HRS DOCUMENTATION RECORD COVER SHEET

Name of Site: 35th Avenue

EPA ID No. ALN000410750

<u>Contact Persons</u>

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

The ground water migration, surface water migration and air migration pathways were not scored in this Hazard Ranking System (HRS) documentation record. These pathways are a concern to the EPA and may be considered during future evaluations. However, the soil exposure pathway is sufficient to qualify the site for the National Priorities List (NPL).

HRS DOCUMENTATION RECORD

Name of Site: 35th Avenue Date Prepared: September 2014

EPA Region: 4

Street Address of Site*: 3500 35TH N.

City, County, State, Zip Code: Birmingham, Jefferson County, Alabama, 35207

General Location in the State: Central Alabama

Topographic Map: Birmingham North (Reference 3)

Latitude: 33.557464° North

Longitude: 86.799671° West

The reference point for the above latitude and longitude coordinates is the approximate center of the site area of observed contamination (AOC).

Ref: 105, p. 1; see also Figure 2 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 EPA considers to be part of the site based on the screening information EPA used to evaluate the site for 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 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.

Scores

Air Pathway	NS
Ground Water Pathway	NS
Soil Exposure Pathway	100.00
Surface Water Pathway	NS

HRS SITE SCORE 50.00

WORKSHEET FOR COMPUTING HRS SITE SCORE

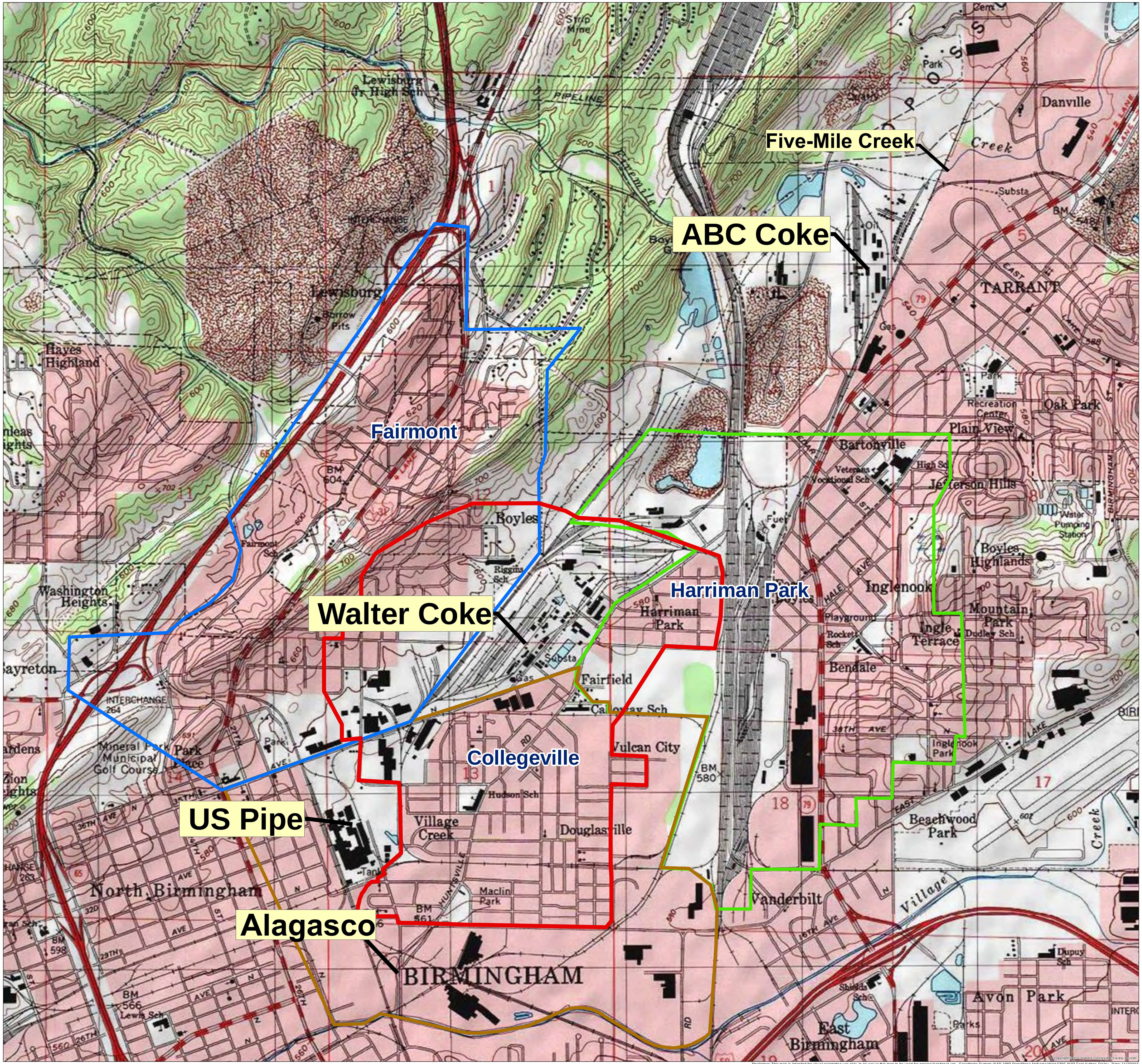
		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw})	NS	NS
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	NS	NS
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	NS	NS
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	NS	NS
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	100.00	10,000
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	NS
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$	100.00	10,000
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root	50.00	

HRS Table 5-1 Soil Exposure Pathway Scoresheet

Factor Categories and Factors	Maximum Value	Value Assigned
Resident Population Threat		
Likelihood of Exposure:		
1. Likelihood of Exposure	550	550
Waste Characteristics:		
2. Toxicity	(a)	10,000
3. Hazardous Waste Quantity	(a)	10
4. Waste Characteristics	100	18
Targets:		
5. Resident Individual	50	50
6. Resident Population:		
6a. Level I Concentrations	(b)	2,405.6
6b. Level II Concentrations	(b)	0
6c. Resident Population (lines 6a + 6b)	(b)	2,405.6
7. Workers	15	0
8. Resources	5	NS
9. Terrestrial Sensitive Environments	(c)	NS
10. Targets (lines 5 + 6c + 7 + 8 + 9)	(b)	2,455.6
Resident Population Threat Score:		
11. Resident Population Threat (lines 1 x 4 x 10)	(b)	24,310,440
Nearby Population Threat		
Likelihood of Exposure:		
12. Attractiveness/Accessibility	100	NS
13. Area of Contamination	100	NS
14. Likelihood of Exposure	500	NS
Waste Characteristics:		
15. Toxicity	(a)	NS
16. Hazardous Waste Quantity	(a)	NS
17. Waste Characteristics	100	NS
Targets:		
18. Nearby Individual	1	NS
19. Population Within 1 Mile	(b)	NS
20. Targets (lines 18 + 19)	(b)	NS
Nearby Population Threat Score:		
21. Nearby Population Threat (lines 14 x 17 x 20)	(b)	NS
Soil Exposure Pathway Score		
22. Soil Exposure Pathway Score[d] (S_s), (lines [11 +21]/82,500, subject to a maximum of 100)	100	100.00

[a]Maximum value applies to waste characteristics category.

[b]Maximum value not applicable.
[c]No specific maximum value applies to factor. However, pathway score based solely on terrestrial sensitive environments is limited to maximum of 60.
[d]Do not round to nearest integer.

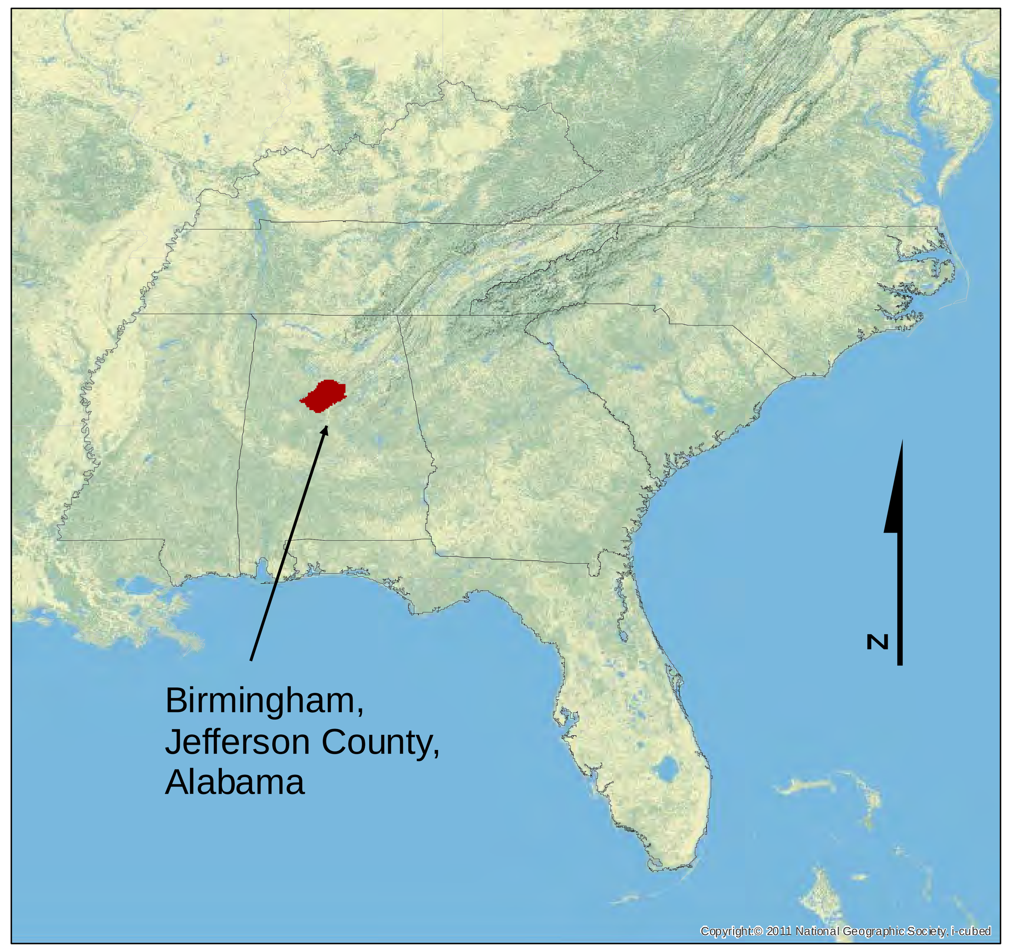


Legend

- 35th Avenue Removal Assessment Study Line
- Fairmont Neighborhood
- Collegeville Neighborhood
- Harriman Park Neighborhood

SOURCE: USGS Topo Quad. 1:24,000 scale of Quad Birmingham North Date published: 1978. Quad ID: 33086-E7; Reference 6

Feet
0 2,000 4,000

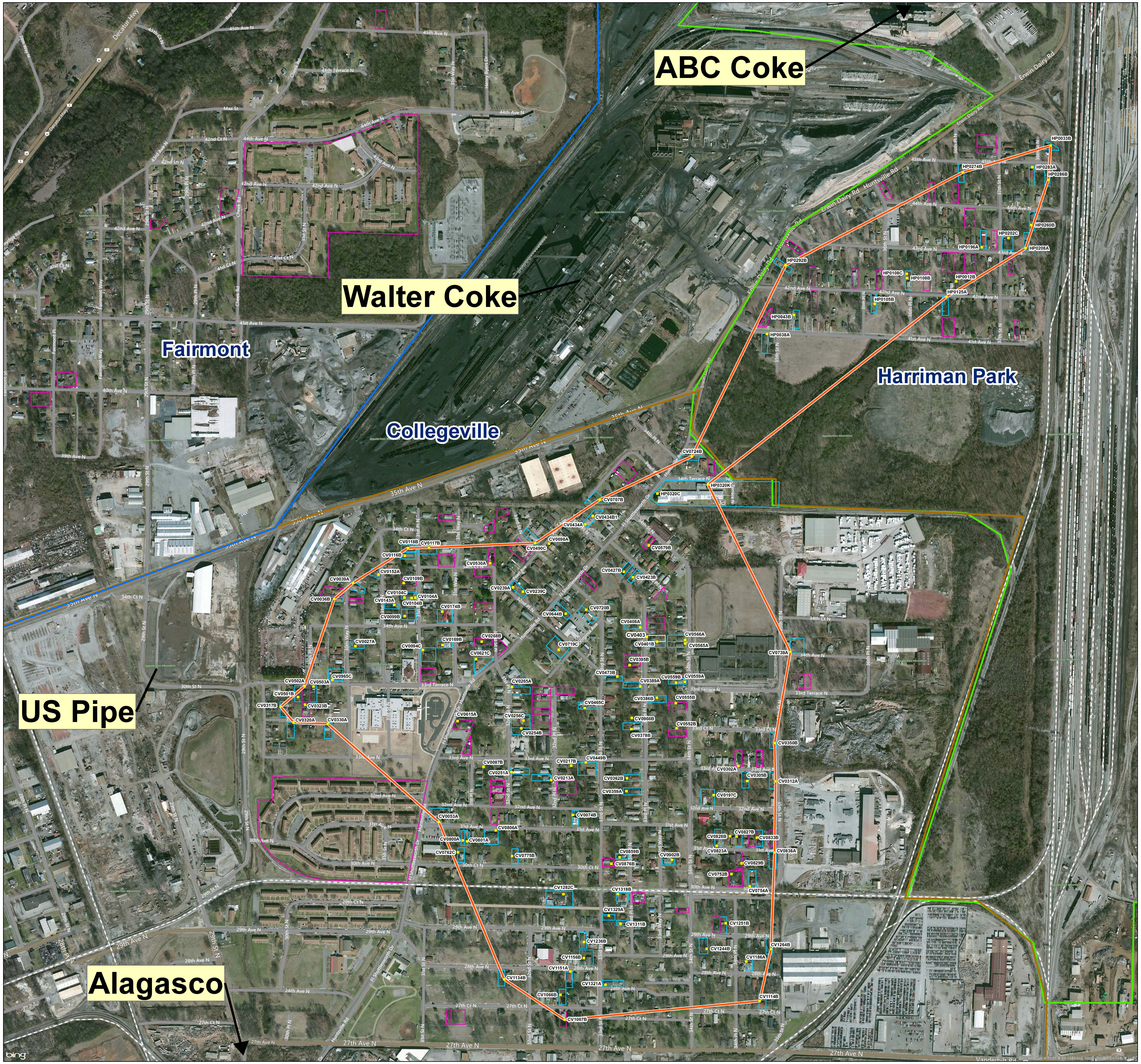


United States Environmental Protection Agency

35TH AVENUE
HAZARD RANKING SYSTEM
DOCUMENTATION RECORD
BIRMINGHAM, JEFFERSON
COUNTY, ALABAMA
TDD NO. TNA-05-003-0148

FIGURE 1
GENERAL AREA LOCATION MAP

OTIE
Oneida Total Integrated Enterprises



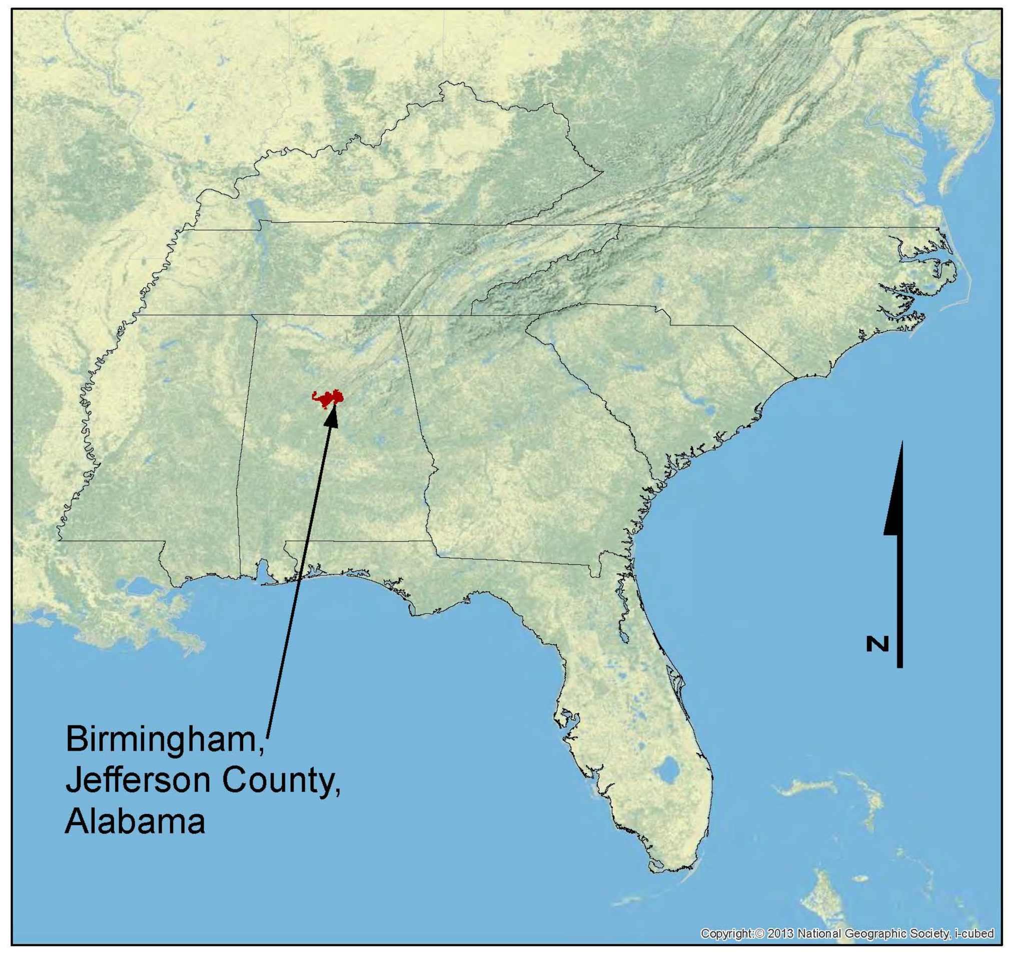
Legend

- Station ID/Sample Location
- Area of Contamination
- Removal Action Properties
- Level I Parcels
- Fairmont
- Collegeville
- Harriman Park

Notes:
CV - Collegeville area
A/B/C - Area identifier within each station/sample location
HP - Harriman Park area

N

Feet
0 700 1,400



United States Environmental Protection Agency

35TH AVENUE SUPERFUND SITE
BIRMINGHAM
JEFFERSON COUNTY
ALABAMA
TDD NO. TNA-05-003-0148

FIGURE 2
35TH AVENUE
AREA OF CONTAMINATION MAP

OTIE
Oneida Total Integrated Enterprises

Source: Base Map Aerial Photograph, Bing 2013; Reference 6

Coordinate System: NAD 1983 StatePlane Alabama West FIPS 0102 Feet Author: Fraley Date: 9/9/2014

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No. Description of the Reference

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113. Denise Goddard, Chemist, Quality Assurance Section, EPA. Memorandum to Jennifer Wendel, National Priorities List Coordinator, Site Evaluation Section, Superfund Remedial and Site Evaluation Branch, Superfund Division, EPA. Subject: Definitions/Use of Minimum Reporting Limits, Contract Required Reporting Limits, Sample Quantitation Limits in the Region 4 Science and Ecosystem Support Division Laboratory and the Contract Laboratory Program. August 1, 2014. 3 pages.

114 USDHHS. ATSDR. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. August 1995. 487 pages.

115. U.S. Pipe and Foundry Company. Closure Plan – U.S. Pipe and Foundry North Birmingham Pipe Plant Landfill. October 14, 1988. 100 pages.

SITE SUMMARY

The 35th Avenue site is located in a mixed industrial and residential area of Birmingham, Jefferson County, Alabama, within the area historically known as North Birmingham (Refs. 3; 4, pp. 2, 4, 17-18; 5, pp. 2, 4, 7). The site consists of an area of lead, arsenic, and benzo(a)pyrene (BaP)-contaminated soil from multiple possible sources, including nearby facility smoke stack emissions and coke oven battery emissions, as well as from possible flooding along Five Mile Creek, that have become intermingled over many decades of releases to the area (See Figure 1) (Refs. 3; 4, pp. 2, 17-18; 7, pp. 3, 12-14; 106, pp. 12-13, 22; Ref. 110, pp. 1-3; 111, pp. 26-37, 60-69). The 35th Avenue site and surrounding area include two coke oven plants, asphalt batch plants, pipe manufacturing facilities, steel producing facilities, quarries, coal gas holder and purification system facility, and the Birmingham-Shuttlesworth International Airport (Refs. 102, p. 14; 103, pp. 1, 159; 104, pp. 1-2). For HRS scoring purposes, the 35th Avenue site is the area of observed contamination (AOC) currently documented in the soil as a result of the release of hazardous substances from nearby facilities (see Figure 2 of this HRS documentation record). However, these releases may extend to areas outside the identified properties in the AOC. They may extend to other surrounding areas to the north, south, east and west. Five-mile Creek flows along the northern portion of the site; Walter Coke, ABC Coke, U.S. Pipe, and Alabama Gas Corporation (Alagasco) facilities are within or near the AOC (see Figures 1 and 2 of this HRS documentation record). The latitude and longitude of the site is based on the approximate center of AOC, 33.557464 North Latitude and 86.799671 West Longitude (Ref. 105; see also Figure 2 of this HRS documentation record).

The first industrial facilities in this site area of North Birmingham commenced operations in the late 1870s and early 1880s. By the turn of the century, the area was home to numerous diversified plants, including foundries and kilns, coal and coke by-product plants, a knitting mill, brickworks, and a cement plant (Refs. 5, pp. 2, 4-8; 7, pp. 12-14). Since 1886, the area has been home to 20 foundries and kilns; seven coal, coke, or byproducts facilities; 26 scrap and metal processing plants; and four chemical plants (Ref. 7, pp. 12-14). By 1981, 20 percent (%) of the land area was devoted to large industrial plants (Ref. 5, p. 8).

