Record of Decision
National Park Service
Washington Gas East Station Site
Anacostia Park
National Capital Parks-East
Washington, D.C.

GSA Contract No.: GS-10F-0160J
Task Order No.: P3000020416

August 2006

Prepared for:

National Park Service

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List of Abbreviations and Acronyms

amsl	above mean sea level
AoEI	analyte of exceptional influence
ARARs	applicable or relevant and appropriate requirements
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
DD	Decision Document
District	District of Columbia
DCRA	Department of Consumer and Regulatory Affairs
DNAPL	dense non-aqueous phase liquid
DoD	Department of Defense
DOI	Department of the Interior
DPW	Department of Public Works
E & E	Ecology and Environment, Inc.
ERA	ecological risk assessment
FEMA	Federal Emergency Management Agency
FS	feasibility study
GAC	granular activated carbon
HHRA	human health risk assessment

List of Abbreviations and Acronyms (cont.)

LDR	land disposal restriction
µg/L	micrograms per liter
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NPS	National Park Service
NPS Site	The portion of the Washington Gas East Station CERCLA Site owned by the U.S.
NPS-managed property	The 4.2-acre portion of the NPS Site that is managed by NPS
O&M	operation and maintenance
OSHA	Occupational Safety and Health Administration
PAHs	polynuclear aromatic hydrocarbons
POTW	publicly owned treatment works
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SVOC	semivolatile organic compound
TBC	to be considered

List of Abbreviations and Acronyms (cont.)

TDS	total dissolved solids
TP	test pit
USACE	United States Army Corps of Engineers
USACE-managed property	The 0.35-acre portion of the NPS Site that is managed by the USACE
U.S.C.	United States Code
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
Washington Gas or WG	Washington Gas Light Company
yd^3	cubic yards

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Declaration

Site Name and Location

This Record of Decision (ROD) pertains to that portion of the Washington Gas Light Company (Washington Gas [WG]) East Station Site that is owned by the United States (U.S.). Most of the U.S.-owned property is managed by the National Park Service (NPS) and the other part is managed by the U.S. Army Corps of Engineers (USACE) (Figure 1). The portion of U.S.-owned property affected by Washington Gas Co. operations is collectively referred to as *the NPS Site* in this document. It has no mailing address and lies in the 1100 to 1300 blocks of Water Street S.E., adjacent to the Anacostia River, in Washington D.C. It incorporates part of the NPS-managed Anacostia Park.

Statement of Basis and Purpose

This Decision Document presents the selected remedial action for the NPS Site, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendment Reauthorization Act (SARA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The selected remedy was chosen by the United States Department of the Interior (DOI)/NPS pursuant to its CERCLA lead agency status for the NPS Site and was adopted by the USACE pursuant to its CERCLA lead agency status and is based on the administrative record file for the NPS Site. The District of Columbia (the District) concurs with the selected remedy.

Assessment of the Site

The selected remedial action for each medium (surface soil, subsurface soil, groundwater, dense non-aqueous phase liquid [DNAPL], and river sediment) is detailed in the ROD and is necessary to protect human health and the environment from actual or threatened releases of hazardous substances into the environment.

Description of the Selected Remedy

The selected remedy addresses five different media: surface soil, subsurface soil, groundwater, DNAPL on or under the NPS Site, and the river sediments adjoining the land portion of the NPS Site.

The selected remedy consists of:

- Removal of contaminated surface soil to a depth of 1 foot and its replacement with
  - For the NPS-managed property, a vegetated soil cover, including 6 inches of clean fill capped by 6 inches of topsoil capable of supporting vegetation;
  - For the USACE-managed property, the amount of clean fill and other cover (such as gravel, blacktop, or concrete) appropriate to the area's prior use;

- Removal of subsurface soil contaminated with tar down to clean fill or to a maximum depth of 3 feet below the original surface or to the water table if the water table is encountered first, followed by backfilling with clean soil and appropriate surface materials as described above;

- Continuation of the pump-and-treat remedy currently being implemented by Washington Gas that requires that no groundwater be allowed to migrate off-site and enter the Anacostia River at any time;

- Continued capture of DNAPL in all groundwater extraction wells into which it flows until no further migration is occurring, with proper treatment and off-site disposal of all captured DNAPL;

- Participation by Washington Gas in a watershed-wide study of sediment quality. This study is being led by the U.S. Environmental Protection Agency (USEPA) and is partially funded by Washington Gas. The study recognizes the multiple sources and complexities of the sediment contamination in the Anacostia River, and it is intended to lead to recommendations for a comprehensive and coordinated remedial plan for the watershed in which Washington Gas will participate. In cooperation with the USEPA and other study participants, including the National Oceanic and Atmospheric Administration (NOAA), NPS will undertake additional remedial action under CERCLA to address the sediment contamination if and to the extent appropriate, based on information contained in this study or related studies.

Because the selected remedy will not remove all contaminants from the NPS Site or render them harmless, institutional controls will be required for the NPS Site. Extraction and monitoring wells for groundwater and DNAPL will continue to operate within the NPS Site until such time as the operations are terminated because they are no longer needed or they are relocated off U.S.-owned land. However, the institutional controls and wells will not prevent access to or use of the NPS-managed property by park visitors or by NPS staff and management or access to or use of the USACE-managed property by its visitors and employees. A more detailed discussion of the selected remedy is presented in Section XII.

SOURCE: Ecology and Environment, Inc.

Figure 1 Site Map, National Park Service Site, Washington, D.C.

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Additionally, this ROD summarizes some of the investigations of the area of contaminated sediments in the Anacostia River adjacent to the NPS site, which has become contaminated by wastes that are believed to have migrated from the Washington Gas East Station Site. Implementation of the selected remedy is expected to prevent future migration of wastes from the Washington Gas East Station Site to the sediments and is expected to be consistent with the remedy that is ultimately selected to address the sediments.

Statutory Determination

The selected remedy is protective of human health and the environment, complies with the federal and state requirements that are applicable or relevant and appropriate, is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. This selected remedy satisfies in part the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment) by providing for treatment of groundwater. Although the selected remedy will leave some wastes in place at the NPS Site, this is appropriate due to the large volume and mixed nature of those wastes, which could not be cost-effectively treated on-site, if at all. In addition, location-specific applicable or relevant and appropriate requirements (ARARs), for which waivers would not be justified, preclude many if not all types of on-site treatment. Moreover, the selected remedy will include off-site treatment of hazardous substances to the extent necessary to meet Land Disposal Restrictions (LDRs). Any such treatment would reduce the volume, toxicity, and/or mobility of the treated hazardous substances. Because the selected remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review of the NPS Site remedial action will be conducted no less often than every five years after initiation of remedial action, in accordance with Section 121 (c) of CERCLA, 42 United States Code (U.S.C.) §9621 (c), to ensure that human health and the environment are being protected by the remedial action.

Data Certification Checklist

The following information is included in the Decision Summary section of this ROD. (Additional information can be found in the Administrative Record File for the NPS Site.)

- Chemicals of concern and their respective concentrations (see Tables 3 and 4 in Section VII, on pages 33 and 34);

- Baseline risk represented by chemicals of concern (see Tables 1 and 2 in Section VII, on pages 30, 31, and 33);

- Cleanup of chemicals of concern and the basis for the cleanup (see Section VII, pages 30 to 37, and Section XII, pages 56 to 62);

- How source materials constituting principal threats are addressed (see Section XI, pages 55 to 56);
- Current and reasonably anticipated future land use assumptions and current and potential beneficial uses of groundwater used in the baseline risk assessment and the ROD (see Section VI, pages 26 through 29);
- Potential land and groundwater use that will be available at the NPS Site as a result of the selected remedy (see Section VI, page 29);
- Estimated capital, annual operation and maintenance (O&M), and total present-worth costs, discount rate, and duration over which the remedy cost estimates are projected (see Section X, Table 6, pages 49 through 51, and Appendix C); and
- Key factor(s) that led to selecting the remedy (see Section X, pages 47 to 56; Section XII, pages 56 to 63; and Section XIII, pages 63 to 65).

Authorizing Signature

R. Thomas Weimer

Assistant Secretary – Policy, Management, and Budget
Department of the Interior

9/14/06
Date

Decision Summary

I. Site Name, Location, and Description

This Record of Decision (ROD) is for the National Park Service (NPS)-managed lands and the U.S. Army Corps of Engineers (USACE)-managed lands that are part of the Washington Gas East Station Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Site. The East Station Site was not placed on the National Priority List (NPL) but, pursuant to CERCLA, underwent a process of investigation and remedial action selection supervised by the United States Environmental Protection Agency (USEPA) Region 3. It is listed as a Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Site DCD077797793 by the USEPA.

The NPS Site lies mostly south of Water Street S.E. between Water Street and the Anacostia River in Washington, D.C., with two small NPS parcels north of Water Street. All of the NPS-managed property is part of Anacostia Park.

The NPS Site is defined by the extent of the U.S. property impacted by the disposal of waste residuals of town gas manufacturing or by migration of waste and waste components onto or under the U.S.-owned property. These wastes and waste components originated on the Washington Gas Site adjoining it to the north. The NPS-managed property encompasses approximately 4.2 acres. Approximately 3.9 acres lie south of Water Street between the 11th Street bridge to the west and the southwest boundary of the Washington Powerboat Club to the east, and are part of NPS Reservation 343D. Two small NPS reservations just north of Water Street (Reservation 298, which is approximately one-tenth of an acre, and a triangular piece of property at the junction of 12th Street and Water Street, which is approximately 0.2 acres and is part of Reservation 343D) are also NPS-managed. The USACE-managed property consists of approximately 0.35 acres adjacent to the river (see Figure 1).

II. Site History and Enforcement Activities

The NPS Site is situated over what were formerly open water, marshes, wetlands, mudflats, and the marginal upland adjoining these features along the Anacostia River tidal estuary. Much of Anacostia Park and, specifically, almost all of the NPS Site was created as a result of fill prior to 1912 and dredge and fill operations

directed by the USACE between 1908 and 1919. The former extent of the filled wetlands is depicted in Figure 2.

The yearly reports of the Chief of Engineers, U.S. Army, from 1908 to 1919 (Washington Perspectives October 11, 1985) show that most of the land now forming the portion of Anacostia Park between Water Street S.E. and the seawall was created between 1914 and 1919. The majority of the work was completed by 1917. The seawall was constructed by dredging a trench into the soft sediments on the river bottom. The trench was filled with crushed rock that was allowed to settle under its own weight. More rock was added until the pile stabilized with its top at approximately low tide level. The seawall foundation extends up to low water level from at least 6 feet below low water, and the seawall itself generally originally extended to 6 feet above low water. The foundations are at least 23 feet across, being approximately symmetrically placed under the wall itself. The wall was built of dry stone, without mortar, but was capped with pre-cast concrete blocks in this area. Along parts of the site, wooden piles were driven into the river bed to prevent the foundation from subsiding sideways into the river channel.

The fill behind the seawall includes not only dredge spoils and wastes disposed by Washington Gas, but also a mass of heterogeneous waste such as demolition debris, rock, gravel, and soil.

Impacts from Gas Manufacturing Activities

From 1888 to 1948 manufactured gas was produced continuously by Washington Gas on their property adjoining the NPS Site. The East Station was used to manufacture coal gas until 1914, carbureted water gas until 1932, reformed gas until 1948, and oil gas intermittently until 1983. Between 1970 and 1983 the plant was operated only once a year to check equipment. From 1888 to 1948, as the gas manufacturing process changed, the facility was enlarged and modified. In 1948 natural gas became available, and manufactured gas was produced only intermittently by the plant during periods of peak gas demand up until 1970. Following the closure of the plant in 1983, a Phase I investigation was conducted. Demolition of the gas manufacturing plant proceeded until 1988, at which time the Phase II investigation began. The aboveground oil storage tanks on the property were removed in 1997.

Coal and oil were the principal gas manufacturing feedstocks. Gasification by-products were tar, oil, coke, and lampblack. Coke was the principal solid residual, and most of it was recycled as plant fuel or sold commercially. Coke was also used in filter beds to purify process water, producing a solid residual of off-specification coke contaminated with tar and oil. Periodic cleaning of the filter beds produced a residual product, at least some of which appears to have been placed as fill on the NPS Site.

SOURCE: Ecology and Environment, Inc.

Figure 2 **Former Extent of Filled Wetlands and Location of Cross Section A-A' (After Hydro-Terra, Inc. March 1999), National Park Service Site, Washington, D.C.**

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By-product tar was sold commercially or used as a boiler fuel. Sampling evidence suggests that some tar was mixed with solid waste and was placed as fill on the NPS Site. Leakage from various plant structures is another probable source of the tar detected on the NPS Site and the oil found in soil above and below the water table. Leakage of oil from underground pipelines operated on the East Station Site by Washington Gas and on the adjoining property to the east by ST Services also is potentially a source of petroleum products found on the NPS Site.

Wood chips containing iron oxide were used in the removal of cyanide from manufactured gas, and when their purification capacity was exhausted some of the wood chips, contaminated with complex cyanides and absorbed tar, were also placed as fill on the NPS Site.

During the course of operations, Washington Gas undertook major cut-and-fill alterations on its property and apparently disposed of town gas waste onto the adjoining property that is now the NPS Site. This is substantiated by the nature of the fill found on the NPS Site.

The thickness of fill under the NPS Site where it was investigated ranges from approximately 1 foot to approximately 13 feet, with an average thickness of approximately 8 feet of fill above the underlying natural silt layer. The estimated volume of fill is approximately 50,000 cubic yards (yds^3). Potentially all of the fill could be contaminated with Washington Gas waste, including tar. Of the 51 pits or boreholes excavated on the NPS-managed property south of Water Street S.E. and the two boreholes on USACE-managed property, 36 (69%) showed visible tar in at least trace amounts (see Figure 3). The area within which tar was observed that lies west of the tree line marked on Figure 1 is the area proposed for surface soil remediation. Three boreholes and one pit, all of which were found to be contaminated with tar, were excavated on the two small segments of NPS-managed property north of Water Street, so these areas are also to be remediated (see Figure 3).

Environmental Investigations and Their Results

Seven significant environmental investigations of the East Station Site have taken place since 1983. They are listed below and can be found in the Administrative Record file for the NPS Site:

- *Preliminary Contamination Investigation (Phase I)* (Hydro-Terra, Inc. 1983)
- *Contamination & Land-Use Study (Phase II)* (Hydro-Terra, Inc. June 1989)
- *Additional Sampling & Ground-Water Recovery System Design (Phase III)* (GeoTrans August 1991)
- *Site Investigation for WMATA Facility* (Engineering-Science March 1994)

- *Site Inspection of NPS/ East Station Site* (Ecology and Environment, Inc. September 1995)

- *Additional Remedial Investigation and Feasibility Study, East Station, Washington, D.C. (Phase IV)* (Hydro-Terra, Inc. March 1999)

- *Assessment of Health Risks to Utility and Landscape Workers on National Parks Service Property South of East Station in Washington, D.C.* (Hydro-Terra, Inc. March 2002).

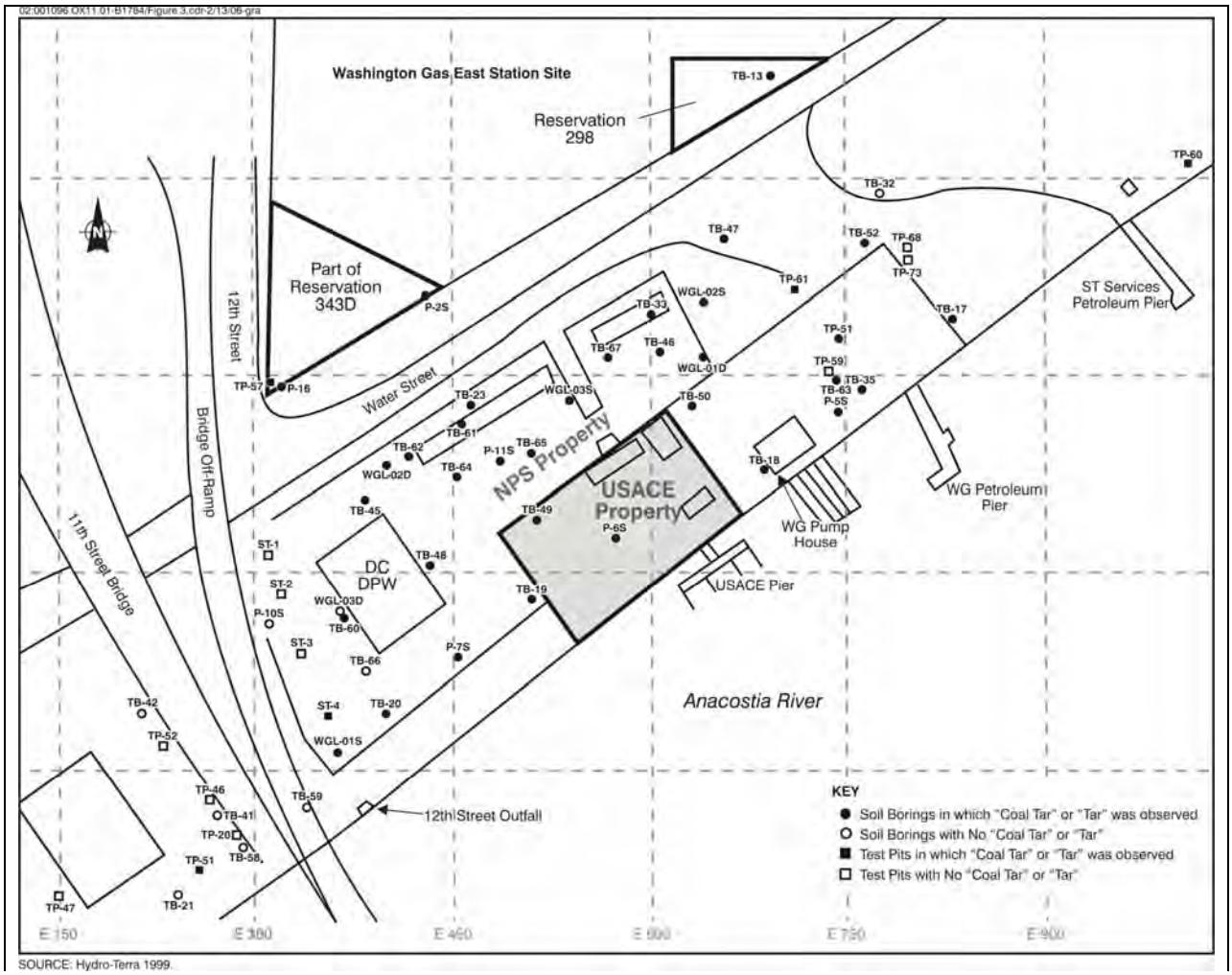


Figure 3 Pits and Boreholes Showing Tar, National Parks Service Site

The investigations show that the NPS Site is underlain by dredge spoils and industrial (town gas) waste derived from Washington Gas as well as miscellaneous waste from unknown sources. The main contaminant of concern is coal tar, which contains carcinogenic and toxic polynuclear aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) (especially benzene), and toxic metals, including arsenic, beryllium, and lead. Soil and groundwater, both shallow (in the fill) and deeper (in a sand and gravel aquifer beneath the natural silt under the fill), are contaminated with coal tar and other town gas waste constituents that have been dumped onto or have migrated into the NPS Site.

NPS listed the entirety of the Site, denominated as the Washington Gas Site, on the Federal Facilities Compliance Docket on October 10, 1993. In addition to the five surface and near-surface soils locations sampled during the remedial investigation/feasibility study (RI/FS) of the NPS Site, Washington Gas also took additional samples of surface and near-surface soils (0 to 3.5 feet) at 20 locations on the NPS Site in November 2001. These data provided a more numerous and therefore probably more representative set of soils samples analyzed for semivolatile organic compounds (SVOCs) for the human health risk assessment (HHRA) of March 2002. Soil-gas sampling results from 12 locations sampled during the RI/FS were used to assess health risks from VOCs under the NPS Site.

The different phases of Washington Gas and NPS Site investigative activities comprise an iterative process that has been gradually extended to encompass the entire area of contaminated fill. The information collected has been used to define the nature and extent of groundwater contamination and delineate the general limits of DNAPL and soils contamination so that appropriate remediation could be identified, evaluated, and selected. The estimated extent of DNAPL contamination can be seen in Figure 4. The USEPA, NPS, and the District of Columbia have participated with Washington Gas in reviewing proposals, overseeing fieldwork, monitoring cleanup, and reviewing reports.

NPS has reviewed and assessed Washington Gas's field investigations to ensure the adequacy of the technical data collected. USEPA Region 3 provided review of the reports, which included a human health risk assessment, an ecological risk assessment (ERA), a feasibility study (FS), the Washington Gas *Proposed Plan for the East Station Site* (June 1999), and the Washington Gas *Decision Document, East Station Site* (September 1999).

The RI/FS for the Washington Gas Site was made available for public comment and a public meeting was held prior to approval. A ROD was not produced; instead, a Decision Document (DD) was submitted by Washington Gas to USEPA Region 3 on September 3, 1999, which was approved by the USEPA in a letter of September 22, 1999. The letter is attached to the DD in the NPS Site Administrative Record.

History of Site Response Actions

Since 1976, actions have been taken by Washington Gas at the East Station Site to address environmental conditions. All actions have received review and comment by the District of Columbia, the USEPA, and the NPS. As needed, permission has been obtained from the NPS and the USACE for construction activities by Washington Gas on those agencies' properties. These actions are summarized below. They are described in detail in the Washington Gas *Decision Document, East Station Site* (September 1999), which is part of the Administrative Record for the NPS Site.

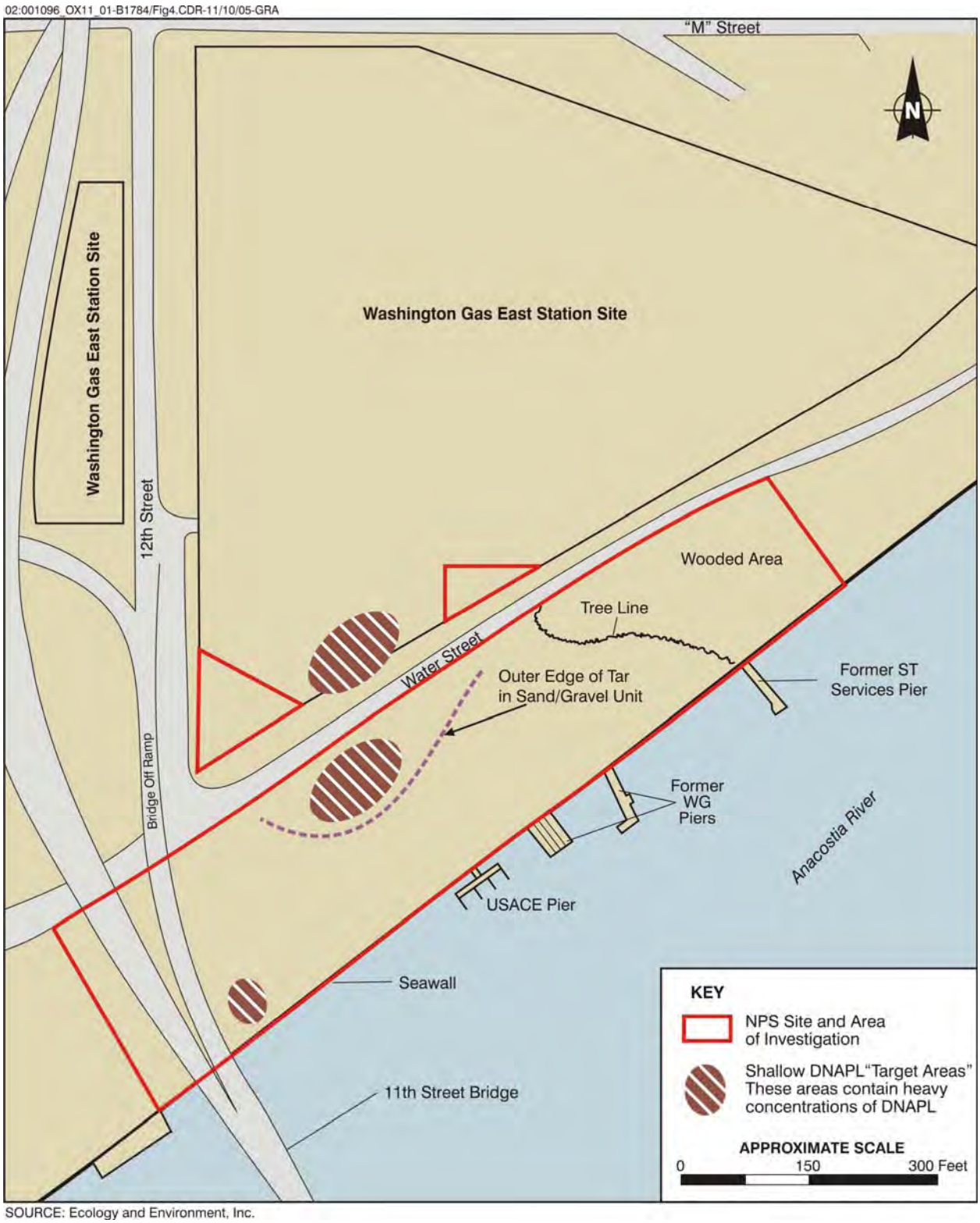
In 1976, after a release of oil of unknown origin to the Anacostia River, Washington Gas undertook a number of pump-and-treat initiatives. The first effort involved installation of a 150-foot lateral groundwater interceptor drain—referred to as the trench well—which was placed within the fill near the river on the NPS and USACE properties. Groundwater containing tar and oil was pumped from the trench well and treated before being released to the river under a National Pollutant Discharge Elimination System (NPDES) permit. Treated groundwater was discharged to the river until 1993. Since 1993, treated groundwater has been discharged to the sewer leading to the District of Columbia's publicly owned treatment works (POTW) under a discharge permit.

