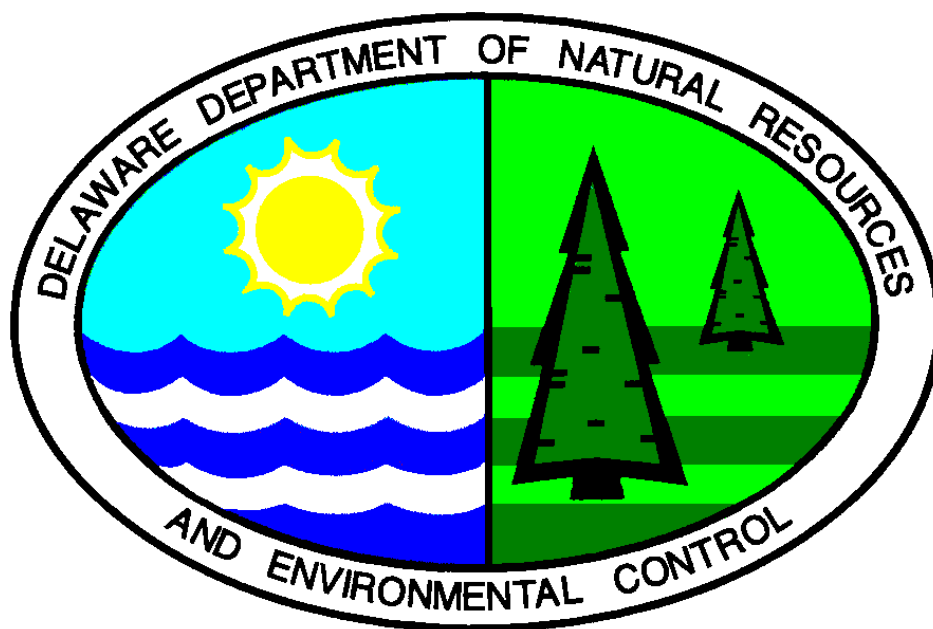


FINAL PLAN OF REMEDIAL ACTION



MADISON STREET CONNECTION
Wilmington Riverfront Transportation Improvements
Wilmington, Delaware

DNREC Project No. DE-1085

August 1998

Department of Natural Resources and Environmental Control
Division of Air and Waste Management
Site Investigation and Restoration Branch

TABLE OF CONTENTS

I. INTRODUCTION	1
III. SITE DESCRIPTION AND HISTORY	2
IV. INVESTIGATION RESULTS	2
V. REMEDIAL ACTION OBJECTIVES.....	3
VI. PROPOSED REMEDIAL ACTION PLAN.....	5
VII. EVALUATION OF REMEDIAL ALTERNATIVES	6
VIII. FINAL REMEDIAL ACTION PLAN	7
XI. PUBLIC PARTICIPATION	7
X. DECLARATION	7

I. INTRODUCTION

In response to requests from the State of Delaware, the City of Wilmington, and the business community, the Delaware Department of Transportation (DelDOT) plans to make improvements to West Street and South Madison Street and to construct a connector road between these two streets to improve traffic flow into and out of the Blue Rocks Stadium area. In addition to the roadways, DelDOT will also create alternate transportation routes, including bicycling and walking paths along this corridor. These improvements will facilitate the redevelopment of the Christina Riverfront Area, which was historically the site of heavy industry.

Because of its industrial past, the soil in the Christina Riverfront Area has been impacted by a variety of industrial residues, including petroleum hydrocarbons, other organic compounds and metals. In March 1997, the Delaware Department of Transportation (DelDOT) entered into a Voluntary Cleanup Program (VCP) Agreement with the Department of Natural Resources and Environmental Control's Site Investigation and Restoration Branch (DNREC-SIRB). The purposes of the VCP Agreement were to:

1. Identify potential sources of contamination within the roadway improvement area.
2. Develop a document that would provide guidance on the acceptable use(s) for soil excavated during the project based on the soil contaminant levels encountered.
3. Develop interim action plans, if required, to A) be protective of road construction workers, the public and the environment during road construction and B) insure that upon project completion the levels of protection for public health and the environment either meet or exceed the existing pre-construction conditions.

