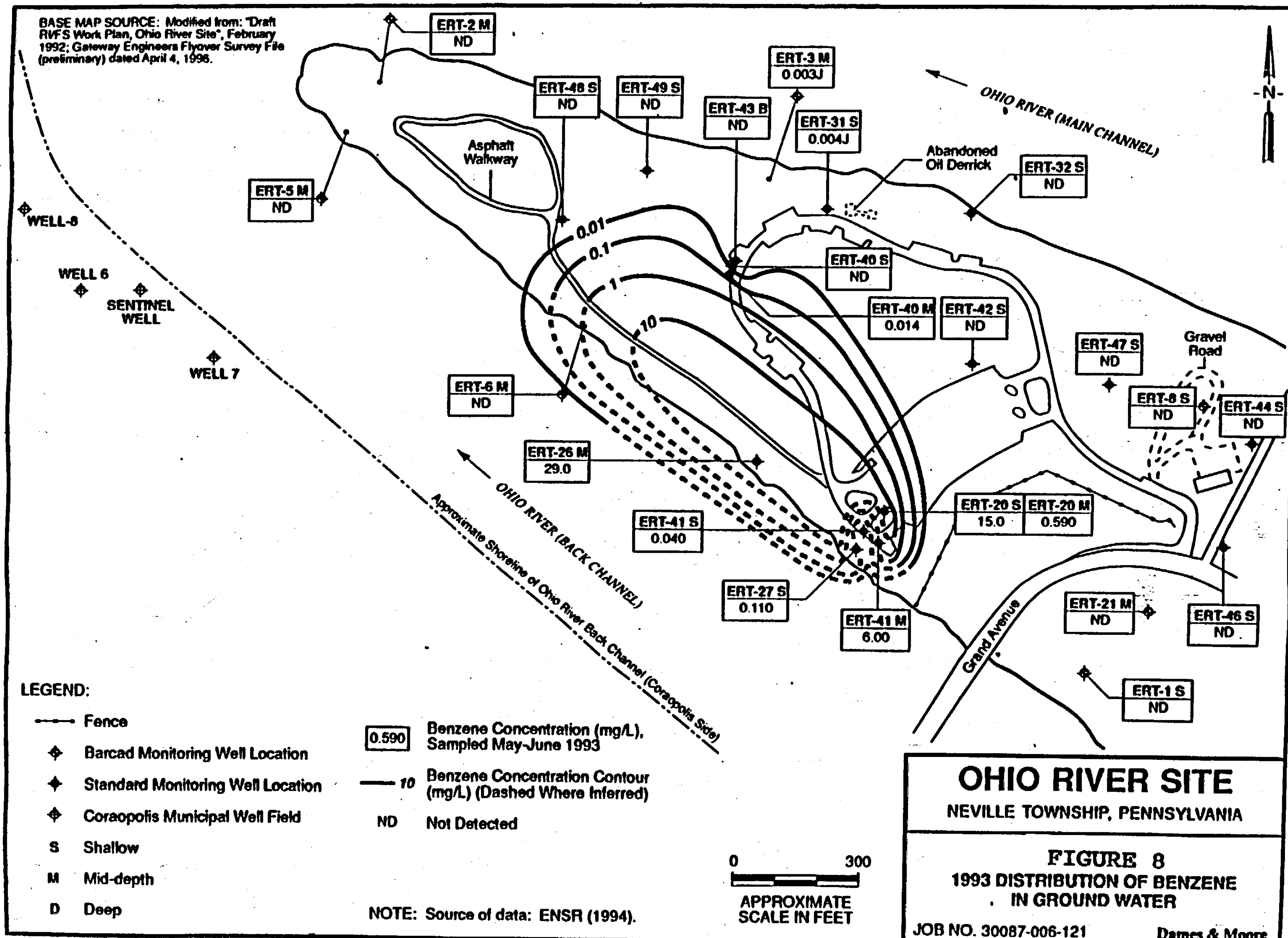
DISTRIBUTION OF BENZENE IN MID-DEPTH GROUND WATER

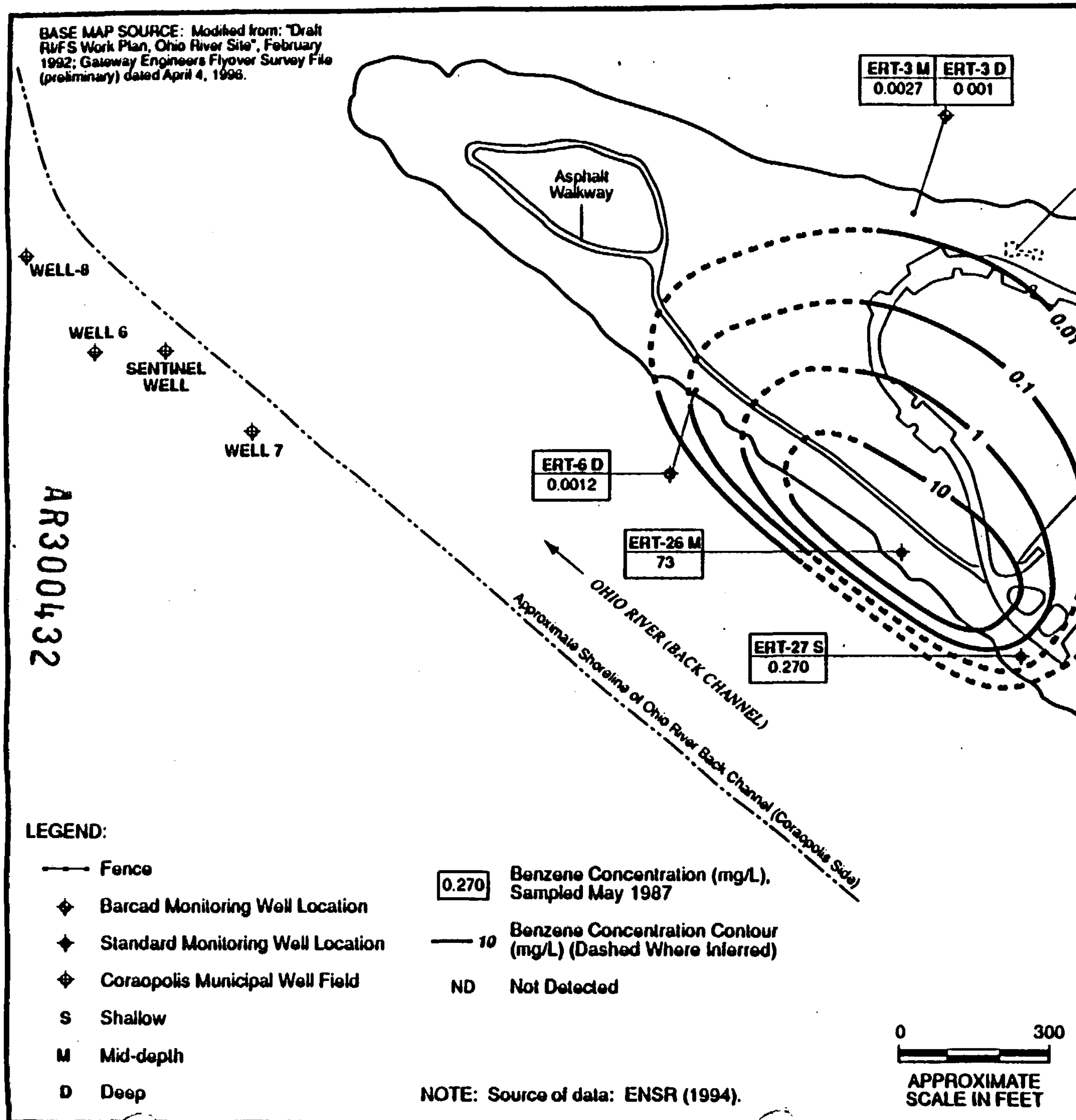
JOB NO. 30087-007-120 Dames & Moore

AR300429


BASE MAP SOURCE: Modified from: "Draft RI/FS Work Plan, Ohio River Site", February 1992; Gateway Engineers Flyover Survey File (preliminary) dated April 4, 1996.
-N-
OHIO RIVER (MAIN CHANNEL)
OHIO RIVER (BACK CHANNEL)
Approximate Shoreline of Ohio River Back Channel (Coraopolis Side)
Gravel Road
Grand Avenue
ERT-14 D NA
DM-54 D ND
ERT-15 D NA
ERT-49 D ND
ERT-3 D NA
DM-53 D ND
ERT-5 D NA
ERT-16 D ND
DM-51 D 4.5
ERT-40 D 0.11
ERT-33 D ND
ERT-42 D ND
ERT-29 D 77
ERT-18 D 210 17.23 (a)
ERT-8 D NA
DM-50 D 0.033
DM-52 D 0.045
ERT-41 D ND
ERT-7 D NA
ERT-21 D ND
ERT-6 D ND
NBC-1D ND
NBC-2D ND
NBC-3D 0.001
NBC-4D ND
NBC-5D ND
NBC-6D ND
NBC-7D ND
NBC-8D ND
NBC-9D ND
WELL-8
WELL-6
SENTINEL WELL