In 1990, Washington Gas placed a soil cover on the portions of the part of the East Station Site that it owns that are not covered by impermeable structures and stabilized the soil with turf grass.

In 1993, Washington Gas installed a new groundwater treatment facility on the Washington Gas Site capable of treating 36,000 gallons of water a day. Contaminated groundwater extracted from the pumping wells is treated in three steps: (1) sedimentation to remove the DNAPL; (2) oil/water separation to remove floating oil and emulsified tar; and (3) air stripping to remove entrained organic gases before releasing the treated groundwater to a POTW via the sewer under a discharge permit. Air and the entrained organic gases from the air stripper(s) pass through granular activated carbon (GAC) filters, and the treated air is released to the atmosphere under an air-discharge permit.

In 1994, three total-fluids (all liquids) recovery wells were installed at the south end of the East Station property: two in the shallow fill and one in the deeper sand/gravel unit. Using these three wells, approximately 8,000 gallons of fluids per day, in addition to the volume captured from the trench well, were captured and treated through the new groundwater treatment system. This pump-and-treat system has remained in continuous operation to the present date.

Since 1996 Washington Gas has removed DNAPL that accumulates in some of the extraction wells installed on the East Station Site and stored it before proper disposal. In 1996, Washington Gas began extracting fluid from two wells finished in the fill. In 1997, three additional wells on the NPS property, two in the fill and another in a deeper sand/gravel unit, also became DNAPL-recovery wells. Total recovery rates for DNAPL declined over time from 1997 to 2002, from an average of 45 gallons per month in 1997 to 29 gallons per month in 2002 (Hydro-Terra, Inc. July 22, 2003). In 2002, Washington Gas made changes to the pump-and-treat system, including installing a trench drain to capture and extract additional groundwater flowing to the Anacostia River from the NPS Site. The trench drain extends northeast of the trench well. A well located at the northeast corner of the District of Columbia Department of Public Works (DPW) office building was



SOURCE: Ecology and Environment, Inc.

Figure 4 Locations of DNAPL Contamination, National Park Service Site, Washington, D.C.

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converted into a groundwater recovery well (RW7S) able to pump water to the trench well. The average for DNAPL recovery during the first half of 2003 was 70 gallons per month as the result of a sharp increase in DNAPL recovery from this new recovery well (RW7S). Washington Gas also installed a new double-walled pipeline between the trench well and the treatment facility and modified the trench well to better accommodate the new sources of groundwater and allow for easier extraction of collected tar. The flow rate from the trench well following flow stabilization is estimated to average between 20 and 22 gallons per minute, which compares with an average of about 12 gallons per minute before the additional measures to capture groundwater were employed. Currently, some 30,000 gallons a day of groundwater are extracted from the trench well, treated, and discharged to the District of Columbia's sewer and POTW (Hydro-Terra, Inc. January 2003).

Evaluation of the Effectiveness of Ongoing Remedies

Current remedies at the NPS Site consist of the DNAPL-recovery and groundwater pump-and-treat system. The DNAPL remedy is apparently effective in capturing DNAPL at those wells around which it is sufficiently concentrated and of low enough viscosity to migrate into the well. Because of the configuration of the top of the silt layer underneath the fill, mobile DNAPL cannot migrate to the river by flow along the top surface of the silt. Instead, it pools in the depressions on the top surface of the silt and is captured there. DNAPL will continue to accumulate in a recovery well until the concentration of DNAPL around the recovery well approaches residual concentrations. At residual concentrations, the capillary forces and surface tension become equal to the fluid driving force and the DNAPL becomes immobile as long as driving forces and restraints remain the same. It should be noted that, of the total quantity of DNAPL recovered across the entire East Station Site as reported to date (3,230.75 gallons), more than 99% has been recovered from wells within the NPS Site.

The January 6, 2000 agreement between the District of Columbia and Washington Gas concerning the groundwater impact on the river requires that Washington Gas demonstrate that no groundwater enters the river. The three-year review of the agreement indicates that this objective is probably being achieved because the volume of groundwater being captured greatly exceeds the likely rates of recharge from rainfall for the entire East Station Site. No flow of any consequence is expected from below the East Station Site across the Arundel Clay. The only likely source of water above that infiltrating into the ground from rainfall is water entering the NPS Site from the river through the seawall. Further studies are under way to conclusively demonstrate that the hydraulic gradient under the entire NPS Site is from the river towards the groundwater capture system at all times and, therefore, no groundwater can leave the NPS Site and enter the river at any time. These studies include installation of additional monitoring wells and possible DNAPL collection wells along the seawall on the NPS Site.

Cost Recovery

In 2005, NPS and Washington Gas entered into a CERCLA Section 122(h) agreement pursuant to which Washington Gas reimbursed NPS $285,000 for NPS costs incurred in responding to the East Station Site contamination. NPS expects to engage Washington Gas in negotiations regarding implementation of the selected remedy for the NPS Site in the near future.

III. Community Participation

The Proposed Plan for the Washington Gas Site was released to the public on June 17, 1999. A public comment period was held from June 17 through July 16, 1999. Responses to the comments received during the public comment period are included in a responsiveness summary. This responsiveness summary is part of Washington Gas's *Decision Document, East Station Site* (September 1999).

The preceding information in Section II concerning the components of the East Station Site remedial action that are ongoing at or under the NPS Site has been included in this ROD because three of the remedial action components adopted for the NPS Site are also remedial action components selected for the entire East Station Site, including the NPS Site: the groundwater remedy, the DNAPL remedy, and the sediment remedy. It should be noted that Washington Gas entered into an agreement with the District of Columbia in 2000 to modify the groundwater remedy from that agreed upon as the result of the RI/FS to one that ensured that no groundwater impacted by Washington Gas operations would be allowed to enter the Anacostia River until, inter alia, the District agreed that the impact would be below levels of concern.

The NPS is the lead agency for the NPS Site, and it issued a *Proposed Plan for the Cleanup of the NPS Portion of the Washington Gas-East Station Site* (March 2005), which was released to the public on April 11, 2005. The Proposed Plan is included in the NPS Site Administrative Record, which is available to the public at National Capital Parks-East headquarters at 1900 Anacostia Drive S.E., Washington D.C. 20020, and in the NPS offices at 1050 Walnut Street, Suite 220, Boulder, Colorado, 80302. The public comment period for the *Proposed Plan* ran from April 11, 2005 to May 13, 2005. A public meeting was advertised in the Washington Times on April 8, 2005 and was held in the Matthew Henson Center, 2000 Half Street S.W., Washington D.C. 20024, on April 28, 2005. Both verbal and written comments were received from the public. Verbal comments were answered at the public meeting and are included in the Responsiveness Summary (see Appendix A). Written comments are also addressed in the Responsiveness Summary.

IV. Scope and Role of the Remedial Action

The overall NPS Site Remedial Action is to clean up the surface and near-surface soils to reduce the risk of exposure to users of and visitors to the NPS Site, NPS and USACE staff, and landscape and utility workers to acceptable levels. The remedy proposed is also designed to reduce risks to on-site ecological receptors to acceptable levels.

The selected remedy described in this ROD includes the remedy for the Washington Gas East Station Site for groundwater, DNAPL and, by reference, for river sediments. The remedy for surface and subsurface soil consists of removal of a 1-foot layer of contaminated surface soil as well as removal of subsurface soil that contains coal tar down to a depth of 3 feet below the original surface or to clean fill or the water table if either of these is encountered before the 3-foot depth is reached. The removed soils will be replaced with a vegetated soil cover, including 6 inches of clean fill capped by 6 inches of topsoil capable of supporting vegetation, or other appropriate cover, on the USACE-managed property. In cooperation with the USEPA, NOAA, and other participants in a watershed-wide study of sediment quality, NPS will undertake additional remedial action under CERCLA to address the sediment contamination if and to the extent appropriate, based on information contained in that study or related studies.

V. Site Characteristics

Site Overview

The area of the NPS Site under which tar was noted is relatively small and approximately trapezoidal, aside from the two small detached portions north of Water Street. The area within which tar has been noted extends for about 950 feet along the seawall from test pit 51 (TP-51) on the east side of the 11th Street bridge to test boring 60 (TB-60) and from the 12th Street/Water Street junction for approximately 450 feet to the east along both sides of Water Street S.E. (see Figure 3). The main part of the NPS Site is approximately 250 feet wide between the seawall and Water Street at the west end and 200 feet wide at the east end. As noted already, the south edge of the NPS Site abuts the Anacostia River seawall, which is approximately 3 feet above mean sea level (amsl). The NPS Site slopes up with increasing steepness to Water Street, which is approximately 11 feet amsl and is therefore close to the elevation of the 100-year floodplain (approximately 12 feet amsl, as defined by the Federal Emergency Management Agency [FEMA]). The NPS Site is slightly flatter and therefore lower along Water Street under and adjacent to the 11th Street bridge abutments at its west end. The NPS Site has no natural soils on its surface; the surface material is largely compacted by traffic and, in part, is covered by gravel and buildings. As a consequence, there is sparse vegetation outside the treed area on the east end, and runoff from the NPS Site is high. While access to much of the NPS Site is controlled, the street provides uncontrolled access to approximately 30% of the Site, primarily at the east end, but also at the west end under the 11th Street bridge. Of the two small triangular NPS Site areas north of Water Street, the western one at the corner of 12th Street and Water Street is graveled and is used for parking, and the smaller triangle to the east (Reservation 298) has been cut off from the street and enclosed within the Washington Gas property fence.

The USACE property includes both a paved fenced area containing offices and storage and an unfenced area to the west for placement of dumpsters and temporary holding of larger objects such as tree trunks removed from the

Anacostia and Potomac Rivers. Access to most of the USACE-managed property is controlled by a chain-link fence whose gate is locked during non-working hours. Nearly 90% of the property is covered by asphalt, buildings, or concrete.

The NPS Site lies within a major city in an area with little other access to the river, so it is used by an active and vibrant boating community and occasionally by anglers or for passive recreation. The District of Columbia's Department of Public Works has leased most of the western part of the NPS Site and has fenced the area they use to control access. The former Washington Gas pump house to the east of the USACE property is unused but fenced and locked. Both the former piers used by Washington Gas and by Steuart Petroleum (now ST Services) have been removed.

Remedial Investigation Field Sampling

The Washington Gas East Station RI/FS (Hydro-Terra, Inc. March 1999) reported on soil samples from a total of 58 excavations made on the combined USACE Site and the NPS Site: 11 test pits, 4 sewer test pits, 7 piezometer bores, 6 well bores, and 30 test borings, some of which were used to install wells. In addition, 5 surface soil samples and 2 duplicates were collected and used for the HHRA. Soil gas samples were collected from 12 locations, and results were also used in the HHRA.

Conceptual Site Model

The conclusions of the Washington Gas and NPS Site investigations are that the NPS Site consists of four layers of material that are either a source of contaminants to the environment or that control the distribution and migration of contaminants within the NPS Site. A cross section of the four layers is shown in Figure 5. The location of cross section A-A' can be found in Figure 2. The seawall cross-section is diagrammatic and based on the description of construction methods, not on actual measurements.

The surface layer of the NPS Site consists of fill materials, including dredge spoils from the bed of the Anacostia River, some of it mixed with and contaminated by town gas wastes containing coal tar, VOCs, and toxic metals. The fill material is thickest within a former inlet of the Anacostia River, which underlies almost all of the NPS Site and rests on a natural layer of silt. At the south side of the NPS Site, the fill material abuts the seawall and terminates at the seawall.

Beneath the fill is a layer of natural silt. Findings on contaminant migration show that this layer of silt essentially prevents further vertical migration of contaminants where the silt layer remains intact. However, the silt layer is discontinuous where it was excavated and removed over part of the Washington Gas property north of Water Street, allowing tar from the fill or from Washington Gas structures to migrate to a layer of sand and gravel below the silt. Through this mechanism, tar and other waste constituents have contaminated the groundwater in the sand and gravel layer, including part of the sand and gravel layer that extends under the NPS Site (see Figure 4).

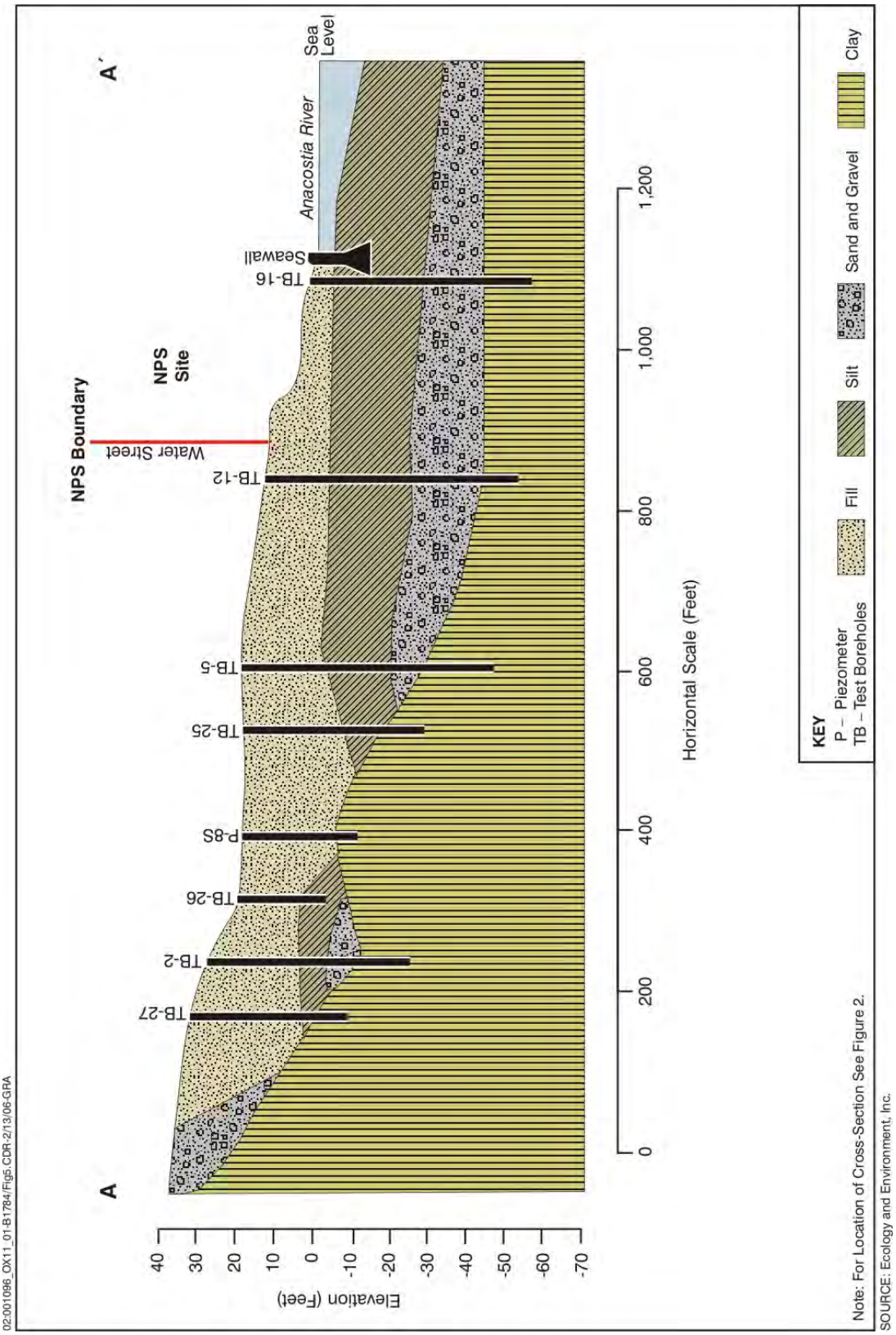

Figure 5 **Cross Section A-A' (After Hydro-Terra, Inc. March 1999), National Park Service, Anacostia Park, Water Street S.E. Site, Washington, D.C.**

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The fourth layer is the Arundel Clay, which lies beneath all other layers under the entire East Station Site, including the NPS Site. Because of its thickness (approximately 100 feet), low hydraulic conductivity, and inferred upward hydraulic gradient from the Patuxent aquifer beneath it to the overlying aquifers at the NPS Site, the Arundel Clay prevents fluid flow from any of the upper layers on the NPS Site from reaching the Patuxent aquifer, which lies beneath the clay. The sources of the contaminants on the NPS Site are town gas manufacturing waste and other gas manufacturing by-products, which were used as fill material across the site or that migrated into the NPS Site either within the fill itself or within the sand and gravel layer.

The seawall forms both the land limit of the NPS Site and the boundary of the fill. The seawall is permeable and allows river water and groundwater to flow into and out of the fill, depending on the direction of the hydraulic gradient. This occurs as a result of changes in groundwater levels and surface water levels due to groundwater extraction by pumping, tidal fluctuations in the river, or as the result of flood and drought levels of the river. At present, the reported evidence implies that Washington Gas pumping of groundwater as part of the East Station Site remediation ensures that migration is always from the river to the pumping wells and that no groundwater is migrating from under the NPS Site into the river.

The groundwater in both the fill and the sand and gravel layer below the silt layer would naturally discharge to the Anacostia River if it were not intercepted by pumping wells. DNAPL in the fill layer could also potentially migrate and discharge to the river but appears to be trapped in depressions on top of the silt layer. The shallowest aquifer beneath the NPS Site with sufficient yield to provide potable water for public use is the Patuxent aquifer, which lies beneath the Arundel Clay layer (the Arundel Clay is an aquitard). Studies of nearby sites such as the National Arboretum and the NPS Langston Golf Course property imply that the hydraulic head in the Patuxent aquifer is currently higher than heads in the surficial layers, so potential flows are upward from the aquifer, rather than downward from the NPS Site. There are no wells in any aquifer beneath the NPS Site within 4 miles of the NPS Site that are used for drinking water, and therefore no drinking water wells are at risk of being contaminated by components originating at the NPS Site. The District of Columbia has a policy of not permitting the use of drinking water wells within the District but also of conserving any fresh water zone of saturation under the District as a potential future or emergency source of drinking water.

The same type of contamination found at the Washington Gas East Station property has been found on the NPS Site. The fill beneath the surface of the East Station Site, including the NPS Site, was contaminated by wastes from the production of town gas. As further described below, these wastes contain tar, oil, coke, and volatile aromatic organics such as benzene and semivolatile PAHs—some of which are carcinogens—complex cyanide, and heavy metals. The groundwater beneath the NPS Site is contaminated by having infiltrated into the ground through the wastes on the Washington Gas Site or by contacting the

wastes migrating from the Washington Gas Site onto the NPS Site or by contact with the wastes deposited directly onto the NPS Site itself. The groundwater could potentially contaminate the Anacostia River. Sediments in the river are contaminated with material that may be attributed to the NPS Site. Some of the tar is present at sufficient concentrations and of low enough viscosity to constitute DNAPLs that are migrating within the NPS Site to some of the pumping wells in both the fill and the sand and gravel layer.

A schematic of the conceptual site model with past, current, and potential migration and exposure pathways and receptors is shown on Figure 6.

VI. Current and Future Site and Resource Uses

Current Land Use at the Site

The entire surface of the NPS Site was created by filling behind the seawall, although earlier filling had brought parts of it above the river level. The continued integrity of the NPS Site depends on the continued integrity of the seawall, which was built during the period 1908 to 1919. Because of its age and significance, the seawall has been found elsewhere in the District to be protected under the National Historic Preservation Act (NHPA). No determination of the seawall's status has been made at the NPS Site.

The NPS Site is complex in that it currently has multiple uses, including an office building and storage sheds for the District of Columbia DPW, a storage area for the boating clubs, a disused pump house formerly used by Washington Gas as a source of cooling and processing water from the river, and underground pipelines for fuel formerly delivered to Washington Gas and to the Steuart Petroleum/ST Services site that adjoins the Washington Gas Site to the east. Multiple wells and several pipelines for the collection of groundwater and DNAPL have been installed by Washington Gas as part of the approved groundwater and DNAPL remediation at the Washington Gas East Station Site. In addition, the USACE property has a number of office and storage structures on it and an active pier used by the USACE to dock debris-collection boats operating along the Anacostia and Potomac Rivers.

The Washington Gas property has been extensively developed and is the location of two large office buildings with their associated parking lots. It also contains an older two-story building used for Washington Gas office space and for treatment of groundwater pumped from beneath both the Washington Gas Site and the NPS Site. Immediately south of the groundwater treatment building on the Washington Gas property is a facility used for fueling vehicles with compressed natural gas. Additional commercial development is proposed for the Washington Gas property, including a hotel.

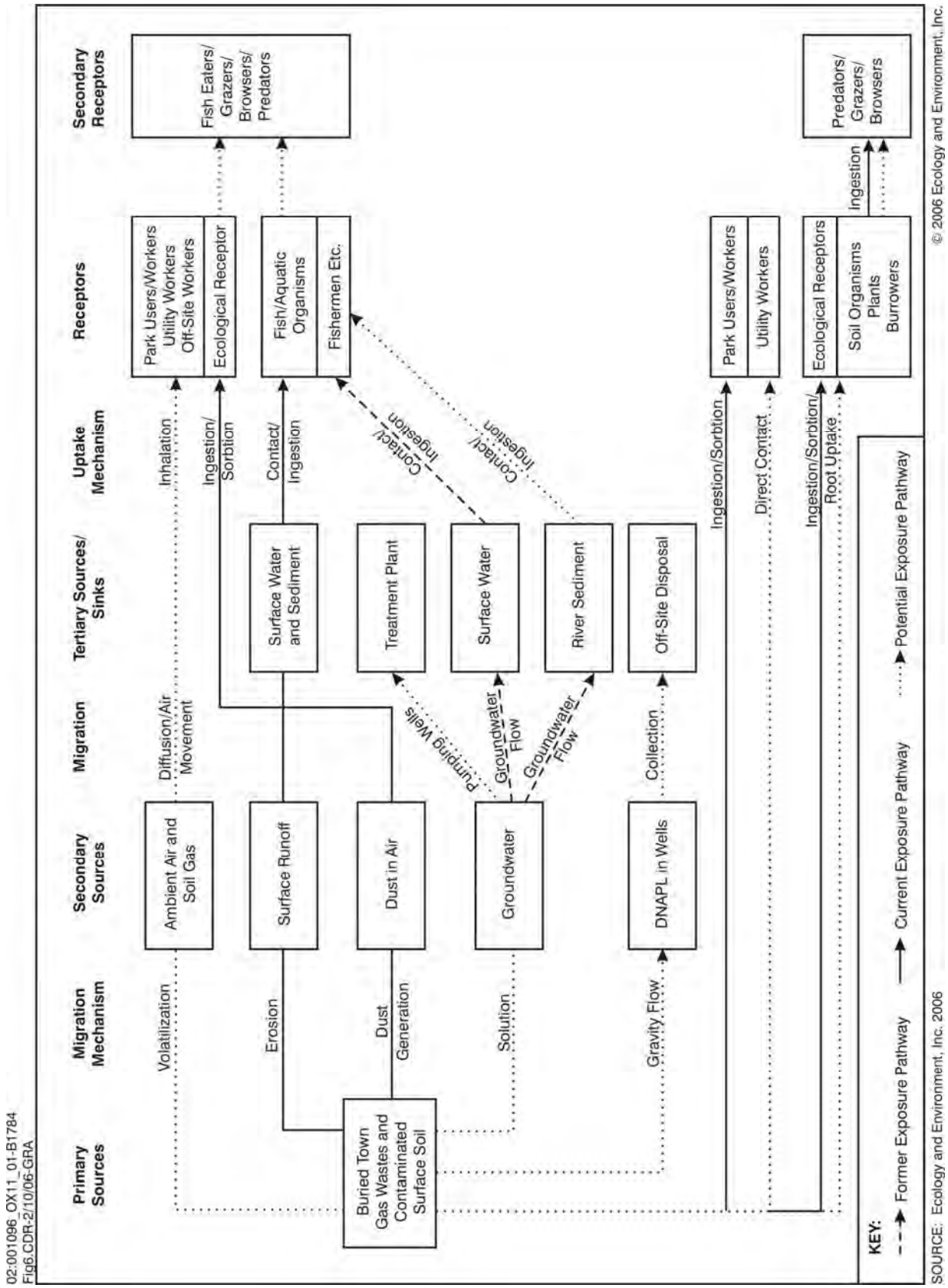

Figure 6 **Conceptual Site Model (Past, Current, and Potential Exposure Pathways), National Park Service Site, Washington D.C.**

The NPS property is currently serving several limited uses:

- An unfenced part of the property allows public access to the river for fishing, non-motorized boating, and open space passive or picnic-types of recreation in a part of Anacostia Park that otherwise has very limited alternatives for public access to the river.

- The District of Columbia DPW stores and maintains roadway maintenance equipment on a permitted portion of the NPS Site that the DPW leases from the NPS.

- Several rowing and paddling clubs use a small area of the property for recreation and to store equipment under and adjacent to the 11th Street bridge.

The USACE's property along the river that is bounded by the river and surrounded by the rest of the NPS Site is used as a staging area for crews removing floating debris from the Anacostia and Potomac rivers.

