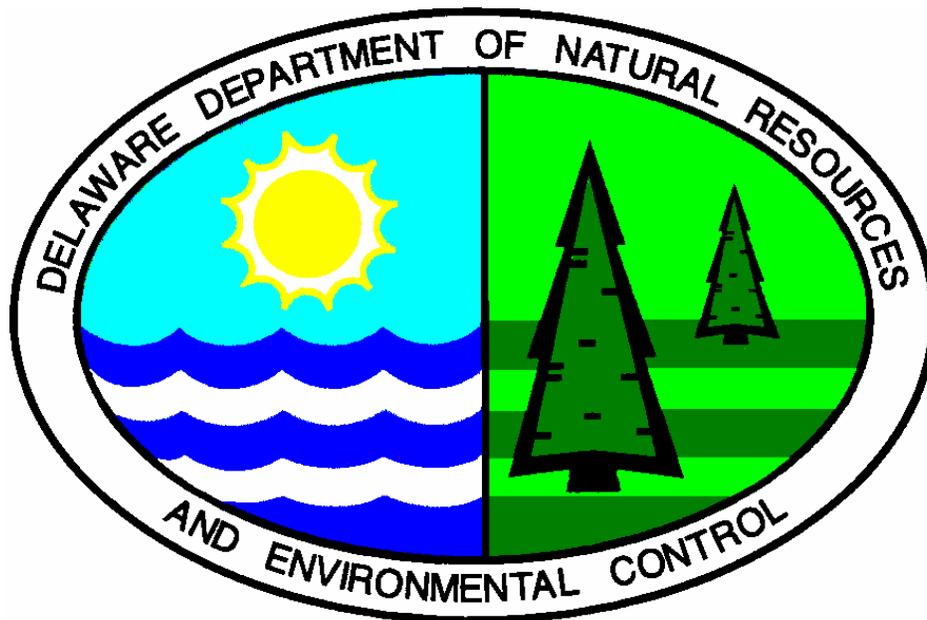


# FINAL PLAN OF REMEDIAL ACTION

201 / 205 A Street  
Wilmington, DE

DNREC Project No. DE 1228



December 2001

Delaware Department of Natural Resources and Environmental Control  
Division of Air and Waste Management  
Site Investigation & Restoration Branch  
391 Lukens Drive  
New Castle, Delaware 19720

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## **I. INTRODUCTION**

The Site is located along the southern bank of the Christina River in Wilmington, Delaware (Figures 1 & 2). The Site is bordered on the north by the Christina River, on the west by a parking lot (200 S. Market Street) on the east by 207 A Street, and on the south by A Street. In order to determine the potential for environmental liability prior to the purchase of the Site, the Riverfront Development Corporation (“RDC”) entered into the Department of Natural Resources and Environmental Control, Site Investigation and Restoration Branch’s (“DNREC-SIRB’s”) Voluntary Cleanup Program (“VCP”) under the provisions of the Delaware Hazardous Substance Cleanup Act, 7 Del. C. Chapter 91 (“HSCA”). Through a VCP Agreement, RDC agreed to investigate the potential risks posed to the public health, welfare, and the environment at the Site. RDC contracted EA Engineering, Science and Technology, Inc. (“EA”) to perform a Remedial Investigation (“RI”) of the Site.

The purpose of the RI was to: 1) collect additional information from the Site to refine Site knowledge from previous investigations; 2) delineate and determine the extent of petroleum contamination, and its possible migration and environmental impacts; and 3) determine the level of risk posed by the contaminants, and based upon this analysis, evaluate remedial alternatives.

This document represents the Department’s Final Plan of Remedial Action (“Final Plan”) for the Site. It is based on the results of the previous investigations performed at the Site, the Proposed Plan of Remedial Action (“Proposed Plan”), and public comments to the Proposed Plan. This Final Plan is issued under the provisions of the HSCA and the Regulations Governing Hazardous Substance Cleanup (“Regulations”). It presents the Department’s assessment of the potential health and environmental risks posed by the Site.

As described in Section 12 of the Regulations, DNREC-SIRB provided notice to the public and an opportunity for the public to comment on the Proposed Plan. No comments were received. The Proposed Plan will thus be adopted as the Final Plan. The Final Plan designates the selected remedy for the Site. All previous investigations of the Site, the Proposed Plan, and the Final Plan will constitute the Remedial Decision Record for the Site.

Section II presents a summary of the Site description and history. Section III provides a description of the RI results. Section IV presents a discussion of the Remedial Action Objectives. Section V contains the Proposed Plan of Remedial Action. Section VI discusses public participation requirements. Section VII presents the Final Plan of Remedial Action, and Section VIII presents the Director’s declaration.

