3.1 DELAWARE REMEDIATION STANDARDS

In 1999 "Remediation Standards Guidance Under the Delaware Hazardous Substance Cleanup Act" was revised (available at http://www.dnrec.state.de.us/dnrec2000/divisions/ awm/sirb/DOCS/PDFS/Misc/RemStnd.pdf). The tables which follow this summary present the Uniform Risk Based Standards for PCBs, various Aroclors. Background and Site-Specific Standards may (and usually do) change substantially between locations due to variations in local natural features and anthropogenic effects. Thus, each site must be treated on a case-by-case basis. As stated in the revised act:

> Contaminated sites vary greatly in complexity with regard to site conditions and in the risk these sites pose to human health and the environment. Evaluation of these risks and determination of the most appropriate remediation approaches to address or manage these risks will include the establishment of acceptable remediation standards. To provide flexibility in the Delaware cleanup program, three remediation standard options has been developed. Each remediation standard option is intended to ensure protection of human health and the environment, but will differ in the level of administrative oversight and technical sophistication required for implementation. In addition, the Department has also established different levels of liability release for each remedial standard option (a detailed discussion of the level of liability release for each standard option is included in each respective section). This will enable responsible parties to tailor assessment and remediation activities to specific site and community needs in a more flexible and cost-effective manner. The three applicable remediation standard options are:
>
> **Background Standard (BGS)** - This standard approach is useful at sites where future site development restrictions are undesirable or where the contamination area is small. The goal in this approach is to demonstrate that the site has been remediated to levels which are equivalent to levels that would be expected at a site where no release of hazardous substances has occurred. Attainment of the default background standard will provide for a complete release of liability (such as through a Covenant Not to Sue agreement). A complete release of liability will also be considered on a case-by-case basis for cleanup to site-specific background standards, based on the levels of background contaminants.
>
> **Uniform-Risk Based Standard (URS)** - This standard approach is useful for sites where it is not possible or cost-effective to achieve background standards because of the volume of the contamination or a site-specific risk assessment was not performed (i.e., a simplified evaluation of site-specific risks is more appropriate and cost effective than a baseline risk assessment). Attainment of the uniform risk standard will provide a limited level of liability release. This may include complete release of liability on a case-by-case basis for cleanups attaining the unrestricted use URS Also, the Department will not require any deed notice or restriction for cleanups attaining the unrestricted use URS.
>
> **Site-Specific Standard (SSS)** - This standard approach is appropriate in lieu of the Background or Uniform-Risk Based options. Specifically, this approach is appropriate for sites that do not meet the assumptions used to derive or conditions applicable to the URS, or sites that contain substances in any media which are not listed in this document. It is also applicable to sites with multiple contaminated media beyond soil or ground water (i.e. sediment, surface water, air, biota, etc.). Based on the actual magnitude of the SSS, attainment of the site-specific standard could provide a variable level of liability release ranging from deed restrictions and/or notice and future land-use limitations to no restrictions on the deed or land-use restrictions.

The remediation standard option to be used at a site is selected by the party initiating the remediation, subject to DNREC approval. It is important to note that these options are not tiered; a party is not obligated to use one standard prior to use of another. The options may be used alone or in combination unless otherwise required by DNREC. For example, a site may use a combination of the three standards in different areas of a site and for different chemicals of concern within the same or different areas. However, only one standard shall be applied to a media unless otherwise directed by the Department. The basic goal is to establish a continuum of options for establishing the most cost-effective objectives for protecting human health and environment.

Regardless of the remediation standard approach selected, certain environmental conditions, including the presence of non-aqueous phase (separate or free) product, hazardous waste (as defined by applicable hazardous waste regulations), and soil hot spots (defined as localized soil areas that would be characterized as hazardous waste if removed from the site, and/or soil areas containing concentrations of contaminants which pose a risk of greater than $1 \times 10e^{-4}$ for carcinogenic compounds or a hazard index of 10) will always warrant further evaluation, and action, if appropriate, including removal, to protect human health and the environment.

These values represent a risk value lower than $1x10^{-6}$, that is, the concentration must not cause more than 1 in 1,000,000 people to suffer from either cancer or non-cancer effects. Similar limits are in place for aquatic life and are represented below:

Table 7. Water Quality Criteria for the Protection of Human Health
(Source: *State of Delaware Surface Water Quality Standards*, as amended July 11, 2004)

Chemical	Systemic Toxicants	Human Carcinogens	
	Fish and Water Ingestion	Fish Ingestion	Fish and Water Ingestion
Total PCBs (µg/L)	0.5 (MCL)	0.000064	0.000064

Table 8. Water Quality Criteria for the Protection of Aquatic Life
(Source: *State of Delaware Surface Water Quality Standards*, as amended July 11, 2004)

	Fresh Water Chronic Criteria	Marine Chronic Criteria
Total PCBs (µg/L)	0.014	0.03

In addition, Delaware is the only State in the basin which recognizes the toxicity of other PCBs that have physical and chemical properties similar to dioxins (2,3,7,8-TCDD). DNREC regulates the following dioxin-like congeners , based on World Health Organization toxicity data:

Non-ortho PCBs	Mono-ortho PCBs	
PCB 77	PCB 105	PCB 156
PCB 81	PCB 114	PCB 157
PCB 126	PCB 118	PCB 167
PCB 169	PCB 123	PCB 189

URS standards for PCB remediation in soil and groundwater are shown on the following page.

Table 9. Delaware Uniform Risk Based Standards (URS) for PCBs

(Source: *Remediation Standards Guidance Under the Delaware Hazardous Substance Cleanup Act,* 1999)

URS for the Protection of Human Health				Critical Water Resource Area								Non-Critical Water Resource Area							
				Unrestricted Use				Restricted Use				Unrestricted Use				Restricted Use			
		Groundwater		Surface Soil		Subsurface Soil		Surface Soil		Subsurface Soil		Surface Soil		Subsurface Soil		Surface Soil		Subsurface Soil	
Contaminant	CASRN	(µg/L)	Basis	mg/kg	Basis	mg/kg	Basis	mg/kg	Basis	mg/kg	Basis	mg/kg	Basis	mg/kg	Basis	mg/kg	Basis	mg/kg	Basis
PCBs	1336363	0.5/0.03	MCL	1	EPA	1	EPA	1	EPA	1	EPA	1	EPA	1	EPA	1	EPA	1	EPA
Aroclor 1016	12674112	0.10	RBC	5	RBC	5	RBC	18	CALB	18	CALB	5	RBC	5	RBC	82	RBC	82	RBC
Aroclor 1221	11104282	0.03	PQL	0.3	PQL	0.3	PQL	0.5	CALB	0.5	CALB	0.3	PQL	0.3	PQL	3	RBC	3	RBC
Aroclor 1232	11141165	0.03	PQL	0.3	PQL	0.3	PQL	0.5	CALB	0.5	CALB	0.3	PQL	0.3	PQL	3	RBC	3	RBC
Aroclor 1242	53469219	0.03	PQL	0.3	PQL	0.3	PQL	3	RBC	3	RBC	0.3	PQL	0.3	PQL	3	RBC	3	RBC
Aroclor 1248	12672296	0.03	PQL	0.3	PQL	0.3	PQL	3	RBC	3	RBC	0.3	PQL	0.3	PQL	3	RBC	3	RBC

PQL – Practical Quantitation Level – value presented is RBC or RBM, which may be at, or below, the most applicable PQL. PQL may be used for demonstrating attainment.
RBC – EPA Risk-Based Concentration Table Value, April 1999 (RBC values equal to risk of $10e^{-6}$)
CALB – Value derived from Soil to Groundwater Equation as follows:

Critical Water Resource Area Soil URS = Groundwater URS * [(Koc * foc) + (PW/Yb)] * DF