Current Land Use of Surrounding Properties

The closest residential area is approximately 1,000 feet north of the NPS Site and is unaffected by the NPS Site. Office workers on the Washington Gas East Station Site across Water Street are much closer. However, even when the Washington Gas East Station Site is fully developed, all workers on the Washington Gas East Station Site will be more than 60 feet from most of the NPS Site. The Anacostia River immediately adjoins the NPS Site and is separated from it only by the seawall, which is porous enough to allow tidal flows of groundwater and river water into and out of the NPS Site. The flow of groundwater out of the NPS Site that formerly occurred is now prevented by the system of pumping wells installed by Washington Gas.

Land uses along the seawall are recreational. The NPS property west of the NPS Site is used by rowing, paddling, and similar clubs belonging to the Anacostia Community Boathouse Association, and the NPS property east of the Site is home to a powerboat club. The Navy Yard, a federal property owned by the Department of Defense (DoD) and now primarily encompassing federal offices and some housing units, is west of the 11th Street bridge. It was formerly a Navy base and shipyard. North of Water Street S.E., the Washington Gas property is now occupied by a recently built office complex. East of the Washington Gas East Station Site is the property formerly owned by ST Services, previously operating as Steuart Petroleum. Steuart Petroleum imported fuels by barge and pipeline from a pier immediately east of the proposed area of remediation for the NPS Site. Both this pier and the similar Washington Gas pier have now been removed and the ST Services property is being redeveloped. More than 1,000 feet north of the NPS Site, across a rail and interstate highway corridor, is a moderate-density residential neighborhood. Across the tidal portion of the Anacostia River, which is approximately 700 feet wide at this location, is more parkland and another interstate highway (see Figure 7).

02:001096_OX11_01-B1784/Fig7.CDR-2/13/06-GRA

SOURCE: Google Earth, 2006.

Figure 7 Land Use of Surrounding Properties, NPS Site, Washington, D.C.

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Future Land Use at the Site

The NPS has proposed as part of a Resource Management Plan (1999) for Anacostia Park that the NPS Site be developed as a connected part of the Anacostia Park system to provide public access to the waterfront and a variety of recreational opportunities. Future use of the NPS Site itself as part of the Anacostia Park will be specifically for recreational use only. Current recreational uses will continue and improvements will include public access to most of the NPS Site, with a riverside bicycle and jogging/walking path traversing the NPS Site.

The USACE expects to continue using its property as an operating base for its congressionally mandated mission of removing drift from the Potomac and Anacostia Rivers; however, because the USACE-managed property is surrounded on three sides by property that will be increasingly used as parkland, it too may eventually become parkland.

The District of Columbia DPW operations are expected to be moved elsewhere in 2006 and the DPW structures will be removed from the NPS Site. The Washington Gas pump house will be demolished and removed. Continued operation of the groundwater and DNAPL remedies for the NPS Site will require the continued presence of wells and pipelines to extract and treat DNAPL and groundwater and access by Washington Gas to maintain them.

Future Land Use at the Surrounding Properties

Continued development of the Washington Gas property will result in hotel workers and guests being close to and probably using the NPS Site for recreation and river access. The Navy Yard area is becoming more commercial, and the neighborhood north of the NPS Site is being redeveloped or more intensively used. The many groups using the NPS Site for boating are expected to use it more intensively once it is remediated, and the remediation of the NPS Site will attract cyclists, joggers, walkers, etc. to Anacostia Park.

Current and Future Resource Uses

There are no known natural soils at the surface, and its location within a highly built-up urban area precludes a great diversity of flora or fauna. The waterfront and access to the river is its major resource.

Surface water is not used as a drinking water source near the NPS Site and is not expected to be used in the future because the river is tidally influenced, with salt water and fresh water mixing.

Groundwater is being remediated, as described above, even though it is not currently used as a source of drinking water. The District has a policy of conserving any freshwater zone of saturation underneath the District, and the groundwater at the Site could be used as a future or emergency source of water.

VII. Summary of Site Risks

The baseline HHRA and ERA performed by Washington Gas for their RI/FS identified only one scenario for risks specific to the NPS Site: human health risk to a juvenile using the NPS Site as a park. An additional study (Hydro-Terra, Inc. March 2002) was an HHRA for landscape workers and utility workers at the NPS Site. These risk assessments provide the basis for taking remedial action at the NPS Site as well as for identifying the exposure pathways involved and the contaminants of greatest concern. This section of the ROD provides a summary of the risks involved if the NPS Site remains unremediated.

Human Health Risks

When the RI/FS for the East Station Site was being developed by Washington Gas, the USEPA, the NPS, and the District of Columbia concluded that primary potential routes of human exposure to chemicals were:

- Ingestion of soil;
- Dermal contact with soil and river sediment;
- Inhalation of VOCs and dust; and
- Ingestion of fish taken from the river.

Thirty-two exposure scenarios were evaluated for the entire East Station Site, covering current land uses, the transition period when the properties will be converted to future uses, and future uses (Table 1). Washington Gas considered two future uses of their portion of the East Station property: commercial/ industrial use and residential use. In their evaluation, it was assumed that the future use of the riverfront NPS property would be recreational, with this entire area converted to a public park.

Table 1 Summary of Human Health Risk Assessment (Hydro-Terra, Inc. March 1999)

Scenario No.	Population	Exposure Location	Exposure Route	Time Frame			Cancer Risk	Hazard Index
				Pres	Trans	Future		
1	Angler	Anacostia R.	Fish Ingestion	x	x	x	2.8E-07	4.8E-03
2	Swimmer/ Wader	Anacostia R.	Sediment Ingestion	x	x	x	9.7E-07	5.0E-03
3			Sediment Dermal	x	x	x	**8.9E-06**	7.6E-03
4	Off-site Resident	Outside Study Area	Soil VOC Inhalation	x	x	x	4.3E-09	4.3E-04
5			Eroded Dust Inhalation	x	x		2.4E-09	9.2E-05
6			Bulldozer Dust Inhalation		x		8.0E-07	7.4E-01
7			Excav. Soil VOC Inhalation		x		5.0E-08	4.8E-03
8	Off-site Office Worker	Outside Study Area	Soil VOC Inhalation	x	x	x	2.2E-10	1.1E-05
9			Eroded Dust Inhalation	x	x		1.2E-10	2.3E-06
10			Bulldozed Dust Inhalation		x		3.4E-08	3.2E-02
11			Excav. Soil VOC Inhalation		x		1.6E-09	7.4E-04
12	On-site Office	East Station Property	Soil VOC Inhalation			x	9.6E-10	4.6E-05
13			Bulldozed Dust Inhalation		x		4.9E-07	4.5E-01

Table 1 Summary of Human Health Risk Assessment (Hydro-Terra, Inc. March 1999)

Scenario No.	Population	Exposure Location	Exposure Route	Time Frame			Cancer Risk	Hazard Index
				Pres	Trans	Future		
14	Worker	NPS Property	Vehicular Dust Inhalation	x	x	x	2.8E-07	5.1E-03
15		East Station Property	Excav. Soil VOC Inhalation		x		2.3E-08	1.1E-03
16			Soil VOC Inhal. via Cracks			x	2.8E-10	1.4E-05
17	On-site Resident	East Station Property	Soil VOC Inhalation			x	8.7E-09	8.6E-04
18			Soil VOC Inhal. via Cracks			x	2.5E-09	2.6E-04
29			Surface Soil Ingestion			x	**9.0E-05**	9.7E-01
31			Surface Soil Dermal			x	**2.4E-04**	4.6E-01
19	Utility Maint. Worker	Study Area	Subsurface Soil VOC Inhal.	x	x	x	**5.5E-05**	**3.9E+00**
20			Subsurface Soil Ingestion	x	x	x	**2.8E-06**	4.5E-03
21			Subsurface Soil Dermal	x	x	x	**1.2E-05**	6.4E-03
22	Juvenile Recreation	NPS Property	Soil VOC Inhalation			x	1.8E-08	2.2E-03
30			Surface Soil Ingestion			x	3.2E-05	2.2E-01
32			Surface Soil Dermal			x	3.0E-04	3.5E-01
23	Construction Worker	East Station Property	Soil VOC Inhalation		x		1.1E-10	1.5E-04
24			Eroded Dust Inhalation		x		1.4E-10	8.2E-05
25*			Bulldozed Dust Inhalation		x		3.7E-05	3.5E+01
26			Excav. Soil VOC Inhalation		x		2.5E-09	3.5E-03
27			Soil Ingestion		x		4.5E-07	3.8E-02
28			Soil Dermal		x		1.9E-06	2.7E-02

Shaded areas indicate a potential exceedance of acceptable risk levels:
Hazard Index >1.0 Cancer > 1.0E-06
*Scenario 25 applies only to the bulldozer operator.

Health risk for humans is expressed as (1) the probability of developing cancer over a 70-year lifetime and (2) the potential for non-cancer adverse health effects to occur due to long-term exposures. For example, an excess cancer risk of 1 in a population of 1 million means that a person exposed to a chemical or chemicals over the course of a lifetime could potentially increase his or her cancer risk by 1 in 1 million. According to the risk estimates in the NCP, the lifetime excess cancer risk should not exceed somewhere in the range of one excess cancer case in 10,000 individuals (1×10^{-4}) to one excess cancer case in 1,000,000 individuals (1×10^{-6}).

Non-cancerous (non-carcinogenic) risks are expressed as a hazard quotient for a single substance and a hazard index for multiple substances and/or exposure pathways. A hazard quotient or hazard index greater than 1 indicates that site-related exposures may present an unacceptable risk to human health.

Risk assessments typically use conservative assumptions that favor protecting human health. Therefore, actual human exposures and risks are likely to be less than those calculated by the risk assessments.

The human health risk scenario specifically related to the use of the NPS property that was evaluated and reported in the 1999 RI/FS by Washington Gas was

exposure to unremediated soil for a juvenile using the NPS property as a recreational park. The exposures to the hypothetical juvenile considered were exposures to volatiles through inhalation and to soil through ingestion and dermal contact with unremediated soils. Only the exposure to dermal contact and the combined exposure through all three routes exceeded the acceptable range of risk as defined by the USEPA.

Exposure to unremediated soil for a juvenile using the NPS property as a recreational park was estimated by Washington Gas to involve a lifetime additional cancer risk of three cancers for 10,000 people (3×10^{-4}). This shows that the surface soil poses an unacceptable risk and therefore surface soil at the NPS Site has to be remediated.

Exposure scenarios found to have a potential risk above the threshold levels are identified in Table 1. The exposure of a utility worker to VOCs was calculated for the entire East Station Site and produced a hazard index of 3.9 for exposure to benzene. This indicates unacceptable levels of exposure to a toxic chemical across the entire area of contamination, including the NPS Site. A similar conclusion was drawn with respect to a bulldozer operator, whose exposure to manganese in inhaled dust resulted in a hazard index of 35.

The most recent investigative activity on the NPS Site, in November 2001, was an effort to more accurately define the calculations of the risks of exposure to subsurface soil for utility and landscape workers. The updated risk assessment is found in the *Assessment of Health Risk to Utility and Landscape Workers on National Park Service Property South of East Station in Washington D.C.* (Hydro-Terra, Inc. March 2002). This document recalculates the risk to workers on the NPS Site based on the results of soil sampling at 12 additional sampling sites on the NPS Site, in addition to the 8 soil sampling sites and 12 soil-gas sampling sites used during the March 1999 RI/FS health risk assessment.

Non-carcinogenic risks on NPS property were calculated to be below a hazard index of 1 and therefore do not represent an unacceptable risk. The cancer risks to utility workers on NPS property are 1.14×10^{-5} for exposure to inhalation of subsurface soil gas (1.14 excess cancers per 100,000 of population for lifetime exposure) and 1.11×10^{-6} for dermal contact with subsurface soil. The risk to landscape workers is 2.84×10^{-6} for exposure to inhalation of subsurface soil gas (Table 2). Carcinogenic risks for other scenarios were significantly less.

Table 2 Risk to Human Health from Exposure to Subsurface Soils (Hydro-Terra, Inc. March 2002)

Scenario	Exposed Population	Carcinogenic Risk	Non-Carcinogenic Risk
Inhalation of soil gas	Utility workers	1.14×10^{-5}	8.34×10^{-1}
	Landscape worker	2.84×10^{-6}	2.01×10^{-1}
Ingestion of soil	Utility workers	3.54×10^{-7}	3.76×10^{-3}
	Landscape workers	1.77×10^{-7}	1.88×10^{-3}
Dermal contact	Utility workers	1.11×10^{-6}	2.67×10^{-3}
	Landscape workers	5.57×10^{-7}	1.33×10^{-3}

The ranges of concentrations and average levels of various classes of chemicals found in the East Station Site media—soils, groundwater, soil gas, and the sediment in the adjoining river—are tabulated on Table 3. The ranges and average levels of individual organic chemicals, metals, and cyanides as found in the near-surface soil and used for the HHRA for utility and landscape workers are shown in Table 4. This table also identifies the contaminants having the greatest impact on the human health risks, i.e., the "analytes of exceptional influence (AoEIs)." The risks that lay between the 10^{-6} and the 10^{-4} risk levels are highlighted on Table 2.

Table 3 Ranges of Values for Groups of Chemicals in Site Media (mg/kg except as noted). (Hydro-Terra, Inc. 1999 [except as noted])

	Chemical Group					
	Volatile Organics		Semivolatile Organics		PAHs	
Medium of Concern	Range of Values	Average Value	Range of Values	Average Value	Range of Values	Average Value
Surface soil	ND to 0.026	0.005	4.7 to 148.7	47.76	0.813 to 230.3[c]	63.67
Subsurface soil	0.039 to 1.9	0.75	10 to 705 (at 6 feet)	247.5	4 to 9,038 (to base of fill)	1,561.7
Subsurface soil (to the water table)	N/A	N/A	N/A	N/A	0.087 to 27,018	2,409
Shallow groundwater	38 to 14,977[a]	3590[a]	ND to 32,662[a]	6,612[a]	ND to 32,662[a]	7,113[a]
Deeper groundwater	ND to 5,405[a]	919[a]	0 to 6,924[a]	1,170[a]	ND to 6924[a]	1170[a]
Soil gas	ND to 11,580[a]	1,114[a]	N/A	N/A	N/A	N/A
River sediment	0.15 to 0.43 [b]	0.26[b]	20.3 to 253[b]	126.5[b]	39.4 to 226.7[b]	129.05[b]

[a] Micrograms per liter (µg/L).
[b] Micrograms per kilogram (µg/kg).
[c] Hydro-Terra , Inc. March 2002.

Key:
mg/kg = milligrams per kilogram
NA = Not applicable
ND = Non-detected.

Table 4 Range of Concentrations and Average Concentrations of PAHs, Metals, and Total Cyanides in Shallow Soils at the NPS Site (Hydro-Terra, Inc. March 2002)

Analytes in Shallow Soils (0 to 5 feet, averaging 3.5 feet)	Range of Concentrations	Average Value	Notes
PAHs (mg/kg)			
Acenaphthene	ND-23,000	1,597	
Acenaphthylene	ND-5,300	885	
Anthracene	ND-21,000	1,768	
Benzo[a]anthracene	ND-16,000	2,505	
Benzo[a]pyrene	ND-15,000	2,813	AoEI[1]
Benzo[b]fluoranthene	ND-8,700	1,854	
Benzo[g,h,i]perylene	ND-16,750	2,132	
Benzo[k]fluoranthene	ND-8,700	1,841	
Chrysene	ND-18,000	2,983	
Dibenzo[a,h]anthracene	ND-5,700	898	AoEI[1]
Fluoranthene	ND-27,000	4,755	
Fluorene	ND-24,000	1,698	
Indeno[1,2,3-cd]pyrene	ND-11,000	1,302	
2-methylnaphthalene	ND-45,000	4,295	
Naphthalene	ND-55,098	6,971	
Phenanthrene	ND-54,000	6,352	
Pyrene	ND-36,000	6,753	
Selected Metals and Cyanides (mg/kg)			
Antimony	ND-36.8	2.33	
Arsenic	1.3-17	7.51	Natural range
Beryllium	ND-0.67	0.25	Natural range
Cadmium	ND-3.65	0.33	
Chromium	7.3-41	20.79	
Cobalt	2.3-14	5.19	
Copper	18-272.5	116.83	
Iron	7,100-65,000	20,118	
Lead	28-12,000	1,069	
Manganese	44-960	254.35	
Mercury	ND-0.90	0.29	
Nickel	8.6-38	20.84	
Selenium	ND-0.97	0.11	
Silver	ND-5.30	0.35	
Thallium	ND-26.1	1.63	
Vanadium	12-50.65	28.23	
Zinc	24-670	171.12	
Total cyanides	ND-44.25	7.99	

[1] Analyte of Exceptional Influence in the Human Health Risk Assessment. These two compounds created more than 80% of the carcinogenic risk. No other compound created more than 10% of the total carcinogenic risk.

Key:
mg/kg = milligrams per kilogram.
ND = Non-detected.

The relatively low levels of the contaminants typical of coal town gas wastes in surface soils (in this case, PAHs ranging from 0.813 to 230.3 mg/kg) still create unacceptable risk, although only to the juvenile park user. Exposure to the much higher levels in subsurface soils, up to a maximum level of 27,018 mg/kg, also has to be controlled. This will be handled by deed restrictions on the property to prevent exposure to these soils. These restrictions will not prevent public use of the NPS Site as a park.

Note that almost all the carcinogenic risk for a juvenile using the NPS Site for recreation, as calculated in the HHRA (Hydro-Terra, Inc. March 1999), is derived from the same suite of PAHs, dominated by benzo(a)pyrene and dibenzo(a,h)anthracene. The average levels of these two PAHs in the five soils samples (SR-21, 22, 24, 25, and 26) used in the 1999 HHRA are very comparable to the values in Table 4 (Hydro-Terra, Inc. March 2002), with benzo(a)pyrene averaging approximately 9% higher and dibenzo(a,h)anthracene averaging approximately 11% lower. In both sets of soil samples, the levels of PAHs varied widely from sample to sample, and the average levels of PAHs were dominated by a few highly contaminated samples. These observations show the high variability of the NPS Site materials and suggest that removal of the top layer of soil may reveal highly variable levels of tar wastes in the underlying subsoil.

Because the NPS Site is characterized by small pockets of coal tar contamination, or "hot spots," in the subsurface that are irregularly distributed within the fill materials, the risks to utility and landscape workers may be greater than that calculated in the HHRA if such materials are left in the shallow subsurface. These hot spots can be adequately identified by their visible, tactile, and olfactory effects. NPS will sufficiently reduce the low risks to utility and landscape workers by requiring the removal of the identified hot spots.

Ecological Risk Assessment

Washington Gas prepared an ERA that is included in the *Additional Remedial Investigation and Feasibility Study* (Hydro-Terra, Inc. March 1999) and is part of the NPS Site Administrative Record. Potential ecological routes of exposure that were identified include:

- Ingestion of contaminated sediment by aquatic invertebrates and by vertebrates;
- Ingestion of contaminated soil or plants by terrestrial vertebrates; and
- Uptake of contaminants in soil and water through the roots of plants.

An ecological risk assessment evaluates the potential for adverse impacts on plants or animals from long-term exposure to chemicals of potential concern. The ecological assessment focuses on mortality and on more subtle changes that affect the functioning of natural populations and communities rather than the risk of developing cancer. Like human health risk assessments, screening-level

ecological risk assessments use a quotient of the exposure concentration as a benchmark, above which the chemical may cause adverse effects.

Risk assessments typically use conservative assumptions that favor protecting the environment. Therefore, actual ecological receptor exposures and risks are likely to be less than those calculated for the risk assessment.

The potential stressors are VOCs, SVOCs, and inorganics (metals and complex cyanides). These are found in the upper 2 feet of soil, in stormwater runoff, in groundwater, in river water, and in sediments.

Chemicals identified in each medium of concern with a hazard quotient above 1.0 were identified as chemicals of potential concern. Table 5 identifies the chemicals of potential ecological concern in each media.

Table 5 Chemicals of Potential Concern for Ecological Risk Assessment (Hydro Terra, Inc. March 1999)

Chemical	Soils		Site Water		Anacostia R.	
	Surface	0 – 2 Ft.	Runoff	Ground	Water	Sediments
Metals						
Silver		X				
Aluminum	X	X	X		X	
Arsenic		X				X
Cadmium	X	X		X		X
Chromium	X	X		X		X
Copper	X	X				X
Iron	X	X	X		X	
Mercury	X	X	X			X
Manganese	X	X				
Nickel	X	X				X
Lead	X	X	X	X	X	X
Antimony		X				
Selenium		X				
Thallium		X				
Vanadium	X	X				
Zinc	X	X				X
Other Inorganic Chemicals						
Cyanides (complex)		X				
Semivolatile Organic Compounds						
Polynuclear Aromatic Hydrocarbons	X	X				X
Di(ethylhexyl) phthalate						X
Dibenzofuran						X
Volatile Organic Compounds						
Benzene		X				
Ethylbenzene		X				
Xylenes		X				

Sediment exposures will be addressed separately in the sediment remedy that will be based on data gathered by the USEPA and other agencies (including existing data as well as the results of the pilot capping studies). The groundwater risks (see Table 3) resulted from the assumption that groundwater was discharging to surface water. However, with the installation of the groundwater capture-and-treat system placed by Washington Gas, such discharge appears to no longer be occurring. The surface water runoff risk was based on the water quality of runoff from unremediated surface soil, which will not apply after the surface soil remedy is in place. This reduces the potential ecological risk after remediation to the impacts of surface and subsurface soil contamination.

Removing the uppermost foot of soil to address the human health risks, combined with the excavation of hot spots in the underlying soil, will result in a significant reduction of the ecological risks posed by the NPS Site. Since most biological activity at any site is confined to the topsoil and immediately beneath it, most biological activity on the remediated NPS Site will occur in imported clean fill and topsoil.

Because the entire portion of the NPS Site deemed unacceptable for park use in its present condition will be remediated, the ecological risks will be greatly reduced, to an extent that sufficiently protects ecological receptors. Also, because the NPS Site is in an intensely urban setting, with a limited range of natural floral and faunal resources, a separate full-scale ecological risk assessment for the NPS Site was deemed unnecessary.

VIII. Remedial Action Objectives

Remedial action objectives (RAOs) were formulated to guide development of remedial alternatives. The primary RAOs include:

1. Prevention of exposure of NPS Site users and biological receptors to contaminated soils and other media;

2. Remediation of the contaminants or contaminated media to create NPS Site conditions that result in acceptable levels of risk to NPS Site users and biological receptors; and

3. Prevention of the release of contaminants to off-site media.

Risk Management-Based Remediation Goals – Human Health

RAOs, as stated in the Washington Gas March 1999 *Additional Remedial Investigation and Feasibility Study*, did not consider any human health risk scenarios for the NPS Site beyond exposure to surface soil during recreational use. Specifically, the feasibility study did not address exposures to subsurface soil by workers installing foundations or utilities or repairing the seawall or the lesser exposure of landscape workers to subsurface soils.

In selecting the remedial action for the NPS Site, the National Park Service Organic Act (16 United States Code [U.S.C.] Section 1) requires that the NPS Site be available to the general public for their safe use and enjoyment as a national park. This necessarily includes construction of park-related services such as the installation of utilities and maintenance of the historic seawall, which provides a boundary to the park on the river side and maintains the physical integrity of the NPS Site.

Because the NPS may, in the future, need to disturb subsurface soil to install water, electricity, gas lines, or other utilities to serve its park land, to construct pathways or buildings, or to maintain or restore the seawall, the selected remedial action must enable the NPS to do so without encountering hazardous substances at levels requiring engineering controls or personal protection equipment.

Risk Management-Based Remediation Goals – Ecological

Protection of the adjacent Anacostia River sediment and water as fish and wildlife resources is an important objective of the on-site remediation. This will involve controlling erosion and runoff during remediation and maintaining the integrity of the seawall.

Other Site Management Objectives

The continued use of the property by the USACE (access to its property through the NPS Site) must be taken into account, as must the accessibility of the groundwater and DNAPL collection systems installed and maintained by Washington Gas.

The RAOs are presented in the sections below for each of the contaminated media on-site and for off-site media (river water and sediment) that could potentially be impacted by the NPS Site. RAOs were established based on the analysis of NPS Site risks and ARARs.

Remediation Goal Verification

Verification of remediation goals for each of the media on or adjacent to the NPS Site will be separate tasks. The new material replacing the existing upper 1 foot of surface soils will have to be analyzed before it is put into place. The imported fill and topsoil must, to the extent practicable, be at or below background levels for naturally occurring metals and at non-detectable levels for other contaminants.

Verification of the remediation goals will be determined by observing the soil removal and accounting for depths and volumes of soil removed and fill and topsoil imported, as well as by detailed surveys of the NPS Site, both before and after remediation. The subsurface soils that are not remediated must remain buried and not be sources of exposure.

Groundwater remediation will be determined by observing hydraulic gradients and maintaining those hydraulic gradients from the river towards the pumping wells so that there is positive proof that groundwater is not migrating off-site into the river.

This will prevent any additional exposure of organisms in the river to discharges of contaminated groundwater. The remediation goal for mobile DNAPL is cessation of migration of DNAPL into those wells into which it had been moving and from which it had been collected. Non-mobile DNAPL encountered during excavation of surface and near-surface soils will be removed as part of the soil remedy. Goals for remediation of contaminated sediments adjacent to the NPS Site will be established in a separate decision document at a later date (see the discussion in Section IX under "River Sediment," page 46 and page 62 of this ROD).

Summary

Soils. The RAOs for soils are:

- Prevention of unacceptable exposure of employees or members of the public using the NPS Site;
- Prevention of unacceptable exposure of utility, landscape, or construction workers at the NPS Site;
- Prevention of erosion of contaminated soil into the Anacostia River by overland flow or by the collapse or breaching of the seawall during remediation; and
- Prevention of unacceptable exposure to ecological receptors at or adjacent to the NPS Site.