Coke is the residue from the destructive distillation of coal (Refs. 13, pp. 1-3; 14, p. 2; 15, p. 11). When coal is subjected to a high degree of heat in the absence of air, the complex organic molecules break down to yield gases, together with liquid and solid organic compounds of lower molecular weight, leaving a relatively non-volatile carbonaceous matter (coke) (Refs. 13, pp. 1-3; 14, p. 2). Water is used to quench the glowing coke to prevent the coke from burning after exposure to air (Ref. 15, pp. 16-17). The volatile products from coal and coal tar derivatives are recovered and separated in the by-products plant (Refs. 14, p. 2: 15, p. 17). The coal used in the coke plants in the site area was generally obtained from mines in the Birmingham area, until the late 1950s when imported ores began supplementing the Red Mountain and Russellville production (Ref. 5, pp. 2-3). Other mining areas known to be used are Nebo, Flat Top, Warrior and Blue Creek (Ref. 5, pp. 2-3). Coal from local mines continued to be used, and those mines expanded through the 1980s (Ref. 5, p. 3). Coal from mines in the Birmingham area and the Black Warrior Basin in west Alabama and the central Appalachians is known to have arsenic levels as high as 1,500 milligrams per kilogram (mg/kg) (Refs. 16, p. 4; 17, p. 1; 18). BaP is a known contaminant from coke ovens and foundries; arsenic, while also high in local soils, is present at high concentrations in the coal from Birmingham and north Alabama, the same coal used in many of the coke furnaces; lead is a known contaminant from foundries and other industrial plants (Refs. 5, p. 3; 16, p. 4; 17, p. 1; 18; 19, p. 1; 106, pp. 12-13, 22; 107, p. 1; 108, p. 1; 109, p. 2).

Air is the primary source of deposition within the 35th Avenue site AOC, from smokestacks and windblown particles from process fines and other stockpiled material; flooding from Five Mile Creek is another source of deposition. Aerial deposition of lead, arsenic, and BaP throughout the 35th Avenue site is supported by the variability in wind direction as documented in the Wind Rose graphs from 1950-1955, 1970-1975, 1990-1995, and 2008-2012 that indicate considerable wind variability in the area (Ref. 100, pp. 1-13). Another source of deposition of material includes the sediments of Five Mile Creek, which have been shown to contain lead, arsenic, and BaP, and are known to be in a flood prone area (Refs. 110, pp. 1-3; 111, pp. 26-37, 60-69).

Area-Wide Air Monitoring Studies

Since 2005, multiple air monitoring studies have been conducted in the site area in North Birmingham to assess the potential health effects resulting from the local population's exposure to chemicals in ambient air (Ref. 102, p. 14). The Agency for Toxic substances and Disease Registry (ATSDR) conducted a Public Health Assessment in 2014 for the area surrounding the 35th Avenue site using the environmental data collected during these studies (Ref. 102, pp. 1, 14.) ATSDR concluded that the past and current exposures to air contaminants and particulate matter in the communities adjacent to the Walter Coke Incorporated facility resulted in both short- and long-term exposures to particulate matter that could have resulted in harmful effects in sensitive individuals (Ref. 102, pp. 11-12). These studies further document the wide-spread air contamination from local industries in the 35th Avenue site area. The table below summarizes the findings and the text following the table provides additional details.

Area-Wide Air Monitoring Studies Summary

Study	Timeframe	Primary Contaminants of Concern	Additional Contaminants Identified	Cancer Risk Identified	Reference
BATS Shuttlesworth location	July 2005 to June 2006	Arsenic Benzo(a)pyrene	Benzene Hex. Chrome Tetrachloro-ethene (PCE)	1.66×10^{-4}	46, p. 3; 47, pp. 4-6, 8, 16, 31, 34, 61
BATS North Birmingham location	July 2005 to June 2006	Arsenic Benzo(a)pyrene	Benzene Cadmium Benzo(a) anthracene PCE	9.92×10^{-5}	46, p. 3; 47, pp. 4-6, 14, 31, 33-34, 61
EPA Schools Monitoring Initiative	August 2009 to December 2009	Arsenic Benzo(a)pyrene	Benzene	Concern for LT Exposure	46, p. 3; 48, pp. i, 1, 5, 7-8, 9-17, 22-23, 66-73

The Birmingham Air Toxics Study (BATS)

The BATS was conducted in four locations north of downtown Birmingham by the Jefferson County Health Department (JCDH) between July 15, 2005, and June 26, 2006 (Ref. 47, p. 4). The purpose of the study was to assess the potential health effects resulting from the local population's exposure to chemicals in ambient air; a subsequent risk assessment was based on the monitoring data (Refs. 47, p. 4). Two locations, Shuttlesworth and North Birmingham, were selected by JCHD for proximity to both industrial facilities and adjacent residential areas (Ref. 47, p. 6). These two locations are discussed below due to proximity to the 35th Avenue site area.

The **Shuttlesworth** air monitoring location was situated between Walter Coke and ABC Coke, due east and immediately adjacent to the Walter Coke facility and approximately 1-mile south of the ABC Coke facility (Ref. 47, pp. 8, 61). Eleven contaminants considered potential risk drivers for chronic cancer risk were identified in air samples collected at this location, including: 1,3-butadiene, acetaldehyde, arsenic, benzene, BaP, beryllium, carbon tetrachloride, hexavalent chromium, naphthalene, p-dichlorobenzene, and tetrachloroethene (PCE) (Ref. 47, pp. 34). The cumulative chronic (long term exposure) cancer risk for these contaminants of potential concern at the Shuttlesworth location was calculated to be 1.66×10^{-4}, equating to an increased likelihood of 166 additional cases of cancer per one million chronic exposures (Ref. 47, p. 34). Additionally, the increased cancer risk exceeds the EPA risk management cleanup threshold of 1 x 10^{-4} increased cancer risk (Ref. 47, p. 31).

The **North Birmingham** air monitoring location was situated to the west of the U.S. Pipe facility (Refs. 47, p. 61). Twelve potential drivers for increased chronic cancer risk were detected at this location: 1,3-butadiene, acetaldehyde, arsenic, benzene, benzo(a)anthracene, BaP, cadmium, carbon tetrachloride, dibenz(a,h)anthracene, naphthalene, p-dichlorobenzene, and PCE (Ref. 47, pp. 33-34). The cumulative increased chronic cancer risk for contaminants of potential concern at the North Birmingham location was calculated to be 9.92 x 10^{-5}, equating to an increased likelihood of 99 additional cases of cancer per one million chronic exposures (Ref. 47, pp. 33-34).

EPA Schools Monitoring Initiative

The Schools Monitoring Initiative was conducted by EPA from August 5, 2009 to December 3, 2009 by the placement of air monitoring stations at three Birmingham-area schools: Lewis Elementary School at 2015 26th Ave N, Riggins School at 3177 44th Avenue North, and North Birmingham Elementary School at 2620 35th Avenue North, as well as from August 5, 2009 through November 24, 2009 at the North Tarrant Elementary School at 1269 Portland Street, as part of a nation-wide air toxics study (Ref. 48, pp. i, 1, 5, 9-10, 64, 65). The studies found levels of coke-related emissions, particularly benzene, arsenic, and BaP, in air samples at levels that pose concern for long-term exposure in the schools (Ref. 48, pp. 7-8, 9-17, 22-23, 66-73).

Sampling Activities

As part of its RCRA permit, sampling was conducted in conjunction with an Environmental Indicator study at residential and school properties in the 35th Avenue site area by Walter Coke in 2005 (Refs. 50, p. F-38; 51, p. 1). EPA RCRA requested additional sampling of residential properties in 2009; 75 composite surface soil samples within the area and surrounding area of the 35th Avenue site were collected (Refs. 46, p. 2; 51, p. 2; 52, pp. 5-6, 9). The sampling results indicated that 22 properties in Collegeville, four properties in Harriman Park, and 2 properties in Fairmont exceeded the cleanup levels for arsenic and/or BaP Toxic Equivalent (TEQ) (Ref. 52, pp. 17-21). Fourteen areas were resampled in 2010, three sampling locations exceeded the cleanup levels for BaP TEQs (Ref. 53, pp. 10-14). In 2011, Walter Coke removed 52,000 cubic feet of soil to a depth of 2 feet due to the presence of BaP toxic equivalents at concentrations exceeding the EPA cleanup level at the Hudson School and replaced it with clean backfill (Ref. 53, pp. 1-3). As of June 2012, Walter Coke was able to gain access and conduct removal activities of 16 of the 23 properties that were identified as having polycyclic aromatic hydrocarbons (PAHs) and arsenic concentrations above Removal Management Levels (RMLs) through negotiations with EPA RCRA (Refs. 46, pp. 3-4; 56, p. 1-1).

In March 2011, EPA RCRA submitted the residential sampling data to the EPA Region 4 Emergency Response and Removal Branch (ERRB) (Ref. 55, p. 3). The EPA ERRB requested the EPA Region 4 Technical Services Section (TSS) to evaluate the 2009 residential sampling results collected by Walter Coke against Removal Action Levels (RALs) (Ref. 55, p. 3). The EPA TSS summarized that 16 residential properties, two schools, a former school, and a right of way exceeded the RAL of 1.5 mg/kg for BaP TEQ in residential surface soil (Ref. 55, p. 3). Therefore, EPA ERRB concluded that the properties meet the criteria for a time-critical removal action (Ref. 55, p. 3). Following suspension of negotiations with Walter Coke for sampling of additional properties, EPA ERRB began coordinating sampling 1,283 properties as part of the 35th Avenue Removal Investigation (Refs. 57, p. 2).

The 35th Avenue Removal Investigation was initiated in November 2012 by EPA and was completed on June 25, 2014 (Refs. 6, pp. 1-2, 7). Sampling was conducted in non-industrial areas of the Harriman Park, Collegeville, and Fairmont neighborhoods, which includes the 35th Avenue site (Refs. 4, p. 5; 6, p. 8, App. A, pp. 1-8). The Removal Investigation consisted of the collection of composite and grab surface soil samples from residential yards and garden areas, playgrounds, schools, churches, apartment housing, and empty lots (Ref. 6, p. 8, App. B, pp. 1-88). Vegetation samples were collected as well (Ref. 6, p. 7, Att. 3, pp. 1-53). The Removal Investigation included the collection of 4,767 surface soil samples for x-ray fluorescence (XRF) screenings, of which approximately 14% (677 samples) were also analyzed by a laboratory (Refs. 6, pp. 13-14). The Removal Investigation identified 394 properties above the RML for one or more compounds analyzed including lead (400 mg/kg), BaP (1,500 µg/kg), and arsenic (39 mg/kg) (Refs. 4, p. 20-22; 6, pp. 17-19). The Removal Investigation identified elevated concentrations of lead, arsenic, and BaP in the residential neighborhoods near the site area (Refs. 6, pp. 17-19). The composite surface soil samples collected and analyzed by a laboratory are used to determine the AOC scored in Section 5.0 of this HRS documentation record.

In 2012, EPA conducted two sampling events along Five Mile Creek to support the Removal Investigation at Five Mile Creek (Ref. 111, p. 7). The purpose of the investigation was to collect information to determine whether contaminants associated with former and current coke and chemical manufacturing operations at nearby facilities had impacted Five Mile Creek at levels hazardous to human health and/or the environment (Ref. 111, p. 7). A total of 31 in situ screening locations and 27 ex situ sediment samples were screened for metals using an XRF. A total of 54 samples, including 36 sediment samples, four surface water samples, four surface soil, seven field duplicates, and three Quality Assurance (QA) samples, were collected and submitted for analysis. Analytical results confirmed that heavy metals and semi-volatile organic compounds (SVOCs), specifically polyaromatic hydrocarbon (PAH) compounds, exist in concentrations above the residential and/or industrial Removal Management Levels (RMLs) within the sediment and overburden soil sampling area (Ref. 111, p. 23).

In 2014, the EPA Region IV began the Phase I removal action targeting properties in which the arsenic, lead, and/or BaP exceeded the Region IV Removal Management Levels (RMLs) by ten times or exceeding 1,200 mg/kg for lead. Fifty-eight parcels were scheduled for removal through August 28, 2014, with an additional 30 properties undergoing removal activities during Phase II activities beginning in September 2014 (Ref. 112, pp. 1-4). These properties undergoing removal activities, or scheduled to undergo such activities, are not included in the calculations for the 35th Avenue site AOC or target populations.

The driving factor for the HRS site score are residential targets associated with properties subject to BaP and/or arsenic and/or lead contamination. According to the HRS, Section 5.1.3, residential targets include a person living or attending school or day care on a property with an area of observed contamination and whose residence, school, or day care center, respectively, is on or within 200 feet of the area of observed contamination (Ref. 1, Section 5.1.3).

5.0 SOIL EXPOSURE PATHWAY

5.0.1 GENERAL CONSIDERATIONS

The soil exposure pathway is based on an area of observed contamination (AOC) (Ref. 1, Sect 5.0.1). The AOC at the site is based on analytical evidence of hazardous substances present in concentrations three times or greater than the designated background levels, if detected in background, and in concentrations greater than the corresponding sample quantitation limits (SQLs) (all surface soil samples were collected at a depth of 2 feet or less). The AOC is currently defined based on analytical results for soil samples collected in the area during the 35th Avenue Removal Investigation (Ref. 6). The AOC excludes those properties that have been determined to be not contaminated or have had a removal conducted (Ref. 112). See Figure 2 of this HRS Documentation Record.

BACKGROUND LEVEL

Due to extensive industrialization in the North Birmingham area, potential background locations near the site area were likely influenced by other industries, or were affected by other coke or foundry facilities. Since 1886, the area has been home to 20 foundries and kilns; seven coal, coke, or byproducts facilities; 26 scrap and metal processing plants; and four chemical plants (Ref. 7, pp. 12-14). In order establish background conditions for the site area the EPA Region 4 Science and Ecosystem Support Division (SESD) and RCRA Division conducted a sampling investigation in 2010 in the Robinwood neighborhood. This area was selected because the soil types within the neighborhood were determined to have similar composition to those within the 35th Avenue site area, and the neighborhood is outside the influence of coke production (Ref. 16, pp. i, 4-6). Differences in contaminant levels are due to the mode and duration of contaminant deposition (contamination has been aerially deposited on the AOC for more than 100 years) (Refs. 3; 16, pp. 5). Additional similarities between the Robinwood neighborhood and the 35th Avenue AOC include: home construction and age; the use and storage of coal for home heating; residential burn barrels in the neighborhood; asphalt shingles on the home; asphalt roads and the nearby rail road line (i.e., non site related factors that could contribute to ambient contaminant levels) (Ref. 16, p. 5). Further, the surficial geology of the Robinwood neighborhood is similar to that of the 35th Avenue site (Ref. 16, p. 5).

Twenty sample locations were identified during the background sampling investigation conducted by SESD and RCRA; see Figures 1 and 2 on pages 30 and 31 of Reference 16 for sampling locations (Ref. 16, p. 7). However, only 5-aliquot composite background surface soil samples collected from residential properties were used for comparison for the purposes of this HRS documentation record, as only 5-aliquot residential samples were used for AOC samples. Only background residential samples were used for comparison as only residential samples were used to document the release and define the AOC. From this subset of background samples collected, the highest sieved and non-sieved sample was used for comparison to sieved and non-sieved samples collected from the 35th Avenue site, respectively. Background and release samples that were collected from a similar depth, using the same sampling protocol, and analyzed using the same analytical method are used do document the observed release of contamination in the site area for this HRS documentation record (Refs. 4, pp. 4-5, 8-9; 16, pp. 6, 28-29). All samples were conducted in accordance with EPA SESD Field Branches Management and Quality System Procedure and using the SESD field measurement and sampling operating procedures (Ref. 16, p. 28). All samples were analyzed according to EPA Analytical Support Branch Laboratory Operations and Quality Assurance Manual, January 2010 (Ref. 16, p. 29). The samples were analyzed according to EPA method 8270D, 200.8, and 6010 (Ref. 16, p. 29).

- Background Concentrations:

Sample ID	Sample Medium	Depth	Date	References
WC12-SF	Non-Sieved Soil	0 to 6 inches	9/23/2010	16, pp. 6, 7, 9, 12, 30, 35
WC12-SF#60	Sieved Soil	0 to 6 inches	9/23/2010	16, pp. 6, 7, 9, 12, 30, 35
WC09-SF	Non-Sieved Soil	0 to 6 inches	9/23/2010	16, pp. 6-8, 11, 30, 35
WC15-SF	Non-Sieved Soil	0 to 6 inches	9/24/2010	16, pp. 6, 7, 9, 12, 30, 35
WC15-SF#60	Sieved Soil	0 to 6 inches	9/24/2010	16, pp. 6, 7, 9, 12, 30, 35

Notes:

WC – Walter Coke
SF – Surface soil (Ref. 16, p. 6)

Sample ID/ Laboratory ID	Hazardous Substance	Concentration (unit)	Minimum Reporting Limit	References
WC12-SF E104001-26	Arsenic	6.2 mg/kg	1.0	16, pp. 35, 89
WC12-SF#60/ E104001-27	Arsenic	6.5 mg/kg	0.99	16, pp. 35, 91
WC15-SF/ E104001-33	Lead	280 mg/kg	2	16, pp. 35, 103
WC15-SF#60/ E104001-34	Lead	220 mg/kg	2	16, pp. 35, 105
WC09-SF/ E104001-20	BaP	530 µg/kg	36	16, pp. 35, 76

Notes:

WC – Walter Coke
BaP - Benzo(a)pyrene
mg/kg - Milligrams per kilogram
SF - Surface soil (Ref. 16, p. 6)
#60 - Sieved sample
µg/kg - Micrograms per kilogram

Contaminated Samples

Contaminated samples obtained from residential yards during the 2013 EPA Removal Investigation sampling events are used to document the AOC. The samples were collected from depths of 0 to 4 inches bgs (Refs. 4, p. 9; 6, pp. 12-14; 62, p. 6). Release samples were compared to the highest value background sample, with the same number of aliquots for each composite sample, from a similar depth, from the same type of property, using the same sampling protocol, and analyzed using the same analytical methods (Refs. 4, pp. 4-5, 8-9; 6, pp. 12-14; 16, pp. 6, 28-29; 63). Sieved and non-sieved background samples were compared to sieved and non-sieved contaminated samples, respectively. All samples were collected within 200 feet of the residential home and within the legal property boundaries (See the contaminated samples table below and Reference 63 for documentation). (See Figure 2 of the HRS documentation record.) Those properties in which removal activities were conducted, or are planned to be conducted, are not included in the following list to ensure scoring under current conditions (See Reference 112 for the list of properties that have had or are scheduled to have a removal conducted).

All activities and procedures conducted by START during the Removal Investigation were performed in accordance with the EPA Region 4 Field Branches Quality System and Technical Procedures (FBQSTP) and the site-specific QAPP/SSP approved on October 18, 2012 (Ref. 6, p. 8). All soil samples collected were submitted to a NELAC Institute certified laboratory, either Spectrum Laboratory of Tampa, Florida, or TestAmerica Laboratories, Inc., of Savannah, Georgia, and Tampa, Florida, for sample analysis (Ref. 6, pp. 14-15). See Appendix E of Reference 6 for the complete analytical data package. Soil samples were analyzed for semi-volatile organic compounds (SVOCs) using EPA Method SW846-8270D and metals using SW846-6010/7471 (Ref. 4, p. 19). Data were validated according to the USEPA "Contract Laboratory Program (CLP) National Functional Guidelines (NFG) for Organic Methods Data Review" dated October 1999, USEPA CLP NFG for Low Concentration Organic Methods Data Review dated June 2001, and USEPA CLP NFG for Inorganic Data Review dated October 2004 (Ref. 6, p. 15).

