

Appendix 16

GOVERNOR BACON HEALTH CENTER/ FORT DUPONT WILMINGTON, DELAWARE

SIRS ID: DE-1007

GENERAL SITE INFORMATION

Site Name: Governor Bacon Health Center/Fort DuPont

SIRS ID Number: DE-1007

Site Location and Description:

The Governor Bacon Health Center and Fort DuPont site is located in Delaware City, New Castle County, Delaware (Figure 1). The site is approximately 311 acres in size and is comprised of two tax parcels (#1202300020 and #1202300021) east of the Reedy Point Bridge approach in Delaware City. The property is bounded to the north and west by the Delaware City Branch Channel, to the east by the Delaware River, and to the south by the C&D Canal Conservation Area. Route 9 runs along the inside of the southwestern boundary and Fort DuPont State Park lies south of the site.

The Delaware City Branch Channel and the Delaware River converge at the northern corner of the Site. Surface water from the Site is expected to flow into the Delaware River.

The Site currently serves as the Governor Bacon Health Center which has many state and private agencies for drug and alcohol abuse, a state hospital, surplus warehousing, and office spaces. About three acres in the northeast of the site are used for the New Castle County sewage treatment plant. In 1992, some of the land was set aside to establish Fort DuPont State Park.

Previous Site Uses:

Starting in 1863, the Governor Bacon Health Center site was used as the location of Ten Gun Battery during the Civil War. Between 1871 and 1904, the land for Fort DuPont was acquired in three separate purchases. Construction of the fort lasted from 1872 to 1875. It was used during World War I as a Coastal Artillery installation, then as an engineer post for construction of the C&D Canal following the war. Throughout World War II, the site was a training center, prisoner-of-war camp, and may have been used to store explosives and ammunition. In 1946 the state of Delaware took control of the site and it was decided to be used as a health center.

There are two abandoned landfills on the site which were used prior to 1947 and two incinerators. Very few details are known about the landfills except that in 1985 there was a fire in Landfill No. 1 which exposed gas cylinders with unknown contents. Fourteen gas cylinders were removed and

the landfill was covered with one foot of soil. In 1986 there was a fire in a fenced in area where surplus goods including oil, greases, and solvents were stored. Damaged drums were overpacked, then all drums were removed from the area and stored in the Drum Staging Area while hazardous materials and contaminated soils were removed by CECOS International, Inc.

Site Regulatory Status:

This section briefly summarizes previous investigations performed on the site through the SIRS program. A current SIRS regulatory status is also included.

Field Trip Report (NUS Corporation, 1986)

Only one of the two incinerators could be located on the site. Landfill No. 1 was identified as a 20 acre area located with the northeast perimeter in the tidal zone of the river. Landfill No. 2 was identified as a 10 acre area southeast of the National Guard Station. No exposed waste or leachate seeps were observed at either landfill. Leaking and bulging drums in the Drum Fire Area were overpacked and stained soil was noted to be removed by CECOS International. A total of 16 buildings on the property were identified as potential sources of contamination. NUS Corporation recommended surface soil and groundwater sampling for organics and inorganics.

Soil Sampling Event (CECOS International, 1986)

CECOS International performed an investigation following the 1986 fire in the Drum Fire Area. The purpose was to determine if any soil contamination resulted from the fire. Analyses revealed metals and pesticides in the soil but the full report was not available for review.

Soil Sampling Event (DNREC, 1987)

Following the 1985 fire, many of the 5 and 55-gallon containers that had been discovered were buried in a plot known as Area P-3. DNREC sampled the area in 1987 and PCBs were detected at concentrations up to 26 ppm. One sample was reported by the laboratory as containing 10,000 ppm of PCBs; however, later sampling during the 1994 Facility Evaluation did not confirm the presence of PCBs. Additional samples contained “moderate levels” of base neutral/acid extractable compounds.

In keeping with the conservative approach, the 10,000 ppm detection was treated as a PCB compound and incorporated in the calculation for this analysis. It should be noted that 10,000 ppm is well outside of the solubility of different Aroclor compounds, which generally ranges from

0.0027 mg/L to 0.59 mg/L, depending on the temperature and type of Aroclor (based on data from the EPA (1979), Monsanto Chemical Company (1985), and Hutzinger, Safe, and Zitko (1974) provided by the U.S. Department of Health and Human Services, 2000).

Soil Sampling Events and Waste Removal (Rollins Environmental, 1987)

In 1986, between 200 and 250 5-gallon containers of DDT were discovered in a building on-site, some of which had spilled onto the earth floor. Rollins Environmental Services collected soil samples in July of 1986 before any containers were removed. The DDT containers were removed from the building. At the same time, 16 cans of flammable liquid hazardous waste were overpacked and staged to be removed later by Rollins (January 1987). After receiving the results of the samples, additional samples were collected from the building and surrounding area in November 1986. Analyses showed high (greater than ten times the normal background and/or in exceedance of DNREC policy) concentrations of DDT and Rollins recommended soil removal. It is uncertain if remedial action was taken. The building where the DDT had been stored was demolished in 1989. No reports documenting the sampling or waste removal were available.

