

# FINAL PLAN OF REMEDIAL ACTION

Former DP&L Holly Oak Substation Site  
Wilmington, Delaware

DNREC Project DE-1200

SCANNED

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

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## 1.0 INTRODUCTION

The Former Delmarva Power & Light Company (DP&L) Holly Oak Substation (site) is located at the northeast corner of Delaware Avenue and Governor Printz Boulevard, in the Holly Oak section south of Claymont, New Castle County, Delaware (Figure 1). The current owners, Mr. and Mrs. Michael Sitaras, purchased the property from Delmarva Power & Light (a wholly-owned subsidiary of Conectiv) in 1999. The Sitaras' operate a landscaping business and store landscaping supplies and heavy equipment on the property.

The Department of Natural Resources and Environmental Control (DNREC or Department) requested that Conectiv perform a remedial investigation at the site based on the findings of previous environmental investigations that showed a contaminant release occurred while DP&L owned the property. There was a limited removal of contaminated soil from the site as a result of the prior investigation, but following this removal action limited contamination remained on the site. DNREC also contacted the current owners to obtain information about their activities and disposal practices on the site. The current owners have brought in soil to fill low-lying areas at the site. DNREC collected soil samples from this fill area. Conectiv agreed, as a past owner, to investigate environmental conditions on the property related to Conectiv's previous site use.

WIK Associates, Inc. (WIK) was retained by Conectiv to conduct a remedial investigation (RI) at the site. The purpose of the RI was to: 1) collect additional information from the site and combine it with information from previous environmental investigations, 2) determine the nature and extent of any soil and/or groundwater contamination at the site, 3) evaluate risks to public health, welfare and the environment associated with any identified contamination, and 4) evaluate whether a remedial action was required at the site. The RI report was completed in April 2003. Conectiv desires to obtain a Certification of Completion of Remedy (COCR) from DNREC upon completion of all required tasks.

This document is the Department's final plan of remedial action (final plan) for the site. It is based on the results of the RI and previous investigations performed at the site. This final plan is issued under the provisions of the Delaware Hazardous Substances Cleanup Act, 7 Del. C Chapter 91 (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 proposed plan of remedial action. During the comment period of December 3, 2003 through December 23, 2003, DNREC received no comments on the proposed plan thus the proposed plan has been adopted as the final plan. The final plan designates the selected remedy for the site. All prior investigations of the site, the proposed plan, 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 final plan of remedial action. Section 6 presents public participation. Section 7 presents Director's declaration.

## **2.0 SITE DESCRIPTION AND HISTORY**

### **2.1 Site Description**

The Former DP&L Holly Oak Substation site covers an area of approximately 0.38-acre and is located at the northeast corner of Delaware Avenue and Governor Printz Boulevard, in the Holly Oak section south of Claymont, Delaware (New Castle County tax parcel number 06-116.00-132). The site is fenced with restricted access. The site is zoned for commercial use. Residences are located north and east of the site.

### **2.2 Site Operation History**

DP&L acquired the property in 1937 from David Anderson for use as an electrical substation. The site remained an active substation until sometime prior to the 1990s. Based on historical information, eleven (11) concrete structures supported five (5) transformers, two (2) capacitor banks, and six (6) oil-filled circuit breakers at the site. Conectiv sold the property to the current owners, Mr. and Mrs. Michael Sitaras, on December 13, 1999. The current owners brought approximately 1.5 to 4 feet of fill soil onto the site after the purchase of the property. Several of the concrete structures and pads remain at the ground. The current owners use the site for storage of equipment and supplies for their landscaping business.

### **2.3 Site Investigation History**

Several phases of investigations and soil removals were previously performed at the site. In 1990, soil sampling and analysis for polychlorinated biphenyls (PCBs) were conducted on the site by DP&L (Figure 2). Based on this sampling, a 20 by 18 foot area in the northwest portion of the property was identified as having PCB concentrations in soil that were above the EPA Region III unrestricted use clean-up standard of 10 parts per million (ppm), which was used as the State's cleanup standard at that time. In addition, soil containing PCBs at concentrations greater than 3 ppm but less than 10 ppm was detected at two other locations (T2 and C4/C5, Figure 2). In 1990, approximately one (1) foot of soil was removed from the area containing PCBs above 10 ppm. However, confirmatory samples indicated that PCBs still remained in this area at lower concentrations.

In September 1994, Tetra Tech performed a sampling event to assess both the horizontal and vertical extent of any remaining PCBs in the area excavated in 1990 (Figure 3). Laboratory analysis of the samples indicated the presence of PCBs (Aroclors 1254 and 1260) and total petroleum hydrocarbons (TPH) at a maximum concentration of 2.72 ppm and 39 ppm, respectively, in the area. The TPH concentrations were below DNREC's Uniform Risk-based Standard (URS) values. On October 26, 1994, 28 cubic yards of soil were excavated and disposed of at an offsite landfill. Confirmatory samples collected from the excavated area did not detect any PCBs.