Cleanup criteria will be based on direct observation of principal-threat wastes and their removal to specified depths or to materials not observably contaminated. This is based on the calculated cancer and non-cancer risks presented in Section VII that show that soils contaminated with tar containing elevated levels of PAHs are capable of causing an unacceptable level of risk to human health under certain exposure conditions. Verification of removal will be based on measured depths and volumes of soil removed from the surface as well as removal of subsurface soils identified as needing remediation or by direct measurement of the depths of additional subsurface soil excavation in small areas.

DNAPL. The RAOs for DNAPL (tar) are:

- Collection of any DNAPL mobile enough to be capable of flow into collection wells and removal for off-site treatment and disposal;
- Removal of DNAPL, if any is found in surface and near-surface soils, to a depth that will prevent unacceptable exposure of NPS Site users, employees, utility or construction workers, and ecological receptors; and
- Prevention of migration of DNAPL into the Anacostia River.

The first and third of these objectives were addressed in the *Additional Remedial Investigation and Feasibility Study* and the *Proposed Plan for the East Station Site*, and the second is addressed in this ROD in Section IX, "Subsurface Soil," on pages 42 to 44.

Groundwater. Because there are no aquifers currently used or anticipated to be used for a water supply that are impacted by the NPS Site, the major RAO for groundwater is to prevent off-site migration of contamination into surface water.

The two water-bearing zones under the NPS Site require separate remedial action components, both of which are currently being implemented:

- Pumping wells in the fill, including the interceptor trench, create a cone of depression in the water table that captures water flowing off the NPS Site and draws some water from the river into the fill. This conclusion is based on the volume of groundwater being pumped compared with the maximum possible rates of infiltration within the area of land recharging the two aquifers under the NPS Site. The District is having Washington Gas perform additional monitoring to establish that hydraulic gradients are from the river to the pumping wells at all times to conclusively demonstrate that no groundwater is leaving the NPS Site. Groundwater is extracted using capture wells, then is treated in the groundwater treatment system on Washington Gas property and discharged off-site into the sanitary sewer that takes it to the District's POTW.

- Pumping wells in the sand and gravel zone beneath the silt layer capture contaminated groundwater entering the NPS Site and prevent it from migrating any farther. Water extracted from this aquifer and any DNAPL accumulating in the wells are treated in the on-site groundwater treatment system and discharged to the sewer or removed off-site.

Remediation will continue indefinitely with review at five-year intervals. Cleanup objectives are performance-based (no migration off-site) rather than risk-based. However, all groundwaters in the District of Columbia are, by default, designated as of drinking water quality, and the two shallow water-bearing zones beneath the NPS Site should ultimately comply with District of Columbia groundwater standards or their classification should be changed by the District Department of Consumer and Regulatory Affairs (DCRA) to non-useable. This is typically only done if the total dissolved solids (TDS) levels in the water in the aquifer become too high for the water to be drinkable.

River Sediment. There are other potential sources of the contaminants in the sediments of the Anacostia River. Efforts are currently under way to evaluate whether, and if so to what extent, the PAHs and other contaminants in sediments adjoining the NPS Site are attributable to the NPS Site. The RAO is to further investigate the extent of sediment contamination and the sources that contribute to

it and, ultimately, to pursue an acceptable remedy for contaminants from the East Station Site found in the sediment.

IX. Description of Alternatives

This section summarizes the media-specific alternatives evaluated in the March 1999 *Additional Remedial Investigation and Feasibility Study* (Hydro-Terra, Inc.) for the entire East Station Site and the additional alternatives that NPS is evaluating in this document to be considered for the NPS Site. Each medium (surface soil, subsurface soil, groundwater, DNAPL, and sediment) is considered separately.

The main difference between the alternatives selected for detailed consideration and evaluated in the *Additional Remedial Investigation and Feasibility Study* and the NPS alternatives is an additional alternative for subsurface soil: the target-area excavation of shallow soils (to 3 feet) and disposal off-site (see "Target-Area Excavation of Shallow Soil" below).

All the remedial alternatives considered by Washington Gas and the NPS are described below.

Surface Soil

The following remedial alternatives for surface soil at the NPS Site were evaluated:

- No action, as a basis for comparison with the other alternatives;
- Soil removal and disposal off-site; and
- Phytoremediation.

No Action. No action is defined as the absence of active steps to remedy the affected media, in this case, surface soil. Consideration of a "no action" alternative is required by the NCP and is used as a baseline for evaluating the potential impact of not undertaking any remedial action. Additional information pertaining to the no action alternative for surface soil can be found in the *Additional Remedial Investigation and Feasibility Study*.

Soil Removal and Disposal Off-Site. Washington Gas considered removal and replacement of surface soil for the NPS Site because it lies within the 100-year flood plain, and regulations (40 Code of Federal Regulations [CFR] Part 6, Appendix A) do not allow filling within a floodplain that reduces its capacity to carry floodwaters. Removal and replacement was also the only option considered by NPS because of various problems with on-site treatment (see Section X, page 48 of this ROD).

To prevent exposure to contaminants in surface soils, the remedial alternative at the NPS Site would involve the removal of 1 foot of surface soil and replacement

with 6 inches of clean fill and 6 inches of topsoil over that portion of the NPS-managed property that is without continuous tree cover. This alternative would be applicable to those portions of the USACE-managed property that have not previously been dug and backfilled to a depth of 1 foot in the course of placing concrete, footers, or asphalt. This action satisfies the requirement to maintain the current surface land elevation. The soil removed will be disposed of off-site. The new topsoil placed on the NPS-managed property will be vegetated to prevent erosion and to ensure the integrity of the clean soil cover. The new topsoil placed on the USACE-managed property will be covered by material appropriate to the property's use, e.g., asphalt, concrete, gravel.

The cost of this alternative is projected to be $1,079,000. It is partially based on the portion attributable to the NPS property in the cost initially presented by Washington Gas for the entire Washington Gas East Station Site (see the alternative "Vegetative Soil Cover and /or Buildings and Paved Areas" in the *Additional Remedial Investigation and Feasibility Study)*. Additional information pertaining to the removal and disposal off-site alternative for surface soil remediation also can be found in the *Additional Remedial Investigation and Feasibility Study*.

The NPS may implement the above alternative concurrently with future NPS Site plans to construct a hiking/biking path parallel with the river. If so, the soil would be excavated to 18 inches below ground surface along the projected location of the path and the fill would consist of 18 inches of crushed stone on a properly prepared sub-base, 10 feet wide, for a distance of approximately 900 feet opposite the Washington Gas East Station Site. Installing the bike path concurrently with the soils remedial alternative would result in a significant cost saving because the cost estimate to implement the remedial alternative is expected to remain nearly unchanged as a result of installing the bike path. In addition, intrusive activities necessary to install the bike path at a future time will be eliminated.

Phytoremediation. Phytoremediation is the planting of vegetation that would take up contaminants and remove them from the soil, followed by harvesting of the vegetation and eventual off-site disposal of the plant waste. Plants may provide a useful, natural mechanism for stabilizing and reducing concentrations of contaminants in the soil.

Additional information pertaining to the phytoremediation alternative for surface soil can be found in the *Additional Remedial Investigation and Feasibility Study*. Because of its uncertain effectiveness, phytoremediation was considered only as a possible adjunct to other forms of remediation.

Subsurface Soil

The following remedial alternatives evaluated by Washington Gas for subsurface soil at the East Station Site were also evaluated for the NPS Site:

- No action;

- Institutional controls;

- Target-area excavation of all contaminated soils, including those to 23 feet below surface and, therefore, well below sea level, with removal and disposal off-site; and

- Phytoremediation.

The following remedial alternative was added by NPS for subsurface soil at the site:

- Target-area excavation of shallow soils to a maximum depth of 3 feet below the present surface (with removal and disposal off-site).

No Action. No action is defined as the absence of active steps to remedy the affected media, in this case, subsurface soil. Additional information pertaining to the no action alternative for subsurface soil remediation can be found in the *Additional Remedial Investigation and Feasibility Study*.

Institutional Controls. Institutional controls involve action aimed at limiting and controlling exposure to chemicals contained in the on-site subsurface soil. Deed restrictions would incorporate special provisions into the property deed that would restrict certain excavation and construction activities in impacted areas. Institutional controls also involve health and safety awareness requiring personal protective equipment and educational programs to reduce potential hazards by limiting NPS Site worker and public exposure to the subsurface soil. However, the institutional controls and groundwater extraction wells will not prevent access to or park use of the NPS-managed property by park visitors or by NPS staff and management, or access to or use of the USACE-managed property by its visitors and employees. Additional information pertaining to this alternative can be found in the *Additional Remedial Investigation and Feasibility Study*.

Target-Area Excavation. Target-area excavation is the removal of fill soil in areas known to contain or suspected to contain significant DNAPL and subsequent disposal off-site. The target soil is material that has been found to contain DNAPL above the residual concentration. Washington Gas considered three areas that would be excavated to depths up to 23 feet under this scenario; the estimated volume of soil to be removed is 64,000 yds^3. Additional information pertaining to this alternative can be found in the *Additional Remedial Investigation and Feasibility Study*.

Phytoremediation. Phytoremediation as a remedial alternative for subsurface soil is virtually identical to that described above for surface soil. The main distinction is that remediation effectiveness at depth is a function of the depth of the root zone, which is specific to the type of vegetation and the depth to the permanent water table at the location of planting. Additional information

pertaining to this alternative for subsurface soil remediation can be found in the *Additional Remedial Investigation and Feasibility Study*.

Target-Area Excavation of Shallow Soils. The NPS considered this alternative for the NPS Site, given the potential for coal tar contamination that may be exposed when the surface soil layer is removed. However, the alternative considered differs from the target-area excavation alternative evaluated in the Washington Gas *Additional Remedial Investigation and Feasibility Study* and described in the previous section, specifically in the depth of subsurface soil removal. Washington Gas proposed target-area excavation to depths of up to 23 feet in several areas, resulting in an estimated excavation of a very large soil volume (64,000 yds^3). NPS is proposing target-area excavation limited to approximately 3 feet below the existing ground surface because utilities such as water lines are normally installed below the frost-line (the depth to which soils typically become frozen in winter), which in the Washington D.C. area is approximately 2.5 feet. Deeper excavation below 3 feet from the present surface would take place only in exceptional circumstances, which are not anticipated during normal park use.

The NPS proposes that during the removal of the 1-foot surface layer of soil the underlying soil be observed for signs of coal tar. If subsurface soils are contaminated with coal tar or coal-tar-like materials, then selective removal will be performed. Contaminated soils will be excavated to a depth of 6 inches below the frost line or approximately 3 feet below the existing ground surface or to the water table if the water table is encountered first. The latter provision is proposed because it is improbable that any excavation below the water table would be required by normal park use, and the water table could be shallow adjacent to the seawall. Contamination with coal tar will be determined in three ways— visually, tactilely with protective gloves, and by odor. Removal of any hot spot will be confirmed by direct observation and will be continued until it is removed or an additional 2 feet of fill soil has been removed from below the surface soil or the water table has been reached. These excavated materials will be disposed off-site and replaced with clean fill.

Groundwater

The following remedial alternatives were evaluated for groundwater at the NPS Site:

- No action;
- Monitored natural attenuation;
- Pump-and-treat;
- Biosparging; and
- Phytoremediation.

No Action. The no action alternative for groundwater would involve terminating the present pump-and-treat system, with the exception of continued DNAPL recovery directly from wells (discussed in the DNAPL alternatives description below). Additional information pertaining to the no action alternative for groundwater remediation can be found in the *Additional Remedial Investigation and Feasibility Study*.

Monitored Natural Attenuation. Natural attenuation would result from the combination of several subsurface contaminant-attenuation mechanisms that are classified as either destructive or non-destructive. Destructive processes include biodegradation, abiotic oxidation, and hydrolysis. Non-destructive attenuation mechanisms include sorption, dilution caused by dispersion and infiltration, and volatilization. Under favorable circumstances, one or more of these processes can result in reduction of particular contaminants. Additional information pertaining to this alternative for groundwater remediation can be found in the *Additional Remedial Investigation and Feasibility Study*.

Pump-and-Treat. Pumping and treating groundwater has historically been used to contain contaminated groundwater. At the East Station Site, this has been used to contain groundwater in both the fill and in the sand and gravel aquifer beneath the silt layer. Half of the groundwater extraction wells are placed on the NPS Site. They are RW-4S, RW-7S, and the trench well. RW-7S is a DNAPL recovery well as well as a shallow groundwater recovery well. RW-1, RW-2, and RW-3 are on Washington Gas property, and RW-3 is the recovery well pumping the sand and gravel unit. Pump-and-treat has been in use since 1976 at the East Station Site, reducing the overall load of contaminants discharging to the Anacostia River. The objective is to ensure that no contaminated groundwater escapes from under the East Station Site into the outside environment. Additional information pertaining to this alternative for groundwater remediation can be found in the *Additional Remedial Investigation and Feasibility Study*.

Biosparging. Biosparging was considered by Washington Gas as a form of in situ groundwater treatment to improve groundwater quality in the fill and the sand and gravel units under the East Station Site. Such a system would serve to enhance natural attenuation by increasing the oxidative and biodegradation processes. A typical system would consist of a biosparging trench installed to the base of the fill to pump air or oxygen bubbles into the groundwater. Additional information pertaining to this alternative for groundwater remediation can be found in the *Additional Remedial Investigation and Feasibility Study*.

Phytoremediation. Phytoremediation has the potential to remove or reduce chemicals in shallow groundwater found in the fill unit at the East Station Site. Phytoremediation would not have any effect on the groundwater in the sand and gravel aquifer beneath the silt layer because of its significant depth. The mechanism of particular interest is the ability of trees to directly uptake groundwater and the chemicals in that water and accumulate or transform them

into non-toxic forms in the plant tissue. Additional information pertaining to this alternative for surface soil remediation can be found in the *Additional Remedial Investigation and Feasibility Study*.

Coal Tar (DNAPL)

The following remedial alternatives were evaluated for DNAPL at the NPS Site:

- No action; and
- Recovery from wells.

No Action. No action is defined as the absence of active steps to remedy the affected media, in this case, DNAPL. Additional information pertaining to the no action alternative for DNAPL contamination can be found in the *Additional Remedial Investigation and Feasibility Study*.

Recovery from Wells. Removal of DNAPL from wells involves continuing current interim measures to pump DNAPL from nine wells, using either fixed or portable pumps especially designed for DNAPL pumping. The optimum rate for removal of DNAPL would be determined for each well in order to maintain a reasonably efficient and effective extraction of DNAPL. Additional information pertaining to this alternative for DNAPL can be found in the *Additional Remedial Investigation and Feasibility Study*.

River Sediment

The following remedial alternatives were evaluated for sediment at the NPS Site:

- No action; and
- Participation in a river-wide study of the Anacostia River watershed, the Anacostia River Initiative.

No Action. No action is defined as the absence of active steps to remedy the affected media, in this case, sediment.

Participation in a Watershed-Wide Study. Contaminated sediments in the Anacostia River are a watershed-wide issue. Washington Gas has joined a USEPA-led watershed-wide study of sediment quality, the Anacostia River Initiative, involving a number of private and public parties. This study's goal is to identify mitigating measures and to recommend remedies for some contaminated sediments. In cooperation with USEPA and study participants, including NOAA, NPS will undertake additional remedial action under CERCLA to address the sediment contamination if and to the extent appropriate, based on information contained in this study or related studies.

X. Comparative Analysis of Alternatives

The NCP requires that the NPS, as the lead agency, evaluate and compare the remedial cleanup alternatives based on nine criteria set forth in the NCP, 40 CFR §300.430(e)(9), which the NPS used to evaluate each of the remedial alternatives summarized above. The purpose of the comparative analysis is to identify the advantages and disadvantages of each alternative relative to the others. These nine criteria can be categorized into three groups: *threshold criteria*, *primary balancing criteria*, and *modifying criteria*. The first two criteria, overall protection of human health and the environment and compliance with ARARs, are threshold criteria that must be satisfied in order for a remedial alternative to be eligible for selection. The next five criteria—primary balancing criteria—are used to weigh trade-offs between alternatives, and the selected remedy should provide the best balance of tradeoffs with respect to these criteria. Finally, state acceptance and community acceptance are modifying criteria formally taken into account after public comment is received on the Proposed Plan.

The nine criteria are:

Threshold Criteria

1. **Overall protection of human health and the environment.** Determines whether the alternative adequately eliminates, reduces, or controls threats to public health and the environment.

2. **Compliance with ARARs.** Evaluates whether the alternative meets identified federal and state environmental laws, regulations, and other requirements that are applicable or relevant and appropriate to the NPS Site or whether a waiver is justified.

Primary Balancing Criteria

3. **Long-term effectiveness and permanence.** Considers the ability of the alternative to protect human health and the environment over time.

4. **Reduction of contaminant toxicity, mobility, or volume through treatment.** Evaluates the alternative's effectiveness in reducing the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

5. **Short-term effectiveness.** Considers the length of time needed to implement the alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

6. **Implementability.** Considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

7. **Cost.** Includes estimated capital and annual operation and maintenance (O&M) costs as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50% to -30%.

Modifying Criteria

8. **State acceptance.** Considers whether the state (or in this case the District) agrees with NPS' analyses and recommendations, as described in the Proposed Plan.

9. **Community acceptance.** Considers whether the local community agrees with the NPS analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Table 6 summarizes the evaluation of the remedial alternatives considered by Washington Gas (with appropriate modifications made for the NPS Site in this ROD), including costs. Actual calculations of costs as prepared by Washington Gas for their *Decision Document* (September 1999) are given in Appendix B of the Washington Gas *Decision Document*. The detailed evaluation of the alternatives can be found in the *Additional Remedial Investigation and Feasibility Study*. Table 6 is derived from the RI/FS performed by Washington Gas for the entire East Station Site, including the NPS Site, with the addition of the last item in the subsurface soil remedies describing Remedial Option 5, which is the NPS preferred remedy for subsurface soils on the NPS Site, a remedy that was not proposed or evaluated by Washington Gas during their RI/FS.

Evaluation of Surface Soil Alternatives

As a consequence of the HHRA during the RI/FS, the no action alternative had already been found to be unacceptable because it resulted in an unacceptable risk of cancer for a hypothetical juvenile using the NPS Site for recreational purposes. The risk for the juvenile park user is primarily from dermal exposure, with a minor effect from soil ingestion. The total risk is estimated at 3.32×10^{-4} and requires that surface soil be remediated. For this reason, the no action alternative was found to be unacceptable and was not further considered. Another alternative considered, phytoremediation (planting vegetation to remove or change contaminants in the soil), was assessed to be of uncertain effectiveness. This left the third remaining alternative, removal, as the only viable alternative.

Because the NPS Site is within a 100-year floodplain, capping was not a possible alternative because it reduces the space available to accommodate flood waters and so increases the severity of floods, an action that is contrary to 40 CFR, Part 6, Appendix A, "Statement of Procedures on Floodplains Management and Wetlands Protection." That leaves only removal and disposal off-site and replacement with clean fill and/or clean soil as a remedy that meets the first two

Table 6 Detailed Evaluation of Remedial Alternatives (East Station* RI/FS 1999 and NPS Site 2005)

Alternative	Provides Overall Protection of Human Health and Environment		Complies with ARARs	Provides Long-Term Effectiveness and Permanence	Reduces Volume, Toxicity, and Mobility	Provides Short-Term Effectiveness	Implementability	Cost 88**
Surface Soil								
1. No Action	Human health:	No	Yes for current use	Not effective for future use	No	Effective for current use of the properties	Yes	None
	Environment:	Yes						
	Note: The "No Action" alternative would not provide overall protection of human health and the environment, would not comply with ARARs, and would not provide short-term or long-term effectiveness on the NPS Site in terms of its expected use as a park							
2. Containment (vegetated cover) including removal and replacement of soil	Human health:	Yes	Yes	Effective for present and future, but will require maintenance	Reduces mobility of soil particles and prevents direct contact	Yes	Yes	$1,079,000
	Environment:	Yes						
	Note: This includes the removal and replacement of one foot of soil on the NPS Site. Cost calculated January 2006 for NPS Site only: $1,079,000. See Appendix C							
3. Phytoremediation	Human health:	Limited	Maybe	May be effective	Some reduction in toxicity and mobility of chemicals	Probably not very effective in the short-term[1]	Maybe	$561,000[2]
	Environment:	Limited						
Subsurface Soil								
1. No Action	Human health:	No	No	Not effective	No	No	Yes	None
	Environment:	No risks						
2. Institutional Controls	Human health:	Yes	No	Effective for present and future	No	Yes	Yes	$223,000
	Environment:	No						
	Note: NPS believes that this alternative is not satisfactorily protective of human health and would not allow unrestricted use of the site as a park, which is in violation of NPS Organic Act.							
3. Target-Area Excavation (Fill Unit)	Human health:	Yes	Yes	Effective for fill unit and limited effectiveness for groundwater	Effective in the fill unit only	Presents risks to workers and nearby residents during excavation	Implementable, but may be impracticable [3,4]	$31,276,000[4]
	Environment:	No risks						
	Note: This is estimated to equate to $7,750,000 for the volume of waste under the NPS Site.							
4. Phytoremediation	Human health:	Uncertain	Maybe	May be effective	Some reduction in toxicity and mobility of chemicals	Probably not very effective in the short-term[1]	Maybe	$561,000[2]
	Environment:	No risks						
5. Target-Area Excavation of Shallow Soil on NPS Property (down to 3 feet below the original surface)	Human health:	Yes	Yes	Effective for shallow fill	Effective for shallow fill	Yes – needs implementation of proper procedures and controls during construction	Yes	$1,118,000 (See Appendix C)
	Environment:	Yes						
	Note: This alternative is the NPS preferred alternative for subsurface soil. It was not considered in the Washington Gas Additional Remedial Investigation and Feasibility Study as a possible alternative							

Table 6 Detailed Evaluation of Remedial Alternatives (East Station* RI/FS 1999 and NPS Site 2005)

Alternative	Provides Overall Protection of Human Health and Environment		Complies with ARARs	Provides Long-Term Effectiveness and Permanence	Reduces Volume, Toxicity, and Mobility	Provides Short-Term Effectiveness	Implementability	Cost 88**
Groundwater								
1. No Action	Human health:	No risks	Likely	May be effective	Uncertain	Uncertain	Yes	None
	Environment:	Maybe						
2. Monitored Natural Attenuation	Human health:	No risks	Likely	May be effective	Uncertain	Uncertain	Yes	$100,000[5]
	Environment:	Maybe						
3. Pump-and-Treat	Human health:	No risks	Yes	Effective only as long as it is operating	Effective to an extent[6]	Yes	Yes	$760,000[7]
	Environment:	Yes						
4. Biosparging	Human health:	No risks	Likely	Effective	Results in reduction in toxicity and volume of chemicals	Yes	Implementable but difficult[8]	$1,722,000
	Environment:	Yes						
5. Phytoremediation (Fill Unit)	Human health:	No risks	Limited	Limited effectiveness	Some reduction in toxicity and mobility of chemicals	Probably not very effective in the short-term[1]	Maybe	$126,000[2]
	Environment:	Limited						
DNAPL								
1. No Action	Human health:	Likely	Maybe	Not effective	No	No	Yes	None
	Environment:	Likely						
2. Recovery from Well	Human health:	Likely	Yes	Effective[9]	Yes	Moderately effective	Yes	$299,000
	Environment:	Likely						

Table 6 Detailed Evaluation of Remedial Alternatives (East Station* RI/FS 1999 and NPS Site 2005)

Alternative	Provides Overall Protection of Human Health and Environment	Complies with ARARs	Provides Long-Term Effectiveness and Permanence	Reduces Volume, Toxicity, and Mobility	Provides Short-Term Effectiveness	Implementability	Cost 88**

Note: The majority of this table was prepared for the East Station site* as part of the Washington Gas Additional Remedial Investigation and Feasibility Study; the NPS does not necessarily concur with the determinations contained herein for the NPS Site. The scope of the remedy for surface soils is accepted, but the WG cost did not calculate the remedy for the NPS Site separately from the remainder of the East Station Site. Alternative 5 for subsurface soil, selective excavation of shallow subsurface soil within the depth of installation of utility lines, was an alternative not considered by WG. This was chosen by NPS as the Preferred Alternative for subsurface soil on the NPS Site.

* The East Station (ES) site (18.8 ac.) includes property owned by Washington Gas as well as properties owned by NPS (3.9 ac.), the District of Columbia, and the USACE.

** The NPS site closely approximates 20% of the area of the total 18.8-acre East Station site and the costs should be approximately proportional for remedies such as phytoremediation, whose costs are proportionate to the area addressed. Remedies such as excavation and removal are more sensitive to the volume of waste removed and to the proportion of the waste that will require special treatment, if any.

[1] Phytoremediation may not be very effective in the short-term due to the time required for plant growth.

[2] It is not possible to fully assess the cost for phytoremediation prior to site-specific studies and design at the site. This cost would be in addition to the cost of constructing a vegetative cover over much of the site.

[3] Target-area excavation for the entire East Station Site may be impracticable due to environmental concerns caused by the handling of a large volume of material containing a relatively high concentration of tar.