Waste Removal (CECOS Environmental and Rollins Environmental, 1987-1988)

Although no report was available for review, the 1992 Engineering Report described a two phase waste removal from Landfill #1 and the DDT storage building. During the first phase, 300 drums of waste were staged and characterized, which was completed in 1987. All visible hazardous waste was disposed of in the second phase which was completed in June 1988. Visible soil contamination was reported in the area even after removal of the drums.

Engineering Report on Contamination Evaluation (Ecology and Environment, 1992)

An investigation was performed to address concerns regarding previous activities on the site by the US Department of Defense (DOD). The investigation focused on a 2 to 3 acre abandoned landfill (Landfill No. 1) and included groundwater, near-surface soil, and sediment sampling and a survey to detect unexploded ordnance. Analyses revealed “low” concentrations of semi-volatiles, PCBs, and petroleum hydrocarbons in the landfill and the area south of the landfill. PCB concentrations did not exceed the EPA cleanup goal of 10 mg/kg for unrestricted residential areas. Sediment along the Delaware River was contaminated with high concentrations of cadmium, lead, and zinc as well as small amounts of PAHs, PCBs, and petroleum hydrocarbons. Ecology and Environment stated that the landfill was a probable source of the contamination. Additionally, the

landfill may have contributed small amounts of organics and inorganics to the groundwater, but all compounds detected were below EPA MCLs. Further delineation of the metals in riparian sediment was recommended.

Facility Evaluation (DNREC, 1994)

A total of 30 subsurface soil samples were collected and screened for PCBs, then selected samples were submitted for confirmatory analysis. PCB concentrations were detected below the EPA Region III's Risk Based Concentrations. DNREC recommended taking additional soil samples at greater depths to further delineate contamination, collecting groundwater samples, conducting an ecological risk assessment, and investigating the fire retardant contamination near the old barracks. Additional concerns included lead and asbestos contamination, underground storage tanks, and the multiple 55-gallon drums still on-site.

Archaeological Survey (Hunter Research, 2001)

An archaeological survey was summarized in a March 2012 Trip Report for the Removal Site Evaluation by Weston Solutions, Inc. (Weston). Soil borings, auger tests, and excavations were performed over five investigation areas, including the Landfill #1 site (called Dump Site #1 in the report). Some artifacts were recovered from the site and consideration of the results was recommended while planning any future remediation activities.

Site Inspection (DNREC, 2003)

DNREC-SIRB collected 164 soil samples from Landfill 1, Landfill 2, the former DDT Building Area, the former Mosquito Control Building Area, and the Drum Fire Area. Landfill 1 and 2 were surveyed with ground penetrating radar prior to sampling and metal objects were marked and avoided during sampling. All soil samples were screened for various compounds, including PCBs, and then selected samples were sent for confirmatory analysis. Four groundwater samples were collected from onsite monitoring wells. PCBs were not detected in any of the samples. DNREC recommended that any prospective purchaser or developer enter into a VCP agreement. In addition, they recommended a Remedial Investigation (RI), cleanup of Landfill 1, and development of a groundwater discharge to surface water model.

December 2011 Removal Site Evaluation of Landfill Area 1 (Weston, 2012)

The EPA contracted Weston to conduct a Removal Site Evaluation for Landfill Area 1. Surface and subsurface soil samples were collected from test pits excavated in and upland of areas of the landfill that are eroding into the Delaware River. A total of 23 test pit soil samples, 22 surface soil samples from both high and low tide zones, two discreet grab soil samples from an area with an oil sheen, and two grab water samples from test pits with oil sheens were analyzed for various constituents. Eight test pit samples, two surface soil samples, and two water samples were analyzed for PCBs. PCBs were only detected in one sample, GBHC-S-120511-TP-03-01, with Aroclor 1254 at a concentration of 90 µg/kg.

July 2012 Sampling of Landfill Area 1 (Weston, 2012)

Following the December 2011 Removal Site Evaluation, the EPA Region III Biological Technical Assistance Group (BTAG) concluded that the metals detected at the site may present an ecological risk. On July 25, 2012, Weston conducted additional sampling of the Landfill Area 1 site. A total of nine soil/sediment samples and four surface water samples were collected from areas along the Delaware River that are prone to erosion. None of the samples were analyzed for PCBs.

December 2012 Removal Site Evaluation of Landfill Area 1 (Weston, 2013)

The second Removal Site Evaluation was conducted to continue delineating the boundary of the landfill material, specifically the pre-1940s disposal area, which Weston believed to be the primary contamination source area. One trench and 52 subsurface test pits were excavated to characterize subsurface debris and field screen soil for lead. Five soil samples (including duplicate and QC samples) were collected from selected test pits, a mound near test pit 26, and the trench. Three grab water samples (including duplicate and QC samples) were collected from test pit 35 and the trench. Samples were analyzed for SVOCs, PCBs, metals, cyanide, and mercury. The maximum concentration of PCBs detected in soil samples was 210 µg/kg for Aroclor 1254 and 99 µg/kg for Aroclor 1260, both occurring in test pit 34. PCBs were not detected in the test pit water samples.

