

**STATE OF DELAWARE**  
**DEPARTMENT OF NATURAL RESOURCES**  
**AND ENVIRONMENTAL CONTROL**  
**SITE INVESTIGATION AND RESTORATION BRANCH**  
**FINAL PLAN OF REMEDIAL ACTION**



**November 2004**

**Peninsula Ventures Site**  
**Wilmington, Delaware**

**DNREC Project No. DE-1294**

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This Final Plan of Remedial Action (final plan) presents the Department of Natural Resources and Environmental Control's (DNREC's) selected alternative for the remediation at the Peninsula Ventures site. This plan was published previously as a proposed plan for a 20-day public comment period in accordance with section 9107 of Chapter 91, Delaware's Hazardous Substance Cleanup Act (HSCA), and section 12 of the Delaware Regulations Governing Hazardous Substance Cleanup. No comments were received from the public during the public comment period; therefore, DNREC is now adopting this final plan of remedial action.

This final plan summarizes the 2003-2004 Remedial Investigation /Feasibility Study (RI/FS) and the administrative record file upon which this final plan is based. Copies of the RI report, the FS, and other site-related documents can be obtained or viewed at the locations listed at the end of this document.

## **INTRODUCTION**

The Peninsula Ventures site consists of four separate tax parcels totaling approximately 16 acres, located south of Industrial Street between the Christina River and the Brandywine Creek in Wilmington, Delaware (Figure 1). In August of 2003, the site developer (Peninsula Ventures, LLC) entered into the DNREC – Site Investigation and Restoration Branch's (SIRB's) Voluntary Cleanup Program (VCP) to conduct a remedial investigation (RI) and Feasibility Study (FS) of the property under the provisions of the Delaware Hazardous Substance Cleanup Act (HSCA), 7 Del. C. Chapter 91. Through the VCP Agreement, Peninsula Ventures agreed to investigate the

potential risks posed to public health, welfare and the environment at the site. Peninsula Ventures contracted BrightFields, Inc. (BrightFields) to perform the RI and focused feasibility study (FFS) of the site. The site was approved by DNREC for Brownfields certification in November of 2003.

## **SITE DESCRIPTION AND HISTORY**

The site consists of approximately 16 acres located south of Industrial Street between East 7th Street and the Brandywine Creek in Wilmington, Delaware. It consists of four parcels of land located at 1170, 1155 and 1145 E. 7th Street and 801 Industrial Street. The City of Wilmington used the site and surrounding properties as a municipal landfill from the 1940s through the 1960s. Portions of the site were then overlain with ash from Wilmington's trash incinerators. The site parcels lay vacant until 1998, at which time Site Investigation and Restoration Branch (SIRB) conducted a Brownfields Preliminary Assessment (BPA) of the peninsula. Test pits and well boring logs indicated that the site properties are extensively filled with municipal waste, incinerator ash and slag, and construction debris to a depth of approximately ten feet, over Holocene marsh sediments.

While performing the field-testing for the BPA, one of the parcels, the Eagle property (tax parcel # 26-045.00-009) was found to contain drums and aboveground metal tanks with unknown contents. As a result, that property was referred to the United States Environmental Protection Agency (EPA), which performed a Removal Action from October 1998 to July 1999 under the name of the Wilmington Drum Site. Approximately 300 drums in various condition and 14 above ground storage tank containers were sampled, characterized, and removed from the property, along with nearly 300,000 pounds of dioxin-contaminated soils and tank contents, 90 gallons of waste corrosive acids, 200 pounds of asbestos-containing material, and 1,000 tons of nonhazardous waste soils. In the areas where drums and tanks were discovered, the shallow soils were removed and properly disposed in accordance with an EPA-approved removal action plan. The EPA using a combination of clean soil backfill, a geotextile fabric, and a vegetated topsoil layer then installed soil caps in those areas.