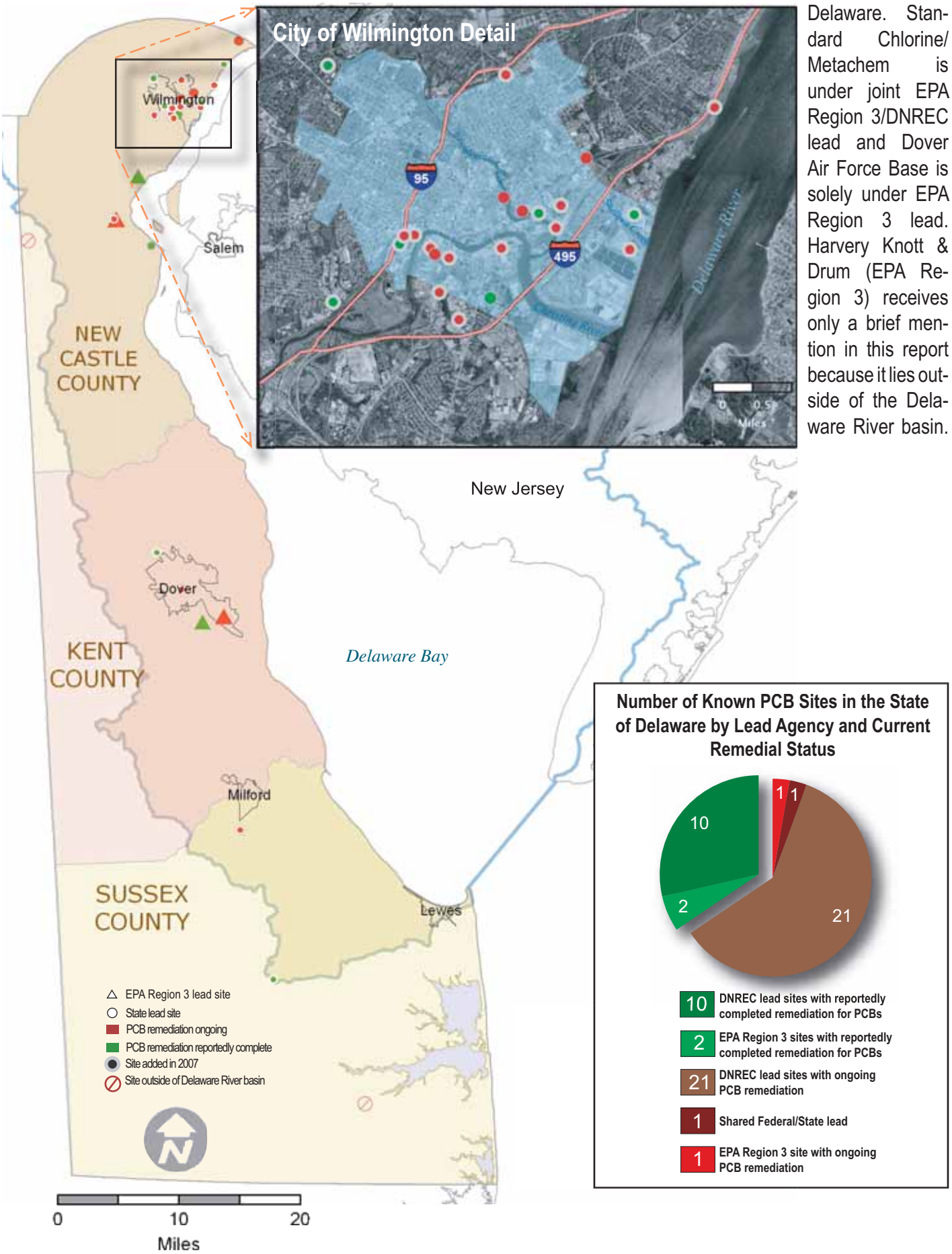
Where: Koc = organic carbon partition coefficient for a regulated substance (1/kg)
Foc = fraction of organic carbon in the soil (default value = 0.0025)
PW = water filled porosity of soil (default value = 0.2)
Yb = dry bulk density of soil (default value = 1.8 kg/L)
DF = dilution factor (default value = 100)

Table 10. URS Remediation Standards for Protection of the Environment

(Source: *Remediation Standards Guidance Under the Delaware Hazardous Substance Cleanup Act,* 1999)

Substance	Surface Water (µg/L)	Sediment (mg/kg)	Surface Soil (mg/kg)
PCBs	0.002	0.002	40
Aroclor 1016	0.2	0.5	No data available
Aroclor 1221	0.3	0.1	No data available
Aroclor 1232	0.6	0.6	No data available
Aroclor 1242	0.05	29	No data available
Aroclor 1248	0.002	1	No data available
Aroclor 1254	0.002	72	No data available
Aroclor 1260	94	63	No data available

Fig. 5. Status of Known PCB sites in the State of Delaware



Delaware. Standard Chlorine/Metachem is under joint EPA Region 3/DNREC lead and Dover Air Force Base is solely under EPA Region 3 lead. Harvery Knott & Drum (EPA Region 3) receives only a brief mention in this report because it lies outside of the Delaware River basin.

3.2 SITES WITH ONGOING PCB REMEDIATION IN DELAWARE

DNREC

Site submitted in 2007

Site Name:	12th Street Drum Site	
Agency Site ID:	DE-0294	
Site Location:	1330 East 12th Street, Wilmington, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.7372890
	Longitude:	-75.5258640
Last history update by agency:		November 2005
Site Category:		Unauthorized landfill
Site Watershed:		Brandywine Creek
Discharge Point(s):		Brandywine Creek, Shellpot Creek
Name of Nearest Water Body:		Brandywine Creek, Shellpot Creek
Distance to Nearest Water Body:		Adjacent
Adjacent to Delaware River?		No
PCBs in groundwater?		No
PCB Remediation Complete?		Unknown, but drum removal has been completed
If so, when did it end?		N/A

Prior to 1950 and up until some time between 1968 and 1977, the 12th Street dump/drum site was used as a waste disposal area by a variety of parties. The site consists of several parcels owned by the Wilmington Economic Development Corporation (WEDCO), the State of Delaware Department of Transportation, the Delaware State Department of Corrections, Norfolk Southern Railway, and one private citizen. In 1999, 10-12 buried drums were located during a remedial investigation for Diamond State Foundry/Pullman Car Works (DE-1144, also in this report). In 1999, EPA Region 3 paid for a bank stabilization and impervious cap to prevent further contribution of contaminants into the adjacent Brandywine Creek immediately to the south. In addition, the roughly 11 acre site is believed to have contributed PCB contamination to neighboring Shellpot Creek. No definitive information could be found regarding past or present PCB concentrations either onsite or in any of the adjacent water bodies. Lead was and continues to be the primary COC, present at very high levels. Current activities (as of Nov., 2005) involved further negotiations between various potentially responsible parties, DNREC, and USEPA as to the future development potential of the site.

DNREC

Site Names: South Wilmington Salvage Yards (A-1 Auto Parts, Don Wilson's Auto Parts, Merkin Auto Spring Co. Inc., Two Guys Auto Parts, Shuster's Auto Salvage, Casper's Auto Parts, American Tank, Cleaning Co., and Junior's Auto Parts)

Agency Site IDs: DE-1172, DE-1174, DE-1175, DE-1176, DE-1177, DE-1178, DE-1180, DE-1184, DE-1185

Site Locations: Wilmington, DE

Site County: New Castle

Site Coordinates: **Latitude:** 39.725418 (A-1 Auto Parts)
Longitude: -75.533644 (A-1 Auto Parts)

Last history update by agency: May 2006

Site Category: Salvage Yards

Site Watershed: Christina River

Discharge Point(s): none

Name of Nearest Water Body: Christina River

Distance to Nearest Water Body: varies

Adjacent to Delaware River? No

PCBs in groundwater? No

PCB Remediation Complete? No

If so, when did it end? N/A

Site submitted in 2007

There are eight salvage yards included in the South Wilmington study area. The figure on the right shows their respective locations, along with A.M. Domino Jr. Salvage Yard, who elected not to be included in this grouping, and thus is not part of the collective remediation. The investigation was initiated to evaluate the potential or actual impacts of the operations of the salvage yards on the neighboring environment and on public health. PCBs were found in soil samples on five of the sites (A-1 Auto: 520 µg/kg, Merkin: 150 µg/kg, 2 Guys: 270 µg/kg, American Tank: 1,000 µg/kg max., and Shuster's: 140 µg/kg max.). Due to groundwater characteristics of the area, testing was limited and further, PCBs were not among the targeted analytes. Seven sediment samples were taken, but did not reveal the presence of PCBs. Also, surface water samples were only taken adjacent to American Tank in the Christina River, which did not show the presence of PCBs over already established background levels. Given the lack of prevalence of PCBs and also their low concentrations (they are all below restricted standards), it is unlikely that PCBs will be aggressively addressed.

