

# PROPOSED PLAN OF REMEDIAL ACTION

200 South Market Street  
Wilmington, DE

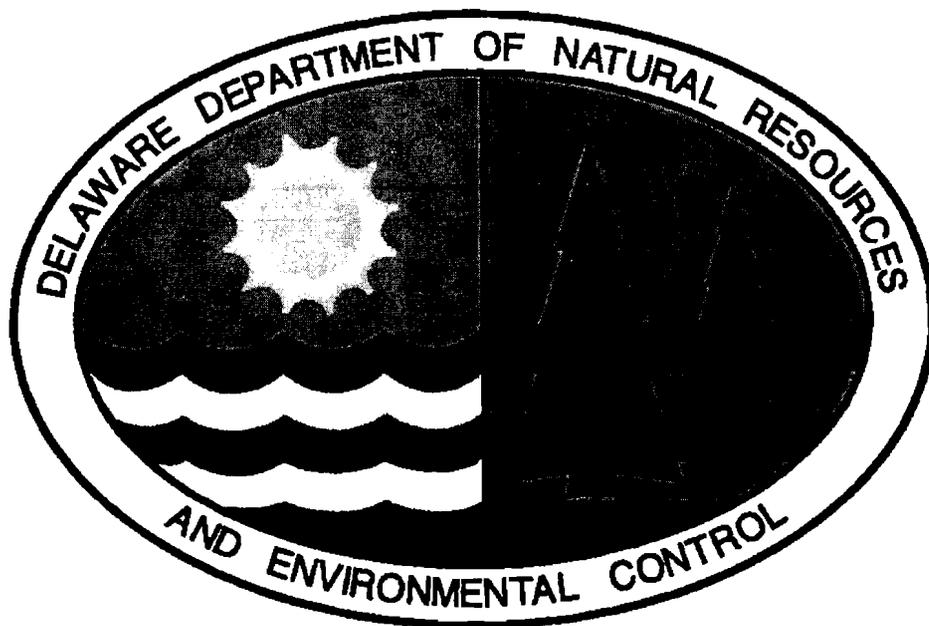
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Delaware Department of Natural Resources and Environmental Control  
Division of Air and Waste Management  
Site Investigation & Restoration Branch  
391 Lukens Drive  
New Castle, Delaware 19720

## TABLE OF CONTENTS

<b>I. INTRODUCTION .....</b>	<b>1</b>
<b>II. SITE DESCRIPTION AND HISTORY .....</b>	<b>1</b>
SITE SETTING .....	1
SITE AND PROJECT HISTORY .....	2
<b>III. INVESTIGATION RESULTS .....</b>	<b>2</b>
SUBSURFACE SOIL .....	2
SURFACE SOIL .....	3
GROUNDWATER .....	3
SEDIMENT .....	4
RESULTS AND RELATIVE RISK .....	4
<b>IV. REMEDIAL ACTION OBJECTIVES .....</b>	<b>5</b>
<b>V. PROPOSED PLAN OF REMEDIAL ACTION .....</b>	<b>5</b>
<b>VI. PUBLIC PARTICIPATION .....</b>	<b>6</b>

## LIST OF FIGURES

Figure 1: Site Location/Topographic Map .....	8
Figure 2: Sampling Locations.....	9

## **I. INTRODUCTION**

The 200 S. Market Street Site (“Site”) is located on the southern bank of the Christina River in Wilmington, Delaware and occupies 4.66 acres. The site is generally bounded by A Street to the South, the Christina River Club Restaurant to the east, Market Street to the west, and the Christina River to the north (Figure 1). 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. 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 and combine information from previous environmental investigations; 2) delineate and determine the extent of petroleum contamination, and its possible migration and environmental impacts; 3) determine the level of risk posed by the contaminants, and based upon this analysis, evaluate remedial alternatives.

This document is the Department’s Proposed Plan of Remedial Action (“Proposed Plan”) for the Site. It is based on the results of the RI performed at the Site. This Proposed Plan is issued under the provisions of the HSCA and the Delaware Regulations Governing Hazardous Substance Cleanup (“Regulations”). It presents the Department’s assessment of the potential health and environmental risk posed by the Site.

As described in Section 12 of the Regulations, DNREC-SIRB will provide notice to the public and an opportunity for the public to comment on the Proposed Plan. After the comment period concludes, DNREC-SIRB will review and consider all of the comments received and issue a Final Plan of Remedial Action (“Final Plan”). The Final Plan will designate the selected remedy for the Site. The RI, the Proposed Plan, the comments received from the public, DNREC-SIRB’s responses to those comments, and the Final Plan will constitute the Remedial Decision Record.

Section II presents a summary of the Site description, history and previous investigations of the Site. Section III provides a description of the RI results. Section IV presents a discussion of the Remedial Action Objectives. Section V presents the Proposed Plan of Remedial Action. Section VI discusses public participation requirements.