Current Regulatory Status:

PCBs were detected in soil in the Landfill Area 1 during the 2012 Removal Site Evaluation. It is still being determined whether or not response actions are necessary.

SUMMARY OF SITE PCB INFORMATION

Site Investigation PCB Findings:

PCBs were detected in nine surface soil samples with concentrations ranging from 0.014 mg/kg to 10,000 mg/kg. No unsaturated subsurface soil samples were analyzed for PCBs. PCBs were not detected in the saturated subsurface soil samples.

The calculated 95% upper confidence limit (UCL) of the mean of the concentration of total PCBs observed in the surface soil (for overland flow calculations) is 26 mg/kg. There were no PCBs detected in groundwater.

Concentrations of PCBs on Site			
Sample Matrix	Corresponding Figure	Analytical Methods	Range of Total PCBs
Surface Soil	Figure 2	Method 8082	Not detected to 10,000 mg/kg
Subsurface Soil (unsaturated)	Figure 3	Not Analyzed	Not Analyzed
Subsurface Soil (saturated)	Figure 4	Method 8082	Not Detected
Groundwater	Figure 5	Method 8082	Not Detected

A summary of all samples collected for PCB analyses are presented in Tables 1 through 3.

Acreage where PCBs detected:

The estimated surface soil area impacted by PCBs is 30.3 acres (Figure 2). According to the information available and reviewed by BrightFields, no subsurface unsaturated soil samples were analyzed for PCBs so the respective area impacted by PCBs cannot be determined. Based on the data available and reviewed by BrightFields, subsurface saturated soil and groundwater are not impacted by PCBs.

PCB Remediation Status:

PCB remediation may be required for Landfill Area 1 at the Governor Bacon Health Center/Fort DuPont site.

PCB MASS LOADING SUMMARY

The PCB mass loading rate to surface water via overland flow was estimated for the Governor Bacon Health Center and Fort DuPont Property. There were no reported concentrations of PCBs in the subsurface saturated zone or in the groundwater; therefore, groundwater transport cannot be evaluated as a mechanism of transport for PCBs at the Property. A summary of the results is included below and the details of the calculations are included as attachments to this Appendix.

Overland Flow:

Overland flow has been determined on this site by using the Revised Universal Soil Loss Equation (RUSLE). The RUSLE predicts the long term average annual rate of erosion on an area based on rainfall patterns, soil type, topography, cover/canopy factors and support management practices. These specific factors are site specific and rely on local information of the site. A breakdown of the individual factors is presented below with a brief explanation of their choice.

Ground Cover and Canopy:

The surface cover and flow paths were assessed through aerial photography and available contour mapping (Delaware Data Mil, 2007). The cover/management factor (C) assigned to the erodible area and associated flow paths was 0.003, which corresponds to heavy vegetation containing both trees and a grass like vegetative cover.

Site Sediment and Erosion Control Practices:

Based on the aerial photography evaluation and review of site documents it does not appear that any sediment and erosion control practices are being implemented on Site.

Input Factors and Results:

A breakdown of the individual factors is presented below with a brief explanation of their choice.

Governor Bacon Health Center/Fort DuPont

RUSLE Factors	Values Provided	Explanation of choice
R = rainfall-runoff erosivity index (10 ² ft-tonf-in/ac-hr-yr)	175	An appropriate value for R for the Site was determined using the Isoerodent Map of the Eastern U.S. from the Stormwater Phase II Final Rule Construction Rainfall Erosivity Waiver (USEPA, 2012).
K = soil erodibility (0.01 ton-ac-hr/ac-ft-tonf-in)	0.25	The soil erodibility factors were selected from the National Resource Conservation Soil Survey Geographic Database (SSURGO) and a raster was generated using the values 0, 0.02, 0.2, 0.28, 0.32, and 0.49, with a weighted average of 0.25.
ls = topographic factor (dimensionless)	0.059	The topographic factor was derived based on the slope and flow accumulation grids created in ArcGIS. An output LS grid was created and the average value for the grid is provided.
C = cover/management factor (dimensionless)	0.003	The cover/management factor C assigned to the erodible area was 0.003, which corresponds to heavy vegetation containing both trees and a grass like vegetative cover.
P = support practice factor (dimensionless)	1	No documentation was provided indicating that any sediment and erosion controls are in place.
A = average annual soil loss estimate (ton/ac-yr)	0.008	The average soil loss estimate was generated by ArcGIS using the input factors listed above.
Erodible Area (acres)	28.2	The erodible area was calculated based on the pervious surfaces within the area of concern polygon for surface soil (Figure 6).

For factors that were not consistent across the site, rasters were used to characterize the variations. Due to the methodology utilized to derive the soil loss estimate, the numbers listed above cannot simply be multiplied.

The total estimated PCB loading via overland flow for the Governor Bacon Health Center/Fort DuPont Property is **5.3 grams per year**. Please see attached table for specific variables.