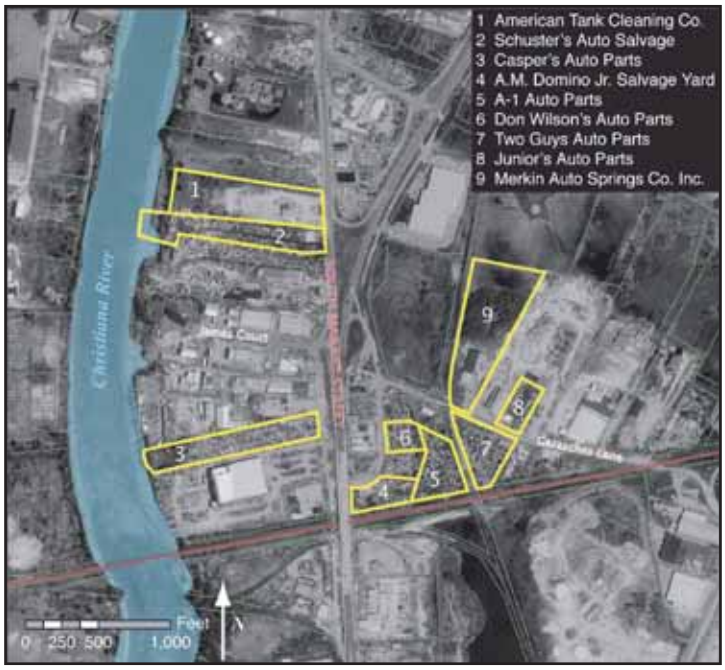


Fig. 6. Detail of South Wilmington Salvage Yards

DNREC

Site Name:	American Scrap and Waste Company	
Agency Site ID:	DE-1265	
Site Location:	Wilmington, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.733587
	Longitude:	-75.538896
Last history update by agency:		May 2006
Site Category:		Salvage Yard
Site Watershed:		Christina River
Discharge Point(s):		none
Name of Nearest Water Body:		Christina River
Distance to Nearest Water Body:		adjacent
Adjacent to Delaware River?		No
PCBs in groundwater?		Not determined
PCB Remediation Complete?		No
If so, when did it end?		N/A

Site submitted in 2007

Very little information was available for this site. American Scrap and Waste Co. occupies the 200 acres site that has had continual use since the early 1800s. Currently part of the "Vision for the Rivers", a governor appointed commission that seeks to cleanup and redevelop the historically industrial corridor adjacent to the Christina River, high levels of PCBs were reportedly onsite as of 2006, though no specific concentrations or specific Aroclors were available. PCBs were also discovered in downstream sediments, and these are thought to have originated from this site. However, no specific reports regarding investigations or other subsequent actions were available as of the writing of this report.

DNREC

Site submitted in 2007

Site Name:	Amtrak Refueling Yard	
Agency Site ID:	DE-0266	
Site Location:	Wilmington, Delaware	
Site County:	New Castle County	
Site Coordinates:	**Latitude:**	39.741667
	Longitude:	-75.524718
Last history update by agency:		May 2006
Site Category:		Industrial
Site Watershed:		Brandywine Creek
Discharge Point(s):		Unnamed Tributary to Brandywine Creek
Name of Nearest Water Body:		Brandywine Creek
Distance to Nearest Water Body:		Nearby
Adjacent to Delaware River?		No
PCBs in groundwater?		Unknown
Remediation Complete?		No
If so, when did it end?		N/A

The Amtrak Refueling Yard occupies 20 acres. PCBs have been detected in soil and sediment from surface water drainage features in the East and South facilities on the property. As early as 1981 PCBs were detected at the Former Fueling Facility Portion of the Maintenance Facility Area, with concentrations up to 0.638 mg/kg. Sampling in 1982 of an adjacent portion to the Former Fueling Facility Portion yielded concentrations up to 18.9 mg/kg. Additional sampling using EPA Method 8080 of the Former Fueling Facility Portion in 1995 yielded concentrations of Aroclor 1260 up to 2.03 mg/kg.

Between 1984 and 1985 approximately 10,000 cubic yards of soil contaminated with PCBs was removed from various “hot spots” as well as the Maintenance Facility Area. Contaminated soil at the Former Fueling Facility Portion was not remediated due to the low levels of contamination reported.

Drainage ditches on the property drain to a pond which drains to an unnamed tributary to Brandywine Creek. A characterization of the Eastern and Western drainage ditches in 1998 yielded samples with concentrations up to 72.3 mg/kg and 3.4 mg/kg from the Western and Eastern ditches, respectively.

In 2002 DNREC directed the National Railroad Passenger Corporation to sample for PCB congeners to differentiate Amtrak from other sources and to investigate Shellpot Creek for PCBs (letter dated August 12, 2002).

In May 2006 the owner submitted to the DNREC a summary of the proposed scope of supplemental Phase II remedial investigations and noted that additional sampling is necessary for the Eastern drainage ditch area. Additionally, a former and abandoned sewer will be sampled for PCBs. Samples of sediments from a ditch north of the Eastern drainage ditch yielded concentrations up to 210 mg/kg; sediment from the Western drainage ditch and the confluence area yielded concentrations of up to 94 mg/kg; sediment from the Eastern drainage ditch yielded concentrations up to 320 mg/kg.

DNREC

Site Name:	Budd Metal	
Agency Site ID:	DE-0270	
Site Location:	Wilmington, Delaware	
Site County:	New Castle County	
Site Coordinates:	**Latitude:**	39.720272
	Longitude:	-75.548889
Last history update by agency:		June 2006
Site Category:		Industrial
Site Watershed:		Christina River
Discharge Point(s):		N/A
Name of Nearest Water Body:		Christina River
Distance to Nearest Water Body:		Nearby
Adjacent to Delaware River?		No
PCBs in groundwater?		No
Remediation Complete?		No
If so, when did it end?		N/A

Site submitted in 2007

The Budd Metal property occupies 12 acres. After a former transformer storage area was vandalized, PCBs were tested for using EPA Method 8080. PCBs were also detected in an area near a former garage with concentrations ranging from below detection limits to as high as 210 ppm. No PCBs were detected in ground water. The site owners entered into DNREC's VCP. As of June 12, 2006 25 tons of contaminated soil were excavated to a one foot depth. Further excavation was halted due to the presence of a natural gas line. The site owners have recommended to the DNREC that no further action is warranted in the transformer storage area. DNREC is currently reviewing the progress of this site.

DNREC

Site Name:	Capitol Scrap	
Agency Site ID:	DE-1171	
Site Location:	39 S. West Street, Dover, DE	
Site County:	Kent	
Site Coordinates:	**Latitude:**	39.158611
	Longitude:	-75.532500
Last history update by agency:		July 2006
Site Category:		Former scrap yard
Site Watershed:		St. Jones River
Discharge Point(s):		none
Name of Nearest Water Body:		St. Jones River
Distance to Nearest Water Body:		3,000 feet
Adjacent to Delaware River?		No
PCBs in groundwater?		No
PCB Remediation Complete?		No
If so, when did it end?		N/A

Site submitted in 2007

As of July 2006, the final work plan for excavation of site soils which contain several different PCB Aroclors, along with various other contaminants. The historic range of PCB soil concentrations since 1999 is 43 µg/kg to 17,000 µg/kg. The work plan calls for the over-excavation of contaminated soils on site, down to a depth of 3-4 bgs, which should, according to estimates prepared by both the consultant and DNREC SIRB, bring PCB levels to below the targeted level of 1 ppm. Any sample that reveals PCB levels over 1 ppm will therefore be excavated and removed from site to be disposed of in an appropriate facility, so that the 2.1 acre site can be redeveloped by the City of Dover/Downtown Dover Development Corp., the present owner. Neither sediments nor surface water of St. Jones River are believed to be affected. Groundwater was not encountered onsite.

DNREC

Site Name:	CitiSteel Area A	
Agency Site ID:	DE-0046	
Site Location:	Claymont, Delaware	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.813087
	Longitude:	-75.450457
Last history update by agency:		October 2002
Site Category:		Industrial
Site Watershed:		Naamans Creek
Discharge Point(s):		Unknown
Name of Nearest Water Body:		Naamans Creek
Distance to Nearest Water Body:		on-site
Adjacent to Delaware River?		No
PCBs in groundwater?		No
Remediation Complete?		No
If so, when did it end?		N/A

CitiSteel Area A occupies 425 acres and is bisected by Naamans Creek and an unnamed tributary to Naamans Creek. The site is divided into multiple parcels. Approximately 50 cubic yards of soil contaminated with PCBs was removed circa 1990 from Parcel 4, also known as the Scrap Sorting Area. No PCBs have been detected in groundwater, but there were no significant detections of PCBs in sediment. However, there are high levels of PCBs in shallow soils that exceed TSCA limits: Aroclor 1242 detected at 6,800 µg/kg; Aroclor 1248 detected at 1,300 µg/kg; Aroclor 1254 detected at 5,800 µg/kg; Aroclor 1260 detected at 110,000 µg/kg.

As of October 2002, CitiSteel submitted a work plan to the DNREC for further delineation of the PCB impacted soils in the Scrap Sorting Area. Currently DNREC is working with CitiSteel to enter into a Voluntary Cleanup agreement.

DNREC

Site submitted in 2007

Site Name:	Delaware Compressed Steel	
Agency Site ID:	DE-1068	
Site Location:	503 South Market Street, Wilmington, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.7332620
	Longitude:	-75.5561120
Last history update by agency:		November 2005
Site Category:		Former metal recycling facility
Site Watershed:		Christina River
Discharge Point(s):		Christina River
Name of Nearest Water Body:		Christina River
Distance to Nearest Water Body:		<1,000 feet
Adjacent to Delaware River?		No
PCBs in groundwater?		Unknown
PCB Remediation Complete?		No
If so, when did it end?		N/A

In 1999, the owners of the Delaware Compressed steel entered into a Voluntary Cleanup Agreement in order to characterize historic contamination in order to facilitate redevelopment of the parcel. The site has been witness to extensive contamination resulting from past onsite metal reclamation and recycling. In December 2003, DNREC completed an interim response for PCB in surface and subsurface soils, which contained PCBs as high as 500 mg/kg. In addition, surface water in the unnamed creek was tested for PCBs and had a concentration of 3.04 µg/L. The DNREC/EPA remedial goal was to immediately remove any soil whose PCB concentrations were above 50 mg/kg and dredge any sediments whose current loading contributed to surface water contamination. A file review was unclear about whether the dredging ever occurred. Following the removal of roughly 2,000 square feet of soil to roughly 2 feet bgs, the highest remaining PCB concentration was 46.1 mg/kg. Groundwater was highly contaminated with a variety or organic compounds, but PCBs were not among them.