[4] Assumes removal of approximately 64,000 yd^3 of soil, all of which is a hazardous material; off-site disposal of the soil; re-routing of a high-pressure gas line and a power line twice; removal and replacement of existing buildings and structures on the NPS Site; shoring a portion of the seawall; control and additional treatment of groundwater pumped from excavations; removal and replacement of a portion of Water Street; removal and replacement of existing hard surfaces (e.g., asphalt or concrete) and monitoring wells; back-filling excavations with clean soil, and miscellaneous engineering, environmental, monitoring, safety control, and site restoration costs.

[5] Cost to conduct additional sampling and natural-attenuation study.

[6] Some quantity of contaminants will remain within the soil so that some dissolved contamination will always exist.

[7] Costs for three years of operation. Subsequent costs will need to be estimated after this period.

[8] The installation of biosparging trenches would be difficult because of the current infrastructure along the river. Buildings and other structures would most likely have to be displaced and large quantities of impacted soil would require disposal.

[9] Product recovery is only effective as long as the product in the soil will flow into the recovery wells. When the residual saturation point is reached, product will no longer flow into the wells but will stay absorbed in the soil.

evaluation criteria, i.e., that it is protective of human health and the environment and complies with ARARs, conditions that are the minimum requirement for an acceptable remedy. The remedy meets the nine criteria as follows:

Overall Protection of Human Health and the Environment. Excavation and removal of surface soil would remove the source of exposure that results in an unacceptable risk as long as it is replaced with clean fill and topsoil. The topsoil ensures that the NPS Site will support a vegetation cover, or other appropriate cover on the USACE-managed property, that will control erosion and prevent re-exposure of any remaining underlying waste-contaminated fill. This soil removal and replacement will also largely reduce ecological exposures both for soil organisms and for the plants and wildlife food chains that depend on soil organisms. The clean cover will eliminate the sources and potential for migration of contaminants in surface runoff and some migration in the shallow subsurface toward the river and pumping wells. This should improve groundwater quality in the long run.

Compliance with ARARs. Any cleanup alternative selected by the NPS must comply with all applicable or relevant and appropriate, federal, and (more stringent) 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 Site. Relevant and appropriate requirements, while not directly applicable, address problems or situations sufficiently similar to those encountered at the Site such that their use is well-suited to the particular action. Removal of the top 1 foot of soil and replacement with clean fill will not raise the surface or obstruct floodwaters (40 CFR Part 6, Appendix A) and is expected to meet all identified ARARs. See Appendix B to this ROD for a list of all NPS Site ARARs.

Long-Term Effectiveness and Permanence. The potential for the excavation and removal of contaminated surface soils to improve groundwater and surface water quality would be a long-term benefit. The degree to which water quality will be improved is uncertain because contaminants will remain at greater depths elsewhere on the NPS Site.

The excavation and removal of contaminated surface soil would permanently reduce the risk associated with exposure of all NPS Site users so long as the erosion control measures, especially the seawall, remain intact.

Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment. Soil excavation and removal will result in reduction of the volume, mobility, or toxicity of the wastes through treatment to the extent such treatment is required as part of the disposal at a properly permitted off-site facility. Excavation and removal of contaminated soil from the surface will reduce the total mass of contaminants at the NPS Site as well as the potential for migration of the more volatile and soluble components of the wastes.

Short-Term Effectiveness. During implementation of the remedial action, exposure to contaminated soil and potential dust generation could impact construction workers, the surrounding community, or the environment. Implementing proper monitoring and construction procedures and controls during construction activities will greatly reduce these risks and will meet the criterion of short-term effectiveness, reducing risks for all NPS Site users but particularly for those who come most into contact with surface soils.

Implementability. This alternative is fully implementable, both technically and administratively.

Cost. The following cost estimate is based on reasonable assumptions about the work and has an accuracy of +50% to -30%. The full calculation is shown in Appendix C.

Estimated Capital Cost:	$913,000
Estimated Annual O&M Cost (30 years):	$9,600
Estimated Present Worth Cost:	$1,079,000
Estimated Construction Timeframe:	1 year
Estimated Time to Achieve RAOs:	1 year

State Acceptance. The District of Columbia has agreed with the selected remedy by a letter sent to the NPS, dated July 25, 2005.

Community Acceptance. The public comments received at the public meeting and during the public comment period indicate that the community accepts the preferred alternative.

Evaluation of the Subsurface Soil Alternative

The following discussion presents an evaluation of the additional remedial alternative proposed by NPS for subsurface soil: Target-area excavation of shallow soils and disposal off-site. This alternative differs from the Washington Gas proposal of target-area excavation of all contaminated soils in that it restricts removal to approximately 3 feet below ground surface. It does not require removal of all coal tar-contaminated soil but only that which is shallow enough to expose utility or landscape workers to hazardous substances in tar-contaminated materials. Excavated soil will be replaced with clean fill.

Because contaminated subsoil will remain in place under the NPS Site even after remediation, institutional controls will also be a component of the remedy. These will involve restrictions on excavating deeper than 3 feet below the surface without being prepared to encounter tar and the need to protect workers and to properly handle and dispose of any material found to contain hazardous or toxic substances they may contain. However, these institutional controls will not prevent park visitors from having unrestricted access to the NPS Site for normal park uses.

Overall Protection of Human Health and the Environment. Selective excavation and removal of subsurface soil would remove a significant amount of the most contaminated material from the NPS Site. Such selective removal will eliminate some of the sources and potential for migration of contaminants in the shallow subsurface towards the river and should improve groundwater quality. The selective excavation and removal of contaminated soil would sufficiently reduce the risk associated with exposure of utility and landscape workers, as well as soil organisms and wildlife, to the subsurface soil. However, contaminants would remain in the soil at greater depths.

Compliance with ARARs. Removal of subsurface soil and replacement with clean fill is expected to comply with all identified ARARs and will not raise the surface or obstruct floodwaters (40 CFR Part 6, Appendix A).

Long-Term Effectiveness and Permanence. The remedy will be of long-term effectiveness in preventing exposure of the users of the NPS Site. The potential for the selective excavation and removal of contaminants to improve groundwater and surface water quality would also be a long-term benefit. The degree to which water quality will be improved is uncertain because contaminants will remain at greater depths elsewhere on the NPS Site.

The selective excavation and removal of contaminated soil would permanently reduce the risk associated with exposure of utility and landscape workers to the subsurface soil.

Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment. Soil excavation and removal will result in reduction of toxicity, mobility, or volume of the wastes through treatment to the extent such treatment is required as part of the disposal at a properly permitted off-site facility. Excavation and removal of contaminants from the subsurface will reduce the total mass of contaminants at the NPS Site as well as the potential for migration of the more volatile and soluble components of the wastes.

Short-Term Effectiveness. During the implementation of the remedial action, exposure to contaminated soil and potential dust generation could impact construction workers, the surrounding community, or the environment. Implementing proper monitoring, construction procedures, and controls during construction activities will greatly reduce these risks and will meet the criterion of short-term effectiveness, reducing risks for all NPS Site users but particularly for those who come most into contact with subsurface soils.

Implementability. This alternative is fully implementable, both technically and administratively.

Cost. The following cost estimate is based on reasonable assumptions about the work and has an accuracy of +50% to -30%. The full calculation is shown in

Appendix C. Actual costs incurred during the implementation of this subsurface soil alternative would be proportionate to the soil volume removed and to the amount of soil considered to be hazardous waste, if any. The exact cost can be calculated only after the extent of removal required has been determined. Based in part on the Washington Gas cost analyses performed during the RI/FS, and assuming that approximately 30% of the soil in the 1- to 3-foot interval will require excavation and that approximately 50% of the total amount of soil excavated will be hazardous waste, the capital cost for this alternative has been estimated as $1,118,000. There is no O&M cost associated with this alternative because O&M for the surface soil will also maintain the remedy for the subsurface soils/fill.

State Acceptance. The District of Columbia has agreed with the selected remedy by letter to the NPS dated July 25, 2005.

Community Acceptance. The public comments received at the public meeting and during the public comment period indicate that the community accepts the preferred alternative.

XI. Principal-Threat Waste

Analytes of Exceptional Influence and Waste Identification

The NCP establishes an expectation that treatment to address the principal threats posed by a site will be considered and used where practicable. In general, principal-threat wastes are those materials considered highly toxic or highly mobile that cannot be contained in a reliable manner or would pose a significant risk to human health or the environment should exposure occur. If the wastes are complex and variable in composition, then specific components of the waste may be identified as analytes of exceptional influence (AoEI). This refers primarily to their influence on the results of the human health risk assessment. Based on the results of the site investigation, including human health and ecological risk assessments, the principal-threat waste at the NPS Site is the tar and tar-contaminated soils or soil-like materials that contain tar components, specifically, carcinogenic PAHs and heavy metals (Hydro-Terra, Inc. March 1999, Appendix D, Scenario 32).

Since there are no analyses of the tar itself, and it is known to be variable, the PAHs and, to a lesser extent, the volatiles are used as surrogate indicators of town gas waste. Table 3 shows the range of values for groups of organic chemicals in surface soils, subsurface soils, groundwater, soil gas, and river sediment. As indicated by the HHRA performed for the RI/FS, the primary carcinogenic risk is from surface soil exposure to PAHs, even though PAHs are found at a higher concentration in subsurface soils. Only a small proportion of risk is from metals. The analytes having the most influence on the risk include benzo[a]pyrene, dibenzo[a,h]anthracene, benzo[b]fluoranthene, indeno[123-cd]pyrene, and benzo[a]anthracene. These represent 96.4% of the human health risk, while the metals arsenic and beryllium represent only 3.3% of the cancer risk and are partly

naturally occurring. Benzo[a]pyrene and dibenzo[a,h]anthracene alone represent more than 80% of the human health risk to a juvenile using the NPS Site for recreation.

The greatest threats to human health from subsurface soil come from exposure of utility workers to a VOC, benzene. Benzene accounted for all the carcinogenic risk from inhalation, a risk that was calculated as being $1.14x\ 10^{-5}$ (Hydro-Terra, Inc. March 2002, Appendix G).

It should be noted that the average levels of PAHs in subsurface soils are more than an order of magnitude greater than the levels in surface soils, but there is no exposure to these wastes for park users.

Because the NPS Site is located within a national park, location-specific ARARs preclude many if not all types of on-site treatment. In addition, due to the large volume and mixed nature of the NPS Site wastes, the wastes could not be cost-effectively treated on-site and some of the wastes might not be able to be effectively treated at all. Reduction of exposure by removal and capping of remaining soils is the major way that risk from these wastes is lowered.

The principal-threat waste removed and treated or disposed of off-site will be treated to the extent necessary to meet statutory or regulatory requirements. Table 4 shows the range of concentrations and average values of analytes in shallow soils, i.e., less than 5 feet deep and averaging 3.5 feet. The data was selected as the basis for estimating risk to utility and landscape workers and is based on 20 samples analyzed for the PAHs and 16 samples analyzed for the metals. This is preferable as a basis for establishing the average NPS Site concentrations, compared with the 5 surface soil samples used in the HHRA for the NPS Site during the Washington Gas RI/FS.

XII. Selected Remedy

Summary of the Rationale for the Selected Remedy

The five components of the selected remedy will reduce the risk to human health and the environment because the contaminants impacting the NPS Site will be removed from the NPS Site or will be covered with clean fill. No more contaminants will be permitted to migrate off-site into the Anacostia River.

Since no on-site treatment method for remediating the contaminated soils will provide cost-effective short- or long-term relief with a reasonable degree of certainty (as well as ARARs that preclude capping the contaminated surface soils and many if not all types of on-site treatment), NPS has selected removal and off-site disposal as the appropriate remedy.

The following are the principal factors upon which the choice of the selected remedy for the NPS Site is based:

- It provides a high degree of overall protection of human health and the environment and maximizes long-term protectiveness.

- It complies with all ARARs.

- Most of the unacceptable on-site risk is permanently eliminated by removing contaminated soils.

- It can be completed in a comparatively short time, and the adverse impacts on human health or the environment during remediation can be mitigated by engineering controls and using personal protection equipment.

- It is readily implemented and cost-effective. Approximate costs for the surface and subsurface soil remedy is estimated at $2,197,000, including O&M costs. (The cost of the ongoing groundwater and DNAPL capture and treatment system is not included in this estimate because the incremental cost of implementing them for the NPS Site is zero. The entire expenditure is already required under the terms of the East Station Site agreement between Washington Gas and the District.)

- The District of Columbia and the community have indicated their acceptance of the selected remedy during the public comment period.

Because the proposed alternatives will not remove all contaminants from the site or render them harmless, some type of institutional control such as a property description with specific limitations on use will need to be developed for this NPS property. However, the NPS will be able to use the land without restrictions on park use.

Description of the Selected Remedy

The NPS has concluded that the Washington Gas preferred remedial alternatives for groundwater, DNAPL, and sediments, as described in the *Additional Remedial Investigation and Feasibility Study*, adequately meet the RAOs for the NPS Site. Accordingly, they are not independently evaluated here. The preferred remedies for groundwater, DNAPL, and sediments are part of the already proposed and approved plan for the Washington Gas East Station Site and have been subject to public review and comment. Implementation of these remedies will impact the NPS Site only insofar as they require access and because the installation of wells, utilities, and piping will affect NPS land. The groundwater and DNAPL remedies will affect the implementation of the NPS Site remedial action for soils to some extent because any existing fixtures or structures on the property will have to be protected during remediation of the soils.

The selected remedy for each medium at the NPS Site is as follows:

Surface Soil. To prevent exposure of park users to contaminants in surface soils, the surface soil will be removed down to a depth of 1 foot, replaced with 6 inches

of clean fill, and capped with 6 inches of topsoil. The contaminated excavated soil will be disposed off-site at a permitted facility in accordance with applicable federal and state regulatory requirements.

The boundaries of the area within which surface soil is to be excavated will be determined in the following manner:

1. The property boundaries of the NPS Site along Water Street will be surveyed and marked from the west side of the 11th Street Bridge to the tree line at the east side of the Site, including the two separate enclaves north of Water Street (Reservation 298 and the portion of Reservation 343D at the junction of Water Street and 12th Street). Excavation will extend up to these property boundaries, with the western extent south of Water Street to be determined as described below. After remediation the treated areas on the NPS property will be fenced to control access during revegetation.

2. The north and south boundaries of the NPS Site south of Water Street will be fixed at the property line along Water Street to the north and the sea wall to the south and will include the USACE property.

3. The east end of the NPS Site shall be the tree line up to the western extent of the canopy created by existing live hardwood trees and ground vegetation.

4. The provisional western boundary of the NPS Site will be the 11th Street bridge supports and, initially, a line determined during excavation that shall extend west and north of and will encompass the sites of the following pits and excavations in which tar or DNAPL was noted; TP-46, TP-51, WGL-01S, and ST-4. The initial line of excavation shall then extend north from ST-4 towards the former location of TP-57 across Water Street and terminate at the property line along the south side of Water Street.

5. Should contamination be found at the provisional boundary line established above, the west extent of excavation will be expanded radially in 10 linear feet increments in those locations where town gas waste (tar, coke or wood chips) is found in the uppermost 1 foot of soil up to the initial boundary line. Excavation will continue until a 10-foot radius can be established around the last evidence of contamination without uncovering further contamination.

6. In the event that town gas waste is uncovered up to the foundations of an existing building or structure such as the boathouse, shallow pits or probes will be excavated to 18 inches below ground surface along the perimeter of the building or structure to establish the extent or absence of town gas waste to the west of the foundation. If town gas waste is found along the perimeter of the foundation, excavation shall continue radially until 10 feet of clean subsurface soil with no further town gas waste is uncovered.

Along the route of the planned hiking/biking path parallel with the river, the soil may be removed to a depth of 18 inches and, if so, the fill would consist of 18 inches of crushed stone on a properly prepared sub-base, 10 feet wide, for a distance of approximately 900 feet, along the length of the NPS Site.

On the NPS property, a vegetated soil cover will be installed following soil removal. A vegetated soil cover will be required to retain the surface soil in the area of the remedy. Maintenance of the vegetative cover is a requirement for protecting NPS Site integrity, and it will require monitoring and potential maintenance because of the expected high number of visitors to the NPS Site.

On the USACE property:

- To prevent exposure to contaminants in surface soils, the exposed surface soil (i.e., those areas that are not currently covered by concrete or asphalt or other paving material where clean backfill material has not already been placed to the depth of at least 1 foot) will be removed down to a depth of 1 foot, replaced with clean fill and topsoil, and covered with appropriate material (such as gravel). This remedy will be implemented in conjunction with the remedy for subsurface soil or after subsurface soils have been remediated.

- Areas that are currently covered by concrete or asphalt or other paving material where clean backfill material has not already been placed to the depth of at least 1 foot will remain undisturbed, except in "hot spots" where deposits of coal tar wastes are known to exist below the surface.

Subsurface Soil. During the removal of the 1-foot surface layer of soil on-site, selective excavation of subsurface contaminated soil will occur. The soil underlying the topmost 1 foot will be uncovered and will be observed for signs of coal tar. If subsurface soils show visible, tactile, or olfactory indications of coal tar contamination, then selective removal of the contaminated soil will be performed. Typically, such soils will be excavated down to the water table or to a depth of 6 inches below the frost line or until clean fill is encountered beneath the contaminated soil at a shallower depth. For cost-estimating purposes, the frost line was estimated to be 2.5 feet below the original surface, and the total depth of excavation of contaminated soils will be down to a maximum of 3 feet below the original surface. Shallower excavation will be acceptable only if clean fill or the water table is encountered before that depth is reached. Complete removal of the hot spot must be confirmed by field observation unless the full 3 feet of soil have been removed (or the water table has been reached).

The remedial action will be carried out in compliance with all NPS Site ARARs. If, during the course of excavation activities, undisturbed natural soil is encountered, the natural soil can be left undisturbed. If it is to be disturbed, a qualified professional must be hired to conduct a Phase I Archaeological Identification Study before excavation. The study will conform to the Secretary of

the Interior's Standards and Guidelines for Archaeology and Historic Preservation (36 C.F.R. 68).

In accordance with the preferred remedy for surface soil, the fill used to replace contaminated subsoil may include, in part, the sub-base for the hiking/biking trail to be installed parallel to the river in accordance with the NPS *Revised Resource Management Plan* (1999).

Consistent with implementation of the remedy, the NPS will continue to provide a right-of-way for the USACE to access their property at all times.

The former Washington Gas pump house will be removed as part of the remedy.

Groundwater. NPS believes that Washington Gas' current remedy for groundwater adequately meets the RAOs, and it is subject to review every five years. Because of a separate agreement between Washington Gas and the District, the remedy has already been reviewed (Hydro-Terra, Inc. July 22, 2003), and it appears to be functioning as intended. The following text is taken directly from the Washington Gas *Decision Document, East Station Site* (September 1999), which can be found in the NPS Site Administrative Record.

> *Ongoing pumping and treatment of groundwater will continue. WG will continue to monitor water quality in wells near the Anacostia River on a quarterly basis up to the time of the required effectiveness evaluation; after that time, monitoring will have to continue but probably on a more limited basis. Within the same timeframe, WG will also annually sample river sediment near the site. Concurrent with the groundwater and sediment sampling, WG will assess the existence of natural attenuation processes and their effectiveness in preventing contaminants from entering the river. The applicability of phytoremediation in conjunction with pump and treat or natural attenuation will also be evaluated, and, if found to be effective, it will be integrated, to the extent feasible into the future uses of the properties on the site* (See also Section 2.10.3, *Washington Gas Proposed Plan for the East Station Site*, June 1999).

The selected groundwater remedy for the Washington Gas East Station Site was amended in 2002 to modify the January 6, 2000 Pump and Treat System Agreement between the District of Columbia and Washington Gas and results in capture of all the shallow groundwater formerly flowing to the Anacostia River from under the NPS property. This agreement included the installation of a trench drain extending northeast of the trench well and modifications to a well located at the northeast corner of the District of Columbia DPW building that converted the well into a groundwater recovery well.

This remedy will result in control of groundwater contamination by a hydraulic barrier of pumping wells and will continue to operate into the foreseeable future or until the District determines to its satisfaction that the probable impacts of the groundwater on the river are acceptable. The NPS remedy will ensure that Washington Gas operates, maintains, repairs, replaces, and monitors those wells located on NPS property as long as they are part of the remedy. Similar access or a right-of-way will be provided for DNAPL collection from those wells, as needed.

The phytoremediation and natural attenuation alternatives that Washington Gas is considering for groundwater are still unproven technologies for the NPS Site. Extensive studies of their effectiveness would have to be performed before they could be implemented as an alternative to pump-and-treat. NPS emphasizes the importance of maintaining the hydraulic gradients towards the pumping wells within the fill and the sand and gravel unit below the silt that prevent contaminated groundwater from reaching the Anacostia River.

DNAPL. NPS believes that the Washington Gas proposed alternative for DNAPL adequately meets the RAOs. The following text is taken directly from the Washington Gas *Decision Document, East Station Site* (September 1999), which can be found in the NPS Site Administrative Record.

> *Recovery of DNAPL directly from wells in which it naturally accumulates until no longer practicable will continue, as will recovery through the ongoing treatment of groundwater pumped from areas of known or suspected DNAPL accumulation. A study will be performed to determine if DNAPL is moving towards the river near the 12th Street Sewer outfall and between the Trench Well and the river. If DNAPL is found to collect in the exploration wells, direct extraction of the DNAPL from the wells will be undertaken. river* (sic). *Additionally, "sentinel wells" in both the fill and sand/gravel units will be monitored monthly for the presence of DNAPL until the time of the five-year effectiveness review, longer if necessary. If DNAPL is detected in one of these wells, direct extraction of the DNAPL at the well head will begin. Collected DNAPL will be disposed of in accordance with RCRA requirements* (See also Section 2.10.4, *Washington Gas Proposed Plan for the East Station Site*, June 1999).

The DNAPL remedy described above applies to any mobile DNAPL encountered around wells within either the sand and gravel aquifer beneath the silt layer or wells screened within the fill. If non-mobile DNAPL is encountered within the uppermost layers of the fill (down to 3 feet beneath the original surface), it will be removed from the NPS Site as part of the soil remedy.

River Sediment. Washington Gas is participating in watershed studies of sediment quality in conjunction with other parties involved in the restoration of the Anacostia River watershed.

The NPS is working with the USEPA, NOAA, Washington Gas, and other interested parties participating in the Anacostia River Initiative to determine how best to address these sediments as well as to identify watershed-wide programs that will reduce contamination to the river as a whole. These programs may include removal, modification, or closure of identified sources, taking into account any ongoing loadings. Based upon available information, including the watershed studies and remedial efforts, the NPS will evaluate actions to reduce any sediment contamination resulting from prior migration of waste or waste components through the NPS Site into the river. This may lead to the implementation of remedial action to mitigate existing contamination in river sediments.

Summary of the Estimated Remedy Costs

Estimated costs are presented in Section X, Comparative Analysis of Alternatives, and address only the remedy for surface soil and selected subsurface soil on the NPS Site. The estimated costs of the selected remedy are presented in more detail in Appendix C to this ROD. The cost analysis is based upon USEPA guidance documents and NPS contractor experience in costing construction and hazardous material remediation projects. The cost estimate has an accuracy of +50% to -30%. Present worth analysis based on current dollars is used to evaluate expenditures that occur over different time periods. For the present worth analysis, a period of performance of 30 years and a discount rate of 4% are assumed. Direct capital costs include construction and disposal costs; contractor mobilization; unlisted items; and contingencies. The indirect capital costs include design data collection; preparation of design, drawings, and specifications; contract administration; construction oversight; unlisted items; and contingencies.

The information in this cost estimate (and in the more detailed cost summary included as Appendix C to this ROD) is based on the best available information regarding the anticipated scope of the selected remedy. Changes in the estimated cost are likely to occur as a result of new information and data collected during the design of the selected remedy. Total estimated present worth cost is $1,079,000 for surface soil and $1,118,000 for subsurface soil.

The other parts of the remedy were selected as the result of the Washington Gas RI/FS and are adopted here as being effective for the NPS Site also. It is not feasible or necessary to determine what proportion of the cost for the groundwater, DNAPL, and sediment remedy addresses the NPS Site. The groundwater, DNAPL, and sediment remedy adopted by Washington Gas covers both sites, and the cost for remedying the Washington Gas East Station Site is no greater or less because it covers the NPS Site also. The additional cost for the NPS Site is therefore zero, and the cost should not be divided or proportionately assigned.

Expected Outcome of the Selected Remedy

The expected outcome of the selected remedy is that the NPS-managed property on the NPS Site will become an integral part of the NPS Anacostia Park and will be used for public recreation. The USACE-managed property in the NPS Site will continue to be used for debris removal and will be available for public recreation use without further remedial action if that use change does occur. Because of its location next to a tidal river and its consequent elevation close to sea level, NPS Site use will not require any deep excavation beyond that required for lighting and plumbing if a service building for the park is sited within this part of the park.

The groundwater and DNAPL remedies will continue to require wells to remain in or under the NPS Site to extract groundwater and to collect any DNAPL still moving into recovery wells. No groundwater or DNAPL will discharge to the river.

The surface runoff will flow over clean soil and thus will not carry any hazardous constituents from the NPS Site into the river.

The sediments adjoining the NPS Site will gradually lose some of their hazardous constituents through erosion or natural attenuation in the river. The sediments will not receive additional contaminants from discharging groundwater from under the NPS Site.

XIII. Statutory Determinations

Under CERCLA §121, a selected remedial action must be protective of human health and the environment; comply with ARARs (unless a statuary waiver is justified); be cost-effective; and use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA § 121 includes a preference for remedial actions that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances as a principal element. This section discusses how the selected remedy meets these statutory requirements and preferences.