Uncertainty Analysis Associated with Overland Flow:

Specific Areas and Degree of Uncertainty for the Governor Bacon Health Center/Fort DuPont

	Samples Per Acre (site)	Chemical Data Quality*	Soil Type	Site Coverage	Map Quality	Average Distance to Discharge Points
Site Specific Information	0.24	Aroclor Data	Soil Database	Based on a limited site assessment	Well Scaled Maps; Okay Scaled Maps; Poorly Scaled Map	Approximately 818 feet
Degree of Uncertainty	High	Moderate to High	Low	Moderate	Low to Moderate	Moderate to High

* Primary analysis used in the historical samples

Sources of uncertainty for the Governor Bacon Health Center/Fort DuPont site include: The majority of the data used in the analysis was Aroclor laboratory data, with some Immunoassay screening data. As discussed previously, the 10,000 ppm PCB detection from 1987 was not confirmed, yet it was still used in the UCL calculation, which could result in an overestimated PCB mass loading via overland flow. Site access was only limited in some areas, but due to the large area of the site and varying site coverage, the aerial was also used. The sample locations came from numerous maps, including six well scaled maps, two okay scaled maps where the buildings and roads appeared to match up with the aerial, and one poorly scaled. Based on this evaluation the level of uncertainty associated with overland flow PCB mass loading from the Governor Bacon Health Center/Fort DuPont site is **Moderate to High**.

Groundwater Discharge Analysis:

No groundwater discharge analysis was performed for this site.

Site References:

Delaware Department of Natural Resources and Environmental Control (DNREC), 1994, Governor Bacon (DE-1007) Facility Evaluation, August 1994.

DNREC, 2003, Site Inspection, Governor Bacon Health Center/Fort DuPont State Park, April 2003.

Delaware Geological Survey, 2013, Delaware Data Mil, <<http://datamil.delaware.gov/geonetwork/srv/en/main.home>>, May 2013.

Ecology and Environment, Inc., 1992, Engineering Report on Contamination Evaluation, Governor Bacon Health Center, October 1992.

NUS Corporation, 1986, A Field Trip Report for Governor Bacon Site, September 1986.

U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, 2000, Toxicological Profile for Polychlorinated Biphenyls (PCBs), November 2000.

U.S. Environmental Protection Agency Region III to Mike Towle, 2012, Sample Summary for the Fort DuPont State Park – Removal Site Evaluations, October 2012.

Weston Solutions, Inc., 2012, Final Trip Report for the Removal Site Evaluation, Governor Bacon Health Center/Fort DuPont State Park, Landfill Area 1, March 2012.

Weston Solutions, Inc., 2013, Trip Report for the December 2012 Removal Site Evaluation, Governor Bacon Health Center/Fort DuPont State Park, Landfill Area 1, March 2013.

PCB Mass Loading Phase II
Governor Bacon Health Center/Fort DuPont
SIRS ID: DE-1007
Wilmington, Delaware



Figures

DELAWARE RIVER

BRANCKE CHANNEL

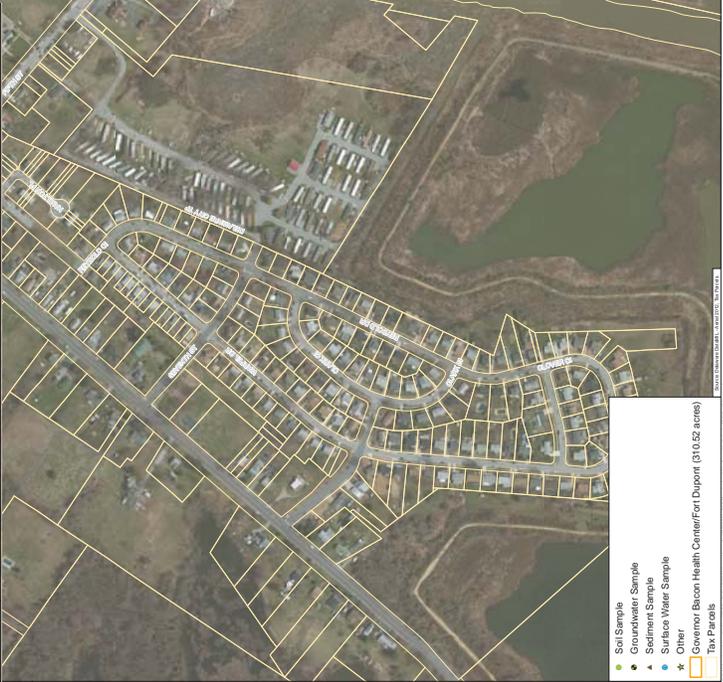
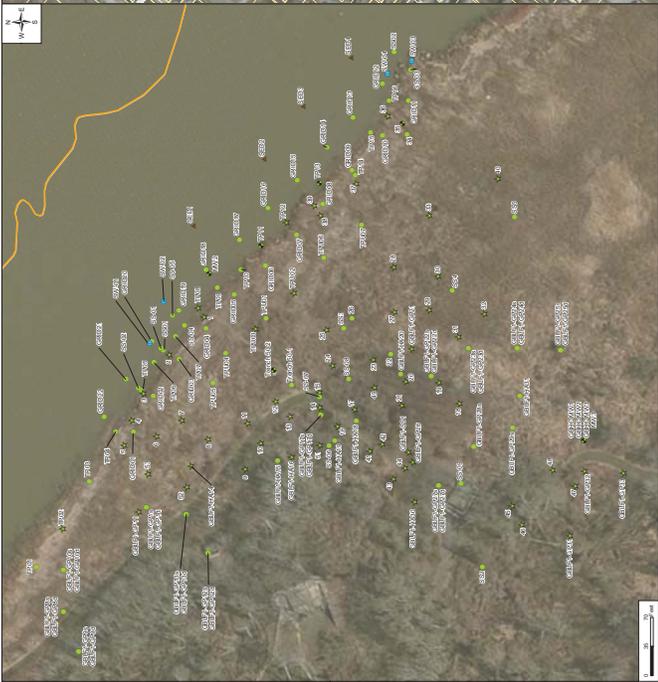