No remedial action has been decided for the site, as investigations are ongoing as of 2006. Further actions will involve minimizing potential exposure to contaminants and determining whether or not any other immediate or interim response measures are necessary to prevent any contaminants migrating off site.

DNREC

Site Name:	Diamond State Foundry / Pullman Car Works	
Agency Site ID:	DE-1144	
Site Location:	Wilmington, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.740448
	Longitude:	-75.533984
Last history update by agency:		September 2000
Site Category:		Industrial
Site Watershed:		Brandywine Creek
Discharge Point(s):		Unknown
Name of Nearest Water Body:		Brandywine Creek
Distance to Nearest Water Body:		Adjacent
Adjacent to Delaware River?		No
PCBs in groundwater?		Unknown
Remediation Complete?		No
If so, when did it end?		N/A

The former Electric Hose and Rubber property, the Diamond State Foundry/Pullman Car Works site occupies 34 acres. A 2000 report indicated high PCB concentrations in soil: Aroclor 1254 detected at 670,000 µg/kg; Aroclor 1260 detected at 1,300,000 µg/kg. The presence of PCBs was also detected in the area of two banks of transformers and was noted to "require immediate remediation" (Final Brownfield Preliminary Assessment II, September 2000). The report also noted possible historic impacts to Brandywine Creek, as well as the recommendation to assess any PCB impact to ground water in the future. DNREC recommends that the property owners enter into a VCP and may refer the site to the EPA Superfund program if the owners are unresponsive.

DNREC

Site Name:	Diamond State Salvage	
Agency Site ID:	DE-1281	
Site Location:	Wilmington, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.7431111
	Longitude:	-75.5383337
Last history update by agency:		June 2006
Site Category:		Former metal salvaging
Site Watershed:		Lower Brandywine/Christina
Discharge Point(s):		Bank of Brandywine Creek, underground pipe
Name of Nearest Water Body:		Brandywine Creek
Distance to Nearest Water Body:		Adjacent
Adjacent to Delaware River?		No
PCBs in groundwater?		Unknown
Remediation Complete?		No
If so, when did it end?		N/A

From 1949 to 1992, metal salvaging operations at Diamond State Salvage created significant amounts of contamination on land and the adjacent tidal Brandywine Creek. With virtually all surface water leaving the site via runoff directed to the Creek, the cleanup has involved preventing future runoff, dredging of contaminated sediments, removal of roughly 125,000 tons of contaminated soil, and continual monitoring of air and groundwater. Significant PCB contamination is believed to have come from an underground pipe and a fractured concrete trail at the bedrock level that discharged oil (as high as 340 ppm) directly into the Brandywine Creek. In 1997, total PCB concentrations were elevated in the mud flats adjacent to the site (ranging from 101 µg/kg to 370 µg/kg, using EPA method 680). In addition, Diamond State Salvage's metal reclamation produced significant quantities of contaminated oil that eventually migrated to subsurface soils that may have been carried to the Brandywine by the relatively fast moving groundwater. Contaminants may have been pushed upstream due to tidal influences; PCB contaminated sediments have been found upstream in trace amounts, but possibly due to other sources. Testing could not definitively confirm that these PCBs were actually the result of historic activities at Diamond State Salvage.

The site has reportedly been fully excavated and restored through actions that include: construction of an onsite sedimentation basin, stabilization of the stream bank, grading of site to prevent stormwater runoff, installation of water velocity buffers that diminish overland flow rate during rain storms, and planting and hydro seeding. Though these actions have restored the site to usable status with few restriction (i.e. soil disturbance may cause exposure to latent contamination beneath the clean infill that is above the action level of 10 ppm), DNREC has recently expressed uncertainty as to whether or not this site is still contributing PCBs to the Brandywine Creek (DNREC emails June 22-26, 2006). Currently, the US EPA is seeking a Certification of Completion of Remediation (COCR) in order to facilitate sale of the site to partially recover costs incurred from cleanup activities since 1996.

Site Name:	Dover Air Force Base	
Agency Site ID:	DED0000605972	
Site Location:	Route 113 Dover, DE	
Site County:	Kent	
Site Coordinates:	**Latitude:**	39.127781
	Longitude:	-75.466669
Last history update by agency:		October 2006
Site Category:		Department of Defense site
Site Watershed:		Army Creek
Discharge Point(s):		Unknown
Name of Nearest Water Body:		Saint Jones River
Distance to Nearest Water Body:		50 feet
Adjacent to Delaware River?		No
PCBs in groundwater?		Unknown
Remediation Complete?		No
If so, when did it end?		N/A

The 3,700-acre Dover AFB site in Dover, Delaware, is the base of operation for the 436th Airlift Wing. The base contains 23 areas on site that were used for the disposal of industrial waste. An estimated 23,000 cubic feet of waste were disposed of from 1951 to 1970. The base's operations generated numerous wastes, some, but not all, in drums, including paints, solvents, waste fuels, and oil. These wastes were disposed of in various on-base locations including 12 landfills and three fire training areas. Access to the site is restricted. There are approximately 1,000 people living on base, and 39,000 people living within a three-mile radius of the site. The distance from the base to the nearest residence is a half mile, and the site is located in a commercial and residential area that is densely populated. The base groundwater well system serves about 10,000 people and is routinely monitored by the Air Force. No contaminants have ever been reported in this system.

Shallow on-site groundwater is contaminated with volatile organic compounds (VOCs) from former waste disposal practices and site operations. A variety of VOCs have been detected in both on- and off-site groundwater including trichloroethylene (TCE), tetrachloroethylene (PCE) and carbon tetrachloride. VOCs also have been detected in the sediments. VOCs and heavy metals including mercury, chromium, and cadmium have been detected in on-site stream waters. EPA did not provide specific descriptions of whether PCBs were still present, and if so, at what concentrations.

Twelve contaminant plumes have been identified in shallow, on-site and off-site ground water. The contaminants are primarily petroleum, volatile organic compounds (VOCs) and to a lesser extent, metals and pesticides. The VOCs include fuel-related components (benzene, toluene, ethylbenzene, and xylene) and industrial-use compounds such as tetrachloroethylene, trichloroethylene, 1,2-dichloroethylene and carbon tetrachloride. Petroleum hydrocarbons, VOCs, metals, pesticides, and semi-volatile organic compounds have also been detected in on-site soils, drainage ditches, surface water and sediments. Potential health threats include exposure to and ingestion of contaminated ground water used for potable purposes. Direct contact with contaminated soil by workers and potential residents may also be a concern. Freshwater wetlands are located on site.

DNREC

Site submitted in 2007

Site Name:	Fitzgerald's Auto Salvage	
Agency Site ID:	DE-1315	
Site Location:	17115 Fitzgerald Road, Lincoln, DE	
Site County:	Sussex	
Site Coordinates:	**Latitude:**	38.872778
	Longitude:	-75.441100
Last history update by agency:		April 2006
Site Category:		Former Salvage Yard
Site Watershed:		Mispillion Creek
Discharge Point(s):		Unknown
Name of Nearest Water Body:		Herring Branch
Distance to Nearest Water Body:		Adjacent
Adjacent to Delaware River?		No
PCBs in groundwater?		Unknown
Remediation Complete?		No
If so, when did it end?		N/A

Fitzgerald's Auto Salvage has operated as a salvage yard since 1937. Initial DNREC and EPA site visits revealed the presence of spilled auto fluids and several areas with soil staining. Groundwater at the site, though not tested for PCBs is roughly 10 feet bgs, thus there is a significant chance that surface water and groundwater may be impacted by historic operations at the site especially given the sandy soil types onsite. PCBs were detected at a maximum concentration of 11 mg/kg near a set of scales in surface soil. PCBs are not widespread onsite and, where present, are generally lower than 4.5 ppm according to 2005 sampling. DNREC currently classifies this site as "pre-remedial". Presently, no sediment sampling of adjacent Herring Branch has taken place.