## **INVESTIGATION RESULTS**

Peninsula Ventures LLC (Peninsula Ventures) contracted BrightFields to conduct a remedial investigation (RI) of the site to determine whether the 16-acre site posed any risks to human health and the environment. The RI included the performance of 24 test pits with associated sampling of surface and subsurface soils, the collection and analysis of three sediment samples from the Brandywine River, and the installation and sampling of eight groundwater monitoring wells over the summer of 2003. The results of the RI are summarized below.

### ***Soils***

The analyses of soil samples indicated a wide range in soil quality over the four parcels, which is not unexpected given the past use of the properties as landfills. In general, soil quality was more contaminated in the northern and eastern portions of the site (on the Smith and Eagle properties), where most of the samples of surface soil and subsurface soil contained arsenic, iron, lead, and/or polynuclear aromatic hydrocarbons (PAHs) in concentrations above DNREC's Uniform

Risk-Based Standards (URS) for unrestricted use (such as residential use) as well as for restricted use (such as commercial and industrial use). Soil quality was generally least contaminated in the southern and western portions of the site (on the Wright-East and Wright-West properties), where most of the surface and subsurface soils did not contain those compounds in concentrations above DNREC's URS for either unrestricted use or restricted use.

BrightFields performed a site-wide risk screening assessment by averaging (computing the 95th percent upper confidence level (UCL) of the mean of) the concentrations of site contaminants over the four parcels. The 95 percent UCL values were entered into the SIRB Risk Calculator for restricted site use to yield a quantitative assessment of risks to human health. The site-wide carcinogenic risk value was  $2 \times 10^{-5}$ , which exceeds the allowable carcinogenic risk of  $1 \times 10^{-5}$  under Delaware's Hazardous Substance Cleanup Act (HSCA) regulations. The Hazard Quotient summing noncarcinogenic risks at the site was not calculated, because the carcinogenic risk already demonstrated a need for remedial action.

### *Sediments*

Selected metals, pesticides, and PAHs were detected in Brandywine Creek sediments at concentrations above the URS for the Protection of the Environment. However, a statistical assessment performed by BrightFields concluded that these basin-wide contaminants could not be demonstrated to have originated solely from the Peninsula Ventures properties or that the properties caused the exceedences.

### *Groundwater*

One volatile organic compound and seven semivolatile organic compounds were detected in the groundwater at very low concentrations, all of which were below the DNREC URS values (most of which are based upon promulgated maximum contaminant levels (MCL's)). The soil contaminants that were present at the highest concentrations in site soils (arsenic and PAHs) were not detected in the groundwater. The metals aluminum, iron, and manganese were detected at concentrations above their Secondary Maximum Contaminant Levels (SMCLs), which are not health-based but relate to the aesthetic qualities (taste, smell, staining, etc.) of drinking water. An elevated level of those metals in groundwater is characteristic of the shallow aquifer in the Wilmington vicinity.

BrightFields performed a site-wide risk calculation using the 95th percent upper confidence level of the mean of the detected organic compounds, resulting in a groundwater risk level of  $1 \times 10^{-5}$ . The carcinogenic risk does not exceed DNREC's allowable level, and the low concentrations of detected organic compounds were below MCLs, therefore groundwater does not present a risk to human health. Site groundwater is neither planned nor permitted for consumptive use. A mass loading evaluation was conducted by BrightFields to assess the impact of the discharge of groundwater to surface water, in which the concentrations of metals and organics in groundwater did not result in an unacceptable level of risk to surface water quality.

## REMEDIAL ACTION OBJECTIVES

According to HSCA Regulation 8-4(1), remedial action objectives must be established for all plans of remedial action. The regulations require that DNREC set objectives for land use, resource use, and cleanup levels that are protective of human health and environment.

The following remedial action objectives were determined to be appropriate for the site:

- Prevent the current and future human exposure to soil containing contaminants at concentrations above the HSCA risk level for carcinogenic compounds of  $1 \times 10^{-5}$  and a Hazard Index of one for non-carcinogenic compounds;
- Prevent the current and future human exposure to groundwater containing contaminants at concentrations above MCLs and the HSCA risk level for carcinogenic compounds of  $1 \times 10^{-5}$  and a Hazard Index of one for non-carcinogenic compounds;
- Minimize the potential for environmental impacts to the Brandywine Creek and to the Christina River due to the off-site migration of site contaminants in surface soils.
- Continue the use of public water for all purposes at the property and the surrounding area.