BrightFields, Inc.
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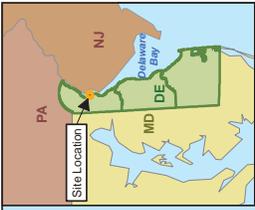
Heavy Metals Location:
Governor Bacon Health Center/Fort Dupont
Delaware City, Delaware

By	Notes	Scale	Revision
Client	Drawn	1:10,000	1/1/2008
Checked	2/11/2008	1/10/2008	1/1/2008
Project #	0082.00.01	1/1/2008	1/1/2008

DATE: 02/11/2008



DATE: 02/11/2008



BrightFields, Inc.
 Environmental Evaluation
 Investigation, and Remediation
 801 Industrial Street, Suite 1
 Wilmington, Delaware 19801
 302-656-9600
 302-656-9700 fax

PCB Distribution in Subsurface Unsaturated Soil
 Governor Bacon Health Center/Fort DuPont
 Delaware City, Delaware

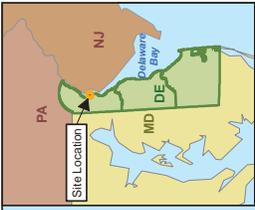
By	Date	Scale	File Name
ADS	6/19/2014	1:6,000	Fig3SS_UnSat.mxd
Checked	JEH	6/19/2014	Fig. No.
Project #	0985.69.51	Figure 3	
	0	275	550
			Feet



● Soil Sample, No PCB data available
 ■ Governor Bacon Health Center/Fort Dupont
 ■ Tax Parcels
 ■ Buildings
 ■ Surface Water

Sources: Delaware Dept. of Transportation - Tax Parcels;
 New Castle County - Buildings

C & D Conservation Area



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PCB Distribution in Subsurface Saturated Soil
 Governor Bacon Health Center/Fort DuPont
 Delaware City, Delaware

By	Date	Scale	File Name
Drawn ADS	6/19/2014	1:6,000	Fig4SS_Sat.mxd
Checked JEH	6/19/2014	Figure 4	
Project #	0985.69.51		
	0	275	550

0 275 550 Feet



C & D Conservation Area

Notes:
 ND 16-201 - Not Detected and Sample Depth.
 Source: Delaware DataMill - Tax Parcels,
 New Castle County - Buildings.

- Soil Sample, No PCB data available
- Soil Sample
- Governor Bacon Health Center/Fort Dupont
- Tax Parcels
- Buildings
- Surface Water

Fig. 4: PCB Distribution in Subsurface Saturated Soil - Governor Bacon Health Center/Fort DuPont, Delaware City, Delaware

PCB Mass Loading Phase II
Governor Bacon Health Center/Fort DuPont
SIRS ID: DE-1007
Wilmington, Delaware



Tables

**Table 1
PCB Screening Results For Soil
Governor Bacon Health Center/Fort DuPont (DE-1007)
Wilmington, DE**

Sample Identification	Sample Depth (feet bgs)	Sampling Company	Report Name	Report Date	Total PCBs	
					DNREC-SIRS Screening Level (January 2014) (mg/kg)	NCA
1	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
2	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
3	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
4	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
6	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
7	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
8	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
9	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
10	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
11	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
12	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
13	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
14	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
15	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
16	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
17	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
18	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
19	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	0.28	ND
20	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
21	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	0.56	ND
22	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
23	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
24	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
25	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
26	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
27	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
28	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
29	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
30	0' - 0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	ND
GBDT-HA2	<2'	DNREC	Site Inspection Governor Bacon Health Center / Fort DuPont State Park	Apr-03	ND	ND

Note: All results reported in mg/kg.

