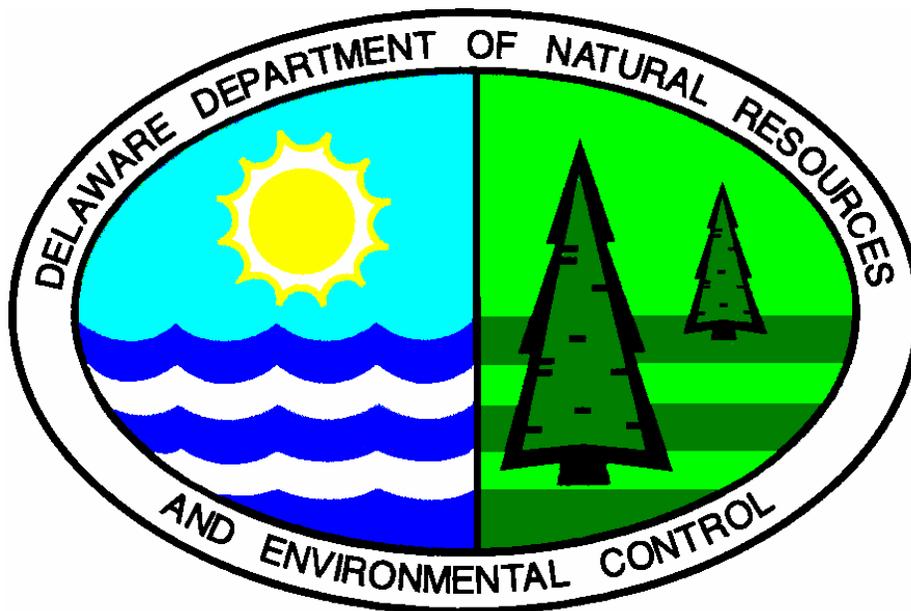


PROPOSED PLAN OF REMEDIAL ACTION

ROUTE 4 ORCHARD SITE NEWARK, DELAWARE

DE-1205



FEBRUARY 2003

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

TABLE OF CONTENTS

1.0 INTRODUCTION.....	1
2.0 SITE DESCRIPTION AND HISTORY.....	1
2.1 SITE AND PROJECT HISTORY	2
3.0 INVESTIGATION RESULTS.....	3
3.1 GENERAL INFORMATION	3
3.2 SOILS	3
3.3 GROUNDWATER	4
3.4 SUMMARY	4
4.0 REMEDIAL ACTION OBJECTIVES	4
5.0 PROPOSED PLAN OF REMEDIAL ACTION	5
6.0 PUBLIC PARTICIPATION	5

LIST OF FIGURES

FIGURE 1: SITE LOCATION

FIGURE 2: SOIL AND GROUNDWATER SAMPLING LOCATIONS

LIST OF TABLES

TABLE 1: SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES

TABLE 2: SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES

1.0 INTRODUCTION

The Route 4 Orchard (site) is located in Newark, New Castle County, Delaware (Figure 1). In order to determine the potential for environmental liability prior to the commercial development of the site, the current owner, Dr. Abdollah Malekzadeh, entered into the Department of Natural Resources and Environmental Control's (DNREC) Voluntary Cleanup Program (VCP) Agreement under the provisions of the Delaware Hazardous Substance Cleanup Act, 7 Del. C. Chapter 91 (HSCA). Through a VCP Agreement, Dr. Abdollah Malekzadeh agreed to investigate the potential risks posed to the public health, welfare and the environment. Dr. Abdollah Malekzadeh contracted Duffield Associates, Inc. to perform a remedial investigation (RI) of the site.

The purpose of the RI was to: 1) understand the nature and extent of any soil and/or groundwater contamination at the site, 2) evaluate risks to public health, welfare and the environment associated with any identified contamination, and 3) perform, if necessary, a feasibility study (FS) that would identify and recommend a remedial action, if required by DNREC. The owner of the property desired to obtain a Certification of Completion of Remedy (COCR) from DNREC upon completion of all required tasks.

This document is the Department's proposed plan of remedial action (proposed plan) for the site. It is based on the results of the previous investigations performed at the site. This proposed 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 risk posed by the site.

As described in Section 12 of the Regulations, DNREC will provide notice to the public and an opportunity to comment on the proposed plan. At the comment period's conclusion, DNREC will review and consider all the comments received and issue a final plan of remedial action (Final Plan). The final plan shall designate the selected remedy, if required, for the site. The proposed plan, the comments received from the public, DNREC's responses to those comments, and the final plan will constitute the remedial decision record.

Section 2 presents a summary of the site description, site history and previous investigations of the site. Section 3 provides a description of the remedial investigation results. Section 4 presents a discussion of the remedial objectives. Section 5 presents the proposed plan of remedial action. Section 6 discusses public participation requirements.