The selected remedy for groundwater, mobile DNAPL, and sediments are part of the already proposed and approved plan for the Washington Gas East Station Site and have been subjected to public review and comment. They will affect the implementation of the remedial action for soils on the NPS Site to some extent because any existing wells and other structures for groundwater and DNAPL recovery on the NPS property will have to be protected during remediation of the soils.

Protection of Human Health and the Environment

By removing the surface soil and some contaminated subsurface soil and replacing them with clean fill capped with clean topsoil, the selected remedy will prevent exposure of NPS Site users, staff, and landscape and utility workers;

greatly reduce exposure of all NPS Site organisms to contaminants; and prevent contaminated surface runoff from being generated and discharged to the river. Some reduction in groundwater contamination will take place in the long run. The soil remedy will allow the NPS to use the NPS property for its intended recreational purpose.

Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy will comply with all NPS Site ARARs.

Cost Effectiveness

The selected remedy is cost-effective and represents a reasonable value for the money to be spent. Under the NCP, a remedy is considered cost-effective "if its costs are proportional to its overall effectiveness" (40 CFR §300.430(f)(1)(ii)(D). This NCP provision also states that overall effectiveness is evaluated by assessing three of the five balancing criteria (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness is then compared with costs to determine cost-effectiveness. Under this analysis, overall effectiveness of the selected remedy was determined to be proportional to its cost. The selected remedy will provide a high degree of protectiveness of human health and the environment at a reasonable cost.

Use of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

The selected remedy uses permanent solutions to the maximum extent practicable for the NPS Site. Because the Site is located in a floodplain and is within a national park, and because of the nature of the contaminants, the soils cannot be treated on-site. Removal and off-site treatment and/or disposal is a permanent solution and represents the best balance of trade-offs in terms of the NCP's five balancing criteria (see criteria 3 through 7 on pages 47 to 48 in Section X), while also considering the two modifying criteria, state and community acceptance. The selected remedy satisfies the criteria for long-term effectiveness and permanent solutions by permanently removing contaminated soils from park lands and potential park lands. The selected remedy presents an acceptable level of short-term risk and is easily implemented. Although the selected remedy may not meet the statutory preference for utilizing treatment that permanently and significantly reduces the toxicity, mobility, or volume of hazardous substances as a principal element, this is reasonable considering the lack of cost-effective treatment options, the need to ensure compliance with ARARs, and (at best) the limited success of on-site treatment.

Preference for Treatment as a Principal Element

The selected remedy could not incorporate treatment as a principal element directly because on-site treatment methods were found to be not cost-effective or practical and because ARARs preclude many, if not all, types of on-site treatment.

The selected remedy involves excavation and removal, and the need for treatment or disposal technologies depends on legal requirements of the off-site disposal facility.

Five-Year Review Requirements

Because contamination remains at the NPS Site, CERCLA and the NCP require the NPS to review the NPS Site remedial action at five-year intervals to ensure that human health and the environment are being protected by the remedial action.

XIV. Documentation of Significant Changes

The Proposed Plan for the NPS Site was released for public comment in February 2005. The Proposed Plan identified the preferred alternative for remediation of the NPS Site as removal of surface soil, selective removal of subsurface soil, off-site disposal, and replacement with clean fill and topsoil. The public comment period was from April 11 to May 13, 2005. The public meeting was held on April 28, 2005. Oral and written comments are addressed in the Responsiveness Summary (see Appendix A). It was determined that no significant changes to the soils remedies as originally identified in the Proposed Plan were necessary or appropriate. The geographic scope of the remedy was clarified to include the USACE property.

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A Responsiveness Summary

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Responsiveness Summary

A public meeting on the Proposed Plan was held on April 28, 2005. Several questions were asked by the public and all were answered by NPS during the Public Meeting. The full record of the proceedings is included here as Attachment A-1. Based upon one question, NPS specified the institutional controls to be incorporated into the deed for the NPS Site. The controls specified are referenced on page 53 of the ROD.

Written comments were received by NPS from Washington Gas, the Anacostia Community Boathouse Association, and the U.S. Army Corps of Engineers. The comments are reproduced below together with the NPS responses. Each NPS response follows the respective comment and is italicized to distinguish it from the comment.

NPS Responses to Washington Gas Comments

General Comment 1

NPS has indicated that the NPS Organic Act is an Applicable or Relevant and Appropriate Requirement (ARAR) for the NPS Site and the Proposed Plan and, therefore, that NPS "reasonably expects to be able to modify and use the land without excessive restrictions in fulfilling its mission." Washington Gas is unaware of any basis for considering the NPS Organic Act as an ARAR. In EPA guidance on the subject of ARARs, the NPS Organic Act is not listed among the potential ARARs nor is it listed as a potential location-specific ARAR (see "CERCLA Compliance with Other Laws Manual," U.S. EPA, Office of Emergency and Remedial Response August 1988 (draft), OSWER Directive No. 9234.I-01 and -02). However, even if the Organic Act qualifies as an ARAR, it should not require or entitle NPS to remediate its property to a level that is cleaner than existed when the property was transferred to the National Park Service. Washington Gas also did not find reference in the EPA guidance to the following laws referenced by NPS as ARARs for the site: Public Law No. 65-208, 36 CFR Part 2, and 36 CFR Part 5.13.

Response: *The NPS, as lead agency for CERCLA response activity at the NPS Site, has the responsibility to identify, select, and apply ARARs to ensure appropriate remediation at the NPS Site. It is the established practice of the NPS to identify, select, and apply the NPS Organic Act as a location-specific ARAR at NPS-lead CERCLA sites. In addition, the USEPA has recognized the Organic Act as a location-specific ARAR at one EPA-lead CERCLA site. Based on the language of the Organic Act, NPS has reasonably interpreted (and will continue to interpret) the Organic Act as not allowing the permanent or long-term prohibition of public access to land within a National Park System unit as a component of a CERCLA remedial action. It should also be noted that the 1988 U.S. EPA guidance document cited by WG does not purport to list every location-specific ARAR. See page 1-25 and page 1-28 footnote (a). Moreover, the cited document is only guidance and, as stated on page ii, it is "intended solely for the guidance of Government personnel."*

General Comment 2

The Proposed Plan should indicate that it is consistent with the January 6, 2000 "East Station Agreement" entered into between Washington Gas and the District of Columbia, to address groundwater contamination associated with the East Station site. In this way it will be clear that Washington Gas is not required to implement two separate groundwater remedies and that the groundwater remedy in the Proposed Plan meets the District of Columbia's goals and requirements for groundwater remediation at the East Station Site. In addition the Proposed Plan should indicate that it is consistent with the "Decision Document East Station Site," approved September 22, 1999 by the U.S. Environmental Protection Agency Region 3 to address DNAPL and sediment contamination associated with the East Station site. This will clarify that Washington Gas is not required to implement two separate DNAPL and sediment remedies.

Response: *This has been noted in Section XII of the ROD on pages 60 and 61.*

General Comment 3

The Proposed Plan should indicate that NPS will provide Washington Gas access to the site as necessary to carry out the corrective actions described in the Proposed Plan, the East Station Agreement, and the Decision Document.

Response: *In the event Washington Gas performs the selected remedial action at the NPS Site, the NPS will ensure that Washington Gas has the requisite access to NPS-managed lands.*

General Comment 4

The Proposed Plan does not indicate when and how the NPS acquired the NPS Site and the condition of the NPS Site when it was acquired by NPS. As such, the Proposed Plan does not contain a complete history of operations on the NPS Site. The Proposed Plan should indicate that the NPS Site has been used for industrial purposes by multiple users both before and after NPS acquisition of the NPS Site.

Response: *The Proposed Plan, ROD, and other documents in the Administrative Record contain the information necessary and appropriate for the NPS to base its remedial action selection decisions. It is incontrovertible that the NPS Site has been negatively impacted by contamination emanating from the Washington Gas East Station Site and that such contamination will be remediated in conformance with the NPS-selected CERCLA remedy set forth in the ROD.*

General Comment 5

The Proposed Plan should reflect whether NPS jurisdiction over the NPS Site extends to include the seawall, sediment, groundwater, surface water, the river, and "endangered species and their habitats."

Response: *NPS jurisdiction extends over the seawall, any endangered species found at the NPS Site, and all those media in which any remedial action identified in the ROD will occur.*

General Comment 6

The Proposed Plan references conducting "archeological investigations." It is highly unlikely that any native soil will be encountered in the top 3 feet; however, if it is, Washington Gas is not qualified to conduct "archaeological investigations" nor are such investigations necessary to protect human health or the environment or relevant to Washington Gas's historic operations at the NPS Site. This issue should be addressed in the remedial design in a manner that does not hinder the efficient implementation of remedial efforts.

Response: *NPS agrees that the finding of an archaeological site within the boundary of the Anacostia Park Water Street S.E. site is unlikely. It is a federal requirement, however, that if undisturbed natural soil is encountered and is to be disturbed during the Site remedial activity, it cannot be disturbed, i.e., excavated, before it is, at a minimum, assessed. In the event Washington Gas implements the selected remedial action, it will be expected to retain a qualified archaeologist to perform a Phase 1 Archaeological Identification Study in conformity with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation if any such soil is to be disturbed.*

General Comment 7

The Proposed Plan does not address many technical details related to implementation of the remedy, such as specific criteria for identifying any "hot spots" that must be excavated to 3 feet in depth. Washington Gas understands that it is appropriate to leave such matters to be addressed in the remedial design document; however, Washington Gas reserves the right to make additional comments at that time as further details are developed.

Response: *The CERCLA process contemplates that many technical details related to the design and implementation of a selected remedial action will be identified and addressed in the Remedial Design phase. If Washington Gas implements the selected remedial action, the NPS will work diligently and in good faith with Washington Gas to address any outstanding technical issues.*

Technical Comment 1

Page 2, "Site Description," defines the East Station Site as "approximately 18.8 acres, which is the area impacted by the wastes from gas manufacturing." The entire 18.8-acre site is not contaminated by manufactured gas plant wastes. Accordingly, the East Station site should be defined as the 18.8-acre site without regard to impact by wastes from gas manufacturing.

Response: *The East Station Site description has been removed from the ROD and only the NPS Site is defined on page 7 by "the extent of the U.S. property impacted by the disposal of waste residuals of town gas manufacturing or by*

migration of waste and waste components onto or under the U.S.-owned property."

Technical Comment 2

Page 3, first "bullet" - indicates that the Department of Public Works (DPW), "… stores roadway maintenance equipment on a leased portion." DPW also appears to conduct vehicle maintenance periodically on the leased portion. The full scope of DPW's operations should be described in order to be complete and accurate.

Response: *The sentence has been modified on page 26 of the ROD to read "stores and maintains roadway maintenance equipment on a permitted portion of the NPS Site that the DPW leases from the NPS."*

Technical Comment 3

Page 3, Figure 2 Site Map - This figure represents the area investigated by Washington Gas during the Phase IV study. Washington Gas considers the area impacted by gas manufacturing operations to end at the upstream fenced line of the pump house property used by Washington Gas rather than at the tree line beyond the fence. The property between the fence and the tree line was used by ST Services and Steuart Petroleum in the handling of fuel oils.

Response: *The Washington Gas investigations of the area east of the fence line of the Pump House area include at least two boreholes (TB-16 for MW-, and TB-17) that showed DNAPL (HydroTerra June 20, 1989, Contamination and Land Use Study, Phase II, East Station Property, Volume II, Appendix B). Based upon this and other information in the Site AR, the NPS has set forth the boundaries for surface soil removal. See page 58 in the ROD.*

Technical Comment 4

Page 3, Paragraph 6 - describes probable sources of tar and oil contamination on the NPS property but does not identify the historic operations of the Department of Defense, Department of War, Department of the Army, and the past and ongoing operations of the Department of Public Works as well as the construction of the seawall and filling by the Army Corps of Engineers. The Proposed Plan should include all potential sources of tar and oil contamination.

Response: *Page 8 of the ROD states that the fill behind the seawall includes not only dredge spoils and wastes disposed by Washington Gas but also a mass of heterogeneous waste such as demolition debris, rock, gravel, and soil. The basis for remediation is the health risk posed by components and residues of town gas manufacture that are incontrovertibly from Washington Gas operations (see pages 23 and 30).*

Technical Comment 5

Page 4, Paragraph 3 – The first sentence states that "the NPS site is filled with dredge spoils and industrial (town gas) waste from Washington Gas." The

Proposed Plan should note that while MGP site wastes are contained in the fill on the NPS property, the fill also contains soil, demolition rubble, and other wastes from unknown sources within the city; which were likely deposited after the Army Corps of Engineers constructed the seawall It is not clear how many and what entities disposed of wastes behind the seawall.

Response: *See the response to Technical Comment 4.*

Technical Comment 6

Page 4, Paragraph 5. The last sentence states that "much of the fill is contaminated with "coal tar, VOCs and heavy metals from gas manufacturing waste." Some of the fill is contaminated with coal tar while much of the fill is contaminated with chemical constituents of coal tar and contaminants from other sources including activities of the DC Public Works, Steuart Petroleum, and ST Services.

Response: *See the response to Technical Comment 4.*

Technical Comment 7

Page 4, Paragraph 6 - Most of the groundwater in the fill is not contaminated "with SVOCs exceeding 1,000 mg/L (parts per million)." Concentrations of organics presented in Washington Gas's Phase IV study are shown as µg/L (parts per billion). Only 32 samples out of 198 (16%), taken over the last five years of monitoring have contained total concentrations of SVOCs in excess of 1,000 µg/L.

Response: *The statement was in error due to a typographic mistake. The statement should have read "with SVOCs exceeding 1,000 -µg/L (micrograms per liter or parts per billion)." The incorrect units did not affect any aspect of selection of the remedy for groundwater or soil, the first of which was decided by the agreement between Washington Gas and the District, and the second of which was not affected by any releases from the groundwater. The units have been correctly stated in the ROD on page 33 (Table 3).*

Technical Comment 8

Page 4, Paragraph 8 - It also should be noted that no drinking water wells are permitted within the District of Columbia and that the nearest possible drinking water well in the Patuxent Aquifer is located more than six miles distant from the site in Prince George's County, Maryland.

Response: *The ROD on page 23 notes that no sources of drinking water are impacted by the Site. However, it is District policy to conserve all potential drinking water sources within the District, including those that are not currently useable or not legally useable at this time (D.C. Municipal Regulations Title 21. Section 1150: Groundwater).*

Technical Comment 9

Page 5, Paragraph 2 - Little or no DNAPL could migrate to the river from the fill unit. DNAPL, which is heavier than water, has migrated downward through the fill to the top of the silt layer. A bowl-like depression, ("stratigraphic trap") that exists on the top of the silt at the base of the fill layer prevents migration of DNAPL towards the river over much of the NPS Site. Some DNAPL was encountered in the well WGL-01S near the outer edge of the trap and is thought to reside in the fill at residual concentration. Small amounts of DNAPL have been extracted from this well and recovery has been de minimus (*sic*).

Response: *The DNAPL remedy applies to the entire East Station Site and is performance-related. That means that it requires Washington Gas to prevent migration of DNAPL into the Anacostia River. The ROD adopts that remedy and accepts that it is protective of human health and the environment for the NPS Site also. No conclusion is drawn as to the likelihood of DNAPL migration to the river.*

Technical Comment 10

Page 5, paragraph 8 - It should be noted that Washington Gas's risk analysis evaluated three potential exposure paths for a juvenile using the NPS property as a recreational park and only dermal contact with unremediated soil posed an unacceptable risk. Exposures to VOCs through inhalation and to surface soil through ingestion were within the acceptable risk range.

Response: *This information is included in the discussion of the HHRA in the ROD on pages 30 through 35.*

Technical Comment 11

Page 6, Paragraph 1- It should be noted that the low levels of risk for utility workers and landscape workers to "unremediated subsurface soil" is within the U.S. EPA's acceptable range of 10E-4 to 10E-6.

Response: *This information is discussed in the ROD on page 32. See page 31 for an accurate depiction of the NCP's description of the 10^{-4} to 10^{-6} range.*

Technical Comment 12

Page 6, Paragraph 3 - The last sentence states that "NPS proposes to excavate . . . any areas found to be contaminated." The word contaminated should be further defined to state "contaminated with visible coal tar."

Response: *The ROD on page 43 and 44 clarifies the criteria for the selection of subsurface soil to be removed during remediation.*

Technical Comment 13

Page 7, Paragraph 2 – Because hazardous substances will remain in the ground below three feet under the surface, the possibility exists that institutional controls might be needed if and when excavation occurs during site development

depending upon area conditions. The Proposed Plan should be clarified to indicate that NPS does not believe that the residual contamination and planned institutional controls will impair NPS' ability to use the property for recreational purposes.

Response: *The ROD in Section XII, page 56, indicates that NPS believes that any residual contamination remaining on-site will not impair the Site for future use as a park and that institutional controls will be used to protect against disturbing the wastes left on-site.*

Technical Comment 14

Page 8, Paragraph 2 (River Sediment)-it should be noted that the remedy for sediment in the East Station Decision Document requires further investigation of sediment contamination through participation in an EPA-led watershed-wide study of sediment quality. This remedy recognizes the multiple sources and complexities of the sediment contamination in the Anacostia River and intends that remediation will be undertaken in a comprehensive and coordinated manner. The remedy does not mandate the "removal or closure" of sources "to reduce sediment loading," because recommended action will be determined by the watershed-wide study. Therefore, WG asks that the second bullet be removed from the Proposed Plan.

Response: *Section XII of the ROD, page 62, indicates that remedies such as removal or closure of sources to reduce sediment loading may be the results of the watershed-wide study. Clearly, existing loadings have resulted in unacceptable impacts. Washington Gas has joined a USEPA-led watershed-wide study of sediment quality, the Anacostia River Initiative, involving a number of private and public parties. This study's goal is to identify mitigating measures and eventually to recommend remedies for some contaminated sediments. In cooperation with study participants, including USEPA and NOAA, NPS will undertake additional remedial actions under CERCLA to address the sediment contamination, if and to the extent appropriate, based on information contained in this study or related studies.*

Technical Comment 15

Page 9, Alternative SUB5 - This alternative remedy proposes subsurface soil removal in addition to removing the top 12 inches of soil. It states that contamination with coal tar will be determined based on visual, tactile and olfactory observations. It should be noted that soil without the presence of any free phase coal tar could smell like coal tar. Tactile observation or touching is not satisfactory from a human health standpoint. Free phase coal tar in soil or in purifier (wood chips) waste can be readily seen. The identification of subsurface soil to be removed should be based solely on visual identification by an experienced engineer or scientist. If visual identification by an experienced inspector is sufficient to begin the excavation, then it should be acceptable for determining where to end the excavation. Sampling and analysis will not identify the presence of free phase coal tar; it will only identify chemicals found in coal

tar. Also, sampling presents logistical problems such as the need to stop work in an area and leave trenches open for days while samples are analyzed, etc.

Response: *As Washington Gas notes, the Proposed Plan states that "Contamination with coal tar will be determined based on visual, tactile* **and** *olfactory observations" (emphasis added). It is agreed that the presence of coal tar cannot be determined by smell alone and that gloves should be worn to protect the hands while touching the wastes.*

Technical Comment 16

Page 13, Paragraph 3 - The last sentence seems to imply that contaminants are currently migrating off-site into the river. The upgrades that were made to the groundwater pump and treat system in 2002 effectively prevent contaminated groundwater from moving off-site.

Response: *This sentence indicates that the selected remedy will prevent any further off-site migration of Washington Gas waste components. This is stated in the ROD on pages 38 to 40. On page 60 of the ROD, it is stated that the January 6, 2000 Pump and Treat System Agreement has been amended and that the amended agreement specifies that Washington Gas will capture all of the shallow groundwater formerly flowing to the Anacostia River under the NPS property.*

Technical Comment 17

Page 13, Paragraph 5 – the two NPS Reservations located to the north of Water Street are not in the 100-year flood plain. In addition the smaller reservation and probably the larger one as well are unlikely to be developed as parkland. Therefore, the surface soil remedy contained in the East Station Decision Document should be appropriate for these areas, that is, capping with one foot of clean soil stabilized with vegetation or with an impermeable surface.

Response: *The NPS has not yet decided what uses the detached parts of their property will have in future. Since these parcels may be used as parkland and both are in areas where tar was detected in the subsurface, the same soil remedies that apply to the main part of the NPS Site must also apply to these detached parcels.*

Technical Comment 18

Page 13, Paragraph 11 – The Proposed Plan states that "Contamination with coal tar will be determined visually and by odor …" WG's comment in number fifteen above applies to this paragraph as well.

Response: *See response to Technical Comment 15.*

Technical Comment 19

Page 13, Last paragraph (Proposed Alternative for Groundwater) - The NPS Proposed Plan recommends adopting the groundwater remedy in the East Station Decision Document. Therefore, WG requires that the remedy statement be

consistent with the Decision Document, i.e., "On-going pumping and treatment of groundwater to protect the Anacostia River from an excessive influx of dissolved chemicals."

Response: *The wording has been changed in the ROD on page 60 to be consistent with the current Washington Gas agreement with the District and refers to that agreement.*

Technical Comment 20

Page 14, Paragraph 6 - The selected groundwater remedy for the "site" is to pump certain wells. It is WG's position that ground-water pumping will continue until an alternative approach is identified by WG and approved by the NPS and the regulatory agencies or until it is determined that the release of groundwater to the river will not adversely affect human health and the environment.

Response: *So noted. There are requirements for periodic review of the remedy's application. Any proposed changes to the remedy will need to be submitted to and approved by the NPS (and any other pertinent regulatory agencies) before changes to the remedy are made.*

Technical Comment 21

Appendix A, NPS Supplement, Cost Estimate Calculations- WG notes that the estimated costs for removal of one foot of surface soil and target excavation of shallow soils are likely to increase somewhat depending upon when the remediation takes place.

Response: *So noted. The cost estimate for the selected remedial action is provided in the ROD on pages 53, 54 to 55, and 62 and in Appendix C and has an accuracy within the parameters established in pertinent U.S. EPA guidance.*

NPS Responses to Anacostia Community Boathouse Association Comments

1. In its discussion of the current uses of the area to be affected, the Proposed Plan accurately states that the "property serves as a green space area for the public" for "non-motorized boating activities." The Proposed Plan also refers to the fact that "a rowing club occupies a site under the 11th Street Bridge." This latter statement, while technically true, is misleading and understates the presence and vibrancy of ACBA's current operations. The current text of the Proposed Plan should be amended to reflect more accurately the current state of ACBA's operations. Specifically:

   - The member organizations of ACBA which now operate from this site include not merely a single club, as suggested by the current text of the Proposed Plan, but rather three high schools, one university, four community-based clubs, and one environmental organization. (The names of ACBA's member organizations may be seen in the above letterhead)[1].

ACBA continues to grow and bring in new member organizations consistent with its mission, and consistent with the vision of the Anacostia Waterfront Initiative, to increase public access to, and pubic use of, the Anacostia River.

- ACBA's activities include not only rowing, but also paddling, so that the hundreds of adults and children who use ACBA's facilities may be seen every day in boats of a variety of shapes and sizes – including racing shells, dragon boats, outrigger boats and canoes.

- ACBA's operations are located not only under the 11th Street Bridge, as suggested by the current text of the Proposed Plan, but also between the two spans of the 11th Street Bridge. ACBA continues to work with the Government of the District of Columbia and the National Park Service regarding how its operations can be expanded to better serve its mission and the goals of the Anacostia Waterfront Initiative.

Response: *NPS recognizes the importance of the boating community and intends to minimize disruption of their activities during implementation of the Site remedial action to the extent practicable. This minimization will be evaluated prior to implementation of the Site remedial action.*

2. In light of ACBA's presence at the southwest end of the area affected by the Proposed Plan, in particular the fact that ACBA's members activity use this space as a recreational facility serving the public, any future planning and implementation of the clean-up envisioned in the Proposed Plan needs to be coordinated with ACBA. This coordination will serve two purposes: To ensure that ACBA can accommodate the clean-up with a minimum impact on its current active and thriving operations, and also to ensure that the Proposed Plan is coordinated with the planning now under way by ACBA to renovate its site for expanded and improved non-motorized boating activities available to the public. ACBA, the District of Columbia, and the National Park Service have a strong record of working together to identify and accommodate each other's needs as we pursue our common vision, and we look forward to continuing this strong working relationship. The Proposed Plan should be amended to call out the importance of coordinating the proposed cleanup efforts with ACBA to ensure that this strong working relationship continues.

   Response: *See the responses to Comments 1 and 3.*

3. As one step towards continuing this strong working relationship and open communication, I also want to comment here on the scheduling of the cleanup work. In the public meeting on April 28, 2005, at which NPS presented the Proposed Plan for comment, NPS estimated that the work on the site was likely to last two to four months. For purposes of minimizing interference with ACBA operations, it would be optimal if this site work was scheduled in the off season for ACBA's boating activities, specifically from November

through February. In any event, as next steps are taken with the Proposed Plan, ACBA looks forward to continuing to communicate and coordinate with NPS about planning and implementation.

Response: *See the response to Comment 1. The NPS will continue to communicate and coordinate with the ACBA regarding Site remedial action planning and implementation. To the extent practicable, NPS will schedule remedial action activities to minimize disruption to ACBA activities.*

NPS Responses to U.S. Army Corps of Engineers Comments

1. The U.S. Army Corps of Engineers (USACE) agrees with the Proposed Plan published by the National Park Service (NPS) to clean up the NPS portion (the NPS Site) of the Washington Gas—East Station Site the WG Site). The USACE-managed property that is surrounded by the NPS property within the WG Site has been contaminated by the same activities as the NPS property, and should be remediated in the same way and at the same time as the NPS property.