DNREC

Site submitted in 2007

Site Name:	Fox Point Park	
Agency Site ID:	DE-1011	
Site Location:	Wilmington, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.760000
	Longitude:	-75.488052
Last history update by agency:		April 4, 2006
Site Category:		Former railroad and waste disposal site
Site Watershed:		Brandywine-Christina
Discharge Point(s):		Drainage ditches carry runoff to Delaware River
Name of Nearest Water Body:		Delaware River
Distance to Nearest Water Body:		Adjacent
Adjacent to Delaware River?		Yes
PCBs in groundwater?		Unknown
Remediation Complete?		No
If so, when did it end?		N/A

This site has a long history of ownership that has presented both opportunities and challenges to its future use. Split into four separate parcels (A, B, C, and D), remediation work has been carried out in several phases. Parcels A and B, the subject of the first Fox Point cleanup by DNREC, were remediated for PCBs by 1994. After placing an impervious cap on these parcels and placing clean soil as a second layer, the site became suitable for, according to Delaware State standards, the creation of Fox Point State Park, its current use. The two remaining contaminated parcels (C and D) are the subject of current remediation efforts (the most recent surface soil sampling found PCBs in 31 of 41 samples averaging 2,390 µg/kg with a maximum of 14,368 µg/kg) and remain closed to public access. Proposed remedial actions will include:

1. Deposition of clean soil that extends over the contaminated surface of parcels C and D that will be accessible to the public through the park entrance when the property is opened as a park
2. Installation of new culverts to isolate three of the four drainage ditches from contaminated sediments and subsurface soil. These drainages ditches carry runoff and potentially contaminated surface soil from as far away the I-495 right-of-way into the Delaware River. These culverts will then be covered and brought to consistent grade with clean fill.
3. A fence will be placed along the Delaware River bank which, "with appropriate park rules, will reduce exposure of park visitors to contaminated sediment in or along the Delaware River" (2005 Consent Order and Agreement).

The current remedial actions are intended to enable parcels C and D to be eventually developed and annexed to the current Fox Point Park. As such, the sediments along the Delaware River, that have PCB loadings that average 224 µg/kg (maximum 583 µg/kg) will be addressed in a subsequent cleanup action.

Groundwater is not believed to be contaminated underneath the site to any significant degree, though further groundwater testing will occur during remedial investigations for the second operable unit (OU2), which is for the aforementioned Delaware River sediments.

DNREC

Site Name:	Former Georgetown Substation	
Agency Site ID:	DE-1286	
Site Location:	Railroad Avenue and Clayton Street, Dagsboro, DE	
Site County:	Sussex	
Site Coordinates:	**Latitude:**	39.735833
	Longitude:	-75.562218
Last history update by agency:		June 2006
Site Category:		Former gas manufacturing plant
Site Watershed:		Broadkill River
Discharge Point(s):		none
Name of Nearest Water Body:		Pepper Creek
Distance to Nearest Water Body:		~300 feet
Adjacent to Delaware River?		No
PCBs in groundwater?		Unknown
PCB Remediation Complete?		Unknown, no post excavation sampling available
If so, when did it end?		N/A

PCBs at low concentrations (4.8 ppm max), but in exceedance of the 2 ppm URS benchmark for restricted development were found during a Phase II site assessment (at generally low levels, but one sample showed 890 ppm near the old capacitor house). This investigation concluded that removal of an estimated 400 yd^3 would suffice to remove all PCB-related contamination from the site. This soil was removed. However, DNREC has advised that should the ongoing groundwater investigation reveal impacted aquifer quality, soil excavation may need to be repeated. Groundwater contamination is being further studied because several other potential pollutant sources are present in the immediate area.

DNREC

Site submitted in 2007

Site Name:	Harper-Thiel (former)	
Agency Site ID:	DE-1057	
Site Location:	Wilmington, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.7431111
	Longitude:	-75.5383337
Last history update by agency:		June 2006
Site Category:		Former electroplating facility
Site Watershed:		Brandywine
Discharge Point(s):		Potential sewer discharge
Name of Nearest Water Body:		Brandywine River
Distance to Nearest Water Body:		~1 mile
Adjacent to Delaware River?		No
PCBs in groundwater?		No
Remediation Complete?		No
If so, when did it end?		N/A

The Harper-Thiel site was operated as an electroplating facility from 1946 until April 2000. The electroplating process utilized at the facility involved the use of chrome, nickel, cadmium, copper, gold and silver. After purchasing the site in April of 2000, Karun LLC entered Delaware's Voluntary Cleanup Program (VCP). PCBs present onsite were generally widespread but at low levels in soil (2003 sampling showed maximum levels of 9.8 ppm in the northeast corner of the site). Additional PCB contamination was found beneath a building where a machine shop once stood (up to 11 ppm in one sample of Aroclor 1254). Floor drains within the building were connected to the City of Wilmington sewer in 1970, but the drainage point prior to 1970 is unknown. Additionally, a hardened storm sewer located along adjacent Miller Road conveys water runoff south to a stream in Haynes Park. PCB testing in soil, sediment, and surface water at Haynes Park did not reveal any PCBs. The groundwater at the former Harper-Thiel site is not contaminated with PCBs. Thus, the site's primary contaminant is a variety of metals; PCBs are not a substantial concern and will presumably be removed through excavation of soil contaminated with other substances.

Site Name:	Harvey Knott & Drum Co.	
Agency Site ID:	DED980713093	
Site Location:	Old County Road, Kirkwood, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.573331
	Longitude:	-75.770839
Last history update by agency:		October, 2006
Distance to Nearest Water Body:		Long Creek
Adjacent to Delaware River?		No
PCBs in groundwater?		No
PCB Remediation Complete?		Yes
If so, when did it end?		1994

This site is outside the Delaware River basin

DNREC

Site Name: Hay Street Sludge Drying Site
Agency Site ID: DE-0024
Site Location: Cherry Island, DE
Site County: New Castle
Site Coordinates: **Latitude**: 39.733333
Longitude: -75.508333
Last history update by agency: July 2006
Site Category: Industrial fill and municipal waste disposal
Watershed: Shellpot Creek
Discharge Point(s): Unknown
Name of Nearest Water Body: Shellpot Creek, Delaware River
Distance to Nearest Water Body: Adjacent
Adjacent to Delaware River? Yes
PCBs in groundwater? No
Remediation Complete? No
If so, when did it end? N/A

Site submitted in 2007

A conglomeration of industrial uses both past and present, DuPont, the Hay Street Sludge Drying site's owner, is currently enrolled in DNREC's Voluntary Cleanup Agreement program. In 1958 DuPont purchased the 108 acre Cherry Island property from American Dredging Company and until 1996, operated a disposal site for the DuPont Edgemore plant, roughly one half mile to the north. Though PCBs are not a significant concern (they have been detected at an average of 0.8 ppm site wide, and at 1.639 ppm max), dioxins and metals are the primary COCs at this site. The sources of contamination are twofold: 1) historical deposition of material from the dredging of the Delaware River shipping channel prior to 1958, and 2) disposal of material extremely rich in iron and other substances from DuPont's white pigment producing plant at Edgemore deposited between 1997 and 2001. While the entirety of Cherry Island, wholly owned by DuPont, is zoned for heavy industrial uses, the entire area lies outside of the 100-year floodplain. However, in 2003, hurricane Isabelle caused a large amount of iron rich material to erode into the Delaware River, thus proving the ineffectiveness of the interim remedy, which was to spray a polymer material to prevent both dusting and wind erosion, as well as significant stormwater erosion. Currently, two remedial alternatives are being considered. The first and most likely, is an elaborate impervious surface cap of the former landfill, and the second is full excavation and offsite incineration of roughly 410,000 cubic yards (500,000 tons) of iron rich material with an estimated cost of $386,666,857.

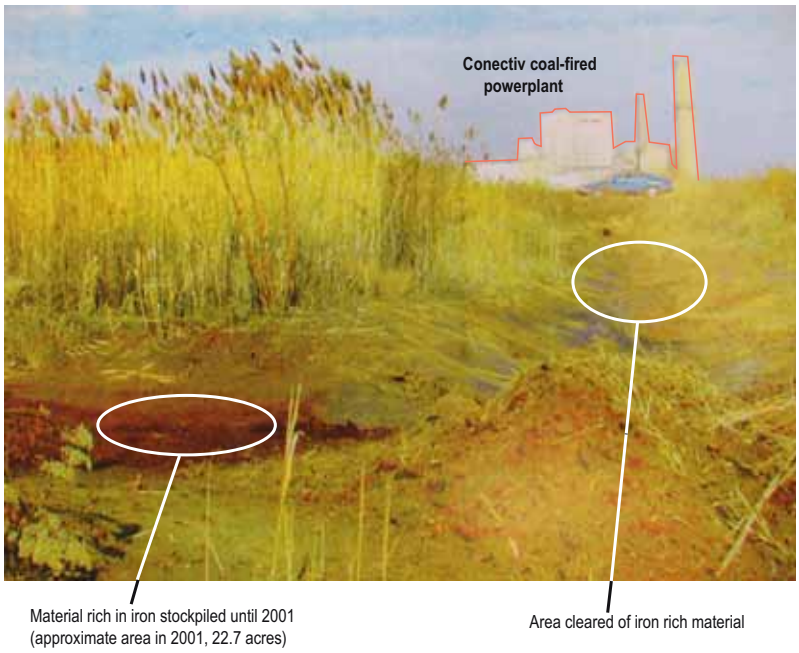


Fig. 7. Iron rich material at Hay Street on Cherry Island in Delaware. *Source*: DNREC

Site Name:	Justison's Landing	
Agency Site ID:	DE-1377	
Site Location:	300 South Madison Street, Wilmington, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.7361150
	Longitude:	-75.5597690
Last history update by agency:		May 2006
Site Category:		Industrial
Site Watershed:		Christina River
Discharge Point(s):		N/A
Name of Nearest Water Body:		Christina River
Distance to Nearest Water Body:		Adjacent
Adjacent to Delaware River?		No
PCBs in groundwater?		Yes
PCB Remediation Complete?		No
If so, when did it end?		N/A

This site is also known as Wilmington Public Works Yard. The area has been in constant industrial use since the late 1700s. In 1984, it was purchased by the city. Several structures once existed and the buildings are no longer there, but many foundations remain, as well as active utility lines for water, natural gas, electricity, sewer systems, and phone cables. Surface water runoff drains into the stormwater and sanitary sewer system, which is connected to the publicly owned treatment works.

