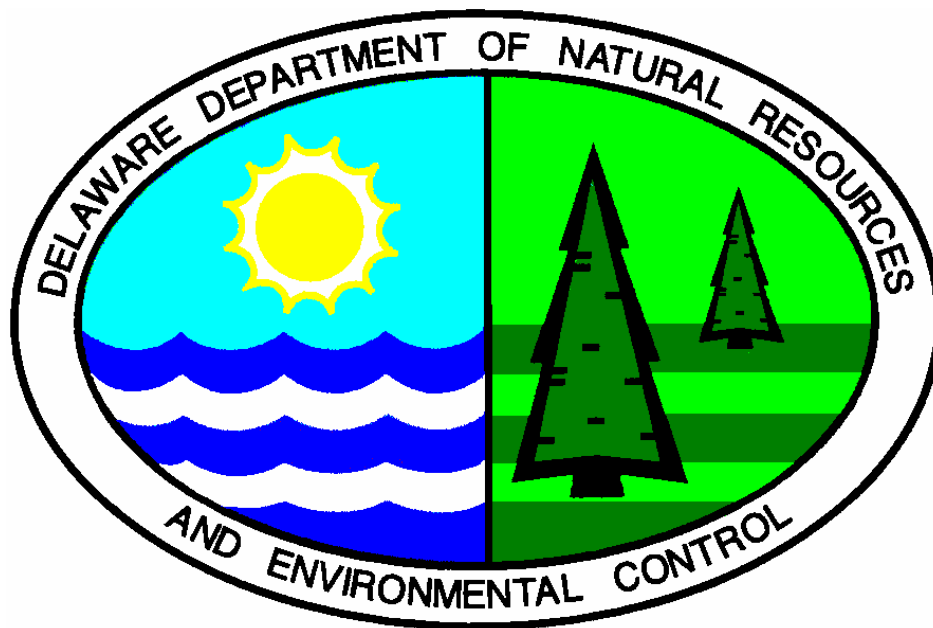


**SECOND AMENDED
FINAL PLAN OF REMEDIAL ACTION**

201 / 205 A Street
Wilmington, DE

DNREC Project No. DE-1228



September 2004

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

1.0	INTRODUCTION	1
2.0	SITE DESCRIPTION AND HISTORY	3
2.1	SITE SETTING	3
2.2	SITE AND PROJECT HISTORY	3
3.0	PREVIOUS INVESTIGATION RESULTS.....	3
4.0	INTERIM REMEDIAL ACTION ACTIVITIES.....	6
5.0	REMEDIAL ACTION OBJECTIVES.....	7
6.0	FINAL PLAN OF REMEDIAL ACTION	7
7.0	DECLARATION.....	8

LIST OF FIGURES

Figure 1: Site Location/Topographic Map.....	10
Figure 2: Sampling Locations.....	11

APPENDICES

Appendix A: Risk Assessment Summary

1.0 INTRODUCTION

The 201/205 A Street site (site) is located on the southern bank of the Christina River in Wilmington, Delaware, which is currently undergoing construction activities associated with the development of the Christina Landing residential townhome community. It is bounded on the south by A Street, on the east by 207 A Street, on the west by 200 S. Market Street, and on the north the Christina River. The site is presently owned by the BPG Residential Partners IV, LLC (BPG), who has entered into a Consent Decree for a Prospective Purchaser Agreement (PPA) and a Voluntary Cleanup Program (VCP) agreement with the Department of Natural Resources and Environmental Control Site Investigation and Restoration Branch (DNREC). BPG entered into these agreements in order to resolve their environmental liability for the site. DNREC's VCP is established under the provisions of the Delaware Hazardous Substance Cleanup Act, 7 Del. C. Chapter 91 (HSCA). Through the PPA and a VCP Agreement, BPG agreed to implement the amended final plan of remedial action, dated August 2003, for the site.

