EPA Region 5 Records Ctr.
210171

DRAFT PHASE II RESIDENTIAL AREA SAMPLING REPORT

for the

ENGINEERING EVALUATION AND COST ANALYSIS OF THE FORMER CELOTEX SITE
2800 South Sacramento Avenue
Chicago, Illinois 60623

Prepared for:

ALLIEDSIGNAL, INC.
MORRISTOWN, NEW JERSEY
and
THE CELOTEX CORPORATION
TAMPA, FLORIDA

AUGUST 1998

Prepared by:

PARSONS ENGINEERING SCIENCE, INC.
1000 JORIE BOULEVARD, SUITE 250
OAK BROOK, ILLINOIS 60523

Parsons ES Project No. 730577

PARSONS ENGINEERING SCIENCE, INC.

525 W. Monroe Street • Chicago, Illinois 60661 • (312) 715-1940 • Fax (312) 930-0018

31 August 1998

Mr. Thomas G. Williams, P.E., (SR-6J)
Remedial Project Manager
United States Environmental Protection Agency
Region V
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Re: Submittal of the Draft Phase II Residential Area Sampling Report
for the Engineering Evaluation and Cost Analysis of the
2800 South Sacramento Avenue Site
Chicago, Illinois

Dear Mr. Williams:

On behalf of the Respondents, AlliedSignal, Inc. and The Celotex Corporation, Parsons Engineering Science, Inc. (Parsons ES) is pleased to present enclosed, two copies of the Draft Phase II Residential Area Sampling Report for the above-referenced project, for your review and comment.

If you have any questions, please feel free to call me at (630) 990-7239.

Sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Mona D. Sutherland
Project Manager

MDS:ct
Enclosure
c: David Paley, AlliedSignal, Inc., 1 copy
Lecil Colburn, The Celotex Corporation, 1 copy
Tony Cox, Cox Associates, 1 copy
Karen Peaceman, USEPA Region V (CS-29A), cover letter only
File 730577

TABLE OF CONTENTS

SECTION 1 INTRODUCTION **1-1**

1.1 GENERAL 1-1
1.2 REPORT ORGANIZATION 1-2

SECTION 2 FIELD INVESTIGATION ACTIVITIES **2-1**

2.1 OVERVIEW 2-1
2.2 SAMPLING ACTIVITIES 2-3

SECTION 3 DATA RESULTS AND VALIDATION FINDINGS **3-1**

3.1 SAMPLE DATA RESULTS 3-1
3.2 DATA VALIDATION 3-1
3.2.1 Level 3 Data Validation Report by Sample Delivery Group *3-1*
3.2.2 Level 4 Data Validation Findings *3-7*
3.2.3 Summary Discussion on the Overall Quality of the Data *3-10*

SECTION 4 DATA EVALUATION **4-1**

SECTION 5 PROPOSED PHASE III ACTIVITIES **5-1**

5.1 OVERVIEW 5-1
5.2 PROPOSED PHASE III SAMPLING AND ANALYSIS PROGRAM 5-1
5.2.1 Foreground Sampling *5-2*
5.2.2 Background Sampling *5-3*
5.2.3 Summary *5-3*

APPENDIX A PHASE II RESIDENTIAL AREA SAMPLING DATA

LIST OF FIGURES

FIGURE 2.1 SOIL SAMPLES PROPERTY LOCATION **2-2**

FIGURE 2.2 SOIL SAMPLE LOCATION MAP PROPERTY NO. 1 ..... **2-5**

FIGURE 2.3 SOIL SAMPLE LOCATION MAP PROPERTY NO. 2 ..... **2-6**

FIGURE 2.4 SOIL SAMPLE LOCATION MAP PROPERTY NO. 3 ..... **2-7**

FIGURE 2.5 SOIL SAMPLE LOCATION MAP PROPERTY NO. 4 ..... **2-8**

FIGURE 4.1 PLOT OF BAPEQ SAMPLE CONCENTRATIONS FOR EACH PROPERTY **4-3**

FIGURE 4.2 PLOT COMPARISON OF BAPEQ CONCENTRATIONS FOR EACH PROPERTY AFTER THE OUTLIER AT RAP1 IS REMOVED **4-4**

TABLE OF CONTENTS

LIST OF TABLES

TABLE 3.1 SUMMARY OF DETECTED COMPOUNDS 3-12

TABLE 3.2 SUMMARY OF BENZO(A)PYRENE EQUIVALENT CONCENTRATIONS 3-21

TABLE 4.1 STATISTICAL SUMMARY OF THE BAPEQ RESULTS BY PROPERTY 4-6

SECTION 1
INTRODUCTION

1.1 GENERAL

Parsons Engineering Science, Inc. (Parsons ES) was retained by AlliedSignal, Inc. (AlliedSignal) to perform the Engineering Evaluation and Cost Analysis (EE/CA) study for the 2800 South Sacramento Avenue site in Chicago, Illinois (the Site), on behalf of the Respondents — AlliedSignal and The Celotex Corporation. The work associated with the EE/CA is being performed in accordance with the Administrative Order by Consent (AOC) entered into between the Respondents and the United States Environmental Protection Agency (USEPA) Region V, on 1 November 1996.

On 4 February and 5 February 1998, Parsons ES executed the Phase II Residential Area Sampling and Analysis Program (Phase II RASAP) associated with the Site. This Phase II Residential Area Sampling Report presents the data from that field investigation and describes the additional field activities that are proposed for the Phase III residential area sampling event. The phase II sampling program was executed based on the approach that was outlined in the following documents:

- Residential Area Conceptual Work Plan for the EE/CA, May 1997
- Final Support Sampling Plan Addendum No. 3 Associated with Phase II of the Residential Area Sampling and Analysis Program, November 1997

Concurrent with the residential area sampling program, which will expand the existing data base regarding site-related impacts to nearby residences, the evaluation of risk associated with these impacts is currently being assessed based on the *Deterministic and Probabilistic Calculations to Estimate Risk-Based Cleanup Goals for Soils at Residences Near the 2800 South Sacramento Avenue Site, Chicago, Illinois, Alceon Corporation, October 25, 1996*, and on related studies performed by other parties (such as Rutgers University and Ogden Environmental and Energy Services) on behalf of the Respondents. As such, the data generated from the various phases of the

residential area sampling program will eventually be assessed within the context of all related project studies.

1.2 REPORT ORGANIZATION

This report is divided into five sections. Section 1 presents this introduction. Section 2 describes the field investigation activities that were performed as part of the Phase II sampling program. Section 3 presents the analytical data generated from the Phase II field sampling event and the findings of data validation activities. Section 4 presents a discussion on the evaluation of the data. Section 5 discusses the activities the Respondents are proposing for the next phase (Phase III) of residential area investigation.