2.0 SITE DESCRIPTION AND HISTORY

The site is a former nursery and farm located on Route 4 in New Castle County, Delaware. The site consists of approximately 7.2 acres of undeveloped agricultural land. On the tax maps of New Castle County, Delaware, the site is tax parcel number 09-011.00-036. The area surrounding the site is used as both residential and commercial property. Dr. Abdollah Malekzadeh intends to develop the site as a medical office building with a parking lot.

2.1 Site and Project History

The site was acquired by Mr. Albert Ciamaricone in 1919 and was used for growing vegetables since 1920. A portion of the property was used for growing pine trees since the 1960's.

In December 1999, Duffield Associates, Inc., completed a modified phase I environmental site assessment (ESA) at the site. The purpose of the ESA was to identify potential environmental issues at the site. The ESA included a walking reconnaissance of the site and a review of selected historic and regulatory environmental documentation pertaining to the site and nearby areas. Duffield Associates, Inc. identified several environmental concerns at the site. These concerns included five, approximately 55-gallon capacity, empty metal drums; a solid waste disposal area that contained old appliances, furniture, metal, automobile parts, tires, plastic, and other miscellaneous debris; site boundaries that were not clearly defined; and historical information that indicated the use of pesticides, primarily Rotenone, on crops at the site.

On June 13, 2000, C.A. Copeland, Inc.- Environmental/Construction Management Company was contracted to perform an environmental evaluation/discovery at the site. The purpose of the evaluation was to further assess the environmental concerns that were identified during the phase I ESA. The results of this evaluation included determining that the five, 55-gallon drums, were not located within site boundaries, collecting soil samples from a depth of 6 to 12 inches below grade at the solid waste disposal and orchard locations and analyzing these samples for volatile organic compounds (VOCs), polyaromatic hydrocarbons (PAHs), pesticides, herbicides, asbestos, and arsenic, removing the debris located in the solid waste disposal area, and staging the asbestos on plastic for disposal.

The analytical results from the soil samples collected by C.A. Copeland, Inc. detected arsenic in 5 of the 23 samples. Detected concentrations of arsenic ranged from 11 to 100 milligrams per kilogram (mg/kg). These arsenic concentrations exceeded the DNREC Uniform Risk-Based Standard (URS) value of 0.4 mg/kg for arsenic in an unrestricted use, non-critical water resource area. Four out of the five samples that exceeded the URS also exceeded the 11 mg/kg background level established for arsenic in the State of Delaware. No VOCs, PAHs, pesticides or herbicides were detected. This analytical data was used for screening purposes only. The data from the C.A. Copeland environmental evaluation was not qualified to be used for formal risk evaluation purposes.

On May 9, 2001 Duffield Associates, Inc. conducted a limited environmental evaluation of the former wetlands on the site. This evaluation was conducted as an interim response activity due to the time expiration of Nationwide Permit 26, which allowed the 0.33 acres of isolated and adjacent wetlands associated with a headwater tributary to White Clay Creek on the site to be filled in. During this evaluation, eight soil samples were collected, one surface and one subsurface from former Wetland E and three surface and three subsurface from former Wetland F.

On October 4, 2001, Duffield Associates, Inc., performed a RI at the site that included investigating surface soil, subsurface soil, and groundwater. Thirteen test pits were used to evaluate the surface soil and subsurface soil. Vironex, Inc., a subcontractor to Duffield Associates, Inc., constructed two temporary wells from two soil borings. From these temporary wells, two groundwater samples were collected on October 11, 2001.

In order to obtain a COCR, Dr. Abdollah Malekzadeh entered into a VCP Agreement on April 17, 2001 with DNREC to perform the RI. The objectives of the RI were to evaluate the soil and groundwater at the site.

3.0 INVESTIGATION RESULTS

DNREC conducted an extensive review of past investigations prepared for the site. After review of the work conducted, DNREC worked with Duffield Associates, Inc., the consultant for Dr. Abdollah Malekzadeh, to develop a RI work plan to address the following:

- Perform an environmental evaluation of the surface soil, subsurface soil, and groundwater at the site in an effort to identify areas of environmental concern prior to site development, and if concerns are present, determine if the concerns pose any unacceptable risks.
- Progress towards obtaining a certification of completion of remedy from DNREC.

The RI work plan called for Duffield Associates, Inc., to perform the following tasks:

- Collect thirteen surface and thirteen subsurface soil samples;
- Collect two groundwater samples from two temporary Geoprobe®-type wells; and
- Analyze samples for VOCs, semivolatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), and pesticides.

The following is a brief summary of the results of the investigations for the site.

3.1 General Information

The site consists of approximately 7.2 acres of undeveloped agricultural land. There are no buildings or structures currently on the site. Site soils tend to be silts with sandier soils at the surface but tend to be comprised more of clay with depth. Evidence of soil fill material was apparent through observations of bituminous hot mix and a trace of glass. The site is located in a non-critical water resource area.

