HAZARD RANKING SYSTEM (HRS) DOCUMENTATION RECORD COVER SHEET

Name of Site: Burlington Industries Cheraw

EPA ID No.: SCN000404896

<u>Contact Persons</u>

Documentation Record:

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<u>Pathways, Components, or Threats Not Scored</u>

The ground water and air migration pathways, the drinking water threat of the surface water migration pathway, and the soil exposure and subsurface intrusion pathway were not scored in this Hazard Ranking System (HRS) documentation record because the human food chain and environmental threats of the surface water migration pathway are sufficient to qualify the site for the National Priorities List (NPL). These pathways are of concern to the U.S. Environmental Protection Agency (EPA) and may be considered during future evaluation. At the time of the listing, the site score is sufficient without the pathways mentioned above.

Ground Water Migration Pathway: A release to groundwater is not suspected. No groundwater samples have been collected. Municipal water in the area is obtained from surface water (Ref. 16, p. 3).

Drinking Water Threat, Surface Water Migration Pathway: No drinking water intakes are located within the 15-mile target distance limit.

Soil Exposure and Subsurface Intrusion Pathway: The South Carolina Department of Health and Environmental Control has sampled 32 residential properties in the vicinity of the former Burlington Industries Cheraw facility (Ref. 28). EPA conducted a removal assessment based on polychlorinated biphenyl (PCB) concentrations detected in residential soils above the PCB hazardous criterion of 50 parts per million (Ref. 76). Based on the removal assessment results, EPA initiated a time-critical removal action in April 2017 (Ref. 80, pp. 1, 2). Removals began in June 2017 and are ongoing. A total of 14 residential parcels are targeted for cleanup (Refs. 80, p. 1; 81, p. 2; 84, p. 6). As of July 20, 2017, removals are complete at three of the 14 residential properties (Ref. 81, p. 2) (additional information is provided in the Previous Investigations section of this HRS documentation record).

Air Migration Pathway: A release to the air migration pathway is not suspected.

HAZARD RANKING SYSTEM (HRS) DOCUMENTATION RECORD

Name of Site:	Burlington Industries Cheraw
EPA Region:	4
Date Prepared:	January 2018
Street Address of Site*:	650 Chesterfield Highway
City, County, State, Zip:	Cheraw, Chesterfield County, South Carolina 29520
General Location in the State:	Northeastern portion of state
Topographic Maps:	Cheraw, South Carolina 1971
Latitude:	34° 41' 55.28" North
Longitude:	79° 54' 46.03" West

The coordinates above for Burlington Industries Cheraw were measured from sampling location BL-SS-11A, within Source No. 1 and just west of the former settling ponds (Ref. 4) (see Figure 3 of this HRS documentation record).

* The street address, coordinates, and contaminant locations presented in this HRS documentation record identify the general area the site is located. They represent one or more locations the U.S. Environmental Protection Agency (EPA) considers to be part of the site based on the screening information EPA used to evaluate the site for National Priorities List (NPL) listing. EPA lists national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release, not precisely delineated boundaries. A site is defined as where a hazardous substance has been "deposited, stored, disposed, or placed, or has otherwise come to be located." Generally, HRS scoring and the subsequent listing of a release merely represent the initial determination that a certain area may need to be addressed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Accordingly, EPA contemplates that the preliminary description of facility boundaries at the time of scoring will be refined as more information is developed as to where the contamination has come to be located.

Pathway	**Pathway Score**
Ground Water[1] Migration	Not Scored
Surface Water Migration	96.00
Soil Exposure and Subsurface Intrusion	Not Scored
Air Migration	Not Scored
HRS SITE SCORE	**48.00**

[1] "Ground water" and "groundwater" are synonymous; the spelling is different due to "ground water" being codified as part of the HRS, while "groundwater" is the modern spelling.

WORKSHEET FOR COMPUTING HRS SITE SCORE

	S Pathway	**S^2 Pathway**
Ground Water Migration Pathway Score (S_{gw})	NS	NS
Surface Water Migration Pathway Score (S_{sw})	96	9,216
Soil Exposure and Subsurface Intrusion Pathway Score (S_{sessi})	NS	NS
Air Migration Pathway Score (S_a)	NS	NS
$S^2_{gw} + S^2_{sw} + S^2_{sessi} + S^2_a$		9,216
$(S^2_{gw} + S^2_{sw} + S^2_{sessi} + S^2_a) / 4$		2,304
$\sqrt{(S^2_{gw} + S^2_{sw} + S^2_{sessi} + S^2_a) / 4}$		**48.00**

Note:

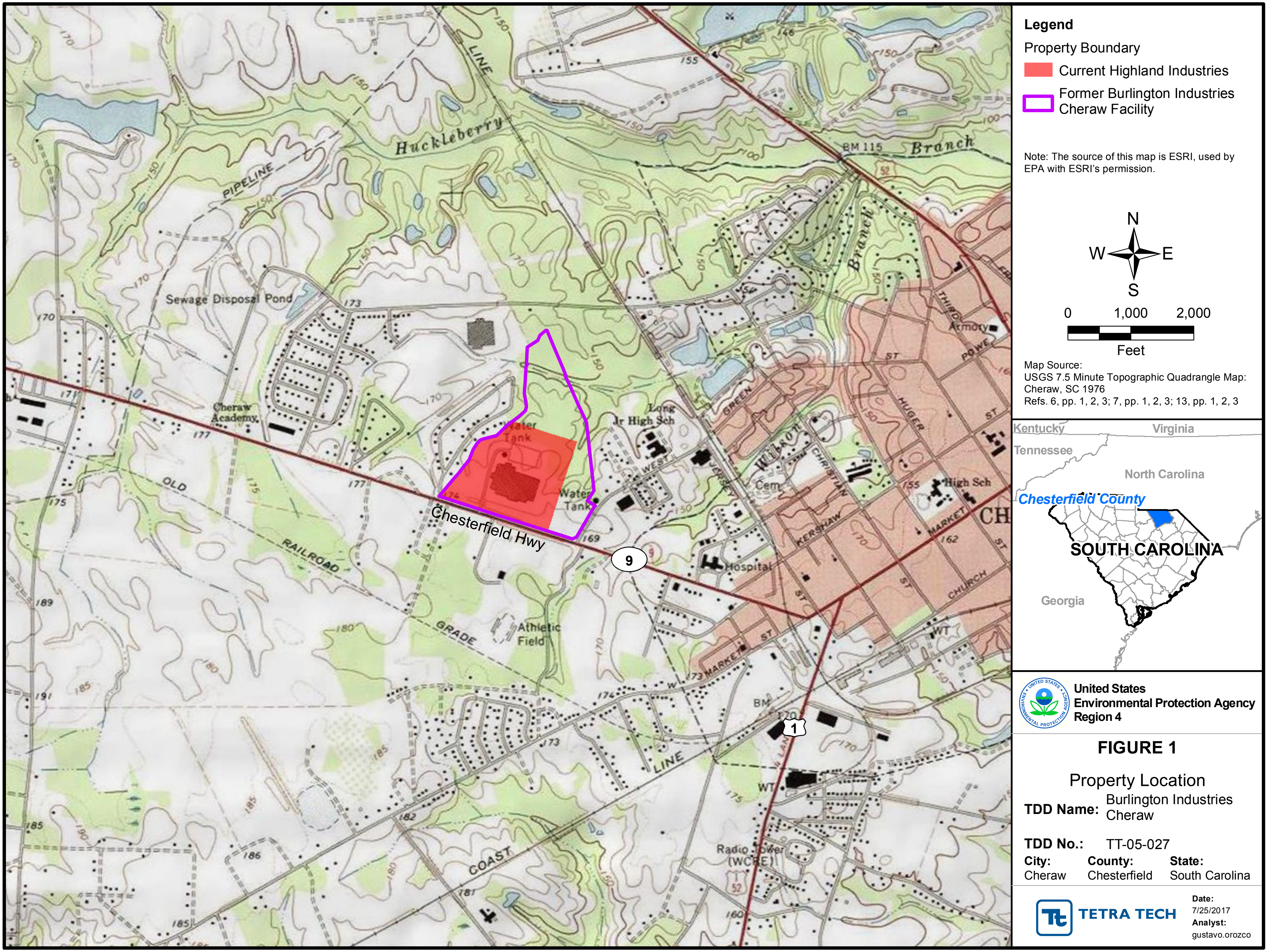
NS = Not scored

Table 4-1 –Surface Water Overland/Flood Migration Component Scoresheet			
Factor Categories and Factors	**Maximum Value**	**Value Assigned**	
Drinking Water Threat			
Likelihood of Release:			
1. Observed Release	550	550	
2. Potential to Release by Overland Flow:			
2a. Containment	10	NS	
2b. Runoff	25	NS	
2c. Distance to Surface Water	25	NS	
2d. Potential to Release by Overland Flow [lines 2a(2b + 2c)]	500	NS	
3. Potential to Release by Flood:			
3a. Containment (Flood)	10	NS	
3b. Flood Frequency	50	NS	
3c. Potential to Release by Flood (lines 3a x 3b)	500	NS	
4. Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	NS	
5. Likelihood of Release (higher of lines 1 and 4)	550		550
Waste Characteristics:			
6. Toxicity/Persistence	(a)	10,000	
7. Hazardous Waste Quantity	(a)	100	
8. Waste Characteristics	100		NS
Targets:			
9. Nearest Intake	50	NS	
10. Population:			
10a. Level I Concentrations	(b)	NS	
10b. Level II Concentrations	(b)	NS	
10c. Potential Contamination	(b)	NS	
10d. Population (lines 10a + 10b + 10c)	(b)	NS	
11. Resources	5	NS	
12. Targets (lines 9 + 10d + 11)	(b)		NS
Drinking Water Threat Score:			
13. Drinking Water Threat Score [(lines 5x8x12)/82,500, subject to a maximum of 100]	100		NS
Human Food Chain Threat			
Likelihood of Release:			
14. Likelihood of Release (same value as line 5)	550		550
Waste Characteristics:			
15. Toxicity/Persistence/Bioaccumulation	(a)	500,000,000	
16. Hazardous Waste Quantity	(a)	100	
17. Waste Characteristics	1,000		320
Targets:			
18. Food Chain Individual	50	20	

Table 4-1 –Surface Water Overland/Flood Migration Component Scoresheet (Continued)			
Factor Categories and Factors	**Maximum Value**	**Value Assigned**	
19. Population			
19a. Level I Concentrations	(b)	NS	
19b. Level II Concentrations	(b)	NS	
19c. Potential Human Food Chain Contamination	(b)	0.000003	
19d. Population (lines 19a + 19b + 19c)	(b)	0.000003	
20. Targets (lines 18 + 19d)	(b)		20.000003
Human Food Chain Threat Score:			
21. Human Food Chain Threat Score [(lines 14x17x20)/82500, subject to maximum of 100]	100		42.66
Environmental Threat			
Likelihood of Release:			
22. Likelihood of Release (same value as line 5)	550		550
Waste Characteristics:			
23. Ecosystem Toxicity/Persistence/Bioaccumulation	(a)	500,000,000	
24. Hazardous Waste Quantity	(a)	100	
25. Waste Characteristics	1,000		320
Targets:			
26. Sensitive Environments			
26a. Level I Concentrations	(b)	NS	
26b. Level II Concentrations	(b)	25	
26c. Potential Contamination	(b)	NS	
26d. Sensitive Environments (lines 26a + 26b + 26c)	(b)	25	
27. Targets (value from line 26d)	(b)		25
Environmental Threat Score:			
28. Environmental Threat Score [(lines 22x25x27)/82,500 subject to a maximum of 60]	60		53.33
Surface Water Overland/Flood Migration Component Score for a Watershed			
29. Watershed Score[c] (lines 13+21+28, subject to a maximum of 100)	100		96.00
Surface Water Overland/Flood Migration Component Score			
30. Component Score (S_{sw})[c] (highest score from line 29 for all watersheds evaluated; subject to a maximum of 100)	100		96.00

Notes:

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] Do not round to nearest integer
NS Not scored



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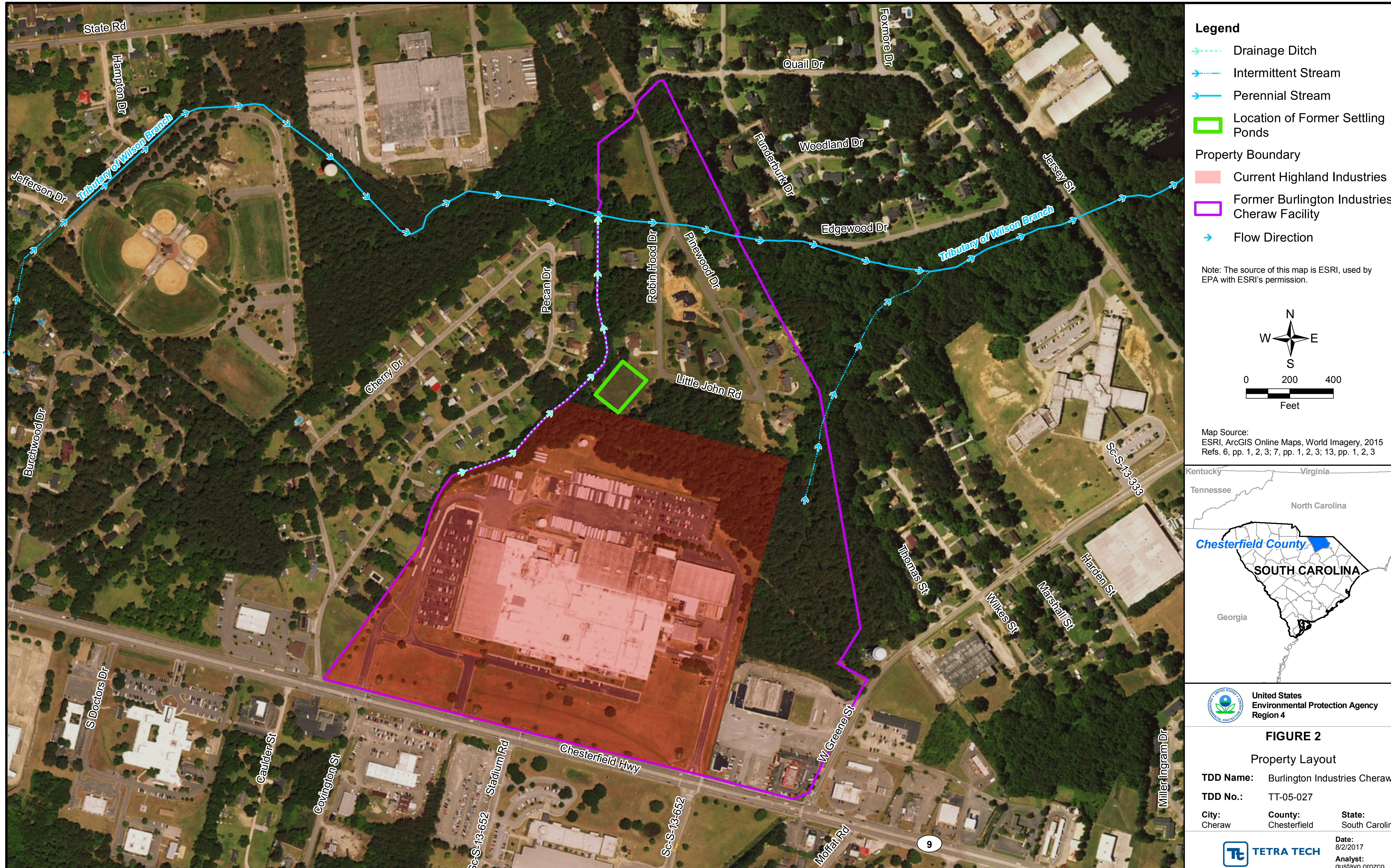