On April 25, 2002, WIK conducted a RI of soil and groundwater at the site. The sampling locations are shown on Figure 4. Surface soil fill brought to the site by the current owners was sampled by DNREC on April 26, 2002 (Figure 5). The RI report for the site was completed in April 2003.

### 3.0 INVESTIGATION RESULTS

Results of the environmental investigations performed at the site are summarized below. Detailed discussion of the sampling results is included in the RI Report, dated April 2003, prepared by WIK.

#### 3.1 Surface and Subsurface Soil

The surface soil at the site consists of the fill-soil brought in by the current owners which encompasses most of the site except for a narrow strip along the northern boundary of the site. Sampling of these fill soils indicated that only certain metals, aluminum, arsenic, manganese, iron, and vanadium exceeded their respective DNREC's URS value for unrestricted use (i.e., residential). However, the representative concentrations found in soils calculated as i.e., the 95% upper confidence level (UCL) of the arithmetic mean of the samples, are below the current restricted use (i.e., commercial) URS value. Arsenic in these fill soils was detected at a maximum concentration of 10 milligrams per kilogram (mg/kg) or ppm which is below the natural default background concentration of 11 mg/kg for Delaware. The 95% UCL of the arithmetic mean iron concentration of 44,208 mg/kg exceeded typical Delaware soil natural background concentrations. Manganese, vanadium and aluminum at 95% UCL of mean concentrations of 863 mg/kg, and 116 mg/kg and 32,635 mg/kg, respectively, are well below the restricted use URS values.

The subsurface soil at the site includes the original surface soil which is now covered with the fill soil. PCBs were detected only at two (2) sampling locations that are at or near the area where PCB contaminated soils were previously removed. However, the maximum total PCB concentration detected was 0.53 mg/kg, which was below the URS value of 1.0 mg/kg for unrestricted use. This sample contained Aroclor 1254, one of the PCB compounds, at a concentration of 0.320 mg/kg which is slightly above the unrestricted URS value of 0.3 mg/kg. However, the 95% UCL of the arithmetic mean concentration for Aroclor 1254 was 0.139 mg/kg. The pesticide, 4,4- Dichlorodiphenyldichloroethylene (4, 4-DDE) was detected in one (1) sample at a concentration of 0.012 mg/kg, which is well below the unrestricted use criteria of 2 mg/kg.

Semivolatile organic compounds (SVOCs) such as benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene and dibenz(a,h)anthracene were detected in one (1) subsurface soil sample at concentrations above the unrestricted use URS values. However, when the 95% UCL of the mean concentrations of these contaminants over the entire site are considered, only benzo(a)pyrene and dibenz(a,h)anthracene at 0.47 mg/kg and 0.14 mg/kg, respectively, exceeded the unrestricted use URS values.

Aluminum, arsenic, iron and manganese were detected in subsurface soil at concentrations above the unrestricted use URS values. However, the 95% UCL of the arithmetic mean arsenic concentration was below the Delaware soil natural background concentration of 11 mg/kg. Iron at 95% UCL concentration of the arithmetic mean of 29,201 mg/kg was slightly above the typical Delaware soil maximum background concentration of 22,000 mg/kg. Aluminum and manganese at 95% UCL of the arithmetic mean concentrations of 10,537 mg/kg and 302 mg/kg, respectively, were detected at concentrations above the unrestricted use URS values. One (1) sample contained 16 mg/kg of cadmium, which is above the unrestricted use URS value of 4

mg/kg, but the 95% UCL of the arithmetic concentration of 0.11 mg/kg, is well below the unrestricted use URS values.

### 3.2 Groundwater

Groundwater samples were collected from three (3) locations at the site. Volatile organic compounds (VOCs) and PCBs were not detected. Two SVOCs, diethylphthalate and nitrobenzene, were detected. Diethylphthalate was detected at a maximum concentration of 7.0 micrograms per liter ( $\mu\text{g/L}$ ); however, this is well below the DNREC groundwater URS value of 5,000  $\mu\text{g/L}$ . Nitrobenzene was detected at a concentration of 0.7 $\mu\text{g/L}$ , slightly above the DNREC's URS groundwater value of 0.4  $\mu\text{g/L}$ .

The pesticides chlordane and dieldrin were detected in groundwater at one location at concentrations of 1.3  $\mu\text{g/L}$  and 0.2  $\mu\text{g/L}$ , respectively. The dieldrin concentration detected is above the URS groundwater value of 0.004  $\mu\text{g/L}$ .

Iron was detected at a concentration of 325  $\mu\text{g/L}$ , which is slightly above the DNREC URS value of 300  $\mu\text{g/L}$ . However, iron was also detected at a concentration of 307  $\mu\text{g/L}$  in the field blank sample, indicating possible field contamination. Manganese was detected at a maximum concentration of 3,600  $\mu\text{g/L}$  which is above the URS groundwater value of 50  $\mu\text{g/L}$ .

### 3.3 Risk Evaluation

DNREC's Site-Specific Standard Calculator for Multiple Analytes was used to assess risk associated with exposure to soil and groundwater at the site.