## **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 generally bounded by A Street to the south, the Christina River Club Restaurant to the east, Market Street to the west, and the Christina River to the north. The Site encompasses 4.66 acres and consists of parcel #26-050.00-006 on the tax maps of New Castle County, Delaware.

Currently, the Site is paved and serves as a commercial parking lot operated by Colonial Parking. The surrounding land use is generally light industrial and commercial.

### *Site and Project History*

EA, through a review of aerial photographs, United States Geologic Survey (USGS) topographic maps (Figure 1), historical fire insurance maps and city directories investigated the historical use of the Site. The 1887 and 1893 maps indicated that the Site was used as a coal and lime yard, and a carriage works. By the 1920s, the Site was used as a sand and gravel yard, and International Harvester Company garage and warehouse. Additionally, several railroad sidings were present on Site. The American Oil Company continued to operate on the Site into the 1980s.

The RDC entered into a VCP Agreement in March 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**

In January 2000, EA conducted a Phase II investigation, which consisted of direct push soil and ground water sampling. Subsurface soil samples were collected from five direct push soil borings (B-1, B-2, B-3, B-5 and B-9) within the subject property. The groundwater samples were collected from temporary wells constructed in four of the five direct push soil borings located throughout the site (W-1, W-2, W-3, and W-4). In accordance with Subsection 8.3 of the Regulations, DNREC-SIRB accepted the January 2000 Phase II investigation as part of the RI. In April 2001, EA collected soil samples from a total of five subsurface soil borings (GP-1, GP-2, GP-3, GP-4, and GP-5) with groundwater samples collected from monitoring wells constructed in three of the five soil boring locations (MW-1, MW-2 and MW-3) along with one shallow surface soil sample (SS-1) and three sediment samples (SD-1, SD-2 and SD-3) from the Christina River, adjacent to the Site. The following summarizes the findings of both the Phase II investigation and the RI. (See Figure 2 for sample locations.)

### *Subsurface Soil*

Based upon the definition provided in the Remediation Standards Guidance under HSCA, the Site is set in a non-critical water resource area. Comparisons with the DNREC Uniform Risk-Based Remediation Standards ("URS") are for unrestricted use in a non-critical water resource area. All subsurface soil samples contained arsenic and iron in concentrations in excess of the unrestricted URS values. Manganese was detected at concentrations above the unrestricted URS value in the soil samples collected from B-1, B-2, B-3, and B-5. Lead exceeded the unrestricted URS value in subsurface soil samples from GP-3 and B-3. Aluminum was detected above the unrestricted URS value in subsurface soil samples collected from B-2, B-3, B-5 and B-9. Copper exceeded the unrestricted URS value in the subsurface soil sample from B-3. Subsurface soil sample, GP-3, exceeded the unrestricted URS value for antimony.

Subsurface soil samples from B-3, B-9, GP-2 and GP-3 contained benzo(a)anthracene in excess of the unrestricted URS values. Subsurface soil samples from GP-2, GP-3, GP-4, GP-5, B-2, B-3, B-5 and B-9 exceeded the unrestricted URS value for benzo(a)pyrene. The unrestricted URS value for benzo(b)fluoranthene was exceeded in samples B-3, B-9, GP-2 and GP-3. Indeno(1,2,3-cd)pyrene was

detected above the unrestricted URS value in subsurface soil samples collected from GP-2 and GP-3. Subsurface soil samples GP-2, GP-3, GP-4, B-2, B-3, B-5 and B-9 exceeded the unrestricted URS value for dibenzo(a,h)anthracene. Subsurface soil sample GP-3 exceeded the unrestricted URS value for benzo(k)fluorene.

No volatile organic compounds (“VOCs”), pesticides, or polychlorinated biphenyls (“PCBs”) were detected at concentrations exceeding the respective DNREC unrestricted URS values from the subsurface soil samples collected during the RI.

### *Surface Soil*

The Site is almost completely covered with asphalt paving, with a small grassy strip in the northern portion of the property. Based upon Site conditions, only one surface soil sample was collected and submitted for laboratory analysis. Iron and arsenic exceeded their respective unrestricted URS values.

No VOCs, semivolatile organic compounds (“SVOCs”), pesticides, or PCBs were detected at concentrations exceeding the unrestricted URS values from the surface soil sample collected during the RI.

### *Groundwater*

The results of the RI identified several metals and polynuclear aromatic hydrocarbons (“PAH”) compounds at concentrations exceeding their respective groundwater URS values. However, the results may have been biased high due to the sampling method used. The original groundwater samples were collected using a Geoprobe® and were noted as turbid during sampling. Therefore, permanent monitoring wells were constructed.

