Residential Sampling Report

Walter Coke, Inc.

Walter Coke, Inc.
Birmingham, Alabama

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Acronyms and Abbreviations

ADEM	Alabama Department of Environmental Management
BaP	benzo(a)pyrene
CAP	Community Advisory Panel
CIP	Community Involvement Plan
COPC	chemical of potential concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
DQE	data quality evaluation
ELCR	excess lifetime cancer risk
EI	Environmental Indicator
EPA	U.S. Environmental Protection Agency
HI	hazard index
mg/kg	milligrams per kilogram
oz	ounce
PAH	polycyclic aromatic hydrocarbon
QA/QC	quality assurance/quality control
RPD	relative percent difference
RSR	Residential Sampling Report
TEQ	toxic equivalents

SECTION 1

Project History

1.1 Introduction

This report documents the field activities and presents the results of the investigation performed in three residential neighborhoods–Collegeville, Fairmont, and Harriman Park–located near the Walter Coke Inc., Birmingham, Alabama, facility. The work was performed in accordance with the U.S. Environmental Protection Agency (EPA) approved *Residential Sampling Work Plan*, final revision (CH2M HILL, 2008), with the exception of the data evaluation. On the basis of communications with EPA following submittal of the draft *Residential Sampling Report* (RSR) in December 2009, the data evaluation was updated to compare detected concentrations to final cleanup levels established by EPA in April 2011 for benzo(a)pyrene toxic equivalents (BaP TEQ) and sieved arsenic.

As documented in communications with EPA during the planning process in 2008 and other communications since 2008, Walter Coke's agreement to conduct sampling of the residential properties is not an acknowledgement or admission that Walter Coke (formerly Sloss Industries) is responsible (solely or in part) for concentrations detected on the neighboring properties.

1.2 Site Information

The three neighborhoods (Collegeville, Fairmont, and Harriman Park) are located in north Birmingham, Jefferson County, Alabama (Figure 1-1). The neighborhoods, which were constructed after 1957, are in an area that has a long history of heavy multiple industrial use, as well as open pit mining. Likewise, the City of Birmingham is known for its industrial history, as documented in the Birmingham Public Library Department of Archives and Manuscripts; the archives can be accessed at http://www.birminghamarchives.org/IndustrialHistory1.htm.

1.3 Purpose and Scope

The overall purpose of this project was to voluntarily assist EPA with its gathering of data and its evaluation of concentrations of the following chemicals of potential concern (COPCs) in surface soils in the three residential neighborhoods of interest:

- Arsenic
- Benzo(a)anthracene
- Benzo(a)pyrene (BaP)
- Benzo(b)fluoranthene
- Dibenzo(a,h)anthracene
- Benzo(k)fluoranthene
- Chrysene
- Indeno(1,2,3-cd)pyrene

Specifically, EPA requested that Walter Coke investigate whether concentrations of the COPCs in surface soils exceeded the EPA-determined cleanup levels at four general types of properties:

1. On certain properties sampled during the Environmental Indicator (EI) evaluation (April 2005)
2. At residential yards immediately adjacent to the properties sampled during the EI evaluation at which rapid screening data exceeded the preliminary chemical-specific action levels identified by EPA in 2008
3. At additional properties (not sampled during the EI evaluation) but within, and representative of, the neighborhoods
4. On school grounds in the three neighborhoods

Seventy-five properties including residences, school properties, Harriman Park, and playgrounds were sampled. The rationale for property selection is described in detail in the *Residential Sampling Work Plan* (CH2M HILL, 2008). Twenty-seven of the 75 locations represent those properties previously sampled during the EI evaluation. Eight of the locations were added in the field at EPA's request, subsequent to EPA's approval of the *Residential Sampling Work Plan,* and therefore, are in addition to the properties identified in the approved work plan. Figures 1-2 through 1-4 show the sampled properties in the Collegeville, Harriman Park, and Fairmont neighborhoods, respectively.

1.4 Community Involvement

Walter Coke has been involved with the neighboring communities throughout its history. Both before and during the residential sampling effort, Walter Coke continued its community outreach, as outlined in the Community Involvement Plan (CIP), which originally was prepared as part of the *Residential Sampling Work Plan*. The CIP is being updated to reflect current activities.

Prior to the 2009 sampling event, Walter Coke coordinated with EPA, the Alabama Department of Environmental Management (ADEM), and the Jefferson County Health Department to conduct an open house for neighborhood residents and other stakeholders. On June 26, 2009, a community picnic and barbeque sponsored by Walter Coke was held at Harriman Park. Representatives from EPA, ADEM, Jefferson County Health Department, and Walter Coke all were available to provide information about the residential sampling plan and to answer questions posed by the residents.

As part of the community involvement effort, Walter Coke established an Information Repository at the North Birmingham Public Library, 2501 31st Ave. North, Birmingham, Alabama 35207. Walter Coke continues to maintain and update the Repository as needed to keep the public informed about the residential sampling.

A recent community involvement activity was the establishment of the North Birmingham Community Advisory Panel (CAP), which serves as a liaison among EPA, Walter Coke, and the surrounding communities of Collegeville, Fairmont, and Harriman Park. The CAP communicates information about the environmental findings and any related cleanup to members and representatives of these communities, and provides candid feedback about

community perceptions and concerns to Walter Coke. Because the CAP functions as a "third party," independent of both EPA and Walter Coke, and because the CAP includes known opinion leaders, the CAP should have significant credibility with the community and can be an effective conduit of information once the group members are comfortable with the work being done.

SECTION 2

Field Activities

This section summarizes the field activities associated with the residential surface soil sampling performed in the three neighborhoods of interest. The sampling results are summarized in Section 3 of this report.

From July 13 through July 28, 2009, surface soil samples were collected from 75 properties within the 3 neighborhoods. The procedures for sample collection, preparation, chain-of-custody documentation, and shipping of the samples generally adhered to the *Field Branches Quality System and Technical Procedures* (EPA Region 4, November 2007). Sampling for arsenic was conducted using the *Superfund Lead-Contaminated Residential Sites Handbook* (EPA, 2003). Field sampling procedures included following the site-specific Health and Safety Plan, collecting survey information from property owners and/or residents, and collecting surface soil samples from sizeable yards at properties where written approval for access had been obtained.

2.1 Property Review

Access agreements were obtained by Walter Coke before and during the residential sampling field event. When an access agreement could not be obtained from a target property identified in the approved work plan, the location was moved to a close neighbor who would provide access.

When the field team arrived at a property, each yard was evaluated as a separate potential exposure area. The yards were measured and subsequently sampled if they were a minimum of 10 feet in width. For larger properties, such as school yards or ball fields, the property was measured and divided into subareas of a minimum of ¼ and up to ½ acre, depending on the similar use and similar visual appearance of the property; composite samples were collected from each subarea. Appendix A provides field forms, which provide a rough sketch of the property and the samples collected. Note that the property addresses have been removed from the copies in Appendix A for privacy reasons.

When a resident was home, a survey was performed to evaluate whether children live at or visit the residence, if the residents plant vegetable gardens, and if the residents engage in other outdoor activities that might affect sampling location or results. When the resident was not at home during sampling, the field team completed the surveys based on observations made in the field. Appendix A also contains the resident surveys.