PZ-7 WELL
WELL-7
0.01
0.1
1
10
100
LEGEND:
Fence
Barcad Monitoring Well Location
Standard Monitoring Well Location
Coraopolis Municipal Well Field
Back Channel Sampling Location
D Deep
77 Benzene Concentration (mg/L) (See Note)
10 Benzene Concentration Contour (mg/L)
ND Not Detected
NA Not Analyzed
0 300
APPROXIMATE SCALE IN FEET
NOTE: Ohio River Site wells sampled June 1996; Back Channel sampled July 1997.
OHIO RIVER SITE
NEVILLE TOWNSHIP, PENNSYLVANIA
FIGURE 7
DISTRIBUTION OF BENZENE CONCENTRATIONS IN DEEP GROUND WATER
JOB NO. 30087-007-120

AR300430


BASE MAP SOURCE: Modified from: "Draft RI/FS Work Plan, Ohio River Site", February 1992; Gateway Engineers Flyover Survey File (preliminary) dated April 4, 1996.
OHIO RIVER (MAIN CHANNEL)
OHIO RIVER (BACK CHANNEL)
Approximate Shoreline of Ohio River Back Channel (Coraopolis Side)
N
Asphalt Walkway
Abandoned Oil Derrick
Gravel Road
Grand Avenue
WELL-8
WELL 6
SENTINEL WELL
WELL 7
ERT-2 M ND
ERT-5 M ND
ERT-48 S ND
ERT-49 S ND
ERT-43 B ND
ERT-3 M 0.003J
ERT-31 S 0.004J
ERT-32 S ND
ERT-40 S ND
ERT-40 M 0.014
ERT-42 S ND
ERT-47 S ND
ERT-8 S ND
ERT-44 S ND
ERT-6 M ND
ERT-26 M 29.0
ERT-41 S 0.040
ERT-27 S 0.110
ERT-41 M 6.00
ERT-20 S 15.0
ERT-20 M 0.590
ERT-21 M ND
ERT-46 S ND
ERT-1 S ND
0.01
0.1
1
10
LEGEND:
Fence
Barcad Monitoring Well Location
Standard Monitoring Well Location
Coraopolis Municipal Well Field
S Shallow
M Mid-depth
D Deep
0.590 Benzene Concentration (mg/L), Sampled May-June 1993
10 Benzene Concentration Contour (mg/L) (Dashed Where Inferred)
ND Not Detected
NOTE: Source of data: ENSR (1994).
0 300
APPROXIMATE SCALE IN FEET
OHIO RIVER SITE
NEVILLE TOWNSHIP, PENNSYLVANIA
FIGURE 8
1993 DISTRIBUTION OF BENZENE IN GROUND WATER
JOB NO. 30087-006-121
Dames & Moore