Prior to the purchase of the site by BPG, the Riverfront Development Corporation (RDC) owned the site and had entered into a VCP agreement with DNREC to conduct 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 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.

As a result of RDC's request to change the proposed development of the property from commercial/industrial to urban residential (i.e., apartment/condominium) in August 2002, 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 would 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, approximately 11 feet above sea level. At a minimum, two (2) feet of clean-fill would be added to the existing grade of the site, even if the final construction plans did not require raising the overall grade of the site to 11 feet

above sea level. In this case, the construction-related excavation would be in the clean fill above the contaminated soil and the risk to construction workers would be eliminated since there would be no exposure. Another possible component of the final construction plan might also include performing construction activities in areas that extended below the clean fill. When excavation would be necessary below the clean fill in areas containing elevated concentrations of PAHs, the soils would be over-excavated, removed and properly disposed of. The over-excavated areas would be subsequently filled with clean fill. Therefore, any necessary construction activities would then occur within the clean fill.

Prior to the issuance of an amended final plan, the RDC requested that DNREC revise the final plan to take into account the new construction plans, which required raising the overall grade of the site from the present elevation,. As a result, DNREC determined that it 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, and DNREC issued the amended final plan on August 2003.

BPG agreed to implement the amended final plan during the development of the site. During the initial site excavation activities, a registered previously abandoned 1,000 gallon underground storage tank (UST) was discovered, as well as, subsurface petroleum impacts that were greater (in area and concentration) than previously identified within the RI. An interim remedial action (IRA) was conducted consisting of removing the UST in accordance with DNREC-Tanks Management Branch (TMB) regulations, over-excavating petroleum-impacted soils and performing an additional risk assessment to address possible vapor intrusion. Based upon these findings, DNREC determined that it was necessary to issue the third amended proposed plan of remedial action (third amended proposed plan). The third amended proposed plan was issued on August 9, 2004, and the comment period expired on August 30, 2004. While no formal comments were received, DNREC did receive and answer two (2) questions regarding the scope of the proposed remedial action.

This document is DNREC's second amended final plan of remedial action (second amended final plan) for the site. It is based on the results of the previous investigations performed at the site and the IRA. This second amended 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 provided notice to the public and an opportunity for the public to comment on the third amended proposed plan and no comments were received by DNREC. Therefore, the third amended proposed plan has been adopted as the second amended final plan. The RI, the original proposed plan, the amended proposed plan, the second amended proposed plan, the third amended proposed plan, the comments received from the public, DNREC's responses to those comments, the final plan, the amended final plan, and the second 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 summary of the IRA. Section 5.0 presents a discussion of the remedial action objectives. Section 6.0 presents the second amended final plan of remedial action. Section 7.0 is the Director's declaration.

2.0 SITE DESCRIPTION AND HISTORY

2.1 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 site is part of the Christina Landing residential development, which consists of several parcels, encompassing approximately nine (9) acres. The site is currently under redevelopment which will consist of two high rise apartment towers, 63 residential townhomes, open space, sidewalks, roads, parking and related infrastructure. 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. Until the property was transacted in January 2004, the site was operated as the Christina River Club, a restaurant.

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 PREVIOUS 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 [“?g/L”], MW-2), iron (up to 28,000 ?g/L, MW-3) and manganese (up to 819 ?g/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 ?g/L and 50 ?g/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 4×10^{-6} , which is below the HSCA action level of 1×10^{-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 that time there were no completed pathways as the majority of the site was covered by asphalt. After development of the site, exposure pathways would then be eliminated as the site will be covered by buildings, landscape, and paving. In that 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 showed 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 was 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 1×10^{-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 would be no exceedences of Delaware's Surface Water Quality Standards (DSWQS) by the discharge of site groundwater into the Christina.