2.2 Sampling Procedures

The approved work plan specified the collection of samples from each individual (sizeable) yard and, where appropriate, from each vegetable garden, active children's play area, and roof drip line (or downspout) at the target properties. Each sample type is discussed in the following text.

2.2.1 Individual Yards

A five-point composite soil sample was collected from each sizeable yard or subarea of larger yards (for example, school ground) using a five-on-dice composite pattern (Figure 2-1). To collect the discrete sub-sample points, five sample locations were selected, taking into consideration the locations of the houses within the property boundary, physical barriers, presence of potentially pressure-treated lumber, roof drip lines, and other variables. The grass (if present) was lifted at each sub-sample location and a surface soil sample was collected from the 0- to 6-inch-depth interval using a stainless-steel scoop. Sufficient soil was collected to fill two 4-ounce (oz) glass jars plus a portion of the composite sample. The soil was placed into a dedicated stainless-steel bowl and thoroughly mixed. After the sub-sample jars were filled, one scoop from each sub-sample bowl was placed into a new stainless-steel bowl for the composite sample and the soils were mixed. The composite sample jars were then filled from the composited soil. Excess soil was returned to one or more of the sub-sample holes, which were filled with additional top soil as needed. The grass was replaced on top of the sample location.

2.2.2 Vegetable Garden and Active Children's Play Areas

When a vegetable garden or active play area was identified at a property, a grab sample was collected from the 0- to 12-inch-depth interval using a hand auger. The soil was mixed in a stainless-steel bowl and used to fill the sample jars. Two 4-oz glass jars were filled for each sample collected. Excess soil was used to refill the holes, which also were filled with top soil as needed.

2.2.3 Roof Drip Line Samples

At properties that exceeded the preliminary chemical-specific action levels during the EI sampling, an additional composite soil sample was collected from each roof drip line (or downspout, when present) from the 0- to 6-inch-depth interval. Soil from each drip line or downspout was mixed in a stainless-steel bowl and used to fill the sample jars. Two 4-oz glass jars were filled for each sample collected. Excess soil was used to refill one or more of the sample locations, which also were filled with top soil as needed.

2.2.4 Sample Summary

Table 2-1 lists, by property, the number of native samples collected by individual yard, garden and/or play area (when present) and drip line at each property.

In addition, quality assurance/quality control (QA/QC) samples were collected and/or analyzed in accordance with the approved work plan, including the following:

- Equipment rinsate blanks
- Field blanks or ambient blanks
- Laboratory method blanks
- Field duplicate samples
- Matrix spike/matrix spike duplicate samples

The QA/QC samples collected at each property are identified in Table B-3, Appendix B.

2.3 Sample Location Survey and Photo Documentation

Before leaving each property, each discrete sub-sample location or grab sample location was surveyed using a Trimble Pro XRT global positioning system unit. The surveyed locations were imported into a geographic information system to develop report figures. In addition, each yard was photographed (Appendix C).

2.4 Sample Handling and Analysis

After samples were collected, they were stored either in a refrigerator or iced cooler and shipped daily to Test America Laboratories, Mobile, Alabama, for sample analyses. Each composite, garden, play area, or drip line sample was analyzed for arsenic (total) and sieved arsenic by EPA SW-846 Method 6010B, and for seven carcinogenic polycyclic aromatic hydrocarbons (cPAHs) using a low-level PAH method (EPA SW-846 Method 8270C).

SECTION 3

Data Evaluation

This section presents the approach used to evaluate the concentrations detected during the offsite sampling event conducted in July 2009 in the three neighborhoods. The composite sample data from each yard and grab sample data from drip lines, gardens, and play areas were evaluated. The results of the evaluation are provided in this section.

3.1 Data Validation

A data quality evaluation (DQE), provided in Appendix B, was performed to assess the effect of the overall analytical process on the usability of the data. To complete the evaluation, hard-copy data packages were reviewed by the project chemist using the process outlined in the EPA guidance documents, *National Functional Guidelines for Organic Data Review* (October 1999), and the *National Functional Guidelines for Inorganic Data Review* (July 2004). A data review worksheet was completed for each of the data packages and any non-conformance was documented. The DQE concluded that the overall project objectives were met and the data can be used in the project decision-making process.

The validated analytical data (including individual cPAH concentrations) for the samples collected are presented in the DQE (Table B-2, Appendix B).

As part of the DQE, QA/QC field duplicate samples were reviewed to evaluate their appropriate use during data evaluation. Specifically, if the relative percent difference (RPD) between the duplicate and native sample result was 35 percent or greater (see Appendix B for a complete discussion), the higher of the two concentrations (native or duplicate sample) was used to represent the sample concentration. If the RPD was less than 35 percent, the field duplicate samples served as QA/QC only.

3.2 Comparison to Final Cleanup Levels

The approved work plan, which was prepared in cooperation with EPA in 2008, specified that data would be evaluated to assess whether the EPA Region 4 cumulative property action level ($1x10^{-4}$ excess lifetime cancer risk [ELCR] and non-cancer hazard index [HI] of 1) for arsenic and cPAHs was exceeded in surface soil at residential properties in the three neighborhoods of interest. Subsequent to EPA's approval of the work plan and concurrent with EPA's review of the draft RSR, EPA was in the process of establishing the final cleanup levels for the site. On April 13, 2011, Walter Coke was notified of EPA's calculation of the final soil cleanup levels, set at 37 milligrams per kilograms (mg/kg) for inorganic arsenic (in sieved soil) based on a HI of 1 and a default bioavailability of 60 percent and 1.5 mg/kg for BaP TEQ based on an ELCR of $1x10^{-4}$. Therefore, in lieu of the cumulative property risk specified by the work plan, comparisons using the final cleanup levels are presented in this section, as follows:

- The cPAH data were evaluated as BaP TEQ. Table 3-1 provides the toxicity equivalence factors used to calculate the BaP TEQ for each sample.

- The sieved arsenic samples were collected through a 250-micron mesh sieve. The sieved (rather than total) arsenic soil data are preferred for risk assessment purposes because that fraction of the soil is more likely to adhere to the hands (dermal and ingestion pathway) and to become airborne (inhalation pathway). Because the final cleanup level for arsenic was established based on sieved arsenic, the total arsenic concentrations are not discussed further, but are included in Appendix B.

Table 3-2 presents the sieved arsenic concentrations and calculated BaP TEQs for soil samples (composite and grab) from each property.

Table 3-3 summarizes the properties that exceeded the final cleanup levels based on sieved arsenic concentrations and calculated BaP TEQ concentrations. The results are grouped by neighborhood to aid in the evaluation of data. In addition, the number of samples at a property that exceeded the final cleanup levels in relation to the total number of samples collected at the property is presented for perspective.

Figure 3-1 (Collegeville), Figure 3-2 (Harriman Park), and Figure 3-3 (Fairmont) are aerial photographs depicting the sample locations and the associated results that exceeded the final cleanup levels within each neighborhood based on sieved arsenic data and unsieved BaP TEQ concentrations. The distributions of the results in these figures show no spatial pattern across each neighborhood, and the results themselves vary from property to property.