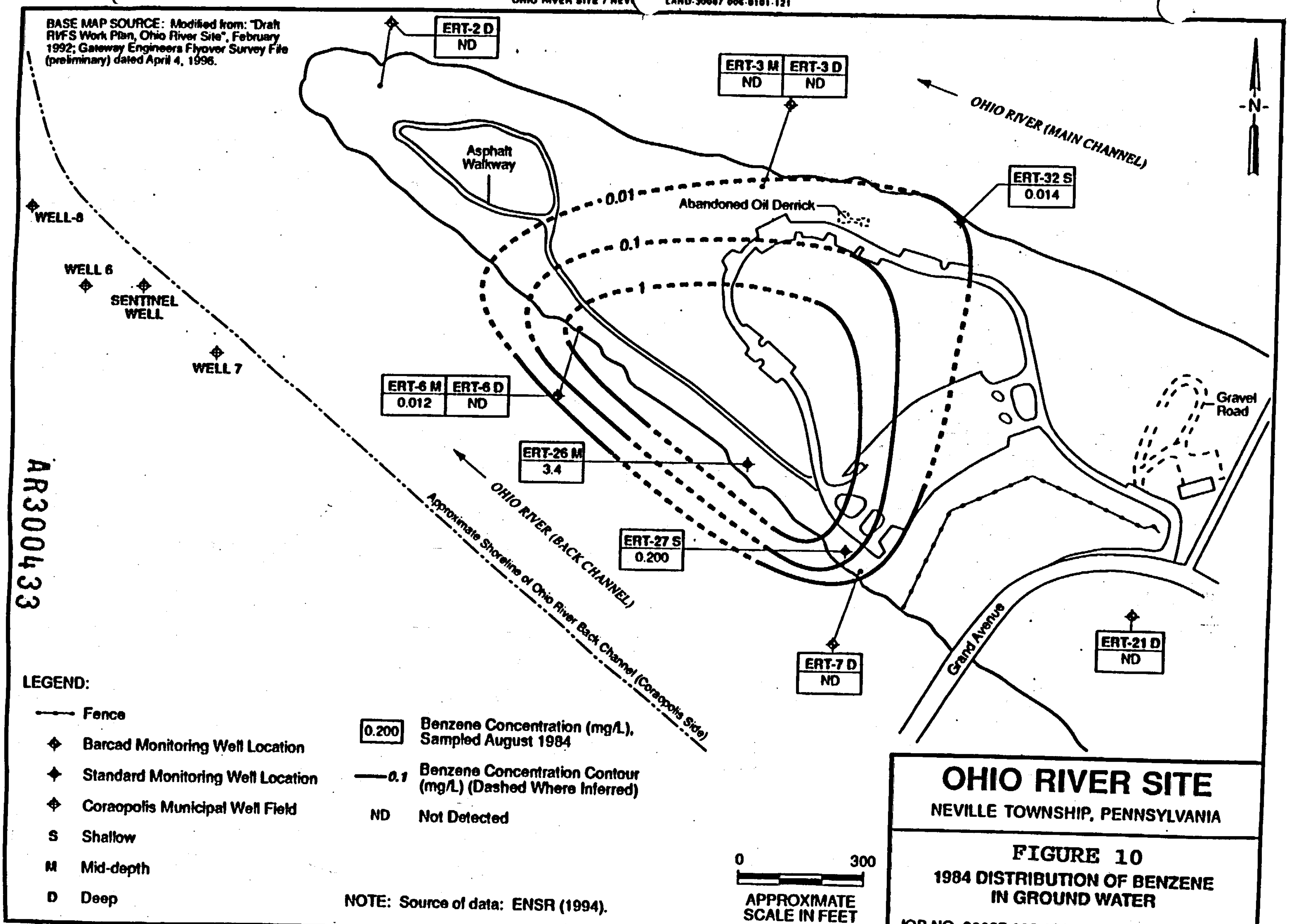


OHIO RIVER SITE
NEVILLE TOWNSHIP, PENNSYLVANIA

FIGURE 9
1987 DISTRIBUTION OF BENZENE IN GROUND WATER

JOB NO. 30087-006-121 D[illegible]s & Moore

AR300432



OHIO RIVER SITE

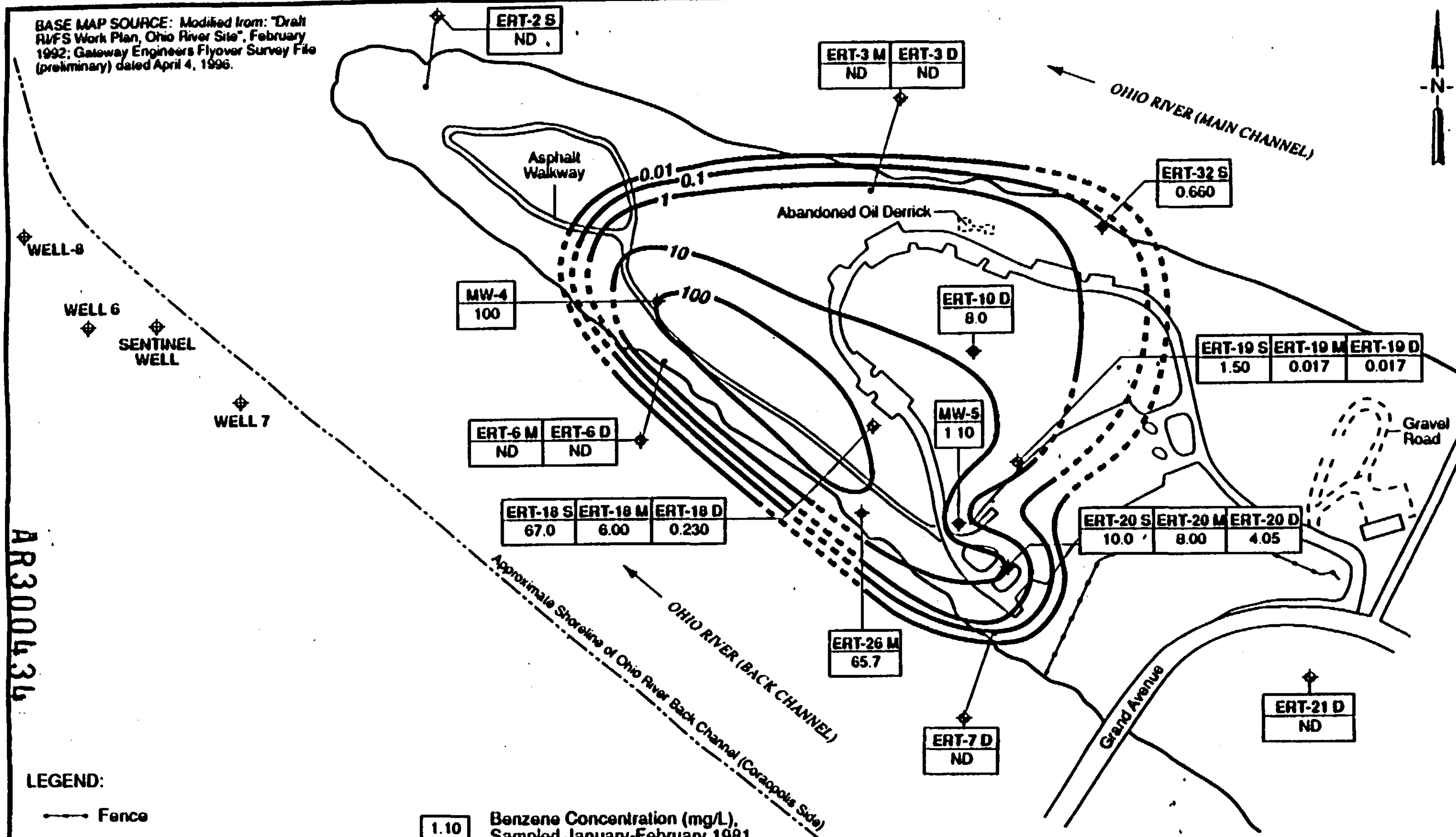
NEVILLE TOWNSHIP, PENNSYLVANIA

FIGURE 10

1984 DISTRIBUTION OF BENZENE IN GROUND WATER

JOB NO. 30087-006-121

Dames & Moore



LEGEND:

- Fence
- Barcad Monitoring Well Location
- Standard Monitoring Well Location
- Coraopolis Municipal Well Field
- S Shallow
- M Mid-depth
- D Deep

- 1.10 — Benzene Concentration (mg/L), Sampled January-February 1981
- 10 — Benzene Concentration Contour (mg/L) (Dashed Where Inferred)
- ND — Not Detected

NOTE: Source of data: ENSR (1994).

