

PCB Mass Loading
Salvation Army Property
SIRB ID: DE-1370
Wilmington, Delaware



BrightFields, Inc.

Appendix 23

SALVATION ARMY PROPERTY WILMINGTON, DELAWARE

SIRB ID: DE-1370

GENERAL SITE INFORMATION

Site Name: Salvation Army Wilmington (107 South Market Street)

SIRB ID Number: DE-1370

Site Location and Description: The Salvation Army Wilmington Site is located at 107 S. Market Street Property in Wilmington, Delaware. The site is approximately 4.38 acres in size and is comprised of five tax parcels (#26-043.00-008, #26-050.00-001, #26-050.00-002, #26-050.00-003, and #26-042.00-015) located at the intersection of South Market and A Streets in downtown Wilmington. The property is bounded to the north by the Burns & McBride brownfield site, beyond which is the Christina River, to the east by South Market Street, beyond which are commercial and residential properties, to the west by Christina River, and to the south by an unoccupied auto supply store and industrial properties. On the north side of the property, the City of Wilmington maintains an approximately 20-foot-wide easement for the purpose of a subsurface utility corridor and a surface access road to their land-locked parcel located northwest of the site. The City of Wilmington parcel to the northwest contains subsurface utilities and the southern expression of a submarine utility tunnel that runs beneath the Christina River. The surrounding land is generally commercial and residential.

The site currently serves as an operational thrift store, warehouse and rehabilitation center for the non-profit organization Salvation Army. The thrift store and warehouse occupies the majority of the site with the store and the parking lot covering the front portion of the site and the rehabilitation center in the rear of the property. The facilities were built in the mid 1980s. Prior to the 1980s, the site was primarily used for tannery operations, boiler repainting and carriage works.

The current facilities were constructed concurrently in the mid 1980s, with no change in use since the original construction. Two 4,000 gallon underground storage tanks (USTs) (gasoline and diesel) were located on the site and were used in the daily operation of the Salvation Army warehouse. The tanks were removed in March 2006, and the site was issued an unconditional No Further Action (NFA) letter by the Tank Management Branch of the Delaware Department of Natural Resources and Environmental Control (DNREC).

Previous Site Uses: The site previously was maintained as several industrial operations. The property historically has housed a carriage works facility, boiler repainting facility, and varying

owners of hairworks and leatherworks operations. Based on the property ownership records it appears that the tannery was operational from 1917 when the property was purchased by Illinois Leather Company, until 1941 (approximately).

Historical records reviewed during previous investigations indicate the following: In 1868, the site appears to have been occupied by the Robinson and Brothers Carriage Factory. The site operated solely as a Carriage Factory under various ownership until 1893 (approximately), when the Illinois Leather Company began operations on the northern portion of the site. Carriage works operations continued on the southern portion of the site during this time. During the early 1900s, the Tannery expanded operations and encompassed a larger portion of the site. During 1927 (approximately), the McAllister Brothers Boiler Repainting Company began operations on the southern portion of the property. Tannery operations continued on the northern portion of the property under various ownership. At this time, potential underground storage tanks with unknown contents were identified at the site, and a gasoline filling station was identified abutting the tannery to the north. The site appeared to change slightly throughout the mid 1950s with increased development in the surrounding properties. It appears that the site structures were removed during the 1970s; however, historical aerial photographs obtained for this time were of poor quality and difficult to decipher.

Given the nature of industrial and commercial disposal practices before environmental regulation, the possibility exists for contamination to have migrated into the subsurface from neighboring properties and from the subject site.

Site Regulatory Status: This section briefly summarizes previous investigations performed on the site through the SIRB program. A current SIRB regulatory status is also included.

Preliminary Assessment (DNREC, 2006(a))

In February 2006, DNREC prepared a Preliminary Assessment for the EPA. A site visit and interview with the Wilmington Salvation Army site manager, Major John Swires, occurred in January 2006. Major Swires gave a tour of the operation facilities and discussed the site's current uses and specifics about the property and buildings. The following information was identified during the assessment:

The property contains a possible drainage swale in the rear of the property and the presence of rip rap along the border of the property to the river. The rip rap was installed to preserve the

shoreline of the property. Two 4,000-gallon USTs, one unleaded gasoline and one diesel, were previously located on-site to supply Salvation Army trucks with fuel. According to Major Swires, both USTs were encased in concrete and located on top of a concrete slab, and were partially above ground. The tanks were removed on March 6, 2006, and a NFA letter was issued on May 9, 2006.