These objectives are consistent with the planned use of the site as commercial use, City of Wilmington zoning policies, state regulations governing water supply, and worker health and safety.

Based upon the RI results, BrightFields conducted a focused feasibility study (FFS) for the site to evaluate remedial alternatives by which to eliminate the current and future exposures to site contaminants present in site soils and groundwater at concentrations above regulatory levels. Using the above-listed remedial action objectives, the FFS evaluated several remedial action alternatives, including: (1) no action; (2) capping the site; and (3) removal and off-site disposal of all landfilled materials and contaminated soil.

Based on the remedial action objectives and the FFS evaluation, the remedial approach of pathway elimination will be used to insure the following:

1. To prevent human contact and exposure to surface soils contaminated by metals and PAHs, which were found to be present at concentrations above their respective restricted-use URS values.
2. To prevent the erosion and transport of contaminated surface soils into the waterways adjacent to the site.
3. To prevent future exposures to subsurface soil through the use of institutional controls (deed restriction prohibiting land-disturbing activities).
4. To prevent the future use of site groundwater through the use of institutional controls, including deed restriction or notation prohibiting groundwater wells, in addition to the continued maintenance of the area-wide Groundwater Management Zone (GMZ).

## PROPOSED PLAN OF REMEDIAL ACTION

The FFS evaluation determined that Site Capping with Institutional Controls best attained the proposed remedial action objectives and was the most cost-effective and easily implemented at the site. The Remedial Action will be implemented as described below:

### *Surface Soils*

1. A soil cap shall be installed over the surface of the entire four-parcel site, consisting of clean fill material at a minimum thickness of two feet. Soil proposed for fill shall be documented by laboratory analysis to be free from contaminants prior to being transported to the property. A geotextile marker fabric shall be installed in two places as a visual demarcation of areas where existing soils contain contaminants above action levels determined in a risk assessment (165 mg/kg arsenic and/or 27 mg/kg benzo(a)pyrene) in order to protect construction workers from future exposure to the soils. A DNREC-approved Erosion and Sediment (E&S) Control Plan and stormwater management will be in place prior to any land-disturbing activities at the site.
2. An additional one foot of clean soil shall be placed over the areas previously capped by the EPA in order to bring those areas up to surrounding grade and to meet the specifications for the two-foot thickness of the soil cap. Note that the pre-existing EPA caps included a geotextile fabric layer as a part of their construction specifications.
3. The soil cap may be modified by future site only under the conditions described in "Future Site Development," below.
4. A DNREC-approved Operation & Maintenance (O&M) plan shall be developed and submitted to DNREC within 90-days of the signed final plan. The O&M plan will specify the requirements for the inspection and maintenance of the vegetated soil-capped areas and of the 40-foot building setback to ensure the continued protection of human health and the environment.

### *Subsurface Soil*

1. The placement of two feet of clean fill on the surface will render the existing surface soils on the property subject to regulation as subsurface soil. As such, only two sample locations contain contaminants above levels shown to pose a potential risk to future site construction workers who might be exposed to the subsurface soils. In those two areas, a visible marker fabric shall be placed **prior to the placement of the clean fill**.
2. A written restriction shall be placed upon the deeds of the properties comprising the site within 90-days following DNREC's adoption of the final plan of remedial action. The soil-related aspects of the deed restriction will: (a) prohibit all land-disturbing activities (including, but not limited to, digging, drilling, excavating, grading, earth moving, constructing) on the site without the prior written approval of the DNREC-SIRB, excepting disturbance of the newly placed clean soil cover; and (b) prohibit current and future residential land use of the property without the prior written consent of the DNREC-SIRB; and (c) require written approval from DNREC prior to any modification of the EPA-capped areas.