For surface soils, only certain metals exceeded the URS values. Arsenic concentrations in the soil are within the typical background concentrations (11 mg/kg) for Delaware and were not considered a contaminant of concern in the risk evaluation. The non-carcinogenic Hazard Index (H.I.) based on the remaining metals; iron, aluminum, manganese, and vanadium were calculated at 2.59 and 0.1 for unrestricted and restricted land use, respectively. The H.I. of 2.59, which was above DNREC's risk standard of 1.0, was primarily due to the presence of iron. There is no carcinogenic risk associated with these metals (Attachment A).

For subsurface soils, aluminum, iron, manganese and arsenic were detected at concentrations above the unrestricted use URS value. Arsenic was within the range of typical background concentrations for Delaware soil. For the remaining metals, the non-carcinogenic risk was calculated at H.I. of 1.41 and 0.05, respectively, for unrestricted and restricted land use. Benzo(a)pyrene and dibenz(a,h)anthracene, with average concentrations of 0.47 mg/kg and 0.14 mg/kg, respectively, exceeded the unrestricted use criteria. The total PCB concentration of 0.53 mg/kg, and 95% UCL of the arithmetic mean concentration of Aroclor was 0.139 mg/kg, were below the unrestricted use URS values. However, since PCBs are associated with the previous use of the site as an electric substation it was included in the risk calculation. An unrestricted use total carcinogenic risk of  $7.4 \times 10^{-6}$  was calculated for these contaminants (Attachment B).

Since the non-cancer risk presented by contaminants in surface and subsurface soil is above DNREC's unrestricted use risk standard, the site should be maintained as restricted use only.

However, because the non-cancerous risk is less than what is allowable under restricted use settings, capping of soils is not required.

A carcinogenic risk of  $5.4 \times 10^{-5}$  was calculated for groundwater and primarily resulted from the presence of dieldrin. The risk is above DNREC's risk standard of  $1 \times 10^{-5}$ . The non-carcinogenic risk was calculated as a H.I. of 0.93, which is slightly below DNREC's standard of a H.I. of 1.0, (Attachment C). The non-carcinogenic risk calculated was primarily due to manganese, which occurs naturally in shallow aquifers in the area. Dieldrin was not detected in soils, which may indicate that the dieldrin is migrating from an offsite source. Groundwater beneath the site and the vicinity is not presently being used as a drinking water source. Because of the risk from potential use of contaminated groundwater at the site, a deed restriction prohibiting future use of groundwater from the site is needed, as well as establishing a groundwater management zone (GMZ) for the area. The GMZ is an internal DNREC document that restricts groundwater withdrawals at the site.

An ecological screening assessment was performed to identify whether there were any ecologically sensitive areas (ECSAs) on or immediately adjacent to the site in accordance with HSCA remediation standard guidance. ECSAs identified were not impacted by the site, and further ecological evaluation was not necessary. This included a qualitative evaluation of the site's location relative to the Delaware River and Fox Point State Park. Interactions between groundwater surface water in that area will be evaluated under the proposed plan for the Fox Point State Park, which is a HSCA site.

#### **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 will 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 human exposure to impacted soil under possible future unrestricted land use; and
- Prevent human exposure to impacted groundwater.

These objectives are consistent with the current commercial use of the site for storage of equipment and supplies for the landscaping business, New Castle County zoning policies, and 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 qualitative objectives, the quantitative objectives are:

- Prevent human exposure to soil contaminated with metals, that would result in a non-carcinogenic risk calculated as H.I. above 1.0 for unrestricted land use; and

- Prevent human exposure to groundwater contaminated by dieldrin that would result in carcinogenic risk above  $1 \times 10^{-5}$ .

## 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:

- The property owner shall place a deed restriction on the property, no longer than ninety days following DNREC's adoption of the final plan. The deed restriction will prohibit unrestricted use (i.e., residential) of the site, installation of any water wells on, or groundwater usage at, the site without prior written approval of DNREC, and note that the site is located within a GMZ.

DNREC will establish a GMZ within six weeks of adopting the final plan. The GMZ is an internal DNREC document that restricts groundwater withdrawals at the site.

## 6.0 PUBLIC PARTICIPATION

The Department actively solicited public comments and suggestions on the proposed plan of remedial action. No comments were received. The comment period began December 3, 2003, and ended at the close of business (4:30 p.m.) on December 23, 2003.

