AMENDED
FINAL PLAN OF REMEDIAL ACTION

201 / 205 A Street
Wilmington, DE

DNREC Project No. DE-1228

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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

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1.0 INTRODUCTION

The 201/205 A Street property (site) is located on the southern bank of the Christina River in Wilmington, Delaware. The site is bordered on the west by a parking lot (200 S. Market Street), on the south by A Street, and on the east by a parking lot for the Christina River Club (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's (DNREC) 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.

The original proposed plan of remedial action (original proposed plan) the 201/205 A Street site was issued for public comment on October 21, 2001. The public comment period ended on November 12, 2001. No comments were received by DNREC. Thus, the proposed plan was adopted as the final plan of remedial action (final plan) on January 31, 2002. Because the owner of the site changed the intended future use of the property after the proposed plan was issued, DNREC determined that it was necessary to issue an amended proposed plan of remedial action (amended proposed plan) to account for this change in the use of the site. The amended proposed plan was issued for public comment on October 21, 2002. The public comment period ended on November 12, 2002, no comments were received by DNREC. Since the possible design and construction plans for the site requires raising the overall grade of the site from the present elevation, RDC has requested that DNREC revise the final plan to take into account the new construction plans. As a result, DNREC has determined that was necessary to issue the second amended proposed plan of remedial action (second amended proposed plan). The second amended proposed plan was issued on July 21, 2003, and the comment period expired on August 11, 2003. No comments were received.

In August 2002, RDC approached DNREC with a request to change the proposed development of the property from commercial/industrial to urban residential (i.e., apartment/condominium). At DNREC's request, RDC agreed to perform an updated risk assessment of the property to take into account the proposed change in land use. The updated risk assessment concluded that elevated risks to human health are posed by soil contamination at the site. DNREC has determined that the initial proposed remedy, which consisted of "hot spot" excavation and removal and containment of residual petroleum-impacted soils underneath structures and a parking lot, would still be protective of human health and the environment provided that no areas of contaminated soil would remain exposed, such as for yards or vegetative buffers.

In January 2003, RDC informed DNREC that a possible component of the final construction plans may consist of raising the overall grade of the site from the present elevation (4 to 5 feet above sea level) to the level of the top of the rebuilt bulkhead, which will be approximately 11

feet above sea level. At a minimum, two (2) feet of clean-fill will be added to the existing grade of site, even if the final construction plans do not require raising the overall grade of the site to 11 feet above sea level. In this case, the construction-related excavation will be in the clean fill above the contaminated soil and the risk to construction workers will be eliminated since there will be no exposure. Another possible component of the final construction plan may include performing construction activities in areas that have extended below the clean fill. When excavation is necessary below the clean fill in areas surrounding GP-3 and other areas containing elevated concentrations of PAHs, the soils will be over-excavated, removed and properly disposed of. The over-excavated areas will be subsequently filled with clean fill. Therefore, any necessary construction activities would then occur within the clean fill.

This document is DNREC's amended final plan of remedial action (amended final plan) for the site. It is based on the results of the previous investigations performed at the site. This amended final plan is issued under the provisions of the HSCA and the Regulations Governing Hazardous Substance Cleanup (Regulations). It presents DNREC's assessment of the potential health and environmental risks posed by the site.

As described in Section 12 of the Regulations, DNREC provided notice to the public and an opportunity for the public to comment on the second amended proposed plan of remedial action (proposed plan). No comments were received. Therefore, the second amended proposed plan has been adopted as the amended final plan. All previous investigations of the site, the original proposed plan, the amended proposed plan, the second amended proposed plan, any comments received from the public, DNREC's responses to those comments, and the final plan and this amended final plan constitute the remedial decision record for the site.

Section 2.0 presents a summary of the site description, history and previous investigations of the site. Section 3.0 provides a description of the RI results. Section 4.0 presents a discussion of the remedial action objectives. Section 5.0 presents the amended final plan of remedial action. Section 6.0 presents the Director's declaration.

2.0 SITE DESCRIPTION AND HISTORY

21. 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 encompass 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.

2.2 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 1920s, 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 1980s.

The RDC entered into a VCP Agreement in 2001 with DNREC 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.

3.0 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 wells constructed in three of the soil boring locations.

Subsequent to the Phase II investigation, a 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 (TAL) and the Target Compound List (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 (2) 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 the *Remediation Standards Guidance*, attainment of guidance criteria can be obtained if sample concentrations from at least 75% of the samples (from the same media) fall below the respective URS for the contaminant in question, with no single result exceeding the URS value by a factor of 10.

Subsurface soil samples from eleven (11) 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 representative of groundwater quality. The RI, which utilized permanent monitoring wells, 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 Levels 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 (GMZ) restricting use of groundwater in Wilmington is presently in place, both of which prevent human exposure to site groundwater.