Area Letter: A

Sample ID	Sample Medium	Depth (inches)	Date	References
CV0027A-CS-SP	Non-Sieved Soil	0-4	6/4/2013	62, pp. 3628-3629; 6, p. 13, App. B, p. 3
CV0027A-CS-SP (SIEVE)	Sieved Soil	0-4	6/4/2013	62, pp. 3628-3629; 6, p. 13, App. B, p. 3
CV0036B-CS (SIEVE)	Sieved Soil	0-4	2/27/2013	62, pp. 2468-2469; 6, p. 13, App. B, p. 3
CV0036B-CSD (SIEVE)	Sieved Soil	0-4	2/27/2013	62, pp. 2468-2469; 6, p. 13, App. B, p. 3
CV0039A-CS	Non-Sieved Soil	0-4	2/20/2013	62, pp. 2354-2355; 6, p. 13, App. B, p. 3
CV0039A-CS (SIEVE)	Sieved Soil	0-4	2/20/2013	62, pp. 2354-2355; 6, p. 13, App. B, p. 3

Sample ID	Sample Medium	Depth (inches)	Date	References
CV0053A-CS	Non-Sieved Soil	0-4	4/3/2013	62, p. 3162; 6, p. 13, App. B, p. 4; 63
CV0053A-CS (SIEVE)	Sieved Soil	0-4	4/3/2013	62, p. 3162; 6, p. 13, App. B, p. 4; 63
CV0053A-CSD	Non-Sieved Soil	0-4	4/3/2013	62, p. 3162; 6, p. 13, App. B, p. 4
CV0053A-CSD (SIEVE)	Sieved Soil	0-4	4/3/2013	62, p. 3162; 6, p. 13, App. B, p. 4; 63
CV0074B-CS-SP	Non-Sieved Soil	0-4	2/21/2013	62, pp. 2196-2197; 6, p. 13, App. B, p. 4
CV0074B-CS-SP (SIEVE)	Sieved Soil	0-4	2/21/2013	62, pp. 2196-2197; 6, p. 13, App. B, p. 4
CV0087B-CS	Non-Sieved Soil	0-4	1/28/2013	62, pp. 1587-1588; 6, p. 13, App. B, p. 5
CV0087B-CS (SIEVE)	Sieved Soil	0-4	1/28/2013	62, pp. 1587-1588; 6, p. 13, App. B, p. 5
CV0094C-CS (SIEVE)	Sieved Soil	0-4	1/16/2013	62, pp. 1103-1106; 6, p. 13, App. B, p. 5
CV0099B-CS-SP	Non-Sieved Soil	0-4	11/28/2012	62, pp. 200-201; 6, p. 13, App. B, p. 6; 63
CV0099B-CS-SP (SIEVE)	Sieved Soil	0-4	11/28/2012	62, pp. 200-201; 6, p. 13, App. B, p. 6;
CV0104B-CS	Non-Sieved Soil	0-4	2/21/2013	62, pp. 2240-2243; 6, p. 13, App. B, p. 6; 63
CV0116B-CS-SP	Non-Sieved Soil	0-4	4/1/2013	62, p. 3177; 6, p. 13, App. B, p. 7
CV0117B-CS (SIEVE)	Sieved Soil	0-4	4/17/2013	62, p. 3206 ; 6, p. 13, App. B, p. 7
CV0118B-CS-SP (SIEVE)	Sieved Soil	0-4	2/26/2013	62, pp. 2268-2269; 6, p. 13, App. B, p. 7
CV0143A-CS-SP	Non-Sieved Soil	0-4	6/5/2013	62, pp. 3638-3639; 6, p. 13, App. B, p. 7; 63
CV0143A-CS-SP (SIEVE)	Sieved Soil	0-4	6/5/2013	62, pp. 3638-3639; 6, p. 13, App. B, p. 7; 63
CV0152A-CS-SP (SIEVE)	Sieved Soil	0-4	2/19/2013	62, pp. 2178-2179; 6, p. 13, App. B, p. 8
CV0169B-CS-SP	Non-Sieved Soil	0-4	3/12/2013	62, pp. 2719-2720; 6, p. 13, App. B, p. 9
CV0169B-CS-SP (SIEVE)	Sieved Soil	0-4	3/12/2013	62, pp. 2719-2720; 6, p. 13, App. B, p. 9

Sample ID	Sample Medium	Depth (inches)	Date	References
CV0174B-CS	Non-Sieved Soil	0-4	1/9/2013	62, pp. 1056-1057; 6, p. 13, App. B, p. 10
CV0174B-CS (SIEVE)	Sieved Soil	0-4	1/9/2013	62, pp. 1056-1057; 6, p. 13, App. B, p. 10
CV0197C-CS	Non-Sieved Soil	0-4	3/21/2013	62, pp. 2881-2884; 6, p. 13, App. B, p. 9; 63
CV0197C-CS (SIEVE)	Sieved Soil	0-4	3/21/2013	62, pp. 2881-2884; 6, p. 13, App. B, p. 9; 63
CV0213A-CS	Non-Sieved Soil	0-4	1/21/2013	62, pp. 1467-1468; 6, p. 13, App. B, p. 10
CV0213A-CS (SIEVE)	Sieved Soil	0-4	1/21/2013	62, pp. 1467-1468; 6, p. 13, App. B, p. 10
CV0213B-CS (SIEVE)	Sieved Soil	0-4	1/21/2013	62, pp. 1467-1468; 6, p. 13, App. B, p. 10
CV0217B-CS (SIEVE)	Sieved Soil	0-4	11/8/2012	62, pp. 13-14; 6, p. 13, App. B, p. 10
CV0239A-CS	Non-Sieved Soil	0-4	11/8/2012	62, pp. 25-26; 6, p. 13, App. B, p. 11
CV0305B-CS	Non-Sieved Soil	0-4	5/28/2013	62, pp. 3578-3579; 6, p. 13, App. B, p. 14; 63
CV0312A-CS	Non-Sieved Soil	0-4	1/31/2013	62, pp. 1561-1562; 6, p. 13, App. B, p. 15; 63
CV0317B-CS-SP	Non-Sieved Soil	0-4	1/29/2013	62, pp. 1549-1550; 6, p. 13, App. B, p. 15; 63
CV0320A-CS-SP	Non-Sieved Soil	0-4	2/20/2013	62, pp. 2180-2181; 6, p. 13, App. B, p. 15; 63
CV0320A-CS-SP (SIEVE)	Sieved Soil	0-4	2/20/2013	62, pp. 2180-2181; 6, p. 13, App. B, p. 15; 63
CV0330A-CS-SP (SIEVE)	Sieved Soil	0-4	12/4/2012	62, pp. 438-439; 6, p. 13, App. B, p.. 15; 63
CV0350B-CS	Non-Sieved Soil	0-4	3/6/2013	62, pp. 2606-2607; 6, p. 13, App. B, p. 16; 63
CV0350B-CS (SIEVE)	Sieved Soil	0-4	3/6/2013	62, pp. 2606-2607; 6, p. 13, App. B, p. 16; 63
CV0359A-CS	Non-Sieved Soil	0-4	11/14/2012	62, pp. 69-70; 6, p. 13, App. B, p. 16; 63
CV0359A-CS (SIEVE)	Sieved Soil	0-4	11/14/2012	62, pp. 69-70; 6, p. 13, App. B, p. 16; 63
CV0362B-CS	Non-Sieved Soil	0-4	11/14/2012	62, pp. 71-72; 6, p. 13, App. B, p. 16; 63

Sample ID	Sample Medium	Depth (inches)	Date	References
CV0362B-CS (SIEVE)	Sieved Soil	0-4	11/14/2012	62, pp. 71-72; 6, p. 13, App. B, p. 16; 63
CV0378B-CS	Non-Sieved Soil	0-4	1/15/2013	62, pp. 1247-1248; 6, p. 13, App. B, p. 17; 63
CV0386B-CS-SP	Non-Sieved Soil	0-4	2/27/2013	62, pp. 2422-2423; 6, p. 13, App. B, p. 17; 63
CV0386B-CS-SP (SIEVE)	Sieved Soil	0-4	2/27/2013	62, pp. 2422-2423; 6, p. 13, App. B, p. 17; 63
CV0389A-CS	Non-Sieved Soil	0-4	1/15/2013	62, pp. 1243-1244; 6, p. 13, App. B, p. 17; 63
CV0389A-CS (SIEVE)	Sieved Soil	0-4	1/15/2013	62, pp. 1243-1244; 6, p. 13, App. B, p. 17; 63
CV0401B-CS	Non-Sieved Soil	0-4	4/11/2013	62, p. 3136 ; 6, p. 13, App. B, p. 18; 63
CV0408A-CS	Non-Sieved Soil	0-4	1/8/2013	62, pp. 983-984; 6, p. 13, App. B, p. 18; 63
CV0423B-CS-SP	Non-Sieved Soil	0-4	4/16/2013	62, pp. 3245-3246; 6, p. 13, App. B, p. 19; 63
CV0423B-CS-SP (SIEVE)	Sieved Soil	0-4	4/16/2013	62, pp. 3245-3246; 6, p. 13, App. B, p. 19; 63
CV0427B-CS-SP	Non-Sieved Soil	0-4	4/23/2013	62, pp. 3331-3332; 6, p. 13, App. B, p. 19; 63
CV0427B-CS-SP (SIEVE)	Sieved Soil	0-4	4/23/2013	62, pp. 3331-3332; 6, p. 13, App. B, p. 19; 63
CV0434A-CS	Non-Sieved Soil	0-4	11/13/2012	62, pp. 59-60; 6, p. 13, App. B, p. 19; 63
CV0465C-CS	Non-Sieved Soil	0-4	1/31/2013	62, pp. 1621-1624; 6, p. 13, App. B, p. 20; 63
CV0465C-CS (SIEVE)	Sieved Soil	0-4	1/31/2013	62, pp. 1621-1624; 6, p. 13, App. B, p. 20; 63
CV0473B-CS	Non-Sieved Soil	0-4	3/7/2013	62, pp. 2633-2634; 6, p. 13, App. B, p. 21; 63
CV0473B-CS (SIEVE)	Sieved Soil	0-4	3/7/2013	62, pp. 2633-2634; 6, p. 13, App. B, p. 21; 63
CV0490C-CS	Non-Sieved Soil	0-4	1/31/2013	62, pp. 1617-1620; 6, p. 13, App. B, p. 21; 63
CV0501B-CS-SP	Non-Sieved Soil	0-4	4/1/2013	62, p. 3176 ; 6, p. 13, App. B, p. 22; 63
CV0503A-CS	Non-Sieved Soil	0-4	1/18/2013	62, pp. 1273-1274; 6, p. 13, App. B, p. 22; 63

Sample ID	Sample Medium	Depth (inches)	Date	References
CV0503A-CS (SIEVE)	Sieved Soil	0-4	1/18/2013	62, pp. 1273-1274; 6, p. 13, App. B, p. 22; 63
CV0552B-CS-SP (SIEVE)	Sieved Soil	0-4	3/5/2013	62, pp. 2520-2521; 6, p. 13, App. B, p. 27; 63
CV0559A-CS-SP	Non-Sieved Soil	0-4	11/29/2012	62, pp. 218-219; 6, p. 13, App. B, p. 28 ; 63
CV0559B-CS-SP	Non-Sieved Soil	0-4	11/29/2012	62, pp. 218-219; 6, p. 13, App. B, p. 28; 63
CV0565A-CS	Non-Sieved Soil	0-4	12/11/2012	62, pp. 713-714; 6, p. 13, App. B, p. 28; 63
CV0566A-CS-SP	Non-Sieved Soil	0-4	3/21/2013	62, pp. 2813-2814; 6, p. 13, App. B, p. 28; 63
CV0566A-CS-SP (SIEVE)	Sieved Soil	0-4	3/21/2013	62, pp. 2813-2814; 6, p. 13, App. B, p. 28; 63
CV0621C-CS	Non-Sieved Soil	0-4	12/13/2012	62, pp. 692-695; 6, p. 13, App. B, p. 30
CV0644B-CS	Non-Sieved Soil	0-4	12/3/2012	62, pp. 492-493; 6, p. 13, App. B, p. 31; 63
CV0644B-CS (SIEVE)	Sieved Soil	0-4	12/3/2012	62, pp. 492-493; 6, p. 13, App. B, p. 31; 63
CV0698A-CS (SIEVE)	Sieved Soil	0-4	11/13/2012	62, pp. 63-64; 6, p. 13, App. B, p. 34; 63
CV0707B-CS-SP	Non-Sieved Soil	0-4	12/4/2012	62, pp. 450-451; 6, p. 13, App. B, p. 34; 63
CV0719C-CS-SP	Non-Sieved Soil	0-4	6/17/2013	62, pp. 3664-3667; 6, p. 13, App. B, p. 35; 63
CV0720B-CS	Non-Sieved Soil	0-4	2/27/2013	62, pp. 2472-2473; 6, p. 13, App. B, p. 35; 63
CV0720B-CS (SIEVE)	Sieved Soil	0-4	2/27/2013	62, pp. 2472-2473; 6, p. 13, App. B, p. 35; 63
CV0724B-CS-SP	Non-Sieved Soil	0-4	2/28/2013	62, pp. 2436-2437; 6, p. 13, App. B, p. 35; 63
CV0739A-CS-SP	Non-Sieved Soil	0-4	1/16/2013	62, pp. 1205-1206; 6, p. 13, App. B, p. 28; 63
CV0754A-CS-SP	Non-Sieved Soil	0-4	2/26/2013	62, pp. 2400-2401; 6, p. 13, App. B, p. 38; 63
CV0754A-CS-SP (SIEVE)	Sieved Soil	0-4	2/26/2013	62, pp. 2400-2401; 6, p. 13, App. B, p. 38; 63
CV0762C-CS	Non-Sieved Soil	0-4	2/4/2013	62, pp. 1840-1843; 6, p. 13, App. B, p. 38; 63

Sample ID	Sample Medium	Depth (inches)	Date	References
CV0762C-CS (SIEVE)	Sieved Soil	0-4	2/4/2013	62, pp. 1840-1843; 6, p. 13, App. B, p. 38; 63
CV0775B-CS	Non-Sieved Soil	0-4	1/23/2013	62, pp. 1495-1496; 6, p. 13, App. B, p. 39; 63
CV0775B-CS (SIEVE)	Sieved Soil	0-4	1/23/2013	62, pp. 1495-1496; 6, p. 13, App. B, p. 39; 63
CV0800A-CS-SP	Non-Sieved Soil	0-4	2/5/2013	62, pp. 1711-1712; 6, p. 13, App. B, p. 39; 63
CV0800A-CS-SP (SIEVE)	Sieved Soil	0-4	2/5/2013	62, pp. 1711-1712; 6, p. 13, App. B, p. 39; 63
CV0801A-CS-SP	Non-Sieved Soil	0-4	6/18/2013	62, pp. 3680-3681; 6, p. 13, App. B, p. 39; 63
CV0801A-CS-SP (SIEVE)	Sieved Soil	0-4	6/18/2013	62, pp. 3680-3681; 6, p. 13, App. B, p. 39; 63
CV0806A-CS-SP	Non-Sieved Soil	0-4	1/22/2013	62, pp. 1400-1401; 6, p. 13, App. B, p. 39; 63
CV0823A-CS	Non-Sieved Soil	0-4	1/24/2013	62, pp. 1499-1500; 6, p. 13, App. B, p. 40; 63
CV0823A-CS (SIEVE)	Sieved Soil	0-4	1/24/2013	62, pp. 1499-1500; 6, p. 13, App. B, p. 40; 63
CV0827B-CS (SIEVE)	Sieved Soil	0-4	3/7/2013	62, pp. 2616-2617; 6, p. 13, App. B, p. 40; 63
CV0828B-CS-SP	Non-Sieved Soil	0-4	5/21/2013	62, p. 3504 ; 6, p. 13, App. B, p. 40; 63
CV0828B-CS-SP (SIEVE)	Sieved Soil	0-4	5/21/2013	62, p. 3504 ; 6, p. 13, App. B, p. 40; 63
CV0829B-CS	Non-Sieved Soil	0-4	2/20/2013	62, pp. 2220-2221; 6, p. 13, App. B, p. 40; 63
CV0829B-CS (SIEVE)	Sieved Soil	0-4	2/20/2013	62, pp. 2220-2221; 6, p. 13, App. B, p. 40; 63
CV0833B-CS-SP	Non-Sieved Soil	0-4	3/20/2013	62, pp. 2785-2786; 6, p. 13, App. B, p. 40; 63
CV0836A-CS	Non-Sieved Soil	0-4	1/23/2013	62, pp. 1445-1446; 6, p. 13, App. B, p. 41; 63
CV0836A-CS (SIEVE)	Sieved Soil	0-4	1/23/2013	62, pp. 1445-1446; 6, p. 13, App. B, p. 41; 63
CV0859B-CS	Non-Sieved Soil	0-4	2/21/2013	62, pp. 2374-2375; 6, p. 13, App. B, p. 41; 63
CV0859B-CS (SIEVE)	Sieved Soil	0-4	2/21/2013	62, pp. 2374-2375; 6, p. 13, App. B, p. 41; 63

Sample ID	Sample Medium	Depth (inches)	Date	References
CV0902B-CS	Non-Sieved Soil	0-4	1/24/2013	62, pp. 1505-1506; 6, p. 13, App. B, p. 42; 63
CV0902B-CS (SIEVE)	Sieved Soil	0-4	1/24/2013	62, pp. 1505-1506; 6, p. 13, App. B, p. 42; 63
CV0965C-CS	Non-Sieved Soil	0-4	1/29/2013	62, pp. 1601-1604; 6, p. 13, App. B, p. 44; 63
CV0965C-CS (SIEVE)	Sieved Soil	0-4	1/29/2013	62, pp. 1601-1604; 6, p. 13, App. B, p. 44; 63
CV1066B-CS-SP (SIEVE)	Sieved Soil	0-4	4/16/2013	62, pp. 3238-3239; 6, p. 13, App. B, p. 48; 63
CV1114B-CS	Non-Sieved Soil	0-4	5/1/2013	62, pp. 3417-3418; 6, p. 13, App. B, p. 49; 63
CV1114B-CS (SIEVE)	Sieved Soil	0-4	5/1/2013	62, pp. 3417-3418; 6, p. 13, App. B, p. 49; 63
CV1134B-CS-SP	Non-Sieved Soil	0-4	6/6/2013	62, pp. 3642-3643; 6, p. 13, App, B, p. 50; 63
CV1134B-CS-SP (SIEVE)	Sieved Soil	0-4	6/6/2013	62, pp. 3642-3643; 6, p. 13, App. B, p. 50; 63
CV1151A-CS-SP	Non-Sieved Soil	0-4	3/14/2013	62, pp. 2755-2756; 6, p. 13, App. B, p. 51; 63
CV1151A-CS-SP (SIEVE)	Sieved Soil	0-4	3/14/2013	62, pp. 2755-2756; 6, p. 13, App. B, p. 51; 63
CV1156B-CS (SIEVE)	Sieved Soil	0-4	3/20/2013	62, pp. 2865-2866; 6, p. 13, App. B, p. 51; 63
CV1186A-CS	Non-Sieved Soil	0-4	3/13/2013	62, pp. 2685-2686; 6, p. 13, App. B, p. 52; 63
CV1186A-CS (SIEVE)	Non-Sieved Soil	0-4	3/13/2013	62, pp. 2685-2686; 6, p. 13, App. B, p. 52; 63
CV1236B-CS	Non-Sieved Soil	0-4	4/2/2013	62, p. 3161 ; 6, p. 13, App. B, p. 53; 63
CV1236B-CS (SIEVE)	Sieved Soil	0-4	4/2/2013	62, p. 3161 ; 6, p. 13, App. B, p. 53; 63
CV1244B-CS-SP	Non-Sieved Soil	0-4	6/6/2013	62, pp. 3646-3647; 6, p. 13, App. B, p. 53; 63
CV1244B-CS-SP (SIEVE)	Sieved Soil	0-4	6/6/2013	62, pp. 3646-3647; 6, p. 13, App. B, p. 53; 63
CV1251B-CS	Non-Sieved Soil	0-4	4/3/2013	62, p. 3168; 6, p. 13, App. B, p. 53; 63
CV1251B-CS (SIEVE)	Sieved Soil	0-4	4/3/2013	62, p. 3168; 6, p. 13, App. B, p. 54; 63

Area Letter: A

Sample ID	Sample Medium	Depth (inches)	Date	References
CV1264B-CS	Non-Sieved Soil	0-4	4/17/2013	62, p. 3210; 6, p. 13, App. B, p. 54; 63
CV1282C-CS-SP	Non-Sieved Soil	0-4	4/16/2013	62, pp. 3232-3235; 6, p. 13, App. B, p. 54; 63
CV1282C-CS-SP (SIEVE)	Sieved Soil	0-4	4/16/2013	62, pp. 3232-3235; 6, p. 13, App. B, p. 54; 63
CV1311B-CS-SP (SIEVE)	Sieved Soil	0-4	4/3/2013	62, p. 3184 ; 6, p. 13, App. B, p. 54; 63
CV1318B-CS	Non-Sieved Soil	0-4	3/19/2013	62, pp. 2779-2780; 6, p. 13, App. B, p. 54; 63
CV1318B-CS (SIEVE)	Sieved Soil	0-4	3/19/2013	62, pp. 2779-2780; 6, p. 13, App. B, p. 54; 63
CV1321A-CS	Non-Sieved Soil	0-4	4/18/2013	62, p. 3214 ; 6, p. 13, App. B, p. 54; 63
CV1321A-CS (SIEVE)	Sieved Soil	0-4	4/18/2013	62, p. 3214 ; 6, p. 13, App. B, p. 54; 63
CV1329A-CS	Non-Sieved Soil	0-4	4/22/2013	62, pp. 3283-3284; 6, p. 13, App. B, p. 55; 63
CV1329A-CS (SIEVE)	Sieved Soil	0-4	4/22/2013	62, pp. 3283-3284; 6, p. 13, App. B, p. 55; 63
HP0012B-CS (SIEVE)	Sieved Soil	0-4	12/5/2012	62, pp. 518-519; 6, p. 13, App. B, p. 76; 63
HP0033B-CS-SP	Non-Sieved Soil	0-4	1/17/2013	62, pp. 1223-1224; 6, p. 13, App. B, p. 77; 63
THP0033B-CS-SP (SIEVE)	Sieved Soil	0-4	1/17/2013	62, pp. 1223-1224; 6, p. 13, App. B, p. 77; 63
HP0038A-CS-SP	Non-Sieved Soil	0-4	1/28/2013	62, pp. 1533-1534; 6, p. 13, App. B, p. 77; 63
HP0043B-CS-SP (SIEVE)	Sieved Soil	0-4	2/19/2013	62, pp. 2166-2167; 6, p. 13, App. B, p. 77; 63
HP0105B-CS-SP (SIEVE)	Sieved Soil	0-4	1/23/2013	62, pp. 1408-1409; 6, p. 13, App. B, p. 80; 63
HP0108B-CS-SP	Non-Sieved Soil	0-4	12/6/2012	62, pp. 472-475; 6, p. 13, App. B, p. 80; 63
HP0108B-CS-SP (SIEVE)	Sieved Soil	0-4	12/6/2012	62, pp. 472-475; 6, p. 13, App. B, p. 80; 63
HP0125A-CS-SP	Non-Sieved Soil	0-4	5/29/2013	62, pp. 3548-3549; 6, p. 13, App. B, p. 80; 63
HP0125A-CS-SP (SIEVE)	Sieved Soil	0-4	5/29/2013	62, pp. 3548-3549; 6, p. 13, App. B, p. 80; 63

Sample ID	Sample Medium	Depth (inches)	Date	References
HP0196A-CS-SP (SIEVE)	Sieved Soil	0-4	12/6/2012	62, pp. 470-471; 6, p. 13, App. B, p. 83; 63
HP0202C-CS-SP (SIEVE)	Sieved Soil	0-4	4/11/2013	62, pp. 3139-3140; 6, p. 13, App. B, p. 83; 63
HP0208A-CS	Non-Sieved Soil	0-4	11/29/2012	62, pp. 329-330; 6, p. 13, App. B, p. 83; 63
HP0260B-CS	Non-Sieved Soil	0-4	11/28/2012	62, pp. 315-316; 6, p. 13, App. B, p. 85; 63
HP0260B-CS (SIEVE)	Sieved Soil	0-4	11/28/2012	62, pp. 315-316; 6, p. 13, App. B, p. 85; 63
HP0274B-CS	Non-Sieved Soil	0-4	1/21/2013	62, pp. 1315-1316; 6, p. 13, App. B, p. 85; 63
HP0274B-CS (SIEVE)	Sieved Soil	0-4	1/21/2013	62, pp. 1315-1316; 6, p. 13, App. B, p. 85; 63
HP0283A-CS-SP	Non-Sieved Soil	0-4	4/9/2013	62, p. 3122; 6, p. 13, App. B, p. 86; 63
HP0283A-CS-SP (SIEVE)	Sieved Soil	0-4	4/9/2013	62, p. 3122 ; 6, p. 13, App. B, p. 86; 63
HP0286B-CS	Non-Sieved Soil	0-4	12/5/2012	62, pp. 516-517; 6, p. 13, App. B, p. 86; 63
HP0292B-CS	Non-Sieved Soil	0-4	1/16/2013	62, pp. 1115-1118; 6, p. 13, App. B, p. 86; 63
HP0292B-CS (SIEVE)	Sieved Soil	0-4	1/16/2013	62, pp. 1115-1118; 6, p. 13, App. B, p. 86; 63

Notes:

CV - Collegeville area
A/B/C - Area identifier within each station/sample location (Ref. 4, p. 11)
CS -Composite sample
D - Duplicate sample
HP - Highland Park area
ID - Identification
SP - Split sample
(SIEVE)- Sample sieved prior to analysis with a #10 sieve (Ref. 4, p. 11)

The Reporting Limit (RL) listed below is equivalent to the Method Reporting Limit (MRL), adjusted for sample-specific conditions. The MRL is synonymous with a contract required quantitation limit (CRQL). For metals analyses where a single point calibration is performed (i.e., a high standard and a blank), the MRL is equivalent to the concentration of the reporting limit check standard (Ref. 113, p. 1).