Qualifiers:

bgs - Below ground surface

NCA - No criteria available

ND - Not detected

Table 2
PCB Analytical Results For Soil
Governor Bacon Health Center/Fort DuPont (DE-1007)
Wilmington, DE

Sample Identification	Sample Depth (feet bgs)	Sampling Company	Report Name	Report Date	Aroclor-1016 Screening Level (mg/kg)	Aroclor-1221 Screening Level (mg/kg)	Aroclor-1232 Screening Level (mg/kg)	Aroclor-1242 Screening Level (mg/kg)	Aroclor-1248 Screening Level (mg/kg)	Aroclor-1254 Screening Level (mg/kg)	Aroclor-1260 Screening Level (mg/kg)	Aroclor-1262 Screening Level (mg/kg)	Aroclor-1268 Screening Level (mg/kg)
2	0'-0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	NA	NCA						
11	0'-0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	NA	NA						
19	0'-0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	NA	NA						
21	0'-0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	NA	NA						
22	1.0'	Weston Solutions, Inc.	Trip Report for the December 2012 Removal Site Evaluation	Mar-13	0.045	U	0.045	U	0.045	J	0.005	U	0.045
26	<2.0'	Weston Solutions, Inc.	Trip Report for the December 2012 Removal Site Evaluation	Mar-13	0.044	U	0.044	U	0.044	J	0.044	U	0.044
28	0'-0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	NA	NA						
29	0'-0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	NA	NA						
34	1.5'	Weston Solutions, Inc.	Trip Report for the December 2012 Removal Site Evaluation	Mar-13	0.056	U	0.056	U	0.056	J	0.056	U	0.056
GB-1	0'-0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	NA	NA						
GB-2	0'-0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	NA	NA						
GB-3	0'-0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	NA	NA						
GB-DDT-1	0'-0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	NA	NA						
GB-DDT-2	0'-0.5'	DNREC	Governor Bacon Facility Evaluation	Aug-94	ND	NA	NA						
GBDF-TP18	1.5' - 1.75'	DNREC	Site Inspection Governor Bacon Health Center / Fort DuPont State Park	Apr-03	0.08	U	0.08	U	0.08	U	0.08	U	0.08
GBDF-TP19	1.5' - 1.75'	DNREC	Site Inspection Governor Bacon Health Center / Fort DuPont State Park	Apr-03	0.079	U	0.079	U	0.079	U	0.079	U	0.079
GBDF-TP20	<2'	DNREC	Site Inspection Governor Bacon Health Center / Fort DuPont State Park	Apr-03	0.083	U	0.083	U	0.083	U	0.083	U	0.083
GBDF-TP21	<2'	DNREC	Site Inspection Governor Bacon Health Center / Fort DuPont State Park	Apr-03	0.11	U	0.11	U	0.11	U	0.11	U	0.11
GBDF-TP22	<2'	DNREC	Site Inspection Governor Bacon Health Center / Fort DuPont State Park	Apr-03	0.11	U	0.11	U	0.11	U	0.11	U	0.11
GBDF-TP23	<2'	DNREC	Site Inspection Governor Bacon Health Center / Fort DuPont State Park	Apr-03	0.11	U	0.11	U	0.11	U	0.11	U	0.11
S-1	0'-0.5'	DNREC	Governor Bacon Sampling	1987	0.99	U	0.99	U	0.99	U	2	U	NA
S-2	0'-0.5'	DNREC	Governor Bacon Sampling	1987	ND	NA	NA						
S-3	0'-0.5'	DNREC	Governor Bacon Sampling	1987	ND	NA	NA						