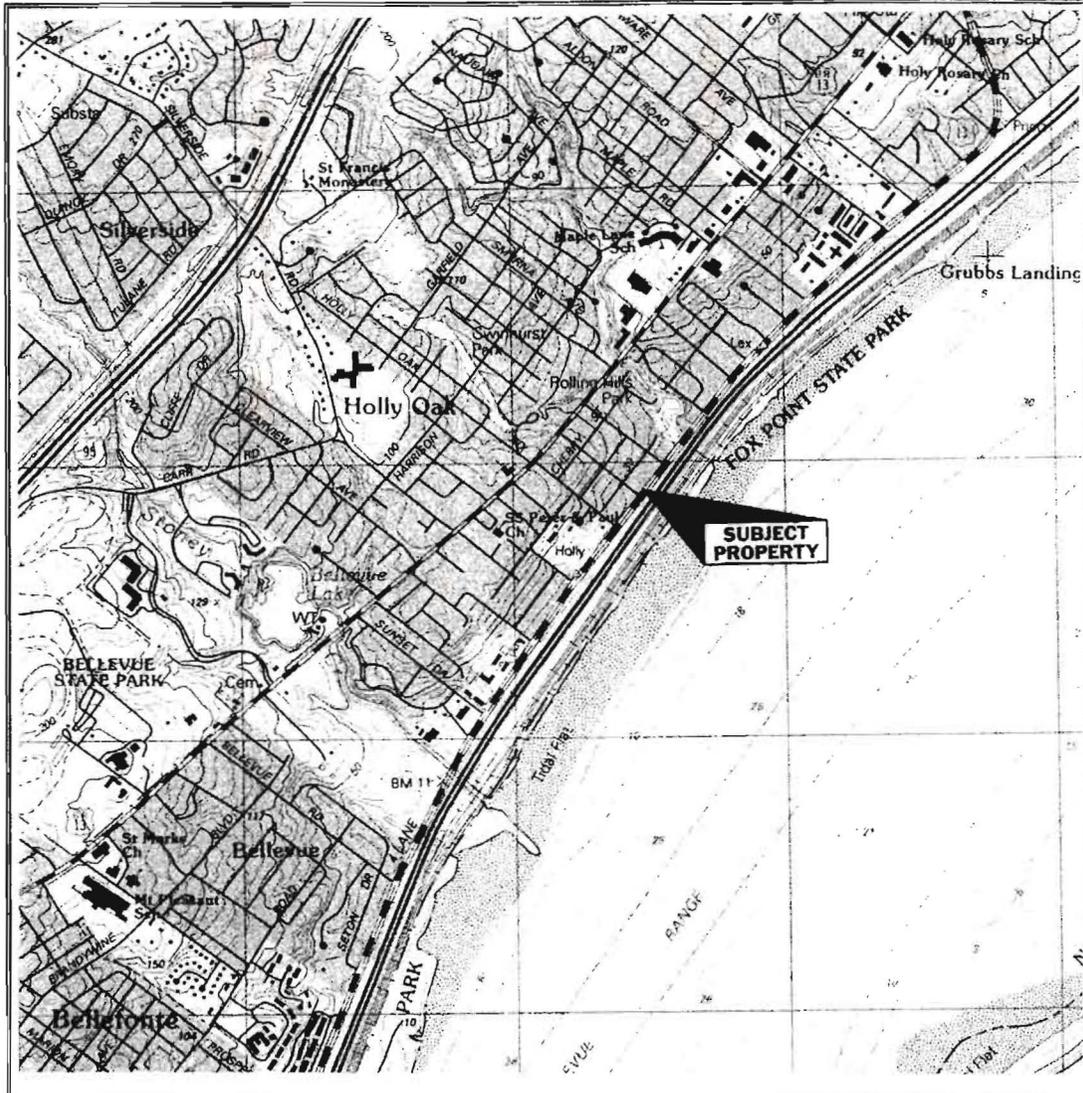
## 7.0 DECLARATION

This final plan of remedial action for the Former DP&L Holly Oak Substation site is protective of human health, welfare and the environment, and is consistent with the requirements of the Delaware Hazardous Substance Cleanup Act.

  
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John Blevins  
Director, Division of Air and Waste

12/31/03  
\_\_\_\_\_  
Date

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DE 1200 II B8



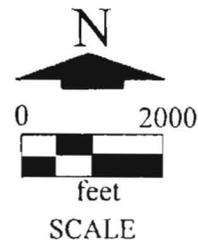
**Figure 1**  
**Site Location/Topographic Map**