### *Future Site Development*

1. Future development of the parcels comprising the Peninsula Ventures site will ultimately result in the placement of impervious materials, such as buildings and paved parking areas, over most of the site. No construction activities will occur on site without DNREC's prior written approval.
2. Within 30-days of the issuance of the signed final plan, the site developer must submit a Contaminated Materials and Water Management Plan (CMWMP) to DNREC-SIRB for the proposed development. The CMWMP will provide the plans for the proper on-site management and off-site disposal of excavated soils and site worker Health and Safety Plans per OSHA regulations. Excavated site soils shall be managed in a manner which mitigates risks to human health and the environment including, but not limited to, the on-site containment of soils posing risks above  $1 \times 10^{-5}$  carcinogenic risk or a HI of one underneath the soil cap or proposed site structures and parking lots, evaluating the potential need for vapor barriers, other engineering controls, or other actions deemed appropriate by DNREC based upon actual conditions encountered during construction.

The CMWMP must also include contingencies for interim response actions and procedures to be followed in the event that site development should encounter unforeseen environmental conditions such as underground storage tanks (USTs), drums or drum fragments, subsurface free product, impacted groundwater, volatile organic vapors, etc. The developer shall only conduct these activities with prior written approval from the Department. In accordance with the CMWMP, these remedial actions may occur at the site during construction activities:

- Any excavated site soils identified to contain contaminants with a collective cancer risk above the HSCA action level of  $1 \times 10^{-5}$  shall be placed under the soil cap or permanent structures or disposed off-site at an approved waste facility.
  - Removal and proper management of contaminated soil and groundwater generated during site preparation activities may include, but not be limited to, utility construction and repair, environmental and geotechnical investigation, temporary capping (for roadway and parking lot construction), and installation of stormwater and erosion controls. All material generated during these activities will be managed per the DNREC-approved CMWMP.
  - DNREC's Tank Management Branch (TMB) in accordance with the applicable TMB regulations will address removal and proper management of petroleum-contaminated materials or underground storage tanks (USTs) that are encountered during construction activities at the site.
  - If any suspect waste materials are encountered during any land-disturbing activities, the site contractor **shall immediately stop** work and contact the DNREC-SIRB. Additional remedial activities will be performed in accordance with the CMWMP.
3. Prior to the issuance of building permits, DNREC-SIRB shall also be contacted to review and approve site-specific plans depicting the planned site layout, the proposed locations of utility corridor excavations, and to ensure that sediment/erosion control methods are included in the site development.

4. Future site use is limited at this time to a restricted (commercial or industrial) land use in accordance with the current zoning under the City of Wilmington's zoning ordinance.

### ***Groundwater***

1. The Peninsula Ventures site is included within the City of Wilmington's groundwater management zone (GMZ), which will be maintained at the site. The GMZ is an internal DNREC document restricting the use of groundwater at the site. A deed restriction shall be placed upon the deeds of the properties comprising the site within 90-days following DNREC's adoption of the final plan to prohibit the installation of any water well on, or use of groundwater at, the site without the prior written approval of DNREC, as well as note that the site is located within a GMZ.
2. The DNREC-approved O&M plan that will be developed and submitted to DNREC within 90-days of the signed final plan shall specify the requirements for the monitoring of the site groundwater pursuant to the remedy. Because of the historic use of the site as a landfill, monitoring of the groundwater shall be required once during the five year Remedy Review to document that conditions remain the same and the site does not adversely influence public health or ecological receptors.

It should be noted that the Groundwater GMZ for Wilmington is already established, and the placement of clean fill (Surface Soil Item 1) has been approved as an interim remedial action at the site.

If you have any questions or concerns regarding the Peninsula Ventures site, or if you would like to review the reports or other information regarding the site, please contact the project manager, Elizabeth Rogers, 391 Lukens Drive, New Castle, Delaware 19720, or at 302.395.2600.

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John Blevins  
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Date of Review