S-4	0'-0.5'	DNREC	Governor Bacon Sampling	1987	8.5	U	8.5	U	8.5	U	1.1	NA	NA
S-5	0'-0.5'	DNREC	Governor Bacon Sampling	1987	8.5	U	8.5	U	8.5	U	26	NA	NA
S-6	0'-0.5'	DNREC	Governor Bacon Sampling	1987	ND	NA	NA						
S-7	0'-0.5'	DNREC	Governor Bacon Sampling	1987	ND	NA	NA						
S-8	0'-0.5'	DNREC	Governor Bacon Sampling	1987	ND	NA	NA						
S-9	0'-0.5'	DNREC	Governor Bacon Sampling	1987	ND	NA	NA						
S-10	0'-0.5'	DNREC	Governor Bacon Sampling	1987	ND	NA	NA						
S-11	0'-0.5'	DNREC	Governor Bacon Sampling	1987	ND	NA	NA						
S-12	0'-0.5'	DNREC	Governor Bacon Sampling	1987	ND	NA	NA						
S-13	0'-0.5'	DNREC	Governor Bacon Sampling	1987	ND	NA	NA						
S-14	0'-0.5'	DNREC	Governor Bacon Sampling	1987	ND	NA	NA						
SS01	0.0'-0.25'	Weston Solutions, Inc.	Final Trip Report for the Removal Site Evaluation	Mar-12	0.033	UJ	0.033	UJ	0.033	UJ	0.033	UJ	0.033
SS02	0.0'-0.25'	Weston Solutions, Inc.	Final Trip Report for the Removal Site Evaluation	Mar-12	0.033	UJ	0.033	UJ	0.033	UJ	0.033	UJ	0.033
SS1	0'-0.5'	Ecology and Environment, Inc.	Engineering Report on Contamination Evaluation	Oct-92	0.025	U	0.025	U	0.025	U	0.025	U	0.025
SS2	0'-0.5'	Ecology and Environment, Inc.	Engineering Report on Contamination Evaluation	Oct-92	0.23	UJ	0.23	UJ	0.23	UJ	0.23	UJ	0.23
SS3	0'-0.5'	Ecology and Environment, Inc.	Engineering Report on Contamination Evaluation	Oct-92	0.13	UJ	0.13	UJ	0.13	UJ	0.13	UJ	0.13
SS4	0'-0.5'	Ecology and Environment, Inc.	Engineering Report on Contamination Evaluation	Oct-92	0.13	UJ	0.13	UJ	0.13	UJ	0.13	UJ	0.13
SS5	0'-0.5'	Ecology and Environment, Inc.	Engineering Report on Contamination Evaluation	Oct-92	0.087	UJ	0.087	UJ	0.087	UJ	0.087	UJ	0.087
TP02	<1'	Weston Solutions, Inc.	Final Trip Report for the Removal Site Evaluation	Mar-12	0.033	UJ	0.033	UJ	0.033	UJ	0.033	UJ	0.033
TP03	1.0'	Weston Solutions, Inc.	Final Trip Report for the Removal Site Evaluation	Mar-12	0.033	UJ	0.033	UJ	0.033	UJ	0.033	UJ	0.033
TP06	1.0'	Weston Solutions, Inc.	Final Trip Report for the Removal Site Evaluation	Mar-12	0.033	UJ	0.033	UJ	0.033	UJ	0.033	UJ	0.033
TP10	1.6'	Weston Solutions, Inc.	Final Trip Report for the Removal Site Evaluation	Mar-12	0.033	UJ	0.033	UJ	0.033	UJ	0.033	UJ	0.033
TP11	<2.0'	Weston Solutions, Inc.	Final Trip Report for the Removal Site Evaluation	Mar-12	0.033	UJ	0.033	UJ	0.033	UJ	0.033	UJ	0.033
TP13	1.0'	Weston Solutions, Inc.	Final Trip Report for the Removal Site Evaluation	Mar-12	0.033	UJ	0.033	UJ	0.033	UJ	0.033	UJ	0.033
TP15	1.1'	Weston Solutions, Inc.	Final Trip Report for the Removal Site Evaluation	Mar-12	0.033	UJ	0.033	UJ	0.033	UJ	0.033	UJ	0.033
TPJ06	0.0'-2.67'	Weston Solutions, Inc.	Final Trip Report for the Removal Site Evaluation	Mar-12	0.033	UJ	0.033	UJ	0.033	UJ	0.033	UJ	0.033
Trench 50-1	1.5'	Weston Solutions, Inc.	Trip Report for the December 2012 Removal Site Evaluation	Mar-13	0.04	U	0.04	U	0.04	U	0.04	U	0.04