3.2 Soils

Uniform Risk-Based Standard (URS) Comparison

The results of the RI identified elevated levels of arsenic, aluminum, iron, and manganese in site soils. Arsenic exceeded the URS value of 0.4 mg/kg for an unrestricted land use setting (i.e., residential) in samples HA-4SA, TP-2A and TP-2B with concentrations of 2.9 mg/kg, 1.5 mg/kg and 19.3 mg/kg, respectively. Sample TP-2B also exceeded the background value of 11mg/kg for arsenic established for the State of Delaware. Aluminum exceeded the URS value of 7,800 milligrams per kilogram (mg/kg) for an unrestricted land use setting in samples HA-4Sa, TP-2A, and TP-2B with concentrations of 14,600 mg/kg, 10,800 mg/kg, and 15,300 mg/kg, respectively. Iron exceeded the unrestricted URS value of 2,300 mg/kg in three samples, HA-4Sa, TP-2A and TP-2B, with concentrations of 8,050 mg/kg, 17,700 mg/kg and 74,200 mg/kg, respectively.

Manganese exceeded the unrestricted land use URS value of 160 mg/kg in one sample, TP-2A, with a concentration of 703 mg/kg.

There were no VOCs, SVOCs, pesticides, or PCBs detected in any of the soil samples above the respective URS values.

3.3 Groundwater

The RI revealed detectable levels of iron and manganese in sample W-1. Iron exceeded the URS value of 0.3 mg/L with a concentration of 43.5 mg/L. Manganese was reported at a concentration of 0.43 mg/L exceeding the URS value of 0.05 mg/L. However, the URS values found in DNREC's remediation standards guidance documents for the contaminants of concern, iron and manganese, are based on the aesthetic qualities of the water such as taste, odor, and color, and do not relate to a human health risk. None of the contaminants of concern that screened above their URS in groundwater sample W-1 (iron and manganese) present a human health risk.

There were no VOCs, SVOCs, pesticides, or PCBs detected in any of the groundwater samples above the respective groundwater URS values.

3.4 Summary

The results of the RI indicated that the site contains elevated levels of metals in both soil and groundwater. Arsenic concentrations exceeded the URS value for an unrestricted land use setting in all three confirmatory samples. Arsenic also exceeded the background level established for the State of Delaware in one sample. In addition, although the analytical data could not be validated in a previous investigation, arsenic levels may have exceeded the background level of 11 mg/kg with concentrations ranging from 87 mg/kg to 100 mg/kg. Aluminum, iron and manganese were detected at levels that exceeded the respective URS values for an unrestricted land use setting.

Iron and manganese were detected in groundwater at concentrations that exceeded the URS values. Although iron and manganese concentrations exceeded the respective URS values for groundwater, these URS values represent aesthetic qualities of the water and do not relate to a human health risk. DNREC has determined that they do not pose a risk to human health or the environment.

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 objective is determined to be appropriate for the site:

- Eliminate potential exposure to contaminants at concentrations that are above their respective URS values for unrestricted land use, that exceed background levels and could potentially pose a risk to human health.

This objective is consistent with the future use of the site as a medical office and parking lot, New Castle County zoning policies, state regulations governing water supply, and worker health and safety.

Quantitative objectives define specific levels of remedial action to achieve protection of human health and the environment. Based on the above qualitative objectives, the quantitative objectives are designed to ensure that future site users such as site workers, construction workers, visitors, and trespassers do not come in contact with soils that contain constituents which exceed a cancer risk level of 1×10^{-5} in a restricted use setting.

5.0 PROPOSED PLAN OF REMEDIAL ACTION

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

Action #1: Placement of a deed restriction on the property: a) limiting the site to non-residential uses; b) requiring written approval from DNREC prior to any repair, renovation or demolition of any structures on the property, or any paved surfaces; and c) prohibiting any digging, drilling, excavating, grading, constructing, earth moving, or any other land disturbing activities on the property without the prior written approval of DNREC.

Action #2: Installation of an asphalt cap and cover consisting of buildings and hardscape as shown on the site development plan. An operations and maintenance (O&M) plan should be submitted and implemented to ensure that the integrity of the asphalt cap is maintained. The proposed cap would be constructed in accordance with a DNREC-approved remedial action work plan and in conjunction with the development of the property. It would include containment of the soils underneath proposed structures and asphalt parking areas and any clean fill needed to bring the site up to grade.

Action #3: Placement of at least six inches of topsoil and seeding with grass in those areas that will not be covered by buildings or hardscape.

6.0 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:

Department of Natural Resources and Environmental Control
Site Investigation and Restoration Branch
391 Lukens Drive

New Castle, Delaware 19720
Attn: Rebecca L. Hawkins

The public comment period for this proposed plan begins on Wednesday, February 5, 2003, and ends at the close of business (4:30 p.m.) on Monday, February 24, 2003. If so requested, a public hearing will be held on the proposed plan. The meeting time and place will be announced if said hearing is requested.

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FIGURES

Figure 1: Site Location, Newark, New Castle County, Delaware.

Figure 2: Soil and Groundwater Sampling Locations.

TABLES

Table 1: Summary of Analytical Results for Soil Samples.

Table 2: Summary of Analytical Results for Groundwater Samples.