SECTION 2
FIELD INVESTIGATION ACTIVITIES

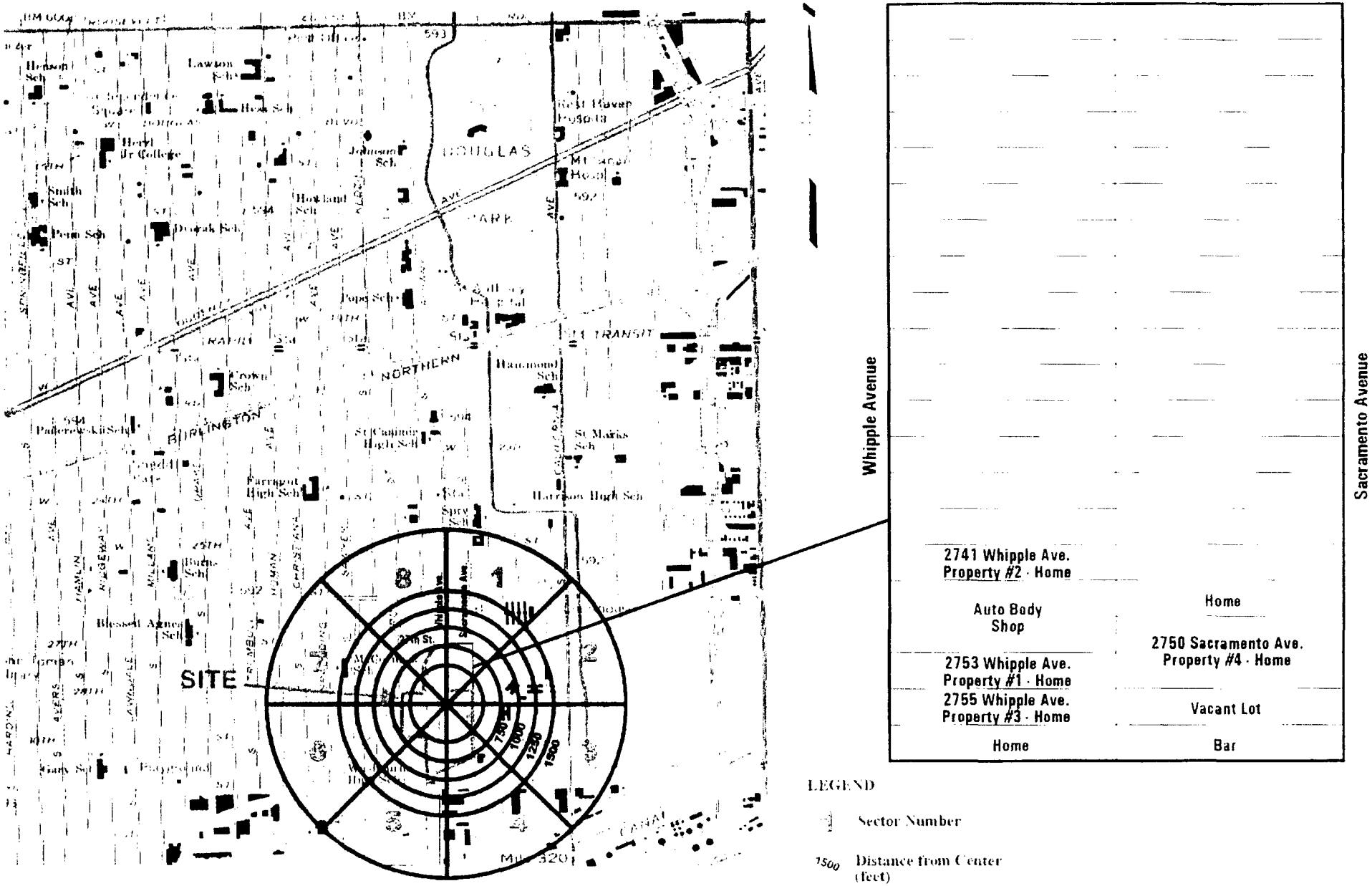
2.1 OVERVIEW

The approach for the Phase II residential sampling program was based on the adaptive sampling approach, and was implemented in accordance with the Phase II RASAP which was approved by the USEPA Region V in December 1997. Four residential properties from within the north north-east quadrant from the Site were identified to be sampled during this phase of the residential evaluation. (Refer to Figure 2.1 for a site location map.) These properties are located at the addresses shown below:

ASSIGNED PROPERTY NO.	PROPERTY ADDRESS	ASSIGNED PROPERTY ID
Property No. 1:	2753 Whipple Avenue	RAP1
Property No. 2:	2941 Whipple Avenue	RAP2
Property No. 3:	2755 Whipple Avenue	RAP3
Property No. 4:	2750 S. Sacramento Avenue	RAP4

Parsons ES (on behalf of the Respondents), with significant assistance from the USEPA Region V, searched for the owners of the abovementioned properties to acquire written permission to access their properties and collect soil samples. Permission to sample all four properties was obtained from the respective owners.

The field sampling effort was performed over a 2-day period, with property Nos. 1 and 2 sampled on 4 February and property Nos. 3 and 4 sampled on 5 February. A summary of the field conditions and activities performed during the Phase II field program, on a property-by-property basis, is presented in the next subsection.



PARSONS ENGINEERING SCIENCE, INC.

SOIL SAMPLING PROPERTY LOCATIONS

AlliedSignal, Inc./The Celotex Corporation

FIGURE 2.1

8-12-98 /soilsamp.cdr

2.2 SAMPLING ACTIVITIES

In accordance with the approach specified in the Phase II RASAP, Parsons ES collected eight surface soil samples from each property, for a total of 32 investigative samples. All soil samples were collected as grab samples (i.e., samples from multiple locations were not composited). The soil samples were collected from a depth of 0 to 3 inches below grade. The sample collection protocol entailed the use of a decontaminated stainless-steel spoon to remove the soil material down to the 3-inch depth and the placement of the removed material into a decontaminated stainless-steel bowl. Once sufficient material had been removed to fill the necessary sample containers, the soils in the bowl were homogenized using the stainless-steel spoon and then placed into the appropriate sample container(s). Field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples were collected in accordance with the requirements specified in the Phase II RASAP. A total of four field duplicate soil samples (one from each property) and two MS/MSD soil samples were collected and sent to the laboratory for analysis. All sample analyses were performed by the Quanterra, Inc. laboratory located in North Canton, Ohio.

At the first property Parsons ES sampled (2753 Whipple Avenue), the majority of the property that was not occupied by the house structure was overlain with concrete. To access the soils beneath the concrete, Parsons ES used a hand-held concrete coring machine to drill through the concrete. The first two soil samples collected as part of the Phase II RASAP were taken from the grassy front yard area located on the west side of the property. Four of the remaining six soil samples were taken from soils located beneath the concrete surface. An additional two soils samples were collected from the exposed soil strip located along the north side of the concrete yard area. Care was taken to avoid collecting samples in areas that visually appeared to be impacted from non-site-related wastes, such as in the vicinity of oil staining. (Refer to Figure 2.2 for a schematic showing the approximate sample locations on this property.)

Concrete cored areas were repaired by Parsons ES after sampling activities were completed at the property, using cement troweled by hand.

The second property that was sampled is located at 2941 Whipple Avenue. This property does not have a front yard, but it has a large grass-covered area in the backyard; therefore, no concrete coring was performed to access subsurface materials. Eight soil samples were collected from this property at the locations shown on Figure 2.3.

The third property that was sampled is located at 2755 Whipple Avenue. This property does not have a front yard area, and a portion of the backyard is overlain with very thick concrete. Because of the thickness of the concrete, no attempt was made to core through this area with the hand coring machine. Instead, samples were collected from grassy areas. Eight soil samples were collected from this property at the locations shown on Figure 2.4.

The fourth property that was sampled is located at 2750 South Sacramento Avenue. This property is a double lot. Portions of the property are covered in concrete, but there are large grassy areas. No concrete coring was performed during the sampling event at this property. The eight soil samples were collected from the locations shown on Figure 2.5.