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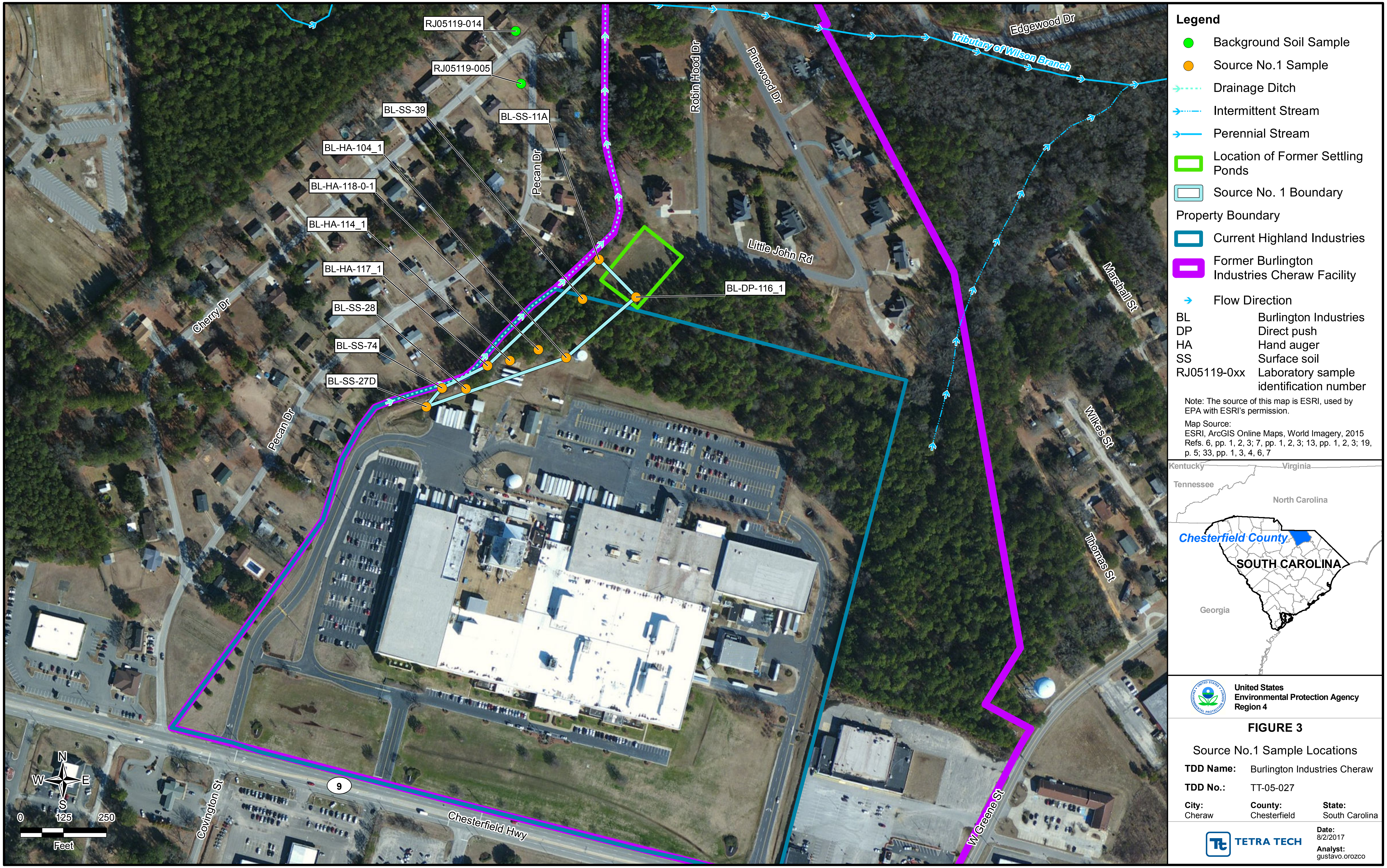

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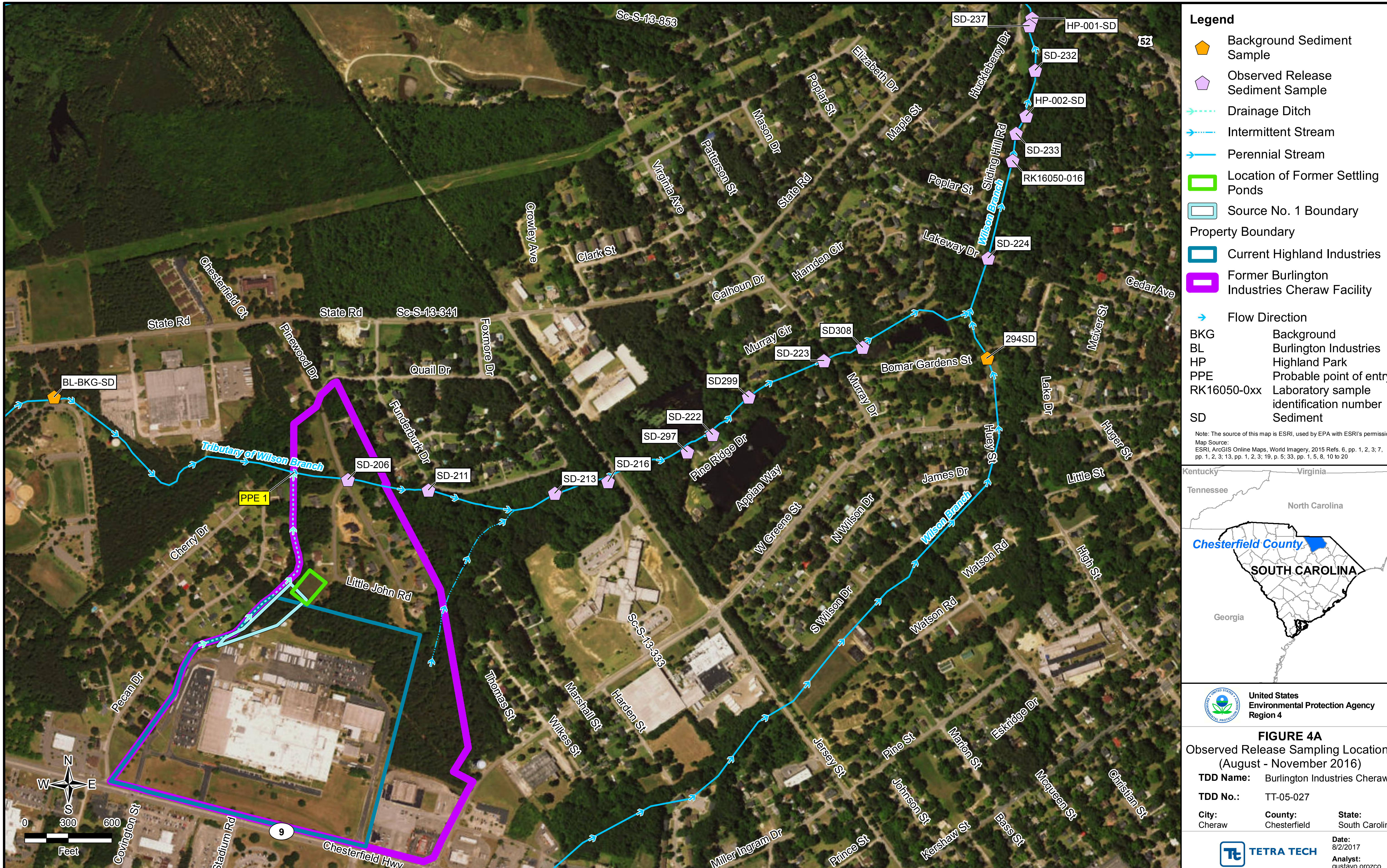

FIGURE 4A
Observed Release Sampling Locations (August - November 2016)

TDD Name: Burlington Industries Cheraw
TDD No.: TT-05-027
City: Cheraw
County: Chesterfield
State: South Carolina
Date: 8/2/2017
Analyst: gustavo.orozco

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93. Tetra Tech. Project Note to File with Attachments. Subject: American Stainless & Supply LLC. Attachments: Information Obtained from American Stainless & Supply LLC and Location Map. July 18, 2017. 7 Pages.

94. EPA. TRI [Toxic Releases Inventory] Facility Report for Cooper Tools Inc Cheraw SC Operation. Available at: https://www3.epa.gov/enviro/facts/tri/ef-facilities. Accessed on July 18, 2017. 3 Pages.

95. Tetra Tech. Project Note to File with Attachments. Subject: Wilson Branch. Attachments: Photographs. July 31, 2017. 5 Pages.

SITE DESCRIPTION

For HRS scoring purposes, the Burlington Industries Cheraw (BIC) site is the result of a release of polychlorinated biphenyls (PCB) to soil (Source No. 1) and an associated observed release to palustrine forested and palustrine emergent wetlands that receive runoff from the former BIC facility (see Sections 2.2.1, Source No. 1; and Figures 1 through 3 of this HRS documentation record). Palustrine forested and palustrine emergent wetlands downstream of Source No. 1 contain the same hazardous substances at concentrations greater than background levels, indicating that a release of hazardous substances has occurred to the surface water migration pathway, as documented in Section 4.0 of this HRS documentation record. The Pee Dee River, which receives runoff from the former BIC facility, is fished for human consumption (Ref. 61). Surface water bodies along the surface water migration pathway and wetlands likely became contaminated as a result of direct discharge of effluent to the drainage ditch and surface water runoff from the former BIC facility (Refs. 19, p. 1; 28; 73). The widespread contamination is believed to have been caused by flooding of the drainage ditch and tributaries along the surface water migration pathway (Ref. 12, p. 1).

The geographic coordinates of the BIC site as measured from Source No. 1 soil sample BL-SS-11A, collected during the August 2016 South Carolina Department of Health and Environmental Control (SCDHEC) sampling event, are latitude 34° 41' 55.28" north and longitude 79° 54' 46.03" west (Refs. 4; 19, p. 4; 33, p. 4). The EPA identification number, as recorded in the Superfund Enterprise Management System (SEMS), is SCN000404896 (Ref. 11). Land uses surrounding the BIC site are predominantly residential and commercial (see Figure 2 of this HRS documentation record). The former BIC facility is bordered to the north by residential properties, to the east by West Greene Street and commercial properties beyond, to the south by Chesterfield Highway and a school beyond, and to the west by residential properties (see Figure 2 of this HRS documentation record).

During operations, Burlington Industries, Inc. owned approximately 93 acres of land (Ref. 7, pp. 2, 3, 5, 7). In 1990, a large tract of land owned by Burlington Industries was sold to a developer. The land was developed as a residential neighborhood and the lots subdivided (Refs. 5, pp. 1, 6; 7, pp. 2, 3, 7, 15, 16, 17). The lot containing the former settling ponds is a vacant parcel (Refs. 6, pp. 4; 8). The parcel is mostly cleared with trees bordering the southern, eastern, and western sides; an occupied residential structure borders the parcel to the north (Refs. 6, p. 4; 33, p. 4). The former settling ponds are also referred to as ponds, lagoons, basins, drying beds, and sludge drying beds in reference documents; however, the term “settling ponds” will be used in this HRS documentation record (Refs. 7, p. 1; 15, p. 246; 16, p. 2; 28; 52; 53).

OPERATIONAL HISTORY

Burlington Industries began operations at the Cheraw, South Carolina facility in 1961 (Ref. 9, pp. i, 5, 6). Two Burlington Industries Divisions, Glass Fabrics and Industrial Fabrics Co., operated at the Cheraw facility beginning in 1961 (Ref. 9, pp. i, 5, 6). The Glass Fabrics Division weaved fiberglass and, in 1976, air jet shuttleless weaving was introduced, which expanded beyond glass fabrics with the weaving of Kevlar fabric. The fabrics were used in electronics, composites, insulation, filtration, and commercial markets (Ref. 9, pp. i, 5). In 1988, Burlington Glass Fabrics was purchased by Porcher Industries of Badinieres, France, and Burlington Glass Fabrics ceased operations at the Cheraw facility. When Burlington Glass Fabrics merged with Porcher Industries, the former Burlington division became BGF Industries, Inc. (Ref. 9, p. i, 5). Highland Industries, current operator of the former Burlington Industries plant, was founded in 1940 as Burlington Industries, Industrial Fabrics Co. (Ref. 9, pp. i, 6, 10). Highland Industries conducts fabric forming and aqueous finishing and is said to be the largest airbag manufacturing facility worldwide (Refs. 9, pp. 6, 12, 13). Historical documents use the names James Fabrics Plant and Hess Goldsmith & Co. when referring to the Burlington Industries plant located at 650 Chesterfield Highway. Both are divisions of Burlington Industries (Refs. 9, p. 3; 12, p. 1; 51; 53).

Wastewater is the largest waste stream for the textile industry. Wastewater types include cleaning water, process water, non-contact cooling water, and storm water. Because of the wide variety of process steps, textile wastewater contains a complex mixture of chemicals (Ref. 82, p. 40). Publicly owned treatment works (POTW) that receive wet processing wastewaters from textile users typically monitor for pH, biological oxygen demand (BOD), total suspended solids (TSS), copper, chromium, zinc, lead, and PCBs, among others (Ref. 83, pp. 22, 23).

In 1966 and 1967, Burlington Industries began experiencing sewer clogging problems from the latex waste in the plant (Ref. 55). The plant applied latex and acrylic finishes along with pigment dyes and delusterants to fiberglass fabrics (Ref. 15, p. 246). The City also began experiencing blockage problems from some of this material falling out in the sewer lines (Ref. 15, p. 246). At that time, Burlington Industries installed a 6,000-gallon test basin in an attempt to see if a plain sedimentation basin would separate the material. The finishing waste passed through the basin and the material was separated. A contract hauler pumped out 1,000 to 2,000 gallons of solids per week from the basin (Ref. 55).

Prior to April 1971, an industrial waste treatment plant was installed (Ref. 51). The liquid waste products from the dyeing operation were piped to a small settling station just to the rear of the main building. At the settling station, the heavier solids partially settled out and a portion of the wastewater was pumped into a nearby city sewer system. The remaining portion of liquid waste was pumped to a series of small settling ponds located approximately 200 yards to the rear of the manufacturing building (Ref. 52). The suspended solid dye wastes settled out in the ponds, and the liquid material either was absorbed into the soil or evaporated in the air. The solidified dye waste residue was then removed from the ponds by heavy equipment, when necessary, and disposed of at the local county landfill located about 10.7 miles south of the former BIC facility (Refs. 28; 52). The six settling ponds located at the rear of the manufacturing building were each 100 feet long, 30 feet wide, and 3 feet deep, with no overflow (Refs. 52; 53).

During a 1972 SCDHEC (previously South Carolina State Board of Health) inspection, personnel observed (1) the settling ponds were flush with the ground, (2) no banks were located around the settling ponds, (3) a fence was not located around the ponds; a residential parcel adjoined the settling pond field, (4) the ponds did not connect; in case of overflow, the sludge would flow into the adjacent field, and (5) no evidence of the sludge was noted on the ground around the ponds (Ref. 53).

No new sludge was placed in the settling ponds since 1980 (Ref. 15, p. 246). The sludge was tested in 1980 and 1989; however, the analytical data are not available. A letter dated November 20, 1989, from Burlington Industries to SCDHEC, indicated that the wastes were nonhazardous (Ref. 15, pp. 246, 247). On November 30, 1989, SCDHEC issued a waste disposal authorization to Burlington Industries for disposal of 300 cubic yards of dried sludge at the Chesterfield County Landfill, which is located about 10.7 miles south of the former BIC facility (Refs. 15, pp. 248, 249; 28).

In a letter dated March 12, 1970, the Pee Dee District Sanitation Director stated that several complaints were received by the Chesterfield County Health Department regarding the discharge of a waste product into an open ditch by Burlington Industries (Ref. 54). The Sanitation Director verified the discharge of a green fluid waste product by Burlington Industries into an open ditch at the rear of a housing development. The ditch leads to Huckleberry Branch and the Pee Dee River (Ref. 54). The Pee Dee River is referred to as the Great Pee Dee River in several documents; however, the name Pee Dee River as listed on the U.S. Geological Survey (USGS) topographic map will be used in this HRS documentation record (Refs. 27; 62).