4.0 INTERIM REMEDIAL ACTION ACTIVITIES

During excavation activities June 2004 for the sanitary manholes, a series of underground petroleum pipelines and associated soil contamination were discovered. Additionally, a previously abandoned 1,000 gallon UST was discovered. Some of these soils contained free product which DNREC required to be removed as part of the interim response action (IRA) performed under DNREC's oversight pursuant to HSCA. At that time, in an abundance of caution, it was decided that all other petroleum-impacted soils would be excavated to the maximum extent practicable to the water table and backfilled with clean fill as part of the IA. The UST was removed in accordance with the DNREC-TMB regulations. The impacted soils were removed and disposed of properly off-site as per the approved *Work Plan to Implement the Amended Final Plans of Remedial Action* (as amended) and the applicable UST regulations. In total, approximately 12,000 tons of petroleum-impacted soils were excavated and properly disposed of off-site. Additionally, approximately 120,000 gallons of potentially impacted groundwater was properly handled and disposed of off-site.

During the excavation activities, a total of 211 confirmatory soil samples were collected from the sidewalls and the floor of the excavation on a 20 foot by 20 foot grid spacing. Additionally, five (5) groundwater samples were collected in the vicinity of the petroleum-impacted soils. Based upon a review of all of the analytical data including the post-excavation results, it was determined that the only completed exposure pathway was the possible migration of vapors into the residential town home garages and crawl spaces. As a result, a vapor intrusion assessment for indoor air inhalation was conducted utilizing the United States Environmental Protection Agency (USEPA) model (Version 3.0 of the Johnson and Ettinger [J&E], 1991, soil-advanced and groundwater-advanced spreadsheets).

The initial modeling results indicated an unacceptable risk to human health for carcinogenic and non-carcinogenic compounds. However, due to the limitations associated with the model, additional site-specific soil gas data was required. This data was collected at three (3) locations, which had the highest levels of residual petroleum contamination. The results of the site-specific soil gas modeling indicate no unacceptable risks to human health, given the concrete slab foundations which are part of the already approved remedial action contained in the amended final plan for the prevention of dermal contact. Therefore, the previously proposed remedy contained within the amended final plan has been found to be protective in addressing the potential pathway of vapor intrusion. As the remedy will remain the same (i.e., the containment of the soils beneath the proposed building structures and asphalt parking lots), no further action is now required beyond the already completed IRA.

Additional confirmatory soil gas data may be collected as part of the operations and maintenance(O&M) Plan when the townhomes have been completed. Based upon the future monitoring results, additional remedial measures may be required in further amendments to the amended final plan for the site. This could include the operations and maintenance of the vapor barrier and ventilation system, which will be voluntarily

installed under the concrete slab foundations, as well as possible improvements or upgrades of that system.

5.0 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 residents and 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 contaminated soils, groundwater and vapors contaminated by VOCs, PAHs and metals that would result in a carcinogenic risk exceeding 1×10^{-5} or noncarcinogenic risks exceeding a HI of 1.0 for a residential scenario.
2. Prevent discharge of groundwater contaminated by VOCs, PAHs, and metals into the Christina River above Delaware Surface Water Quality Standards.

6.0 FINAL PLAN OF REMEDIAL ACTION

Based on DNREC's evaluation of the current site information, DNREC recommends that the following remedial actions be taken at the site which shall constitute the second amended final plan:

- ☞ The remedy is consistent with the August 2003 amended final plan of remedial action; therefore, no further action beyond the already performed interim action is required.

The Department actively solicited public comments and suggestions on the third amended proposed plan of remedial action. The comment period began on August 9, 2004 and ended at the close of business August 30, 2004. While no formal comments were received, DNREC did receive and answer two (2) questions regarding the scope of the proposed remedial action.

7.0 DECLARATION

This second 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

Date

KLT:
KLT04035.doc
DE 1228 II B 9
SIRB_201205AStreetFinalPlan_083104_KLT

Figures 1 & 2 from Remedial Investigation Report

Prepared by EA Engineering, Science and Technology, Inc., September 2001.

Figure 1: Site Location/Topographic Map

Figure 2: Sampling Locations

APPENDIX A