To accomplish these purposes DELDOT performed soil drilling, sampling and analysis in and along the planned road right-of-way to characterize the existing levels of contaminants from past industrial practices. The collection and analysis of these soil samples were performed in accordance with the Delaware Regulations Governing Hazardous Substance Cleanup (HSCA), Delaware Standard Operating Procedures for Chemical Analytical Programs (SOPCAP), guidance documents and other DNREC policies and procedures. The analytical information collected by DelDOT was supplemented with data from previous soil investigations on other properties in and around the planned roadway.

In addition to the environmental testing conducted by DELDOT, The DNREC and DELDOT drafted and signed a Memorandum of Understanding (MOU) which more specifically identifies the responsibilities of DNREC and DELDOT as it pertains to issues such as soil usage, groundwater investigations, excavation of contaminated material, and issuance of Certificates of Completion of Remedy.

II. PURPOSE

This document is the Department's Final Plan of Remedial Action for the site. It is based on the technical reports and guidance documents listed in the References Section at the end of this document. The Final Plan is issued under the provisions of the Delaware HSCA and the Regulations Governing Hazardous Substance Cleanup. This Final Plan presents the Department's assessment of human health and environmental risks associated with the site.

The Department provided public notice and opportunity to comment on the Proposed Plan in accordance with Section 12 of the Regulations. At the conclusion of the comment period, the Department, after review and consideration of the comments received, issues this Final Plan which will designate the remedial action and the selected procedures and stipulations concerning future activities within the site. The Proposed Plan, the comments received from the public, the Department's response to the comments, the Final Plan, and all of the documents which formed the basis for the Proposed and Final Plans will constitute the "Remedial Decision Record." There were no comments received on the Proposed Plan of Remedial Action.

III. SITE DESCRIPTION AND HISTORY

Site Description

The site consists of approximately 4 acres of land comprising portions of West Street, Bell Alley and South Madison Street and several adjacent properties in Wilmington, Delaware. Figure 1 shows the project area, including the road right-of-way and the surrounding properties that will be used to construct the transportation improvements.

Site History

Based on a review of historical directories, maps, existing environmental reports and interviews, several possible sources of historic contamination were identified on the subject property and in the immediate vicinity of the site. These include the Harlan & Hollingsworth shipyard, the Gates Engineering property and portions of the Wilmington Coal Gas company.

The entire area of the planned road improvements was historically the site of shipbuilding and other heavy industrial activities. Much of the area was reclaimed from marshland by filling with slag and other industrial waste products. Because of its previous industrial use, some of the soil in the area has been impacted by environmental contaminants, including total petroleum hydrocarbons (TPH), heavy metals (i.e., lead, arsenic), polychlorinated biphenyls (PCBs) and polynuclear aromatic hydrocarbons (PAHs).

IV. INVESTIGATION RESULTS

Two investigations were conducted by DelDOT to collect environmental data for this project. The first investigation, entitled "Phase II - Site Investigation", consisted of sample collection and analysis and occurred from September 16 through October 3, 1996. The investigation consisted of soil sampling, immunoassay screening and laboratory analysis. A total of 61 soil samples were collected from the transportation improvement project area and analyzed for heavy metals, volatile organic compounds (VOCs), PAHs, and PCBs.

The results of the first investigation were used to further focus the scope of the second investigation. The second investigation, entitled "Phase II - Site and Facility Investigation for Property Acquisition", occurred from June 16 through 24, 1997, and included the collection and analysis of 36 soil samples and 24 groundwater samples from soil borings. The analyses performed during this investigation were: Carcinogenic polynuclear aromatic hydrocarbons (CaPAH) using Ohmicron immunoassay kits; Total Petroleum Hydrocarbons (TPH) Gasoline Range Organics (GRO) and Diesel Range Organics (DRO); Volatile Organic Compounds (VOCs), and; Total metals, including arsenic, cadmium, chromium, lead, and mercury using an X-ray fluorescence instrument.

The findings of these environmental investigations show that in one area groundwater was impacted above DNREC reporting levels. This one area where contaminants exceeded DNREC reporting levels is located on the northwest portion of the Gates Engineering (Berger Brothers) property and extending to portions of the Bell Supply and O'Brien properties. This area is suspected to contain free product based on the visual evaluation of the soil borings.