Site Inspection (DNREC, 2006(b))

During April and May 2006, personnel from DNREC Site Investigation and Restoration Branch's (SIRB) consultant, Tetra Tech, performed a Site Inspection at the property to assess surface water and subsurface conditions at the site. The Site Investigation consisted of soil sampling (surface and subsurface soil), groundwater sampling, sediment sampling, and surface water sampling. Selected samples of each media were submitted for confirmatory analysis to STL for pesticide/polychlorinated biphenyls (PCBs) cyanide analyses, and for volatile organic compounds (VOC), polycyclic aromatic hydrocarbon (PAH), total petroleum hydrocarbon (TPH) and metals analyses. The following details sampling activities and analytical results obtained during the Site Inspection:

Soil Investigation

From April 17-20, Tetra Tech completed 21 Geoprobe® borings and collected 45 soil samples, encompassing shallow and deep samples and duplicates. Soil samples were field screened at the DNREC-SIRB lab for the following classes of compounds: VOCs, pesticides/PCBs, carcinogenic PAHs, TPH, and metals. Of the total samples collected, ten soil samples were submitted for confirmatory analysis.

Aluminum was detected above the Unrestricted Use DNREC Uniform Risk Standard (URS) in seven of the ten soil samples submitted for analysis; Antimony was detected in eight samples above the DNREC URS; Arsenic was detected in six samples above the Delaware Default Background Standard; Lead was detected in one sample above the DNREC URS; Iron was detected in all ten samples above the DNREC URS; Manganese was detected in seven samples above the DNREC URS (only three of these samples were above the Delaware Default Background Standard); and, vanadium was detected in one sample above the DNREC URS.

Five of the ten soil samples submitted for analysis contained at least one of the following semivolatile compounds: Benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene,

benzo(k)fluoranthene, dibenz(a,h)anthracene, and ideno(1,2,3-cd)pyrene. Surface soil sample GP20, located in the southwest portion of the property, contained relatively high concentrations of all the aforementioned semivolatile compounds.

VOCs were not detected above the Unrestricted Use URS values in any of the soil samples submitted for analysis.

The pesticide/PCB analysis indicated one of the ten soil samples contained the PCB Aroclor-1254 above the Unrestricted Use URS. Subsurface soil sample GP14, located in the northeast portion of the property at a depth of 7 to 8 feet, had a concentration of 450 µg/kg, which is above the Unrestricted Use URS value of 300 µg/kg. No other soil samples contained pesticides or PCBs at concentrations above the Unrestricted Use URS values.

Groundwater Investigation

On April 26, 2006, six monitoring wells were installed throughout the site. The monitoring wells were developed on May 1, 2006 and a sample was collected from each well on May 9, 2006.

Arsenic, antimony, beryllium, cadmium, iron, manganese and thallium were detected in all six groundwater samples at or above the DNREC URS. Aluminum was detected in five of the samples at or above the DNREC URS. Chromium and lead were detected in four of the samples above the DNREC URS. Mercury was detected in one of the samples above the DNREC URS.

Concentrations of methyl tertiary butyl ether (MTBE) were detected above the EPA RBC value for tap water, but did not exceed the DNREC URS value for groundwater. There were no detections of semivolatile or pesticide/PCB compounds in exceedance of the DNREC URS values in any of the groundwater samples analyzed.

Surface Water Investigation

On April 20, 2006, three surface water samples were collected from the northern edge of the site in the Christina River to investigate the potential for migration of site contaminants to the surface water body. The inorganic compound analysis indicated exceedances of DNREC URS values for Surface Water for various metals including arsenic, chromium, lead, iron, manganese, and copper. Semivolatiles and pesticides/PCBs were not detected at or above the laboratory reporting limits in any surface water samples. VOC analysis indicated slight detections of

MTBE in two samples and acetone in one sample; however, these detections were below DNREC URS values.