3.3 Field Observations

Some portion of the arsenic and BaP TEQ concentrations likely can be attributed to current and historical residential activity. Several field observations were made where residential activities appear to have affected soil concentrations. Example observations that were noted both on the field forms (Appendix A) and from photographs (Appendix C) include the following:

- Cars parked in yards and cars being worked on in yards
- Backyard grills, including historical brick stationary grills and modern charcoal grills
- Yards with residential trash such as charcoal and cigarette ash, paint cans, car parts, etc.
- Pieces of asphalt roofing shingles or roofing tar in yards; in particular, roofing tar was noted dripping along the entire perimeter of Riggins School. This observation correlated with the highest concentrations noted around the school building.

In addition to documented observations, conversations with residents provided insight as to possible historical activities that might have affected soils in the area. In particular, residents recalled collecting coal dropped along the railroad track that runs along the eastern boundary of the neighborhood. The coal was stored in yards or houses and used as fuel to heat the residences.

SECTION 4

Works Cited

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Tables

TABLE 2-1
Samples Collected Per Property

Collegeville

Sample Location	Number of Yards	Garden	Play Area	Dripline
OSS-01	1			
OSS-02	3			
OSS-03	3			1
OSS-04[A]	4		2	
OSS-05	2			
OSS-06	2			
OSS-07	2			
OSS-08	4			
OSS-09	2	1		1
OSS-10[A]	7		1	
OSS-11	3			
OSS-12	2			
OSS-13	2			1
OSS-14	1			
OSS-15	1			
OSS-16	2		1	
OSS-17	3			
OSS-18	2	1		
OSS-19	2			
OSS-20	2			
OSS-21	2			
OSS-22	2			
OSS-23	1			
OSS-24	4	2		
OSS-25	3			
OSS-26	2			
OSS-27	2			
OSS-28	2			
OSS-29	3	1		
OSS-30	2			
OSS-31	2			
OSS-32[A]	13			
OSS-33	3			
OSS-34	3			
OSS-35	3			
OSS-36	3			
OSS-37	3			
OSS-38	1			
OSS-39	1			
OSS-40	2			
OSS-41	4	1		
TOTAL:	***111***	***6***	***4***	***3***

Harriman Park

Sample Location	Number of Yards	Garden	Play Area	Dripline
OSE-01	3			
OSE-02	2	2		
OSE-03	2			1
OSE-04	2			
OSE-05	3			
OSE-06	3			
OSE-07	2		1	
OSE-08	3			
OSE-09	3	1		
OSE-10	2			
OSE-11	1			
OSE-12[B]	6			
OSE-13	3			
OSE-14	3			
OSE-15	1			
OSE-16	3			
OSE-17	2			
OSE-18	3	2		
OSE-19	2			
OSE-20	1			
OSES-1[B]	1			
OSES-2[B]	1			
OSES-3[B]	1			
TOTAL:	***53***	***5***	***1***	***1***

Fairmont

Sample Location	Number of Yards	Garden	Play Area	Dripline
OSW-8[A]	12			4
OSW-13	2			
OSW-14	3			
OSW-15	3			
OSW-16	3			
OSW-17	5			
TOTAL:	***28***	***0***	***0***	***4***

Additional Collegeville Properties (Selected by EPA)

Sample Location	Number of Yards	Garden	Play Area	Dripline
EPA-01	2	1		
EPA-02	2	1		
EPA-03	3			
EPA-04	2	1		
EPA-05	1			
EPA-06	1			
EPA-07	2			
EPA-08	3			
TOTAL:	***16***	***3***	***0***	***0***

Notes:
A blank cell indicates a sample was not collected.
[A] = Indicates the property is an active or former school.
[B] = Sample collected within the neighborhood park, known as Harriman Park

TABLE 3-1
Toxicity Equivalence Factors Used to Calculate BaP Toxic Equivalents per Sample

Carcinogenic PAH	Toxicity Equivalence Factor
Benzo[a]pyrene	1.0
Benzo[a]anthracene	0.1
Benzo[b]fluoranthene	0.1
Benzo[k]fluoranthene	0.01
Chrysene	0.001
Dibenz(a,h)anthracene	1.0
Indeno[1,2,3-cd]pyrene	0.1

Notes:
BaP = Benzo(a)pyrene
PAH = Polycyclic aromatic hydrocarbon

TABLE 3-2
Summary of Detected Concentrations of Sieved Arsenic and Calculated BaP TEQ

Station ID	Property ID	Sample Yard/Location	Sieved Arsenic (mg/kg)	BaP TEQ (mg/kg)
Collegeville				
OSS1-B-C	OSS-1	Back Yard	8.5	0.15
OSS2-B-C	OSS-2	Back Yard	20	0.15
OSS2-F-C		Front Yard	22	0.20
OSS2-L-C		Left Yard	15	0.12
OSS3-D	OSS-3	Dripline	15	1.5
OSS3-B-C		Back Yard	9.4	0.13
OSS3-F-C		**Front Yard**	24	**4.8**
OSS3-L-C		**Left Yard**	12	**3.5**
OSS4-B-C	OSS-4[A]	Back Yard	17	0.34
OSS4-F-C		Front Yard	12	0.69
OSS4-L-C		Left Yard	17	0.54
OSS4-P1-C		Play Area 1	8	0.19
OSS4-P2-C		Play Area 2	16	0.47
OSS4-R-C		Right Yard	12	0.86
OSS5-B-C	OSS-5	Back Yard	7.7	0.14
OSS5-F-C		Front Yard	18	0.44
OSS6-B-C	OSS-6	Back Yard	9.7	0.45
OSS6-F-C		Front Yard	13	0.52
OSS7-B-C	OSS-7	Back Yard	12	0.14
OSS7-F-C		Front Yard	14	0.45
OSS8-B-C	OSS-8	Back Yard	11	0.33
OSS8-F-C		Front Yard	11	0.46
OSS8-L-C		Left Yard	18	0.42
OSS8-R-C		Right Yard	16	0.9
OSS9-B-C	OSS-9	**Back Yard**	18	**8.2**
OSS9-D		**Dripline**	16	**2.3**
OSS9-F-C		Front Yard	19	1.0
OSS9-G		**Garden**	**40**	**3.0**
OSS10-BA-C	OSS-10[B]	Sub: BA	17	0.81
OSS10-BB-C		Sub: BB	18	0.63
OSS10-BC-C		Sub: BC	7.4	0.65
OSS10-BD-C		Sub: BD	8.3	0.93
OSS10-F-C		**Front Yard**	15	**39**
OSS10-L-C		**Left Yard**	14	**29**
OSS10-P-C		**Play Area - Composite**	30	**2.6**
OSS10-P-G		**Play Area - Grab**	**38**	**7.3**
OSS11-B-C	OSS-11	Back Yard	11	0.2
OSS11-F-C		**Front Yard**	13	**12**
OSS11-R-C		Right Yard	13	0.47
OSS12-B-C	OSS-12	Back Yard	11	0.89
OSS12-F-C		Front Yard	15	0.29
OSS13-B-C	OSS-13	Back Yard	30	1.2
OSS13-D		Dripline	30	0.44
OSS13-F-C		**Front Yard**	**38**	1.4
OSS14-F-C	OSS-14	Front Yard	20	0.38
OSS15-C	OSS-15	**Right of Way**	29	**1.7**
OSS16-B-C	OSS-16	Back Yard	13	0.35
OSS16-F-C		Front Yard	22	0.54
OSS16-P		Play Area	13	0.72
OSS17-B-C	OSS-17	Back Yard	17	0.63
OSS17-F-C		**Front Yard**	**38**	0.97
OSS17-L-C		Left Yard	29	0.84
OSS18-B-C	OSS-18	Back Yard	18	0.27
OSS18-F-C		Front Yard	24	0.49
OSS18-G		Garden	20	0.31