Following these initial findings, a soil investigation using a systematic sampling approach was implemented. One soil sample was collected for each 100 cubic meters of soil in the project area and analyzed for the contaminants identified in the previous investigations. In the project area, the soil is impacted with low to moderate levels of lead, arsenic, PAHs, and PCBs. The analytical results are reported in the "Grid Sampling Report" as well as the Remedial Investigation Report".

The information gathered during the environmental investigations was used to develop a Feasibility Study, Interim Action Plans, and this Final Plan of Remedial Action.

V. REMEDIAL ACTION OBJECTIVES

According to HSCA regulation 8.4(1), during a remedial investigation, remedial action objectives must be established. For the Madison Street Connection, remedial action objectives were designed based on the following factors:

- the site is currently zoned as commercial and industrial land and numerous vacant lots and former industrial buildings are present.
- the future site use is expected to be paved roadway, commercial and open space.
- the site is within 1,000 feet of the Christina River.
- surrounding land uses are mixed, including manufacturing, commercial and residential.
- soil at the site has been impacted by various chemical constituents. Based on the nature and extent of the contaminants, arsenic, lead, petroleum hydrocarbons, PAHs, PCBs and VOCs have been chosen as the primary contaminants of concern.
- The primary exposure pathways are inhalation, direct contact and incidental ingestion with/of impacted soil and erosional transport to the Christina River.

- The major risk associated with the site is potential human contact with impacted soil.

In accordance with the MOU between DNREC and DeIDOT, groundwater contamination and impact issues will be addressed separately by DNREC.

Qualitative Remedial Objectives

Based on the above factors, the following qualitative remedial action objectives were developed:

- Control potential human contact (dermal and ingestion) with contaminated soil.
- Control potential contaminated soil erosion to the Christina River.
- Remove any free-phase petroleum encountered during construction.
- Control potential human contact with contaminated groundwater during trench dewatering.

Quantitative Remedial Objectives

Based on the above qualitative remedial action objective, the following quantitative remedial action objectives were developed:

- Prevent human contact with soil having an arsenic concentration greater than 60 mg/Kg.
- Prevent human contact with soil having a lead concentration greater than 400 mg/Kg.
- Prevent human contact with soil having a carcinogenic PAH concentration greater than 1 mg/Kg.
- Prevent human contact with soil having a PCB concentration greater than 0.5 mg/Kg.
- Prevent human contact with soil having a BTEX concentration greater than 10 mg/Kg.
- Prevent human contact with soil having a TPH concentration greater than 100 mg/Kg.
- Prevent human contact with groundwater having concentrations over respective maximum contaminant levels (MCLs) in trench excavations.

The quantitative remedial action objectives are based on the DNREC “Remediation Standards Guidance Under the Delaware Hazardous Substance Cleanup Act” (February 1998). These objectives are protective of potential human and environmental receptors including surface water and groundwater.

VI. PROPOSED REMEDIAL ACTION PLAN

The proposed remedial actions considered were based upon the Remedial Action Objectives and the MOU between DNREC and DelDOT.

Potential Remedial Alternatives

To accomplish the described remedial action objectives, three (3) potential remedial alternatives were reviewed. These are listed below and discussed further in the following section:

1. Removal and selective reuse of excavated materials
2. Complete removal of excavated materials.
3. No further action.

Alternative 1 (Presumptive Remedy): Removal and selective re-use of excavated materials.

Under this alternative soil planned to be excavated for the transportation improvement project will be handled in accordance with the findings of the samples collected in the 100 cubic meter grids. Based on the analysis the soil will be placed into one of four categories for either selective reuse during the transportation project or for testing and off-site disposal at an appropriate facility. These categories of soil reuse have been developed by DNREC to be protective of public health, welfare and the environment based upon land use and or containment actions. The categories of soil reuse begin with unlimited use (i.e., uncontaminated) to highly contaminated (i.e., off-site disposal). These categories include:

- A** - Unlimited Contractor re-use Outside of Riverfront Redevelopment Area. (This soil category has low or no concentration of contaminants which are at levels suitable for unrestricted residential use).
- B** - Construction Re-use within Roadway Project (and covered with a physical barrier and clean fill).
- C** - Re-use Limited to Planned Roadway Subbase.
- Z** - Off-Site Treatment or Disposal (i.e., Highly contaminated)

Table 1 in the Grid Sampling report provides contaminant ranges for each of the reuse and disposal categories. In addition, other provisions that will be implemented under this alternative will be:

- provide deed restrictions for all project involved parcel for non-residential usage;
- require notification and approval from DNREC prior to any future intrusive activity in the project area; and,
- an Operations and Maintenance (O&M) Plan than will ensure the continued effectiveness of the remedial action.