Sediment Investigation

On April 20, 2006, five sediment samples were collected along the shoreline of the site and the adjacent City of Wilmington property from water saturated areas. The samples were screened at the DNREC-SIRB lab and two of the samples, one from site sediment and one from the adjacent City of Wilmington site sediment, were selected for full analysis. Analytical data indicated exceedances of DNREC URS values for sediment for antimony, arsenic, barium, cadmium, chromium, copper, mercury, nickel, silver, zinc, several PAHs, toluene, and dieldrin. The highest concentrations and number of contaminants were detected in the sediment sample collected from the bank of the City of Wilmington property.

Conclusions

Based upon the completed Site Investigation and previous work conducted at the site, DNREC-SIRB indicated that the Salvation Army property does contain contamination possibly related to historical operations at the site and surrounding properties. Several contaminants were identified at the site including arsenic, which was detected in exceedance of DNREC URS values for each media sampled. DNREC-SIRB recommended that a Remedial Investigation be conducted at the site to further delineate the extent of contamination.

Current Regulatory Status:

The site is currently occupied by the Salvation Army and there are no immediate plans for further investigation or remediation.

SUMMARY OF SITE PCB INFORMATION

Site Investigation PCB Findings:

PCBs (Aroclor-1254) were detected in subsurface saturated soil at one location, GP14-S002 (7.0 to 8.0 feet below ground surface (bgs)) at a concentration of 0.450 mg/kg, which is below the restricted use Uniform Risk-Based Remediation Standard (URS) value for human health for Aroclor-1254. The surface soil and unsaturated subsurface soil did not contain any PCBs.

Due to the fact that there was only one detection in the subsurface saturated soil, this detected value was used in the calculations instead of calculating the 95% upper confidence level (UCL) of the mean across the site. 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 and Screening Data	Not detected
Subsurface Soil (unsaturated)	Figure 3	Method 8082 and Screening Data	Not detected
Subsurface Soil (saturated)	Figure 4	Method 8082 and Screening Data	Not detected to 0.45 mg/kg
Ground Water	Figure 5	Method 8082	Not detected

A summary of all samples collected for PCB analyses are presented in the attached Tables 1 through 4.

Acreage where PCBs detected:

There are no surface or subsurface unsaturated soil areas that are impacted by PCBs. The estimated subsurface saturated soil area impacted by PCBs is 0.53 acres in the vicinity of GP14 (Figure 4).

PCB Remediation Status:

PCB remediation is not presently required for the Salvation Army site.

PCB MASS LOADING SUMMARY

Because there currently are no surface soil detections of PCBs, overland flow is not a likely mechanism of transport of PCB contamination at the Salvation Army site. The PCB mass loading rate to surface water via groundwater transport was estimated for the Salvation Army Property.

OVERLAND FLOW:

No overland flow calculations were performed for this site.

Ground Cover and Canopy:

A site inspection was performed on July 31, 2008 to estimate the current site ground cover and canopy. The site is primarily composed of impervious surfaces including asphalt parking lot, building footprint, or hardscaping. The western portion of the property along the Christiana River is covered primarily by grass. There is one section that is composed of a volleyball court with a surface cover of fine sand. The photographs of the site ground cover and canopy are attached.

Site Sediment and Erosion Control Practices:

There are currently no sediment and erosion controls in place at the Salvation Army site.

Uncertainty Analysis Associated with Overland Flow

Specific Areas and Degree of Uncertainty for the Salvation Army

	Samples Per Acre (site)	Chemical Data Quality*	Topography	Soil Type	Site Coverage	Map Quality	Distance to Discharge Points
Site Specific Information	9.33	Screening Data	Estimated using topography	Detailed site logs	Based on a limited site assessment	Scaled Map	N/A
Degree of Uncertainty	Low to Moderate	High	Moderate	Moderate	Moderate	Moderate	N/A

* Primary analysis used in the historical samples

Sources of uncertainty for the Salvation Army site include: The spatial distribution of samples across the property is under represented because of the current buildings that exist on the site. No samples were collected under the footprint of the building, which encompasses

approximately 30% to 40 % of the property. Based on these evaluations the overall level of uncertainty associated with PCB mass loading from the Salvation Army site is **Moderate**.