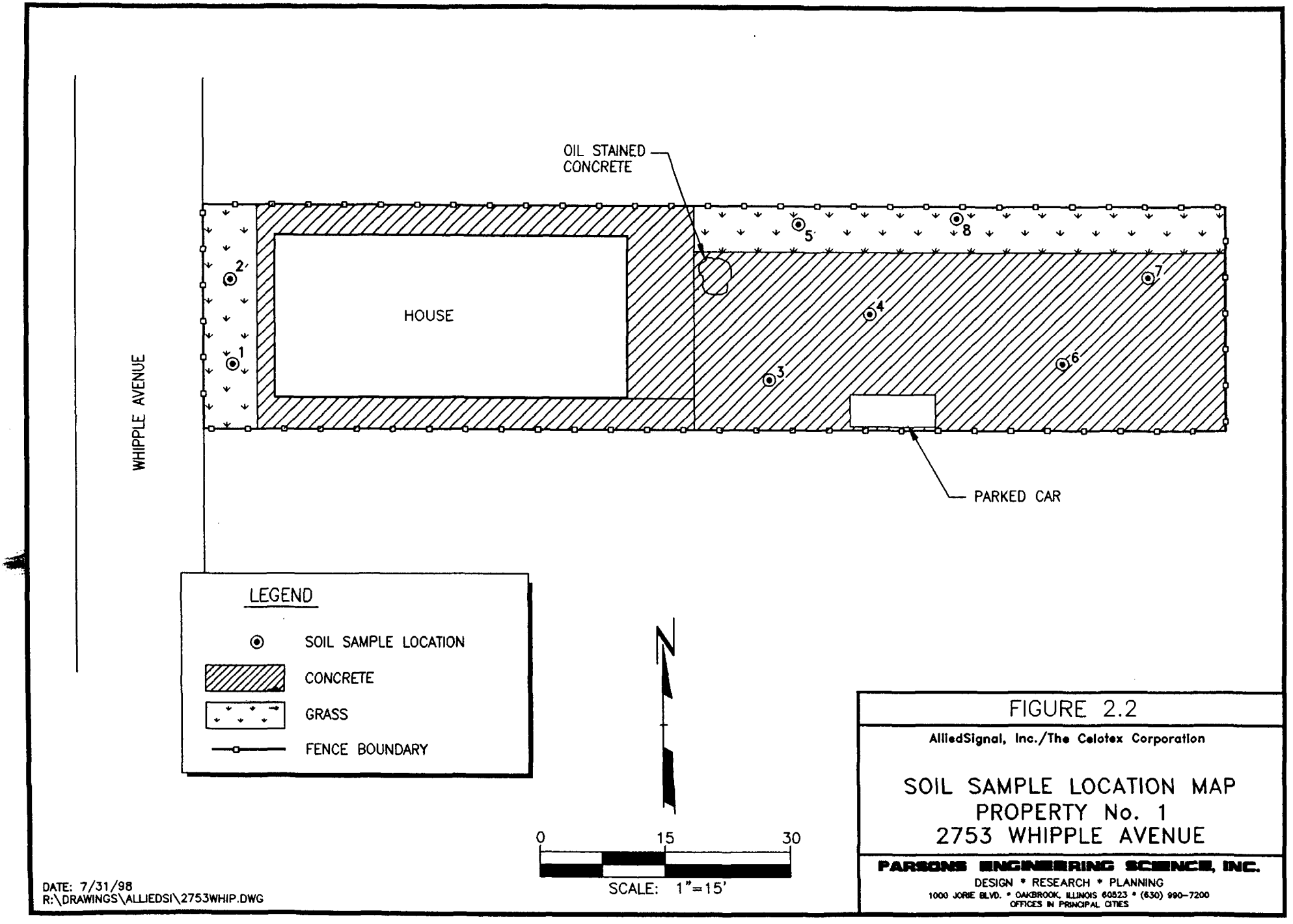
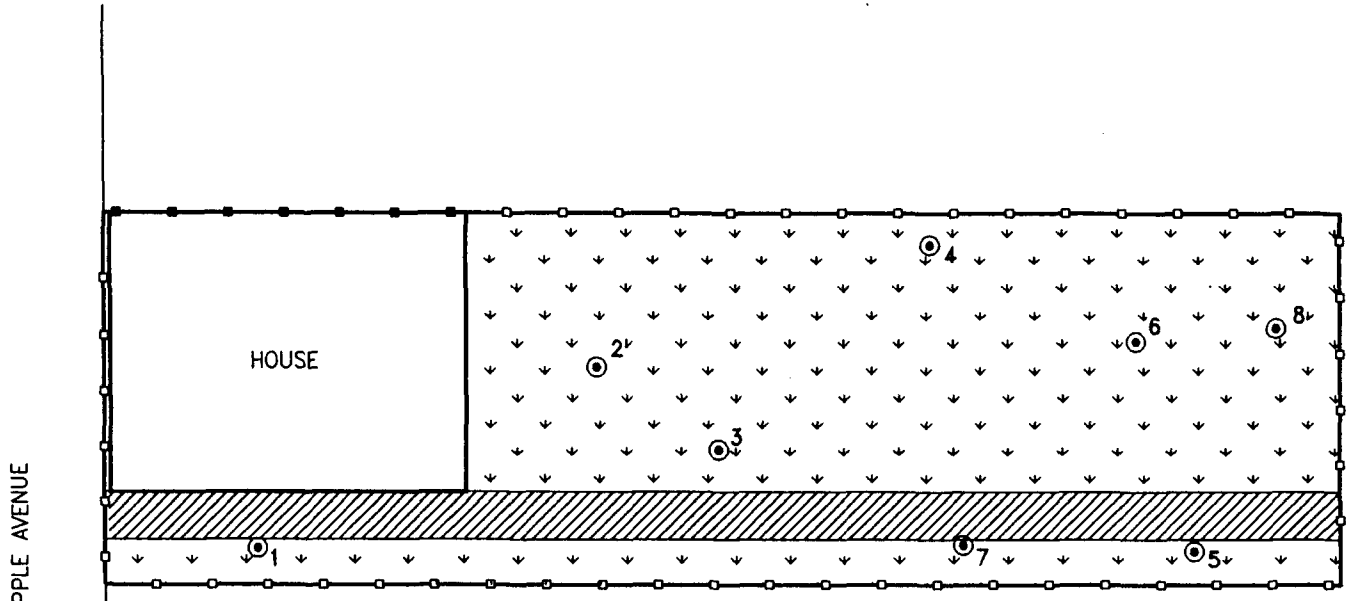


FIGURE 2.2

AlliedSignal, Inc./The Celotex Corporation

SOIL SAMPLE LOCATION MAP
PROPERTY No. 1
2753 WHIPPLE AVENUE

PARSONS ENGINEERING SCIENCE, INC.
DESIGN * RESEARCH * PLANNING
1000 JORIE BLVD. * OAKBROOK, ILLINOIS 60523 * (630) 990-7200
OFFICES IN PRINCIPAL CITIES



LEGEND

- SOIL SAMPLE LOCATION
- CONCRETE
- GRASS
- FENCE BOUNDARY

N

0 15 30

SCALE: 1"=15'

FIGURE 2.3

AlliedSignal, Inc./The Celotex Corporation

SOIL SAMPLE LOCATION MAP
PROPERTY No. 2
2941 WHIPPLE AVENUE

PARSONS ENGINEERING SCIENCE, INC.
DESIGN * RESEARCH * PLANNING
1000 JORIE BLVD. * OAKBROOK, ILLINOIS 60523 * (630) 990-7200
OFFICES IN PRINCIPAL CITIES