Alternative 2: Complete removal of excavated materials.

Under this alternative all soil excavated for the transportation improvement project will be removed, tested and disposed at appropriate off-site facilities. With this approach approximately 6,000 cubic meters of excavated soil material would be transported through Wilmington for off-site disposal and an equal amount of clean fill would be transported back for use in constructing the transportation improvement project.

Alternative 3: No Further Action.

The no further action alternative will allow the transportation construction project to continue without further environmental related tasks or remediation. The contaminated soil will be left at the site and no remedial action will be conducted at the site.

VII. EVALUATION OF REMEDIAL ALTERNATIVES

The remedial alternatives were evaluated in accordance with the criteria set forth in the HSCA regulations. The applications of these criteria are as follows;

Protection of public health, welfare and the environment - Alternatives 1 and 2 introduce a slight increased risk of exposure to construction workers who will be handling the soil material during implementation. The final project design is protective of public health, welfare and the environment. In Alternative 2, off-site disposal presents an additional short term exposure risk to a larger (residential and business) human population during off-site soil transportation due to potential dust releases, spills, or accidents. Alternative 3 is not protective of human health and the environment.

Compliance with all applicable local, state and federal laws - Alternatives 1 and 2 comply with all applicable local, state and federal laws. Alternative 3 does not comply with all applicable local, state and federal laws.

Community acceptance - Alternatives 1 and 2 are anticipated to be most acceptable to the community. Alternative 3 is not anticipated to be acceptable to the community. These criteria will be fully evaluated during the public comment period.

Monitoring required - Alternatives 1 and 2 would require minimal monitoring and maintenance of the capped (with pavement, brick and/or soil) area. Alternative 3 would require subsequent sampling to determine if the concentrations of contaminants of concern were decreasing with time and/or not migrating off the site.

Technical practicability - Alternatives 1, 2 and 3 are technically practicable.

Restoration time frame - Alternatives 1 and 2 will take 12 to 15 months to implement. Alternative 3 can be implemented during road construction.

Reduction in toxicity, mobility and volume - Alternatives 1 and 2 would effectively reduce the toxicity, mobility and volume of the contaminated soil in the project area. Alternative 3 would not reduce toxicity, mobility or volume of the contaminated material.

Long term effectiveness - Alternatives 1 and 2 are effective in protecting public health, welfare and the environment over a long term period. Alternative 3 does not offer protection.

Short term effectiveness - Alternatives 1 and 2 are effective in protecting public health, welfare and the environment in the short term. Alternative 3 does not offer protection.

VIII. FINAL REMEDIAL ACTION PLAN

Based on the above criteria, Alternatives 2 and 3 (off-site disposal and no further action) were not considered viable alternatives. Alternative 2 (off-site disposal) may cause short term exposures to the public due to hauling large quantities of contaminated soil off-site. Further, there is little to no apparent increased protectiveness over Alternative 1 but there is a substantial increase in cost. Alternative 3 (no further action) is not a viable alternative because it will not protect human health or the environment or comply with current laws.

Therefore, the most appropriate remedial action is Alternative 1 (removal and selective reuse of impacted soil). Alternative 1 will provide a cost effective means of meeting all the remedial objectives while satisfying the evaluation criteria. Alternative 1 will also remove the potential exposure pathway of human contact with impacted soil by isolating the source.

XI. PUBLIC PARTICIPATION

The Department actively solicited public comments or suggestions on the Proposed Plan and welcomed opportunities to answer questions through a public meeting and advertisement. The comment period began July 27, 1998 and ended August 15, 1998. No comments were received on the Proposed Plan.

X. DECLARATION

This Final Plan of Remedial Action for the Madison Street Connection site is protective of human health, welfare and the environment and is consistent with the requirements of the Delaware Hazardous Substance Cleanup Act.

Nicholas A. Di Pasquale
Director

Date

KDO:slb
KDO98047.doc
DE 1085 II B 8