GROUNDWATER DISCHARGE ANALYSIS

Groundwater discharge is based on the hydraulic conductivity of the soil, the groundwater gradient, and the cross-sectional area of the aquifer. A breakdown of the individual factors used in the Darcy equation is presented below.

Because PCBs were detected in saturated soil, but not in groundwater, the calculated concentration of PCBs in pore water, based on partitioning, was used to calculate the mass loading.

The calculations are presented in Table B in the groundwater transport calculations attachment.

Input Factors:

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

Groundwater Transport Factors	Value Used		Justification/Derivation of Value Used
	min	max	
K = Hydraulic Conductivity (ft/day)	5.67	14.2	Drilling logs from Geoprobe [®] borings were used to evaluate the lithology beneath the site. Groundwater being monitored is within a moderately coarse-grained fill unit that overlies the marsh deposit clay. The fill unit ranges in composition from a coarse-grained sandy silt to fine sand. The hydraulic conductivity for coarse sandy silt to fine sand ranges from approximately 2×10^{-3} to 5×10^{-3} cm/sec (Cernica, 1995).
I = Horizontal Groundwater Gradient	0.0032	0.011	In June 2007, BrightFields and DNREC-SIRB measured depth to groundwater in all wells on the Salvation Army property and the two adjoining properties (105 S. Market Street and the Schwartz Property). This data was used to assess the groundwater flow direction and horizontal gradient at the site.
Saturated Thickness (ft)	8.3	8.3	Based on the borings logs, the saturated thickness averaged 8.3 feet.
Lateral Discharge Distance (ft)	110	110	The lateral discharge distance was estimated to be equal to the length of the PCB impacted area measured perpendicular to the Christina River.
A= Cross-Sectional Area (ft ²)	913	913	Calculated from the saturated thickness and lateral discharge distance.
Groundwater PCB Concentration (ug/L)	0.10	0.49	The maximum concentration observed in the saturated subsurface soil (0.450 mg/kg) was used to determine the estimated concentration in groundwater.
Distance to Discharge point (ft)	Directly adjacent		Approximate distance from property boundary to closest surface water location.

Mass Loading Via Groundwater Transport Result:

The groundwater discharge is 469 to 4,040 L/day (attached Table A). The maximum detected PCB concentration (0.450 mg/kg) was used to calculate the groundwater concentrations for the loading estimate. The estimated minimum and maximum contaminant mass loading contributions are shown in the Table C in the groundwater transport calculations attachment, assuming that there are no contaminant losses due to degradation, dispersion, sorption, volatilization, etc.

The total PCB loading via groundwater discharge is between 0.08 and 0.7 grams per year (attached Table C).

Uncertainty Analysis Associated with Groundwater Transport:

Specific Areas and Degree of Uncertainty for the Salvation Army

	Groundwater PCB Concentration	Hydraulic Conductivity	Horizontal Groundwater Gradient	Saturated Thickness	Lateral Discharge Distance	Distance to Discharge point
Site Specific Information	Partitioning based on maximum concentration observed in saturated soil	Based on detailed site logs	Multiple points with numerous groundwater measurements	Good quality logs	Good groundwater gradient defined and a moderate number of samples collected onsite	Directly adjacent
Degree of Uncertainty	High	Moderate	Low to Moderate	Moderate	Moderate	Low

Based on this evaluation the overall uncertainty associated with the Salvation Army is **moderate**.

Site References:

DNREC, 2006(a), Preliminary Assessment, Salvation Army (DE-1370), February, 2006.

DNREC, 2006(b), Site Investigation, Salvation Army, September, 2006.

BrightFields, 2008, Brownfield Remedial Investigation Report, Schwartz Property (DE-1389) 201 and 211 S. Market Street, Wilmington, DE, April 2008.

BrightFields, 2007, Remedial Investigation Report, 105 S. Market Street Property (DE-0325), Wilmington, Delaware (DE-1293), December 2007.

PCB Mass Loading
Salvation Army Property
SIRB ID: DE-1370
Wilmington, Delaware



BrightFields, Inc.