In October 2015, a resident contacted SCDHEC and stated that he believed a wastewater unit was previously located on his property and an adjacent vacant lot. Research conducted by SCDHEC concluded that Burlington Industries operated settling ponds on at least one (vacant) residential lot in the area that was the subject of the resident inquiry (Ref. 16, p. 2). Further research indicated that in 1990 a large tract of land owned by Burlington Industries that contained the former settling ponds was sold to a developer. The land was developed as a residential neighborhood, and the lots were subdivided (Ref. 7, pp. 1, 3, 4, 7, 15, 16, 17). The parcel that contains the former settling ponds is mostly a vacant lot with trees bordering the south, east, and western sides (Refs. 6, pp. 2, 3; 7, pp. 1, 3, 4; 8; 13, pp. 1, 2, 3; 33, p. 4).

PREVIOUS INVESTIGATIONS

Beginning in February 2016, SCDHEC conducted numerous investigations at and in the vicinity of the former BIC facility. Activities conducted included collecting samples from (1) the location of the former settling ponds, (2) residential properties in the vicinity of the former BIC facility, (3) residential properties along the surface water migration route, (4) a ditch that flows along the western edge of the former BIC facility and the location of the former settling ponds, (5) an unnamed perennial stream (tributary of Wilson Branch) that receives runoff from the drainage ditch, (6) Wilson Branch, and (7) the Pee Dee River (Refs. 10, pp. 1, 3, 4; 15, pp. 3, 14, 15; 16, p. 4; 17, p. 1; 18, pp. 1, 3; 20, p. 1; 28; 87; 95) (see Figures 2, 3, 4A, and 4B of this HRS documentation record).

Table 1 provides a brief summary of the previous investigations conducted at the former BIC facility including the hazardous substances detected in the samples collected.

TABLE 1: Summary of Previous Investigations

Agency	Investigation	Date	Samples Collected	Hazardous Substances Detected	References
SCDHEC	Expanded Pre-CERCLIS Screening Assessment	February 2016	Soil and sediment	Aroclor-1248 SVOC Metals	15, pp. 3, 4, 14, 15
SCDHEC	Site Inspection	August 2016	Sludge, soil, and sediment	Aroclor -1248 Aroclor -1254 SVOCs Metals	10, p. 2; 16, pp. 1, 2, 3, 19, 20; 21, pp. i, 96, 138 to 143
SCDHEC	Sampling Event	September 2016	Soil and sediment	Aroclor -1248 Aroclor -1254 SVOCs Metals	22, pp. i, 3, 4, 5, 66, 67, 103, 104, 172 to 179, 354, 385
SCDHEC	Sampling Event	October 5, 2016	Soil	Aroclor -1254 Aroclor -1248	18, pp. 1, 2, 3; 24, pp. 3, 4
SCDHEC	Sampling Event	October 20, 2016	Soil and sediment	Aroclor -1254 Aroclor -1248	23, p. 4
SCDHEC	Sampling Event	November 2016	Soil and sediment	Aroclor -1254 Aroclor -1248 SVOCs Metals	20, pp. 1 through 10; 25, pp. 3, 4, 5, 6, 116, 117

Notes:

CERCLIS Comprehensive Environmental Response and Compensation Liability Information System
SCDHEC South Carolina Department of Health and Environmental Control
SVOC Semivolatile organic compounds

In February 2016, SCDHEC conducted an Expanded Pre-Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) assessment. SCDHEC collected eight soil (four surface and four subsurface) samples from the former settling ponds and two sediment samples from the drainage ditch located along the western edge of the former BIC facility and in the backyards of residential properties (Refs. 15, pp. 3, 4, 14, 15; 73). The drainage ditch begins at sediment sample BL-DS-01B (station location BL-01B), located about 293 feet northwest of the western corner of the manufacturing building, and continues flowing north for about 1,500 feet where it meets a perennial tributary of Wilson Branch (Refs. 73; 87) (see Figure 4A of this HRS documentation record). The drainage ditch receives runoff from the western portion of the former BIC facility including the location of the former settling ponds (Refs. 28, 33, pp. 1, 3; 73). The samples were analyzed for PCBs, semivolatile organic compounds (SVOC), volatile organic compounds (VOC), and metals (Ref. 15, pp. 20, 22, 65, 67, 117, 119, 173, 175).

Soil samples collected from the former settling ponds contained Aroclor-1248 (up to 14,000 micrograms per kilogram [µg/kg]), benzo(a)anthracene (at 150 µg/kg), benzo(b)fluoranthene (at 260 µg/kg), benzo(k)fluoranthene (at 280 µg/kg), chrysene (at 270 µg/kg), fluoranthene (at 500 µg/kg), bis(2-ethylhexyl)phthalate (up to 10,000 µg/kg), acetone (up to 97 µg/kg), p-isopropyltoluene (up to 16 µg/kg), arsenic (up to 0.95 milligram per kilogram [mg/kg]), cadmium (up to 0.18 mg/kg), chromium (up to 14 mg/kg), hexavalent chromium (up to 6.1 mg/kg), lead (up to 16 mg/kg), and mercury (up to 0.075 mg/kg), among others (Ref. 15, pp. 20 to 56, 65 to 104, 117 to 153, 173 to 212).

Sediment samples collected from the drainage ditch contained Aroclor -1248 (up to 50,000J [estimated] µg/kg), benzo(a)anthracene (up to 930 µg/kg), benzo(a)pyrene (up to 2,500 µg/kg), benzo(b)fluoranthene (up to 4,300 µg/kg), benzo(k)fluoranthene (up to 3,700 µg/kg), chrysene (up to 3,500 µg/kg), fluoranthene (up to 4,600 µg/kg), acetone (at 32J µg/kg), arsenic (up to 1.9 mg/kg), cadmium (up to 0.42 mg/kg), chromium (up to 9.1 mg/kg), lead (up to 63 mg/kg), and mercury (at 0.061 mg/kg), among others (Ref. 12, pp. 42 to 47, 88 to 93, 140 to 144, 198 to 203).

SCDHEC recommended further assessment to delineate the extent of soil contamination as well as additional sampling along the surface water migration route (Ref. 15, p. 5). This recommendation was based on the presence of PCBs in sediment samples collected from the drainage ditch that flows through residential properties at concentrations that exceed the EPA Regional Screening Level (RSL) of 230 µg/kg for residential soil (Ref. 26, p. 9).

Between August 2016 and March 2017, SCDHEC collected numerous sediment samples from the surface water migration route that includes the drainage ditch, the tributary of Wilson Branch, Wilson Branch, Huckleberry Branch, and the Pee Dee River (Refs. 10, pp. 1, 2; 17, pp. 1, 2, 3; 19; 20, pp. 1, 2; 28; 29, pp. 1, 2, 3; 31, p. 9) (see Figure 3 of this HRS documentation record). The samples contained PCBs including Aroclor-1248 (up to 1,900,000 µg/kg) and Aroclor-1254 (up to 880,000 µg/kg) (Ref. 33, pp. 23 through 48). The highest concentrations of PCBs were detected in the drainage ditch adjacent to the western portion of the former BIC facility (Ref. 33, pp. 2, 44). The drainage ditch contained Aroclor-1248 (up to 1,900,000 µg/kg) and Aroclor-1254 (up to 880,000 µg/kg) (Ref. 33, p. 23 through 27). The tributary of Wilson Branch contained Aroclor-1248 (up to 24,000 µg/kg) and Aroclor-1254 (up to 17,000 µg/kg) (Ref. 33, pp. 1, 12, 35, 36, 37). Wilson Branch contained Aroclor-1248 (up to 6,100 µg/kg) and Aroclor-1254 (up to 6,600 µg/kg) (Ref. 33, pp. 19, 39, 40). Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor (Ref. 66).

In 2016, three samples were collected from sludge observed on top of the former settling ponds and a residential property located about 540 feet east of the former settling ponds (Ref. 19, pp. 1, 4). The sludge was dark green and gray with a rubbery sludge-like consistency (Ref. 15, p. 236). The samples were analyzed for PCBs, SVOCs, and metals (Refs. 10, p. 2; 21, pp. 96, 138, 139, 160 to 164, 172 to 178). The sludge samples contained Aroclor-1248 (up to 750,000 µg/kg), arsenic (up to 0.90 mg/kg), cadmium (up to 21 mg/kg), chromium (up to 1,800 mg/kg), lead (up to 1,100 mg/kg), and mercury (at 9.7 mg/kg), among others (Refs. 21, pp. 96, 138, 139).

It should be noted that samples collected from and in the vicinity of the former BIC facility contain VOCs, SVOCs, and metals in addition to PCBs. However, only selected samples were analyzed for these constituents. All samples were analyzed for PCBs, and PCBs are prevalent throughout the former BIC facility as well as the surface water migration pathway (see Section 2.2.1 Source Identification and Section 4.1.2.1.1 Surface Water Migration Pathway Observed Release of this HRS documentation record). Therefore, only PCBs are evaluated in this HRS documentation record.

Aroclor-1260 was used in the textile industry as a polyester resin to produce stronger fiberglass (Ref. 74, p. 8). Aroclor-1260 was not detected in the samples collected from the sludge (Refs. 19, p. 1; 21, p. 104). The sludge samples contained Aroclor-1248 and the sludge samples mixed with soil or sediment contained Aroclor-1248 and Aroclor-1254 (Refs. 19, p. 1; 21, pp. 47, 104). Commercially used PCBs are complex mixtures of chlorinated biphenyls made up of different congeners resulting from the different number and position of chlorines on the two biphenyl rings. Commercial mixtures were sold under the trade name Aroclor in the U.S. (Ref. 89, p. 3). Two mechanisms allow PCB concentrations to change in the environment: weathering and dechlorination (Ref. 88, pp. 14, 16). Both weathering and dechlorination alter congener patterns resulting in environmental samples found with very different PCB congener composition (Refs. 88, p. 16; 90, p. 27). Therefore, the PCB composition in the environmental sample may not closely resemble the Aroclor standards the samples are compared to and quantified against (Ref. 90, p. 37). By this process, even if the Aroclor introduced into the site was originally Aroclor 1260, the laboratory results reported may be for different Aroclors (as in 1248 and 1254). See Section 4.2.1.1 Attribution of this HRS documentation record for additional information.

Additional Information

Although not included as part of the site for HRS scoring purposes, site-related contamination has been detected in adjacent residential properties. From August 2016 to November 2016, SCDHEC collected numerous soil and sediment samples from 32 residential properties in neighborhoods adjacent to and downgradient of the former BIC facility, including several residential properties that back onto the drainage ditch that drains Source No. 1 along the western border of the BIC property as well as residential properties near the vacant parcel where the former settling ponds were located (Refs. 16, pp. 1, 2, 3; 17, pp. 1, 2, 3; 18, pp. 1, 2, 3; 20, pp. 1-10). Sampling was conducted in an effort to delineate the extent of contamination within residential properties surrounding the former BIC facility and within the surface water migration pathway overland route (Ref. 28). Soil and sediment samples collected from residential properties or the drainage ditch located in the backyards (within 200 feet of the residential structure) of residential properties contained Aroclor-1248 (up to 2,100,000 µg/kg) and Aroclor-1254 (up to 1,600,000 µg/kg) (Ref. 33, pp. 49, 60).

In February 2017, EPA conducted a removal assessment to determine whether a removal action was warranted as a result of PCB concentrations in soil and sediment at residential properties situated along the drainage ditch that flows along the western edge of the former BIC facility as well as Huckleberry Park, situated about 1 mile northeast and downstream of the former BIC facility (Ref. 34, p. 2, 9, 11). The goal of the sampling event was to estimate the volume of soil requiring disposal based on the PCB hazardous criterion of 50 parts per million (ppm) (Ref. 34, p. 4; 76). During the removal assessment, more than 2,100 samples were collected in residential yards adjacent to the drainage ditch. Certain samples were selected for analysis using a PCB screening analyzer. The criteria for analysis were established using existing SCDHEC data (Ref. 76). More than 900 samples have been screened using the PCB screening analyzer, with concentrations ranging from 1 ppm to over 1,100 ppm (Ref. 76).

EPA selected locations based on vicinity and similar concentration to prepare 38 composite samples. The samples were homogenized and screened using a PCB screening analyzer to obtain a PCB concentration. These same homogenized samples were also submitted to an analytical laboratory to compare laboratory analytical results to the PCB screening analyzer results (Ref. 76). Composite sample PCB concentrations ranged from 1.23 ppm to 338 ppm. Laboratory analytical results showed PCB-1248 concentrations ranging from 0.023J (estimated) ppm to 100J ppm and PCB-1254 concentrations ranging from 0.25J ppm to 220J ppm (Ref. 76). Based on the removal assessment results, EPA initiated a time critical removal action in April 2017 (Ref. 80, pp. 1, 2). Removals began in June 2017 and included the cleanup of six residential properties with PCB concentrations greater than 10 times the EPA Removal Management Level (RML) for residential properties (23,000 µg/kg, Aroclor 1248 and 3,500 µg/kg, Aroclor 1254) as well as play areas in Huckleberry Park (Refs. 80, pp. 1, 2; 84, pp. 2, 3). On July 12, 2017, an Action Memorandum was approved to include eight additional residential properties that contained PCBs at concentrations greater than the RML (Ref. 84, pp. 3, 4, 8). A total of 14 residential parcels are targeted for cleanup (Refs. 80, p. 1; 81, p. 2). As of July 20, 2017, removals are complete at three of the 14 residential properties (Ref. 81, p. 2).

2.2 SOURCE CHARACTERIZATION

2.2.1 SOURCE IDENTIFICATION

Number of source: 1

Name of source: Contaminated soil located along the western portion of the former BIC facility, including the southern portion of the former settling ponds location

Source Type: Contaminated soil

Description and Location of Source (with reference to a map of site):

Source No. 1 is an area of PCB-contaminated soil along the western portion of the former BIC facility, including the southern portion of the former settling ponds location (see Figure 2 of this HRS documentation record) as defined by 10 samples. The parcel of land containing the former settling ponds is mostly cleared with trees bordering the southern, eastern, and western sides; an occupied residential structure borders the parcel to the north (see Figure 2 of this HRS documentation record). Borings advanced at depths up to 15 feet below ground surface (bgs) within the former settling ponds show soil mixed with minor amounts of sludge; therefore, the southern portion of the former settling ponds location is evaluated as contaminated soil (Refs. 17, pp. 4, 5, 6, 13; 19, p. 3). Soil within Source No. 1 likely became contaminated because of direct discharge to the drainage ditch on the western side of the former BIC facility, migration, deposition, and flooding; possible leaks and spills from the settling station; and surface water runoff. Also, when the settling ponds were closed, the area was apparently graded and sludge-like material can presently be seen over a much wider footprint than the former settling ponds, indicating that the material may have been moved in any direction (Refs. 28; 73).

Prior to 1971, sludge from wastewater (or effluent) was disposed of in settling ponds located north of the manufacturing building (Refs. 51; 52; 53). In November 1989, SCDHEC issued a waste disposal authorization to Burlington Industries for disposal of 300 cubic yards of dried sludge at a landfill located about 10.7 miles south of the former BIC facility (Refs. 15, pp. 248, 249; 28). These settling ponds are included in the evaluation of Source No. 1 (see Figure 2 and 3A of this HRS documentation record).

Sludge was observed in pieces on the ground surface above the location of the former settling ponds (samples BL-WA-01, BL-WA-2) and on a residential property about 540 feet east of the former settling ponds location (sample BL-WA-3) (Ref. 19, p. 1). Sludge also was observed mixed with soil and sediment in samples collected from residential properties 560 feet southwest and 320 feet northwest of the former settling ponds location (Refs. 10, pp. 3, 4, 5; 19, pp. 1, 2; 33, p. 1). The material was dark green and gray with a rubbery sludge-like consistency (Refs. 15, p. 236; 19, p. 1). Samples collected from the sludge contained Aroclor-1248 (up to 750,000 µg/kg in sample BL-WA-3) (Refs. 19, p. 1; 21, p. 104). Samples collected from the sludge material mixed with soil or sediment contained Aroclor-1248 (up to 780,000 µg/kg in sample BL-DS-04) and Aroclor-1254 (up to 730,000 µg/kg in sample BL-DS-04) (Refs. 19, p. 1; 21, p. 47).