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 initial risk assessment that was performed assumed a restricted use risk setting, and development of the site into a multi-story office building. It was performed in order to evaluate the cumulative risk associated with the exposure to soil and ingestion of groundwater on the site. The initial risk assessment calculated a soil cumulative risk to be $4X10^{-6}$, which is below the HSCA action level of $1X10^{-5}$, and a hazard quotient (HQ) below 1.0. Therefore, it was concluded that the soil did not pose an unacceptable risk to human health, given a commercial/industrial risk setting.

Based upon the request to change the proposed development at the site from commercial/industrial to urban residential, a second risk assessment was performed, at DNREC's request, to take into account the proposed change in land use. The exposure pathway evaluation determined that the only potential completed pathway is exposure to contaminated soil by future construction workers. At the present time there are no completed pathways as the majority of the site is covered by asphalt. After development of the site, exposure pathways will be eliminated as the site will be covered by buildings, landscape , and paving. In this case, the only possible exposure pathway would be that of construction workers exposed to direct contact with subsurface soil or to fugitive dust emissions during construction, future utility maintenance, and similar activities.

The results of the risk calculations show that noncancer risk (HQ) to the construction worker was 0.83, which is below the 1.0 threshold. The ingestion route of exposure accounted for 97% of the total risk. Thus the potential for noncancer effects to the construction worker are acceptable. The risk calculations for cancer risk ranged from 2×10^{-7} for benzo(b)fluoranthene and dibenz(a,h)anthracene to 2×10^{-6} for benzo(a)pyrene. The total cancer risk to the construction worker was 4×10^{-6}. Incidental ingestion of soil accounted for 92% of cancer risks. The Regulations set a cleanup and background risk of $1x\ 10^{-5}$. Therefore, the total cancer risk level of 4×10^{-6} is acceptable under the Regulations.

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, with the existing bulkhead being 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 were no exceedences of Delaware's Surface Water Quality Standards (DSWQS) by the discharge of site groundwater into the Christina.

4.0 REMEDIAL ACTION OBJECTIVES

According to Section 8.4 (1) of the Regulations, site-specific remedial action objectives (RAOs) must be established for all plans of remedial action. The Regulations provide that DNREC 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 a commercial use 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 at concentrations above their respective URS values.

2. Prevent discharge of groundwater contaminated by VOCs, PAHs, and metals into the Christina River above Delaware Surface Water Quality Standards.

5.0 FINAL PLAN OF REMEDIAL ACTION

Based on DNREC's evaluation of the site information and the above remedial action objectives, the recommended action for the site will include the following:

1. Cap any impacted soils containing the aforementioned constituents at concentrations between the noted $1x10^{-4}$ levels (above) and 1×10^{-5} levels. The proposed cap would be constructed in accordance with a DNREC-approved remedial action workplan, and in conjunction with development of the property and will include containment of the soils underneath proposed structures and asphalt parking lots and any clean fill needed to bring the site up to grade. A geotextile fabric will be installed immediately above the residual contaminated soil as a marker boundary to identify the presence of the contaminated layer.

2. Maintain a bulkhead along the Christina River to contain the existing impacted soils at the site so as to prevent their erosion into the Christina River. Maintenance shall include any repair, modification, refurbishment, or reconstruction of the bulkhead (including any removal and replacement of the bulkhead), and any other intrusive activities related to the maintenance of the bulkhead. All bulkhead maintenance work shall be performed in accordance with a DNREC-SIRB approved work plan. An Operations and Maintenance (O&M) Plan will specify those non-intrusive bulkhead maintenance activities which can be performed without further DNREC approval.

3. Placement of a deed restriction on the property, no longer than ninety days following DNREC's adoption of the amended final plan: a) prohibiting any digging, drilling, excavating, grading, constructing, earth moving, or any other land disturbing activities on the property (including the removal or modification of the bulkhead) below the geotextile fabric marker boundary without the prior written approval of the DNREC; b) requiring written approval from DNREC prior to any repair, renovation or demolition of the existing structures on the property, or any paved surfaces; and c) identifying that the site is included in the GMZ for the City of Wilmington which prohibits the installation of any water well on, or use of groundwater at, the site without the prior written approval of DNREC.

4. Prepare and implement the O&M Plan within two years to be approved by DNREC to maintain the integrity of the site structures, including, but not limited to the bulkhead, the asphalt cap, sidewalks and other impervious ground cover.

The Department actively solicited public comments and suggestions on the second amended proposed plan of remedial action. No comments were received. The comment period began on July 21, 2003 and ended at the close of business August 11, 2003.

6.0 DECLARATION

This amended 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.

John Blevins, Director
Division of Air & Waste Management

8/29/03
Date

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