Sample ID/ Laboratory ID	Hazardous Substance	Concentration (unit)	Reporting Limit (unit)	References
CV0027A-CS-SP/ 680-91068-12	Arsenic	26 mg/kg	2.2 mg/kg	62, pp. 3628-3629; 6, App. B, p. 165, App. E, p. 162682, 162700
CV0027A-CS-SP (SIEVE)/ 680-91068-19	Arsenic	29 mg/kg	2.2 mg/kg	62, pp. 3628-3629; 6, App. B, p. 165, App. E, p. 162682, 162702
CV0036B-CS (SIEVE)/ 680-87904-45	Arsenic	21 mg/kg	2.2 mg/kg	62, pp. 2468-2469; 6, App. B, p. 166, App. E, p. 105019
CV0036B-CSD (SIEVE)/ 680-87904-44	Arsenic	20 mg/kg	2.2 mg/kg	62, pp. 2468-2469; 6, App. B, p. 166, App. E, pp. 105295, 105018
CV0039A-CS/ 680-87709-30	Arsenic	21 mg/kg	2.5 mg/kg	62, pp. 2354-2355; 6, App. B, p. 166, App. E, p. 97665
CV0039A-CS (SIEVE)/ 680-87709-58	Arsenic	20 mg/kg	2.1 mg/kg	62, pp. 2354-2355; 6, App. B, p. 166, App. E, p. 97672
CV0053A-CS/ 680-89038-9	Arsenic	33 mg/kg	2.9 mg/kg	62, p. 3162; 6, App. B, p. 166, App. E, pp. 134231, 135379
CV0053A-CS (sieve)/ 680-89038-33	Arsenic	23 mg/kg	2.3 mg/kg	62, p. 3162; 6, App. B, p. 166, App. E, pp. 135364, 135382
CV0053A-CSD/ 680-89038-10	Arsenic	27 mg/kg	2.7 mg/kg	62, p. 3162; 6, App. B, p. 166, App. E, p. 135380
CV0053A-CSD (sieve)/ 680-89038-34	Arsenic	29 mg/kg	2.4 mg/kg	62, p. 3162; 6, App. B, p. 166, App. E, pp. 135364, 135383
CV0074B-CS-SP/ 680-87770-2	Arsenic	26 mg/kg	2 mg/kg	62, pp. 2196-2197; 6, App. B, p. 167, App. E, p. 100900
CV0074B-CS-SP (SIEVE)/ 680-87770-68	Arsenic	35 mg/kg	2.3 mg/kg	62, pp. 2196-2197; 6, App. B, p. 167, App. E, p. 100906

Sample ID/ Laboratory ID	Hazardous Substance	Concentration (unit)	Reporting Limit (unit)	References
CV0087B-CS (SIEVE)/ 680-86948-28	Arsenic	32 mg/kg	2.6 mg/kg	62, pp. 1587-1588; 6, App. B, p. 167, App. E, p. 68887
CV0094C-CS (SIEVE)/ 680-86640-53	Arsenic	26 mg/kg	2.4 mg/kg	62, pp. 1103-1106; 6, App. B, p. 168, App. E, p. 55154
CV0099B-CS-SP/ 680-85260-4	Arsenic	28 mg/kg	2.4 mg/kg	62, pp. 200-201; 6, App. B, p. 168, App. E, pp.11447, 11465
CV0099B-CS-SP (SIEVE)/ 680-85260-43	Arsenic	29 mg/kg	2.7 mg/kg	62, pp. 200-201; 6, App. B, p. 168, App. E, pp.11448, 11469
CV0104B-CS/ 680-87770-49	BaP	3600 µg/Kg	57 µg/kg	62, pp. 2240-2243; 6, App. B, p. 246, App. E, p. 100021
CV0116B-CS-SP/ 680-88913-2	Arsenic	31 mg/kg	3.3 mg/kg	62, p. 3177; 6, App. B, p. 169, App. E, p. 132545
CV0117B-CS (SIEVE)/ 680-89516-30	Arsenic	32 mg/kg	2.5 mg/kg	62, p. 3206; 6, App. B, p. 169, App. E, pp. 145625, 145641
CV0118B-CS-SP (SIEVE)/ 680-87853-50	Arsenic	23 mg/kg	1.9 mg/kg	62, pp. 2268-2269; 6, App. B, p. 169, App. E, pp. 103240, 102976
CV0143A-CS-SP/ 680-91166-9	Arsenic	51 mg/kg	11 mg/kg	62, pp. 3638-3639; 6, App. B, p. 170, App. E, pp.163987, 164001
CV0143A-CS-SP (SIEVE)/ 680-91166-10	Arsenic	27 mg/kg	2.3 mg/kg	62, pp. 3638-3639; 6, App. B, p. 170, App. E, pp. 163987, 164002
CV0169B-CS-SP/ 680-88298-4	Arsenic	35 mg/kg	2.5 mg/kg	62, pp. 2719-2720; 6, App. B, p. 171, App. E, p. 114666
CV0169B-CS-SP (SIEVE)/ 680-88298-33	Arsenic	32 mg/kg	2.1 mg/kg	62, pp. 2719-2720; 6, App. B, p. 171, App. E, p. 114669
CV0174B-CS/ 680-86458-15	Arsenic	38 mg/kg	3.4 mg/kg	62, pp. 1056-1057; 6, App. B, p. 171, App. E, p. 48230
CV0174B-CS (SIEVE)/ 680-86458-52	Arsenic	33 mg/kg	2.3 mg/kg	62, pp. 1056-1057; 6, App. B, p. 171, App. E, p. 48238

Sample ID/ Laboratory ID	**Hazardous Substance**	**Concentration (unit)**	**Reporting Limit (unit)**	**References**
CV0197C-CS/ 680-88632-34	Arsenic	370 mg/kg	2.6 mg/kg	62, pp. 2881-2884; 6, App. B, p. 172, App. E, p. 124740
CV0197C-CS (SIEVE)/ 680-88632-42	Arsenic	340 mg/kg	3 mg/kg	62, pp. 2881-2884; 6, App. B, p. 172, App. E, p. 124742
CV0213A-CS/ 680-86746-30	Arsenic	30 mg/kg	2.8 mg/kg	62, pp. 1467-1468; 6, App. B, p. 172, App. E, pp. 59784, 60255
CV0213A-CS (SIEVE)/ 680-86746-52	Arsenic	24 mg/kg	2.5 mg/kg	62, pp. 1467-1468; 6, App. B, p. 172, App. E, pp. 59791, 60257
CV0213B-CS (SIEVE)/ 680-86746-53	Arsenic	21 mg/kg	2.4 mg/kg	62, pp. 1467-1468; 6, App. B, p. 172, App. E, pp. 59792, 60257
CV0217B-CS (SIEVE)/ 350755818	Arsenic	22.3 mg/kg	1.12 mg/kg	62, pp. 13-14; 6, App. B, p. 172, App. E, pp. 236, 294
CV0239A-CS/ 350755813	Arsenic	20.7 mg/kg	0.983 mg/kg	62, pp. 25-26; 6, App. B, p. 173, App. E, pp. 234, 294
CV0305B-CS/ 680-90852-2	BaP	6200 µg/Kg	61 µg/kg	62, pp. 3578-3579; 6, App. B, p. 252, App. E, pp. 158752, 158843
CV0312A-CS/ 680-87089-8	BaP	4600 µg/Kg	56 µg/kg	62, pp. 1561-1562; 6, App. B, p. 252, App. E, p. 71856
CV0317B-CS-SP/ 680-86983-25	Arsenic	25 mg/kg	2.5 mg/kg	62, pp. 1549-1550; 6, App. B, p. 176, App. E, p. 71400
CV0320A-CS-SP/ 680-87709-8	Arsenic	31 mg/kg	2.6 mg/kg	62, pp. 2180-2181; 6, App. B, p. 176, App. E, p. 97664
CV0320A-CS-SP (SIEVE)/ 680-87709-60	Arsenic	28 mg/kg	2.3 mg/kg	62, pp. 2180-2181; 6, App. B, p. 176, App. E, p. 97674
CV0330A-CS-SP (SIEVE)/ 680-85475-41	Arsenic	27 mg/kg	2.3 mg/kg	62, pp. 438-439; 6, App. B, p. 177, App. E, pp. 21052, 24334
CV0350B-CS/ 680-88118-27	Arsenic	40 mg/kg	2.2 mg/kg	62, pp. 2606-2607; 6, App. B, p. 178, App. E, p. 111499

Sample ID/ Laboratory ID	Hazardous Substance	Concentration (unit)	Reporting Limit (unit)	References
CV0350B-CS (sieve)/ 680-88118-40	Arsenic	38 mg/kg	2.3 mg/kg	62, pp. 2606-2607; 6, App. B, p. 178, App. E, p. 111502
CV0359A-CS/ 350761802	Arsenic	26 mg/kg	1.06 mg/kg	62, pp. 69-70; 6, App. B, p. 178, App. E, p.17939
CV0359A-CS (sieve)/ 350762002	Arsenic	44.2 mg/kg	1.54 mg/kg	62, pp. 69-70; 6, App. B, p. 178, App. E, p. 20167
CV0362B-CS/ 350761801	Arsenic	28.7 mg/kg	1.26 mg/kg	62, pp. 71-72; 6, App. B, p. 178, App. E, p. 17720
CV0362B-CS (sieve)/ 350762008	Arsenic	29.9 mg/kg	1.29 mg/kg	62, pp. 71-72; 6, App. B, p. 178, App. E, p. 20174
CV0378B-CS/ 680-86603-42	BaP	2800 µg/Kg	14 µg/kg	62, pp. 1247-1248; 6, App. B, p. 254, App. E, p. 52572
CV0386B-CS-SP/ 680-87904-18	Arsenic	54 mg/kg	2.6 mg/kg	62, pp. 2422-2423; 6, App. B, p. 179, App. E, pp. 105294, 105015
CV0386B-CS-SP (sieve)/ 680-87904-47	Arsenic	37 mg/kg	2.3 mg/kg	62, pp. 2422-2423; 6, App. B, p. 179, App. E, pp. 105296, 105021
CV0389A-CS/ 680-86603-15	Arsenic	50 mg/kg	2.8 mg/kg	62, pp. 1243-1244; 6, App. B, p. 179, App. E, p. 52920
CV0389A-CS (SIEVE)/ 680-86603-51	Arsenic	43 mg/kg	2.0 mg/kg	62, pp. 1243-1244; 6, App. B, p. 179, App. E, p. 52927
CV0401B-CS/ 680-89328-12	BaP	4400 µg/Kg	55 µg/kg	62, p. 3136; 6, App. B, p. 255, App. E, pp. 138880, 139235
CV0408A-CS/ 680-86390-9	BaP	2900 µg/Kg	88 µg/kg	62, pp. 983-984; 6, App. B, p. 255, App. E, pp. 44408, 44610
CV0423B-CS-SP/ 680-89459-30	Arsenic	76 mg/kg	2.4 mg/kg	62, pp. 3245-3246; 6, App. B, p. 181, App. E, pp.142738, 142754
CV0423B-CS-SP (SIEVE)/ 680-89459-35	Arsenic	50 mg/kg	2.4 mg/kg	62, pp. 3245-3246; 6, App. B, p. 181, App. E, pp. 142739, 142757

Sample ID/ Laboratory ID	Hazardous Substance	Concentration (unit)	Reporting Limit (unit)	References
CV0427B-CS-SP/ 680-89695-14	Arsenic	32 mg/kg	2.6 mg/kg	62, pp. 3331-3332; 6, App. B, p. 181, App. E, p. 147136, 147154
CV0427B-CS-SP (SIEVE)/ 680-89695-34	Arsenic	25 mg/kg	2.3 mg/kg	62, pp. 3331-3332; 6, App. B, p. 181, App. E, p. 147137, 147158
CV0434A-CS/ 350760008	Arsenic	22.2 mg/kg	1.04 mg/kg	62, pp. 59-60; 6, App. B, p. 181, App. E, pp. 2428, 2698
CV0465C-CS/ 680-87089-22	Arsenic	29 mg/kg	1.9 mg/kg	62, pp. 1621-1624; 6, App. B, p. 182, App. E, p. 74449
CV0465C-CS (SIEVE)/ 680-87089-66	Arsenic	23 mg/kg	2.4 mg/kg	62, pp. 1621-1624; 6, App. B, p. 182, App. E, p. 74456
CV0473B-CS/ 680-88176-15	Arsenic	29 mg/kg	2.3 mg/kg	62, pp. 2633-2634; 6, App. B, p. 183, App. E, p. 112993
CV0473B-CS (SIEVE)/ 680-88176-23	Arsenic	23 mg/kg	1.8 mg/kg	62, pp. 2633-2634; 6, App. B, p. 183, App. E, p. 112995
CV0490C-CS/ 680-87089-25	BaP	1900 µg/Kg	11 µg/kg	62, pp. 1617-1620; 6, App. B, p. 256, App. E, p. 72646, 72816
CV0501B-CS-SP/ 680-88913-4	Arsenic	54 mg/kg	2.9 mg/kg	62, p. 3176 ; 6, App. B, p. 184, App. E, p. 132546
CV0503A-CS/ 680-86697-37	Arsenic	66 mg/kg	2.8 mg/kg	62, pp. 1273-1274; 6, App. B, p. 184, App. E, p. 57413
CV0503A-CS (SIEVE)/ 680-86697-56	Arsenic	74 mg/kg	2.6 mg/kg	62, pp. 1273-1274; 6, App. B, p. 184, App. E, p. 57415
CV0552B-CS-SP (sieve)/ 680-88067-33	Arsenic	20 mg/kg	2.2 mg/kg	62, pp. 2520-2521; 6, App. B, p. 189, App. E, p. 109831
CV0559A-CS-SP/ 680-85323-17	BaP	3300 µg/Kg	50 µg/kg	62, pp. 218-219; 6, App. B, p. 262, App. E, pp. 7255, 7681, 8748

Sample ID/ Laboratory ID	**Hazardous Substance**	**Concentration (unit)**	**Reporting Limit (unit)**	**References**
CV0559B-CS-SP/ 680-85323-18	BaP	2300 µg/Kg	56 µg/kg	62, pp. 218-219; 6, App. B, p. 262, App. E, pp. 7255, 7706, 7961, 8748
CV0565A-CS/ 680-85731-5	BaP	1600 µg/Kg	44 µg/kg	62, pp. 713-714; 6, App. B, p. 262, App. E, pp. 31399, 31538, 32009
CV0566A-CS-SP/ 680-88632-23	Arsenic	23 mg/kg	2.5 mg/kg	62, pp. 2813-2814; 6, App. B, p. 189, App. E, p. 124738
CV0566A-CS-SP (SIEVE)/ 680-88632-44	Arsenic	27 mg/kg	2.7 mg/kg	62, pp. 2813-2814; 6, App. B, p. 189, App. E, p. 124744
CV0621C-CS/ 680-85860-57	Arsenic	23 mg/kg	2.2 mg/kg	62, pp. 692-695; 6, App. B, p. 191, App. E, pp. 39074, 39102
CV0644B-CS/ 680-85402-13	Arsenic	28 mg/kg	2.5 mg/kg	62, pp. 492-493; 6, App. B, p. 192, App. E, pp. 9491, 21694
CV0644B-CS (SIEVE)/ 680-85402-20	Arsenic	32 mg/kg	2.6 mg/kg	62, pp. 492-493; 6, App. B, p. 192, App. E, pp. 9491, 21697
CV0691C-CS/ 680-85048-13	Arsenic	19 mg/kg	2.3 mg/kg	62, pp. 171-174; 6, App. B, p. 194, App. E, pp. 14075, 14910
CV0698A-CS (SIEVE)/ 350760108	Arsenic	20.8 mg/kg	1.19 mg/kg	62, pp. 63-64; 6, App. B, p. 194, App. E, pp. 4962, 5180
CV0707B-CS-SP/ 680-85475-32	Arsenic	29 mg/kg	2.3 mg/kg	62, pp. 450-451; 6, App. B, p. 194, App. E, pp. 21054, 24329
CV0719C-CS-SP/ 680-91637-5	BaP	1700 µg/Kg	12 µg/kg	62, pp. 3664-3667; 6, App. B, p. 268, App. E, p. 164402, 164402
CV0720B-CS/ 680-87904-34	Arsenic	30 mg/kg	2.8 mg/kg	62, pp. 2472-2473; 6, App. B, p. 195, App. E, pp. 105017, 105295
CV0720B-CS (SIEVE)/ 680-87904-46	Arsenic	23 mg/kg	2 mg/kg	62, pp. 2472-2473; 6, App. B, p. 195, App. E, pp. 105020, 105296

Sample ID/ Laboratory ID	Hazardous Substance	Concentration (unit)	Reporting Limit (unit)	References
CV0724B-CS-SP/ 680-87947-16	BaP	2100 µg/Kg	14 µg/kg	62, pp. 2436-2437; 6, App. B, p. 268, App. E, p. 105779
CV0739A-CS-SP/ 680-86640-7	Lead	990 mg/kg	1.4 mg/kg	62, pp. 1205-1206; 6, App. B, p. 196, App. E, p. 55145
CV0739A-CS-SP/ 680-86640-7	BaP	14000 µg/Kg	400 µg/kg	62, pp. 1205-1206; 6, App. B, p. 268, App. E, p. 53443
CV0754A-CS-SP/ 680-87853-14	Arsenic	43 mg/kg	2.9 mg/kg	62, pp. 2400-2401; 6, App. B, p. 199, App. E, p. 102972
CV0754A-CS-SP (sieve)/ 680-87853-52	Arsenic	42 mg/kg	2.3 mg/kg	62, pp. 2400-2401; 6, App. B, p. 199, App. E, p. 102978
CV0762C-CS/ 680-87170-25	Arsenic	29 mg/kg	2.3 mg/kg	62, pp. 1840-1843; 6, App. B, p. 199, App. E, p. 76065
CV0762C-CS (sieve)/ 680-87170-32	Arsenic	29 mg/kg	2.2 mg/kg	62, pp. 1840-1843; 6, App. B, p. 199, App. E, p. 76069
CV0775B-CS/ 680-86829-50	Arsenic	30 mg/kg	2.4 mg/kg	62, pp. 1495-1496; 6, App. B, p. 199, App. E, p. 64406
CV0775B-CS (sieve)/ 680-86829-61	Arsenic	35 mg/kg	3.0 mg/kg	62, pp. 1495-1496; 6, App. B, p. 199, App. E, p. 64410
CV0800A-CS-SP/ 680-87218-3	Arsenic	41 mg/kg	2.5 mg/kg	62, pp. 1711-1712; 6, App. B, p. 199, App. E, p. 78121
CV0800A-CS-SP (sieve)/ 680-87218-49	Arsenic	36 mg/kg	2.6 mg/kg	62, pp. 1711-1712; 6, App. B, p. 199, App. E, p. 78128
CV0801A-CS-SP/ 680-91637-18	Arsenic	31 mg/kg	2.5 mg/kg	62, pp. 3680-3681; 6, App. B, p. 199, App. E, p. 165491
CV0801A-CS-SP (sieve)/ 680-91637-25	Arsenic	48 mg/kg	2.4 mg/kg	62, pp. 3680-3681; 6, App. B, p. 199, App. E, p. 165494
CV0806A-CS-SP/ 680-86785-25	BaP	1900 µg/Kg	49 µg/kg	62, pp. 1400-1401; 6, App. B, p. 273, App. E, p. 61249