0 — 300
APPROXIMATE SCALE IN FEET

OHIO RIVER SITE

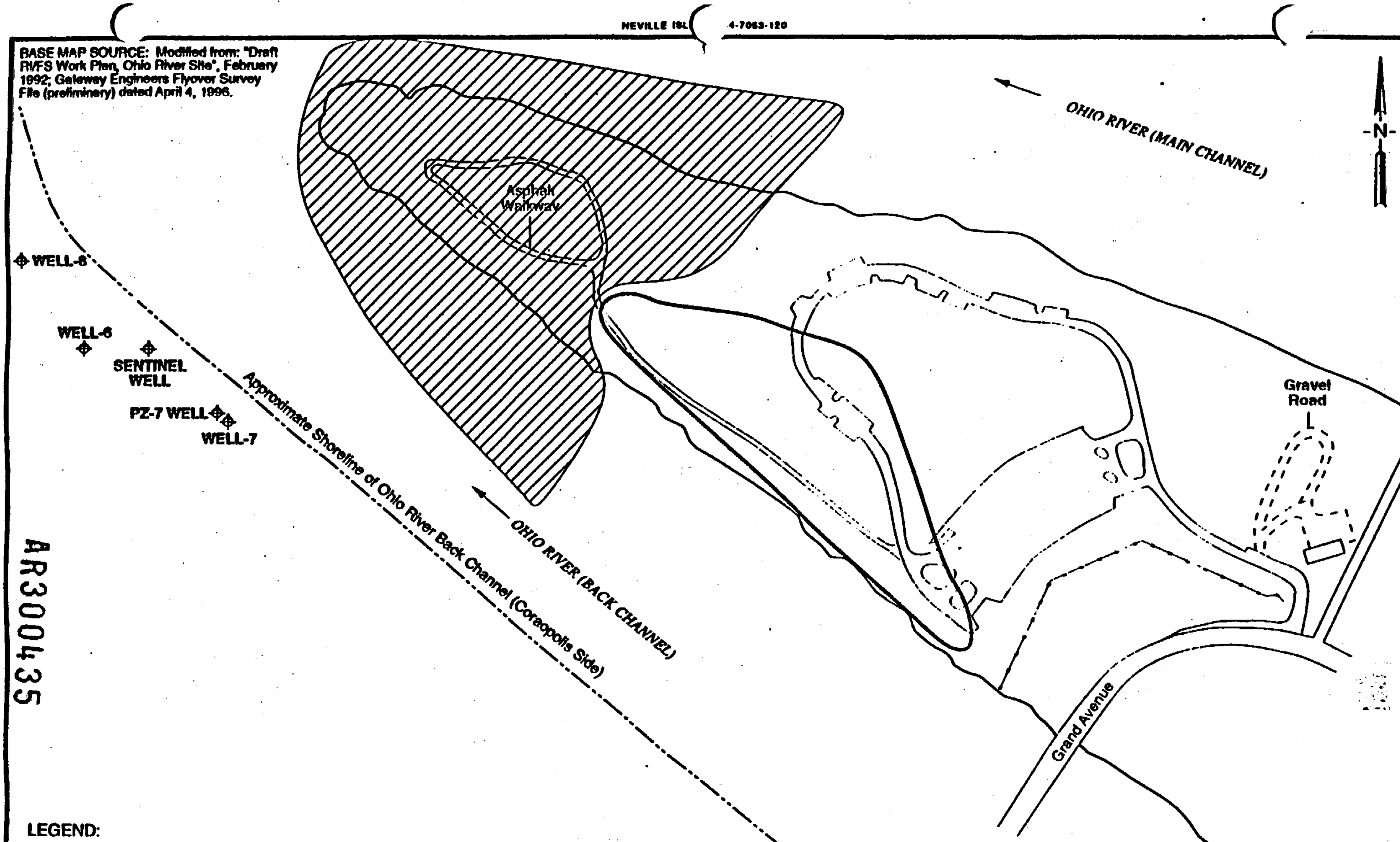
NEVILLE TOWNSHIP, PENNSYLVANIA

FIGURE 11

1981 DISTRIBUTION OF BENZENE IN GROUND WATER

JOB NO. 30087-006-121

...es & Moore



LEGEND:

- Fence
- 1996 Boundary of Benzene Detections
- Benzene Not Detected During Ground Water Monitoring History (1981-1996)
- Probable Area of Coal Coking Sludge Disposal

NOTE: Composite of shallow, mid-depth and deep well data.