   Response: *The NPS concurs with this comment.*

2. USACE requests that the Record of Decision (ROD) for the NPS Site be expanded to encompass all of the land owned by the United States within the WG Site, to include the 0.35 acres managed by USACE. The Site Description in the Proposed Plan notes that the activities of the former East Station Manufactured Gas Plant impacted the USACE property as well as the NPS property. The Record of Decision published by Washington Gas Light Company (WG) in 1999 defined the WG Site as "the terrestrial area that has been impacted by the residuals of gas manufacturing," and stated that its study area encompassed both properties owned by the United States; that is, both the NPS property and the USACE property. USACE engineers who have reviewed the investigative work performed by WG indicate that the extent and scope of sampling was sufficient for characterizing the USACE property. The work performed by Washington Gas included installation of a lateral groundwater interceptor drain near the Anacostia River on the USACE Site. Because the USACE property is already involved, it would make sense to include it in this cleanup action.

   Response: *The NPS concurs with this comment, and the ROD addresses the land managed by USACE.*

3. USACE believes that the preferred remedies identified by NPS in its Proposed Plan are equally appropriate for the USACE property. NPS has projected that the NPS property will be used as park land. USACE expects to continue using the USACE property as an operating base for the mission it was given by Congress under the River and Harbor Act of 1965 (Pub. Law 89-298): to remove drift from the Potomac and Anacostia Rivers in the Washington

Metropolitan Area. Nevertheless, USACE recognizes that its 0.35-acre site is surrounded on three sides by property that will be used as park land and that it may eventually become park land, too. Therefore, the NPS remedies are appropriate for the USACE property.

Response: *The NPS concurs with this comment.*

4. Some minor adjustments may be required in performance of the remedies, to comport with USACE's current use of the USACE property. The following specific changes are recommended for application to the USACE property:

   - The requirement for backfilling and placing topsoil after excavation and removal of contaminated areas would be a requirement to return the excavated area to its prior condition; for example, if paving were removed for excavation, appropriate clean backfill would be placed and the surface would be repaved.

   - Certain improved areas of the USACE property would be excluded from remedial action to the extent previous removal of soil to the required depth can be demonstrated.

   - The moveable structures at the USACE property would be temporarily moved during implementation, as needed, and then returned to their previous locations and conditions.

   - Implementation of the remedial action on the USACE property would be closely coordinated with USACE, to prevent interference with or interruption of its drift removal operations.

   Response: *The NPS concurs with this comment.*

Attachment A-1

Public Meeting Transcript

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NATIONAL PARK SERVICE

PUBLIC MEETING

PROPOSED PLAN for the CLEANUP of the NATIONAL PARK SERVICE PORTION of the WASHINGTON GAS EAST STATION

April 28, 2005

Earth Conservation Corps' “Henson Center”

2000 Half Street, S.W.

Washington, D.C. 20024

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PRESENT:

GAYLE HAZELWOOD, Superintendent of National Capital Parks- East

SHAWN MULLIGAN, Department of Interior

MURIEL BOUZINAC, Ecology and *Environment*

PUBLIC COMMENTS:

DYLAN CORV, President, Anacostia Community Boathouse Association

JOHN IMPARATO

JIM CONNOLLY

AKIMA PRICE

JEFF WOODS

CHRISTINE RIDGE

DAN RIDGE

JERUSALEM BEKELE

Note: Where the record noted gaps, marked by dashes, or has words that were misheard, the gaps or misheard words are enclosed in ordinary brackets, and a suggested correction or addition is inserted within square brackets.

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P R O C E E D I N G S

MS. HAZELWOOD: Good evening everyone. My name is Gayle Hazelwood, and I'm Superintendent at National Capital Parks-East, and it is definitely my pleasure to welcome you this evening here for this evening here for our public meeting as we discuss the proposed plan for the actions out here at the park land associated, with the Washington Gas site.

Let me take care of a couple housekeeping things first. Did everyone sign in? And that's a *yes,* okay (.)[?] And for those who did not know it, there (is)[are] additional copies of the community (fax){fact] sheet and the proposed plan at the front if you didn't pick that up and if you'd please feel free to do so.

The other important thing is the restrooms. To my left, just pass the door on the left, you'll see the restrooms. Just so everybody is aware also, we have provided a couple [of] different forms for you to be able to provide comments and/or questions.

There are some sheets on the brown box to my left at the table with some pencils also, so if you want to write out a comment or a question, feel free to do so; if you want it addressed at this point, hand it to one of the staff; if it's something that you just need to have for the record, you can simply put it in the comment box there. All right. With that, let me introduce some of the folks that('s) ['re] going to be doing the formal presentation. First, our attorney and advisor with the Department of Interior, Shawn Mulligan; and our Environmental Engineer with Ecology and Environment, Muriel Bouzinac. And I'm going to turn it over at this point to Shawn, and he'll guide us from (the rest of) this point [on]. We have

some of the other staff members with us in the audience this evening, and we'll get presentation and take it from there; Shawn.

Mr. MULLIGAN: Thank you, Gayle. And just for the record, it looks like the National Park Service representatives outnumber the public here, and just remember that when you're providing comments to us, please. I'm also glad to be here.

The fact that we're here represents a significant milestone in the full investigation and appropriate remediation of lands that are managed by the National Park Service that have been impacted by historical gas manufacturing operations (to) [at] a site immediately north of National Park Service property.

We'll go into detail where the site is located, and, in fact, a lot of the detail in the presentation will be provided by Muriel, who will be talking in great detail about the nature and extent of contamination at the site. [She will be discussing](T){t]he preferred alternative that the National Park Service is(—) [proposing] in terms of fully protecting this National Park Service property, as well as (--) discussing another thing that we'll be talking about today, [that] is providing the public with the opportunity to speak tonight, to provide comments and questions on the proposed preferred alternative to the National Park Service.

As many of you are aware, the National Park Service has made the proposed plan available to the public already. The proposed plan and the administrative record which fully supports the proposed plan is available at the Headquarters of National

Capital Parks-East, as well as in my office in Colorado, for those who want to travel to review the administrative record. And it is a scintillating read, so if you have an opportunity, please check out the administrative record on this particular matter.

Now, again, Muriel will discuss this in great detail. But the preferred alternative as articulated by the National Park Service in the proposed plan is the removal of surface soils, selected removal of sub-surface soils that are contaminated, a continued groundwater system that prevents contaminants from reaching the river, as well as those actions necessary to collect coal tar that is in a liquid state such that it can be captured. The National Park Service believes that this proposed plan will be fully (protected) [protective] of (the) human health and the environment and is fully consistent with land use for a National Park Service unit. After the National Park Service (expedition) [explanation] provided by Muriel regarding the proposed plan, we'll talk about what are the next (ups) [steps] in the Superfund process.

As many of you know, the site is being cleaned up under the authorities of the Comprehensive Environmental Response Compensation and Liability Act, CERCLA, also known as Superfund. And one of the requirements of that is that we provide the public with an opportunity to chime in on our preferred alternative. And we'll talk about the next steps after this public comment period runs [out].

Obviously, one of the things tonight, if you want to provide oral comments, please do so. You also have the opportunity to provide written comments, and we'll be talking later specifically how one can best provide those comments.

In terms of one housekeeping issue, then I'll turn it over to Muriel, we have, pursuant to the applicable authorities, we're having this public meeting transcribed by Steven, and so one of the things that we'll want to do is to ensure that we produce a legible transcript. So to the extent possible when we get to public comments, we'll ask you to introduce yourself and then speak into the mike so we can capture it for the record. We want to make sure that we're fully responsive to any public comments on this proposed plan, and we take our obligation seriously to respond fully to your comments.

I guess the final point is, if you can hold your comments and questions until after Muriel has spoken, that would be helpful in managing the transcript, as well as making sure we pay full attention exactly to the information you're trying to get from us, and we'd be happy to provide that. I think that's (this)[the] point(,) [.] Muriel.

MS. BOUZINAC: I want to mention, I will present the preferred alternative in more detail. But before I do that, I'll describe the site condition[s] and potential risks, and present the remedial action objectives.

So here we have an aerial photo of the site. The site lies east (of)[and) south of the *1-29S* corridor. It's between Water Street here and the Anacostia River, east of the 11th Street

Bridge and west of the Boat Club here. The site is in Anacostia Park. If you look at the figure in red, you have the boundary of the, what we're calling tonight the National Park Service site, NPS site. The site is part of a bigger area in CERCLA, the East Station site, and that also includes the Washington Gas owned property that located north of Water Street. The total [of] the CERCLA site is about 18.8 acres, I think. National Park Service['s] (is) property – is about 4.2 acre[s]. You have to understand that this proposed plan only addressed the NPS owned portion of the property.

On the aerial photo, you can also see the different uses (,) [---] current uses of the site. You have here a building currently used by D.C. Department of Public Works for equipment storage. The rowing club is using this part of the site under the bridge. Here there's a small portion of the site, about a half an acre, that is owned by the Corps of Engineers and that is used as a staging area for waste cleaning boats, and that's pretty much it.

Here, those two areas, north of Water Street, [are] NPS reservations, and they are considered part of this National Park Service site we're talking about tonight. You can see the same thing on that, here, on that -- that I'm not going to describe more since it's pretty much the same thing you just saw here.

As Shawn mentioned, that site used to have gas manufacturing operations. Operations lasted from 1888 to 1983. There was actually continued production of gas until 1948 and then intermittent production during periods of 1983. In 1986, the

(plan) [plant] was demolished in [the] Washington Gas portion of the East Station site. And then all above-ground storage tanks were demolished in 1997. The feedstocks (are)used for the process were coal and oil; by-products and waste, (including)[included] tar, oil, coke, as wall as contaminated wood chips.

Site investigations (should) [showed] evidence that some of those wastes were used as (fuel) [fill] in the National Park Service portion of the site, as well as in the Washington Gas portion of the site. So this is pretty much the source of the contamination that is found on this site, both (ways) [waste] that has been used as (fuel) [fill] directly in the area, as migration of these contaminants from one part of the site to another.

The site investigation started back in 1983, and there have been several phases as part of the CERCLA process. First, preliminary assessment and site investigation, followed by additional sampling and studies to better understand (---) the extent of contamination. And then Washington Gas completed the remedial investigation and feasibility study in 1999, and that has been done for the entire East Station site that included the Washington Gas owned portion of the site and NPS portion of the site.

After that, additional evaluation were completed by National Park Service, and that included additional assessment of site risk for the specific use of the National Park Service owned property, as well as supplements to the Washington Gas remedial

investigation and feasibility reports. And these led to the proposed plan that was completed this year, and that includes all these additional evaluations.

So the findings of these investigations show the presence at the site of toxic substances including polynuculear aromatic hydrocarbons, or PAH's, some of which are carcinogens. Other compounds found on the site include volatile organic compounds such as benzene, as well as heavy metals and complexed cyanides.

Before further discussing the contamination, I'm going to talk a little bit about the (–) [fill] at the site. And you can look at those two figures here. This first figure, figure two, is showing this green shape is the former extent of the (field) [filled] wetlands. The NPS site is located here, but used to be former wetlands, and they have been (field) filled first between 1914 and 1919 by dredge spoils that were put by the Corps of Engineer[s] after they installed the seawall. So they feel that this space was filled with dredge spoils, as well as (--) [town gas wastes] so the fill material include dredge spoils, as well as waste – I'm sorry, I'm going on [too much]. So the figure here shows this line A for the cross-section that you see down here. So you can see that on top you have a layer [of fill], and this area here is that National Park Service property located here south of Water Street. So you have a layer of fill material that is about eight feet in average (---) [thickness, then] there's s natural layer of silt, and again a layer of sand and gravel. Then you have that clay down there.

So you have several units without (---) [breaks, and] there's one area around here where the silt layer was (excavating) {excavated], and that gave an area where migration occurred between the (silt) [fill] and the sand and gravel layer, and that's how we're finding contamination both in that fill layer and also in the sand and gravel layer.

So to summarize the contamination, and we can see a few maps here of contamination in the different layers, and we're not showing all the parameters, all the media, but just to give an idea of where most of the contamination is located.

What we can say about the fill layer is that we found in these material contamination most of the parameter I mentioned before, PAH's, heavy metals, as well as tar. The natural silt layer, as I said, prevents downward migration on most of the area, but there's this one area where we've seen migration, and so as a result, we've seen some contamination occurring in that sand and gravel layer. So this first map here shows the extent of PAX contamination in the fill layer, that top layer here, and pretty much it shows that area here in the dark orange is the area where we find contamination (about) [above] 1,000 parts per million {of PAHs}, and it pretty much shows where tar material is located at the site.

That other map here shows tar contamination in various layers. These round shapes here show the area of tar contamination in the fill layer. The line here shows where the tar has been found in the sand and gravel layer. So you can see that here we have that concentration between -- around Water

Street of tar contamination, but also in some areas like right here near the river.

So based on (those)[these] site's (,) contamination results, risks have been evaluated at the site for both human health and ecological receptors[.] [I]nvestigation included, I mean evaluations[,] included various type of exposure in various groups of [the] population. The results do not show unacceptable risks to the adult population or workers, but when assessing the potential risk to children using the site a park, Washington Gas found that they were low, but unacceptable risk to children that would be exposed if using the park as a recreational area. There was also some risk identified for some wildlife such as birds or mammals from certain parameters (of)[on] the site. As the lead agency for the site, it is National Park Service responsibility to ensure that (the)[a] remedial action is implemented, that is protective of human health and the environment. And this, of course, requires the remediation of surface soils to prevent exposure [of the] public and [also] ecological receptors to contaminated surface soils.

NPS also has specific requirements. Per the NPS Organic Act, they have a mission to preserve and protect the resources for the future generations. NPS intends to use the site as a parkland and expects that they will be able to modify and use the land, for example, by utility workers or landscape workers without restrictions related to the existence of coal tar[,] such as requirement[s] for protective clothing or possibly special

disposal requirement[s] if they found coal tar during these type of activities.

So (these)[this] requires the remediation of some the subsurface soil also, the subsurface that is contaminated with coal tar. So[,] pretty much this summarizes the objectives that National Park Service have for (these sites)[this site]. So to be more specific about the preferred alternative, it would consist of removing one foot of surface [soil] and (replace) [replacing] it with clean fill, six inches of clean fill and six inches of top soil that would support vegetation, and then off-site disposal of the soil that has been removed. Now, once the first foot of soil has been removed and before placing the fill, (NPA) [NPS] proposes to excavate the soil visibly contaminated with (the) coal tar to a depth of three feet below surface, meaning another two feet, or to the water table if it's encountered first[,] and replace this with clean fill. The selective removal of the subsurface soil would only apply to that soil visibly contaminated with tar. So, of course, we don't know exactly the extent of that contamination yet, that would be known once the first foot of soil has been removed.

The estimated cost for this remedy is about $2,200,000. The extent of the remedial action would be, and we can look at this map here[;] remedial action would extent from that line here east of the 11th Street Bridge and stop at the tree line here. The results of the investigation do net justify going beyond this line or this line here on either side. So this consist[s] -- this represents approximately 3.5 acres.

Other (remedy)[remedies] that are ongoing at the site include [a] groundwater remedy, as well as removal of coal tar. There's been an ongoing remedy for several years now, and it is articulated in the already proposed and approved plan for the entire East Station Site. These actions are currently being implemented and are subject to review every Give years. So for groundwater, the remedy currently consist[s] in capturing the groundwater by pumping. And I think we have here the treatment that Washington Gas has on the site, the (civil) [several] wells, as well as (--) [a trench] located on the (NPA) [NPS] site. Groundwater is being pumped, it's being treated before being discharged into a sewer system.

There's also everywhere, all the wells where the coal tar accumulates are being monitored and coal tar is being removed at regular intervals. So these are the ongoing remedies for groundwater at the site.

Sediment contamination, and I haven't mentioned when described the site contamination, there's been some contaminants such as elevated PAH's contaminations that we found along the seawall here. The remedy proposed, because -- I mean the different parties have agreed that the best remedy for the sediments would be to participate in (--)[a] program to deal with the sediment program (in) [on] the watershed site scale basis rather than a site specific basis, so we can talk about that further if you have questions on that.

But those remedies would reduce the risk to human health and the environment and would comply with the National Park Service

specific requirements and intention to use the site as a park. Proper monitoring, construction procedures and controls, of course, will be implemented during construction. And long-term monitoring would ensure that there's no concern of contaminant migration to potential points of exposure. Of course, to come to this preferred alternative, National Park Service has evaluated a number of alternatives. And I'm not going to describe all of them in detail or why they haven't been selected, we can, you know, talk about that later if you have questions.

But, for example, (for)[four] alternatives considered for surface soil included also no action alternative that is always considered as a basis to compare other alternatives, phytoremediation has been considered, which is the planting of vegetation that would take [up] the contaminants (for)[as a] subsurface soil alternative.

So alternatives such as institutional controls only (has)[have] being evaluated,{and] phytoremediation, also excavation of all the contamination in [the] subsurface has been considered, for some reason, either effectiveness or cost effectiveness, those alternatives haven't been selected.

And I think that that concludes the presentation. If you have specific comments or questions, we'll be happy to answer them. Oh, you have –

MR. MULLIGAN: If you want to hold that question, I'd like to talk about now where we're going in the Superfund process and what's next at the site. In addition, I'd like to also, for those of you who have a lot of interest in the analysis of

alternatives, that were not selected by the National Park Service, I would refer your attention to the administrative record, the proposed plan~ and a document -- a supplement to a Washington Gas study that they proposed -- a feasibility study that they proposed for their specific property. There's a detailed analysis the National Park Service consideration of the alternatives that were 11timately not selected.

AUDIENCE: Did you (got) [have] that online?

MR. MULLIGAN: I don't believe it's online. We have -- the proposed plan is available to you tonight and that does a lot of the analysis and conclusions. The other document is in the administrative record at the National Park Service Headquarters. It’s not online at this time.

Let's talk about where we are and where we’re going to in the Superfund process. Hopefully you've gotten a flavor that the National Park Service, in consultation with the District of Columbia, the United States Environmental Protection Agency, and Washington Gas have fully determined the nature and extent of contamination :at the site. We've also comprehensibly analyzed, identified, and evaluated various alternatives for the clean-up of this particular property. Where we are now is, we're in the public comment period on the preferred alternative identified by the National Park Service in the proposed plan. The public comment period, which will run from April 11th to May 13th, is a time for the public to evaluate the National Park Service's analysis, to see whether or not the public agrees or if it wants

to add additional information for the National Park Service to consider.

Under the requirements of the Superfund statute, the National Park Service is required to look at and incorporate public comment for the proposed plan, and this-is exactly what we're trying to do, solicit tonight, as well as the opportunity you'll have to provide comments in writing.

After the public period has run, after the National Park Service has evaluated everything the public has to say, the National Park Service will select the remedial action that will be implemented at the site. They will formally do that in a record of decision issued under the Superfund authorities. That will say what the remedy is.

And, again, if there's no alteration based upon the public input, it will be the proposed plan that you hear tonight. If it is altered, there will be a comprehensive analysis of why it has been altered, and if it’s a significant modification, may go out with a new proposed plan. If it's a minor modification, then we would just modify the remedial action based upon the public comment. The record of decision importantly will include a responsiveness summary. A responsiveness summary is document that will be generated by the National Park Service that includes all the public comments and the National Park Services response thereto and how we are addressing the comment in terms of the record of decision.

After the record of decision, the National Park Service will work hopefully hand-in-hand with Washington Gas to design how the

remedy is going to be implemented on National Park Service property. It is a projection of the National Park Service that the record of decision will take approximately six months to generate. At that time, we'll work on remedial design. So if things break the way we hope them to break, the National Park Service will be prepared to implement the remedy of the site in approximately one year.

It is a project where the on-site construction is going to be a relatively small window, between perhaps two and four months, so if things go well, the on-site construction can occur in the next year and a half. I think at this point I'd like to solicit any questions and comments from the public, and we'll talk at the end of this presentation on how you can submit formal written comments to (that)[the National Park Service [that they] will respond to in the responsiveness summary. In terms of process, I think the National Park Service will hand out a mike to anybody that wants to raise a question or provide a comment. If you could identify yourself for the record and then give your question, I will initially field it and defer it to, if necessary, to someone that can speak specifically to the question. So with that, I'd like to open it up to the public.

MR. CORV: Good evening. My name is Dylan Cord, I'm the President of the Anacostia Community Boathouse Association, and I represent the hundreds of men, women, and children that now use the area on the edge of the project area and to the west of it as a recreation area. We boat, we row, we paddle, we canoe out of this area.

I have three general comments I'd like to make and then one question. The first comment is that I think I'd like the proposed plan to be corrected in the following relatively minor sense. The plan refers to a rowing club operating out of this area. In fact, our boathouse association now has three high schools that row every day, one university, American University, two rowing clubs, and one paddling club, so we're very active there. It's is an active and thriving center, and I think the proposed plan should reflect more accurately the vibrancy of the activity there. The second comment is that we as a boathouse association strongly support the effort to clean up the area. We want the area to be safe and clean as much as anyone. We're the ones who stretch on that ground and get our hands in that dirt and probably ingest as much of the material as anyone else. But we don't have any expertise on the environmental -- the alternatives for remediation, so we don't comment on that, although one of our founding members is the Anacostia Watershed Society, and we look forward to their comments, and I see their executive director, Jim Connolly, is here tonight.

The third comment I have is simply that as we look forward to his plan happening, we note that the implementation of the plan and the continued planning must be coordinated with us. We are happy to accommodate the construction and other efforts that need to happen at the site, just as we accommodate the bridge repair that happens right around our area, but we just need that communication, and I've given my name to Gayle and Steve and others here with the Park Service.

But part of that coordination is not only making sure we smoothly accommodate that project through adjusting our operation, but also that we talk about the future of the site. The Anacostia Waterfront initiative envisions this area being a boathouse row with even more boating, non-motorized boating activities than occur now. We're advocates of that vision. It's not detailed now, but we are planning for the renovation and conversion of our site to better accommodate the public's interest in boating, and we want to communicate with the Park Service and other parties to coordinate those plans as this goes forward. Those are my three comments.

My questions is, could you give us more information about how the southwestern boundary of the project area was drawn? It seems to me almost ironic. I'm not challenging the validity of it, but the area that is now the most active recreation area is not included within the clean-up area. Perhaps that's because you've definitively concluded there's no clean-up activity needed there, but I wish we could (flush)[flesh] that out more because -- if there's going to be a clean-up there, we'd like to make sure that the area to the southwest of the project area is also cleaned up for future recreational use, perhaps construction or other projects on the site. Thank you very much.

MR. MULLIGAN: Thank you for your comments. I'll address your comments and then I'll throw your question to Muriel in terms of how the southwest boundary was delineated for purposes of site investigation or remediation. But please be assured that no slight was intended to the proposed plan. Future

communications out of the park and this office will hopefully accurately capture the vibrancy of the boating community there. I appreciate your strong support for the clean-up. And in terms of implementation of the remedy, we talked about the remedial design phase after we specifically articulate the remedy that will be implemented in terms of the National Park Service commitment to protect human health and the environment.

We recognized that there are a lot of remedial design issues. I've talked with the park, and we've had a number of very productive discussion[s] on how best we ensure that we properly communicate with the public to ensure there's minimum disruption.

We recognized that there are a lot of users of that particular property, we recognize it's a vital part of the community, we recognize that the National Park Service has a commitment to serve the public, so we're very aware of those implementation issues. I appreciate all your efforts to communicate your interest specifically to the park. They're great listeners and I'm sure they'll work with you. With that, Muriel could you address the issue on the delineation of boundary?

MS. BOUZINAC: Yes. Actually, samples were collected beyond that line that I showed on the west of 11th Street Bridge, both (--) [surface] samples [I] believe and (blow) [bore]holes, but there was no evidence in those samples of waste from the Washington Gas operations or migration of waste to those areas,

and this is why that line - - was east of the bridge. Does that answer your question?

MR. CORV: It does. I would be interested in seeing where the samples were taken, just out of curiosity. Is that - - if you could refer me - - is it a part of the public record?

MS. BOUZINAC: Yeah, the remedial investigation feasibility study is the location where you would find most information on the location samples. And there's been, as I say, various stages, various phases of sampling. But there's like one specific section on previous work, I believe, that shows all the samples, subsurface samples, subsurface groundwater samples that we collected, so there's pretty good graphics showing all that.

MR. CORV: And one more follow(-u) [up].

MS. BOUZINAC: Yes, a document will be there, remedial investigation feasibility study. It might have not be the exact name, so - -

MR. CORV: If you could find out later and let me know.

MS. BOUZINAC: Yes.

MR. CORV: It's a follow-up question. I'm not sure I know enough to ask this question well, but the testing that was done in that area, I know it was for some specific chemicals that you anticipated would have been the result of the gas production over the decades, was it also a broad enough test for all the chemicals that would normally be looked for when one would anticipate any other kind of construction or projects at the site? And I don't know the full environmental regulatory scheme (Go) [you] know, but was it a full, broad investigation so that

we could consider this a definitive basis to plan for other construction at the site?

MS. BOUZINAC: Yes, it was a full scan pretty much with organic chemicals being tested and (organic) [inorganic] chemicals being tested, and that would pick up all the contamination that might not be coming from Washington Gas activities, but it will pick up any other contamination such as leakage of oil, for example, it will pick up that type of contamination, too.

MR. CORV: Thank you very much.