Marcus Hook Quadrangle: 7.5 minute series  
 Map Date: 1993 Map

Former DP&L Holly Oak Substation Property

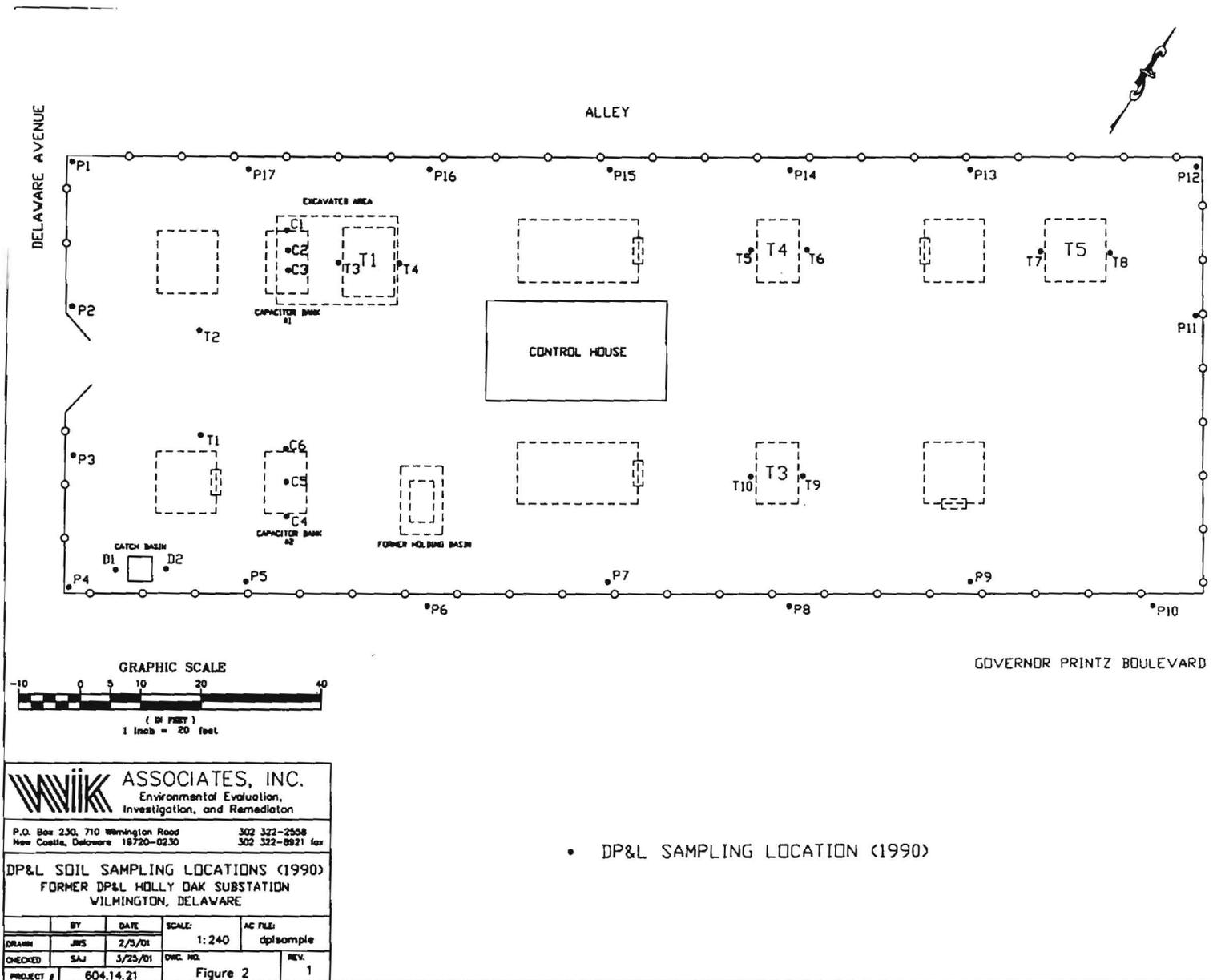
Wilmington, Delaware

WIK File: 0604.14.21



**Figure 1 Site Location Topographic Map**

Figure 2: DP&L Soil Sampling Locations (1990)



• DP&L SAMPLING LOCATION (1990)