Sample ID/ Laboratory ID	**Hazardous Substance**	**Concentration (unit)**	**Reporting Limit (unit)**	**References**
CV0823A-CS/ 680-86887-56	Arsenic	20 mg/kg	2.7 mg/kg	62, pp. 1499-1500; 6, App. B, p. 200, App. E, p. 67272
CV0823A-CS (SIEVE)/ 680-86887-57	Arsenic	23 mg/kg	2.5 mg/kg	62, pp. 1499-1500; 6, App. B, p. 200, App. E, p. 67273
CV0827B-CS (SIEVE)/ 680-88176-22	Arsenic	24 mg/kg	2.1 mg/kg	62, pp. 2616-2617; 6, App. B, p. 200, App. E, p. 112994
CV0828B-CS-SP/ 680-90622-30	Arsenic	33 mg/kg	2.6 mg/kg	62, p. 3504; 6, App. B, p. 200, App. E, p. 154958
CV0828B-CS-SP (sieve)/ 680-90622-40	Arsenic	40 mg/kg	2.2 mg/kg	62, p. 3504; 6, App. B, p. 200, App. E, p.154959
CV0829B-CS/ 680-87709-47	Arsenic	36 mg/kg	2.7 mg/kg	62, pp. 2220-2221; 6, App. B, p. 200, App. E, p. 97668
CV0829B-CS (SIEVE)/ 680-87709-62	Arsenic	36 mg/kg	2.2 mg/kg	62, pp. 2220-2221; 6, App. B, p. 201, App. E, p. 97676
CV0833B-CS-SP/ 680-88592-28	Arsenic	28 mg/kg	2.3 mg/kg	62, pp. 2785-2786; 6, App. B, p. 201, App. E, pp. 122125, 122140
CV0836A-CS/ 680-86829-14	Arsenic	32 mg/kg	2.1 mg/kg	62, pp. 1445-1446; 6, App. B, p. 201, App. E, p. 64402
CV0836A-CS (sieve)/ 680-86829-58	Arsenic	28 mg/kg	2.2 mg/kg	62, pp. 1445-1446; 6, App. B, p. 201, App. E, p. 64407
CV0859B-CS/ 680-87770-35	Arsenic	36 mg/kg	2.3 mg/kg	62, pp. 2374-2375; 6, App. B, p. 201, App. E, p. 100903
CV0859B-CS (SIEVE)/ 680-87770-71	Arsenic	27 mg/kg	2.2 mg/kg	62, pp. 2374-2375; 6, App. B, p. 201, App. E, p. 100909
CV0902B-CS/ 680-86887-60	Arsenic	32 mg/kg	2.5 mg/kg	62, pp. 1505-1506; 6, App. B, p. 202, App. E, p. 67276
CV0902B-CS (SIEVE)/ 680-86887-61	Arsenic	22 mg/kg	2.5 mg/kg	62, pp. 1505-1506; 6, App. B, p. 202, App. E, p. 67277

Sample ID/ Laboratory ID	Hazardous Substance	Concentration (unit)	Reporting Limit (unit)	References
CV0965C-CS/ 680-86983-22	Arsenic	28 mg/kg	2.2 mg/kg	62, pp. 1601-1604; 6, App. B, p. 204, App. E, p. 71818
CV0965C-CS (SIEVE)/ 680-86983-50	Arsenic	43 mg/kg	2.5 mg/kg	62, pp. 1601-1604; 6, App. B, p. 204, App. E, p.71819
CV1066B-CS-SP (sieve)/ 680-89459-34	Arsenic	43 mg/kg	2.2 mg/kg	62, pp. 3238-3239; 6, App. B, p. 208, App. E, pp. 142739, 142756
CV1114B-CS/ 680-89985-10	Arsenic	31 mg/kg	2.1 mg/kg	62, pp. 3417-3418; 6, App. B, p. 208, App. E, p. 152728
CV1114B-CS (sieve)/ 680-89985-27	Arsenic	26 mg/kg	2.3 mg/kg	62, pp. 3417-3418; 6, App. B, p. 208, App. E, p. 152730
CV1134B-CS-SP/ 680-91166-14	Arsenic	32 mg/kg	2.3 mg/kg	62, pp. 3642-3643; 6, App. B, p. 209, App. E, pp. 163987, 164003
CV1134B-CS-SP (sieve)/ 680-91166-28	Arsenic	32 mg/kg	2.5 mg/kg	62, pp. 3642-3643; 6, App. B, p. 209, App. E, pp. 163988, 164005
CV1151A-CS-SP/ 680-88420-12	Arsenic	45 mg/kg	2.2 mg/kg	62, pp. 2755-2756; 6, App. B, p. 209, App. E, p. 118259
CV1151A-CS-SP (SIEVE)/ 680-88420-32	Arsenic	29 mg/kg	1.8 mg/kg	62, pp. 2755-2756; 6, App. B, p. 209, App. E, p. 118262
CV1156B-CS (SIEVE)/ 680-88592-33	Arsenic	23 mg/kg	2.3 mg/kg	62, pp. 2865-2866; 6, App. B, p. 209, App. E, p. 122142
CV1186A-CS/ 680-88348-22	Arsenic	32 mg/kg	3.1 mg/kg	62, pp. 2685-2686; 6, App. B, p. 210, App. E, p. 116332
CV1186A-CS (SIEVE)/ 680-88348-35	Arsenic	29 mg/kg	2.3 mg/kg	62, pp. 2685-2686; 6, App. B, p. 210, App. E, p. 116335
CV1236B-CS/ 680-88980-25	Arsenic	29 mg/kg	3.6 mg/kg	62, p. 3161; 6, App. B, p. 211, App. E, p. 133704, 133721
CV1236B-CS (sieve)/ 680-88980-27	Arsenic	20 mg/kg	2.6 mg/kg	62, p. 3161; 6, App. B, p. 211, App. E, p. 133705, 133719

Sample ID/ Laboratory ID	Hazardous Substance	Concentration (unit)	Reporting Limit (unit)	References
CV1244B-CS-SP/ 680-91166-18	Arsenic	32 mg/kg	2.5 mg/kg	62, pp. 3646-3647; 6, App. B, p. 211, App. E, pp. 163988, 164004
CV1244B-CS-SP (sieve)/ 680-91166-29	Arsenic	33 mg/kg	2.5 mg/kg	62, pp. 3646-3647; 6, App. B, p. 211, App. E, pp. 163988, 164006
CV1251B-CS/ 680-89038-30	Arsenic	41 mg/kg	2.9 mg/kg	62, p. 3168; 6, App. B, p. 211, App. E, p. 135381
CV1251B-CS (sieve)/ 680-89038-36	Arsenic	32 mg/kg	2.3 mg/kg	62, p. 3168; 6, App. B, p. 211, App. E, p. 135385
CV1264B-CS/ 680-89516-21	BaP	3500 µg/Kg	52 µg/kg	62, p. 3210; 6, App. B, p. 282, App. E, pp. 145159, 145209
CV1282C-CS-SP/ 680-89459-16	Arsenic	41 mg/kg	2.6 mg/kg	62, pp. 3232-3235; 6, p. 211, App. E, pp. 142738, 142753
CV1282C-CS-SP (sieve)/ 680-89459-33	Arsenic	39 mg/kg	2.4 mg/kg	62, pp. 3232-3235; 6, App. B, p. 211, App. E, pp. 142739, 142755
CV1311B-CS-SP (sieve)/ 680-89038-35	Arsenic	46 mg/kg	2.4 mg/kg	62, p. 3184; 6, App. B, p. 212, App. E, p.135384
CV1318B-CS/ 680-88527-5	Arsenic	33 mg/kg	3.1 mg/kg	62, pp. 2779-2780; 6, App. B, p. 212, App. E, p. 120051
CV1318B-CS (SIEVE)/ 680-88527-35	Arsenic	23 mg/kg	2.3 mg/kg	62, pp. 2779-2780; 6, App. B, p. 212, App. E, p. 120056
CV1321A-CS/ 680-89513-23	Arsenic	32 mg/kg	2.3 mg/kg	62, p. 3214; 6, App. B, p. 212, App. E, p. 144094
CV1321A-CS (sieve)/ 680-89513-28	Arsenic	33 mg/kg	2.6 mg/kg	62, p. 3214; 6, App. B, p. 212, App. E, p. 144097
CV1329A-CS/ 680-89695-4	Arsenic	23 mg/kg	2.3 mg/kg	62, pp. 3283-3284; 6, App. B, p. 212, App. E, pp. 147136 , 147153
CV1329A-CS (sieve)/ 680-89695-32	Arsenic	24 mg/kg	2.3 mg/kg	62, pp. 3283-3284; 6, p. 212, App. E, pp. 147137, 147156

Sample ID/ Laboratory ID	**Hazardous Substance**	**Concentration (unit)**	**Reporting Limit (unit)**	**References**
HP0012B-CS (SIEVE)/ 680-85534-60	Arsenic	20 mg/kg	2.2 mg/kg	62, pp. 518-519; 6, App. B, p. 229, App. E, pp. 26435, 27607
HP0033B-CS-SP/ 680-86697-10	Arsenic	39 mg/kg	2.5 mg/kg	62, pp. 1223-1224; 6, App. B, p. 230, App. E, p. 57405
HP0033B-CS-SP (SIEVE)/ 680-86697-31	Arsenic	31 mg/kg	2.3 mg/kg	62, pp. 1223-1224; 6, App. B, p. 230, App. E, p. 57409
HP0038A-CS-SP/ 680-86948-3	BaP	1700 µg/Kg	50 µg/kg	62, pp. 1533-1534; 6, App. B, p. 300, App. E, p. 67818
HP0043B-CS-SP (SIEVE)/ 680-87655-82	Arsenic	33 mg/kg	2 mg/kg	62, pp. 2166-2167; 6, App. B, p. 230, App. E, p. 95334
HP0105B-CS-SP (SIEVE)/ 680-86829-62	Arsenic	20 mg/kg	2.2 mg/kg	62, pp. 1408-1409; 6, App. B, p. 233, App. E, p. 64411
HP0108B-CS-SP/ 680-85585-18	Arsenic	40 mg/kg	2.5 mg/kg	62, pp. 472-475; 6, App. B, p. 233, App. E, pp. 27240, 30689,
HP0108B-CS-SP (SIEVE)/ 680-85585-51	Arsenic	43 mg/kg	2.3 mg/kg	62, pp. 472-475; 6, App. B, p.233, App. E, pp. 27240, 30697, 31355
HP0125A-CS-SP/ 680-90852-35	Arsenic	31 mg/kg	2.1 mg/kg	62, pp. 3548-3549; 6, App. B, p. 234, App. E, pp.160728, 160370
HP0125A-CS-SP/ 680-90852-35	BaP	9500 µg/Kg	50 µg/kg	62, pp. 3548-3549; 6, App. B, p. 303, App. E, p.159917
HP0125A-CS-SP (SIEVE)/ 680-90852-43	Arsenic	29 mg/kg	2.1 mg/kg	62, pp. 3548-3549; 6, App. B, p. 234, App. E, pp.160353, 160373
HP0196A-CS-SP (SIEVE)/ 680-85585-50	Arsenic	27 mg/kg	2.7 mg/kg	62, pp. 470-471; 6, App. B, p. 236, App. E, pp. 27243, 30696, 31355
HP0196A-CS-SP (SIEVE)/ 680-85585-50	Lead	860 mg/kg	1.3 mg/kg	62, pp. 470-471; 6, App. B, p. 236, App. E, pp. 27243, 30696, 31355

Sample ID/ Laboratory ID	**Hazardous Substance**	**Concentration (unit)**	**Reporting Limit (unit)**	**References**
HP0202C-CS-SP (SIEVE)/ 680-89328-34	Arsenic	34 mg/kg	2.2 mg/kg	62, pp. 3139-3140; 6, App. B, p. 236, App. E, pp. 140110, 140127
HP0208A-CS/ 680-85323-29	BaP	21000 µg/Kg	290 µg/kg	62, pp. 329-330; 6, App. B, p. 305, App. E, pp. 8013, 8285, 8749, 8764,
HP0260B-CS/ 680-85260-34	Arsenic	34 mg/kg	2.5 mg/kg	62, pp. 315-316; 6, App. B, p. 238, App. E, p. 11467
HP0260B-CS (SIEVE)/ 680-85260-45	Arsenic	32 mg/kg	2.6 mg/kg	62, pp. 315-316; 6, App. B, p. 238, App. E, p. 11471
HP0274B-CS/ 680-86746-46	Arsenic	30 mg/kg	2.5 mg/kg	62, pp. 1315-1316; 6, App. B, p. 238, App. E, p. 59787
HP0274B-CS (SIEVE)/ 680-86746-50	Arsenic	28 mg/kg	2.2 mg/kg	62, pp. 1315-1316; 6, App. B, p. 238, App. E, p. 59789
HP0283A-CS-SP/ 680-89220-42	Arsenic	41 mg/kg	2.5 mg/kg	62, p. 3122; 6, App. B, p. 239, App. E, pp. 137107, 137124
HP0283A-CS-SP (SIEVE)/ 680-89220-46	Arsenic	36 mg/kg	2.4 mg/kg	62, p. 3122; 6 App. B, p. 239, App. E, pp. 137107, 137126
HP0286B-CS/ 680-85534-9	BaP	2000 µg/Kg	13 µg/kg	62, pp. 516-517; 6, App. B, p. 307, App. E, pp. 23970
HP0292B-CS/ 680-86640-47	Arsenic	38 mg/kg	2.2 mg/kg	62, pp. 1115-1118; 6, App. B, p. 239, App. E, p. 55149
HP0292B-CS (SIEVE)/ 680-86640-49	Arsenic	31 mg/kg	2 mg/kg	62, pp. 1115-1118; 6, App. B, p. 239, App. E, p. 55150

Notes:

µg/kg - Micrograms per kilogram
BaP - Benzo(a)pyrene
CV - Collegeville area
A/B/C - Area identifier within each station/sample location (Ref. 4, p. 11)
CS - Composite sample
D - Duplicate sample
HP - Highland Park area

mg/kg - Milligrams per kilogram
SP - Split sample
(SIEVE)- Sample sieved prior to analysis with a #10 sieve (Ref. 4, p. 11)

ATTRIBUTION

Some of the current and historical coal/coke and foundry-related facilities in the immediate area of the 35th Avenue site include the active Walter Coke facility located at 3500 35th Avenue; the former U.S. Pipe facility located at 3000 30th Avenue North; the ABC Coke facility located at 900 Railroad Avenue in Tarrant City, Jefferson County, Alabama (also listed as 1 Railroad Avenue and 900 Huntsville Avenue); and the Alagasco facility at 2333 F L Shuttlesworth Drive (also listed as 2337 Huntsville Road) in Birmingham, Alabama (See Figures 1 and 2 of this HRS documentation record) (Refs. 8, p. 1; 9, p. 3; 10, p. 1; 11, p. 1; 12, p. 1; 103, p. 1, 159; 104, pp. 1-3). Particulate and volatile organic compound emissions originate from many operations at coke facilities such as Walter Coke and ABC Coke (Ref. 15, p. 20). Organic compounds soluble in benzene are major constituents of the particulate material emissions and are also included as VOCs (Ref. 15, p. 20). Substantial emissions are also obtained from ancillary operations such as boilers, wastewater treatment, cooling towers, and roads (Ref. 15, p. 20). Foundries such as U.S. Pipe can contribute to the deposition of contamination in the area by air emissions of metals, such as lead, and polycyclic aromatic hydrocarbons (PAHs), such as BaP, both through gaseous emissions and PAHs adsorbed onto dust (Refs. 106, pp. 12-13, 22; 108, p. 1; 109, p. 2). Alagasco, a coal gas holder and gas purification facility, could contribute to the deposition of metals via air emissions and BaP adsorbed onto dust (Ref. 114, p. 247)

The results of sampling events conducted in the 35th Avenue study area in 2012 and 2013 revealed elevated concentrations of lead, arsenic, and BaP at concentrations greater than or equal to background concentrations collected from similar residential areas. As explained below, the EPA has determined that there is insufficient data to identify the contribution from any individual industry in the area to the soil contamination present in the commingled AOC. Therefore, a commingled AOC has been identified at this site. This area includes the releases from the industries that operated in and around the 35th Avenue study area as possible origins of the lead, arsenic, and BaP contamination. The presence of lead, arsenic, and BaP within the AOC is most likely due to emissions from facility stacks, use of solid waste as fill material, and the likely inundation of properties during flood events (Refs. 15, p. 20; 16, p. 9; 106, pp. 12-13, 22; 108, p. 1; 109, p. 2; 110, pp. 1-3; 111, pp. 26-37, 60-69; 114, p. 247). BaP is a known contaminant from coke ovens, foundries and manufactured gas sites; arsenic, while also high in local soils, is present at high concentrations in the coal from Birmingham and north Alabama, the same coal used in many of the coke furnaces; lead is a known contaminant from foundries and other industrial plants (Refs. 5, p. 3; 16, p. 4; 17; 19, p. 1; 106, pp. 12-13; 108, p. 1; 109, pp. 2, 18; 114, p. 247).

North Birmingham was developed in the late 1800s as a planned residential and industrial community (Ref. 5, pp. 2, 4-6). The first industrial facilities in North Birmingham commenced operations in the late 1870s and early 1880s (Ref. 5, pp. 2, 4-7; 7, p. 12). By 1920, the area was home to numerous diversified plants, including pipeworks, foundries, a knitting mill, brickworks, and a cement plant (Ref. 5, pp. 2, 4-7; 7, p. 12). Since 1886, the area has been home to 20 foundries and kilns; seven coal, coke, or byproducts facilities; 26 scrap and metal processing plants; and four chemical plants (Ref. 7, pp. 12-14;). By 1981, 20% of the land area was devoted to large industrial plants (Ref. 5, p. 8). An industrial survey prepared by Walter Coke identified 76 distinct facilities in seven industries that Walter Coke claimed were associated with both metals and PAHs (Ref. 7, pp. 12-14). Most of the facilities provided in the survey are outside of the site area (Ref. 7, pp. 12-14; See Figures 1 and 2).

Many of the residences in the area were developed as company housing for the numerous large industries in the area (Ref. 5, pp. 4-7). By 1908, the neighborhood of Collegeville was developing east of the current U.S. Pipe facility (Ref. 5, p. 7).

Coke is the residue from the destructive distillation of coal (Refs. 14, p. 2; 15, p. 11). Prepared coal is heated in an oxygen-free atmosphere (coked) until most volatile components in the coal are removed; the remaining is a carbon mass called coke (Ref. 15, p. 11). When coal is subjected to a high degree of heat in the absence of air, the complex organic molecules break down to yield gases, together with liquid and solid organic compounds of lower molecular weight, leaving a relatively non-volatile carbonaceous matter (Ref. 14, p. 2). Metallurgical coke is used in iron and steel industry processes to reduce iron ore to iron (blast furnaces); foundry coke is used by foundries in furnaces for melting metal and the preparation of molds (Ref. 15, p. 11). Foundry coke production uses a different blend of coking coals, longer coking times, and lower coking temperatures relative to those used for metallurgical coke (Ref. 15, p. 11). Most coke plants are co-located with iron and steel production facilities (Ref. 15, p. 11).

Most coke is produced in the US using the "byproduct" process, including coke produced at Walter Coke and ABC Coke (Refs. 5, p. 3; 14, p. 2; 15, pp. 11-14; 33, p. 4). The general process of coking using the by-product process is described in Reference 15, pages 15 through 18, and includes coal being charged to ovens; the thermal distillation of coal in groups of ovens (batteries) producing coke; the glowing coke being quenched with water, and the quenched coke allowed to drain and cool; the coke is then crushed, screened and stored (Ref. 15, pp. 15-17). The volatile products from coal and coal tar derivatives are recovered and separated in the by-products plant (Ref. 14, p. 2).

Emissions originate from many operations at the coke and byproducts plant (Ref. 15, p. 20). Particulate emissions (PM) are emitted from leaks from doors, lids, and offtakes during coking; soaking; pushing coke from the oven; hot coke quenching; combustion stacks; and coke crushing, sizing, screening, handling, and storage (Ref. 15, p. 20). Volatile organic compounds are emitted from coke oven leaks, coke pushing, and coke quenching (Ref. 15, p. 20). Organic compounds soluble in benzene are major constituents of the PM emissions and are also included as VOCs (Ref. 15, p. 20). Substantial emissions are also obtained from ancillary operations such as boilers, wastewater treatment, cooling towers, and roads (Ref. 15, p. 20). Controls for coke plants consist of operation and maintenance practices to reduce oven emissions, and application of control devices to specific operations in the coke-making and byproduct recovery process (Ref. 15, p. 20). Operation and maintenance practices include steam aspiration and staged charging to reduce charging leaks, and sealing of doors, lids and off takes at joints that may leak (Ref. 15, p. 20). Sheds ducted to a baghouse and hooded quench cars are available controls for pushing and coke-side door leaks (Ref. 15, p. 20, 21). Quenching emissions are controlled by baffles in the quench tower to impeded PM flow and the use of non-process water for quenching (Ref. 15, p. 21). Several factors can affect emissions from the combustion stack during coke manufacturing, including incomplete combustion in the flues or cracks in the brickwork between an oven chamber and flue (Refs. 15, pp. 12, 26; 34 p. 58). Incomplete combustion is typically the result of excess gas and/or insufficient air in the system (Ref. 34, p. 58). Excess emissions from damaged brickwork or overly decarbonized ovens are most notable just after an oven is charged because gases from combusted coal dust are forced through cracks during charging (Ref. 34, p. 58).