Samples collected to delineate Source No. 1 in August and September 2016 contained Aroclor-1248 and Aroclor-1254 (Refs. 19, p. 4; 40, p. 28, 29, 32, 36, 48, 141, 173, 187, 190, 195). The highest concentrations of Aroclor-1248 (up to 1,500,000 µg/kg) and Aroclor-1254 (up to 1,300,000 µg/kg) were detected in sample BL-SS-28, collected in the western portion of the former BIC facility adjacent to the drainage ditch (Refs. 19, p. 4; 33, pp. 1, 3; 40, p. 28). The August and September 2016 soil samples contained Aroclor-1248 and Aroclor-1254 at concentrations above background levels (Refs. 19, p. 4; 40, pp. 28, 29, 32, 36, 48, 141, 173, 187, 190, 195, 221, 230) (see Table 2 of this HRS documentation record).

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

SCDHEC August, September, and October Sampling Events

The soil samples contained in Table 2 of this HRS documentation record were collected during the SCDHEC August, September, and October 2016 sampling events (Ref. 19, p. 4). Background samples collected from residential properties were used to represent background levels for PCBs for comparison to contaminated soil samples. Specifically, the background soil samples were collected at residential properties located about 0.12 mile northwest and 0.14 mile northwest of the approximate center of the former settling ponds location (Refs. 19, p. 4; 33, pp. 1, 6, 7) (see Figure 3 of this HRS documentation record). Analytical results indicate that the residential properties located west of the former BIC facility have not been affected by past operations at the former BIC facility (Refs. 19, p. 4; 40, pp. 221, 230; 33, pp. 1, 6, 7).

The background samples were collected from 0 to 2 inches bgs and will be compared with contaminated samples collected from 0 to 6 inches bgs and 0 to 12 inches bgs (Refs. 19, pp. 1, 2, 3, 4). All samples were collected by use of direct-push technology (DPT), hand augers, and aluminum pans and spoons (Ref. 19, p. 1). The soil samples were collected in accordance with the EPA Region 4, Science and Ecosystem Support Division (SESD), Field Branches Quality System and Technical Procedures (FBQSTP) for Soil Sampling, SESDPROC-300-R3, August 2014 (Refs. 19, p. 1; 45).

All samples were analyzed by Shealy Environmental Services, Inc. (Shealy) for PCBs using EPA Method 8082A (Ref. 19, pp. 1, 2, 3). The analytical data were reviewed and the data elements in the data package were compared against the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use and the EPA Contract Laboratory Program (CLP) National Functional Guidelines (NFG) for Superfund Organic Data Review. The data validation effort shows the overall data quality to be acceptable (Refs. 39; 40, pp. 1 through 8; 71). The practical quantitation limits (PQL) are listed on the analytical data sheets contained in Reference 40. The PQLs are equivalent to sample quantitation limits (SQL) as defined in Section 1.1, Definitions, of the HRS (Refs. 1, Section 1.1; 37).

Background and contaminated soil samples were collected during the same time frame, in accordance with the same sampling procedures and approved QAPPs, and from similar types of soil including silty sand and sand (Refs. 14, pp. 1, 2, 3; 19, pp. 1, 4; 33, pp. 1, 3, 4, 6, 7, 8; 35; 36; 40, pp. 221, 230; 41, p. 78; 43, pp. 5, 10). Soil descriptions are not available for all samples contained in Table 2 below. However, soil descriptions are available for both background samples (RJ05119-014, RJ05119-005) and one contaminated sample (BL-SS-74) and consist of silty sand and sand (Refs. 40, pp. 221, 230; 41, p. 78; 43, pp. 5, 10).

The background and contaminated soil grab samples were analyzed using the same analytical methods by Shealy (Ref. 19, pp. 1, 2, 3). Chain-of-custody records for the background and contaminated soil samples are provided in References 21, 22, and 24. Logbook notes are provided in References 41 and 43. The locations of the samples contained in Table 2 are provided in References 19, p. 4 and Reference 33, pp. 1, 3, 4, 6, and 7. Specific page numbers for the chain-of-custody records and logbook notes are provided in the table below.

TABLE 2: Analytical Results for Source No. 1						
Sample ID	Sample Location[1]	Date Collected	Hazardous Substance	Hazardous Substance Concentration (µg/kg)	PQL (µg/kg)	References
Background Soil Samples						
RJ05119-014	About 0.14 mile north of the approximate center of the former settling ponds location	10/5/2016	Aroclor-1248	10U	10	19, p. 4; 24, p. 32; 33, p. 6; 40, p. 230; 43, p. 10
RJ05119-014	About 0.14 mile north of the approximate center of the former settling ponds location	10/5/2016	Aroclor-1254	10U	10	19, p. 4; 24, p. 32; 33, p. 6; 40, p. 230; 43, p. 10
RJ05119-005	About 0.12 mile north of the approximate center of the former settling ponds location	10/5/2016	Aroclor-1248	11U	11	19, p. 4; 24, p. 33; 33, p. 7; 40, p. 221; 43, p. 5
RJ05119-005	About 0.12 mile north of the approximate center of the former settling ponds location	10/5/2016	Aroclor-1254	11U	11	19, p. 4; 24, p. 33; 33, p. 7; 40, p. 221; 43, p. 5
Contaminated Soil Samples						
BL-SS-28	Western portion of the former BIC facility	8/23/2016	Aroclor-1248	1,500,000	54,000	21, p. 133; 33, p. 3; 40, p. 28
BL-SS-28	Western portion of the former BIC facility	8/23/2016	Aroclor-1254	1,300,000	54,000	21, p. 133; 33, p. 3; 40, p. 28
BL-SS-39	Western portion of the former BIC facility	8/24/2016	Aroclor-1248	20	10	21, p. 133; 33, p. 3; 40, p. 32
BL-SS-39	Western portion of the former BIC facility	8/24/2016	Aroclor-1254	27	10	21, p. 133; 33, p. 3; 40, p. 32
BL-SS-27D	Western portion of the former BIC facility	8/24/2016	Aroclor-1248	68,000	5,700	21, p. 133; 33, p. 3; 40, p. 29

TABLE 2: Analytical Results for Source No. 1						
Sample ID	**Sample Location[1]**	**Date Collected**	**Hazardous Substance**	**Hazardous Substance Concentration (µg/kg)**	**PQL (µg/kg)**	**References**
BL-SS-27D	Western portion of the former BIC facility	8/24/2016	Aroclor-1254	37,000	5,700	21, p. 133; 33, p. 3; 40, p. 29
BL-SS-74	Western portion of the former BIC facility	8/25/2016	Aroclor-1248	2,100	590	21, p. 307; 33, p. 3; 40, p. 36; 41, p. 78
BL-SS-74	Western portion of the former BIC facility	8/25/2016	Aroclor-1254	5,300	590	21, p. 307; 33, p. 3; 40, p. 36; 41, p. 78
BL-HA_104_1	Western portion of the former BIC facility	9/20/2016	Aroclor-1248	35,000	1,100	22, p. 344; 33, p. 3; 40, p. 141
BL-HA_104_1	Western portion of the former BIC facility	9/20/2016	Aroclor-1254	31,000	1,100	22, p. 344; 33, p. 3; 40, p. 141
BL-HA-114_1	Western portion of the former BIC facility	9/20/2016	Aroclor-1248	27	11	22, p. 349; 33, p. 3; 40, p. 195
BL-HA-114_1	Western portion of the former BIC facility	9/20/2016	Aroclor-1254	110	11	22, p. 349; 33, p. 3; 40, p. 195
BL-HA-117_1	Western portion of the former BIC facility	9/20/2016	Aroclor-1248	53,000	7,000	22, p. 349; 33, p. 3; 40, p. 190
BL-HA-117_1	Western portion of the former BIC facility	9/20/2016	Aroclor-1254	65,000	7,000	22, p. 349; 33, p. 3; 40, p. 190
BL-HA-118-0-1	Western portion of the former BIC facility	9/20/2016	Aroclor-1248	13	11	22, p. 344; 33, p. 3; 40, p. 187
BL-HA-118-0-1	Western portion of the former BIC facility	9/20/2016	Aroclor-1254	28	11	22, p. 344; 33, p. 3; 40, p. 187
BL-SS-11A	Soil located west of the former settling ponds location	8/25/2016	Aroclor-1248	130,000	11,000	21, p. 308; 33, p. 4; 40, p. 48
BL-SS-11A	Soil located west of the former settling ponds location	8/25/2016	Aroclor-1254	100,000	11,000	21, p. 308; 33, p. 4; 40, p. 48

TABLE 2: Analytical Results for Source No. 1						
Sample ID	**Sample Location[1]**	**Date Collected**	**Hazardous Substance**	**Hazardous Substance Concentration (µg/kg)**	**PQL (µg/kg)**	**References**
BL-DP-116_1	Soil located in the southeastern portion of the former settling ponds location	9/20/2016	Aroclor-1248	53	11	22, p. 347; 33, p. 4; 40, p. 173
BL-DP-116_1	Soil located in the southeastern portion of the former settling ponds location	9/20/2016	Aroclor-1254	47	11	22, p. 347; 33, p. 4; 40, p. 173

Notes:

1	See Figure 3 of this HRS documentation record
_1	0 to 1 foot bgs
-0-1	0 to 1 foot bgs
bgs	Below ground surface
BL	Burlington Industries
DP	Direct push
HA	Hand auger
ID	Identification
µg/kg	Microgram per kilogram
SS	Surface soil
PQL	Practical quantitation limit. The PQLs are equivalent to sample quantitation limits as defined in Section 1.1, Definitions of the HRS (Refs. 1, Section 1.1; 37).
RJ05119-xxx	Laboratory ID
U	The analyte was analyzed for, but was not detected at or above the associated value (PQL) (Ref. 40, p. 8).

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Soil samples collected from Source No. 1 contained Aroclor-1248 and Aroclor-1254 at concentrations significantly greater than background levels (see Table 2 of this HRS documentation record). Source No. 1 consists of an area of contaminated soil in the western portion of the former BIC facility, including the southern portion of the former settling ponds location (Refs. 33, pp. 1, 3, 4; 40, pp. 28, 29, 32, 36, 48, 141, 173, 187, 190, 195). Analytical results for sediment samples collected downgradient of Source No. 1 indicate that a release of hazardous substances has occurred to the surface water migration pathway, as documented in Section 4.0 of this HRS documentation record. During the 2016 SCDHEC sampling events, a (1) maintained engineered cover, or (2) functioning and maintained run-on control system and (3) runoff management system were not observed (Ref. 19, p. 1). Therefore, a containment factor value of 10, as noted in Table 3, was assigned for Source No. 1 (Ref. 1, Section 3.1.2.1, Table 3-2).

TABLE 3: Containment Factors for Source No. 1

Containment Description	Containment Factor Value	References
Gas release to air	NS	NA
Particulate release to air	NS	NA
Release to groundwater	NS	NA
Release to surface water via overland migration and/or flood: No engineered and maintained run-on and runoff control systems	10	19, p. 1

Notes:

NA Not applicable
NS Not scored

2.4.2.1 HAZARDOUS WASTE QUANTITY

2.4.2.1.1 Hazardous Constituent Quantity

The total hazardous constituent quantity for Source No. 1 could not be adequately determined according to the HRS requirements; that is, the total mass of all CERCLA hazardous substances in the source and releases from the source is not known and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.1). Insufficient historical and current data [manifests, potentially responsible party (PRP) records, State records, permits, waste concentration data, etc.] are available to adequately calculate the total or partial mass of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to calculate a total or partial Hazardous Constituent Quantity estimate for Source No. 1 with reasonable confidence. Scoring proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.1).

Hazardous Constituent Quantity Assigned Value: NS

2.4.2.1.2 Hazardous Wastestream Quantity

The total hazardous wastestream quantity for Source No. 1 could not be adequately determined according to the HRS requirements; that is, the total mass of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and releases from the source is not known and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.2). Insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, annual reports, etc.) are available to adequately calculate the total mass of all hazardous wastestreams and CERCLA pollutants and contaminants or the source and the associated releases from the source. Therefore, there is insufficient information to adequately calculate the total or partial mass of the wastestream plus the mass of all CERCLA pollutants and contaminants in the source and the associated release from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous wastestream quantity for Source No. 1 with reasonable confidence. Scoring proceeds to the evaluation of Tier C, Volume (Ref. 1, Section 2.4.2.1.2).

Hazardous Wastestream Quantity Assigned Value: NS

2.4.2.1.3 Volume (Tier C)

The information available on the depth of Source No. 1 is not sufficiently specific to support a volume of contaminated soil with reasonable confidence; therefore, it is not possible to assign a volume (Tier C) in cubic yards (yd^3) for Source No. 1 (Ref. 1, Section 2.4.2.1.3). Source No. 1 has been assigned a value of 0 for the volume measure (Ref. 1, Section 2.4.2.1.3). As a result, the evaluation of hazardous waste quantity proceeds to the evaluation of Tier D, area (Ref. 1, Sec. 2.4.2.1.3).

Volume Assigned Value: 0
Are the data complete for volume quantity for this area? No

2.4.2.1.4 Area (Tier D)

The estimated area of Source No. 1 was determined using Figure 3 of this HRS documentation record and Reference 33, pp. 1, 3, and 4 that depict the soil sampling locations for the SCDHEC August and September 2016 sampling events (Refs. 19, p. 4; 33, p. i). The measuring tool in Nuance Power Portable Document Format (PDF) Advanced was used to calculate the square footage. The approximate area of Source No. 1 is 29,600 square feet (see Figure 3 of this HRS documentation record) (Refs. 1, Section 2.4.2.1.4; 10, pp. 3, 4, 5; 17, pp. 7, 13; 19, p. 4; 33, p. 3; 46). Soil within Source No. 1 likely became contaminated because of direct discharge to the drainage ditch on the western side of the former BIC facility, migration, deposition, and flooding; possible leaks and spills from the settling station; and surface water runoff. Also, when the settling ponds were closed, the area was apparently graded and sludge-like material can presently be seen over a much wider footprint than the former settling ponds, indicating that material may have been moved in any direction (Ref. 28). Contamination between sampling points was inferred based on analytical results from soil samples collected from areas within Source No. 1 and the likely mode of deposition (Refs. 33, pp. 1, 3, 4, 41, 42, 44, 45, 47, 48).

Sum (square feet): 29,600
Equation for Assigning Value (Table 2-5): Area (A)/34,000

Area Assigned Value: 0.87

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source HWQ value for Source No. 2 is 1.2 (Ref. 1, Section 2.4.2.1.5).

Source HWQ Value: 0.87

SUMMARY OF SOURCE DESCRIPTIONS

TABLE 4: Summary of Source Descriptions

Source No.	Source Hazardous Waste Quantity Value	Source Hazardous Constituent Quantity Complete? (Yes/No)	Containment Factor Value by Pathway			
			Ground Water (Ref. 1, Table 3-2)	Surface Water Overland/ Flood (Ref. 1, Table 4-2)	Air	
					Gas (Ref. 1, Table 6-3)	Particulate (Ref. 1, Table 6-9)
1	0.87	No	NS	10	NS	NS

Notes:

NS Not scored

Description of Other Possible On-Site Sources

Other possible on-site sources include the drainage ditch located adjacent to Source No. 1 and contaminated soil located throughout the former BIC facility not included in Source No. 1.

- Drainage Ditch – The drainage ditch is located along the western side of the former BIC facility and in the backyards of residential properties (Ref. 73). The drainage ditch begins at sample point BL-DS-01B, about 293 feet northwest of the western corner of the manufacturing building, and continues flowing north for about 1,500 feet where it meets a perennial tributary of Wilson Branch (Refs. 73; 87) (see Figure 4A of this HRS documentation record). The drainage ditch receives runoff from Source No. 1, including the location of the former settling ponds (Refs. 28, 3; 33, pp. 1, 3) (see Figures 3 and 4A of this HRS documentation record). No mounds, berms, or other impediments that would cause runoff from Source No. 1 to collect or to travel away from the direction of the drainage ditch are located in areas adjacent to Source No. 1 (Ref. 28). Numerous samples have been collected from the drainage ditch adjacent to Source No. 1. The samples contain PCBs including Aroclor-1248 (up to 1,900,000 µg/kg in sample BL-DS-06) and Aroclor-1254 (up to 880,000 µg/kg in sample BL-DS-06) (Ref. 33, pp. 1, 23 to 27). Aroclor-1248 and Aroclor-1254 have been detected in the surface water bodies downstream of the drainage ditch (in the tributary of Wilson Branch and Wilson Branch) as documented in Tables 7, 8, 11, and 12 of this HRS documentation record (see Figures 4A and 4B of this HRS documentation record).