DATE: 7/31/98
R:\DRAWINGS\ALLIEDSI\2941WHIP.DWG

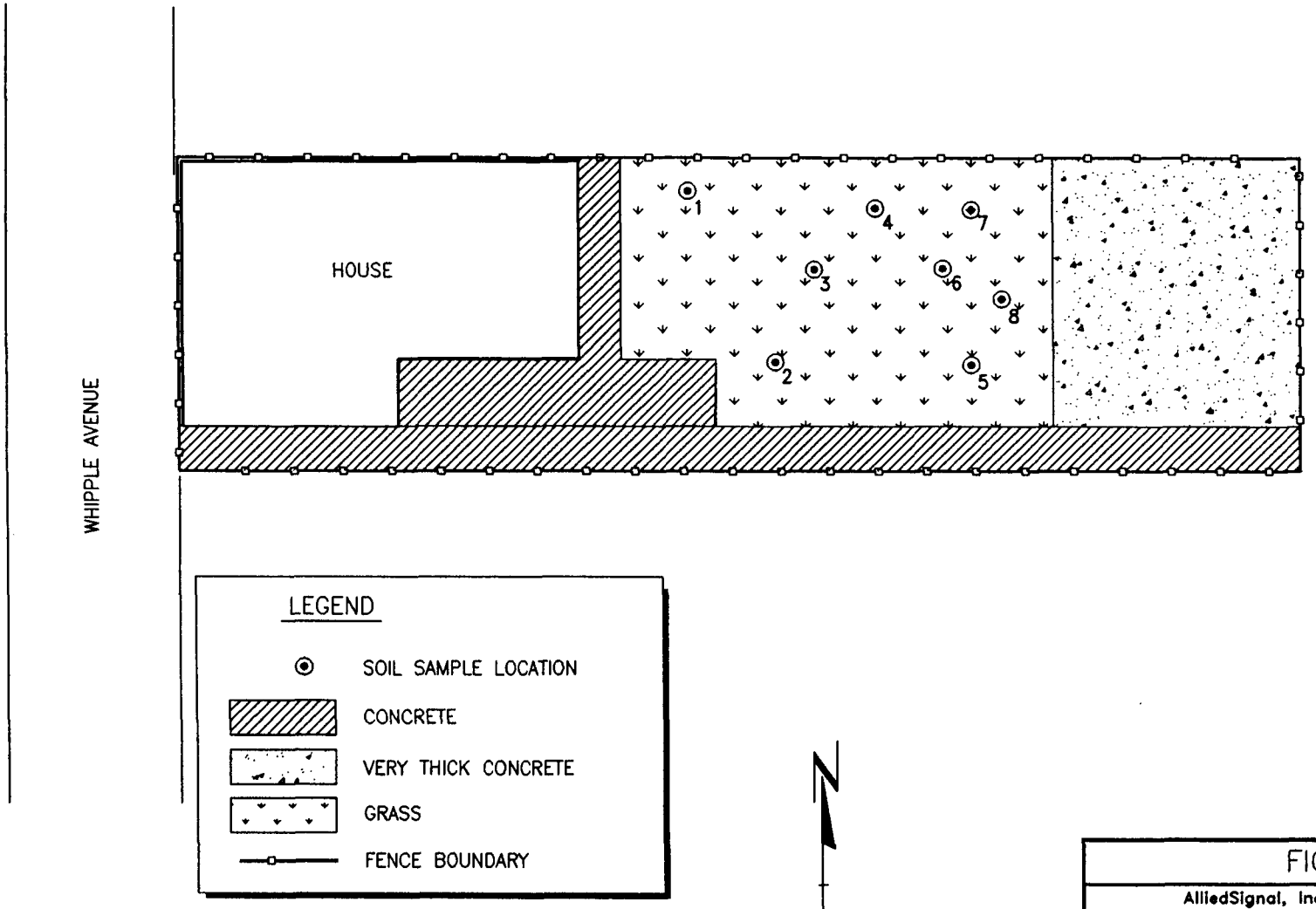


FIGURE 2.4

AlliedSignal, Inc./The Celotex Corporation

SOIL SAMPLE LOCATION MAP
PROPERTY No. 3
2755 WHIPPLE AVENUE

PARSONS ENGINEERING SCIENCE, INC.
DESIGN * RESEARCH * PLANNING
1000 JORIE BLVD. * OAKBROOK, ILLINOIS 60523 * (630) 990-7200
OFFICES IN PRINCIPAL CITIES

DATE: 7/31/98
R:\DRAWINGS\ALLIEDSI\2755WHIP.DWG

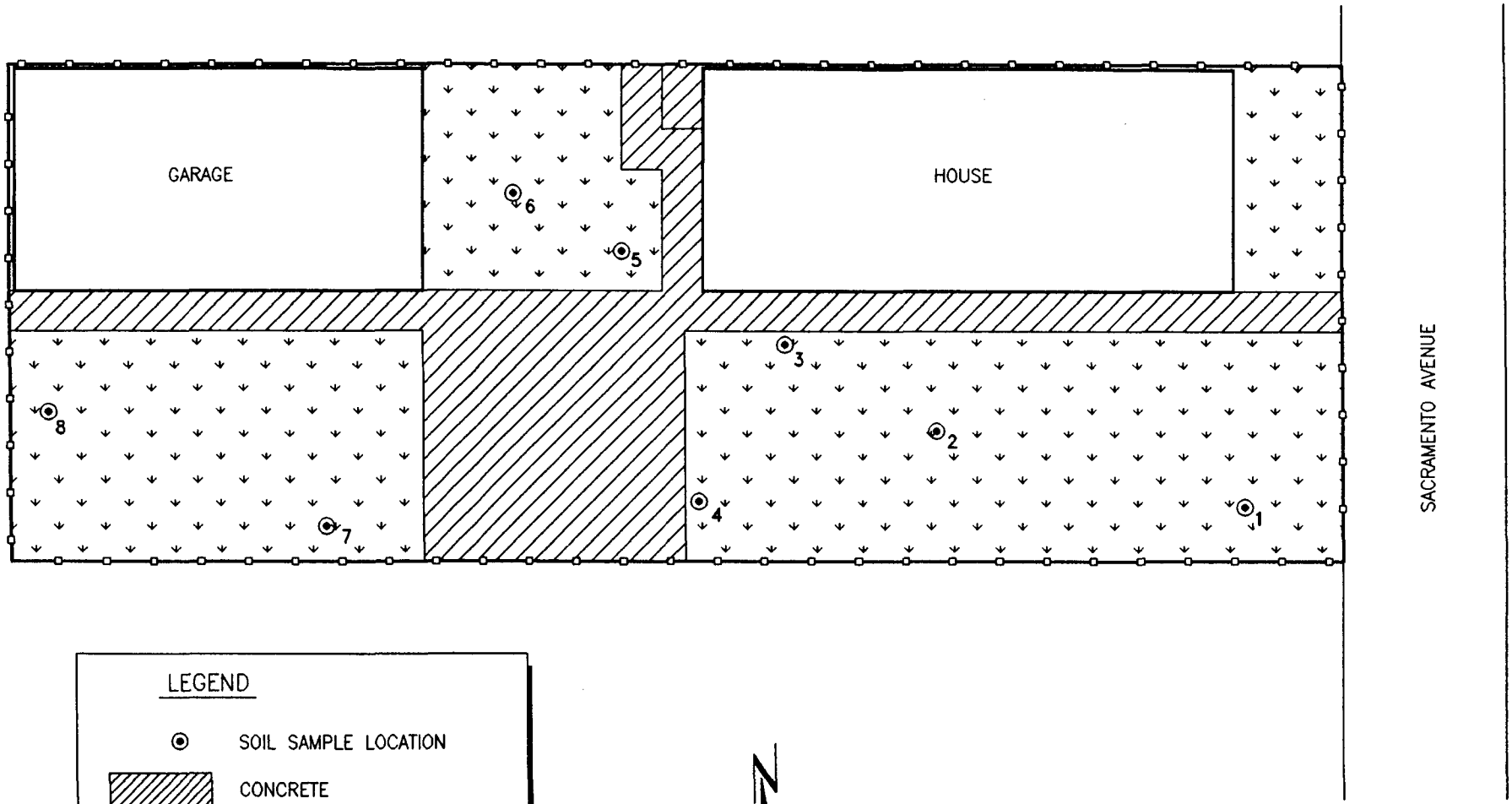


FIGURE 2.5

AlliedSignal, Inc./The Celotex Corporation

SOIL SAMPLE LOCATION MAP
PROPERTY No. 4
2750 S. SACRAMENTO AVENUE

PARSONS ENGINEERING SCIENCE, INC.
DESIGN * RESEARCH * PLANNING
1000 JORIE BLVD. * OAKBROOK, ILLINOIS 60523 * (630) 990-7200
OFFICES IN PRINCIPAL CITIES