TABLE 3-2
Summary of Detected Concentrations of Sieved Arsenic and Calculated BaP TEQ

Station ID	Property ID	Sample Yard/Location	Sieved Arsenic (mg/kg)	BaP TEQ (mg/kg)
Collegeville (cont'd)				
OSS19-B-C	OSS-19	Back Yard	21	0.42
OSS19-F-C		**Front Yard**	15	**1.7**
OSS20-F-C	OSS-20	Front Yard	15	0.25
OSS20-R-C		Right Yard	18	0.32
OSS21-B-C	OSS-21	**Back Yard**	12	**7.9**
OSS21-F-C		**Front Yard**	11	**5.9**
OSS22-B-C	OSS-22	Back Yard	11	0.13
OSS22-F-C		Front Yard	10	0.55
OSS23-F-C	OSS-23	Front Yard	19	0.14
OSS24-B-C	OSS-24	**Back Yard**	13	**2.3**
OSS24-F-C		Front Yard	14	0.34
OSS24-G1		Garden 1	11	1.0
OSS24-G2		Garden 2	26	0.84
OSS24-L-C		Left Yard	15	0.96
OSS24-R-C		Right Yard	21	0.75
OSS25-B-C	OSS-25	Back Yard	14	0.24
OSS25-F-C		Front Yard	18	0.77
OSS25-R-C		Right Yard	18	0.29
OSS26-B-C	OSS-26	Back Yard	12	0.16
OSS26-F-C		Front Yard	19	0.29
OSS27-B-C	OSS-27	**Back Yard**	14	**3.4**
OSS27-F-C		Front Yard	12	0.89
OSS28-B-C	OSS-28	Back Yard	6.9	0.38
OSS28-F-C		Front Yard	9	0.11
OSS29-B-C	OSS-29	**Back Yard**	13	**3.5**
OSS29-F-C		Front Yard	14	0.43
OSS29-G		Garden	8.2	0.24
OSS29-R-C		**Right Yard**	16	**4.1**
OSS30-B-C	OSS-30	**Back Yard**	14	**3.3**
OSS30-F-C		**Front Yard**	16	**11**
OSS31-B-C	OSS-31	Back Yard	11	1.1
OSS31-F-C		**Front Yard**	15	**6.0**
OSS32-BA-C	OSS-32[C]	Sub: BA	5.6	0.075
OSS32-BB-C		**Sub: BB**	15	**1.9**
OSS32-BC-C		**Sub: BC**	15	**2.9**
OSS32-BD-C		**Sub: BD**	20	**1.7**
OSS32-BE-C		Sub: BE	6	0.055
OSS32-BF-C		Sub: BF	16	1.0
OSS32-BG-C		Sub: BG	36	0.27
OSS32-BH-C		**Sub: BH**	**46**	0.22
OSS32-BI-C		Sub: BI	12	0.61
OSS32-BJ-C		Sub: BJ	29	1.1
OSS32-BK-C		**Sub: BK**	18	**2.6**
OSS32-BL-C		**Sub: BL**	14	**2.0**
OSS32-F-C		**Front Yard**	14	**7.0**
OSS33-B-C	OSS-33	**Back Yard**	10	**14**
OSS33-F-C		Front Yard	13	1.0
OSS33-L-C		**Left Yard**	14	**16**
OSS34-B-C	OSS-34	Back Yard	12	1.0
OSS34-F-C		**Front Yard**	11	**2.4**
OSS34-R-C		Right Yard	10	0.21
OSS35-B-C	OSS-35	Back Yard	19	0.36
OSS35-F-C		**Front Yard**	18	**2.6**
OSS35-R-C		Right Yard	17	0.45

TABLE 3-2
Summary of Detected Concentrations of Sieved Arsenic and Calculated BaP TEQ

Station ID	Property ID	Sample Yard/Location	Sieved Arsenic (mg/kg)	BaP TEQ (mg/kg)
Collegeville (cont'd)				
OSS36-F-C	OSS-36	**Front Yard**	10	**2.0**
OSS36-L-C		Left Yard	8.6	0.34
OSS36-R-C		Right Yard	10	0.43
OSS37-B-C	OSS-37	Back Yard	8.7	0.94
OSS37-F-C		Front Yard	13	0.55
OSS37-L-C		Left Yard	10	0.93
OSS38-F-C	OSS-38	Front Yard	20	0.36
OSS39-F-C	OSS-39	Front Yard	16	0.21
OSS40-B-C	OSS-40	Back Yard	10	0.22
OSS40-F-C		Front Yard	15	0.17
OSS41-B-C	OSS-41	Back Yard	19	0.26
OSS41-F-C		Front Yard	23	0.69
OSS41-G		Garden	18	1.1
OSS41-L-C		Left Yard	21	0.36
OSS41-R-C		Right Yard	21	1.2
EPA1-B-C	EPA-1	Back Yard	10	0.45
EPA1-F-C		**Front Yard**	9.9	**15**
EPA1-G		Garden	7.4	0.17
EPA2-B-C	EPA-2	Back Yard	13	0.32
EPA2-F-C		Front Yard	14	0.33
EPA2-G		**Garden**	6.4	**13**
EPA3-B-C	EPA-3	**Back Yard**	18	**15**
EPA3-F-C		Front Yard	12	0.49
EPA3-L-C		Left Yard	18	0.66
EPA4-B-C	EPA-4	Back Yard	3.7	0.23
EPA4-F-C		Front Yard	22	0.22
EPA4-G		Garden	7.1	0.11
EPA5-L-C	EPA-5	Left Yard	16	0.41
EPA6-B-C	EPA-6	Back Yard	26	0.78
EPA7-B-C	EPA-7	Back Yard	11	0.22
EPA7-F-C		Front Yard	16	0.64
EPA8-B-C	EPA-8	Back Yard	23	1.1
EPA8-F-C		Front Yard	20	1.3
EPA8-R-C		Right Yard	13	0.53
Harriman Park				
OSE1-B-C	OSE-1	Back Yard	12	0.49
OSE1-F-C		**Front Yard**	22	**8.5**
OSE1-L-C		Left Yard	7.6	0.66
OSE2-B-C	OSE-2	Back Yard	20	0.97
OSE2-F-C		Front Yard	12	0.56
OSE2-G1		Garden 1	11	0.27
OSE2-G2		Garden 2	13	0.15
OSE3-B-C	OSE-3	Back Yard	15	0.79
OSE3-D		**Dripline**	20	**3.9**
OSE3-F-C		Front Yard	16	0.42
OSE4-B-C	OSE-4	Back Yard	15	0.25
OSE4-F-C		Front Yard	24	1.1
OSE5-B-C	OSE-5	Back Yard	13	0.27
OSE5-F-C		Front Yard	9.7	0.18
OSE5-L-C		Left Yard	15	0.24
OSE6-B-C	OSE-6	**Back Yard**	19	**3.4**
OSE6-L-C		**Left Yard**	13	**8.5**
OSE6-R-C		Right Yard	8.8	0.39
OSE7-F-C	OSE-7	Front Yard	15	1.1
OSE7-P		Play Area	21	0.2
OSE7-R-C		Right Yard	9.8	0.26
OSE8-B-C	OSE-8	Back Yard	13	0.17
OSE8-F-C		Front Yard	20	0.22