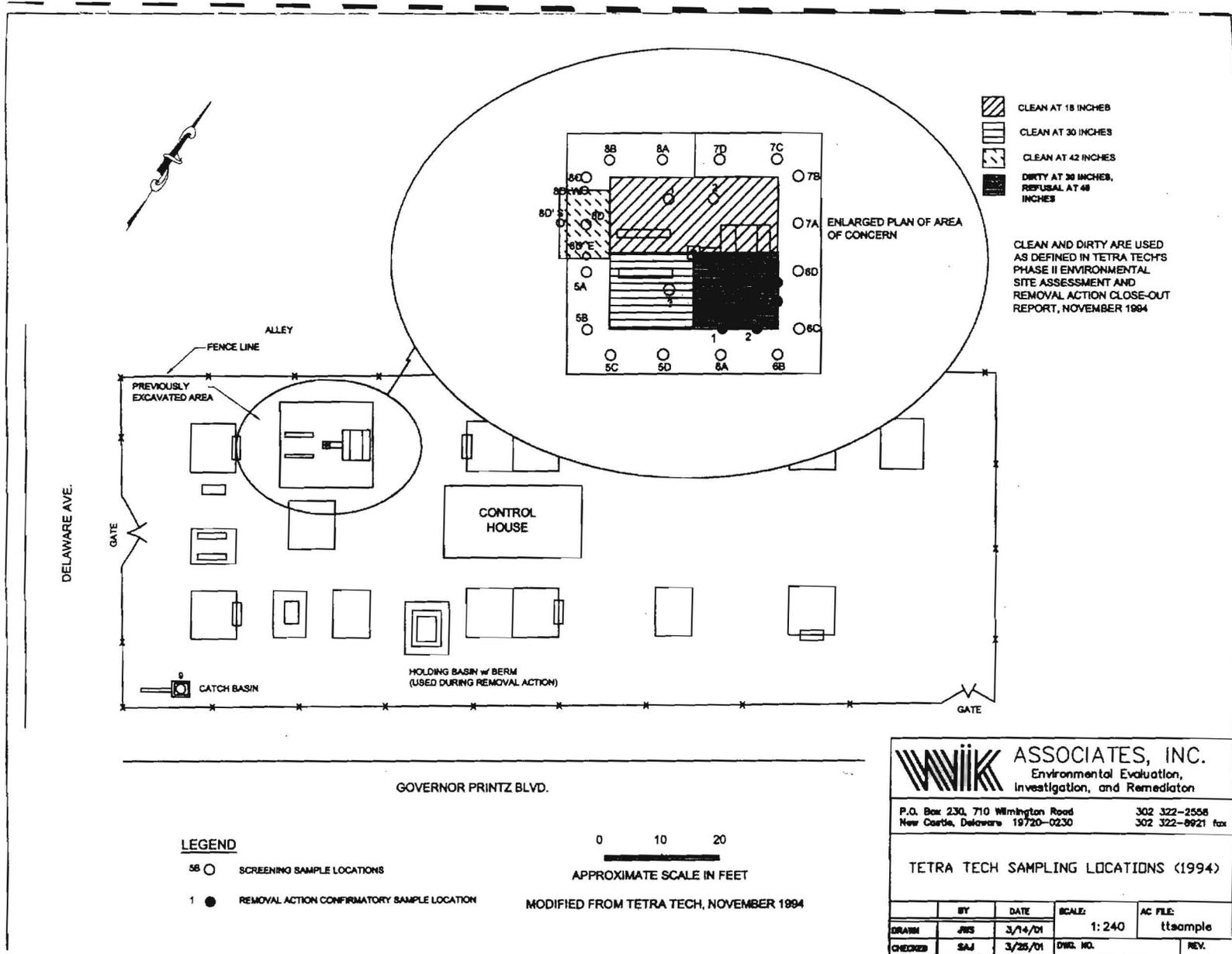


Figure 3: Tetra Tech Sampling Locations (1994)