MR. MULLIGAN: A follow-up to that; when National Park Service is faced with issues of release of hazardous substances on its property, it ensures that it takes all actions to determine the full extent of contamination of the site. So we looked at a very full array of contamination. In addition, I would note that USEPA worked very closely with Washington Gas; the District of Columbia was heavily involved (in) [and] the expertise of the National Park Service through contractor assistance, really focused on the site to determine the full suite of contamination, what should be analyzed, what should be sampled, and we're very confident in terms of the suite of analyzed that [we] looked at, and again, that would be in the administrative record, and we'll get a proper (site) [cite] for the specific name of the remedial investigation feasibility study document that was generated in this case before it's all kind of run together. Next.

MR. IMPARATO: Good evening. I'm John Imparato. Three quick questions; one, is the Money available or do you have to find it; and two, can we get copies or find these figures, they look pretty interesting and pretty useful in explaining what the project evolves; and the third question is, maybe take a little longer to answer, what's the time line assuming you have no set backs and the funds are available and nobody has any significant suggestions to change? Thank you.

MR. MULLIGAN: Do we have the money available? Short answer is no. The National Park Service has two options when it's cleaning up property contaminated by a third party. It has the opportunity and very full enforcement powers to work with the responsible party to ensure that responsible party pays for the full clean-up. Independently, the National Park Service has funding sources for contaminated sites, and we compete for departmental funds in an(- -) [emergency] situation. [The] United States Environmental Protection Agency has Superfund where it can access funds to clean up this site.

That being said, it has been the experience of the National Park Service working very closely with Washington Gas throughout these years. Washington Gas shows responsibilities to meeting their commitment. And the National Park Service is hopeful that it can work out an agreement with Washington Gas where it fully meets its obligations. In fact, we're talking with Washington Gas in that respect now.

Secondly, with respect to getting copies of these figures, I think we have a few extra sets, so if there's a limited claimer

for them in this particular meeting, we can hand those out to you specifically tonight. If not, if you want to give us your mailing information, we'd be happy to provide those to you. Thirdly, the time line, if there are no set-backs, let's make certain assumptions, that the proposed plan stands as it, that the record of decision can be completed in three to six months, the remedial design will take another three to six months, so that's a year before we'd be ready to implement remedy.

Remedy is relatively short term, two to four months, so we might be completely done with on-site construction in about a year and six months. We recognize that there are some remedial design issues, we've touched on some of them with the vibrant boating community in the area, working with them, we have some issues with the District of Columbia and some other parties to ensure that we have full access for implementation of the remedial action, but we're probably looking about a year and a half, and nothing ever slips in this business.

MR. CONNOLLY: Okay. My name is Jim Connolly, I'm with the Anacostia Watershed Society. I have a couple questions. I was involved a few years ago in the public process with a remediation of the Washington Gas East Station Maritime Plaza site, and when that process occurred, it was determined that they would pursue phytoremediation using vegetation to take up the pollutants with their roots and break it down biologically. This process seems to be a little bit more aggressive which I support. I think it's a good thing. I think removing that contaminated soil probably should have been done at the Washington Gas site. I don't know

the specifics of it, but that's I think what probably should have occurred. But my question really ±s, what data do we have mow that it's been five or so years from Maritime Plaza to show if there's been any progress there, and then how are we going to deal with the migration of pollutants from the Washington Gas site to the newly cleaned site that National Park Service owns, and then thirdly, how will you (at) [halt] migration from that into the river and the riverbank, and is there any attention being paid to cleaning up the contaminants in the river bottom?

MR. MULLIGAN: We have -- there's a bright line, the easy questions, I'll handle, the other questions; Muriel, I think those are questions that I'll defer to Muriel.

MS. BOUZINAC: I got the first two ones, about the third one?

MR. CONNOLLY: The third one is migration.

MS. BOUZINAC: I'll start with the migration issue. Migration will (--)[occur] with migration of the groundwater or the coal tar phase. This is being taken care of by the current remedies for groundwater and coal tar. And as I said, there's currently a pump (entry) [and treat] system for the groundwater at the site, there's wells and trenches connected.

MR. CONNOLLY: Will it be a new pump or the existing one that's there?

MS. BOUZINAC: That's an existing system that has been improved, I believe, since -- with additional wells since the proposed plan for the Maritime Plaza site. But it's the same system, and currently all the water is being pumped at a rate that prevents any flew to the river.

So basically you currently have the [flow from the] river ('s flow) that prevents any groundwater from going into the river. Same thing about migration of coal tar, this is taken care of by wells that have been put in location where it could accumulate, and every well where the coal tar came [it] will be (--)[collected] and [re]move[d.] the coal tar is being collected in those wells. So this is supposed to take care of any migration to, as you say, to the newly clean, you know, soil[,] after the soil has been removed and replaced with (--) [new] at the National Park Service site.

MR. CONNOLLY: How about the phytoremediation at the Maritime Plaza?

MS. BOUZINAC: I wouldn't be able to respond to that. I don't know if you want to –

MR. CONNOLLY: It's all connected to the same – so I don't see why you wouldn't know the connection.

Ms. BOUZINAC: Well, one big difference, and I can talk about why the phytoremediation alternative was not selected for the National Park Service site, and there's different use of the property that have been considered for the two different areas. For the National Park Service site, and that might be what explains the more aggressive alternative, the site use that National Park Service has been looking at is recreational use by children, so the site evaluation was based on different assumption as to who is going to use the (side)[site] in which way, and the phytoremediation alternative was not considered

sufficiently effective to reduce the contamination to a level that would pose no risk to this group of [the] population.

Mr. MULLIGAN: As an adjunct to that, the National Park Service, when it analyzes alternatives, is bound by nine criteria found in the National Contingency Plan, which articulates what the National Park Service has to look at in terms of selecting a remedy. And our determination that phytoremediation would be ineffective in particular given this proposed land use at the site, so that's why we went for what may be considered more aggressive remedy in getting rid of the source.

MS. PRICE: I have a question. This off-site that you're mentioning - -

MR. MULLIGAN: If you could also state your name for the record, that would be great, thank you.

MS. PRICE: Akim Price; my question with this is, it's mentioning that this contaminated soil and all this is being pumped off to an off-site location; where is this off-site location?

MR. MULLIGAN: I don't really know.

MS. PRICE: Do you know if it's within the watershed or is it out of the state, is it - -

MR. MULLIGAN: Well, there are specific legal requirements that apply when you generate a waste, and it's my understanding that Washington Gas is taking that to a licensed facility for that particular waste. I'd be happy to get more information on that and respond specifically to you. But one of the things that the Superfund program wants to do is to ensure when you take

waste from site A, you're just not creating another site, a site B.

MS. PRICE: Right.

MR. MULLIGAN: So I'm sure Washington Gas, a very sophisticated company, a very responsible corporate citizen in this particular matter, as well as perhaps all matters, I can't speak to that, but it's doing everything in accordance with the law. Obviously, one of the components of our remedy is to ensure that Washington Gas continues its operations that (egress) [address] off-site migration of contamination to National Park Service property or any lands that the National Perk Service manages. We've got the building until 9:30. I need a two hour question, otherwise we're going to Stairway to Heaven. This is on the record, isn't it?

MR. WOODS: It doesn't have to be. I'm Jeff Woods with District Yacht Club, and I don't have a question specific to this site, but could you, for the benefit of me and others, could you describe other sites that might be on the river, or is this the only site, the first site, are there other sites, or are there other samplings, you know, including, you know, all the way up to Benning Road? I was just curious.

MR. MULLIGAN: I can't speak specifically to the question, but the purpose of this meeting is to specifically talk about the Washington Gas site. That was just an hour and 59 minutes short.

MR. CONNOLLY: Let me just ask a simple question. Do you know when, if this all is approved, when the physical removal of the soil will occur, is that next year, five years, do you have

just a general sense, and if so, would it be possible to maybe time it, if it's only a two to four month actual removal, during the lower use times of the boating activities?

MR. MULLIGAN: Well, I've tried to sketch the (online) [timeline]. There are some critical steps. It's the record of decision, and then it's designing the remedy, and it's making sure that any issues that impede the implementation of the remedy are addressed. That's obviously a large unknown in terms of the various users of the National Park Service property.

You knew, we've thrown out -- no, that doesn't suggest enough thinking on the matter. We think our best estimate is one year and six months to be complete with the on-site construction of the activity. When we design the remedy, we look at all factors including minimization of disruption to present users. We have a number of sites in the National Park Service where we have limited seasons based upon the weather, nesting seasons of various endangered species, et cetera, so we're very comfortable in looking at the variety of factors that should be considered in designing and implementing a remedy.

One of the things that I'm hearing very strongly from the National Park Service is the desire to take care of this issue to fully remediate that, and that's a primary driver in the National Park Service, paying attention to the site and cleaning it up. But if you have usage figures for the vibrant boating community, that would be helpful for us in terms of timing, what would be best for you, and we'll look at that and factor that into our analysis. Thank you very much. And it would be great to provide

them in the comments to the proposed plan. This will be the best opportunity to provide input to the National Park Service.

MS. RIDGE: Hi, my name is Christine Ridge, I'm a neighbor in the area. I was just wondering if you had an idea how deep the DNAPL's and the coal tar are, how deep they are in the soil, since you're planning to remove the top three feet?

MS. BOUZINAC: We found coal tar deeper than that. As I said, we found coal tar in that first layer of fill, and that's one to sixteen feet deep, I believe, in the (aerial)[area]. And then we've also found some coal tar in the sand and gravel layer below, and I don't have the numbers, the exact, you know,(numbering) number[s],[on] how deep, the deeper section, where coal tar has been found, but definitely deeper than three feet.

The reason why the preferred remedy is only looking at the first three feet, and I mean for soil remedy, is because there's on exposure expected below this depth. Now, the potential migration of coal tar is taken care of by the remedy that I described for what we call the coal tar remedy, where wells have been installed, and they've been installed deep to those areas, even in the sand and gravel layer to (--) [collect] the coal tar in those locations, so that's to (--) [prevent] migration. Now, you have coal tar remaining, but coal tar will not move (--)[or] migrate, so –

MR. CONNOLLY: I'm just looking at the site and there are a couple of buildings, there's the DPW office and the Corps of Engineers, that's within the area. Are you going to remove those

buildings and excavate the soil under them, is that the plan? And then secondly, looking at those two circular areas of heavy target area of DNAPL coal tar, the one that's sort of closer to the river seems to be sort of on the other side of the pumping, you know, the pump and treat well, and I'm unclear if that is something that you're saying is not going to migrate towards the river, or if it is, is there now a new pump and treat well on the downstream or the closer to the river edge side of the area?

MS. BOUZINAC: To answer your last question, I believe, I'm sorry, tell me if I'm wrong, that there is a well in that location, in that specific location mentioning near the 11th Street Bridge to - -

MR. CONNOLLY: This one here?

MS. BOUZINAC: (- -) [No.]

MR. CONNOLLY: Or that small one and the larger one?

MS. BOUZINAC: Yes. So there' been pumping (--)[wells,] they're not just like one well, there's been a set of pumping wells everywhere coal tar had been found in (--) [high] concentrations, so some of those coal tar[s] will not migrate and the wells do not collect much coal tar because it doesn't mobilize, but there are wells to ensure that there's no coal tar potentially migrating to the river, for example. And your first question?

MR. CONNOLLY: The first question is that the buildings that are there~ they're going to be torn down and then excavated?

MS. BOUZINAC: That's the intention, yes.

MR. CONNOLLY: Okay. Thank you.

MR. CORV: Just a question, a clarification. You said the on-site construction would take two to four months; the on-site construction, does that phase include all of that, tearing down the buildings, tearing away the top soil, constructing the wells, the whole project, is there a later phase?

MR. MULLIGAN: Do you want to take it?

MS. BOUZINAC: Yeah, everything, I mean depending on the time frame of everybody, everything might not happen at the same time, but when we estimated I think two to four months, we included this type of preliminary work at the site before starting excavation.

MR. MULLIGAN: And some of that activity discussions with the parties that are currently utilizing the buildings is occurring now, so we don't mean to suggest that the on-site construction includes some of the (--) [negotiation] it might include some of those activities, but it might not be the only period in which we're getting rid of some of the obstacles to implementing the remedy at the site. We've got a year before we might be ready for on-site construction in terms of the record of decision and the implementing the remedial design to take care of some of those issues. Hopefully we've spotted them all, so we're on top of them.

MR. RIDGE: My name is Dan Ridge, I just have a very quick question. From the time the plan is adopted, how long will it take for the covenants to be recorded on the deed about the institutional controls for the site?

MR. MULLIGAN: I'm trying to think of the institutional controls; do you have any specifically in mind?

MR. RIDGE: Yes, thank you. Among the summary of remedial alternatives, there's a section that says common elements, and it suggests that because none of the proposed alternatives will totally remove the contaminants, that controls will need to be implemented, provide restrictions in the property deed prohibits certain actions or changes to the property ore you know, the property use. So when from time of the adoption would those changes be recorded in the deed?

MR. MULLIGAN: Right; typically the way that is handled is, the identification of the institutional controls, the specific means by which you implement the institutional controls are identified either in the record of decision or the remedial design. And you talk about specifically what you're going to do, how you're going to do it, when you're going to do it, and how long it will take. So we're probably, you know, six to nine months out before identifying that. But that is something that will be contained in a public document for you to review. Going once, oh.

MR. BEKELE: My name is Jerusalem Bekele, I'm with D.C. government. And I have some knowledge of the area, and I think the area has come a long way from how it used to be with the development that happened with Washington Gas, and I look at the first Board here, and there is one word that may not be very accurate, and that's the word clean-up. So the way I perceive what's going on in the site is to reclaim the land for a useful

purpose, for, you know, some activity, and we bring the condition so that it will be appropriate for recreation, office building, or whatever it is proposed, and that is how I would look at it, because there is some contamination, as you all mentioned, in the lower levels, and that may be there, and the clean-up may be still going on, but the particular parcel is being utilized for certain uses, that is how I look at it, and my suggestion is whenever such a plan goes in place, I'm sorry, haven't looked at the feasibility or the proposed plan in detail, but I think it ought to take into account some future clean-up or ongoing clean-up that are taking place at Washington Gas, perhaps the Park Service parcel, and even beyond that, perhaps also whatever action might be taken or could be taken in cleaning up the sediments, all of those have to be tied together and be a comprehensive type of planning that need to go into it.

I think it's a great step that National Park Service is taking, you know, putting those parcels for the enjoyment of, you know, all of us. By the way, I plan to bring my kayak down there one day. And over all, the current plan has to kind of fit and go hand-in-hand with I think the continuing or the ongoing clean-up activity, and I think it's a great step that the Park Service has taken. And I may not get the chance to go down to headquarters to get those documents. You did say you forwarded the documents to D.C.? If you tell me which agency it was forwarded, I can take a look at them and offer my suggestions.

MR. MULLIGAN: Okay. Well, you said a lot. The National Park Service is here to stay, we're committed steward of our

property. We evaluated this site comprehensibly in terms of risk posed to human health and the environment of the National Park Service managed property, and we're using the full authorities that we have under the Superfund statute and the National Park Service Organic Act to identify the risks posed to the users, as well as ecological receptors.

We think this is an excellent remedy in terms of responding to the release of contamination of the East Station site, and' we're committed to seeing it through. We recognize that there are other risks to the Anacostia, and we're working with groups to ensure that the National Park Service is a full partner as applicable and as appropriate.

And to clarify, if there's any confusion, the administrative record, which is the body of documents the National Park Service considered, reviewed, and evaluated in identifying alternatives, analyzing alternatives, determining nature and extent of contamination, and selecting the preferred alternative, all those documents are contained in the administrative record, The administrative record is Boulder, Colorado, as well as the headquarters of National Capital East, and I could really encourage if you have the time and the commitment, to look at this. We'd love the input of the District, and we'll be soliciting that also. One of the criteria, selection is the District's looking at this.

Well, with that, I'd like to close public comment in terms of this particular meeting and talk about how you can submit written comments. As you may know, we have a proposed plan

that's available to you within the administrative record we're also handing out tonight, and that articulates how you can provide written comments.

But specifically, you can provide written comments on the proposed plan to either me or Gayle. You can provide a carbon copy to one of us if you provide the comments to the other. I can be reached at Shawn Mulligan, at the National Park Service, 1050 Walnut Street, Suite 220, Boulder, Colorado 80302.

Gayle, the Superintendent, Gayle Hazelwood, the Superintendent, National Capital East, can be reached at 1900 Anacostia Drive, Southeast, Washington, D.C. 20020. If you lose this address, please call the Superintendent's office and she'd be happy to provide those to you. Her phone number is 202-690-5158. I've got it memorized.

MS. HAZELWOOD: Correction, 5185, my telephone number.

MR. MULLIGAN: Correction, it's 5185. Gayle, any closing words?

MS. HAZELWOOD: The only closing word I have is a thank you for those of you that came and joined us this evening and took you time out to actively participate, and also a heartfelt thank you to our regional staff and park staff who were a part of this well before I got here, and we just look forward to working with everyone to bring this to an appropriate close and get the site cleaned up and available for public use as a part of our National Park. Thank you and have a safe evening getting home. Good night.

(Whereupon, at 7:55 p.m., the hearing concluded.)

B List and Summary of ARARs for the Selected Remedy

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Federal and District Chemical-Specific and Action-Specific ARARs

[Code of Federal Regulations]

Standard requirement, criteria, or limitation	Citation	Description
CHEMICAL-SPECIFIC		
National Primary and Secondary Ambient Air Standards	40 CFR Part 50	Establishes standards for ambient air quality to protect public health and welfare; includes standards for lead and particulate matter; applicable to remedial action implementation.
ACTION SPECIFIC		
NPDES Storm Water Discharges	40 CFR § 122.26	Regulates the discharge of storm water. Applicable for storm water discharges; applicable to storm water runoff from remedial action excavation and other implementation operations.
Discharges of Dredge and Fill Material to Waters of the United States	40 CFR Part 230	Establishes conditions or prohibitions against depositing dredge and fill material into waters of the U.S.; applicable if remedial action implementation results in such depositing.
Corrective Action for Solid Waste Management Units	40 CFR §§ 264.552-264.554	Establishes requirements regarding placement, consolidation, treatment, and storage of remediation waste within corrective action management units, temporary units, and staging piles; relevant and appropriate.

Federal Location-Specific ARARs

[United States Code; Code of Federal Regulations]

Standard requirement, criteria, or limitation	Citation	Description
National Park Service Organic Act and General Authorities Act	16 U.S.C. §§ 1 et seq.	Establishes requirements for management of NPS units. Does not allow permanent or long-term prohibition of public access to Site as component of remedial action; applicable.
National Park Resources Protection, Public Use and Recreation	36 CFR Part 2	Prohibits various activities on NPS units; applicable.
National Park Area Nuisance	36 CFR § 5.13	Prohibits the creation or maintenance of a nuisance on NPS units; applicable.
Solid Waste Disposal Sites in Units of National Park Service	36 CFR Part 6	Places restrictions on solid waste disposal sites within NPS units including prohibiting disposal of solid waste containing hazardous waste, PCBs, or petroleum-contaminated soil; prohibiting incineration of the same materials; prohibiting treatment of the same materials that may result in the same materials entering the environment; and various siting restrictions; applicable.
National Historic Preservation Act and Regulations	16 U.S.C. §§ 470 et seq., 36 CFR Part 800	Requires federal agencies to take into account the effect of any federally assisted undertaking on any district, site, building, structure, or object that is included in or eligible for the Register of Historic Places; applicable.
Archaeological and Historic Preservation Act	16 U.S.C. §§ 469 et seq.	Establishes procedures to provide for preservation of historical and archaeological data that might be destroyed through alteration of terrain as a result of federal construction projects; applicable.
Historic Sites, Buildings, and Antiquities Act	16 U.S.C. §§ 461 et seq	Requires federal agencies to consider the existence and location of landmarks on the National Registry of Natural Landmarks to avoid undesirable impacts on such landmarks; applicable.
Endangered Species Act and Regulations	16 U.S.C. §§ 1531 et seq., 50 CFR Parts 17,402	Requires federal agencies to ensure that federal actions not jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify a critical habitat; applicable.

Federal Location-Specific ARARs (Continued)

[United States Code]

Standard requirement, criteria, or limitation	Citation	Description
Migratory Bird Treaty Act	16 U.S.C. §§ 668 et seq.	Establishes federal responsibility for the protection of the international migratory bird resource and requires consultation with U.S. Fish and Wildlife Service to ensure remedial action does not unnecessarily impact migratory birds; applicable.
Coastal Zone Management Act	16 USC Chapter 33 Section 1451	Requires protection of the water quality and wildlife in Coastal Zones during any development that may affect them; applicable.
Executive Order 11988 (Floodplain Management)	40 CFR Part 6, Appendix A	Protects floodplains by preventing obstruction of a floodplain by filling and the creation of any situation that could result in uncontrolled erosion; applicable.
Office of the Federal Executive; Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds	60 Fed. Reg. 40837 (August 10,1955)	To be considered (TBC) in restoring the site after excavation.
The Environmental Impact Statement for the Anacostia River Walk	www.nps.gov/anac/ c.f. 40 CFR Section 300.400(g)(e)	TBC. Defines development of the Site as parkland with a specific requirement to install part of the Anacostia River Walk along the length of the Site.
Resource Management Plan, National Capital Parks East	National Park Service Management Document	TBC. Required by all units of the National Park Service, the Plan is developed to design and prioritize development and maintenance of all park facilities within a given NPS jurisdiction.

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C Cost Calculations

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Cost Estimate
Alternative: Surface Soil - Soil Removal and Disposal Off-Site
Washington Gas Site - NPS Site Only

Construction Cost Item	Unit Cost	Unit	Quantity	Cost	Cost Rounded to $100
Contractor Mobilization/Demobilization	$20,000	[1] Lump Sum	1	$20,000	$20,000
Field Control	$5,000	[1] Lump Sum	1	$5,000	$5,000
Erosion and Sediment Control	$24,300	[2] Lump Sum	1	$24,300	$24,300
Miscellaneous Controls and Safety Measures	$14,000	[3] Lump Sum	1	$14,000	$14,000
Strip Existing Vegetation	$585	[1] acre	3.5	$2,048	$2,000
Strip Soil (1 foot) and Loading	$3	[1] cy	5641	$18,333	$18,300
Transportation and Disposal of Non Hazardous Soil	$75	[6] ton	6769	$507,675	$507,700
6" Clean Fill	$10	[1] cy	2820.5	$28,205	$28,200
6" Topsoil	$15	[1] cy	2820.5	$42,308	$42,300
Seeding	$1,300	[1] acre	3.5	$4,550	$4,600
Subtotal Construction					$666,400
Engineering and Administration (10%)[4]					$66,640
Construction Management (12%)[4]					$79,968
Contingency (15%)[4]					$99,960
Total Construction Cost (rounded to $100)					**$913,000**
				Annual Cost	
Operation and Maintenance Cost	$85	[1] hour	14	$1,190	$1,200
Inspection	$2,350	[2] Lump Sum	1	$6,600	$6,600
Repair and Maintenance					$7,800
Subtotal O & M					
Administration (12%)[4]					$792
Contingency (15%)[4]					$990
Total Annual O & M Cost					$9,600
Total 30 Yrs O & M Percent Worth (Using 4% Discount Rate)					**$166,000**
Total Percent Worth Cost for NPS Surface Alternative (Rounded to $1,000)					**$1,079,000**

Assumptions:
- The area to have soil removed and replaced is approx 3.5 acres**.** It extends to the East to the tree line and includes the two NPS reservations to the North of Water Street.
- 1 cy soil in situ = 1.2 tons

Notes:
(1) Unit cost obtained from WG FS for consistency in comparison
(2) Cost derived from WG FS proportional to acreage
(3) Estimate based on WG experience in developing Maritime Plaza (WG letter of 11/21/00)
(4) Percentage obtained from WG FS for consistency in comparison
(5) Quantity derived from WG FS proportionally to acreage
(6) Unit cost differs from WG FS and is based on more recent estimates from vendors

Cost Estimate
Alternative: Subsurface Soil - Target Area Excavation of Shallow Soils
Washington Gas Site - NPS Site Only

Construction Cost Item	Unit Cost	Unit	Quantity	Cost	Cost Rounded to $100
Field Control	$5,000	[1] Lump Sum	1	$5,000	$5,000
Miscellaneous Controls and Safety Measures	$10,000	[2] Lump Sum	1	$10,000	$10,000
Excavation of Contaminated Soil and Loading	$10	[1] cy	3385	$33,850	$33,900
Transportation and Disposal of Non-hazardous Soil	$75	[5] ton	2031	$152,325	$152,300
Transportation and Disposal of Hazardous Soil	$338	[1] cy	1693	$571,388	$571,400
Backfill	$12	[1] cy	3385	$40,620	$40,600
Analytical Testing	$2,800	[3] Lump Sum	1	$2,800	$2,800
Subtotal Construction					$816,000
Engineering and Administration (10%)[4]					$81,600
Construction Management (12%)[4]					$97,920
Contingency (15%)[4]					$122,400
Total Construction Cost (rounded to $1000)					**$1,118,000**

Assumptions:
- Assume subsurface alternative initiated concurrently with surface alternative, i.e., no mobilization costs, etc.
- Assume 30 percent of soil in the 1- to 3-foot depth interval requires excavation.
- Assume 50 percent of excavated material to be hazardous.
- 1 cy soil = 1.2 tons

Notes:
(1) Unit cost obtained from WG FS for consistency in comparison
(2) Estimate based on WG experience in developing Maritime Plaza (WG letter of 11/21/00)
(3) Cost derived from WG FS proportional to acreage
(4) Percentage obtained from WG FS for consistency in comparison
(5) Unit cost differs from WG FS and is based on more recent estimates from vendors