According to a recent feasibility study, PCBs were found in the river and riverbank sediments around the Christina River Pedestrian Walkway. Proposed remediation included construction of a stormwater management system, the building of concrete and brick walkways over impacted soil, and the stabilization of the riverbank by removing some impacted soil and covering the bank with a geotextile material and riprap armory.

The site is divided into two Operable Units. A groundwater sample taken from OU1 in February 2004 revealed Aroclor-1260 at 15 µg/L in one monitoring well. In June 2004, four out of 27 borings exceeded DNREC soil URS for PCBs (which is 3 mg/kg). In August 2004, four more borings were tested. All were below DNREC URS but one, at 4.2 mg/kg. In groundwater testing, no PCBs were detected in the filtered sample, but 0.94 µg/L were detected in the unfiltered sample (URS is 0.5 µg/L).

Generally, PCB concentrations in OU1 are low enough that exposure does not pose either carcinogenic or non-carcinogenic risks, either restricted or unrestricted. OU2 had no PCBs. Remediation for soil potentially includes excavation and backfilling, which would eliminate the exposed surface soil. Capping and the installation of a vapor barrier are also options. For groundwater, monitoring will be done semi-annually for eight years. There is restricted use of groundwater under the site.

As far as groundwater discharge, PCBs were measured below the URS but above the fish ingestion criteria. PCB removal was performed in OU1 (2005) and recent groundwater samples did not contain PCBs, so ingesting fish is no longer a risk. (Focused Feasibility Study, 2004-2005). "PCBs were identified in the soil ranging from non-detect to 11.8 mg/kg. Soil will be removed to 3 mg/kg. Soil was removed from one area. DNREC has not received the disposal report. The removal for the other area is slated for Fall 2006."

DNREC

Site Name:	Kreiger/Finger Property	
Agency Site ID:	DE-1067	
Site Location:	Bordered by Lombard, Poplar, B and C Streets, Wilmington, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.7318510
	Longitude:	-75.5514710
Last history update by agency:		
Site Category:		Industrial/Salvage
Site Watershed:		Christina River
Discharge Point(s):		Unknown
Name of Nearest Water Body:		Christina River
Distance to Nearest Water Body:		1,600 feet southwest
Adjacent to Delaware River?		No
PCBs in groundwater?		Yes
PCB Remediation Complete?		No
If so, when did it end?		N/A

The Kreiger/Finger property takes up 2 acres between Lombard, Poplar, B and C Streets in Wilmington. It is located on the northwest side of a man-made intermittent drainage ditch which flows along the property in a northeasterly direction to the Christina River. The site was home to a scrap metal business for about twenty years, and then an auto salvage yard for an additional thirty. There has been no industrial activity since 1988. Fill from the neighboring Amtrak yard was at one time deposited onto the Krieger/Finger Property, which is the most likely source of PCBs.

8/11/88: There is no evidence that this site is used by the public. "PCB levels as high as 63.5 ppm in grab samples and 84.7 ppm in composite samples were detected in surface soil" (DelTRiP Site Tracking Form, 4/11/2006). Estimated maximum concentration in any spot, based on sample readings, was 384 ppm. Assuming the highest possible concentration, the PCBs in the air would be 15 ng/m^3 (The threshold limit value is 250,000 times this number). Thus airborne PCBs do not pose a threat. Migration could lead to contamination of the Christina River, but this is improbable, due to the size of the site, surface concentration, and distance to the River. It was determined that no further analysis or cleanup was imperative to public health, based on the isolated nature of the site. However, there is still a need for proper closure to prevent off-site migration of contaminants.

8/25/88: No further action required, but residential development is advised against.

Site Name:	Meco Drive/Wayman Fire Protection Site	
Agency Site ID:	DE-1103	
Site Location:	Wilmington, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.725030
	Longitude:	-75.579910
Last history update by agency:		June 2006
Site Category:		Unknown
Site Watershed:		Brandywine
Discharge Point(s):		Drainage ditch
Name of Nearest Water Body:		Unnamed tributary
Distance to Nearest Water Body:		Runs through site
Adjacent to Delaware River?		No
PCBs in groundwater?		No
Remediation Complete?		No
If so, when did it end?		N/A

DNREC

The Meco Drive cleanup project consists of seven adjacent properties along Meco Drive in Wilmington, DE (parcel #'s 401, 403, 404, 406, 407, 408, and 410). The entire area was allegedly used as a dump in the 1960s. In 1986, a complaint prompted an investigation that revealed the presence of an oily subsurface plume (later found to be petroleum related wastes, possibly due to one underground storage tank on #406) that was discharging to Little Mill Creek intermittently through a pipe. A drainage culvert running throughout the collective site had been receiving discharge almost continuously, though surface waters showed no contamination above action levels. Because the area is zoned for commercial and industrial use, there is little risk of human exposure but DNREC has initiated remediation of the PCB-free LNAPL plume. PCBs have been found on one property at low levels (1,400 µg/kg Aroclor-1260 and 420 µg/kg Aroclor-1248, or roughly 1,400 parts per billion (ppb) and 420 ppb, respectively). Each of these levels is below Delaware action levels and neither spot sample has any potential of migrating off site.

DNREC

Site Name:	Penn-Del Metal Recycling Corporation	
Agency Site ID:	DE-1057	
Site Location:	Wilmington, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.7431111
	Longitude:	-75.5383337
Last history update by agency:		June 2006
Site Category:		Metal recycling
Site Watershed:		Christina River
Discharge Point(s):		None
Name of Nearest Water Body:		Christina River
Distance to Nearest Water Body:		~500 feet
Adjacent to Delaware River?		No
PCBs in groundwater?		No
PCB Remediation Complete?		No
If so, when did it end?		N/A

Penn-Del Recycling Corporation is the current contractor for metal recycling for the city of Wilmington, DE. Having enrolled in Delaware's Voluntary Cleanup Program (VCP), the site has been contaminated with PCBs averaging 39 ppm, but as high as 220 ppm in one sample (in a 2001 test using USEPA method 8082) from past activities. Comprising seven tax parcels, Penn-Del's total area is 3.8 acres, with a two-acre section called the "operations yard" that is used mostly for mechanical sorting of metals, bundling, and shipment of scrap material. There are railroad tracks in the operations yard that ceased operations in the early 1980s, which are believed to be the primary source of PCB contamination. Though further sampling has been ordered to fully delineate onsite contamination, PCBs are not believed to be an offsite risk since little to no surface runoff leaves the site. In addition, both standing water and oil contained on site are not PCB contaminated.

DNREC

Site Name:	Purina Tower Area B	
Agency Site ID:	DE-1264	
Site Location:	South of Northeast Blvd., west of Shellpot Creek, northwest of the Amtrak Maintenance Yard (Wilmington)	
Site County:	New Castle County	
Site Coordinates:	**Latitude:**	39.773056
	Longitude:	-75.519167
Last history update by agency:		Last available record, 2002
Site Category:		Industrial/Landfill
Site Watershed:		Shellpot Creek
Discharge Point(s):		Unknown
Name of Nearest Water Body:		Shellpot Creek
Distance to Nearest Water Body:		Several hundred feet
Adjacent to Delaware River?		No
PCBs in groundwater?		No
PCB Remediation Complete?		No
If so, when did it end?		N/A

Purina Tower Area B is located south of Northeast Boulevard, west of Shellpot Creek, and northwest of the Amtrak Maintenance Yard in Wilmington. It was formerly the location of Ralston Purina Company, beginning ~1940. It is actually 4 property parcels totaling 6.2 acres, but the area of concern is a 3.5 acre portion housing 3 buildings. Concrete silos (from Purina), a masonry block truck garage, and a bus transportation administration building for the Brandywine School District are all housed on the premises. The site is also suspected of formerly containing a municipal landfill, but is now used for bus storage and maintenance.