TABLE 3-2
Summary of Detected Concentrations of Sieved Arsenic and Calculated BaP TEQ

Station ID	Property ID	Sample Yard/Location	Sieved Arsenic (mg/kg)	BaP TEQ (mg/kg)
Harriman Park (cont'd)				
OSE8-L-C	OSE-8	Left Yard	16	0.22
OSE9-B-C	OSE-9	Back Yard	18	0.42
OSE9-F-C		Front Yard	15	0.25
OSE9-G		**Garden**	14	**1.6**
OSE9-L-C		Left Yard	17	0.52
OSE10-B-C	OSE-10	Back Yard	8.9	0.64
OSE10-F-C		Front Yard	9	0.28
OSE11-F-C	OSE-11	Front Yard	22	1.1
OSE12-AA-C	OSE-12	Sub: AA	19	0.16
OSE12-BB-C		Sub: BB	21	0.32
OSE12-CC-C		Sub: CC	17	0.16
OSE12-DD-C		Sub: DD	20	0.12
OSE12-EE-C		Sub: EE	16	0.2
OSE12-FF-C		Sub: FF	16	0.13
OSE13-B-C	OSE-13	Back Yard	13	0.16
OSE13-F-C		Front Yard	20	0.41
OSE13-R-C		Right Yard	12	0.24
OSE14-B-C	OSE-14	Back Yard	13	0.13
OSE14-F-C		Front Yard	16	0.25
OSE14-R-C		Right Yard	21	0.16
OSE15-F-C	OSE-15	Front Yard	18	0.16
OSE16-B-C	OSE-16	Back Yard	8.9	1.5
OSE16-F-C		Front Yard	10	1.5
OSE16-L-C		Left Yard	10	0.56
OSE17-B-C	OSE-17	Back Yard	13	0.51
OSE17-F-C		Front Yard	13	0.34
OSE18-B-C	OSE-18	Back Yard	15	0.13
OSE18-F-C		Front Yard	19	0.29
OSE18-G1		Garden 1	21	0.11
OSE18-G2		Garden 2	17	0.11
OSE18-R-C		Right Yard	14	0.36
OSE19-B-C	OSE-19	Back Yard	16	1.0
OSE19-F-C		Front Yard	17	0.43
OSE20-C	OSE-20	Empty lot	27	0.36
OSES1-C	OSES-1	Sub: OSE-12	18	0.38
OSES2-C	OSES-2	Sub: OSE-12	17	0.57
OSES3-C	OSES-3	Sub: OSE-12	21	0.32
Fairmont				
OSW8-B1-C	OSW-8[D]	**Sub: B1**	8.8	**11**
OSW8-B2-C		**Sub: B2**	8.5	**13**
OSW8-D-1		**Dripline 1**	8.5	**460**
OSW8-D-2		**Dripline 2**	20	**980**
OSW8-D-3		**Dripline 3**	13	**710**
OSW8-D-4		**Dripline 4**	8.7	**650**
OSW8-F-C		**Front Yard**	9.5	**10**
OSW8-P1-C		**Sub: P1**	8.9	**3.5**
OSW8-P2-C		Sub: P2	9.4	0.94
OSW8-P3-C		Sub: P3	12	0.12
OSW8-P4-C		Sub: P4	9.6	0.24
OSW8-P5-C		Sub: P5	7.3	0.096
OSW8-P6-C		**Sub: P6**	8.1	**1.7**
OSW8-P7-C		Sub: P7	4.9	0.097
OSW8-P8-C		Sub: P8	8.4	0.13

TABLE 3-2
Summary of Detected Concentrations of Sieved Arsenic and Calculated BaP TEQ

Station ID	Property ID	Sample Yard/Location	Sieved Arsenic (mg/kg)	BaP TEQ (mg/kg)
Fairmont (cont'd)				
OSW8-P9-C	OSW-8[D]	Sub: P9	7.9	0.13
OSW13-P1-C	OSW-13	Play Area 1	8.5	0.17
OSW13-P2-C		Play Area 2	11	0.15
OSW14-P1-C	OSW-14	Play Area 1	7.5	0.18
OSW14-P2-C		Play Area 2	8.4	0.14
OSW14-P3-C		Play Area 3	6.1	0.19
OSW15-B-C	OSW-15	Back Yard	9	0.21
OSW15-F-C		Front Yard	8.7	0.23
OSW15-L-C		Left Yard	8.7	0.55
OSW16-B-C	OSW-16	Back Yard	6.5	0.4
OSW16-F-C		Front Yard	9.4	0.52
OSW16-L-C		Left Yard	7.6	0.19
OSW17-B-C	OSW-17	Back Yard	13	0.6
OSW17-F1-C		Sub: Front Yard 1	20	0.2
OSW17-F2-C		Sub: Front Yard 2	12	0.17
OSW17-L-C[E]		**Left Yard**	22	**2.3**
OSW17-R-C		Right Yard	14	0.45

Notes:

[A] - OSS-4 represents the Callaway Elementary School

[B] - OSS-10 represents the Hudson School (under constuction at time of sampling)

[C] - OSS-32 represents the closed Carver High School

[D] - OSW-8 represents the Riggins School. High concentrations noted where roofing tar dripped to the ground surface.

[E] - The exceedance concentration was only reported in the duplicate sample. The native sample reported 0.4 ppm.

mg/kg = milligrams per kilogram

Sub: = 1/4 to 1/2 acre subdivision of a larger yard.

BaP TEQ = Benzo(a)pyrene Toxic equivalents

All samples collected from 0- to 6-inches in depth except gardens, play areas, and play area grab samples (0- to 12-inches in depth).

Bold text indicates the sample exceeded a cleanup level - 37 ppm for sieved arsenic or 1.5 ppm BaP TEQ.