Coal from mines in the Birmingham area and the Black Warrior Basin in west Alabama and the central Appalachians is known to have arsenic levels as high as 1,500 mg/kg (Refs. 5, p. 3; 16, p. 4; 17, p. 1; 18). Coal from these mines was used extensively in coke plants in the North Birmingham area (Ref. 5, p. 3). The use of this coal in many of the coke furnaces in the area concentrates the levels of arsenic during the burning process (Refs. 19, p. 1; 16, p. 4; 5, p. 3; 17, p. 1; 18)

The following facilities have been identified as possible or likely contributors to the lead, arsenic, and/or BaP contamination found in the AOC due to their proximity to the AOC, the type of plant, the processes utilized at the plant, and the history of releases contributing to the commingled contamination of the AOC over the period of many years. A brief history of the facility, their processes, permits and violations, as available, is provided below.

Walter Coke

Walter Coke, also known as Sloss-Sheffield Steel and Iron Company; United States Pipe and Foundry Company; Jim Walter Resources, Inc.; and Sloss Industries, has operated as a coke plant at the 35th Avenue facility since 1920 through the present, although the name and ownership has changed several times over the course of the operational history (Refs. 5, p. 3; 20, pp. 1-3; 21, pp. 1-2). Coke is the residue from the destructive distillation of coal (Refs. 14, p. 2; 15, p. 11). BaP is a known contaminant from coke ovens. Arsenic, while also high in local soils, is present at high concentrations in the coal from Birmingham and north Alabama, the same coal used in many of the coke (Refs. 5, p. 3; 16, p. 4; 17, p. 1; 18).

Both foundry and furnace coke are produced at the Walter Coke facility (Ref. 20, p. 3). The Walter Coke plant currently utilizes 120 coke ovens with a capacity to produce 460,000 tons per year (tpy) of coke (Ref. 20, p. 8). Additionally, Walter Coke operates a Utility Plant consisting of four generators that consume coke oven gas and natural gas. The principal end user for the power produced at Walter Coke is the Coke Plant. All remaining power generated from the Utility Plant is sold back to the local utility provider under a cogeneration agreement (Ref. 14, p. 2).

Thirty-nine (39) Solid Waste Management Units (SWMUs) were identified at the Walter Coke (formerly Sloss Industries) facility during a 1989 EPA RCRA Facility Assessment (RFA) and 1996 Geraghty & Miller RCRA Facility Investigation (RFI) (Refs. 23, pp. 1, 6-17; 24, p. 17; 25, pp. 1, 8). These 39 SWMUs were separated into four separate areas, created to group similar industrial activities together and allow for a systematic implementation of the investigation at each area: the Coking Facility, Land Disposal Areas, Biological Treatment Facility (BTF) and Sewers, and Chemical Manufacturing Plant (Ref. 25, p. 8). An investigation into the overall facility, and each of these identified areas, was implemented in 1995 and continued through at least 2007 (Refs. 24, p. 17-19; 25, p. 8; 26, p. 1; 27, p. 1; 28, p. 19; 29, pp. 1, 17-18). Further information regarding each waste area can be found in References 30, pages 4 through 15.

In 2010, the Walter Coke facility had two quench towers and one baghouse that were shared between all three batteries (Ref. 22, p. 2). The shared baghouse had seven cells consisting of 352 shaker style bags each with one hood shared between the batteries (Ref. 22, p. 2).

The Walter Coke facility's Title V Air Permit was originally granted on November 21, 2002 (Ref. 22, p. 4). Between 1999 and 2000, three violations regarding opacity were recorded at the facility and four violations of the source operating permits were identified (Ref. 65, pp. 2-3). An Official Warning was served to the Sloss Corporation that continued violations may result in more stringent action (Ref. 65, p. 1). A Settlement Agreement, Civil Action No. CV0103322, was entered into on May 25, 2001, between the Jefferson County Board of Health (JCBH) and Sloss Industries (aka Walter Coke) Slag Wool Plant as a result of a JCBH complaint alleging violations of its Air Pollution Control Rules and Regulations and National Ambient Air Quality Standards (NAAQS) for carbon monoxide (Ref. 66, pp. 1-2). Multiple violations were documented in the 2003 JCDH Full Compliance Inspection, specifically:

- Six visible emission observance violations;
- Sixteen National Emission Standards for Hazardous Air Pollutants (NESHAP) violations for off-take violations;
- Three State Implementation Plan violations for off-takes;
- Two NESHAP violations for emergency bleeder flares;
- Three reporting violations related to the quench towers;
- Failure to install appropriate flow gas meters at both underfire systems and four steam generators;
- Improper fuel combustion (landfill gas) reported in 2001 in two of the generators;
- Failure to maintain appropriate rolling records since August 29, 1994 (issuance date) for each steam generating unit;
- Errors on the initial January 31, 2003 Title V Air Permit semi-annual report;
- And Failure to report by proper notification violations that had occurred at the facility (Ref. 67, pp. 116-121).

Additional Settlement Agreements and several Notices of Violation (NOV), civil penalties and civil actions were imposed on Walter Coke between 2000 and 2005 (Refs. 68, pp. 1-3; 69, pp. 4-7).

A 2009 NOV for visible air emissions resulted in a Release Agreement whereby Walter Coke, formerly Sloss Industries, paid a fine of $62,000 (Refs. 70, pp. 1-6; 71)

Historically, the Walter Coke facility treated wastewater generated by its own operations and also received and treated wastewater from its Ariton, Alabama facility. In addition, by agreement, wastewater from U.S. Pipe and Foundry Company was accepted and treated at the plant (Ref. 72, pp. 1, 2). NPDES Permit No. AL0003247 was issued by ADEM on September 29, 1993. The permit authorized the discharge of pollutants and industrial wastes to Five Mile Creek. Subsequent to issuance of the NPDES permit in 1993, it was modified by ADEM on January 31, 1994 and June 16, 1995 (Ref. 72, p. 2). Walter Coke was subsequently cited for numerous permit violations and ordered to pay civil penalties as a result (Ref. 72, pp. 1-3). Since the effective date of Consent Order # 02-214-CWP, 41 additional violations of its NPDES permit were committed (Ref. 72, p. 3).

On September 13, 2010, ADEM issued an NOV in response to a comprehensive NPDES evaluation indicating that Walter Coke discharged pollutants in violation of the limits imposed by Part 1 of its NPDES Permit nine times between January 2009 and June 2010 (Ref. 75, pp. 1-8).

ABC Coke

ABC Coke, also known as Birmingham Coke and ByProducts Company [or Birmingham By-Products Coke Company (BBCC)]; Alabama By-Products Corporation (ABC); and Drummond Company Inc., ABC Coke Division has operated at the facility from 1919 through the present, although the names and ownership have changed hands several times (Refs. 32, pp. 5-13). Coke is the residue from the destructive distillation of coal (Refs. 14, p. 2; 15, p. 11). BaP is a known contaminant from coke ovens, and arsenic, while also high in local soils, is present at high concentrations in the coal from Birmingham and north Alabama, the same coal used in many of the coke (Refs. 5, p. 3; 16, p. 4; 17, p. 1; 18; 19, p. 1; 106, pp. 12-13; 108, p. 1; 109, p. 2).

The active ABC Coke facility property, originally 50 acres, is bordered by a railroad and other industrial complexes to the east and south, by Five Mile Creek to the North, and a sewage disposal plant and quarry to the West (Refs. 3; 31, p. 5; 32, p. 105).

ABC Coke produces foundry coke and furnace coke from three coke oven batteries (Ref. 33, p. 4). The Wilputte battery (#1A) has 78 ovens and produces 75% of the total coke; the two remaining Koppers-Becker batteries (#5 and #6) have 54 ovens and produce the remaining 25% of coke (Refs. 33, p. 4; 34, p. 57). Coal is placed in the coke batteries, in the absence of air, at a temperature of approximately 2,100 degrees Fahrenheit (Ref. 33, p. 4). The coal breaks down in this destructive distillation process, creating coke oven gas and coke (Ref. 33, p. 4). The volatile products from the coal and coal tar derivatives are recovered and separated in the coke by-products recovery plant (Ref. 33, p. 4). Listed hazardous waste generated in the coke by-products plant and other solid wastes are recycled into the coke ovens using a waste recycling process, called the Kipin process (Ref. 33, p. 4). ABC Coke receives waste materials, such as tar decanter sludge, for recycling from the coke by-products plant and from facilities in Ohio, New Jersey, and Alabama (Ref. 33, p. 4). Further information regarding processes at the ABC Coke facility is located in References 33, pages 4 through 11; 34, pages 57 through 59; and 35, pages 2 through 4.

ABC Coke operates a biological wastewater treatment system, including tanks with secondary containment, an equalization basin, post aeration basin, and separate storm water runoff basin, whose discharge to Five Mile Creek is regulated by an NPDES permit (Refs. 31, p. 3, 5-6, 22; 32, p. 17). An area near Five Mile Creek was used for the storage of tar storages, a practice that ended around 1950; coke is stored in this area (Refs. 31, p. 3, 5-6, 22; 32, pp. 16-17; see also Figure 1 of this HRS documentation record). ABC Coke regularly (at least twice a year) removes all sludge and sediments from these ponds and units, dewaters these materials, and recycles them through its process (Ref. 32, pp. 17-18). ABC Coke produces foundry coke from three coke oven batteries, all of which use coke oven gas for fuel (Ref. 34, p. 57). Factors affecting emissions from the combustion stack include incomplete combustion in the flues or cracks in the brickwork between an oven chamber and flue (Ref. 34, p. 58). ABC Coke practices periodic silica dusting, the spraying of a silica-containing dust inside an oven before charging it with coal (Ref. 34, pp. 58-59). The dust fuses to the silica brick lining the oven and sealing any small cracks (Ref. 34, pp. 58-59). Repairs to brickwork, jambs, through-walls and end flues are reportedly conducted as needed (Ref. 34, p. 59).

Water is used to quench the glowing coke (Ref. 32, p. 17). The process consumes water and uses up all water internally in the process (Ref. 32, p. 17). The quenching process and the process air emissions are both regulated under 40 C.F.R. §§ 63.7280—63.7352, whose requirements are incorporated into the Facility's Title V permit (Ref. 32, p. 17).

ABC Coke's air emissions were regulated by JCHD since the mid-1970s (Refs. 32, p. 15; 76, pp. 402-404).
A Major Source Operating Permit in 2003 replaced 22 existing permits (Refs. 32, p. 15; 76, pp. 36-37, 49). The 2003 Major Source Operating Permit reduced the emissions sources to 14; this permit was replaced in 2008 (Ref. 32, p. 15; 76, pp. 36-37, 105-107).

Multiple violations and corrective actions were brought against ABC Coke over its operating history (Refs. 32, p. 16; 36, pp. 10-12, 759-1116; 79, pp. 1-24; 80, pp. 1-10; 81, p. 1-26). In 1975, legal action was first brought against ABC Coke for failure to implement Clean Air Act provisions (Ref. 80, p.161). On October 31, 1980, a Consent Decree between the United States of American and ABC Coke was ordered that included detailed requirements to control door, standpipe, and charging hole lid emissions (Ref. 80, pp. 295-315). The 1980 Consent Decree was subsequently modified in 1982 to include schedules for engineering, construction, start-up and demonstration of compliance for new boilers and a new pushing emission control system (Ref. 80, pp. 316-345). The terms of the 1982 Consent Decree expired in 1985; the one exception was that the 20% maximum opacity, as established as a standard for pushing emissions in the Consent Decree, remained in effect until between 1997 and 1998 (Ref. 80, pp. 155-156, 159). Following a NOV from JCHD citing five observed violations between January 6 and April 22, 1987, a Settlement Agreement was entered in April 1988 that included extensive requirements to repair and replace door jambs, door plugs, and valves, as well as demonstrations of compliance with Jefferson County Air Pollution Control Rules (Ref. 80, p. 160). In March, 1988, JCDH received a letter indicating that after repair and modification of the system, ABC Coke could not meet the 20% opacity limits as dictated by the 1982 Consent Decree (Ref. 80, p. 33). Additional violations and complaints were received between 1989 and 2005, including a Notice of Violation in 1999 and 2005 (Ref. 80, pp. 12, 23, 45-76, 98, 102, 117, 119, 157, 254, 290). Multiple violations were also noted with the NPDES permit (Refs. 78, pp. 1-9; 81, pp. 1-9). A Consent Order was submitted in 2004 by ADEM for exceeding the maximum daily discharge limit for BaP 37 times, exceeding the monthly average for BaP four times, and failure to report the daily maximum for BaP once, a total of 42 violations (Ref. 81, pp. 271-279).

U.S. Pipe

The former U.S. Pipe operated at 3000 30th Avenue North as a pipe foundry from the early 1900s until 2010, with ownership and the name changing several times (Refs. 5, pp. 3-5; 37, p.1; 115, p. 10). U.S. Pipe has also been known as: Dimmick Pipe Co. (Dimmick); United States Cast Iron Pipe and Foundry Company a/k/a United States Pipe and Foundry Company; Jim Walter Corporation; Mueller Water Products, Inc.; and USP Holdings (Refs. 5, pp. 3-5; 21, pp. 1-2; 38, pp. 1-9). BaP and lead are known contaminants from foundries (Refs. 5, p. 3; 16, p. 4; 17; 19, p. 1; 106, pp. 12-13, 22; 108, p. 1; 109, pp. 2, 18; 114, p. 247).

The approximately 63-acre facility is bounded on the north by 35th Avenue and to the southwest by the Birmingham Southern railroad right-of-way (Refs. 3; 40, p. 4). The facility's main entrance was located on 29th Avenue North (Ref. 40, p. 4). The former U.S. Pipe originally manufactured pipe using the pit cast method, replaced in 1921 by centrifugal casting (Ref. 21, p. 1). Prior to dismantlement, the facility contained a foundry, several pipe storage yards for finished products, several treatment ponds, scrap raw material storage, and a closed landfill formerly used for disposal of solid waste (Ref. 40, p. 4). Scrap metal, including automobile parts, demolition debris from steel tanks, and building materials, was placed into a cupola furnace and heated to approximately 3,000 degrees Fahrenheit (°F). Limestone was added to remove impurities from the scrap metal mixture and coke was added to fuel the reaction (Ref. 41, p. 10). Together this material formed the cupola furnace input or "charge" (Ref. 41, p. 10). While in the furnace, lead, cadmium and other contaminants in the scrap metal vaporized and adhered to particulates in the off-gases (Ref. 41, p. 10). Additional details regarding the processes at U.S. Pipe are available in Reference 41, pages 13 through 15 and 42, pages 12 through 16.

Waste products from the facility included approximately 104 tons per day (tpd) of solid waste, consisting of baghouse dust and cement-lining materials (Ref. 40, p. 4). Baghouse dust, generally 15-20 microns in size, was generated at a rate of 15 tpd and was formed by metal vaporization, reaction of air within the cupola, and deposition on condensed nuclei scrap (Refs. 41, p. 13-14; 42, p. 12). Metals such as zinc, lead, and cadmium became part of the dust along with dirt normally found in melted scrap (Ref. 42, p. 12). Prior to 1987, the baghouse dust contents were disposed in a landfill on the property, where it was spread and mixed with other foundry waste (Ref. 42, p. 1, 14). In early 1988, U.S. Pipe began operating a totally enclosed treatment system for its baghouse dust whereby the dust was gathered and mixed with a reagent to bind the metals and then disposed of at an off-property permitted industrial landfill (Refs. 40, p. 4; 42, pp. 14; 43, p. 66). The contact wastewaters were channeled to facility ponds for settling treatment followed by additional settling in the facility's primary and secondary treatment ponds. Water from the secondary treatment pond was pumped to a National Pollutant Discharge Elimination System (NPDES) wastewater treatment plant located at another U.S. Pipe plant on Huntsville Road in Birmingham (Refs. 44, p. 1; 41, pp. 14-15; 45, p. 3). Additional details regarding the wastestreams at U.S. Pipe are available in References 41, pages 13 through 15 and 42, pages 12 through 16.

U.S Pipe's air emissions were regulated by the JCHD since the early 1970s (Ref. 82, p. 2). On July 18, 2001, JCDH issued a Title V Major source Operating Permit No. 4-07-0360-01 to U.S. Pipe, which expired on July 19, 2006, and included 16 permitted emissions units (Ref. 83, pp. 1, 3). On January 30, 2009, U.S. Pipe was issued Title V Major Source Operating Permit No. 4-07-0360-02 (Ref. 84, p. 1).

U.S. Pipe first filed a Hazardous Waste Notification form in 1981 and was assigned EPA ID No. ALD004017901 (Ref. 85, p. 1). A facility inspection conducted on June 10, 1985 determined that U.S. Pipe had been disposing of baghouse dust containing hazardous waste in an on-site landfill (Ref. 86, p. 1). EPA issued U.S. Pipe a Complaint and Compliance Order in November 1985 for violations surrounding the on-site landfill (Ref. 87, pp. 1-6). After nearly three years of negotiations, in 1988, U.S. Pipe and EPA entered into a Consent Agreement and Final Order, in which U.S. Pipe agreed to immediately cease placing untreated baghouse dust in its landfill, develop and implement plans for closure and post-closure of the landfill, including periodic ground water monitoring (Ref. 88, pp. 1, 6-7). The landfill was certified closed in 1995 (Refs. 89; 90, pp. 8). U.S. Pipe was granted Post-Closure Care Permit in 1997, which required U.S. Pipe to perform additional assessment activities in three areas: ground water monitoring, interim measures work plan and implementation, and confirmatory sampling work plan and implementation (Ref. 91, p. 1).

Multiple air releases were reported at the U.S. Pipe facility, including malfunctions causing the release of excess emissions from as little as 6 minutes to 19 hours, often resulting in opaque emissions (Refs. 92, pp. 1-2; 93, p. 1; 94, pp. 2-3; 95; 98). Surface water violations were also noted at the U.S. Pipe facility, including the release of cement-burdened wastewater, industrial water, and pH 10 water from various ponds (Ref. 99, pp. 1-3).

Alagasco

The Alagasco facility, also known as the Blue Mud Facility, operated as the Alagasco gas holder and purification system from 1878 until the mid-1900s (Ref. 103, pp. 5, 273). The gas was not manufactured on the property, but was further purified and stored; an area behind the Gas Storage Facilities was used as a disposal site for spent wood chip filters or "boxes" used to clean the synthetic gas (Ref. 103, pp. 5, 273). The gas supplied to the property reportedly may have come from local coking operations conducted at foundries in and around the Birmingham area (Ref. 103, p. 5). The conversion from coke oven gas to natural gas occurred at this location between 1950 to 1955, and afterwards it served as a gas holder and distribution facility, until the gas holder operations were discontinued and the gas holder dismantled in 1985 (Ref. 103, p. 5). The dominant chemical used in the spent filters was Prussian Blue, or ferric ferrous cyanide, imparting a bright blue color to the soil at the property (Ref. 103, pp. 10-11, 273). The property was also used an unofficial dump; buried debris and numerous bottles were discovered over the years (Ref. 103, p. 273). The location became the Birmingham District Distribution Control Center until those operations were moved in September 1999 (Ref. 103, p. 6).

In 1980, Alabama Gas Corporation was notified that sampling at the property, referred to as the Birmingham Disposal Site, had indicated low pH water, containing cyanide and arsenic, was intermittently flowing from the area to a nearby ditch (Ref. 103, p. 459-461). Arsenic and lead were also detected in sludge collected from the property during the same year (Ref. 103, p. 470).

An area was excavated in 1982, with a large amount of the blue soil and clay excavated, the excavated area filled with lime, and the original soil material returned to the hole with new fill material from off the property (Ref. 103, pp. 273, 626-645).

In 1997, an environmental and geotechnical Site Assessment was conducted at the facility to evaluate the property for future land use (Ref. 103, pp. 279-281). According to the report, a number of PAHs, metals and total cyanide were detected at elevated concentrations on the property, with the possibility of an unacceptable risk of direct exposure to soil (Ref. 103, p. 284). Specifically, BaP, arsenic, and lead were all detected in soils located on the property (Ref. 103, p. 301).

In 1998, a sampling investigation was conducted to determine if the cyanide had migrated off the property (Ref. 103, p. 273-274). Trace metals were detected in the monitoring wells, as well as cyanide in the surface water and sediment samples (Ref. 103, p. 274). However, as there were no target populations, and the soil was scheduled to be capped, no further evaluation was recommended (Ref. 103, p. 276).

Alabama Gas Corporation was authorized by NPDES permit to discharge to Village Creek, located south of the 35th Avenue AOC, effective February 4, 1985, and expiring February 4, 1986 (Ref. 103, p. 827).