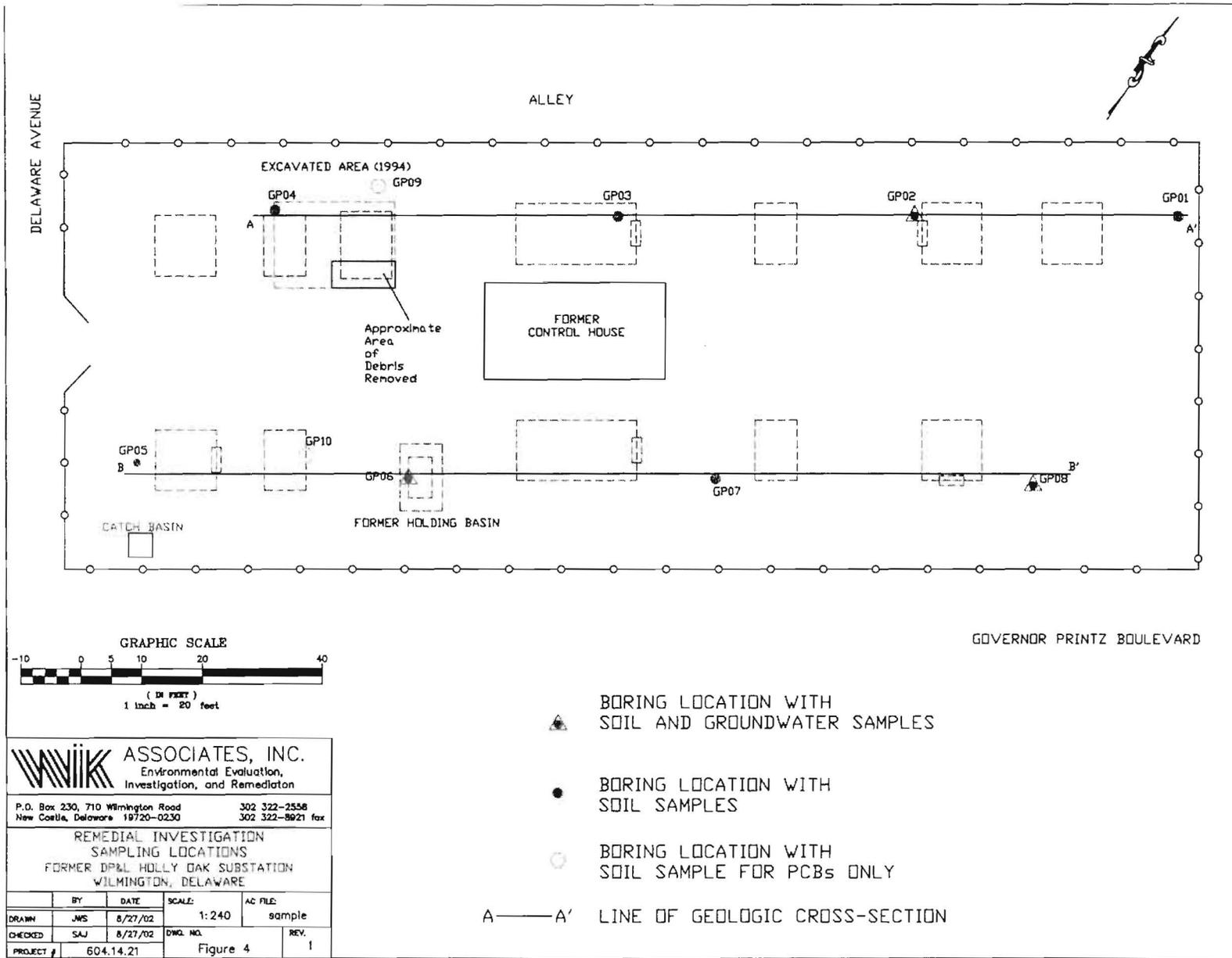
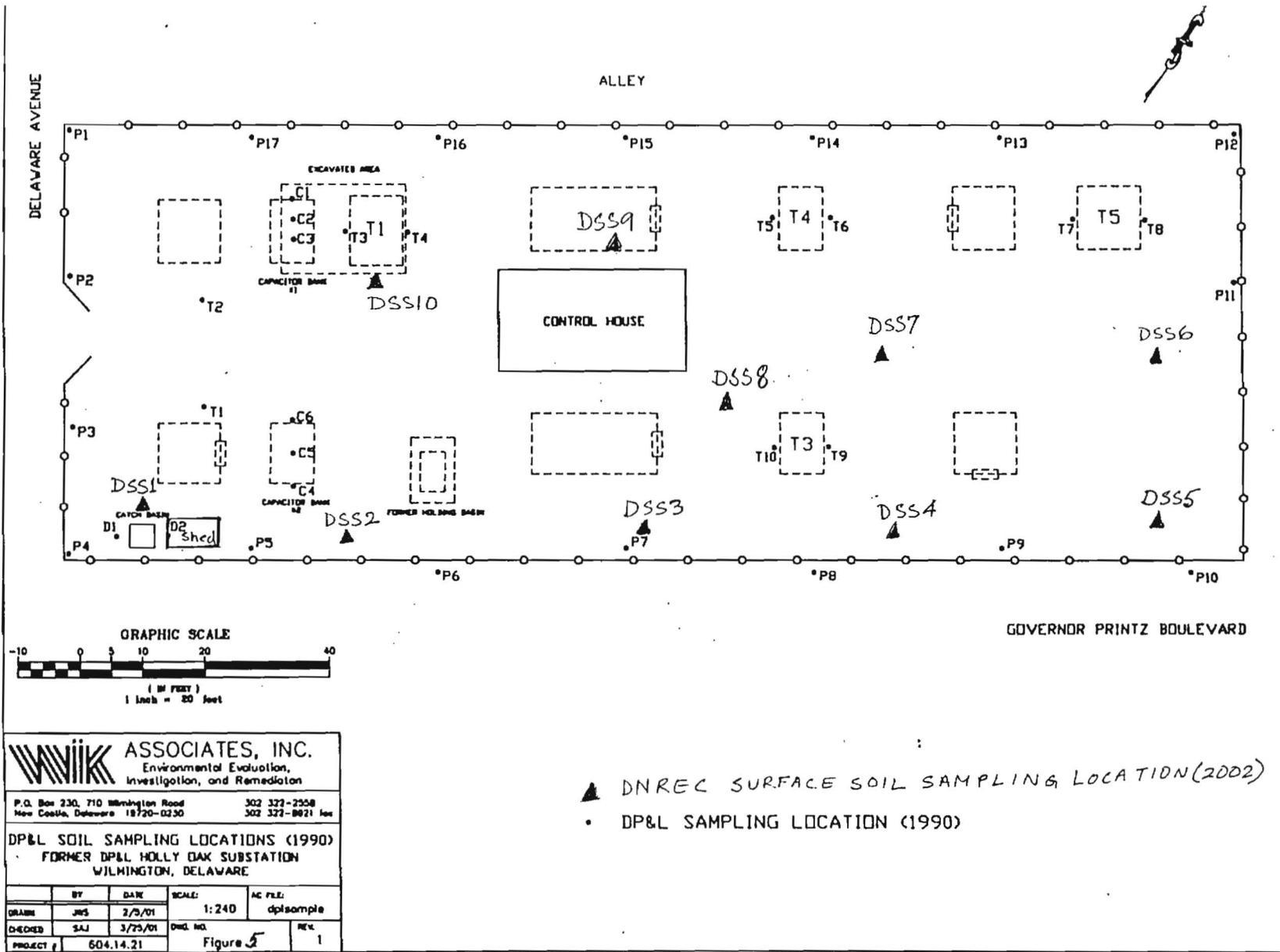


Figure 4: Remedial Investigation Sampling Locations (2002)