TABLE 3-3
Summary of Properties Where One or More Samples Exceeded Final Cleanup Levels

Collegeville		
Exceedance Property	**No. of Samples Collected**	**No. of Samples Exceeded***
OSS-3	4	3
OSS-9	4	3
OSS-10[A]	8	4
OSS-11	3	1
OSS-13	3	1
OSS-15	1	1
OSS-17	3	1
OSS-19	2	1
OSS-21	2	2
OSS-24	6	2
OSS-27	2	1
OSS-29	4	2
OSS-30	2	2
OSS-31	2	1
OSS-32[B]	13	7
OSS-33	3	2
OSS-34	3	1
OSS-35	3	1
OSS-36	3	1

Additional Collegeville Properties (Selected by EPA)		
EPA-1	3	1
EPA-2	3	1
EPA-3	3	1

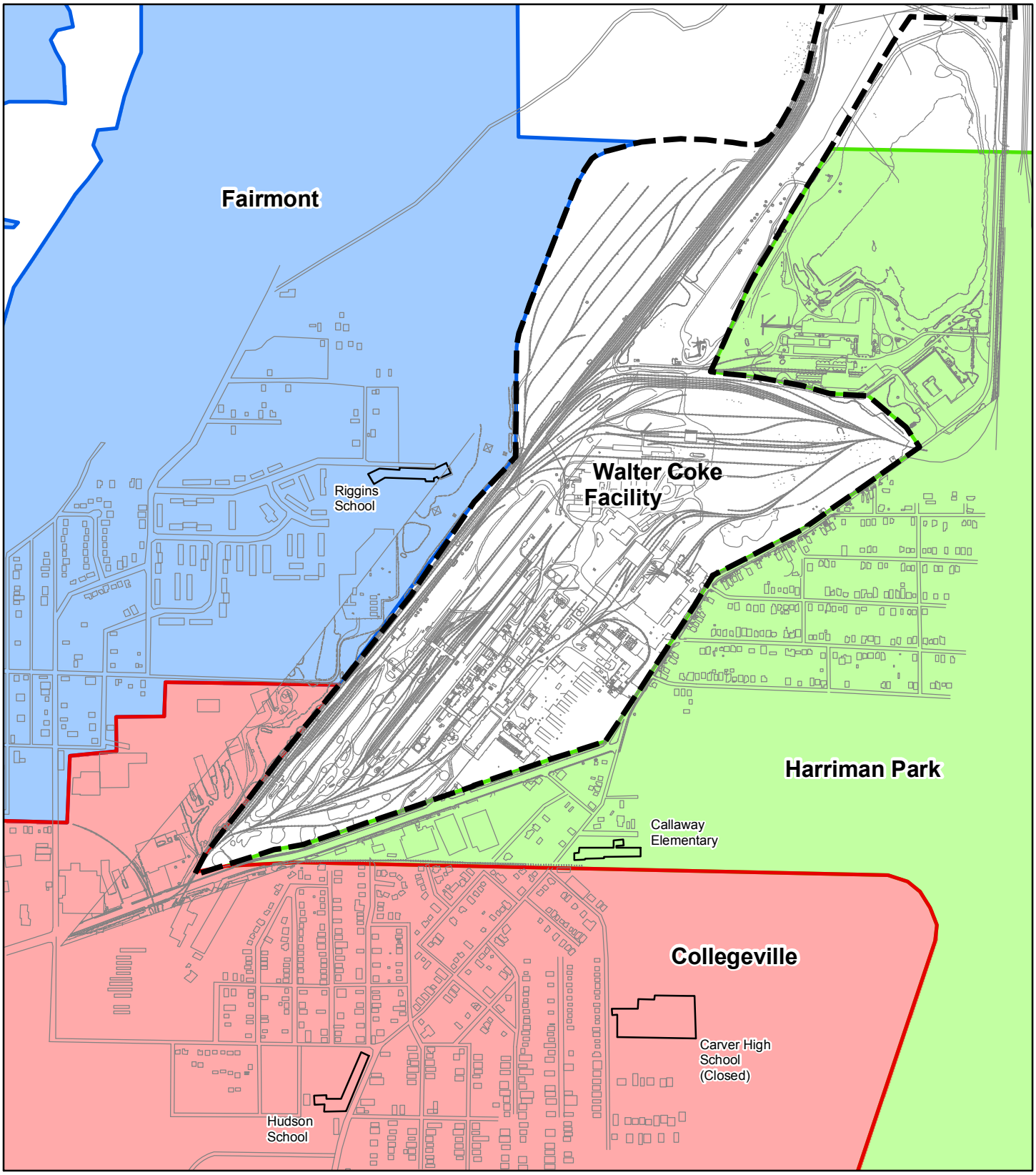
Harriman Park		
Exceedance Property	**No. of Samples Collected**	**No. of Samples Exceeded***
OSE-1	3	1
OSE-3	3	1
OSE-6	3	2
OSE-9	3	1
OSE-16	3	1
OSE-18	5	2

Fairmont		
Exceedance Property	**No. of Samples Collected**	**No. of Samples Exceeded***
OSW-8[C]	16	9
OSW-17[D]	5	1

Summary by Neighborhood						
	Total # of Properties	**# Exceeded**	**Percent Exceeded**	**Total # of Samples**	**# Exceeded**	**Percent Exceeded**
Collegeville	49	22	45%	143	40	28%
Harriman Park	20	6	30%	60	8	13%
Fairmont	6	2	33%	32	10	31%

Notes:
Based on sieved arsenic and unsieved cPAH samples.
The number of samples collected does not include quality assurance/quality control samples.
* See Table 3-2 for the samples that exceeded (indicated in bold).
[A] - OSS-10 represents the Hudson School (under constuction at time of sampling)
[B] - OSS-32 represents the former Carver High School (fenced)
[C] - OSW-8 represents the Riggins School. High concentrations noted where roofing tar dripped to the ground surface.
[D] - The exceedance concentration was only reported in the duplicate sample. The native sample reported 0.4 parts per million.