Figures

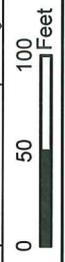
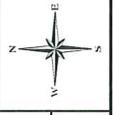


BrightFields, Inc.
 Environmental Evaluation
 Investigation, and Remediation

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Historic Sample Locations
 and Aerial Photograph (2007)
 Salvation Army
 Wilmington, Delaware

By	Date	Scale:	File Name:
Drawn	SMD	5/7/09	1:1200
Checked	JPR	5/7/09	salvos_aerial.mxd
Project #	0985.26.51		Figure 1



Legend

- ▲ Sediment Sample Location
- Soil Boring Location
- ⊕ Well Location
- Tax Parcel
- ▭ Salvation Army Property Boundary

Total Site Area= 4.5 acres



Site Location



BrightFields, Inc.

Environmental Evaluation
Investigation, and Remediation

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PCB Distribution in Surface Soil (0'-2' bgs)

Salvation Army
Wilmington, Delaware

By	Date	Scale:	File Name:
Drawn	SMD	8/1/08	1:1200
Checked	JPR	8/1/08	salvos_0-2.mxd
Project #	0985.26.51		Figure 2



Legend

- ND (0'-2')
- (ND)
- ▲
-
- ⊕
- ▭
- ▭
- ▭
- ▭
- ▭
- ▭
- ▭
- ▭

PCBs Not Detected and Sample Depth (feet bgs)
Screening Result
Sediment Sample Location
Soil Boring Location
Well Location
Existing Building
Historic Building
Water
Tax Parcel
Salvation Army Property Boundary

Note: Samples in gray indicate that no sample was collected from this depth or the sample was not analyzed for PCBs.



Site Location



BrightFields, Inc.

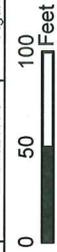
Environmental Evaluation
Investigation, and Remediation

801 Industrial Street, Suite 1
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302-656-9700 fax

PCB Distribution in Subsurface Unsaturated Soil Salvation Army Wilmington, Delaware

By	Date	Scale	File Name:
SMD	8/1/08	1:1200	salvos_unsat.mxd
Checked	JPR	8/1/08	Fig. No.
Project #	0985.26.51	Figure 3	



Legend

- ND (7'-8')
- (ND)
- ▲ Sediment Sample Location
- Soil Boring Location
- ⊕ Well Location
- ▭ Existing Building
- ▭ Historic Building
- ▭ Water
- ▭ Tax Parcel
- ▭ Salvation Army Property Boundary

PCBs Not Detected and Sample Depth (feet bgs)

Screening Result

Sediment Sample Location

Soil Boring Location

Well Location

Existing Building

Historic Building

Water

Tax Parcel

Salvation Army Property Boundary

Note: Samples in gray indicate that no sample was collected from this depth or the sample was not analyzed for PCBs.



Site Location



BrightFields, Inc.
Environmental Evaluation
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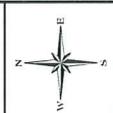
801 Industrial Street, Suite 1
Wilmington, Delaware 19801

302-656-9600
302-656-9700 fax

PCB Distribution in Subsurface Saturated Soil

Salvation Army
Wilmington, Delaware

By	Date	Scale	File Name:
Drawn	SMD	1:1200	salvos_sat.mxd
Checked	JPR	8/1/08	
Project #	0985.26.51	Fig. No.	Figure 4



Legend

- 0.45 (7'-8') [Green hatched box]
- (ND) [Green circle]
- ND (6'-8') [Green circle]
- Sediment Sample Location [Green triangle]
- Soil Boring Location [Green circle]
- Well Location [Black circle with crosshair]
- Estimated PCB Distribution [Green hatched box]
- Existing Building [Gray rectangle]
- Historic Building [Light gray rectangle]
- Water [Blue area]
- Tax Parcel [Black outline]
- Salvation Army Property Boundary [Orange outline]

Note: Samples in gray indicate that no sample was collected from this depth or the sample was not analyzed for PCBs.