Surface water is directed to Shellpot Creek, located several hundred feet to the east side of the property. This in turn drains to the Delaware River. In 1988, a general site remediation plan was devised that would remove all non-contaminated building debris (as determined by visual inspection) and transported to a landfill. Contaminated debris was to be wetted, cut into smaller pieces, and disposed of.

Later, in 1995, the Brandywine School District completed a cleanup, including the removal of underground sludge separators, associated petroleum-contaminated soils, the sealing of floor drains, removal of empty 55-gallon drums, four ASTs, and 15 tons of soil. In 1997, two 10,000 gallon fuel tanks and pumps were removed with 933 tons of contaminated soil. Additionally, 68 tons of contaminated soil were excavated and disposed of after a diesel spill.

In 2002, while no PCBs were detected in groundwater, two soil samples were found to exceed the RBC Industrial and RBC Residential limits. In one sample, Aroclor-1254 was at 19,000 mg/kg. In the other contaminated sample, Aroclor-1254 was found to be 410 mg/kg, and Aroclor-1260 was measured at 330 mg/kg. The RBC benchmarks for Industrial and Residential are 2900c and 320c mg/kg, respectively. The “c” refers to carcinogenic hazard.

According to the 2006 DelTRiP Report, “the BPA II report was sent to the EPA on July 23, 2002. PAHs and metals were detected on site but do not appear to be impacting the groundwater beneath the site. DNREC recommended further investigation of the PCB impacted soils outside of the fenced bus parking area. The area where PCBs were detected may be part of the adjacent AMTRAK facility. A survey may be required on site determine the property boundaries.” No information was available after this Brownfields Assessment.

Site Name:	Standard Chlorine/Metachem	
Agency Site ID:	DE-0053, EPA ID# DED041212473	
Site Location:	745 Governor Lea Road, Delaware City, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.600000
	Longitude:	-75.640000
Last history update by agency:		November 2005
Site Category:		Former chemical manufacturing facility
Site Watershed:		Red Lion Creek
Discharge Point(s):		Red Lion Creek
Name of Nearest Water Body:		Red Lion Creek, unnamed creek
Distance to Nearest Water Body:		Onsite
Adjacent to Delaware River?		No
PCBs in groundwater?		No
PCB Remediation Complete?		No
If so, when did it end?		N/A

Added to the NPL in 1987 in response to several tank spills, Metachem declared bankruptcy in 2002 after purchasing the site from Standard Chlorine of Delaware (SCD) in 1998. Throughout its operations since 1967, the facility produced several organic chemicals and constituents that have contributed to soil, groundwater, and air contamination. A 1995 Record of Decision (ROD) by EPA listed PCBs as an onsite contaminant. PCB concentrations have been found primarily in a PCB/dioxin area where these substances were loaded into drums, which would have eventually been removed for offsite disposal. PCBs were also found in sediments in both Red Lion Creek and in very small concentrations in onsite soils (0.110 ppm max), described in the ROD mentioned above. PCBs were also produced as byproducts of chemical fabrication processes; thus, PCB contamination has been discovered primarily in wastes at concentrations exceeding 50 ppm (regulating it under TSCA), and must be fully characterized and incinerated offsite. PCBs are primarily found in one tank used to house them after they were distilled out of other liquid waste products by EPA, as well as in other rinse fluids and column bottoms. Between 2002 - 2006, EPA cleaned PCBs out of the process equipment and turned the clean equipment over to a process equipment salvage firm. Since EPA took over the site, the majority of the PCB-containing liquid wastes present have been sent offsite for incineration. The remainder are properly stored onsite awaiting offsite incineration. EPA anticipates making a final remedial decision regarding all remaining onsite soils not addressed in the 1995 ROD (including some PCB-contaminated soils) in 2008.

Most of the site related remediation activities have been in response to several tank spills that released and estimated 574,000 gallons of chlorobenzenes and other constituents that ultimately impacted surface soils, onsite sediments, groundwater, and air quality. The most recent reports available do not refer to PCBs in any media with the exception of the onsite substances referred to above. These substances are classified as being either below 50 ppm (RCRA controlled substance, not in need of incineration) or greater than 50 ppm (TSCA controlled, i.e. mandatory incineration).

DNREC

Site Name:	Wilmington Coal Gas (Northern Section)	
Agency Site ID:	DE-1046	
Site Location:	Madison & Front Streets, Wilmington, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.735833
	Longitude:	-75.562218
Last history update by agency:		June 2006
Site Category:		Former gas manufacturing plant
Site Watershed:		Christina River
Discharge Point(s):		Not fully understood
Name of Nearest Water Body:		Christina River
Distance to Nearest Water Body:		~200 yards
Adjacent to Delaware River?		No
PCBs in groundwater?		Unknown
Remediation Complete?		No
If so, when did it end?		N/A

A former gas manufacturing plant, Wilmington Coal Gas (northern section) fabricated carbureted water gas from 1905 until 1956. After 1956, when Delmarva Power purchased the property, transformers were stored in the northern section of the site. Since 1956 the site had a variety of non-intensive uses, most notably the storage of liquid propane gases, and a majority of the site was paved with asphalt, while the remainder is either gravel-covered or vegetated. A variety of contaminants exists beneath the site, but DNREC and its contractors feel that excavation poses a greater risk to both onsite workers and the surrounding community.

PCBs were detected in historic sampling (32.8 ppm, Jan. 1988 in one sample) in soil. Subsequent reports from 2001 to 2005 have not discussed the presence of any PCBs, though an Amtrak electrified railroad passes very close to the site, which are often sources of PCB contamination. There have been inconsistencies in data regarding PCBs. There has been no definitive statement as to whether, or in what concentrations PCB exist onsite, through DNREC has submitted data to DRBC (2003) that indicates Wilmington Coal Gas (northern section) is a current contributor to PCB loadings in the Christina River (2.2378×10^{-6} kg/day). This suggests that sewer culverts on the north end of the site that divert water to the Christina River may be receiving storm runoff that passes over contaminated surfaces, according to at least one DNREC consultant.

Current remedial investigations in 2006 are focusing on site soils and groundwater impacted by NAPLs but no decisions have been made as to the future of the site.

3.3 SITES WITH REPORTEDLY COMPLETE PCB REMEDIATION IN DELAWARE

DNREC

Site Name:	Bancroft Mills	
Agency Site ID:	DE-1130	
Site Location:	1 Mill Road, Wilmington, DE	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.733587
	Longitude:	-75.538896
Site Watershed:		Christina River
PCBs in groundwater?		No
PCB Remediation Complete?		Yes
If so, when did it end?		2002
Remedial level attained?		Non residential

Bancroft Mills, located adjacent to the Brandywine Creek, was a die manufacturer since 1831. Site investigation since 1989 included soil, surface water, sediment, air, and groundwater tests. Remediation was completed in 2002, though PCBs were not present in media besides containerized dyes and refuse. A portion of the site was donated to DNREC's Parks and Recreation Division to integrate the property into an existing greenway. Roughly 225 cubic yards of site soils underwent excavation and offsite disposal, though the disposal records do not indicate the presence of PCBs. The site was regraded to near natural topography, and where soil contamination was low enough, was covered with asphalt.

DNREC

Site Name:	Conectiv, Hay Road Facility	
Agency Site ID:	DE-1265	
Site Location:	Hay Road, Wilmington, DE, 19809	
Site County:	New Castle	
Site Coordinates:	**Latitude:**	39.738589
	Longitude:	-75.503618
Site Watershed:		Shellpot Creek
PCBs in groundwater?		Unknown
PCB Remediation Complete?		Unknown
If so, when did it end?		N/A
Remedial standard attained?		N/A

No files were available for Conectiv's (now Delmarva's) facility at Hay Road in Wilmington other than for a variety of air releases of non-PCB containing gases. DNREC submitted this 311 MW power generating station to DRBC, highlighting the presence of PCBs, either currently or in the past, but no information related to PCBs could be found through a file review. In addition DNREC's *2006 Fiscal Outlook* report listed the Conectiv site as "low priority".