- Contaminated Soil – Based on field screening results, PCB-contaminated soil is located in other areas north and northeast of the manufacturing building. These areas are not evaluated as part of Source No. 1 or as a separate source because only field screening results are available (Refs. 10, pp. 4, 6, 10; 33, pp. 43, 44).

4.0 SURFACE WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT – Drainage Ditch, Tributary of Wilson Branch, Wilson Branch, Huckleberry Branch, and Pee Dee River

4.1.1.1 Definition of Hazardous Substance Migration Path for Overland/Flood Component

The hazardous substance migration pathway includes both the overland segment and the in-water segment that hazardous substances would take as they migrate away from sources. The overland segment begins at the source and proceeds downgradient to the probable point of entry (PPE) to surface water. The in-water segment at the PPE continues in the direction of flow (Refs. 1, Section 4.1.1.1; 3) (see Figure 4A of this HRS documentation record).

Surface water runoff from Source No. 1 flows overland in a westward direction, enters the drainage ditch along the western boundary of the former BIC facility, and flows north for about 1,500 feet where the ditch meets a perennial tributary of Wilson Branch. The point where the drainage ditch meets the tributary of Wilson Branch is the PPE into perennial surface water (Refs. 3; 33, pp. 1, 3; 73; 87) (see Figure 4A of this HRS documentation record). No mounds, berms, or other impediments that would cause runoff from Source No. 1 to collect or to travel away from the direction of the drainage ditch are located in areas adjacent to Source No. 1. Surface water runoff from Source No. 1 does not flow in an eastwardly direction (Ref. 28).

From the PPE, flow in the tributary of Wilson Branch continues for about 1 mile east and northeast and joins Wilson Branch. Wilson Branch flows northeast for about 0.5 mile and joins Huckleberry Branch. Huckleberry Branch flows about 1.5 miles east-southeast, where it joins the Pee Dee River. The Pee Dee River flows south for more than 13 miles, completing the 15-mile surface water migration pathway target distance limit (TDL) (Ref. 3). The area of observed release is designated from sediment sample SD-206 along the tributary of Wilson Branch (about 300 feet downstream of the PPE) to sediment sample HP-001-SD along Wilson Branch about 1.34 miles downstream of the PPE (see Tables 5 through 8 and Figure 4A of this HRS documentation record). About 1,500 feet downstream of the confluence of the drainage ditch with the tributary of Wilson Branch, a second drainage ditch (the eastern drainage ditch) joins the tributary of Wilson Branch (see Figure 2 of this HRS documentation record). This ditch receives runoff from the eastern portion of the Highland Industries property (Refs. 33, pp. 1, 2; 73). Runoff from Source No. 1 does not enter the eastern drainage ditch; therefore, this overland flow path was not evaluated (Ref. 28).

The tributary of Wilson Branch is perennial upstream of background sample location BL-BKG-SD to its confluence with Wilson Branch (Ref. 87) (see Figures 2 and 4A of this HRS documentation record). Additionally, Wilson Branch and Huckleberry Branch are perennial surface water bodies (Refs. 86, pp. 1 through 5; 95, pp. 1 through 5) (see Figure 4A of this HRS documentation record).

Published flow rate data from the USGS are not available for the tributary of Wilson Branch, Wilson Branch, or Huckleberry Branch (Ref. 47, pp. 1 through 11). The flow rate for the tributary of Wilson Branch and Wilson Branch is estimated to be less than 10 cubic feet per second (cfs). The flow rate for Huckleberry Branch is estimated to be between 10 and 100 cfs (Ref. 73). According to the USGS, the annual mean flow rates for the Pee Dee River for water years 1992 through 2015 (a 23-year period) ranged from 2,061 to 13,980 (Ref. 48, pp. 1, 2). The tributary of Wilson Branch, Wilson Branch, Huckleberry Branch, and the Pee Dee River are located within a 100-year flood plain (Ref. 49, pp. 1 through 5).

Targets associated with the surface water bodies along the 15-mile TDL include fishing for human consumption on the Pee Dee River and HRS-eligible palustrine forested and palustrine emergent wetlands along the tributary of Wilson Branch (Refs. 3; 59, pp. 3, 4, 25; 61). About 672 feet of palustrine forested and palustrine emergent wetlands are evaluated for the BIC site (sample BIC-103-SD to sample BIC-108-SD) (Refs. 32, p. 23; 59, pp. 3, 4, 25; 92) (see Figure 4B of this HRS documentation record).

4.1.2.1 LIKELIHOOD OF RELEASE

4.1.2.1.1 OBSERVED RELEASE

Chemical Analysis

An observed release by chemical analysis is established by showing that the hazardous substances in release samples are significantly greater in concentration than the background level and by documenting that at least part of the significant increase is the result of a release from the site being evaluated. The significant increase can be documented in one of two ways for HRS purposes. If the background concentration is not detected (or is less than the detection limit), an observed release is established when the sample measurement equals or exceeds the appropriate quantitation limit. If the background sample concentration equals or exceeds the detection limit, an observed release is established when the sample measurement is 3 times or more above the background concentration and above the appropriate quantitation limit (Ref. 1, Table 2-3). An observed release of Aroclor-1248 and Aroclor-1254 is documented in the following sections by comparing the hazardous substances in similar background and contaminated sediment samples (see Tables 5 through 12 in this section, Section 4.1.2.1.1, of this HRS documentation record) and by attributing the increase to the site. The samples documenting this observed release were collected by SCDHEC during the August, September, October, and November 2016 and February and March 2017 sampling events (Refs. 40, pp. 138, 147, 152, 154, 157, 165, 167, 168, 177, 179, 246, 267, 294, 309, 330; 69, pp. 6 through 11, 20 through 23) (see Figures 4A and 4B of this HRS documentation record).

SCDHEC August, September, October, and November 2016 Sampling Events

Background Samples

During the August 2016 SCDHEC sampling event, background sample BL-BKG-SD was collected along the tributary of Wilson Branch (a perennial surface water body), about 1,584 feet upstream of its confluence with the drainage ditch and therefore outside of the influence of the BIC site (Refs. 19, pp. 1, 2; 33, p. 5; 87) (see Figure 4A of this HRS documentation record). Background sample BL-BKG-SD is used to document observed releases along the tributary of Wilson Branch. During the November 2016 SCDHEC sampling event, sediment sample 294SD was collected from Wilson Branch upstream of its confluence with the tributary of Wilson Branch and is used to document observed releases along Wilson Branch downstream of its confluence with the tributary of Wilson Branch (Ref. 19, p. 4) (see Figure 4A of this HRS documentation record). Background and contaminated sediment samples were collected with aluminum pans and spoons at depths ranging from 0 to 2 inches to 0 to 6 inches below the creek bed (bcb) (Refs. 19, pp. 1, 2, 4; 41, p. 69; 42, pp. 58, 60, 62, 74, 87, 94, 96, 97, 99, 102; 43, pp. 24, 25; 44, pp. 12, 22, 33, 47). All sediment samples were collected in accordance with the EPA Region 4 SESD FBQSTP for Sediment Sampling, SESDPROC-200-R3, August 21, 2014 (Refs. 19, p. 1; 50).

Background and contaminated sediment samples were collected during the same time frame (August to November 2016), using the same sampling procedures, and in accordance with approved QAPPs (Refs. 19, pp. 1, 2, 3, 4; 35; 36; 38; 41, p. 69; 42, pp. 58, 60, 62, 74, 87, 94, 96, 97, 99, 102; 43, pp. 24, 25; 44, pp. 12, 22, 33, 47). The background and contaminated samples were collected from similar sediment types that were typically sand, sandy loam, and silt, with some clay (41, p. 69; 42, pp. 58, 60, 62, 74, 87, 94, 96, 97, 99, 102; 43, pp. 24, 25; 44, pp. 12, 22, 33, 46, 47). The surface water bodies, physical characteristics, sample collection methods, time frame, and depths of the background and contaminated sediment samples are similar (Refs. 19, pp. 1, 4; 35; 36; 38; 41, p. 69; 42, pp. 58, 60, 62, 74, 87, 94, 96, 97, 99, 102; 43, pp. 24, 25; 44, pp. 12, 22, 33, 46, 47) (see Tables 5 and 7 in this section [Section 4.1.2.1.1] of this HRS documentation record).

The background sediment samples were collected in accordance with approved QAPPs dated August 18, 2016, and November 10, 2016 (Refs. 19, pp. 1, 2, 3; 35; 38). Logbook notes are contained in Reference 41, p. 69, and Reference 44, p. 46. The chain-of-custody record is provided in Reference 21, p. 309 and Reference 25, p. 111.

TABLE 5: Background Sediment Samples

Sample ID	Sample Location[1]	Sediment Type	Distance from PPE	Depth (inches bcb)	Date Sampled	References
BL-BKG-SD	Perennial tributary of Wilson Branch	Light brown clay	1,584 feet	0 to 6	8/25/2016	19, pp. 1, 2, 4; 21, p. 309; 27; 33, p. 5; 41, p. 69; 87
294SD	Wilson Branch	Sandy (tan to gray)	300 feet	0 to 2	11/15/2016	19, p. 4; 25, p. 111; 27; 33, p. 89; 44, p. 46

Notes:

1 See Figure 4A of this HRS documentation record
bcb Below the creek bed
BKG Background
BL Burlington Industries
ID Identification number
PPE Probable point of entry
SD Sediment sample

Background Concentrations

Background sediment sample BL-BKG-SD, collected along the tributary of Wilson Branch about 1,584 feet (0.3 mile) upstream of its confluence with the drainage ditch, was evaluated to establish background concentrations of Aroclor-1248 and Aroclor-1254 for comparison to concentrations of Aroclor-1248 and Aroclor-1254 detected in the tributary of Wilson Branch (Refs. 19, pp. 2, 4; 33, pp. 1, 5, 8 through 20, 89). Background sediment sample 294SD, collected along Wilson Branch about 300 feet upstream of its confluence with the tributary of Wilson Branch, was evaluated to establish background concentrations of Aroclor-1248 and Aroclor-1254 for comparison to Aroclor-1248 and Aroclor-1254 concentrations detected along Wilson Branch (Refs. 19, p. 4; 27; 33, pp. 16 through 20, 89).

The background samples listed in Table 6 were collected by SCDHEC during the August 2016 and November 2016 sampling events (Refs. 19, p. 4; 21, p. 309; 25, p. 111). The samples were analyzed by Shealy for PCBs using EPA Method 8082A (Ref. 40, pp. 54, 292). The analytical data were reviewed and the data elements in the data package were compared against the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use and the EPA CLP NFG for Superfund Organic Data Review. The data validation effort shows the overall data quality to be acceptable (Refs. 39; 40, pp. 1 through 8; 71). The PQLs are listed on the analytical data sheets contained in Reference 40. The PQLs are equivalent to SQLs as defined in Section 1.1, Definitions of the HRS (Refs. 1, Section 1.1; 37).

TABLE 6: Analytical Results for Background Samples

Sample ID	Hazardous Substance	Concentration (µg/kg)	PQL (µg/kg)	References
BL-BKG-SD	Aroclor-1248	19	15	40, p. 54
BL-BKG-SD	Aroclor-1254	15U	15	40, p. 54
294SD	Aroclor-1248	12U	12	19, p. 4; 40, p. 292
294SD	Aroclor-1254	12U	12	19, p. 4; 40, p. 292

Notes:

BKG Background
BL Burlington Industries
ID Identification number
µg/kg Micrograms per kilogram
PQL Practical quantitation limit. The PQLs are equivalent to sample quantitation limits as defined in Section 1.1, Definitions of the HRS (Refs. 1, Section 1.1; 37).
SD Sediment sample
U The analyte was analyzed for, but not detected at or above the associated value (PQL) (Ref. 40, p. 8).

Contaminated Samples

The sediment samples listed in Table 7 were collected by SCDHEC during the September, October, and November 2016 sampling events (Ref. 19, p. 4). The sediment samples were collected from the tributary of Wilson Branch and Wilson Branch (Refs. 19, p. 4; 33, pp. 1, 8 through 20) (see Figure 4A of this HRS documentation record). Sediment samples were collected with aluminum pans and spoons from 0 to 2 inches to 0 to 6 inches bcb (Refs. 19, pp. 1, 4; 41, p. 69; 42, pp. 58, 60, 62, 74, 87, 94, 96, 97, 99, 102; 43, pp. 24, 25; 44, pp. 12, 22, 33, 47). Sediment samples were collected in accordance with the EPA Region 4 SESD FBQSTP for Sediment Sampling, SESDPROC-200-R3, August 21, 2014 (Ref. 19, p. 1; 50).

The background and contaminated sediment samples were collected during the same time frame (September to November 2016); from similar surface water bodies; in accordance with approved QAPPs; using the same sampling procedures; at similar depths; and are similar in characteristics (sediment type) (Refs. 19, pp. 1 through 4; 35; 36; 38; 41, p. 69; 42, pp. 58, 60, 62, 74, 87, 94, 96, 97, 99, 102; 43, pp. 24, 25; 44, pp. 12, 22, 33, 47). The contaminated samples were collected from sediment types that were typically sand, sandy loam, and silt, with some clay (Refs. 42, pp. 58, 60, 62, 74, 87, 94, 96, 97, 99, 102; 43, pp. 24, 25; 44, pp. 12, 22, 33, 47). Based on the surface water bodies, physical characteristics, sample collection methods, time frame, and depths, the background and contaminated sediment samples are similar (Refs. 19, pp. 1 through 4; 35; 36; 38; 41, p. 69; 42, pp. 58, 60, 62, 74, 87, 94, 96, 97, 99, 102; 43, pp. 24, 25; 44, pp. 12, 22, 33, 47) (see Tables 5 and 7 in this section [Section 4.1.2.1.1] of this HRS documentation record).

The contaminated sediment samples were collected in accordance with approved QAPPs dated September 13, 2016, and November 10, 2016 (Refs. 19, pp. 2, 3; 36; 38). Logbook notes are contained in References 42, 43, and 44. The chain-of-custody records are provided in References 22, 23, and 25. Specific page numbers for the logbook notes and chain-of-custody records are provided in the table below.