Legend

- ND PCBs Not Detected
- Well Location
- Existing Building
- Historic Building
- Water
- Tax Parcel
- Salvation Army Property Boundary

BrightFields, Inc.
Environmental Evaluation
Investigation, and Remediation

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PCB Distribution in Groundwater
Salvation Army
Wilmington, Delaware

By	Date	Scale:	File Name:
Drawn	SMD 8/1/08	1:1200	salvos_gw.mxd
Checked	JPR 8/1/08		
Project #	0985.26.51	Fig. No.	Figure 5





BrightFields, Inc.
 Environmental Evaluation
 Investigation, and Remediation

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Groundwater Discharge Map
 Salvation Army
 Wilmington, Delaware

By	Date	Scale	File Name:
SMD	5/19/09	1:1200	salvos_sat.mxd
Checked	JPR	5/19/09	Fig. No.
Project #	0985.26.51		Figure 6

0 50 100 Feet

Legend

- ▲ 0.45 (7'-8')
- ND (6'-8')
- ND (10'-12')
- ▲ Sediment Sample Location
- Soil Boring Location
- ⊕ Well Location
- Groundwater Flow Direction
- ↔ 110' Groundwater Discharge Distance (feet)
- ▨ Estimated PCB Distribution
- ▭ Existing Building
- ▭ Historic Building
- ▭ Water
- ▭ Tax Parcel
- ▭ Salvation Army Property Boundary

Note: Samples in gray indicate that no sample was collected from this depth or the sample was not analyzed for PCBs.

PCB Mass Loading
Salvation Army Property
SIRB ID: DE-1370
Wilmington, Delaware



BrightFields, Inc.

Tables

Table 1
 PCB Laboratory Analytical Results For Soil
 Salvation Army
 Wilmington, DE
 SIRB ID: DE-1370

Sample ID Sampling Depth (feet bgs) Sampling Date Units Report Issued	DNREC URS for Protection of Human Health Non-critical Water Resource Area mg/Kg		GP03 6'-8' 4/19/06 mg/Kg Tetra Tech (2006)	GP04 0'-2' 4/19/06 mg/Kg Tetra Tech (2006)	GP06 0'-2' 4/19/06 mg/Kg Tetra Tech (2006)	GP08 0'-2' 4/18/06 mg/Kg Tetra Tech (2006)	GP10 7'-8' 4/18/06 Tetra Tech (2006)
	Unrestricted Use	Restricted Use					
PCBs							
Aroclor-1016	5		0.078 U	0.076 U	0.073 U	0.074 U	0.085 U
Aroclor-1221	0.3	82	0.078 U	0.076 U	0.073 U	0.074 U	0.085 U
Aroclor-1232	0.3	3	0.078 U	0.076 U	0.073 U	0.074 U	0.085 U
Aroclor-1242	0.3	3	0.078 U	0.076 U	0.073 U	0.074 U	0.085 U
Aroclor-1248	0.3	3	0.078 U	0.076 U	0.073 U	0.074 U	0.085 U
Aroclor-1254	0.3	3	0.078 U	0.076 U	0.073 U	0.074 U	0.085 U
Aroclor-1260	0.3	3	0.078 U	0.076 U	0.073 U	0.074 U	0.085 U
Aroclor-1262	nca	nca	0.078 U	0.076 U	0.073 U	0.074 U	0.085 U
Aroclor-1262	nca	nca	0.078 U	0.076 U	0.073 U	0.074 U	0.085 U

Tetra Tech (2006) - Salvation Army Site Investigation Report

Qualifiers
 U - The compound was not detected above the indicated laboratory detection limit
 NR - Not analyzed
 J - Estimated value
 nca - no criteria available
 bold - concentration is above DNREC URS Unrestricted Use criteria
 shaded - concentration is above DNREC URS restricted Use criteria

Table 1
 PCB Laboratory Analytical Results For Soil
 Salvation Army
 Wilmington, DE
 SIRB ID: DE-1370