DNREC

Site Name:	Former Dagsboro Substation	
Agency Site ID:	DE-1287	
Site Location:	Railroad Avenue and Clayton Street, Dagsboro, DE	
Site County:	Sussex	
Site Coordinates:	**Latitude:**	38.547500
	Longitude:	-75.248511
Site Watershed:		Indian River Bay
PCBs in groundwater?		No
PCB Remediation Complete?		Yes
If so, when did it end?		2006
Remedial standard attained?		Unknown

This site is outside the Delaware River basin

EPA Region 3

Site Name: Delaware Sand & Gravel
Agency Site ID: DED000605972
Site Location: 229 Grantham Lane, New Castle, DE
Site County: New Castle County
Site Coordinates: **Latitude:** 39.651389
Longitude: -75.602781
Site Watershed: Christina River
PCBs in groundwater? No
PCB Remediation Complete? Yes
If so, when did it end? 2002
Remedial standard attained? 1997

All remedial construction at the site is complete. The site is now in the operation and maintenance phase, which includes operating the soil treatment system, plus quarterly groundwater and vapor testing to ensure the cleanup continues to be effective. Formerly a sand and gravel quarry, the 27-acre site is now an inactive industrial waste landfill located adjacent to another NPL site, the Army Creek Landfill. As early as 1968, the site operated 24 hours a day and accepted municipal trash, construction debris, and industrial wastes; the industrial wastes included at least 13,000 drums of liquids and sludge from chemical production, manufacturing and petroleum refining processes. Beginning in 1983, remediation activities included excavation and off-site disposal of buried drums and 4,000 tons of PCB-contaminated soil, installation of a slurry wall, bioventing, landfill capping and revegetation and groundwater pumping and treatment. The site is currently in its operations and management phase.

DNREC

Site Name: The Estate of Lester Nolan
Agency Site ID: DE-0165
Site Location: Area bounded by New York Avenue, New Castle Avenue, Christina Avenue, and the Christina River
Site County: New Castle County
Site Coordinates: **Latitude:** 39.724167
Longitude: -75.541667
Site Watershed: Christina River
PCBs in groundwater? No
PCB Remediation Complete? Yes
If so, when did it end? 2002
Remedial standard attained? Unknown

The Estate of Lester Nolan has been the location of industrial properties since 1893. The entire property is 33.09 acres, but the area of interest is a 2.9 acre landfill. This landfill is located north of the main plant building of Insteel Industries, Inc, which currently operates as a wire fabricating plant on the site. 0.7 acres of wetlands divides the landfill into east and west sections.

There are no drainage channels within the site, but there is a small channel that was formerly part of a larger tributary system. The wetlands on the site (including the area dividing the landfill) used to drain to the tidal marches adjacent to the Christina River, but railroad construction blocked the connection. During precipitation, groundwater flows in all directions away from the landfill. Within the vicinity of the site, surface water flow is toward the Lobdell Canal, into the Christina River.

Aroclor-1260 was detected in soil having a maximum concentration of 1.7 mg/kg. The next highest concentration was 0.480 mg/kg. The soil regulatory criteria for surface soil is 0.74 mg/kg, and 8.2 mg/kg for subsurface soils. "PCBs were found to exceed DNREC HSCA Reporting Levels for industrial subsurface soils. This detection (one location only) did not exceed the 10^{-5} cancer risk level and therefore, will not require remediation."

DNREC proposed a closure cover option for remediation to deal with other contaminants of concern. This cap was constructed in 2000, and DNREC approved the site closeout report in September of 2002. The site entered the Operations and Maintenance Phase in 2003.

DNREC

Site Name: Governor Bacon Health Center
Agency Site ID: DE-1007
Site Location: East of Delaware City, DE 19720
Site County: New Castle
Site Coordinates: **Latitude:** 39.568056
Longitude: -75.582501
Site Watershed: C&D Canal East
PCBs in groundwater? None

PCB Remediation Complete? Yes
If so, when did it end? 1992

A former Department of Defense site, decommissioned on December 31, 1945, the Governor Bacon Health Center occupies three contiguous parcels owned by the State of Delaware. The site spans 382 acres, with a tidal marsh present on the property. In 1992 water and soil samples were tested for PCBs using EPA Method 8080. Results indicated PCB levels present below applicable cleanup goals: Aroclor 1254 was detected in soil at 0.46 mg/kg; 510 µg/kg was detected in sediment. No PCBs were detected in groundwater.

A portion of the site noted as *Drum Fire Area* was sampled in 1987 and indicated PCB concentrations as high as 10,000 ppm. However, additional sampling of the *Drum Fire Area* in 1994 revealed that no PCBs were then present, and the 1987 data was regarded as "inaccurate or incorrectly reported" (Site Inspection Governor Bacon Health Center/Fort DuPont State Park, April 2003). According to a 2003 report, Aroclor 1254 may be present in a portion of the property known as *Landfill #1*. However, sediment samples in this area were not collected due to the potential of unexploded ordinance. The report recommends that any future owner of developer of the property enter into a Voluntary Cleanup Program and collect samples for analysis.

DNREC

Site Name: Former Delmarva Power & Light Holly Oak Substation
Agency Site ID: DE-1200
Site Location: NE corner of Delaware Ave. and Governor Printz Blvd., Claymont, DE
Site County: New Castle
Site Coordinates: **Latitude:** 39.784264
Longitude: -75.473256
Site Watershed: Naamans Creek
PCBs in groundwater? No
PCB remediation complete? Yes
If so, when did it end? 2004
Remedial standard attained? Non-residential

This site was an electrical substation until the property was sold in 1999 by Delmarva Power & Light (a wholly owned subsidiary of Conectiv). DNREC requested Conectiv to perform and remedial investigation given the history of released compounds during the substation's operating history. This investigation resulted in the removal of soil contaminated with PCBs, petroleum hydrocarbons, and SVOCs. Post excavation sampling showed one PCB sample (Aroclor 1254) at a concentration of 0.320 mg/kg, which slightly exceeds the URS value for unrestricted use (0.3 mg/kg). The property continues, however, to be zoned residential. Some time after December 2003, the owners have attempted to sell the property, which would likely be eligible for State Brownfields funding. The property currently has soil contaminated with metals and one remaining concrete pad which could potentially still be PCB-contaminated.

DNREC

Site Name: NVF Wilmington
Agency Site ID: DE-1374
Site Location: Bounded by Maryland Avenue, Beech Street, Anchorage and Oak Streets
Site County: New Castle
Site Coordinates: **Latitude:** 39.7400000
Longitude: -75.5300000
Site Watershed: Christina River
PCBs in groundwater? No
PCB Remediation Complete? Yes
If so, when did it end? Unknown
Remedial standard attained? Unknown

National Vulcanized Fibre (NVF) operated a manufacturing company on the ~2 acre site from 1927 until February of 2005. NVF produced engineered plastics and electrical/electronic insulations. According to the Brownfield Investigation Report published in February 2006, the soil had elevated levels of SVOCs and inorganics, but the groundwater was not a threat to human health. As far as PCBs, 58 surface and 49 subsurface soil samples were taken. Very low concentrations of PCBs were found in 2 out of 21 tested samples. These concentrations did not exceed standards. The maximum detected Aroclor-1254 concentration was 0.023 mg/kg, and the maximum detected concentration of Aroclor-1260 was 0.046 mg/kg. The URS for Unrestricted Use for a Non-Critical Water Resource 3 Area is 0.3 mg/kg for both of these types of PCBs. No PCBs were found in the groundwater.

EPA Region 3

Site Name: Wildcat Landfill
Agency Site ID: DED980704951
Site Location: Delaware Rte. 356A & Delaware Rte. 10, Dover, DE
Site County: Kent
Site Coordinates: **Latitude:** 39.120831
Longitude: -75.500000
Site Watershed: Army Creek
PCBs in groundwater? No
PCB Remediation Complete? Yes
If so, when did it end? Unknown

This former landfill has been remediated using several engineering and land use controls. Following the removal of approximately 200 drums and the drainage and treatment of roughly 16,000 gallons of contaminated surface water, development on the site, including the installation of drinking wells on or near the site, has been restricted. In January 2005, with the site's design solutions being fully protective, Kent County purchased several parcels of land to develop into a county park and greenway, as well as a future archaeological research site. The third five-year review was scheduled to be completed in October 2006. Site cleanup was completed in 1992. Information offered by EPA in January 2007 indicated that "PCBs were apparently only detected in subsurface waste samples".

DNREC

Site Name: Wilmington Coal Gas (Southern Section)
Agency Site ID: DE-0114
Site Location: Wilmington, DE
Site County: New Castle
Site Coordinates: **Latitude:** 39.734444
Longitude: -75.563051
Site Watershed: Christina River
PCBs in groundwater? No
PCB Remediation Complete? Yes
If so, when did it end? Unknown

Located approximately 1.5 miles east of the Delaware River, the Wilmington Coal Gas (Southern Section) site occupies 4.4 acres and is divided into five parcels. The property was first developed in 1937, and until 1978 utility poles were stored near a railroad spur on the property. A preliminary investigation in 1987 utilized EPA Methods 5503, 3540 and 8080, and 608 for air (5503 and 3540), soil, and water, respectively. No PCBs were detected in ground water or subsurface soils. However, Aroclor 1260 was detected in surface soils at 32.8 ppm, with further sampling recommended. PCBs were also detected in low levels in unconsolidated material. In 2006 in-situ stabilization combined with excavation was recommended for soil contaminated with diesel range organics and petroleum hydrocarbons. No PCB contamination was noted.