Figure 5: DNREC's Surface Fill-Soil Sampling Locations (2002)



Command Buttons		DNREC SITE-SPECIFIC STANDARD CALCULATOR FOR MULTIPLE ANALYTES May, 1999 Version			Calculated Cancer Risk			Calculated Noncancer Risk		
Click to learn about this application		Site Concentrations Table			Totals By Category			Totals By Category		
Click here to calculate risk					0.00E+00	0.00E+00	0.00E+00	0.00	0.10	2.59
Click on this to filter results					Maximum In Each Category			Maximum In Each Category		
Click to remove results filter		0.00E+00	0.00E+00	0.00E+00	0.00	0.07	1.88			
Contaminant Name	CAS Number	Ground Water Concentration ug/L	Soil Concentration (Restricted Use) mg/kg	Soil Concentration (Unrestricted Use) mg/kg	Ground Water Ingestion Cancer Risk	Soil-Related Cancer Risk (Restricted Use)	Soil-Related Cancer Risk (Unrestricted Use)	Ground Water Ingestion Noncancer Risk	Soil-Related Noncancer Risk (Restricted Use)	Soil-Related Noncancer Risk (Unrestricted Use)
<b>METALS</b>										
ALUMINUM	7429905		32635.000	32635.000					0.02	0.42
IRON	7439896		44208.000	44208.000					0.07	1.88
MANGANESE	7439965		863.000	863.000					0.00	0.08
VANADIUM	7440622		116.000	116.000					0.01	0.21

Attachment A. Risk Calculated for Surface soil

Command Buttons			DNREC SITE-SPECIFIC STANDARD CALCULATOR FOR MULTIPLE ANALYTES May, 1999 Version			Calculated Cancer Risk			Calculated Noncancer Risk					
Click to learn about this application			Site Concentrations Table			Totals By Category			Totals By Category					
Click here to calculate risk						0.00E+00			8.28E-07			7.40E-06		
Click on this to filter results						0.00E+00			6.02E-07			5.37E-06		
Click to remove results filter			Maximum in Each Category			0.00			0.05			1.41		
Contaminant Name	CAS Number	Ground Water Concentration (ug/L)	Soil Concentration (Restricted Use) (mg/kg)	Soil Concentration (Unrestricted Use) (mg/kg)	Ground Water Ingestion Cancer Risk	Soil-Related Cancer Risk (Restricted Use)	Soil-Related Cancer Risk (Unrestricted Use)	Ground Water Ingestion Noncancer Risk	Soil-Related Noncancer Risk (Restricted Use)	Soil-Related Noncancer Risk (Unrestricted Use)				
<b>METALS</b>														
ALUMINUM	7429905		10537.000	10537.000					0.01	0.13				
IRON	7439896		29201.000	29201.000					0.05	1.24				
MANGANESE	7439965		302.000	362.000					0.00	0.03				
<b>POLYNUCLEAR AROMATIC HYDROCARBONS</b>														
BENZO[A]PYRENE	50328		0.472	0.470		6.02E-07	5.37E-06							
DIBENZO[A,H]ANTHRACENE	53709		0.139	0.139		1.77E-07	1.59E-06							
POLYCHLORINATED BIPHENYLS														
AROCLOR-1254	11097691		0.139	0.139		4.86E-08	4.35E-07							

Attachment B. Risk Calculated for Subsurface Soil

Command Buttons		DNREC SITE-SPECIFIC STANDARD CALCULATOR FOR MULTIPLE ANALYTES May, 1999 Version			Calculated Cancer Risk			Calculated Noncancer Risk		
Click to learn about this application		Site Concentrations Table			Totals By Category			Totals By Category		
Click here to calculate risk					5.46E-05	0.00E+00	0.00E+00	0.93	0.00	0.00
Click on this to filter results					Maximum In Each Category			Maximum In Each Category		
Click to remove results filter		4.78E-05	0.00E+00	0.00E+00	0.70	0.00	0.00			
Contaminant Name	CAS Number	Ground Water Concentration ug/L	Soil Concentration (Restricted Use) mg/kg	Soil Concentration (Unrestricted Use) mg/kg	Ground Water Ingestion Cancer Risk	Soil-Related Cancer Risk (Restricted Use)	Soil-Related Cancer Risk (Unrestricted Use)	Ground Water Ingestion Noncancer Risk	Soil-Related Noncancer Risk (Restricted Use)	Soil-Related Noncancer Risk (Unrestricted Use)
<b>METALS</b>										
IRON	7439896	352						0.03		
MANGANESE	7439965	3600						0.70		
<b>PESTICIDES</b>										
DIELDRIN	60571	0.2			4.78E-05					
<b>SEMI-VOLITALE COMPOUNDS</b>										
**1,2,4,5-TETRACHLOROBENZENE	95943									
CHLORDANE	57749	1.3			6.79E-06					
DIMETHYLPHTHALATE	131113	7						0.00		
NITROBENZENE	98953	0.7						0.20		

Attachment C. Risk Calculated for Groundwater