DATE: 7/31/98
R:\DRAWINGS\ALLIEDSI\2750SAC.DWG

SECTION 3
DATA RESULTS AND VALIDATION FINDINGS

3.1 SAMPLE DATA RESULTS

As discussed in Section 2, 32 investigative soil samples and 4 field duplicate soil samples were collected and analyzed as part of the Phase II RASAP. All soil samples were analyzed for polynulcear aromatic hydrocarbons (PAHs). Per the project Quality Assurance Project Plan (QAPP), analyses were performed using the USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Organic Analysis (CLP SOW OLM3.1) for low/medium semivolatile organic compounds (SVOCS), of which PAHs are a subset. Table 3.1 presents a summary of the PAH compounds detected in each soil sample and the associated concentrations. Table 3.2 presents a summary of the benzo(a)pyrene equivalent (BaPeq) concentration for each sample.

3.2 DATA VALIDATION

Quanterra prepared and submitted the data from the Phase II RASAP in two sample delivery groups (SDGs): CELOTEX1 and CELOTEX2. Each of the SDGs was subjected to the Level 3 validation process. A quality assurance summary report has been prepared for each SDG to present the findings of the Level 3 validation processes for that SDG. These reports are presented below. Refer to the Level 4 data validation report for a general discussion of the data validation approach utilized for this project data, and for discussions on the overall accuracy, precision, and completeness of the data set.

3.2.1 Level 3 Data Validation Report by Sample Delivery Group

3.2.1.1 Validation Report for the Sample Delivery Group CELOTEX1

Sample delivery group CELOTEX1 contained the analytical data for 18 soil samples collected and analyzed for SVOCs (PAHs only). The samples collected included two field replicates: SSAS2-RAP1-SS92-0/3 is a replicate of sample SSAS2-

RAP1-SS02-0/3, and sample SSAS2-RAP2-SS95-0/3 is a replicate of SSAS2-RAP2-SS05-0/3. This SDG included one sample which was collected as a MS/MSD sample: SSAS2-RAP1-SS08-0/3. Per the QAPP, no field blanks were collected as part of this field program.

No results for samples in this SDG have been qualified as unusable. Other quality assurance and quality control (QA/QC) issues which lead to the qualification of results included the following: reported results above the method detection limit (MDL) but below the project reporting limit (PRL), flagged 'J1'; and MS/MSD accuracy outliers, flagged 'J5'. Outliers indicate that the reported or calculated result for the QC sample is outside the specified control limits described in the SOW and the QAPP. Details regarding the samples and analytes affected by these issues are presented below.

The laboratory reported that each of the 18 samples in this SDG required dilution due either to (1) matrix interferences or (2) high levels of target analytes or non-target tentatively identified compounds (TICs). As a result of the necessary dilutions, the reporting limits for these samples have been elevated. The laboratory also reported that some surrogates were diluted out due to the necessary dilutions. No data have been qualified due to surrogate outliers resulting from necessary dilutions.

3.2.1.1.1 Overall Assessment

Except as indicated below, all soil samples analyzed for PAHs were prepared and analyzed following the procedures specified for SVOC analysis in the SOW. No reported PAH results have been qualified as unusable (rejected) for this SDG. Other QA/QC issues leading to qualification of reported PAH results include: MS/MSD outliers, and reported results above the MDL but less than the PRL, or a combination of these issues. Details regarding the samples and analytes affected by these issues are presented in the sections below.

3.2.1.1.2 Holding Time

All SVOC analyses were performed within the holding time specified in the CLP SOW.

3.2.1.1.3 Gas Chromatography and Mass Spectrometry Instrument Performance Check (Tuning)

Gas chromatography and mass spectrometry (GC/MS) instrument performance checks (tuning) were performed as required by the CLP SOW. All tunes were in compliance with the tuning criteria specified by the SOW.

3.2.1.1.4 Calibration

All initial and continuing calibration checks were performed as required by the CLP SOW. All calibration checks were in compliance with the initial and continuing calibration criteria specified in the SOW.

3.2.1.1.5 Field and Laboratory Blanks

All laboratory blanks for SVOC analyses were prepared and analyzed as required by the QAPP and the SOW. All blanks were free of SVOC contamination.

3.2.1.1.6 Surrogate Spikes

All samples, blanks, standards, and QC samples were spiked with surrogates as specified in the SOW. All results reported for surrogates are in compliance with the criteria specified in the QAPP and the SOW. As indicated above, the laboratory reported that some surrogate spikes were diluted out due to the necessary dilutions.

3.2.1.1.7 Matrix Spike/Matrix Spike Duplicate Compounds

Accuracy (percent recovery) outliers were reported for the MS/MSD for SVOC analysis for the SVOC pyrene. The reported result for pyrene in the associated unspiked sample, SSAS2-RAP1-SS08-0/3, has been qualified as estimated and flagged 'J5'.

3.2.1.1.8 Laboratory Control Samples

All laboratory control samples (LCSs) prepared and analyzed in support of SVOC analyses for samples in this SDG are in compliance with the criteria specified in the QAPP and the SOW. No accuracy outliers were reported for the SVOC LCSs.

3.2.1.1.9 Internal Standards

All results reported for the internal standards for each of the samples in this SDG are in compliance with the criteria specified in the QAPP and the SOW.

3.2.1.1.10 Target Compound Identification

The following target PAHs were detected above the MDL in one or more of the samples in this SDG: 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. All detections and quantitation of the analytes were made following the criteria specified in the SOW.

3.2.1.2 Validation Report for the Sample Delivery Group CELOTEX 2

Sample delivery group CELOTEX2 contained the analytical data for 18 soil samples collected and analyzed for SVOCs (PAHs only). The samples collected included two field replicates: sample SSAS2-RAP3-SS95-0/3 is a replicate of sample SSAS2-RAP2-SS05-0/3 and sample SSAS2-RAP4-SS96-0/3 is a replicate of sample SSAS2-RAP4-SS06-0/3. One sample was collected as a MS/MSD: SSAS2-RAP3-SS07-0/3.

No field blanks were collected with the samples in this SDG. No reported results for samples in this SDG have been qualified as unusable. Some reported results above the MDL but less than the PRL have been flagged 'J1', and should be considered estimates.

The laboratory also reported that each of the 18 samples in this SDG required dilution due either to (1) matrix interferences or (2) high target analytes or non-target TICs. The necessary dilutions sometimes resulted in some surrogates being diluted out. The reporting limits for each of the samples have been adjusted to reflect the dilution.