Figures



Legend

- Walter Coke Facility Boundary

Neighborhood

- Collegeville
- Harriman Park
- Fairmont

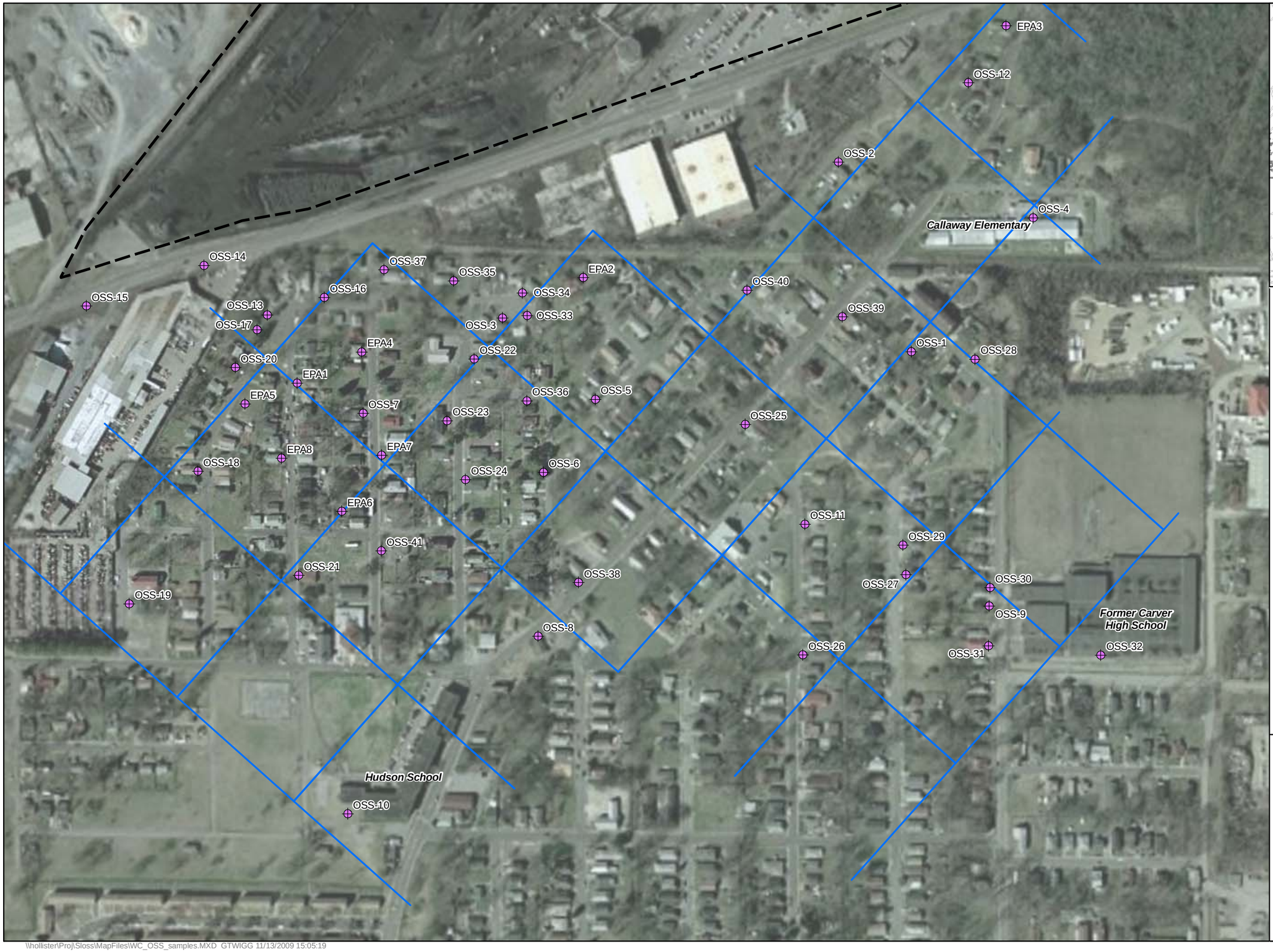
N

0 500 1,000 2,000 Feet

FIGURE 1-1
Walter Coke Facility and Surrounding Neighborhoods
Residential Sampling Report
Walter Coke Inc.
Birmingham, Alabama

CH2MHILL

\\HOLLISTER\PROJ\SLOSS\MAPFILES\NEIGHBORHOOD_MAP_COMMUNITY.MXD NEIGHBORHOOD_MAP_COMMUNITY.MXD FLONDON 11/10/2009 11:00:10