TABLE 7: Contaminated Sediment Samples – September, October, and November 2016

Sample ID	Sample Location[1]	Sediment Type	Distance from PPE (feet)	Depth (inches bcb)	Date Sampled	References
SD-206	The tributary of Wilson Branch, between Pinewood Drive and Jersey Street	Tan sand	400	0 to 2	9/20/2016	19, p. 4; 22, p. 348; 33, pp. 8, 9; 42, p. 87
SD-211	The tributary of Wilson Branch, between Pinewood Drive and Jersey Street	Tan sand	950	0 to 4	9/20/2016	19, p. 4; 22, p. 348; 33, pp. 8, 10; 42, p. 102
SD-213	The tributary of Wilson Branch, between Pinewood Drive and Jersey Street	Tan sand/clay	1,870	0 to 4	9/20/2016	19, p. 4; 22, p. 347; 33, pp. 8, 11; 42, p. 74
SD-216	The tributary of Wilson Branch, between Pinewood Drive and Jersey Street	Brown sandy clay	2,240	0 to 3	9/20/2016	19, p. 4; 22, p. 346; 33, pp. 8, 12; 42, p. 62
SD-297	The tributary of Wilson Branch, between Jersey Street and Murray Drive	Sand	2,810	0 to 3	11/15/2016	19, p. 4; 25, p. 151; 33, pp. 8, 13; 44, p. 22

TABLE 7: Contaminated Sediment Samples – September, October, and November 2016						
Sample ID	**Sample Location[1]**	**Sediment Type**	**Distance from PPE (feet)**	**Depth (inches bcb)**	**Date Sampled**	**References**
SD-222	The tributary of Wilson Branch, between Jersey Street and Murray Drive	Greyish clay and sand	3,025	0 to 3	9/20/2016	19, p. 4; 22, p. 345; 33, pp. 8, 13; 42, p. 60
SD299	The tributary of Wilson Branch, between Jersey Street and Murray Drive	Coarse sand	3,370	0 to 3	11/15/2016	19, p. 4; 25, p. 112; 33, pp. 8, 14; 44, p. 12
SD-223	The tributary of Wilson Branch, between Jersey Street and Murray Drive	Black, gray, thick clay sediment	3,945	0 to 4	9/20/2016	19, p. 4; 22, p. 347; 33, pp. 8, 14; 42, p. 99
SD308	The tributary of Wilson Branch, between Murray Drive and Lakeway Drive	Coarse gray tan sandy sediment	4,253	0 to 3	11/15/2016	19, p. 4; 25, p. 107; 33, pp. 8, 15; 44, p. 47
SD-224	The tributary of Wilson Branch, between Lakeway Drive and 2nd Street	Coarse sand with some gravel	5,390	0 to 3	9/20/2016	19, p. 4; 22, p. 345; 33, pp. 8, 16, 17; 42, p. 58
RK16050-016	Wilson Branch, between Lakeway Drive and 2nd Street	Brown sandy loam	6,080	0 to 2	11/15/2016	19, p. 4; 25, p. 108; 33, pp. 8, 16, 18; 44, p. 33
SD-233	Wilson Branch, between Lakeway Drive and 2nd Street	Sandy sediment	6,275	0 to 4	9/20/2016	19, p. 4; 22, p. 346; 33, pp. 8, 16, 19; 42, p. 97
HP-002-SD	Wilson Branch, between Lakeway Drive and 2nd Street	Sand	6,405	0 to 2	10/20/2016	19, p. 4; 23, p. 27; 33, pp. 8, 16, 19; 43, p. 25
SD-232	Wilson Branch, between Lakeway Drive and 2nd Street	Dark grey silty sediment	6,725	0 to 6	9/20/2016	19, p. 4; 22, p. 344; 33, pp. 8, 16, 19; 42, p. 96
SD-237	Wilson Branch, between Lakeway Drive and 2nd Street	Sandy sediment	7,035	0 to 4	9/20/2016	19, p. 4; 22, p. 345; 33, pp. 8, 16, 20; 42, p. 94
HP-001-SD	Wilson Branch, between Lakeway Drive and 2nd Street	Grey fine sand	7,090	0 to 2	10/20/2016	19, p. 4; 23, p. 27; 33, pp. 8, 16, 20; 43, p. 24

Notes:

1	See Figure 4A of this HRS documentation record
bcb	Below the creek bed
HP	Huckleberry Park
ID	Identification number
PPE	Probable point of entry
RK16050-016	Laboratory Sample ID
SD	Sediment sample

Contaminated Concentrations

The contaminated sediment samples listed in Table 8 were collected by SCDHEC during the September, October, and November 2016 sampling events (Refs. 19, p. 4; 42, pp. 58, 60, 62, 74, 87, 94, 96, 97, 99, 102; 43, pp. 24, 25; 44, pp. 12, 22, 33, 47). The samples were analyzed by Shealy for PCBs using EPA Method 8082A (Refs. 19, p. 4; 40, pp. 138, 147, 152, 154, 157, 165, 167, 168, 177, 179, 244, 246, 267, 294, 309, 330). The analytical data were reviewed and the data elements in the data package were compared against the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use and the EPA CLP NFG for Superfund Organic Data Review. The data validation effort shows the overall data quality to be acceptable (Refs. 39; 40, pp. 1 through 8; 71). The PQLs are listed on the analytical data sheets contained in Reference 40. The PQLs are equivalent to SQLs as defined in Section 1.1, Definitions of the HRS (Refs. 1, Section 1.1; 37). All samples listed in Table 8 meet observed release criteria in accordance with Reference 1, Table 2-3.

TABLE 8: Analytical Results for Contaminated Samples				
Sample ID	**Hazardous Substance**	**Concentration (µg/kg)**	**PQL (µg/kg)**	**References**
SD-206	Aroclor-1248	470	120	40, p. 177
SD-206	Aroclor-1254	400	120	40, p. 177
SD-211	Aroclor-1248	4,100	630	40, p. 179
SD-211	Aroclor-1254	3,600	630	40, p. 179
SD-213	Aroclor-1248	3,900	180	40, p. 167
SD-213	Aroclor-1254	1,600	180	40, p. 167
SD-216	Aroclor-1248	24,000	1,400	40, p. 165
SD-216	Aroclor-1254	17,000	1,400	40, p. 165
SD-297	Aroclor-1248	820	130	40, p. 330
SD-297	Aroclor-1254	590	130	40, p. 330
SD-222	Aroclor-1248	9,200	840	40, p. 152
SD-222	Aroclor-1254	7,500	840	40, p. 152
SD299	Aroclor-1248	770	120	40, p. 309
SD299	Aroclor-1254	540	120	40, p. 309
SD-223	Aroclor-1248	780	140	40, p. 168
SD-223	Aroclor-1254	580	140	40, p. 168
SD308	Aroclor-1248	2,700	130	40, p. 294
SD308	Aroclor-1254	1,200	130	40, p. 294
SD-224	Aroclor-1248	350	130	40, p. 154
SD-224	Aroclor-1254	340	130	40, p. 154
RK16050-016	Aroclor-1248	2,300	110	40, p. 267
RK16050-016	Aroclor-1254	1,500	110	40, p. 267
SD-233	Aroclor-1248	97	12	40, p. 157

TABLE 8: Analytical Results for Contaminated Samples				
Sample ID	**Hazardous Substance**	**Concentration (µg/kg)**	**PQL (µg/kg)**	**References**
SD-233	Aroclor-1254	53	12	40, p. 157
HP-002-SD	Aroclor-1248	300	120	40, p. 246
SD-232	Aroclor-1248	6,100	700	40, p. 138
SD-232	Aroclor-1254	6,600	700	40, p. 138
SD-237	Aroclor-1248	600	120	40, p. 147
SD-237	Aroclor-1254	470	120	40, p. 147
HP-001-SD	Aroclor-1248	180	120	40, p. 244

Notes:

HP	Huckleberry Park
ID	Identification number
µg/kg	Micrograms per kilogram
PQL	Practical quantitation limit. The PQLs are equivalent to sample quantitation limits as defined in Section 1.1, Definitions of the HRS (Refs. 1, Section 1.1; 37).
RK16050-016	Laboratory Sample ID
SD	Sediment sample

SCDHEC February and March 2017 Sampling Events

Background Samples

In March 2017, SCDHEC conducted wetland verification of the background sample locations along an unnamed tributary of Huckleberry Branch and Huckleberry Branch upstream of its confluence with Wilson Branch and contaminated sample locations along the tributary of Wilson Branch (Refs. 27; 58, p. 6; 67, pp. 1, 2, 13, 14). It was determined that palustrine wetlands are located at the background and contaminated sampling locations (Refs. 27; 58, p. 6; 59, pp. 1 through 4, 25; 67, pp. 1, 2, 13, 14, 17, 18; 92) (see Figure 4B of this HRS documentation record). Because the background and contaminated sediment samples were collected from HRS-eligible wetlands, they will be referred to as wetland samples.

In March 2017, SCDHEC collected four background samples (0 to 3 inches bcb) from verified wetlands located along an unnamed tributary of Huckleberry Branch and Huckleberry Branch upstream of its confluence with Wilson Branch (Refs. 27; 58, pp. 4, 5, 6; 60; 67, pp. 1, 2, 3, 13, 14, 17, 18). Samples were collected in accordance the EPA FBQSTP Sediment Sampling, SESDPROC-200-R3, August 21, 2014 (Refs. 28; 50).

Background and contaminated wetland samples were collected from palustrine wetlands during the same time frame (February and March 2017), using the same sampling procedures, and in accordance with approved QAPPs (Refs. 28; 30, p. 23; 31; 56, p. 13; 57, pp. 3, 4, 5; 58, pp. 4, 5, 6; 59, pp. 1 through 4, 25; 60; 67, pp. 1, 2, 13, 14, 17, 18; 92). The background and contaminated wetland samples were collected from similar sediment types that were typically sand and silty sand with occasional clay (Refs. 57, pp. 3, 4, 5; 58, pp. 4, 5). The wetland type, physical characteristics, sample collection methods, time frame, and the depths of the background and contaminated wetland samples are similar (Refs. 27; 28; 30, p. 23; 56, p. 13; 57, pp. 3. 4, 5; 58, pp. 4, 5, 6; 59, pp. 1 through 4, 25; 67, pp. 1, 2, 17, 18; 92).

The background samples were collected in accordance with the approved QAPP dated March 1, 2017 (Refs. 60; 67, p. 1). Logbook notes are provided in Reference 58, pp. 4, 5. The chain-of-custody record is provided in Reference 56, p. 13.

TABLE 9: Background Wetland Samples

Sample ID	Sample Location[1]	Sediment Type	Distance[2]	Depth (inches bcb)	Date Sampled	References
BIC- 201-SD	Palustrine forested wetlands; unnamed tributary of Huckleberry Branch	Light brown tan sand with yellow clay interspersed	1.05 miles	0 to 3	3/2/2017	27; 56, p. 13; 58, pp. 4, 6; 67, pp. 1, 2, 3, 9, 18
BIC- 202-SD	Palustrine forested wetlands; unnamed tributary of Huckleberry Branch	Light brown/tan sand	1.1 miles	0 to 3	3/2/2017	27; 28; 56, p. 13; 58, pp. 4, 6; 67, pp. 1, 2, 3, 8, 18
BIC-203-SD	Palustrine forested wetlands; Huckleberry Branch	Grey silty sand	2.65 miles	0 to 3	3/2/2017	27; 56, p. 13; 58, pp. 4, 6; 67, pp. 1, 2, 3, 8, 17

TABLE 9: Background Wetland Samples						
Sample ID	**Sample Location[1]**	**Sediment Type**	**Distance[2]**	**Depth (inches bcb)**	**Date Sampled**	**References**
BIC-204-SD	Palustrine forested wetlands; Huckleberry Branch	Brown and gray sandy sediment with some clay	2.7 miles	0 to 3	3/2/2017	27; 56, p. 13; 58, pp. 5, 6; 67, pp. 1, 2, 3 4, 7, 9,

Notes:

1 See Figure 4B of this HRS documentation record.
2 The distance is measured from the confluence of Huckleberry Branch with Wilson Branch to the sampling location (see Figure 4B of this HRS documentation record).
bcb Below the creek bed
BIC Burlington Industries Cheraw
HRS Hazard Ranking System
ID Identification number
PPE Probable point of entry
SD Sediment sample

Background Concentrations

Four wetland samples (BIC-SD-201, BIC-SD-202, BIC-SD-203, BIC-SD-204) collected from palustrine forested wetlands along an unnamed tributary of Huckleberry Branch and Huckleberry Branch upstream of the confluence of Huckleberry Branch with Wilson Branch were evaluated to establish background Aroclor-1248 and Aroclor-1254 concentrations in palustrine wetlands for comparison against contaminated wetland samples along the tributary of Wilson Branch (Refs. 27; 58, p. 6; 67, pp. 1, 2, 3, 14, 18) (see Figure 4B of this HRS documentation record).

The background samples listed in Table 10 were collected by SCDHEC during the March 2017 sampling event (Refs. 58, pp. 4, 5; 60; 67, pp. 1, 2, 3, 4). The samples were analyzed by Shealy for PCBs using EPA Method 8082A (Ref. 69, pp. 20, 21, 22, 23). The analytical data were reviewed and the data elements in the data package were compared against the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use and the EPA CLP NFG for Superfund Organic Data Review. The data validation effort shows the overall data quality to be acceptable (Refs. 39; 69, p. 1; 71). The PQLs are listed on the analytical data sheets contained in Reference 69. The PQLs are equivalent to SQLs as defined in Section 1.1, Definitions of the HRS (Refs. 1, Section 1.1; 37).

TABLE 10: Analytical Results for Background Samples

Sample ID	Hazardous Substance	Concentration (µg/kg)	PQL (µg/kg)	References
BIC-SD-201	Aroclor-1248	13 U	13	56, p. 13; 69, p. 21
BIC-SD-201	Aroclor-1254	13 U	13	56, p. 13; 69, p. 21
BIC-SD-202	Aroclor-1248	15 U	15	56, p. 13; 28; 69, p. 20
BIC-SD-202	Aroclor-1254	15 U	15	56, p. 13; 28; 69, p. 20
BIC-SD-203	Aroclor-1248	14 U	14	56, p. 13; 69, p. 22
BIC-SD-203	Aroclor-1254	14 U	14	56, p. 13; 69, p. 22
BIC-SD-204	Aroclor-1248	13 U	13	56, p. 13; 69, p. 23
BIC-SD-204	Aroclor-1254	13 U	13	56, p. 13; 69, p. 23

Notes:

BIC Burlington Industries Cheraw
ID Identification number
µg/kg Micrograms per kilogram
PQL Practical quantitation limit. The PQLs are equivalent to sample quantitation limits as defined in Section 1.1, Definitions of the HRS (Refs. 1, Section 1.1; 37).
SD Sediment sample
U The analyte was analyzed for, but not detected at or above the associated value (PQL) (Ref. 69, p. 5).

Contaminated Samples

The wetland samples listed in Table 11 were collected by SCDHEC during the February 2017 sampling event (Refs. 32, pp. 1, 2, 3; 57, pp. 3, 4, 5). The samples (0 to 3 inches bcb) were collected from palustrine and palustrine emergent wetlands along the tributary of Wilson Branch (Refs. 32, p. 23; 57, pp. 3, 4, 5; 59, pp. 4, 25; 92) (see Figure 4B of this HRS documentation record). Samples were collected in accordance the EPA FBQSTP Sediment Sampling, SESDPROC-200-R3, August 21, 2014 (Refs. 28; 50).

The background and contaminated wetland samples were collected during the same time frame from palustrine wetlands; using the same sampling procedures; at the same depths; and are similar in characteristics (Refs. 27; 28; 30, p. 23; 32, p. 23; 50; 56, p. 13; 57, pp. 3, 4, 5; 58, pp. 4, 5, 6; 59, pp. 4, 25; 67, pp. 1, 2, 3, 4, 13, 14, 17, 18; 92). The contaminated samples were collected from sediments that typically were sand (Ref. 57, pp. 3, 4, 5). The wetland type, physical characteristics, sample collection methods, time frame, and depths of the background and contaminated wetland samples are similar (Refs. 28; 30, p. 23; 32, p. 23; 50; 56, p. 13; 57, pp. 3, 4, 5; 58, pp. 4, 5, 6; 59, pp. 4, 25; 67, pp. 1, 2, 3, 4, 13, 14, 17, 18; 92) (see Tables 9, 10, 11, and 12 of this HRS documentation record).

The sediment samples were collected in accordance with the approved QAPP dated February 13, 2017 (Refs. 28; 31). Logbook notes are contained in Reference 57, pp. 3, 4, 5 and the chain-of-custody record is provided in Reference 30, p. 23.