## **II. SITE DESCRIPTION AND HISTORY**

### *Site Setting*

The Site is located along the southern bank of the Christina River in Wilmington, Delaware (Figures 1 & 2). The Site is bordered on the north by the Christina River, on the west by a parking lot (200 S. Market Street) on the east by 207 A Street, and on the south by A Street. The Site is part of a larger property, which consists of three parcels: 201 A Street, 205 A Street, and 207 A Street, which in total encompasses 3.58 acres. However, 207 A Street, which consists of 1.76 acres, was assessed as part of

a separate investigation and is not part of the Site. The remaining two parcels (combined as tax parcel number 26-050.00.005) constitute the 201/205 A Street Site, which is approximately 1.82 acres in size. The Christina River Club Restaurant and a warehouse are located on the Site. The remainder of the Site is utilized as a paved parking lot. The surrounding land use is generally light industrial and commercial.

### *Site and Project History*

EA, through a review of historical aerial photographs, United States Geologic Survey topographic maps, historical Sanborn fire insurance maps and city directories, investigated the historical use of the Site. The 1887 and 1893 Sanborn maps indicated that the Site was used as a planing mill, coal and lumberyard, and was owned by the Cold Spring Ice and Coal Company. By the 1920's, the Site was occupied by the American Oil Company, and contained an aboveground storage tank farm, several small buildings and railroad sidings. The American Oil Company continued to operate at the property until the 1980's.

The RDC entered into a VCP Agreement in 2001 with DNREC-SIRB to perform a RI. The objectives of the RI were to evaluate potential risks to human health, welfare and the environment posed by the Site.

## **III. INVESTIGATION RESULTS**

EA conducted a Phase II investigation at the Site in October 1999, which consisted of direct push soil and groundwater sampling. Subsurface soil samples were collected from five direct push soil borings at the Site. Groundwater samples were collected from temporary monitoring wells constructed in three of the soil boring locations.

Subsequent to the Phase II investigation, an RI was conducted in April and May 2001 by EA, in which soil samples were collected from a total of seven soil borings, with groundwater samples collected from permanent monitoring wells constructed in three of the soil boring locations.

The samples were analyzed for contaminants listed on the Target Analyte List and the Target Compound List ("TAL/TCL"). The analytical results were first compared to the DNREC-SIRB Uniform Risk Based Remediation Standards ("URS") in a non-critical water resource area, using the unrestricted use risk scenario as a screen in order to determine potential contaminants of concern ("COCs"). Those chemicals whose concentrations exceeded the unrestricted use URS were selected as COCs and included in a human health risk assessment and ecological risk assessment screening.

The only volatile organic compound (VOC) detected above the unrestricted use URS values was benzene in two Phase II soil boring locations. Benzene was detected at concentrations of 3.4 milligrams per kilogram ("mg/kg") from the soil sample collected from soil boring location B-4, and 1.2 mg/kg from the soil sample collected from location B-9 (URS value of 0.8 mg/kg). However, concentrations of benzene did not exceed the unrestricted URS value in 83% of the soil samples collected. In accordance with the 75%/10X rule outlined in DNREC-SIRB's *Remediation Standards Guidance*, attainment of guidance criteria can be demonstrated if sample concentrations from at least 75% of the samples (from the same media) fall below the respective URS value for the contaminant in question, with no single result exceeding the URS value by a factor of 10.

Subsurface soil samples from eleven Phase II and RI soil boring locations contained one or more polynuclear aromatic hydrocarbons (“PAHs”) at concentrations exceeding the respective unrestricted use URS values. Benzo(a)pyrene exceeded the unrestricted use URS value of 0.09 mg/kg in eleven locations, with concentrations ranging up to 7.1 mg/kg. Other PAHs detected in subsurface soils at concentrations in exceedence of the respective unrestricted URS values include benzo(a)anthracene (up to 6.9 mg/kg; URS of 0.9 mg/kg), benzo(b)fluoranthene (up to 7.7 mg/kg; URS of 0.9 mg/kg), dibenz(a,h)anthracene (up to 1.3 mg/kg; URS value of 0.09 mg/kg), and indeno(1,2,3-cd)pyrene (up to 3.3 mg/kg; URS of 0.9 mg/kg). The highest concentrations of each of the above compounds were detected in samples collected from soil boring B-4, located along the 205/207 A Street parcel boundary. However, all of the contaminant concentrations were below the respective restricted use URS values.

Arsenic and iron exceeded their unrestricted use URS value of 0.4 mg/kg and 2,300 mg/kg, respectively, in every soil sample, at concentrations ranging up to 30.7 mg/kg and 58,000 mg/kg, respectively. However, all of the contaminant concentrations were below the respective restricted use URS values.

The results of the Phase II investigation identified several metals and PAH compounds at concentrations exceeding the respective groundwater URS values. However, due to the sampling method utilized, these groundwater samples contained a high level of suspended fine sediment, and were not considered to be valid data and were not representative of groundwater quality. The RI, which utilized permanent monitoring wells, did have valid groundwater data which did not detect any PAH compounds.

Each of the three RI groundwater samples contained arsenic (up to 63 micrograms per liter [“µg/L”], MW-2), iron (up to 28,000 µg/L, MW-3) and manganese (up to 819 µg/L, MW-3) above their respective groundwater URS values. Both the iron and manganese values are based upon drinking water Secondary Maximum Contaminant Level (SMCL) standards of 300 µg/L and 50 µg/L, respectively, and represent non-enforceable aesthetic standards. Further, public water is available in this area, and a Groundwater Management Zone restricting use of groundwater in Wilmington is presently in place, both of which prevent human exposure to Site groundwater.