3.2.1.2.1 Overall Assessment

Except as indicated below, all samples were prepared and analyzed following the procedures specified for SVOC analysis in the SOW. No reported SVOC results have been qualified as unusable (rejected) for this SDG. As indicated above, some reported results were above the MDL but less than the PRL. Target PAHs detected in one or more of the samples in this SDG include: 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. Some of these detections have been qualified 'J1'.

3.2.1.2.2 Holding Time

All SVOC analyses were performed within the holding time specified in the CLP SOW.

3.2.1.2.3 GC/MS Instrument Performance Check (Tuning)

Gas chromatography and mass spectrometry instrument performance checks (tuning) were performed as required by the CLP SOW. All tunes were in compliance with the tuning criteria specified by the SOW.

3.2.1.2.4 Calibration

All initial and continuing calibration checks were performed as required by the CLP SOW. All calibration checks were in compliance with the initial and continuing calibration criteria specified in the SOW.

3.2.1.2.5 Field and Laboratory Blanks

No equipment or field blanks were analyzed in this SDG. All laboratory blanks for SVOC analyses were prepared and analyzed as required by the QAPP and the SOW. All blanks were free of SVOC contamination.

3.2.1.2.6 Surrogate Spikes

All samples, blanks, standards, and QC samples were spiked with surrogates as specified in the SOW. All results reported for surrogates are in compliance with the criteria specified in the QAPP and the SOW. As indicated above, some surrogates were diluted out due to necessary dilutions.

3.2.1.2.7 Matrix Spike/Matrix Spike Duplicate Compounds

Sample SSAS2-RAP3-SS07-0/3 was collected as the MS/MSD sample associated with this SDG. Accuracy (percent recovery) outliers were reported for both the MS and MSD for SVOC 4-nitrophenol. No sample results have been qualified due to these outliers, since the affected spike compound is not a PAH.

3.2.1.2.8 Laboratory Control Samples

All LCSs prepared and analyzed in support of SVOC analyses for samples in this SDG are in compliance with the criteria specified in the QAPP and the SOW. No accuracy outliers were reported for the SVOC LCSs.

3.2.1.2.9 Internal Standards

All results reported for the internal standards for each of the samples in this SDG are in compliance with the criteria specified in the QAPP and the SOW.

3.2.1.2.10 Target Compound Identification

The following target SVOCs were detected above the MDL in one or more of the samples in this SDG: 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene,

benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. All detections and quantitation of the analytes were made following the criteria specified in the SOW.

3.2.2 Level 4 Data Validation Findings

3.2.2.1 Overview of Approach

In addition to Level 3 data validation (which was based on the electronic data deliverables [EDDs] submitted by the laboratory) approximately 50 percent of the raw data have been subjected to Level 4 validation. The Level 4 validation process was performed as an independent quality control check of the Level 3 validation findings, and was executed as an additional step to verify that no major problems had been overlooked during the Level 3 validation process.

The selection of which data was subjected to Level 4 validation was based on the information from the Level 3 validation. A very deliberate attempt was made to select those samples and analyses which exhibited the most QA/QC problems during the Level 3 validation process. Based on this approach, one complete SDG was selected — CELOTEX1.

The Level 4 validation included a comprehensive review and validation of all QC items addressed in the Level 3 validation, as well as a comprehensive review and validation of the raw data generated in support of the results. Items reviewed and validated in Level 4, but not in Level 3, included the following: chromatograms and instrument printouts; quantitation reports and bench sheets showing calculated results; mass spectral data for the GC/MS analyses; and preparation and extraction logs. One additional difference between the Level 3 and 4 validation processes was the recalculation of representative results for standards, QC samples, and field samples for the method.

The quality assurance summary report presented below for SDG CELOTEX1 summarizes the findings of the Level 4 data validation process for that SDG. QA/QC results outside the specified quality control limits, outliers, etc., have resulted in qualification of the data for samples associated with the QC sample. The association and the type of qualifier applied have been based on the USEPA Functional Guidelines for Organic Data Review (February, 1994) and on the project QAPP.

3.2.2.2 Level 4 Validation Report for SDG CELOTEX1

All samples and analyses for SDG CELOTEX1 were subjected to the Level 4 validation process. There is obviously some repetition of information between the Level 3 and 4 validation for certain items, while greater details are presented for other items.

3.2.2.2.1 Overall Assessment

Except as indicated below, all samples were prepared and analyzed following the procedures specified for SVOC analysis in the SOW. QA/QC issues leading to additional qualification of reported SVOC results include: reported results above the MDL but below the PRL, and MS/MSD outliers Details regarding the samples and analytes affected by these issues are presented in the sections below.

3.2.2.2.2 Holding Time

All SVOC analyses were performed within the holding time specified in the CLP SOW.

3.2.2.2.3 Gas Chromatography and Mass Spectrometry Instrument Performance Check (Tuning)

Gas chromatography and mass spectrometry instrument performance checks (tuning) were performed as required by the CLP SOW. All tunes were in compliance with the tuning criteria specified by the SOW.

3.2.2.2.4 Calibration

All initial and continuing calibration checks were performed as required by the CLP SOW. All calibration checks were in compliance with the initial and continuing calibration criteria specified in the SOW.

3.2.2.2.5 Field and Laboratory Blanks

All laboratory blanks for SVOC analyses were prepared and analyzed as required by the QAPP and the SOW. All blanks were free of SVOC contamination.

3.2.2.2.6 Surrogate Spikes

All samples, blanks, standards, and QC samples were spiked with surrogates as specified in the SOW. All results reported for surrogates are in compliance with the criteria specified in the QAPP and the SOW. The laboratory reported that each of the samples required dilution due either to matrix interferences, or high levels of target or non-target analytes. In some cases, the required dilution resulted in the surrogates being diluted out. No data have been qualified due to surrogate outliers resulting from dilution.

3.2.2.2.7 Matrix Spike/Matrix Spike Duplicate Compounds

Accuracy (percent recovery) outliers were reported for the MS/MSD for SVOC analysis for the SVOC pyrene. The reported recoveries for both the MS and MSD samples exceeded the upper control limit for pyrene, indicating a high bias. Since pyrene was detected in the associated unspiked sample, SSAS2-RAP1-SS08-0/3, the reported result has been qualified as estimated and flagged 'J5'.

3.2.2.2.8 Laboratory Control Samples

All LCSs prepared and analyzed in support of the SVOC analyses for samples in this SDG are in compliance with the criteria specified in the QAPP and the SOW. No accuracy outliers were reported for the SVOC LCSs.

3.2.2.2.9 Internal Standards

All results reported for the internal standards for each of the samples in this SDG are in compliance with the criteria specified in the QAPP and the SOW.

3.2.2.2.10 Target Compound Identification

The following target PAHs were detected above the MDL in one or more of the samples in this SDG: 2-methylnaphthalene, acenapthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. All detections and quantitation of the analytes were made following the criteria specified in the SOW.

3.2.3 Summary Discussion on the Overall Quality of the Data

3.2.3.1 General

Generally, the samples were prepared and analyzed by the laboratory in accordance with the analytical and QA/QC procedures specified in the CLP SOW and the QAPP. A number of samples required dilution for various reasons. The laboratory attributed the required dilutions to either matrix interferences in some of the samples, or high levels of target analytes or non-target TICs above the calibration range for the method. Usually, sample reanalyzes resulted in elevated reporting limits due to dilutions or modification of sample size to allow analysis of the sample.

Sample reanalyzes due to high levels of target or non-target analytes, or matrix interferences in the sample are consistent with the project-specified analytical protocols as long as the reanalyzes follow the guidelines specified by the method. As a result, no data have been qualified due to these problems. In some cases, the required dilutions resulted in some surrogates being diluted outside the QC criteria. No data have been qualified due to surrogate outliers resulting from necessary dilutions.