TABLE 11: Contaminated Wetland Samples – February 2017

Sample ID	Sample Location[1]	Sediment Type	Distance from PPE (feet)	Depth (inches bcb)	Date Sampled	References
BIC-103-SD	Palustrine forested and palustrine emergent wetlands on the tributary of Wilson Branch	Brown and grey sand	1,540	0 to 3	2/16/2017	30, p. 23; 32, p. 23; 33, p. 8; 57, p. 5; 59, pp. 4, 25; 92
BIC-104-SD	Palustrine forested and palustrine emergent wetlands on the tributary of Wilson Branch	Brown and grey sand	1,820	0 to 3	2/16/2017	30, p. 23; 32, p. 23; 33, p. 8; 57, p. 5; 59, pp. 4, 25; 92
BIC-105-SD	Palustrine forested and palustrine emergent wetlands on the tributary of Wilson Branch	Brown and grey sand	1,830	0 to 3	2/16/2017	30, p. 23; 32, p. 23; 33, p. 8; 57, p. 4; 59, pp. 4, 25; 92
BIC-106-SD	Palustrine forested and palustrine emergent wetland son the tributary of Wilson Branch	Grey sandy sediment	1,990	0 to 3	2/16/2017	30, p. 23; 32, p. 23; 33, p 8; 57, p. 4; 59, pp. 4, 25; 92
BIC-107-SD	Palustrine forested and palustrine emergent wetlands on the tributary of Wilson Branch	Brown and grey sand with small amount of organic matter	2,120	0 to 3	2/16/2017	30, p. 23; 32, p. 23; 33, p 8; 57, p. 3; 59, pp. 4, 25; 92

TABLE 11: Contaminated Wetland Samples – February 2017						
Sample ID	**Sample Location[1]**	**Sediment Type**	**Distance from PPE (feet)**	**Depth (inches bcb)**	**Date Sampled**	**References**
BIC-108-SD	Palustrine forested and palustrine emergent wetlands on the tributary of Wilson Branch	Brown and grey sandy sediment	2,250	0 to 3	2/16/2017	30, p. 23; 32, p. 23; 33, p. 8; 57, p. 3; 59, pp. 4, 25; 92

Notes:

1	See Figure 4B of this HRS documentation record
bcb	Below the creek bed
BIC	Burlington Industries Cheraw
ID	Identification number
PPE	Probable point of entry
SD	Sediment sample

Contaminated Concentrations

The contaminated wetland samples listed in Table 12 were collected by SCDHEC during the February 2017 sampling event (Refs. 32, pp. 1, 2, 3; 57, pp. 3, 4, 5). The samples were analyzed by Shealy for PCBs using EPA Method 8082A (Ref. 69, pp. 6 through 11). The analytical data were reviewed and the data elements in the data package were compared against the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use and the EPA CLP NFG for Superfund Organic Data Review. The data validation effort shows the overall data quality to be acceptable (Refs. 39; 69, p. 1; 71). The PQLs are listed on the analytical data sheets contained in Reference 69. The PQLs are equivalent to SQLs as defined in Section 1.1, Definitions of the HRS (Refs. 1, Section 1.1; 37). All samples listed in Table 12 meet observed release criteria in accordance with Reference 1, Table 2-3.

TABLE 12: Analytical Results for Contaminated Wetland Samples

Sample ID	Hazardous Substance	Concentration (µg/kg)	PQL (µg/kg)	References
BIC-103-SD	Aroclor-1248	9,600	660	69, p. 11
BIC-103-SD	Aroclor-1254	6,800	660	69, p. 11
BIC-104-SD	Aroclor-1248	11,000	1,300	69, p. 10
BIC-104-SD	Aroclor-1254	8,900	1,300	69, p. 10
BIC-105-SD	Aroclor-1248	7,100	720	69, p. 9
BIC-106-SD	Aroclor-1248	4,200 J (420)	310	30, p. 7; 69, p. 8; 70, p. 16; 72
BIC-106-SD	Aroclor-1254	2,000	310	69, p. 8
BIC-107-SD	Aroclor-1248	22,000	1,600	69, p. 7
BIC-107-SD	Aroclor-1254	9,200	1,600	69, p. 7
BIC-108-SD	Aroclor-1248	10,000	1,300	69, p. 6

Notes:

( )	Concentration was adjusted in accordance with References 70 and 72.
BIC	Burlington Industries Cheraw
ID	Identification number
J	Estimated value
µg/kg	Micrograms per kilogram
PQL	Practical quantitation limit. The PQLs are equivalent to sample quantitation limits as defined in Section 1.1, Definitions of the HRS (Refs. 1, Section 1.1; 37).
SD	Sediment sample

Attribution

Burlington Industries began operations in 1961, weaving glass and Kevlar fabrics and conducting fabric forming and aqueous finishing (Ref. 9, pp. i, 5, 6). In response to sewer clogging problems caused by latex waste, Burlington Industries installed an industrial waste treatment plant prior to April 1971 (Refs. 51; 55). Small settling ponds located about 200 feet north of the rear of the manufacturing building received liquid waste (Ref. 13, pp. 1, 2, 3). The suspended solid dye wastes settled out in the ponds and the liquid material either was absorbed into the sediment or evaporated into the air (Ref. 52). The solidified dye waste residue was removed from the ponds, when necessary, and disposed of at the local county landfill located about 10.7 miles south of the former BIC facility (Refs. 28; 52).

In a letter dated March 12, 1970, the Pee Dee District Sanitation Director stated that several complaints were received by the Chesterfield County Health Department regarding the discharge of a waste product into an open ditch by Burlington Industries (Ref. 54). The Sanitation Director verified the discharge of a green fluid waste product by Burlington Industries into an open ditch at the rear of a housing development. The ditch leads to Huckleberry Branch and the Pee Dee River (Ref. 54). In 2016, SCDHEC collected sediment samples from the ditch to its confluence with the tributary of Wilson Branch (Ref. 28). The drainage ditch and tributary of Wilson Branch are upstream of Huckleberry Branch and the Pee Dee River (Ref. 3). Sediment samples collected from the drainage ditch contained Aroclor-1248 (up to 1,900,000 µg/kg in sample BL-DS-06) and Aroclor-1254 (up to 880,000 µg/kg in sample BL-DS-06) (Ref. 33, pp. 23 to 27). The drainage ditch begins along the western boundary of the former BIC facility (Ref. 73).

During a 1972 SCDHEC inspection, personnel observed (1) the settling ponds were flush with the ground, (2) no banks were located around the settling ponds, (3) no fence was located around the ponds; a residential section adjoined the settling pond field, (4) the ponds did not connect; in case of overflow, the sludge would flow into the adjacent field, and (5) no evidence of the sludge was noted on the ground around the ponds (Ref. 53).

No new sludge was placed in the settling ponds since 1980 (Ref. 15, p. 246). In 1989, SCDHEC, at the request of Burlington Industries, issued a waste disposal authorization to Burlington Industries for disposal of 300 cubic yards of dried sludge at the Chesterfield County Landfill located about 10.7 miles south of the former BIC facility (Refs. 15, pp. 248, 249; 28).

In February 2016, SCDHEC observed small pieces of a dark green/dark grey rubbery sludge-like material across the lot that contained the former settling ponds as well as on the adjoining residential property. The same material was present in larger chunks along the western edge of the lot, appearing as though the material was pushed to that side of the property as the area was graded. Significant deposits of sludge-like material were not found at depth during the investigation, indicating that the majority of the material was likely removed as requested by Burlington Industries in 1989 (Ref. 15, pp. 2, 236).

In August 2016, three samples were collected from sludge observed on the ground surface above the location of the former settling ponds and on a residential property located about 540 feet east of the approximate center of the former settling ponds location (Refs. 10, pp. 23, 25; 19, pp. 1, 4; 41, pp. 54, 55). The material was dark green and gray with a rubbery sludge-like consistency and contained Aroclor-1248 (up to 750,000 µg/kg) (Refs. 15, p. 236; 21, pp. 104, 162, 174). Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor (Ref. 66, p. 1).

In November 2016, SCDHEC observed a bright turquoise material that looked like a coating on top of fabric in multiple locations throughout the residential property north of the former settling ponds location as well as one location on the northern portion of the former settling ponds parcel (Refs. 20, pp. 2, 5; 33, p. 4). A sample was collected from the material (RK16051-019), which contained Aroclor-1248 at 34,000 µg/kg and Aroclor-1254 at 13,000 µg/kg (Refs. 19, p. 4; 20, pp. 2, 5; 40, p. 328; 44, p. 74).

SCDHEC collected soil samples from Source No. 1 in August and September 2016 (Ref. 19, p. 4) (see Figure 3 of this HRS documentation record). The Source No. 1 samples contained Aroclor-1248 and Aroclor-1254 above background levels (see Table 2 of this HRS documentation record). The highest concentrations of Aroclor-1248 (1,500,000 µg/kg) and Aroclor-1254 (1,300,000 µg/kg) were detected in the western portion of the former BIC facility in sample BL-SS-28 (Refs. 19, p. 4; 33, p. 3; 40, p. 28) (see Figure 3 of this HRS documentation record).

In addition to Source No. 1, PCBs have been detected in sediment samples collected from the tributary of Wilson Branch and Wilson Branch, indicating that a release to perennial surface water has occurred (see Tables 5 through 12 of this HRS documentation record). The area of observed release extends from sediment sample SD-206 to sediment sample HP-001-SD collected about 1.34 miles downstream (Refs. 19, p. 4; 33, pp. 1, 8, 16, 20; 43, p. 24) (see Figure 4A of this HRS documentation record). To attribute these releases to Source No. 1, background levels were established using sediment samples collected from the tributary of Wilson Branch upstream of its confluence with the drainage ditch and Wilson Branch upstream of its confluence with the tributary of Wilson Branch (Refs. 19, pp. 2, 4; 33, pp. 5, 89). Additionally, background wetland levels were established using sediment samples collected from verified palustrine forested wetlands located along an unnamed tributary of Huckleberry Branch and Huckleberry Branch, which are similar surface water bodies to the tributary of Wilson Branch (Refs. 27; 58, p. 6; 67, pp. 1, 2, 17, 18).

Sediment samples collected from the tributary of Wilson Branch and Wilson Branch contained PCBs at concentrations significantly above background levels (see Tables 5 through 12 of this HRS documentation record). Sediment samples collected from the tributary of Wilson Branch after its confluence with the drainage ditch contained Aroclor-1248 (up to 24,000 µg/kg in sample SD-216) and Aroclor-1254 (17,000 µg/kg in sample SD-216). Sediment samples collected from Wilson Branch contained Aroclor-1248 (up to 6,100 µg/kg in sample SD-232) and Aroclor-1254 (6,600 µg/kg in sample SD-232) (Ref. 33, pp. 9 through 20, 35, through 37, 39, 40) (see Figure 4A and Tables 5 through 12 of this HRS documentation record). Additionally, sediment samples containing PCBs at concentrations above background levels were documented in SCDHEC-verified palustrine forested and palustrine emergent wetlands located along a portion of the tributary of Wilson Branch (Refs. 32, pp. 1, 23; 59, pp. 1 through 4, 25; 92) (see Figure 4B and Tables 9 through 12 of this HRS documentation record).

According to an EPA facility registry system (FRS) query, no facilities within a 0.5-mile radius of the BIC site handle PCBs (Ref. 68, pp. 1 through 13). American Stainless & Supply LLC is located at 815 State Road, along the tributary of Wilson Branch, downstream of the background sample location BL-BKG-SD and upstream of the PPE (Ref. 93, pp. i, 3, 4, 7) (see Figure 4A of this HRS documentation record). American Stainless & Supply LLC is not located in the EPA FRS (Ref. 68, pp. 1 through 13). According to their website, the facility moved to its current location in 2006 and is a distribution center for pipe, valves, fittings, structural shapes, and related products (Ref. 93, p. 1). Prior to American Stainless & Supply LLC, the property was owned by Cooper Tools, Inc. (Cooper Tools), from at least 1987 to 2003 (last reported year in the EPA toxic releases inventory [TRI]) (Ref. 94, pp. 1, 3). Chemicals included in the EPA TRI for Cooper Tools include 1,1,1-trichloroethane, chromium compounds, copper, hydrochloric acid, lead, lead compounds, nitrate compounds, nitric acid, and sodium hydroxide (Ref. 94, p. 3). PCBs are not listed on the EPA TRI report (Ref. 94, p. 3). According to historical aerial photographs, the building located at 815 State Road was present in 1975; however, ownership prior to 1987 is not known (Ref. 13, pp. 1, 2).

Highland Industries currently operates at the former Burlington Industries plant. Highland Industries conducts fabric forming and aqueous finishing and has been said to be the largest airbag manufacturing facility worldwide (Refs. 9, pp. i, 6, 10, 12, 13). According to Highland Industries personnel, Highland Industries never used PCBs in its operations (Ref. 28).

Burlington Industries discharged green effluent into the drainage ditch that abuts the former BIC facility and residential properties (Ref. 54). Pieces of sludge observed on the ground above the location of the former settling ponds and on a residential property were dark green and gray with a rubbery sludge-like consistency (Refs. 15, p. 236; 19, pp. 1, 4; 33, p. 4). The samples collected from the sludge contained Aroclor-1248 (up to 750,000 µg/kg in sample BL-WA-3) (Refs. 19, pp. 1, 4; 21, pp. 96, 104, 138, 139; 40, p. 33). Aroclor-1248 (up to 1,900,000 µg/kg in sample BL-DS-06) and Aroclor-1254 (up to 880,000 µg/kg in sample BL-DS-06) have been documented in sediment samples collected from the drainage ditch that receives runoff from Source No. 1 (Refs. 21, p. 11; 28; 33, pp. 3, 23 through 27). The drainage ditch flows north and joins the perennial tributary of Wilson Branch. The point at which the drainage ditch meets the tributary of Wilson Branch is the PPE (see Figure 2 of this HRS documentation record). Aroclor-1248 (up to 24,000 µg/kg) and Aroclor-1254 (up to 17,000 µg/kg) have been documented at concentrations above background levels in sediment samples collected from the tributary of Wilson Branch. The tributary of Wilson Branch joins Wilson Branch about 5,000 feet downstream of the PPE. Aroclor-1248 (up to 6,100 µg/kg) and Aroclor-1254 (up to 6,600 µg/kg) have also been documented at concentrations above background levels in samples collected from Wilson Branch (see Tables 5 through 8 of this HRS documentation record and Figure 4A of this HRS documentation record).

PCBs may have been used as softeners, carriers, flame retardants, rubberizers, and pesticide extenders in the textile industry (Ref. 75, p. 125). Specific Aroclors detected in sludge, sediment, and soil samples collected from the former BIC facility include Aroclor-1248 and Aroclor-1254. The common uses of these Aroclors are provided below.

- Aroclor-1248: Polyvinyl chloride – secondary plasticizers to increase flame retardence and chemical resistance (Ref. 74, p. 7)
- Aroclor-1254: Synthetic resins; pesticide extenders; polyvinyl chloride – secondary plasticizers to increase flame retardence and chemical resistance; chlorinated rubber – enhanced resistance, flame retardence (Ref. 74, pp. 7, 8)
- Aroclor-1260: Polyvinyl chloride – secondary plasticizers to increase flame retardence and chemical resistance; polyester resins – stronger fiberglass, reinforced resins and economical fire retardants (Ref. 74, p. 8)

Aroclor-1260 was not detected in the samples scored in this HRS documentation record or in those collected from the sludge observed on top of the ground above the former settling ponds location (Refs. 19, p. 1; 21, p. 104). The sludge samples contained Aroclor-1248 and the sludge samples mixed with soil or sediment contained Aroclor-1248 and Aroclor-1254 (Refs. 19, p. 1; 21, pp. 47, 104); however, Aroclor-1260 may well have been used at the BIC facility. Aroclor-1260 was used in the textile industry as a polyester resin to produce stronger fiberglass (Ref. 74, p. 8). Commercially used PCBs are complex mixtures of chlorinated biphenyls made up of different congeners resulting from a different number and position of chlorines on the two biphenyl rings. Commercial mixtures were sold under the trade name Aroclor in the U.S. (Ref. 89). Two mechanisms allow PCB concentrations to change in the environment: weathering and dechlorination (Ref. 88, pp. 14, 16). Both weathering and dechlorination alter congener patterns (Refs. 88, p. 16; 90, p. 27). EPA Method 8082, the method used to analyze samples contained in this HRS documentation record, is susceptible to significant identification and quantitation problems due to Aroclor mixing, environmental weathering of PCBs, and complex sample matrices. Analyte identification is made through comparison of the chromatogram to Aroclor standards that are analyzed under the same conditions as environmental samples. Quantification is based on the peak area counts of a set of representative peaks, or peak clusters, and comparing to the same in Aroclor standards. Because PCBs undergo a variety of compositional changes once released into the environment, the PCB composition may not closely resemble the Aroclor standards the samples are compared to and quantified against. The Aroclor determination is a best fit to the peaks from the Aroclor standards, even when they may not be present in the environmental samples or may be present at dramatically altered relative composition (Ref. 90, p. 37). Therefore, even if the Aroclor introduced to the site was originally Aroclor 1260, the laboratory results reported may be for different Aroclors (as in Aroclor 1248 and Aroclor 1254).