0 300
APPROXIMATE SCALE IN FEET

OHIO RIVER SITE

NEVILLE TOWNSHIP, PENNSYLVANIA

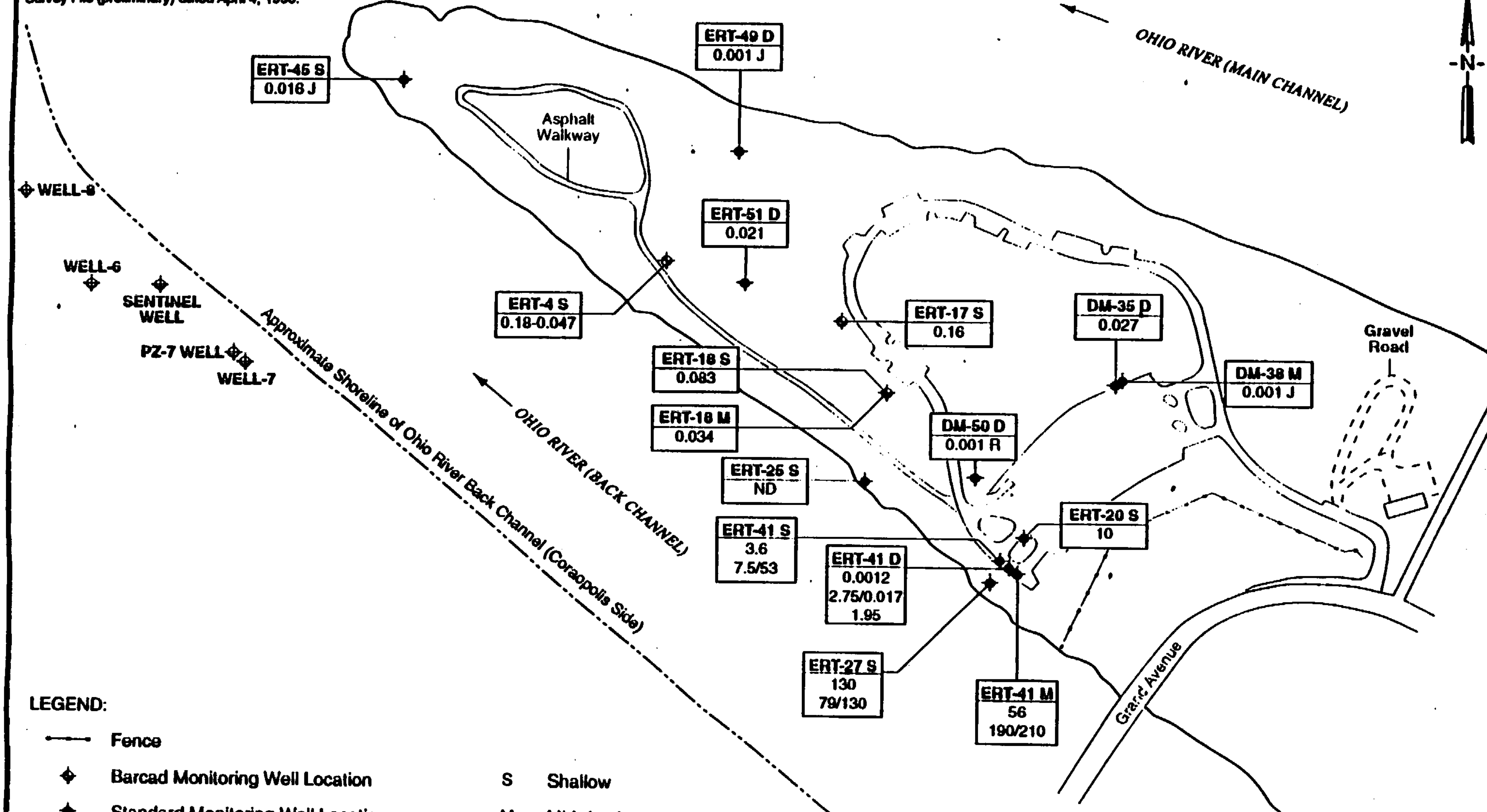
FIGURE 12
RELATIONSHIP OF HISTORIC BENZENE DETECTIONS IN GROUND WATER, 1981-1996

JOB NO. 30087-004-120

Dames & Moore

NEVILLE ISLAND-004-7053-120

BASE MAP SOURCE: Modified from: "Draft RI/FS Work Plan, Ohio River Site", February 1992; Gateway Engineers Flyover Survey File (preliminary) dated April 4, 1996.



LEGEND:

- Fence
- Barcad Monitoring Well Location
- Standard Monitoring Well Location
- Coraopolis Municipal Well Field
- [0.0012] 2, 4, 6-Trichlorophenol Concentration (mg/L), June 1996 Data, Dames & Moore
- [0.0165] 2, 4, 6-Trichlorophenol Concentration (mg/L), Pre-1996 Data, ENSR (1994)

S	Shallow
M	Mid-depth
D	Deep
J	Estimated Value
R	Unreliable Value
ND	Not Detected

0 300
APPROXIMATE SCALE IN FEET

NOTE: Composite of shallow, mid-depth and deep well data.