LEGEND

- Property Sampled
- Walter Coke Property Boundary

N

0 150 300 600 Feet

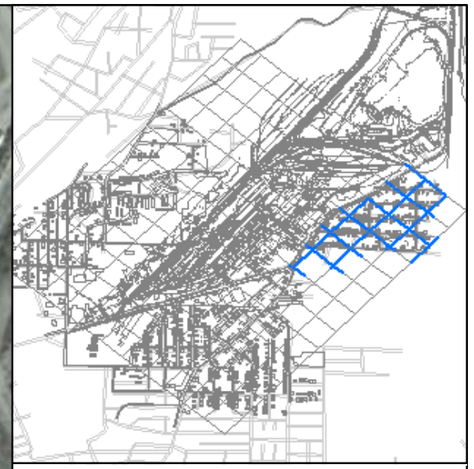
1 inch = 300 feet

FIGURE 1-2
Collegeville Properties

Walter Coke Inc.
Birmingham, Alabama

CH2MHILL

\\hollister\Proj\Sloss\MapFiles\WC_OSS_samples.MXD GTWIGG 11/13/2009 15:05:19



LEGEND

- Property Sampled
- Site Boundary

N

0 150 300 600 Feet

1 inch = 300 feet

FIGURE 1-3
Harriman Park Properties

Walter Coke Inc.
Birmingham, Alabama

CH2MHILL

\\hollister\Proj\Sloss\MapFiles\WC_OSE_samples.MXD GTWIGG 11/13/2009 15:05:19

LEGEND

- Property Sampled
- Walter Coke Property Boundary

N

0 150 300 600 Feet

1 inch = 300 feet

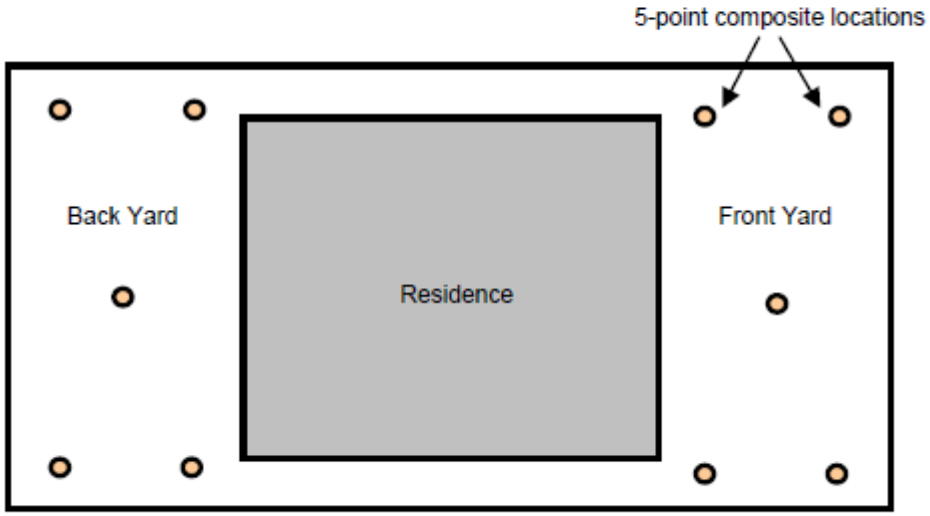
FIGURE 1-4
Fairmont Properties

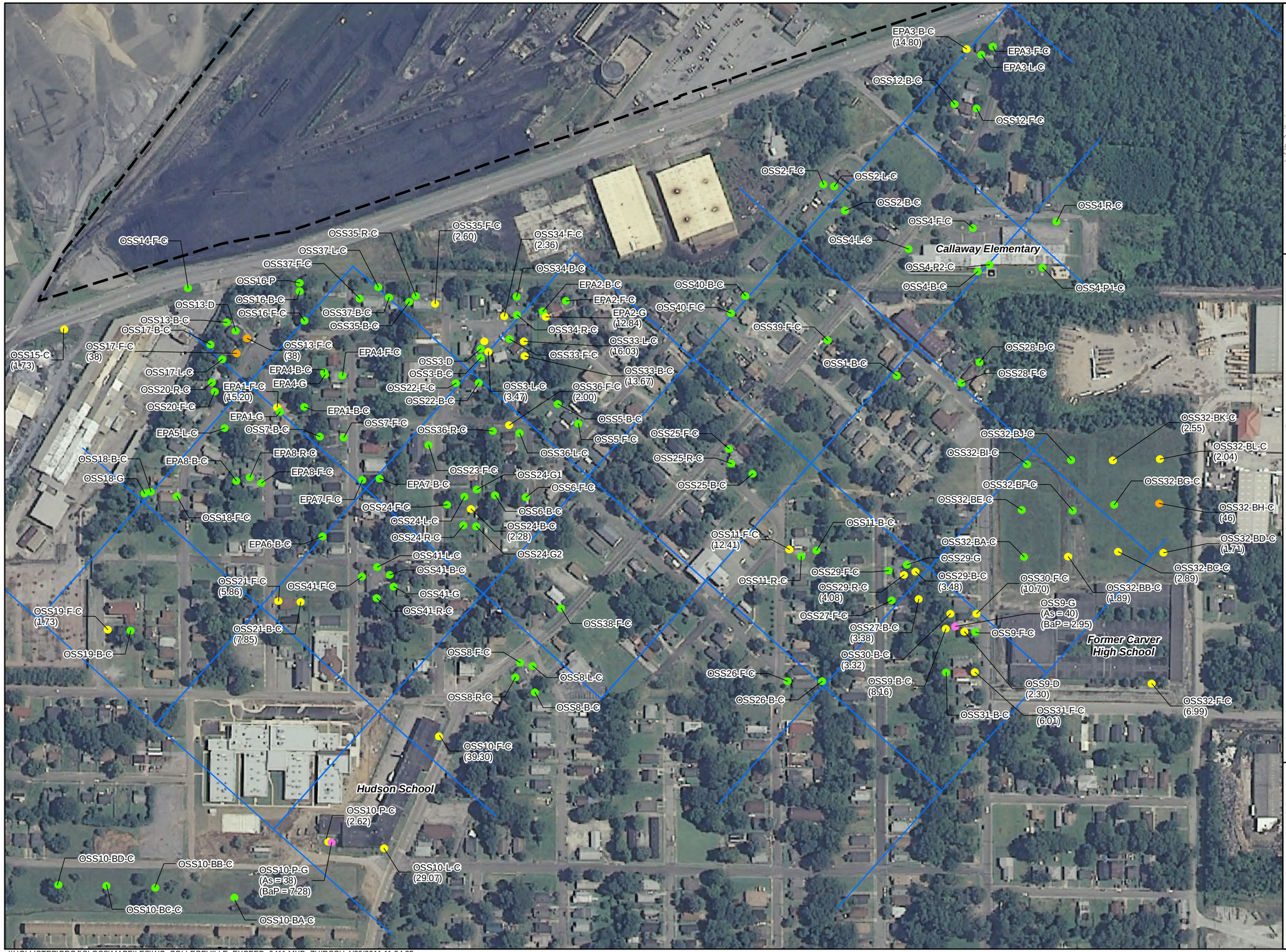
Walter Coke Inc.
Birmingham, Alabama

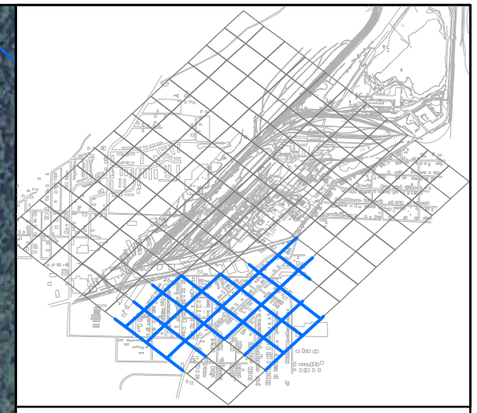
CH2MHILL

\\hollister\Proj\Sloss\MapFiles\WC_OSW_samples.MXD FLONDON 11/10/2009 15:05:19

Figure 2-1
General Soil Sampling Layout in Residential Properties
Walter Coke, Inc. - Birmingham, AL







LEGEND

Sample Results

- Arsenic (sieved) > 37 mg/kg
- BaP Toxic Equivalents > 1.5 mg/kg
- Both Arsenic (sieved) and BaP Toxic Equivalents exceed final cleanup level
- Final cleanup level not exceeded
- Site Boundary
- (3.54) As or BaP Toxic Equivalents Concentration (mg/kg)

Notes:

1. mg/kg = milligrams per kilogram
2. BaP = Benzo(a)pyrene (as shown in Figure, BaP represents BaP Toxic Equivalents)
3. As = Arsenic (sieved)
4. The aerial photograph provided shows the former Hudson school building on the Hudson school property. This building has been since removed.

0 150 300 600 Feet

1 inch = 300 feet

N

FIGURE 3-1
Results at Collegeville Neighborhood Properties

Walter Coke Inc.
Birmingham, Alabama

CH2MHILL

\\HOLLISTER\PROJ\SLOSS\MAPFILES\WC_COLLEGEVILLE_EXCEED_0411.MXD ZHIRSCH 4/20/2011 11:24:35

LEGEND

Sample Results

- Arsenic (sieved) > 37 mg/kg
- BaP Toxic Equivalents > 1.5 mg/kg
- Both Arsenic (sieved) and BaP Toxic Equivalents exceed final cleanup level
- Final cleanup level not exceeded
- Site Boundary
- (3.54) BaP Toxic Equivalents Concentration (mg/kg)

Notes:

1. mg/kg = milligrams per kilogram
2. BaP = Benzo(a)pyrene
3. As = Arsenic (sieved)

0 150 300 600 Feet

1 inch = 300 feet

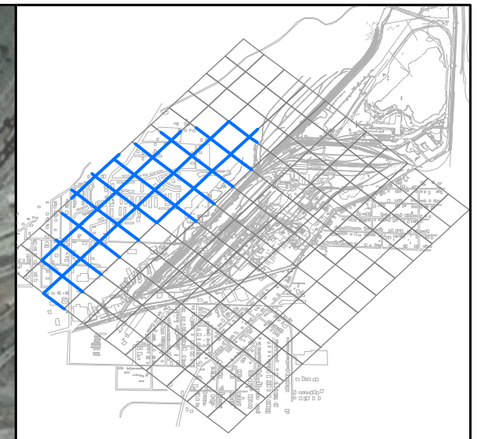
N

FIGURE 3-2
Results at Harriman Park
Neighborhood Properties

Walter Coke Inc.
Birmingham, Alabama

CH2MHILL

\\HOLLISTER\PROJ\SLOSS\MAPFILES\WC_HARRIMAN_EXCEED_0411.MXD ZHIRSCH 4/20/2011 10:23:14



LEGEND

Sample Results

- Arsenic (sieved) > 37 mg/kg
- BaP Toxic Equivalents > 1.5 mg/kg
- Both Arsenic (sieved) and BaP Toxic Equivalents exceed final cleanup level
- Final cleanup level not exceeded
- Site Boundary
- (3.54) As or BaP Toxic Equivalents Concentration (mg/kg)

Notes:

1. mg/kg = milligrams per kilogram
2. BaP = Benzo(a)pyrene
3. As = Arsenic (sieved)

0 150 300 600 Feet

1 inch = 300 feet

N

FIGURE 3-3
Results at Fairmont Neighborhood Properties

Walter Coke Inc.
Birmingham, Alabama

CH2MHILL

\\HOLLISTER\PROJ\SLOSS\MAPFILES\WC_FAIRMONT_EXCEED_0411.MXD ZHIRSCH 4/20/2011 11:00:53