The hazardous substance listed below (PCB) has been detected in Source No. 1 as well as in sediment samples collected from palustrine forested wetlands along the tributary of Wilson Branch and Wilson Branch downstream, indicating that a release has occurred or is occurring from the former BIC facility (see Table 2 in Section 2.2.2, Source No. 1 and Tables 6, 8, 10, and 12 in Section 4.1.2.1.1, Observed Release of this HRS documentation record).

Hazardous Substances in the Release

PCBs

Surface Water Observed Release Factor Value: 550.00

4.1.2 DRINKING WATER THREAT

The drinking water threat was not scored because it is not expected to contribute significantly to the overall site score.

4.1.3.2 HUMAN FOOD CHAIN THREAT WASTE CHARACTERISTICS

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

Table 13 summarizes the toxicity, persistence, and bioaccumulation factor values for PCBs detected in Source No. 1 with a containment factor value exceeding 0. The combined toxicity, persistence, and bioaccumulation factor values are assigned in accordance with Reference 1, Section 4.1.3.2.1.

TABLE 13: Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Source No.	Toxicity Factor Value	Persistence Factor Value[1]	Human Food Chain Bioaccumulation Value[2]	Toxicity/ Persistence/ Bioaccumulation Factor Value (Ref. 1, Table 4-16)	Reference
PCBs	1	10,000	1	50,000	5×10^8	2, p. 2

Notes:

[1] Persistence factor value for rivers
[2] Bioaccumulation factor value for fresh water

The toxicity/persistence/bioaccumulation factor value for PCBs is 5×10^8 (Ref. 2, p. 2).

Toxicity/Persistence/Bioaccumulation Factor Value: 500,000,000
(Refs. 1, Section 4.1.3.2.1.4; 1a)

4.1.3.2.2 HAZARDOUS WASTE QUANTITY

TABLE 14: Hazardous Waste Quantity		
Source No.	**Source Type**	**Source Hazardous Waste Quantity**
1	Contaminated soil (Source No. 1)	0.87

See Section 2.4.2.1.5, Source Hazardous Waste Quantity Value, of this HRS documentation record.

Total Source Hazardous Waste Quantity: 0.87

The hazardous constituent quantity for Source No. 1 is not adequately determined. Source No. 1 is composed of Aroclor-1248- and Aroclor-1254-contaminated soil along the western portion of the former BIC facility, including the southern portion of the former settling ponds location (see Figure 3 and Tables 7 and 8 of this HRS documentation record). The approximate area of Source No. 1 is 29,600 square feet (Refs. 1, Section 2.4.2.1.4; 10, pp. 3, 4, 5; 17, pp. 7, 13; 19, p. 4; 33, p. 3; 46) (see Figure 3 of this HRS documentation record). In addition, the hazardous waste quantity receives a minimum factor value of 100 for the surface water migration pathway because, although the hazardous constituent quantity is not adequately determined, actual contamination at Level II concentrations is present in palustrine forested and palustrine emergent wetlands (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value: 100
(Ref. 1, Table 2-6)

4.1.3.2.3 CALCULATION OF HUMAN FOOD CHAIN THREAT WASTE CHARACTERISTICS FACTOR CATEGORY VALUE

For the human food chain threat, PCBs are evaluated for the waste characteristics. The waste characteristics factor category was obtained by multiplying the toxicity, persistence, and hazardous waste quantity (HWQ) factor values, subject to a maximum product of 1×10^8. Then, this product was multiplied by the human food chain bioaccumulation potential factor value, subject to a maximum product of 1×10^{12}. Based on this product, a value was assigned in accordance with Reference 1, Table 2-7.

Toxicity/Persistence Factor Value: 10,000.00
Hazardous Waste Quantity Factor Value: 100

Toxicity/Persistence Factor Value ×
Hazardous Waste Quantity Factor Value: 1×10^6

Toxicity/Persistence Factor Value ×
Hazardous Waste Quantity Factor Value × Bioaccumulation Factor Value (50,000): 5×10^{10}

Waste Characteristics Factor Category Value: 320
(Ref. 1, Table 2-7)

4.1.3.3 HUMAN FOOD CHAIN THREAT TARGETS

4.1.3.3.1 Food Chain Individual

An observed release of a hazardous substance having a bioaccumulation factor value of 500 or greater is documented in perennial surface water with a fishery downstream — specifically, an observed release to the tributary of Wilson Branch and Wilson Branch with the Pee Dee River as a downstream fishery (Refs. 3; 40, pp. 54, 138, 147, 152, 154 157, 165, 167, 168, 177, 179, 244, 246, 267, 292, 294, 309, 330; 61; 69, pp. 6 through 11, 20 through 23) (see Tables 6, 8, 10, and 12 and Figures 4A and 4B of this HRS documentation record). According to South Carolina Department of Natural Resources personnel, the Pee Dee River is fished for human consumption (Ref. 61). Fish caught and consumed by people from the Pee Dee River include bass (largemouth, striped, black, and white bass), catfish (channel and flathead), and bream (bluegill redear and redbreast), among others (Ref. 61). SCDHEC has issued PCB fish consumption advisories for the Pee Dee River from the North Carolina/South Carolina border to Interstate 95 in Dillon County, South Carolina, which includes the entire Pee Dee River portion of the 15-mile surface water migration pathway TDL (Refs. 3; 62; 63; 64). The advisory provides guidelines for fish consumption as follows: one meal per month of blue catfish and one meal per week of largemouth bass, bowfin (mudfish), and redear sunfish (Ref. 62). The fish consumption advisory does not contain information relating to a release from specific facilities (Ref. 62).

Food Chain Individual Factor Value: 20
(Ref. 1, Section 4.1.3.3.1)

4.1.3.3.2 Population

4.1.3.3.2.1 Level I Concentrations

No Level I samples were collected.

4.1.3.3.2.2 Level II Concentrations

No Level II samples were collected.

4.1.3.3.2.3 Potential Human Food Chain Contamination

The entire portion of the Pee Dee River within the 15-mile surface water migration pathway TDL is fished (Refs. 3; 61). Information is not available on the annual production of fish caught in the Pee Dee River; therefore, the annual production is assumed to be at greater than 0 pounds per year.

TABLE 15: Potential Population Targets							
Identity of Fishery	**Annual Production (pounds)**	**Type of Surface Water Body**	**Average Annual Flow (cfs)**	**Population Value (P_i) (Ref. 1, Table 4-18)**	**Dilution Weight (D_i) (Ref. 1, Table 4-13)**	**$P_i \times D_i$**	**References**
Pee Dee River	>0	Large stream to river	7,070	0.03	0.001	0.00003	1, Tables 4-13, Table 4-18; 3; 91, p. 3
					Total	**0.00003**	

Notes:

cfs Cubic feet per second

For the potential human food chain contamination factor value, the sum of $P_i \times D_i$ is divided by 10.

Potential Human Food Chain Factor Value: 0.000003
(Ref. 1, Section 4.1.3.3.2.3)

4.1.4.2 ENVIRONMENTAL THREAT WASTE CHARACTERISTICS

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

Table 16 summarizes the ecosystem toxicity, persistence, and bioaccumulation factor values for PCBs detected in Source No. 1, with a containment factor value exceeding 0. The combined ecosystem toxicity, persistence, and bioaccumulation factor values are assigned in accordance with Reference 1, Section 4.1.4.2.1.

TABLE 16: Ecosystem Toxicity/Persistence/Bioaccumulation

Hazardous Substances	Source No.	Ecosystem Toxicity Factor Value[1]	Persistence Factor Value[2]	Environmental Bioaccumulation Value[3]	Ecosystem Toxicity/ Bioaccumulation Factor Value (Ref. 1, Table 4-21)	Reference
PCBs (Aroclor-1248 and Aroclor-1254)	1	10,000	1	50,000	5×10^8	2, p. 2

Notes:

[1] Ecotoxicity for fresh water
[2] Persistence value for rivers
[3] Bioaccumulation factor value for fresh water, environmental threat

The ecosystem toxicity/persistence/ecosystem bioaccumulation factor value for PCBs is 5×10^8 (Ref. 2, p. 2).

Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value: 5×10^8
(Reference 1, Section 4.1.4.2.1.4)

4.1.4.2.2 HAZARDOUS WASTE QUANTITY

TABLE 17: Hazardous Waste Quantity		
Source No.	**Source Type**	**Source Hazardous Waste Quantity**
1	Contaminated soil	0.87

See Section 2.4.2.1.5, Source Hazardous Waste Quantity of this HRS documentation record.

Total Source Hazardous Waste Quantity: 0.87

The hazardous constituent quantity for Source No. 1 is not adequately determined. Source No. 1 is composed of Aroclor-1248- and Aroclor-1254-contaminated soil along the western portion of the former BIC facility, including the southern portion of the former settling ponds location (see Figure 3 and Tables 7 and 8 of this HRS documentation record). The approximate area of Source No. 1 is 29,600 square feet (Refs. 1, Section 2.4.2.1.4; 10, pp. 3, 4, 5; 17, pp. 7, 13; 19, p. 4; 33, p. 3; 46) (see Figure 3 of this HRS documentation record). In addition, the hazardous waste quantity receives a minimum factor value of 100 for the surface water migration pathway because, although the hazardous constituent quantity is not adequately determined, actual contamination at Level II concentrations is present in palustrine forested and palustrine emergent wetlands (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value: 100
(Ref. 1, Table 2-6)

4.1.4.2.3 CALCULATION OF ENVIRONMENTAL CHAIN THREAT WASTE CHARACTERISTICS FACTOR CATEGORY VALUE

For the environmental threat, PCBs are evaluated for the waste characteristics. The waste characteristics factor category was obtained by multiplying the ecosystem toxicity, persistence, and HWQ factor values, subject to a maximum product of 1×10^8. Then, this product was multiplied by the environmental bioaccumulation potential factor value, subject to a maximum product of 1×10^{12}. Based on this product, a value was assigned in accordance with Reference 1, Table 2-7.

Ecosystem Toxicity/Persistence Factor Value: 10,000.00
Hazardous Waste Quantity Factor Value: 100

Ecosystem Toxicity/Persistence Factor Value ×
Hazardous Waste Quantity Factor Value: 1×10^6

Ecosystem Toxicity/Persistence Factor Value ×
Hazardous Waste Quantity Factor Value × Bioaccumulation Factor Value (50,000): 5×10^{10}

Waste Characteristics Factor Category Value: 320
(Ref. 1, Table 2-7)

4.1.4.3 Environmental Threat Targets

Level I Concentrations

No Level I concentrations have been documented.

Level II Concentrations

Actual contamination has been documented in wetland areas along the tributary of Wilson Branch in Section 4.1.2.1.1 of this HRS documentation record. The sampling locations are depicted on Figure 4B of this HRS documentation record. During the March 2017 wetland field verifying event, SCDHEC assessed wetlands mapped by the National Wetlands Inventory (NWI) (Ref. 59, pp. 1, 3, 21). A wetland specialist reviewed the soils, plants, and hydrology of four sample points along the tributary of Wilson Branch to verify the presence or absence of wetlands (Refs. 59, pp. 1 through 4, 21; 92). The wetland area assessed was palustrine forested and palustrine emergent (Refs. 59, pp. 3, 21; 92). Plants observed within the green shaded polygon (Ref. 59, pp. 4, 25) having a wetland indicator status of obligate wetland (OBL) or facultative wetland (FACW) included *Quercus pagoda* (FACW), *Magnolia virginiana* (FACW), *Arundinaria gigantean* (FACW), *Juncus effusus* (FACW), *Eleocharis* sp. (probably *parvula*, *baldwinii*, or *obtusa*, or all three) (OBL), *Luziola fluitans* (OBL), *Persea borbonia* (FACW), *Onoclea sensibilis* (FACW), and *Woodwardia* sp. (OBL) (Ref. 59, pp. 3, 8, 9, 10, 14, 15, 16, 25; 65; 77, pp. 5, 16, 24, 27, 28, 36; 78, pp. 22, 28, 29; 92).

During the February 2017 SCDHEC sampling event, SCDHEC collected sediment samples from the tributary of Wilson Branch, downstream of the confluence with the drainage ditch (Ref. 32, pp. 1, 23) (see Figure 4A of this HRS documentation record). Most of the samples collected were located in wetlands mapped by the NWI, and some were located within wetland areas verified by a wetland specialist in March 2017 (Refs. 32, p. 23; 59, pp. 4, 21, 25; 92) (see Figure 4B of this HRS documentation record). The zone of actual contamination begins at wetland sample BIC-103-SD and ends at wetland sample BIC-108-SD (Refs. 32, p. 23; 59, pp. 4, 25) (see Tables 11 and 12 of this HRS documentation record). The contaminated wetlands within the zone of actual contamination along the tributary of Wilson Branch were measured based on one wetland segment (Ref. 59, pp. 4, 25). The estimated wetland frontage is 672 feet (Refs. 32, p. 23; 59, pp. 4, 25) (see Figure 4B of this HRS documentation record).

Most Distant Level II Sample

Investigation:	February 2017 Sampling Event
Sample ID:	BIC-108-SD
Sample Medium:	Sediment
Hazardous Substance:	Aroclor-1248
Location:	Tributary of Wilson Branch prior to Jersey Street
References:	32, p. 23; 59, pp. 4, 25; 69, p. 6 (see Figure 4B and Tables 11 and 12 of this HRS documentation record)

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.1 Level I Concentrations

Sensitive Environments

Sensitive environments other than wetlands have not been identified within the 15-mile TDL.

Wetlands

Level I wetlands were not scored in this HRS documentation record.

Level II Concentrations

Sensitive Environments

Sensitive environments other than wetlands have not been identified within the 15-mile TDL.

Wetlands

The wetlands were identified from Reference 59, Wetland Boundaries Memorandum. Reference 59 presents the NWI mapped wetlands as well as field verified wetlands (Ref. 59, pp. 1, 4, 21, 25). The wetlands evaluated are palustrine forested and palustrine emergent (Refs. 59, pp. 1 through 4, 8, 9, 10, 14, 15, 16, 25; 92). Sediment samples (BIC-103-SD, BIC-104-SD, BIC-105-SD, BIC-106-SD, BIC-107-SD, and BIC-108-SD) evaluated at Level II concentrations are located in palustrine forested and palustrine emergent wetlands along the tributary of Wilson Branch, starting about 1,500 feet downstream of the PPE (confluence of the drainage ditch with the tributary of Wilson Branch) (Refs. 32, p. 23; 59, pp. 1, 4, 25; 92) (see Figure 4B of this HRS documentation record). The total wetland frontage from BIC-103-SD to the most downstream sample that contained PCBs at Level II concentrations (BIC-108-SD) is about 672 feet (Refs. 32, p. 23; 59, pp. 4, 25; 69, p. 6) (see Figure 4B and Table 12 of this HRS documentation record).

TABLE 18: Level II Wetland Frontage

Wetland	Water Body	Wetland Frontage	References
Palustrine forested and palustrine emergent	Tributary of Wilson Branch	672 feet	32, p. 23; 59, pp. 1 through 4, 25; 92
Total Wetland Frontage		672 feet or 0.127 mile	

Total Wetland Frontage: 672 feet (0.127 mile)

The wetland ratings value for 0.127 mile is obtained from Reference 1, Table 4-24 and is 25.

Wetland Value: 25
(Ref. 1, Table 4-24)

For wetlands subject to Level II concentrations, the wetland value (25) is multiplied by 1 (Ref. 1, Section 4.1.4.3.1.2).

Wetland Value: 25 × 1
Level II Concentrations Factor Value: 25
(Ref. 1, Section 4.1.4.3.1.2)

4.1.4.3.1.3 Potential Contamination

Sensitive Environments

Potential sensitive environments were not scored because the presence of sensitive environments other than wetlands has not been identified.

Wetlands

Potential contamination of wetlands was not scored because potential contamination does not contribute significantly to the site score.