OHIO RIVER SITE

NEVILLE TOWNSHIP, PENNSYLVANIA

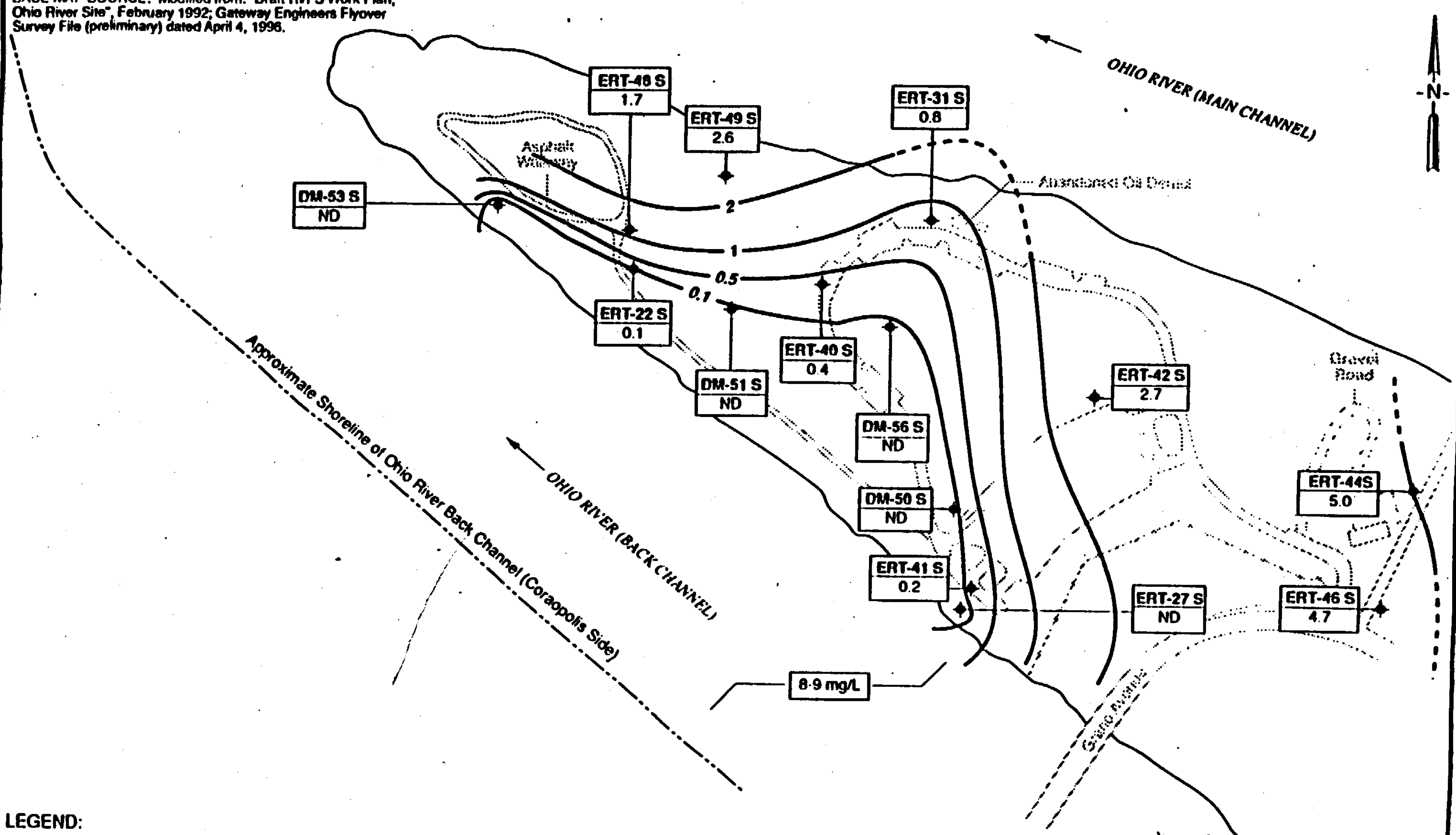
FIGURE 13

CURRENT AND HISTORICAL DISTRIBUTION OF 2, 4, 6-TRICHLOROPHENOL IN GROUND WATER

JOB NO. 30087-004-120 Dames & Moore

NEVILLE ISLAND-004-7053-120

BASE MAP SOURCE: Modified from: "Draft RI/FS Work Plan, Ohio River Site", February 1992; Gateway Engineers Flyover Survey File (preliminary) dated April 4, 1996.



LEGEND:

- -·-·- Fence
- Barcad Monitoring Well Location
- Standard Monitoring Well Location
- Coraopolis Municipal Well Field
- S Shallow
- [1.7] Dissolved Oxygen Concentration (mg/L), Sampled June 1996
- —1 Dissolved Oxygen Concentration Contour (mg/L), (Dashed Where Inferred)
- ND Not Detected

NOTE: Ohio River measurements collected September 18, 1996.

0 300
APPROXIMATE SCALE IN FEET

OHIO RIVER SITE

NEVILLE TOWNSHIP, PENNSYLVANIA

FIGURE 14

DISTRIBUTION OF DISSOLVED OXYGEN IN SHALLOW GROUND WATER

JOB NO. 30087-004-120 Dames & Moore

AR300437