Groundwater samples from MW-1, MW-3, W-1, W-2, W-3 and W-4 exceeded the arsenic URS value for non-critical water resource area and for Protection of Human Health. Barium was detected at concentrations greater than the URS values in the groundwater samples collected from MW-2, W-1, W-2, W-3, and W-4. Manganese was detected in groundwater at concentrations greater than the URS value in samples collected from MW-1, MW-2, MW-3, W-1, W-2, and W-4. Groundwater samples collected from MW-1, MW-2, MW-3, W-1, W-2, and W-4 exceeded the URS value for iron. Aluminum and lead were detected at a concentration greater than the URS value in the groundwater sample collected from W-3. Benzo(a)anthracene, benzo(b)fluoranthene, and benzo(a)pyrene were detected above their URS values in MW-1 and W-1. Dibenzofuran and carbazole exceeded the URS values in samples collected from MW-3 and W-1. Bis(2-ethylhexyl)phthalate was detected above the URS value in the groundwater samples from MW-1 and MW-2. Benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene were only detected above their URS values in the groundwater sample from W-1. No other analyte for VOCs, SVOCs, pesticides, PCBs, and/or metals were detected at concentrations exceeding the respective DNREC URS values from the seven groundwater samples.

## *Sediment*

Sediment samples collected as part of the RI served to characterize the sediment conditions in the Christina River adjacent to the Site. Barium, cadmium, copper, lead, mercury and zinc exceeded the URS value for the Protection of the Environment in all 3 sediment samples. Nickel and chromium were detected above the URS value in sample SD-1. Arsenic exceeded the URS value in samples SD-1 and SD-2. Naphthalene, phenanthrene, anthracene, fluoranthene, benzo(a)anthracene, bis(2-ethylhexyl)phthalate, chrysene, and benzo(a)pyrene exceeded the URS for the Protection of the Environment in all 3 sediment samples. Only sample SD-1 exceeded the URS values for fluorene, bis(2-ethylhexyl)phthalate, benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene. No other analytes from the three sediment samples were detected at concentrations exceeding the DNREC URS values.

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-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 value were selected as COCs and included in a human health risk assessment and ecological risk assessment screening.

## *Results and Relative Risk*

The results of the January 2000 Phase II investigation identified several metals and PAH compounds at concentrations exceeding their respective groundwater URS values. However, due to the sampling method utilized, these groundwater samples contained a high level of suspended fine sediment. The RI utilized permanent monitoring wells. The groundwater results of the permanent monitoring wells indicated that several metals and SVOCs were elevated above the respective URS Values for non-critical water resource area. However, 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 exposure to Site groundwater.

A human health 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, dibenzo(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 only completed exposure pathway consisted of incidental soil ingestion. Based on the assessment of noncancer risks to construction workers from the incidental ingestion of chemicals in total soil and dermal contact with total soil, the risk is acceptable. The soil noncancer risk or Hazard Index was calculated to be 0.436, which is below the HSCA action level of 1.0. The soil cancer risk was calculated to be  $1.3 \times 10^{-5}$ , which is above the HSCA action level of  $1 \times 10^{-5}$ . However, COCs were found at appreciably higher concentrations in one soil sample collected from GP-3 (0-2 ft. below ground surface) during the RI. This is indicative of a potential localized "hot spot". Soil removal in the hot spot will reduce the soil cancer risk to an acceptable level.

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. At the present time, as well as in the planned future, the Site will remain paved and developed. 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, and the tidal components of the Christina River, the resulting concentrations entering into the river would be below the Delaware Surface Water Quality Standards.

#### **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. Remedial options were evaluated utilizing the Qualitative and Quantitative Objectives and the following considerations:

- The property will be redeveloped into a commercial office building with a parking lot, and sidewalks;
- The surrounding land use is to remain commercial and industrial;
- The Site is bordered by the Christina River with a bulkhead acting as a physical barrier between the Site and the river;
- The risk posed to future construction workers through exposure to contaminated soil; and
- The risk posed to human health through the ingestion of contaminated groundwater.

Based on the qualitative objectives, the quantitative objectives are:

1. Prevent human exposure to soils and groundwater contaminated by PAHs and metals that would result in a carcinogenic risk exceeding  $1 \times 10^{-5}$ .

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

Three remedial options were evaluated for their ability to accomplish the Remedial Action Objectives:

ALTERNATIVE 1: No Further Action;

ALTERNATIVE 2: Removal of "hot spot" and containment of remaining affected material; maintenance of the bulkhead and contain the existing soils at the Site, so as to prevent their erosion into the Christiana River; and placement of a deed restriction on the property limiting the site to non-residential uses; prohibiting any digging, drilling, excavating, grading, constructing, earth moving, or any other land disturbing activities on the property including bulk head and prohibiting the use of groundwater without DNREC-SIRB's prior written approval; or

ALTERNATIVE 3: Removal and off-site disposal of all soils with detected concentrations exceeding DNREC unrestricted use URS criteria.