3.2.3.2 Data Accuracy

Accuracy of the laboratory results has been assessed for compliance against the QA objectives specified in the CLP SOW and in Section 4 of the QAPP, using the analytical results of laboratory/method blanks, MS/MSD samples surrogate spikes, LCS, and field blanks. There were no significant accuracy problems associated with the SVOC analyses except for the MS/MSD outliers for sample SSAS2-RAP1-SS08-0/3. The reported result for pyrene has been qualified as estimated due to the MS/MSD accuracy (percent recoveries) results.

3.2.3.3 Data Precision

Precision of the laboratory results has been assessed by comparing the analytical results between MS/MSDs and laboratory duplicates against the QA objectives specified in the SOW and the QAPP. There were no precision problems leading to qualification of data.

3.2.3.4 Data Completeness

The completeness of laboratory results has been assessed using the equation in Section 13 of the QAPP by comparing the number of valid (usable) sample results against the total number of planned measurements. Since no data in either of the SDGs have been qualified as unusable, the completeness for this sampling event is 100 percent compared to the QA objective of 90 to 95 percent specified in the QAPP for this project. Every sample which was collected was analyzed by the laboratory.

TABLE 3.1
SUMMARY OF DETECTED COMPOUNDS
PHASE II RESIDENTIAL AREA SAMPLING REPORT

2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP1-SS01-0/3	SSAS2-RAP1-SS02-0/3	SSAS2-RAP1-SS92-0/3	SSAS2-RAP1-SS03-0/3	SSAS2-RAP1-SS04-0/3
LOCATION:		SSAS2-RAP1	SSAS2-RAP1	SSAS2-RAP1	SSAS2-RAP1	SSAS2-RAP1
DEPTH RANGE:		0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
SAMPLE DATE:		2/4/98	2/4/98	2/4/98	2/4/98	2/4/98
MATRIX:		Soil	Soil	Soil	Soil	Soil
SAMPLE TYPE:		Field Sample	Field Sample	Field Duplicate	Field Sample	Field Sample
LAB SAMPLE ID:		A8B050150001	A8B050150002	A8B050150003	A8B050150004	A8B050150005
EPA SAMPLE ID:		RAP101	RAP102	RAP192	RAP103	RAP104
SAMPLE TYPE:		N1	N1	FR1	N1	N1
SDG NO:		CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX1
Semivolatile Organic Compounds						
2-Methylnaphthalene	ug/kg	1700 J1	600 J1	430 J1	14000 J1	4900 U
Acenaphthene	ug/kg	7000 J1	2400 J1	2100 J1	20000 J1	3400 J1
Acenaphthylene	ug/kg	8600 U	4200 U	3900 U	21000 U	4900 U
Anthracene	ug/kg	8100 J1	3600 J1	3000 J1	28000	3400 J1
Benzo(a)Anthracene	ug/kg	32000	15000	14000	45000	18000
Benzo(a)pyrene	ug/kg	38000	17000	16000	48000	25000
Benzo(b)fluoranthene	ug/kg	50000	22000	21000	53000	31000
Benzo(g,h,i)perylene	ug/kg	17000	8300	7300	20000 J1	12000
Benzo(k)fluoranthene	ug/kg	18000	8800	9100	23000	14000
Chrysene	ug/kg	31000	17000	14000	44000	19000
Dibenz(a,h)anthracene	ug/kg	5100 J1	2400 J1	2100 J1	5400 J1	3400 J1
Fluoranthene	ug/kg	51000	25000	22000	95000	29000
Fluorene	ug/kg	3500 J1	1200 J1	1200 J1	17000 J1	1300 J1
Indeno(1,2,3-cd)pyrene	ug/kg	18000	8700	7800	20000 J1	12000
Naphthalene	ug/kg	3900 J1	1300 J1	1200 J1	34000	1200 J1
Phenanthrene	ug/kg	34000	16000	13000	95000	15000
Pyrene	ug/kg	38000	19000	16000	76000	20000

TABLE 3.1
SUMMARY OF DETECTED COMPOUNDS
PHASE II RESIDENTIAL AREA SAMPLING REPORT

2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP1-SS05-0/3	SSAS2-RAP1-SS06-0/3	SSAS2-RAP1-SS07-0/3	SSAS2-RAP1-SS08-0/3	SSAS2-RAP2-SS01-0/3
LOCATION:		SSAS2-RAP1	SSAS2-RAP1	SSAS2-RAP1	SSAS2-RAP1	SSAS2-RAP2
DEPTH RANGE:		0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
SAMPLE DATE:		2/4/98	2/4/98	2/4/98	2/4/98	2/4/98
MATRIX:		Soil	Soil	Soil	Soil	Soil
SAMPLE TYPE:		Field Sample	Field Sample	Field Sample	Field Sample	Field Sample
LAB SAMPLE ID:		A8B050150006	A8B050150007	A8B050150008	A8B050150009	A8B050150010
EPA SAMPLE ID:		RAP105	RAP106	RAP107	RAP108	RAP201
SAMPLE TYPE:		N1	N1	N1	N1	N1
SDG NO:		CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX1
Semivolatile Organic Compounds						
2-Methylnaphthalene	ug/kg	1700 J1	3800 J1	52000 J1	700 J1	4300 U
Acenaphthene	ug/kg	1000 J1	8400 J1	110000 J1	2000 J1	540 J1
Acenaphthylene	ug/kg	4700 U	10000 U	120000 U	6000 U	4300 U
Anthracene	ug/kg	1400 J1	11000	190000	3500 J1	1300 J1
Benzo(a)Anthracene	ug/kg	9800	31000	320000	13000	6100
Benzo(a)pyrene	ug/kg	15000	35000	340000	15000	6700
Benzo(b)fluoranthene	ug/kg	19000	41000	360000	19000	8700
Benzo(g,h,i)perylene	ug/kg	8100	15000	140000	7100	4200 J1
Benzo(k)fluoranthene	ug/kg	5900	18000	150000	7000	3400 J1
Chrysene	ug/kg	10000	30000	310000	13000	7100
Dibenz(a,h)anthracene	ug/kg	2300 J1	4200 J1	47000 J1	2400 J1	1000 J1
Fluoranthene	ug/kg	15000	54000	660000	25000	12000
Fluorene	ug/kg	4700 U	5500 J1	110000 J1	1100 J1	4300 U
Indeno(1,2,3-cd)pyrene	ug/kg	8200	16000	170000	7200	3600 J1
Naphthalene	ug/kg	1200 J1	10000 J1	120000 J1	980 J1	4300 U
Phenanthrene	ug/kg	5400	41000	650000	12000	5800
Pyrene	ug/kg	10000	40000	530000	18000 J5	9500