Attribution Conclusion

Due to the duration of deposition, likely overlapping releases within the AOC, and number of contributors, the EPA has determined that there is insufficient data to define the extent of the contribution from any industry in the area. Therefore, a commingled area of observed soil contamination has been identified at this site (Ref. 100, p. 1-13; see Figure 2 and the tables in section 5.0.1 of this HRS documentation record). The AOC includes commingled soil contamination likely resulting from the emissions of nearby industrial operations (e.g., Walter Coke, ABC Coke and U.S. Pipe); numerous other possible contributors have been identified in and around the 35th Avenue site area. An industrial survey prepared by Walter Coke identified 76 distinct facilities in seven industries that Walter Coke claimed were associated with both metals and PAHs (Ref. 7, pp. 12-14). The AOC is likely a result of a combination of air deposition, physical transfer of contaminated waste solids from the industries by residents, and the deposition from flooding downstream of NPDES outfalls. This conclusion is based on the following:

(1) The operational history of the industries listed above;
(2) The presence of lead, benzene compounds, and arsenic in air studies;
(3) The presence of lead, BaP, and arsenic in sediments along Five Mile Creek (Ref. 111, p. 23)

Uneven spatial distribution of contaminants within the AOC is likely due to the length of time since initial contamination deposition, variations in wind and weather patterns, and the proximity to Five Mile Creek (Refs. 3; 100, pp. 1-13). In the 100-plus years since operations began in the area, many of the residential yards have been disturbed by landscaping, sidewalk placement, gardening, and even total redevelopment. Additionally, the historical wind direction for the 5-year periods between 1950-1955, 1970-1975, 1990-1995, and 2008-2013 indicates considerable wind variability in the area (Ref. 100, pp. 1-5). This data further supports the aerial deposition and commingling of lead, arsenic, and BaP contamination in the soil within the AOC from multiple likely and possible contributors.

Area Letter: A

AREA HAZARDOUS WASTE QUANTITY

- Hazardous Constituent Quantity:

The Hazardous Constituent Quantity for AOC A 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, pp. 51590-51591 [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 mass of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to calculate the Hazardous Constituent Quantity for AOC A with reasonable confidence.

Hazardous Constituent Quantity Assigned Value: Not Scored

- Hazardous Wastestream Quantity:

The Hazardous Wastestream Quantity for AOC A 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, p. 51591 [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 for the source and the associated releases from the source. Therefore, there is insufficient information to adequately calculate or extrapolate the Hazardous Wastestream Quantity for AOC A with reasonable confidence.

Hazardous Wastestream Quantity Assigned Value: Not Scored

- Volume:

The volume for AOC A could not be adequately determined according to the HRS requirements because insufficient historical and current waste sampling data are available to adequately calculate the volume of the source with reasonable confidence (Ref. 1, p. 51591 [Section 2.4.2.1.3]). Insufficient historical or current sampling data are available to adequately estimate the depth of waste material within the source. Therefore, there is insufficient information to adequately calculate or estimate the volume for AOC A.

Volume Assigned Value: 0

- Area:

The AOC is defined by the contamination presented in the above tables. Because of some possible removal activities not included in the scoring, or disturbances such as roads, other possible removal actions, etc. that have not been quantified, EPA has not inferred contamination between locations for the hazardous waste quantity measurement or scoring purposes; therefore, an area measure has not been made for the AOC. The Area for the AOC is undetermined but greater than zero.

Sum (square feet [ft^2]): >0

Equation for Assigning Value (Ref. 1, Table 5-2): >0/34,000

Area Assigned Value: >0

5.1 RESIDENT POPULATION THREAT

5.1.1 LIKELIHOOD OF EXPOSURE

All samples within the AOC containing arsenic, lead, or BaP concentrations equal to or greater than 3 times the applicable background level meet observed contamination criteria as defined by the HRS (Ref. 1, Sections 2.3 and 5.0.1). Release samples were compared to the highest value background containing the same number of aliquots for each composite sample, from a similar depth, similar property type, and compared to sieved or non-sieved as appropriate. All samples were collected using the same sampling protocol and analyzed using the same analytical methods (Ref. 4, pp. 4-5, 8-9; 6, pp. 12-15; 16, pp. 6, 28-29; 63). All background samples were conducted in accordance with EPA SESD Field Branches Management and Quality System Procedure and using the SESD field measurement and sampling operating procedures (Ref. 16, p. 28). Background soil samples were analyzed according to EPA Analytical Support Branch Laboratory Operations and Quality Assurance Manual, January 2010 (Ref. 16, p. 29). The samples were analyzed according to EPA method SW-846 8270D, 200.8, and 6010 (Refs. 4, p. 19; 16, p. 29). Contaminated samples were collected in accordance with the EPA Region 4 Field Branches Quality System and Technical Procedures (FBQSTP) and the site-specific QAPP/SSP approved on October 18, 2012, and were submitted to a NELAC Institute certified laboratory, either Spectrum Laboratory of Tampa, Florida, or TestAmerica Laboratories, Inc., of Savannah, Georgia and Tampa, Florid, for sample analysis (Ref. 6, pp. 8, 14-15). Contaminated soil samples were analyzed for semi-volatile organic compounds (SVOCs) using EPA Method SW846-8270D and metals using SW846-6010/7471 (Ref. 4, p. 19). Data were validated according to the USEPA Contract Laboratory Program (CLP) National Functional Guidelines (NFG) for Organic Methods Data Review dated October 1999, USEPA CLP NFG for Low Concentration Organic Methods Data Review dated June 2001, and USEPA CLP NFG for Inorganic Data Review dated October 2004 (Ref. 6, p. 15).

Residential property boundaries and sample locations were plotted in the field logbooks and also recorded with global positioning system (GPS) coordinates during sampling events (Ref. 62, p. 8). Some of the sample locations were not manually measured from the residence in the field. In these instances, the property boundaries were obtained electronically, and the distance from the residence to the farthest aliquot was measured using the Geographic Information System (GIS) program to provide the evidence that the samples were within 200 feet of the home (Ref. 63, pp.1-4). Therefore, all properties whose soil sample analytical results indicate arsenic, lead, or BaP contamination meet observed contamination criteria. For all samples presented below, the sample documenting observed contamination is on the property of and within 200 feet of a residence. Thus, a likelihood of exposure factor category value of 550 was assigned in accordance with the HRS (Ref. 1, Sections 5.1 and 5.1.1, p. 51646). Those properties undergoing removal actions have not been included in this list (Ref. 112, pp. 1-4).

The samples listed below, and shown in Figure 2 of this HRS documentation record, meet the requirements for establishing observed contamination.

Sample ID (s)	Distance of Population/Resource from Area of Observed Contamination	References
CV0027A-CS-SP CV0027A-CS-SP (SIEVE)	Within 200 feet	62, pp. 3628-3629
CV0036B-CS (SIEVE) CV0036B-CSD (SIEVE)	Within 200 feet	62, pp. 2468-2469
CV0039A-CS CV0039A-CS (SIEVE)	Within 200 feet	62, pp. 2354-2355

Sample ID (s)	Distance of Population/Resource from Area of Observed Contamination	References
CV0053A-CS CV0053A-CS (SIEVE) CV0053A-CSD CV0053A-CSD (SIEVE)	Within 200 feet	62, p. 3162; 63
CV0074B-CS-SP CV0074B-CS-SP (SIEVE)	Within 200 feet	62, pp. 2196-2197
CV0087B-CS (SIEVE)	Within 200 feet	62, pp. 1587-1588
CV0094C-CS (SIEVE)	Within 200 feet	62, pp. 1103-1106
CV0099B-CS-SP CV0099B-CS-SP (SIEVE)	Within 200 feet	62, pp. 200-201; 63
CV0104B-CS	Within 200 feet	62, pp. 2240-2243; 63
CV0116B-CS-SP	Within 200 feet	62, p. 3177
CV0117B-CS (SIEVE)	Within 200 feet	62, p. 3206
CV0118B-CS-SP (SIEVE)	Within 200 feet	62, pp. 2268-2269
CV0143A-CS-SP CV0143A-CS-SP (SIEVE)	Within 200 feet	62, pp. 3638-3639; 63
CV0169B-CS-SP CV0169B-CS-SP (SIEVE)	Within 200 feet	62, pp. 2719-2720
CV0174B-CS CV0174B-CS (SIEVE)	Within 200 feet	62, pp. 1056-1057
CV0197C-CS CV0197C-CS (SIEVE)	Within 200 feet	62, pp. 2881-2884; 63
CV0213A-CS CV0213A-CS (SIEVE) CV0213B-CS (SIEVE)	Within 200 feet	62, pp. 1467-1468
CV0217B-CS (SIEVE)	Within 200 feet	62, pp. 13-14
CV0239A-CS	Within 200 feet	62, pp. 25-28
CV0305B-CS	Within 200 feet	62, pp. 3578-3579; 63
CV0312A-CS	Within 200 feet	62, pp. 1561-1562; 63

Sample ID (s)	Distance of Population/Resource from Area of Observed Contamination	References
CV0320A-CS-SP CV0320A-CS-SP (SIEVE)	Within 200 feet	62, pp. 2180-2181; 63
CV0330A-CS-SP (SIEVE)	Within 200 feet	62, pp. 438-439; 63
CV0350B-CS CV0350B-CS (SIEVE)	Within 200 feet	62, pp. 2606-2607; 63
CV0359A-CS CV0359A-CS (SIEVE)	Within 200 feet	62, pp. 69-70
CV0362B-CS CV0362B-CS (SIEVE)	Within 200 feet	62, pp. 71-72
CV0378B-CS	Within 200 feet	62, pp. 1247-1248; 63
CV0386B-CS-SP CV0386B-CS-SP (SIEVE)	Within 200 feet	62, pp. 2422-2423
CV0389A-CS CV0389A-CS (SIEVE)	Within 200 feet	62, pp. 1243-1244; 63
CV0401B-CS	Within 200 feet	62, p. 3136; 63
CV0408A-CS	Within 200 feet	62, pp. 983-984; 63
CV0423B-CS-SP CV0423B-CS-SP (SIEVE)	Within 200 feet	62, pp. 3245-3246; 63
CV0427B-CS-SP CV0427B-CS-SP (SIEVE)	Within 200 feet	62, pp. 3331-3332; 63
CV0434A-CS	Within 200 feet	62, pp. 59-60
CV0465C-CS CV0465C-CS (SIEVE)	Within 200 feet	62, pp. 1621-1624; 63
CV0473B-CS CV0473B-CS (SIEVE)	Within 200 feet	62, pp. 2633-2634; 63
CV0490C-CS	Within 200 feet	62, pp. 1617-1620
CV0501B-CS-SP	Within 200 feet	62, p. 3176
CV0503A-CS CV0503A-CS (SIEVE)	Within 200 feet	62, pp. 1273-1274
CV0552B-CS-SP (SIEVE)	Within 200 feet	62, pp. 2520-2521; 63

Sample ID (s)	Distance of Population/Resource from Area of Observed Contamination	References
CV0559A-CS-SP CV0559B-CS-SP	Within 200 feet	62, pp. 218-219; 63
CV0565A-CS	Within 200 feet	62, pp. 713-714; 63
CV0566A-CS-SP CV0566A-CS-SP (SIEVE)	Within 200 feet	62, pp. 2813-2814; 63
CV0621C-CS	Within 200 feet	62, pp. 692-695
CV0644B-CS CV0644B-CS (SIEVE)	Within 200 feet	62, pp. 492-493; 63
CV0698A-CS (SIEVE)	Within 200 feet	62, pp. 63-64
CV0707B-CS-SP	Within 200 feet	62, pp. 450-451; 63
CV0719C-CS-SP	Within 200 feet	62, pp. 3664-3667
CV0720B-CS CV0720B-CS (SIEVE)	Within 200 feet	62, pp. 2472-2473
CV0724B-CS-SP	Within 200 feet	62, pp. 2436-2437
CV0739A-CS-SP	Within 200 feet	62, pp. 1205-1206; 63
CV0754A-CS-SP CV0754A-CS-SP (SIEVE)	Within 200 feet	62, pp. 2400-2401; 63
CV0762C-CS CV0762C-CS (SIEVE)	Within 200 feet	62, pp. 1840-1843
CV0775B-CS CV0775B-CS (SIEVE)	Within 200 feet	62, pp. 1495-1496
CV0800A-CS-SP CV0800A-CS-SP (SIEVE)	Within 200 feet	62, pp. 1711-1712; 63
CV0801A-CS-SP CV0801A-CS-SP (SIEVE)	Within 200 feet	62, pp. 3680-3681
CV0806A-CS-SP	Within 200 feet	62, pp. 1400-1401
CV0823A-CS CV0823A-CS (SIEVE)	Within 200 feet	62, pp. 1499-1500
CV0827B-CS (SIEVE)	Within 200 feet	62, pp. 2616-2617; 63
CV0828B-CS-SP CV0828B-CS-SP (SIEVE)	Within 200 feet	62, p. 3504; 63

Sample ID (s)	Distance of Population/Resource from Area of Observed Contamination	References
CV0829B-CS CV0829B-CS (SIEVE)	Within 200 feet	62, pp. 2220-2221; 63
CV0833B-CS-SP	Within 200 feet	62, pp. 2785-2786
CV0836A-CS CV0836A-CS (SIEVE)	Within 200 feet	62, pp. 1445-1446; 63
CV0859B-CS CV0859B-CS (SIEVE)	Within 200 feet	62, pp. 2374-2375
CV0902B-CS CV0902B-CS (SIEVE)	Within 200 feet	62, pp. 1505-1506
CV0965C-CS CV0965C-CS (SIEVE)	Within 200 feet	62, pp. 1601-1604
CV1066B-CS-SP (SIEVE)	Within 200 feet	62, pp. 3238-3239; 63
CV1114B-CS CV1114B-CS (SIEVE)	Within 200 feet	62, pp. 3417-3418
CV1134B-CS-SP CV1134B-CS-SP (SIEVE)	Within 200 feet	62, pp. 3642-3643; 63
CV1151A-CS-SP CV1151A-CS-SP (SIEVE)	Within 200 feet	62, pp. 2755-2756; 63
CV1156B-CS (SIEVE)	Within 200 feet	62, pp. 2865-2866
CV1186A-CS CV1186A-CS (SIEVE)	Within 200 feet	62, pp. 2685-2686; 63
CV1236B-CS CV1236B-CS (SIEVE)	Within 200 feet	62, p. 3161; 63
CV1244B-CS-SP CV1244B-CS-SP (SIEVE)	Within 200 feet	62, pp. 3646-3647; 63
CV1251B-CS CV1251B-CS (SIEVE)	Within 200 feet	62, p. 3168; 63
CV1264B-CS	Within 200 feet	62, p. 3210
CV1282C-CS-SP CV1282C-CS-SP (SIEVE)	Within 200 feet	62, pp. 3232-3235; 63
CV1311B-CS-SP (SIEVE)	Within 200 feet	62, p. 3184
CV1318B-CS CV1318B-CS (SIEVE)	Within 200 feet	62, pp. 2779-2780
CV1321A-CS CV1321A-CS (SIEVE)	Within 200 feet	62, p. 3214; 63

Sample ID (s)	Distance of Population/Resource from Area of Observed Contamination	References
CV1329A-CS CV1329A-CS (SIEVE)	Within 200 feet	62, pp. 3283-3284
HP0012B-CS (SIEVE)	Within 200 feet	62, pp. 518-519
HP0033B-CS-SP HP0033B-CS-SP (SIEVE)	Within 200 feet	62, pp. 1223-1224; 63
HP0038A-CS-SP	Within 200 feet	62, pp. 1533-1534; 63
HP0043B-CS-SP (SIEVE)	Within 200 feet	62, pp. 2166-2167
HP0105B-CS-SP (SIEVE)	Within 200 feet	62, pp. 1408-1409
HP0108B-CS-SP HP0108B-CS-SP (SIEVE)	Within 200 feet	62, pp. 472-475; 63
HP0125A-CS-SP HP0125A-CS-SP (SIEVE)	Within 200 feet	62, pp. 3548-3549; 63
HP0196A-CS-SP (SIEVE)	Within 200 feet	62, pp. 470-471
HP0202C-CS-SP (SIEVE)	Within 200 feet	62, pp. 3139-3140; 63
HP0208A-CS	Within 200 feet	62, pp. 329-330
HP0274B-CS HP0274B-CS (SIEVE)	Within 200 feet	62, pp. 1315-1316; 63
HP0260B-CS HP0260B-CS (SIEVE)	Within 200 feet	62, pp. 315-316; 63
HP0283A-CS-SP HP0283A-CS-SP (SIEVE)	Within 200 feet	62, p. 3122 ; 63
HP0286B-CS	Within 200 feet	62, pp. 516-517
HP0292B-CS HP0292B-CS (SIEVE)	Within 200 feet	62, pp. 1115-1118; 63

Notes:

CV - Collegeville area
A/B/C - Area identifier within each station/sample location (Ref. 4, p. 11)
CS - Composite sample
D - Duplicate sample
HP - Highland Park area
SP - Split sample
(SIEVE)- Sample sieved prior to analysis with a #10 sieve (Ref. 4, p. 11)

Resident Population Threat Likelihood of
Exposure Factor Category Value: 550

5.1.2 WASTE CHARACTERISTICS

5.1.2.1 Toxicity

Hazardous Substance	Toxicity Factor Value	References
Arsenic	10,000	2, p. BI-1
Lead	10,000	2, p. BI-7
Benzo(a)pyrene	10,000	2, p. BI-2

Toxicity Factor Value: 10000

5.1.2.2 Hazardous Waste Quantity

Area Letter	Source Type	Area Hazardous Waste Quantity	Area Hazardous Constituent Quantity Complete?
A	Contaminated Soil	>0	No

Sum of Values: >0

Hazardous Waste Quantity Factor Value: 10
(Ref. 1, Table 2-6)

5.1.2.3 Calculation of Waste Characteristics Factor Category Value

Toxicity Factor Value: 10,000
Hazardous Waste Quantity Factor Value: 10

Toxicity Factor Value x Hazardous Waste Quantity Factor Value: 10,000 x 10 = 1 x 10^5

Waste Characteristics Factor Category Value: 18
(Ref. 1, Sections 2.4.3 and 5.1.2.3, pp. 51592 (Table 2-7), 51647)

5.1.3 TARGETS

Only those individuals whose residence is both within said property boundary and within 200 feet of documented contamination meeting observed contamination criteria are counted as targets. Properties that have had removal activities conducted or are scheduled for removal activities were not included.

Level I Concentrations

Area Letter: A
Persons per Household: 2.48 (Ref. 101, p. 1)
Reference for Benchmark: 2, pp. BII-14, BII-15
See the contaminated samples tables in section 5.0.1 of this HRS documentation record for hazardous substance concentrations.