Sample ID Sampling Depth (feet bgs) Sampling Date Units Report Issued	DNREC URS for Protection of Human Health Non-critical Water Resource Area mg/Kg		GP11 0'-2' 4/17/06 Tetra Tech (2006)	GP12 7'-8' 4/17/06 Tetra Tech (2006)	GP14 7'-8' 4/17/06 Tetra Tech (2006)	GP17 10'-12' 4/17/06 Tetra Tech (2006)	GP20 0'-2' 4/17/06 Tetra Tech (2006)
	Unrestricted Use	Restricted Use					
PCBs							
Aroclor-1016	5	82	0.076 U	0.088 U	0.079 U	0.120 U	0.075 U
Aroclor-1221	0.3	3	0.076 U	0.088 U	0.079 U	0.120 U	0.075 U
Aroclor-1232	0.3	3	0.076 U	0.088 U	0.079 U	0.120 U	0.075 U
Aroclor-1242	0.3	3	0.076 U	0.088 U	0.079 U	0.120 U	0.075 U
Aroclor-1248	0.3	3	0.076 U	0.088 U	0.079 U	0.120 U	0.075 U
Aroclor-1254	0.3	3	0.076 U	0.088 U	0.45	0.120 U	0.075 U
Aroclor-1260	0.3	3	0.076 U	0.088 U	0.079 U	0.120 U	0.075 U
Aroclor-1262	nca	nca	0.076 U	0.088 U	0.079 U	0.120 U	0.075 U
Aroclor-1262	nca	nca	0.076 U	0.088 U	0.079 U	0.120 U	0.075 U

Tetra Tech (2006) - Salvation Army Site Investigation Report

Qualifiers

U - The compound was not detected above the indicated laboratory detection limit

NR - Not analyzed

J - Estimated value

nca - no criteria available

bold - concentration is above DNREC URS Unrestricted Use criteria

shaded - concentration is above DNREC URS restricted Use criteria

Table 2
 DNREC PCB Screening Data
 Salvation Army
 Wilmington, DE
 SIRB ID: DE-1370

Sample ID	Sample Depth	Investigation Report	Sample Date	DNREC URS for Protection of Human Health (Non-critical Water Resource Area) Unrestricted Use (mg/kg)	Total PCBs (mg/kg)
GP01	0'-2'	Tetra Tech (2006)	4/19/06	1	ND
GP02	0'-2'	Tetra Tech (2006)	4/19/06	1	ND
GP03	0'-2'	Tetra Tech (2006)	4/19/06	1	ND
GP04	4'-6'	Tetra Tech (2006)	4/19/06	1	ND
GP05	6'-8'	Tetra Tech (2006)	4/19/06	1	ND
GP05	0'-2'	Tetra Tech (2006)	4/19/06	1	ND
GP06	6'-8'	Tetra Tech (2006)	4/19/06	1	ND
GP07	6'-8'	Tetra Tech (2006)	4/19/06	1	ND
GP07	0'-2'	Tetra Tech (2006)	4/19/06	1	ND
GP08	8'-9'	Tetra Tech (2006)	4/18/06	1	ND
GP09	0'-2'	Tetra Tech (2006)	4/18/06	1	ND
GP09	6'-7'	Tetra Tech (2006)	4/18/06	1	ND
GP09	8'	Tetra Tech (2006)	4/18/06	1	ND
GP10	0'-2'	Tetra Tech (2006)	4/18/06	1	ND
GP11	11'-12'	Tetra Tech (2006)	4/17/06	1	ND
GP12	0'-2'	Tetra Tech (2006)	4/17/06	1	ND
GP13	0'-2'	Tetra Tech (2006)	4/17/06	1	ND
GP13	7'-8'	Tetra Tech (2006)	4/17/06	1	ND
GP14	0'-2'	Tetra Tech (2006)	4/17/06	1	ND
GP14	7'-8'	Tetra Tech (2006)	4/17/06	1	ND
GP15	6'-7'	Tetra Tech (2006)	4/17/06	1	ND
GP15	5'-6'	Tetra Tech (2006)	4/17/06	1	ND
GP15	0'-2'	Tetra Tech (2006)	4/17/06	1	ND
GP16	0'-2'	Tetra Tech (2006)	4/17/06	1	ND
GP17	0'-2'	Tetra Tech (2006)	4/17/06	1	ND
GP18	0'-2'	Tetra Tech (2006)	4/17/06	1	ND
GP19	0'-2'	Tetra Tech (2006)	4/17/06	1	ND
GP21	5'-8'	Tetra Tech (2006)	4/19/06	1	ND
GP21	0'-2'	Tetra Tech (2006)	4/19/06	1	ND

Tetra Tech (2006) - Salvation Army Site Investigation Report

Qualifiers:

ND - compound was not detected

Bold - concentration exceeds URS

nca - no criteria available

Table 3
 PCB Laboratory Analytical Results For Groundwater
 Salvation Army
 Wilmington, DE
 SIRB ID: DE-1370