Only Alternatives 2 and 3 meet DNREC requirements for an appropriate remedy for this Site. Removal and containment of the affected soil is expected to offer sufficient protection to the public and to the environment. A risk exists only if there is a source, a pathway, and a receptor. If any of the three components of risk are eliminated, the risk is eliminated. By implementing Alternative 2, the expected pathway to the impacted source will be eliminated; therefore, implementing Alternative 2 will eliminate the risk. Additionally, Alternative 2 is expected to offer adequate protection to the public/environment at significantly less cost than Alternative 3. Thus, the Proposed Plan for the 200 S. Market Street Site is Alternative 2.

## **VI. PUBLIC PARTICIPATION**

The Department actively solicits public comments or suggestions on the Proposed Plan of Remedial Action and welcomes opportunities to answer questions. Please direct written comments to:

DNREC Site Investigation and Restoration Branch  
391 Lukens Drive  
New Castle, Delaware 19720  
Attention: Kristen Thornton

The comment period begins on December 17, 2001, and ends at the close of business (4:30 p.m.) January 7, 2002. If so requested, a public hearing will be held on the Proposed Plan. The hearing time and place will be announced if said hearing is requested.

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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**

APPROXIMATE GRAPHIC SCALE: 1 INCH = 24,000 FT



Figure 1-1. Site location map, 200 South Market Street, Wilmington, Delaware. (Source: USGS 7.5 Minute Series Topographic Map, Wilmington South Quadrangle, DE)

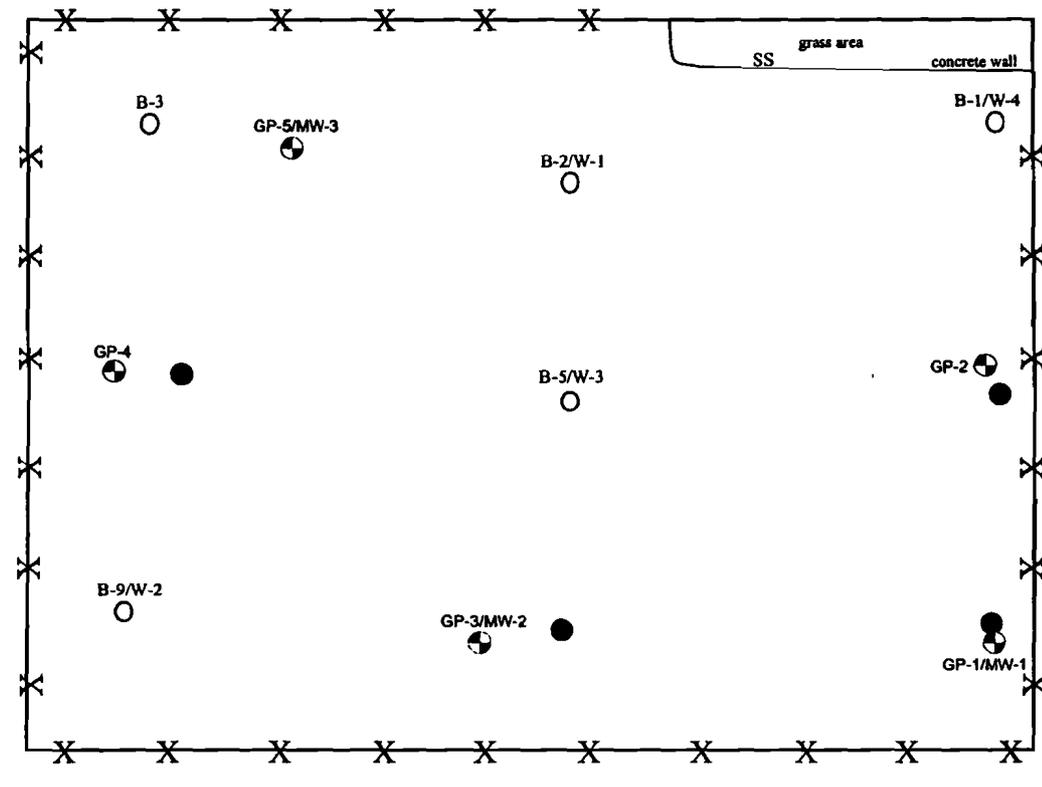


**Figure 2: Sampling Locations**



CHRISTINA RIVER

SOUTH MARKET STREET



A STREET

**LEGEND**

- Phase II Subsurface Soil and Ground-Water Sample Location
- Phase II Refusal Soil Boring Locations (approximate locations)
- ⊕ RI Subsurface Soil and Ground-Water Sample Locations
- SS RI Surface Soil Sample Location

Figure 1-2. Site sketch of 200 South Market Street, Wilmington, DE showing approximate locations of the Phase II sample locations, and the RI sample locations.