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
CV0027	1	2.48	CV0027A-CS-SP/ 680-91068-12	Arsenic	26 mg/kg	0.71 mg/kg	CRSC
			CV0027A-CS-SP (SIEVE)/ 680-91068-19	Arsenic	29 mg/kg	0.71 mg/kg	CRSC
CV0036	1	2.48	CV0036B-CS (SIEVE)/ 680-87904-45	Arsenic	21 mg/kg	0.71 mg/kg	CRSC
			CV0036B-CSD (SIEVE)/ 680-87904-44	Arsenic	20 mg/kg	0.71 mg/kg	CRSC
CV0039	1	2.48	CV0039A-CS/ 680-87709-30	Arsenic	21 mg/kg	0.71 mg/kg	CRSC
			CV0039A-CS (SIEVE)/ 680-87709-58	Arsenic	20 mg/kg	0.71 mg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
CV0053	1	2.48	CV0053A-CS/ 680-89038-9	Arsenic	33 mg/kg	0.71 mg/kg	CRSC
			CV0053A-CS (sieve)/ 680-89038-33	Arsenic	23 mg/kg	0.71 mg/kg	CRSC
			CV0053A-CSD/ 680-89038-10	Arsenic	27 mg/kg	0.71 mg/kg	CRSC
			CV0053A-CSD (sieve)/ 680-89038-34	Arsenic	29 mg/kg	0.71 mg/kg	CRSC
CV0074	1	2.48	CV0074B-CS-SP/ 680-87770-2	Arsenic	26 mg/kg	0.71 mg/kg	CRSC
			CV0074B-CS-SP (SIEVE)/ 680-87770-68	Arsenic	35 mg/kg	0.71 mg/kg	CRSC
CV0087	1	2.48	CV0087B-CS (SIEVE)/ 680-86948-28	Arsenic	32 mg/kg	0.71 mg/kg	CRSC
CV0094	1	2.48	CV0094C-CS (SIEVE)/ 680-86640-53	Arsenic	26 mg/kg	0.71 mg/kg	CRSC
CV0099	1	2.48	CV0099B-CS-SP/ 680-85260-4	Arsenic	28 mg/kg	0.71 mg/kg	CRSC
			CV0099B-CS-SP (SIEVE)/ 680-85260-43	Arsenic	29 mg/kg	0.71 mg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
CV0104	1	2.48	CV0104B-CS/ 680-87770-49	BaP	3600 µg/kg	20 µg/kg	CRSC
CV0116	1	2.48	CV0116B-CS-SP/ 680-88913-2	Arsenic	31 mg/kg	0.71 mg/kg	CRSC
CV0117	1	2.48	CV0117B-CS (SIEVE)/ 680-89516-30	Arsenic	32 mg/kg	0.71 mg/kg	CRSC
CV0118	1	2.48	CV0118B-CS-SP (SIEVE)/ 680-87853-50	Arsenic	23 mg/kg	0.71 mg/kg	CRSC
CV0143	1	2.48	CV0143A-CS-SP/ 680-91166-9	Arsenic	51 mg/kg	0.71 mg/kg	CRSC
			CV0143A-CS-SP (SIEVE)/ 680-91166-10	Arsenic	27 mg/kg	0.71 mg/kg	CRSC
CV0169	1	2.48	CV0169B-CS-SP/ 680-88298-4	Arsenic	35 mg/kg	0.71 mg/kg	CRSC
			CV0169B-CS-SP (SIEVE)/ 680-88298-33	Arsenic	32 mg/kg	0.71 mg/kg	CRSC
CV0174	1	2.48	CV0174B-CS/ 680-86458-15	Arsenic	38 mg/kg	0.71 mg/kg	CRSC
			CV0174B-CS (SIEVE)/ 680-86458-52	Arsenic	33 mg/kg	0.71 mg/kg	CRSC
CV0197	1	2.48	CV0197C-CS/ 680-88632-34	Arsenic	370 mg/kg	0.71 mg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
			CV0197C-CS (SIEVE)/ 680-88632-42	Arsenic	340 mg/kg	0.71 mg/kg	CRSC
CV0213	1	2.48	CV0213A-CS/ 680-86746-30	Arsenic	30 mg/kg	0.71 mg/kg	CRSC
			CV0213A-CS (SIEVE)/ 680-86746-52	Arsenic	24 mg/kg	0.71 mg/kg	CRSC
			CV0213B-CS (SIEVE)/ 680-86746-53	Arsenic	21 mg/kg	0.71 mg/kg	CRSC
CV0217	1	2.48	CV0217B-CS (SIEVE)/ 350755818	Arsenic	22.3 mg/kg	0.71 mg/kg	CRSC
CV0239	1	2.48	CV0239A-CS/ 350755813	Arsenic	20.7 mg/kg	0.71 mg/kg	CRSC
CV0305	1	2.48	CV0305B-CS/ 680-90852-2	BaP	6200 µg/kg	20 µg/kg	CRSC
CV0312	1	2.48	CV0312A-CS/ 680-87089-8	BaP	4600 µg/kg	20 µg/kg	CRSC
CV0317	1	2.48	CV0317B-CS-SP/ 680-86983-25	Arsenic	25 mg/kg	0.71 mg/kg	CRSC
CV0320	1	2.48	CV0320A-CS-SP/ 680-87709-8	Arsenic	31 mg/kg	0.71 mg/kg	CRSC
			CV0320A-CS-SP (SIEVE)/ 680-87709-60	Arsenic	28 mg/kg	0.71 mg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
CV0330	1	2.48	CV0330A-CS-SP (SIEVE)/ 680-85475-41	Arsenic	27 mg/kg	0.71 mg/kg	CRSC
CV0350	1	2.48	CV0350B-CS/ 680-88118-27	Arsenic	40 mg/kg	0.71 mg/kg	CRSC
			CV0350B-CS (sieve)/ 680-88118-40	Arsenic	38 mg/kg	0.71 mg/kg	CRSC
CV0359	1	2.48	CV0359A-CS/ 350761802	Arsenic	26 mg/kg	0.71 mg/kg	CRSC
			CV0359A-CS (sieve)/ 350762002	Arsenic	44.2 mg/kg	0.71 mg/kg	CRSC
CV0362	1	2.48	CV0362B-CS/ 350761801	Arsenic	28.7 mg/kg	0.71 mg/kg	CRSC
			CV0362B-CS (sieve)/ 350762008	Arsenic	29.9 mg/kg	0.71 mg/kg	CRSC
CV0378	1	2.48	CV0378B-CS/ 680-86603-42	BaP	2800 µg/kg	20 µg/kg	CRSC
CV0386	1	2.48	CV0386B-CS-SP/ 680-87904-18	Arsenic	54 mg/kg	0.71 mg/kg	CRSC
			CV0386B-CS-SP (sieve)/ 680-87904-47	Arsenic	37 mg/kg	0.71 mg/kg	CRSC
CV0389	1	2.48	CV0389A-CS/ 680-86603-15	Arsenic	50 mg/kg	0.71 mg/kg	CRSC
			CV0389A-CS (SIEVE)/ 680-86603-51	Arsenic	43 mg/kg	0.71 mg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
CV0401	1	2.48	CV0401B-CS/ 680-89328-12	BaP	4400 µg/kg	20 µg/kg	CRSC
CV0408	1	2.48	CV0408A-CS/ 680-86390-9	BaP	2900 µg/kg	20 µg/kg	CRSC
CV0423	1	2.48	CV0423B-CS-SP/ 680-89459-30	Arsenic	76 mg/kg	0.71 mg/kg	CRSC
			CV0423B-CS-SP (SIEVE)/ 680-89459-35	Arsenic	50 mg/kg	0.71 mg/kg	CRSC
CV0427	1	2.48	CV0427B-CS-SP/ 680-89695-14	Arsenic	32 mg/kg	0.71 mg/kg	CRSC
			CV0427B-CS-SP (SIEVE)/ 680-89695-34	Arsenic	25 mg/kg	0.71 mg/kg	CRSC
CV0434	1	2.48	CV0434A-CS/ 350760008	Arsenic	22.2 mg/kg	0.71 mg/kg	CRSC
CV0465	1	2.48	CV0465C-CS/ 680-87089-22	Arsenic	29 mg/kg	0.71 mg/kg	CRSC
			CV0465C-CS (SIEVE)/ 680-87089-66	Arsenic	23 mg/kg	0.71 mg/kg	CRSC
CV0473	1	2.48	CV0473B-CS/ 680-88176-15	Arsenic	29 mg/kg	0.71 mg/kg	CRSC
			CV0473B-CS (SIEVE)/ 680-88176-23	Arsenic	23 mg/kg	0.71 mg/kg	CRSC
CV0490	1	2.48	CV0490C-CS/ 680-87089-25	BaP	1900 µg/kg	20 µg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
CV0501	1	2.48	CV0501B-CS-SP/ 680-88913-4	Arsenic	54 mg/kg	0.71 mg/kg	CRSC
CV0503	1	2.48	CV0503A-CS/ 680-86697-37	Arsenic	66 mg/kg	0.71 mg/kg	CRSC
			CV0503A-CS (SIEVE)/ 680-86697-56	Arsenic	74 mg/kg	0.71 mg/kg	CRSC
CV0552	1	2.48	CV0552B-CS-SP (sieve)/ 680-88067-33	Arsenic	20 mg/kg	0.71 mg/kg	CRSC
CV0559	1	2.48	CV0559A-CS-SP/ 680-85323-17	BaP	3300 µg/kg	20 µg/kg	CRSC
			CV0559B-CS-SP/ 680-85323-18	BaP	2300 µg/kg	20 µg/kg	CRSC
CV0565	1	2.48	CV0565A-CS/ 680-85731-5	BaP	1600 µg/kg	20 µg/kg	CRSC
CV0566	1	2.48	CV0566A-CS-SP/ 680-88632-23	Arsenic	23 mg/kg	0.71 mg/kg	CRSC
			CV0566A-CS-SP (SIEVE)/ 680-88632-44	Arsenic	27 mg/kg	0.71 mg/kg	CRSC
CV0621	1	2.48	CV0621C-CS/ 680-85860-57	Arsenic	23 mg/kg	0.71 mg/kg	CRSC
CV0644	1	2.48	CV0644B-CS/ 680-85402-13	Arsenic	28 mg/kg	0.71 mg/kg	CRSC
			CV0644B-CS (SIEVE)/ 680-85402-20	Arsenic	32 mg/kg	0.71 mg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
CV0698	1	2.48	CV0698A-CS (SIEVE)/ 350760108	Arsenic	20.8 mg/kg	0.71 mg/kg	CRSC
CV0707	1	2.48	CV0707B-CS-SP/ 680-85475-32	Arsenic	29 mg/kg	0.71 mg/kg	CRSC
CV0719	1	2.48	CV0719C-CS-SP/ 680-91637-5	BaP	1700 µg/kg	20 µg/kg	CRSC
CV0720	1	2.48	CV0720B-CS/ 680-87904-34	Arsenic	30 mg/kg	0.71 mg/kg	CRSC
			CV0720B-CS (SIEVE)/ 680-87904-46	Arsenic	23 mg/kg	0.71 mg/kg	CRSC
CV0724	1	2.48	CV0724B-CS-SP/ 680-87947-16	BaP	2100 µg/kg	20 µg/kg	CRSC
CV0739	1	2.48	CV0739A-CS-SP/ 680-86640-7	BaP	14000 µg/kg	20 µg/kg	CRSC
CV0754	1	2.48	CV0754A-CS-SP/ 680-87853-14	Arsenic	43 mg/kg	0.71 mg/kg	CRSC
			CV0754A-CS-SP (sieve)/ 680-87853-52	Arsenic	42 mg/kg	0.71 mg/kg	CRSC
CV0762	1	2.48	CV0762C-CS/ 680-87170-25	Arsenic	29 mg/kg	0.71 mg/kg	CRSC
			CV0762C-CS (sieve)/ 680-87170-32	Arsenic	29 mg/kg	0.71 mg/kg	CRSC
CV0775	1	2.48	CV0775B-CS/ 680-86829-50	Arsenic	30 mg/kg	0.71 mg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
			CV0775B-CS (sieve)/ 680-86829-61	Arsenic	35 mg/kg	0.71 mg/kg	CRSC
CV0800	1	2.48	CV0800A-CS-SP/ 680-87218-3	Arsenic	41 mg/kg	0.71 mg/kg	CRSC
			CV0800A-CS-SP (sieve)/ 680-87218-49	Arsenic	36 mg/kg	0.71 mg/kg	CRSC
CV0801	1	2.48	CV0801A-CS-SP/ 680-91637-18	Arsenic	31 mg/kg	0.71 mg/kg	CRSC
			CV0801A-CS-SP (sieve)/ 680-91637-25	Arsenic	48 mg/kg	0.71 mg/kg	CRSC
CV0806	1	2.48	CV0806A-CS-SP/ 680-86785-25	BaP	1900 µg/kg	20 µg/kg	CRSC
CV0823	1	2.48	CV0823A-CS/ 680-86887-56	Arsenic	20 mg/kg	0.71 mg/kg	CRSC
			CV0823A-CS (SIEVE)/ 680-86887-57	Arsenic	23 mg/kg	0.71 mg/kg	CRSC
CV0827	1	2.48	CV0827B-CS (SIEVE)/ 680-88176-22	Arsenic	24 mg/kg	0.71 mg/kg	CRSC
CV0828	1	2.48	CV0828B-CS-SP/ 680-90622-30	Arsenic	33 mg/kg	0.71 mg/kg	CRSC
			CV0828B-CS-SP (sieve)/ 680-90622-40	Arsenic	40 mg/kg	0.71 mg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
CV0829	1	2.48	CV0829B-CS/ 680-87709-47	Arsenic	36 mg/kg	0.71 mg/kg	CRSC
			CV0829B-CS (SIEVE)/ 680-87709-62	Arsenic	36 mg/kg	0.71 mg/kg	CRSC
CV0833	1	2.48	CV0833B-CS-SP/ 680-88592-28	Arsenic	28 mg/kg	0.71 mg/kg	CRSC
CV0836	1	2.48	CV0836A-CS/ 680-86829-14	Arsenic	32 mg/kg	0.71 mg/kg	CRSC
			CV0836A-CS (sieve)/ 680-86829-58	Arsenic	28 mg/kg	0.71 mg/kg	CRSC
CV0859	1	2.48	CV0859B-CS/ 680-87770-35	Arsenic	36 mg/kg	0.71 mg/kg	CRSC
			CV0859B-CS (SIEVE)/ 680-87770-71	Arsenic	27 mg/kg	0.71 mg/kg	CRSC
CV0902	1	2.48	CV0902B-CS/ 680-86887-60	Arsenic	32 mg/kg	0.71 mg/kg	CRSC
			CV0902B-CS (SIEVE)/ 680-86887-61	Arsenic	22 mg/kg	0.71 mg/kg	CRSC
CV0965	1	2.48	CV0965C-CS/ 680-86983-22	Arsenic	28 mg/kg	0.71 mg/kg	CRSC
			CV0965C-CS (SIEVE)/ 680-86983-50	Arsenic	43 mg/kg	0.71 mg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
CV1066	1	2.48	CV1066B-CS-SP (sieve)/ 680-89459-34	Arsenic	43 mg/kg	0.71 mg/kg	CRSC
CV1114	1	2.48	CV1114B-CS/ 680-89985-10	Arsenic	31 mg/kg	0.71 mg/kg	CRSC
			CV1114B-CS (sieve)/ 680-89985-27	Arsenic	26 mg/kg	0.71 mg/kg	CRSC
CV1134	1	2.48	CV1134B-CS-SP/ 680-91166-14	Arsenic	32 mg/kg	0.71 mg/kg	CRSC
			CV1134B-CS-SP (sieve)/ 680-91166-28	Arsenic	32 mg/kg	0.71 mg/kg	CRSC
CV1151	1	2.48	CV1151A-CS-SP/ 680-88420-12	Arsenic	45 mg/kg	0.71 mg/kg	CRSC
			CV1151A-CS-SP (SIEVE)/ 680-88420-32	Arsenic	29 mg/kg	0.71 mg/kg	CRSC
CV1156	1	2.48	CV1156B-CS (SIEVE)/ 680-88592-33	Arsenic	23 mg/kg	0.71 mg/kg	CRSC
CV1186	1	2.48	CV1186A-CS/ 680-88348-22	Arsenic	32 mg/kg	0.71 mg/kg	CRSC
			CV1186A-CS (SIEVE)/ 680-88348-35	Arsenic	29 mg/kg	0.71 mg/kg	CRSC
CV1236	1	2.48	CV1236B-CS/ 680-88980-25	Arsenic	29 mg/kg	0.71 mg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
			CV1236B-CS (sieve)/ 680-88980-27	Arsenic	20 mg/kg	0.71 mg/kg	CRSC
CV1244	1	2.48	CV1244B-CS-SP/ 680-91166-18	Arsenic	32 mg/kg	0.71 mg/kg	CRSC
			CV1244B-CS-SP (sieve)/ 680-91166-29	Arsenic	33 mg/kg	0.71 mg/kg	CRSC
CV1251	1	2.48	CV1251B-CS/ 680-89038-30	Arsenic	41 mg/kg	0.71 mg/kg	CRSC
			CV1251B-CS (sieve)/ 680-89038-36	Arsenic	32 mg/kg	0.71 mg/kg	CRSC
CV1264	1	2.48	CV1264B-CS/ 680-89516-21	BaP	3500 µg/kg	20 µg/kg	CRSC
CV1282	1	2.48	CV1282C-CS-SP/ 680-89459-16	Arsenic	41 mg/kg	0.71 mg/kg	CRSC
			CV1282C-CS-SP (sieve)/ 680-89459-33	Arsenic	39 mg/kg	0.71 mg/kg	CRSC
CV1311	1	2.48	CV1311B-CS-SP (sieve)/ 680-89038-35	Arsenic	46 mg/kg	0.71 mg/kg	CRSC
CV1318	1	2.48	CV1318B-CS/ 680-88527-5	Arsenic	33 mg/kg	0.71 mg/kg	CRSC
			CV1318B-CS (SIEVE)/ 680-88527-35	Arsenic	23 mg/kg	0.71 mg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
CV1321	1	2.48	CV1321A-CS/ 680-89513-23	Arsenic	32 mg/kg	0.71 mg/kg	CRSC
			CV1321A-CS (sieve)/ 680-89513-28	Arsenic	33 mg/kg	0.71 mg/kg	CRSC
CV1329	1	2.48	CV1329A-CS/ 680-89695-4	Arsenic	23 mg/kg	0.71 mg/kg	CRSC
			CV1329A-CS (sieve)/ 680-89695-32	Arsenic	24 mg/kg	0.71 mg/kg	CRSC
HP0012	1	2.48	HP0012B-CS (SIEVE)/ 680-85534-60	Arsenic	20 mg/kg	0.71 mg/kg	CRSC
HP0033	1	2.48	HP0033B-CS-SP/ 680-86697-10	Arsenic	39 mg/kg	0.71 mg/kg	CRSC
			HP0033B-CS-SP (SIEVE)/ 680-86697-31	Arsenic	31 mg/kg	0.71 mg/kg	CRSC
HP0038	1	2.48	HP0038A-CS-SP/ 680-86948-3	BaP	1700 µg/kg	20 µg/kg	CRSC
HP0043	1	2.48	HP0043B-CS-SP (SIEVE)/ 680-87655-82	Arsenic	33 mg/kg	0.71 mg/kg	CRSC
HP0105	1	2.48	HP0105B-CS-SP (SIEVE)/ 680-86829-62	Arsenic	20 mg/kg	0.71 mg/kg	CRSC
HP0108	1	2.48	HP0108B-CS-SP/ 680-85585-18	Arsenic	40 mg/kg	0.71 mg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
			HP0108B-CS-SP (SIEVE)/ 680-85585-51	Arsenic	43 mg/kg	0.71 mg/kg	CRSC
HP0125	1	2.48	HP0125A-CS-SP/ 680-90852-35	Arsenic	31 mg/kg	0.71 mg/kg	CRSC
			HP0125A-CS-SP/ 680-90852-35	BaP	9500 µg/kg	20 µg/kg	CRSC
			HP0125A-CS-SP (SIEVE)/ 680-90852-43	Arsenic	29 mg/kg	0.71 mg/kg	CRSC
HP0196	1	2.48	HP0196A-CS-SP (SIEVE)/ 680-85585-50	Arsenic	27 mg/kg	0.71 mg/kg	CRSC
HP0202	1	2.48	HP0202C-CS-SP (SIEVE)/ 680-89328-34	Arsenic	34 mg/kg	0.71 mg/kg	CRSC
HP0208	1	2.48	HP0208A-CS/ 680-85323-29	BaP	21000 µg/kg	20 µg/kg	CRSC
HP0260	1	2.48	HP0260B-CS/ 680-85260-34	Arsenic	34 mg/kg	0.71 mg/kg	CRSC
			HP0260B-CS (SIEVE)/ 680-85260-45	Arsenic	32 mg/kg	0.71 mg/kg	CRSC
HP0274	1	2.48	HP0274B-CS/ 680-86746-46	Arsenic	30 mg/kg	0.71 mg/kg	CRSC
			HP0274B-CS (SIEVE)/ 680-86746-50	Arsenic	28 mg/kg	0.71 mg/kg	CRSC

EPA Property ID	Number of Households	Total No. of Residents	Sample ID/ Laboratory ID	Hazardous Substance	Concentration (units)	Benchmark Concentration (units)	Benchmark
HP0283	1	2.48	HP0283A-CS-SP/ 680-89220-42	Arsenic	41 mg/kg	0.71 mg/kg	CRSC
			HP0283A-CS-SP (SIEVE)/ 680-89220-46	Arsenic	36 mg/kg	0.71 mg/kg	CRSC
HP0286	1	2.48	HP0286B-CS/ 680-85534-9	BaP	2000 µg/kg	20 µg/kg	CRSC
HP0292	1	2.48	HP0292B-CS/ 680-86640-47	Arsenic	38 mg/kg	0.71 mg/kg	CRSC
			HP0292B-CS (SIEVE)/ 680-86640-49	Arsenic	31 mg/kg	0.71 mg/kg	CRSC
Total	97	240.56					

Notes:

µg/kg - Micrograms per kilogram
A/B/C - Area identifier within each station/sample location (Ref. 4, p. 11)
BaP - Benzo(a)pyrene
CV - Collegeville area
CRSC - Cancer Risk Screening Concentration (Ref. 2, pp. BII-13, BII-14)
CS - Composite sample
D - Duplicate sample
HP - Highland Park area
mg/kg - Milligrams per kilogram
SP - Split sample
(SIEVE)- Sample sieved prior to analysis with a #10 sieve (Ref. 4, p. 11)

5.1.3.1 Resident Individual

Area Letter: A
Level of Contamination (Level I/Level II): I
As previously stated in this HRS documentation record, the samples were collected from depths of 0 to 4 inches bgs (Refs. 4, p. 9; 6, pp. 12-14; 62, p. 6). Because properties in the AOC are less than 200 feet in length and width, all residential properties where analytical results indicate arsenic, BaP, or lead contamination significantly above background level have residents living less than 200 feet from the AOC (confirmed by samples presented in Section 5.1.1 of this HRS documentation record). There are no health-based benchmarks for lead in the soil exposure pathway, therefore only those properties with arsenic or BaP above applicable benchmarks were considered for resident individual and Level I resident population evaluation, a total of 97 properties (confirmed by the table in Section 5.1.3).

Resident Individual Factor Value: 50
Ref. 1, Section 5.1.3.1, p. 51647

5.1.3.2 Resident Population

5.1.3.2.1 Level I Concentrations

Level I Resident Population Targets

All residents located on the property of and within 200 feet of a sample within the AOC documenting arsenic and/or BaP contamination at concentrations equal to or greater than the Cancer Risk Screening Concentration (CRSC) for the soil exposure pathway qualify as Level I targets. A total of 97 residential properties have samples exceeding the CRSC benchmark and are therefore considered subject to Level I concentrations. The average number of persons per household in Jefferson County is 2.48, resulting in a total of 240.56 individuals subject to Level I concentrations (97 households x 2.48 persons per household = 240.56 individuals) (Refs. 1, Section 5.1.3.2, p. 51647; 101, p. 1).

Sum of individuals subject to Level I concentrations: 240.56
Sum of individuals subject to Level I concentrations x 10: 2,405.6

Level I Concentrations Factor Value: 2,405.6
Ref. 1, Section 5.1.3.2.1, p. 51647

5.1.3.2.2 Level II Concentrations

No Level II targets are documented in this HRS documentation records as all targets scored qualify as Level I targets.

Level II Concentrations Factor Value: 0
Ref. 1, Section 5.1.3.2.2, p. 51647

5.1.3.3 Workers

Only residential properties were considered for the purposes of this HRS documentation record. Therefore, no worker target population is scored.

Total workers: 0

Workers Factor Value: 0
(Ref. 1, Table 5-4)

5.1.3.4 Resources

Description of Resource(s): Resources were not evaluated for the purposes of this HRS documentation record.

Resources Factor Value: NS

5.1.3.5 Terrestrial Sensitive Environments

No terrestrial sensitive environments were evaluated for this purpose of this HRS documentation record.

Terrestrial Sensitive Environments Factor Value: NS

5.2 NEARBY POPULATION THREAT

The nearby population threat was not evaluated for the purposes of this HRS documentation record.