Note: All results reported in mg/kg.

Qualifiers:

bgs - Below ground surface

NCA - No criteria available

U - Sample not detected above the laboratory method detection limit

C - Detection limit elevated due to sample matrix interferences

ND - Not detected

NA - Not available from reports provided to Brightfields

Bold and shaded - Exceeds DNREC-SIRS January 2014 Screening Levels

Table 3
 PCB Analytical Results For Groundwater
 Governor Bacon Health Center/Fort Dupont (DE-1007)
 Wilmington, DE

Sample Identification	Screen Depth (feet/bgs)	Sampling Company	Report Name	Report Date	Aroclor-1016 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.11	Aroclor-1221 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.004*	Aroclor-1232 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.004*	Aroclor-1242 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.034*	Aroclor-1248 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.034*	Aroclor-1254 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.031*	Aroclor-1260 DNREC-SIRS Screening Level (January 2014) (ug/L) 0.034*	Aroclor-1262 DNREC-SIRS Screening Level (January 2014) (ug/L) NCA	Aroclor-1268 DNREC-SIRS Screening Level (January 2014) (ug/L) NCA
GEHC MW1	7' - 17'	DNREC	Site Inspection Governor Bacon Health Center / Fort Dupont State Park	Apr-03	1	1	2	1	1	1	1	NA	NA
GEHC MW2	12' - 22'	DNREC	Site Inspection Governor Bacon Health Center / Fort Dupont State Park	Apr-03	1	1	2	1	1	1	1	NA	NA
GEHC MW3	10' - 20'	DNREC	Site Inspection Governor Bacon Health Center / Fort Dupont State Park	Apr-03	1	1	2	1	1	1	1	NA	NA
GEHC MW4	7' - 17'	DNREC	Site Inspection Governor Bacon Health Center / Fort Dupont State Park	Apr-03	1	1	2	1	1	1	1	NA	NA
MW1	7' - 17'	Ecology and Environment, Inc	Engineering Report on Contamination Evaluation	Oct-92	0.5	0.5	0.5	0.5	0.5	0.5	0.5	NA	NA
MW2	7' - 17'	Ecology and Environment, Inc	Engineering Report on Contamination Evaluation	Oct-92	0.5	0.5	0.5	0.5	0.5	0.5	0.5	NA	NA
MW3	7' - 17'	Ecology and Environment, Inc	Engineering Report on Contamination Evaluation	Oct-92	0.5	0.5	0.5	0.5	0.5	0.5	0.5	NA	NA
MW4	7' - 17'	Ecology and Environment, Inc	Engineering Report on Contamination Evaluation	Oct-92	0.5	0.5	0.5	0.5	0.5	0.5	0.5	NA	NA
OW-1	>2'	Ecology and Environment, Inc	Engineering Report on Contamination Evaluation	Oct-92	0.5	0.5	0.5	0.5	0.5	0.5	0.5	NA	NA
OW-2	>2'	Ecology and Environment, Inc	Engineering Report on Contamination Evaluation	Oct-92	0.5	0.5	0.5	0.5	0.5	0.5	0.5	NA	NA
TP11	< 2.0'	Weston Solutions, Inc.	Final Trip Report for the Removal Site Evaluation	Mar-12	1	1	1	1	1	1	1	1	1
TP13	< 1.0'	Weston Solutions, Inc.	Final Trip Report for the Removal Site Evaluation	Mar-12	1	1	1	1	1	1	1	1	1
Trench 50-2	< 3.0'	Weston Solutions, Inc.	Trip Report for the December 2012 Removal Site Evaluation	Mar-13	1	1	1	1	1	1	1	1	1
Trench 35	< 2.5'	Weston Solutions, Inc.	Trip Report for the December 2012 Removal Site Evaluation	Mar-13	1	1	1	1	1	1	1	1	1

Note: All results reported in ug/L.

Qualifiers:
 bgs - Below ground surface
 - - Screening level likely below the routine method detection limit
 NCA - No criteria available
 U - Sample not detected above the laboratory method detection limit

PCB Mass Loading Phase II
Governor Bacon Health Center/Fort DuPont
SIRS ID: DE-1007
Wilmington, Delaware



Site Photographs



Near the intersection of New Castle Avenue and Sussex Avenue towards the north of the site.



Looking towards the Delaware River from the building at the intersection of New Castle Avenue and Sussex Avenue. The site is mostly covered in grass but is more heavily vegetated towards the water, where the land appears to be sloping down.



Looking northwest by the building at the intersection of New Castle Avenue and Sussex Avenue there is a thick tree line, beyond which there are parking lots (shown in next picture).



Looking north from the northern corner of the site towards the canal there is tall, thick grass and some trees.



Looking northeast towards the Delaware River from the northernmost parking lot which slopes down slightly towards the northwest.



Looking southeast from the northernmost parking lot, there are some buildings surrounded by foliage.



Courts and a large open area in the northern portion of the site next to the bend in Airfield Road.
The Delaware River is in the distance beyond the trees.



Mixed buildings, pavement, grass, and trees at the intersection of Sussex Avenue and Exchange Road.



At the intersection of Sussex Avenue and Exchange Road looking southwest towards the middle of the site.



At the intersection of Sussex Avenue and Engineer Road near the western corner of the site where there are numerous buildings and parking areas.



On Engineer Road near the intersection with Hall Powers Lane in the southern portion of the site where there is a large dirt mound partially covered in vegetation and a lot with cars for sale.



Near the western end of Delaware Avenue where shorter grass meets taller, thicker grass and there is a forested area in the background.



At the eastern end of Delaware Avenue in the southern corner of the site looking southeast into the woods with areas of grass, thick bushes and weeds, and a wooded area.



A parking lot for a building at the eastern end of Delaware Avenue where water has ponded and there is thick forest in the background.



On Canal Road near the intersection with Kent Avenue where there are small streams on either side of the road.

PCB Mass Loading Phase II
Governor Bacon Health Center/Fort DuPont
SIRS ID: DE-1007
Wilmington, Delaware



Overland Flow Calculations

**PCB Loading Calculations from the Revised Universal Soil Loss Equation (RUSLE)
 Governor Bacon Health Center/Fort DuPont (DE-1007)
 Delaware City, DE**

Surface PCB Concentration 26 mg/kg

Symbol	Factor	Value	Units
R	Rainfall/Runoff Erosivity Index	175	10 ² ft-tonf-in/ac-hr-yr
K	Soil Erodibility	0.25	0.01 ton-ac-hr/ ac-ft-tonf-in
	Erodible Area	28.2	Acres
LS	Topographic Factor	0.059	Dimensionless
C	Cover and Management Factor	0.003	Dimensionless
P	Support Practice Factor	1	Dimensionless
A	Average Annual Soil Loss	0.008	ton/ac-yr

**PCB Loading via Overland
 Flow** 5.3 **grams/year - PCBs**

PCB Mass Loading Phase II
Governor Bacon Health Center/Fort DuPont
SIRS ID: DE-1007
Wilmington, Delaware



Groundwater Transport Calculations (Not Applicable)