A risk assessment was performed, assuming a restricted use risk setting, and development of the Site into a multi-story office building. The risk assessment was performed in order to evaluate the cumulative risk associated with the exposure to soil and ingestion of groundwater on the site. Contaminants identified as COCs and retained for inclusion in the human health risk assessment include: benzo(b)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, benzo(a)anthracene, iron, manganese and arsenic. The calculations were conducted using the DNREC Site-Specific Calculator for Multiple Analytes (DNREC May 2000 version). The planned future use of the Site consists of construction of a multi-story office complex. As such, the only completed exposure pathway consisted of incidental ingestion of soils. The soil cumulative risk was calculated to be  $4 \times 10^{-6}$ , which is below the HSCA action level of  $1 \times 10^{-5}$ , and a hazard quotient that was below 1.0. Therefore, the soil does not pose an unacceptable risk to human health assuming a restricted use setting.

Due to the Site’s location along the Christina River, it was necessary to assess what potential impacts, if any, the Site could pose to the environmental health of the river. The Site will remain paved and will be re-developed, and the existing bulkhead will be maintained, thus precluding erosion of Site soils into the river. Groundwater loading values were also calculated to evaluate the possible effects of

groundwater discharge into the Christina River. Loading values for all organic and metallic analytes detected in groundwater during both the Phase II and RI investigations were calculated based upon the measured groundwater flow rate at the Site and the flow rate of the Christina River. Based upon these calculations, it was determined that there would be no exceedences of Delaware's Surface Water Quality Standards by the discharge of Site groundwater into the Christina.

#### **IV. REMEDIAL ACTION OBJECTIVES**

According to Section 8.4 (1) of the Regulations, site-specific Remedial Action Objectives ("RAO") must be established for all Plans of Remedial Action. The Regulations provide that DNREC-SIRB set objectives for land use, resource use and cleanup levels that are protective of human health and the environment.

Qualitative objectives describe in general terms what the ultimate result of the remedial action, if necessary, should be. The following qualitative objectives are determined to be appropriate for the Site:

- Prevent residential exposure to impacted media;
- Minimize potential exposure to Site contaminants of concern for construction workers at the Site;
- Prevent environmental impacts, specifically to the Christina River, due to impacted media at the Site; and
- Continue the use of public water for all purposes to the surrounding community;

These objectives are consistent with the current use of the Site as commercial in an urban setting, New Castle County zoning policies, state regulations governing water supply and worker health and safety.

Based on the qualitative objectives, the quantitative objectives are:

1. Prevent human exposure to soils and groundwater contaminated by VOCs, PAHs, and metals that would result in a carcinogenic risk exceeding  $1 \times 10^{-5}$  or a hazard index of 1.0.
2. Prevent discharge of groundwater contaminated by VOCs, PAHs, and metals into the Christina River above Delaware Surface Water Quality Standards.

#### **V. PROPOSED PLAN OF REMEDIAL ACTION**

The preferred remedy conveyed in the Proposed Plan for the 201/205 A Street Site consisted of the following elements:

- Maintain the existing bulkhead along the Christina River, and contain the existing soils at the Site so as to prevent their erosion into the Christina River;

- Placement of a deed restriction on the property: 1) limiting the Site to non-residential uses; 2) prohibiting any digging, drilling, excavating, grading, constructing, earth moving, or any other land disturbing activities on the property (including the bulkhead) without the prior written approval of the DNREC-SIRB; and 3) prohibiting the installation of any water well on, or use of groundwater at the Site, without the prior written approval of DNREC-SIRB; and
- Placement of a Groundwater Management Zone (“GMZ”) and deed restriction at the Site to prevent future use of the groundwater beneath the Site without prior approval of DNREC-SIRB and the DNREC Division of Water Resources.

## **VI. PUBLIC PARTICIPATION**

The Department provided public notice of its Proposed Plan of Remedial Action for the 201/205 A Street Site in The News Journal on October 21, 2001. The comment period began on October 21, 2001, and ended at the close of business (4:30 p.m.) on November 12, 2001. The Department received no comments from the public on the Proposed Plan.

## **VII. FINAL PLAN OF REMEDIAL ACTION**

Based upon the information and results of the investigations performed at the 201/205 A Street Site, DNREC-SIRB has determined that the preferred remedy conveyed in the Proposed Plan should be adopted as the Final Plan, and be implemented.

## **VIII. DECLARATION**

This Final Plan of Remedial Action for the 201/205 A Street Site is protective of human health, welfare and the environment, and is consistent with the requirements of the Delaware Hazardous Substance Cleanup Act.

\_\_\_\_\_  
Date

\_\_\_\_\_  
John Blevins, Director  
Division of Air and Waste Management

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**Figures 1 & 2 from Remedial Investigation Report**

**Prepared by EA Engineering, Science and Technology, Inc., August 2001.**

**Figure 1: Site Location/Topographic Map**

**Figure 2: Sampling Locations**