Sample ID Sampling Date Units Report Issued	DNREC URS for Protection of Human Health ug/L	MW01 5/9/06 ug/L Tetra Tech (2006)	MW02 5/9/06 ug/L Tetra Tech (2006)	MW03 5/9/06 ug/L Tetra Tech (2006)	MW04 5/9/06 ug/L Tetra Tech (2006)	MW05 5/9/06 ug/L Tetra Tech (2006)	MW06 5/9/06 ug/L Tetra Tech (2006)
PCBs							
Aroclor-1016	0.1	0.51 U	0.56 U	0.58 U	0.55 U	0.53 U	0.62 U
Aroclor-1221	0.03	0.51 U	0.56 U	0.58 U	0.55 U	0.53 U	0.62 U
Aroclor-1232	0.03	0.51 U	0.56 U	0.58 U	0.55 U	0.53 U	0.62 U
Aroclor-1242	0.03	0.51 U	0.56 U	0.58 U	0.55 U	0.53 U	0.62 U
Aroclor-1248	0.03	0.51 U	0.56 U	0.58 U	0.55 U	0.53 U	0.62 U
Aroclor-1254	0.03	0.51 U	0.56 U	0.58 U	0.55 U	0.53 U	0.62 U
Aroclor-1260	0.03	0.51 U	0.56 U	0.58 U	0.55 U	0.53 U	0.62 U
Aroclor-1262	nca	0.51 U	0.56 U	0.58 U	0.55 U	0.53 U	0.62 U
Aroclor-1268	nca	0.51 U	0.56 U	0.58 U	0.55 U	0.53 U	0.62 U

Tetra Tech (2006) - Salvation Army Site Investigation Report

Qualifiers

- U - The compound was not detected above the indicated laboratory detection limit
- NR - Not analyzed
- J - Estimated value
- nca - no criteria available
- bold - concentration is above DNREC URS unrestricted use criteria
- shaded - concentration is above DNREC URS restricted use criteria

PCB Mass Loading
Salvation Army Property
SIRB ID: DE-1370
Wilmington, Delaware



BrightFields, Inc.

Site Photographs

**PCB Mass Loading Evaluation
Salvation Army**



Landscaped areas associated with the Salvation Army building.



Cover in the northwest portion of the site.



**PCB Mass Loading Evaluation
Salvation Army**



Cover behind the rehabilitation facility. Slopes directly into river with very little riparian buffer.



Grass cut all the way up to river bank.



**PCB Mass Loading Evaluation
Salvation Army**



Cover in the southwest portion of the site with larger riparian buffer.

PCB Mass Loading
Salvation Army Property
SIRB ID: DE-1370
Wilmington, Delaware



BrightFields, Inc.

Overland Flow Calculations

(Not Applicable)

PCB Mass Loading
Salvation Army Property
SIRB ID: DE-1370
Wilmington, Delaware



BrightFields, Inc.

Groundwater Transport Calculations

**PCB Loading Calculations - Groundwater Discharge to Surface Water
Salvation Army Site
Wilmington, DE
DE-1370**

**TABLE A
Groundwater Discharge Calculations**

Location	Hydraulic Conductivity (K) (ft/day)	Horizontal Gradient (i) (ft/ft)	Cross-sectional Area (A) (ft ²)	Groundwater Discharge*	
				Liters/day	Gallons/day
GP14					
Minimum	5.67	0.0032	910	470	120
Maximum	14.2	0.011	910	4,000	1,100

* - Groundwater Discharge (Q) = KiA

**TABLE B
Potential Groundwater PCB Concentration Calculation**

Location	Maximum Soil PCB (µg/kg)	f _{oc} (fraction of organic carbon)		Pore Water PCB (µg/L)	
				Minimum	Maximum
GP14	450	0.01	0.05	0.10	0.49

**TABLE C
Estimated Mass Loadings of PCBs in Groundwater to Surface Water**

LOCATION	Subsurface Soil Concentration/ Converted to Pore Water Concentration (µg/L)	Estimated PCB Mass Loading (g/yr)	
		Minimum	Maximum
GP14	0.49	0.084	0.72