TABLE 3.1
SUMMARY OF DETECTED COMPOUNDS
PHASE II RESIDENTIAL AREA SAMPLING REPORT

2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP2-SS02-0/3	SSAS2-RAP2-SS03-0/3	SSAS2-RAP2-SS04-0/3	SSAS2-RAP2-SS05-0/3	SSAS2-RAP2-SS95-0/3
LOCATION:		SSAS2-RAP2	SSAS2-RAP2	SSAS2-RAP2	SSAS2-RAP2	SSAS2-RAP2
DEPTH RANGE:		0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
SAMPLE DATE:		2/4/98	2/4/98	2/4/98	2/4/98	2/4/98
MATRIX:		Soil	Soil	Soil	Soil	Soil
SAMPLE TYPE:		Field Sample	Field Sample	Field Sample	Field Sample	Field Duplicate
LAB SAMPLE ID:		A8B050150011	A8B050150012	A8B050150013	A8B050150014	A8B050150015
EPA SAMPLE ID:		RAP202	RAP203	RAP204	RAP205	RAP295
SAMPLE TYPE:		N1	N1	N1	N1	FR1
SDG NO:		CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX1
Semivolatile Organic Compounds						
2-Methylnaphthalene	ug/kg	4400 U	4900 U	690 J1	480 J1	490 J1
Acenaphthene	ug/kg	2000 J1	2200 J1	3300 J1	1900 J1	1600 J1
Acenaphthylene	ug/kg	4400 U	4900 U	6500 U	4500 U	4400 U
Anthracene	ug/kg	2600 J1	2700 J1	3900 J1	3200 J1	2500 J1
Benzo(a)Anthracene	ug/kg	16000	16000	22000	13000	11000
Benzo(a)pyrene	ug/kg	19000	20000	29000	18000	14000
Benzo(b)fluoranthene	ug/kg	25000	25000	36000	23000	18000
Benzo(g,h,i)perylene	ug/kg	8700	8700	13000	7900	6800
Benzo(k)fluoranthene	ug/kg	9500	10000	12000	9200	7000
Chrysene	ug/kg	16000	16000	23000	14000	11000
Dibenz(a,h)anthracene	ug/kg	2800 J1	2600 J1	3600 J1	2200 J1	1900 J1
Fluoranthene	ug/kg	26000	26000	35000	22000	20000
Fluorene	ug/kg	860 J1	940 J1	1300 J1	1100 J1	980 J1
Indeno(1,2,3-cd)pyrene	ug/kg	9200	9100	13000	8400	6700
Naphthalene	ug/kg	1000 J1	920 J1	1500 J1	920 J1	890 J1
Phenanthrene	ug/kg	11000	12000	17000	12000	10000
Pyrene	ug/kg	22000	23000	30000	20000	16000

TABLE 3.1
SUMMARY OF DETECTED COMPOUNDS
PHASE II RESIDENTIAL AREA SAMPLING REPORT

2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP2-SS06-0/3	SSAS2-RAP2-SS07-0/3	SSAS2-RAP2-SS08-0/3	SSAS2-RAP3-SS01-0/3	SSAS2-RAP3-SS02-0/3
LOCATION:		SSAS2-RAP2	SSAS2-RAP2	SSAS2-RAP2	SSAS2-RAP3	SSAS2-RAP3
DEPTH RANGE:		0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
SAMPLE DATE:		2/4/98	2/4/98	2/4/98	2/5/98	2/5/98
MATRIX:		Soil	Soil	Soil	Soil	Soil
SAMPLE TYPE:		Field Sample	Field Sample	Field Sample	Field Sample	Field Sample
LAB SAMPLE ID:		A8B050150016	A8B050150017	A8B050150018	A8B060127001	A8B060127002
EPA SAMPLE ID:		RAP206	RAP207	RAP208	RAP301	RAP302
SAMPLE TYPE:		N1	N1	N1	N1	N1
SDG NO:		CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX2	CELOTEX2
Semivolatile Organic Compounds						
2-Methylnaphthalene	ug/kg	5400 U	320 J1	9200 U	730 J1	6300 U
Acenaphthene	ug/kg	1200 J1	1700 J1	1400 J1	3400 J1	3000 J1
Acenaphthylene	ug/kg	5400 U	2800 U	9200 U	5800 U	6300 U
Anthracene	ug/kg	5000 J1	1800 J1	1900 J1	3700 J1	3800 J1
Benzo(a)Anthracene	ug/kg	17000	9900	10000	16000	21000
Benzo(a)pyrene	ug/kg	19000	12000	13000	25000	27000
Benzo(b)fluoranthene	ug/kg	25000	16000	15000	30000	36000
Benzo(g,h,i)perylene	ug/kg	7200	5800	7300 J1	12000	13000
Benzo(k)fluoranthene	ug/kg	8300	4800	6200 J1	12000	12000
Chrysene	ug/kg	19000	10000	9800	19000	21000
Dibenz(a,h)anthracene	ug/kg	2300 J1	2300 J1	2000 J1	3300 J1	3600 J1
Fluoranthene	ug/kg	33000	16000	16000	28000	32000
Fluorene	ug/kg	1200 J1	690 J1	970 J1	1700 J1	1400 J1
Indeno(1,2,3-cd)pyrene	ug/kg	8300	5900	6800 J1	12000	13000
Naphthalene	ug/kg	5400 U	790 J1	9200 U	3100 J1	1300 J1
Phenanthrene	ug/kg	17000	8200	7900 J1	15000	17000
Pyrene	ug/kg	29000	17000	11000	22000	26000

TABLE 3.1
SUMMARY OF DETECTED COMPOUNDS
PHASE II RESIDENTIAL AREA SAMPLING REPORT

2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP3-SS03-0/3	SSAS2-RAP3-SS04-0/3	SSAS2-RAP3-SS05-0/3	SSAS2-RAP3-SS95-0/3	SSAS2-RAP3-SS06-0/3
LOCATION:		SSAS2-RAP3	SSAS2-RAP3	SSAS2-RAP3	SSAS2-RAP3	SSAS2-RAP3
DEPTH RANGE:		0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
SAMPLE DATE:		2/5/98	2/5/98	2/5/98	2/5/98	2/5/98
MATRIX:		Soil	Soil	Soil	Soil	Soil
SAMPLE TYPE:		Field Sample	Field Sample	Field Sample	Field Duplicate	Field Sample
LAB SAMPLE ID:		A8B060127003	A8B060127004	A8B060127005	A8B060127006	A8B060127007
EPA SAMPLE ID:		RAP303	RAP304	RAP305	RAP395	RAP306
SAMPLE TYPE:		N1	N1	N1	FR1	N1
SDG NO:		CELOTEX2	CELOTEX2	CELOTEX2	CELOTEX2	CELOTEX2
Semivolatile Organic Compounds						
2-Methylnaphthalene	ug/kg	5600 U	9200 U	1900 J1	2500 J1	1000 J1
Acenaphthene	ug/kg	2800 J1	4200 J1	4300 J1	4800	4700 J1
Acenaphthylene	ug/kg	5600 U	9200 U	6200 U	4700 U	8600 U
Anthracene	ug/kg	3500 J1	4800 J1	4700 J1	5400	5800 J1
Benzo(a)Anthracene	ug/kg	19000	23000	20000	19000	24000
Benzo(a)pyrene	ug/kg	26000	34000	24000	24000	32000
Benzo(b)fluoranthene	ug/kg	38000	42000	31000	32000	42000
Benzo(g,h,i)perylene	ug/kg	13000	15000	11000	11000	15000
Benzo(k)fluoranthene	ug/kg	11000	18000	11000	10000	15000
Chrysene	ug/kg	21000	26000	18000	18000	25000
Dibenz(a,h)anthracene	ug/kg	3700 J1	4900 J1	3600 J1	2700 J1	4600 J1
Fluoranthene	ug/kg	31000	39000	34000	33000	43000
Fluorene	ug/kg	1100 J1	2000 J1	2700 J1	3000 J1	2000 J1
Indeno(1,2,3-cd)pyrene	ug/kg	14000	16000	12000	11000	16000
Naphthalene	ug/kg	1100 J1	2400 J1	4600 J1	7300	2800 J1
Phenanthrene	ug/kg	14000	20000	19000	23000	23000
Pyrene	ug/kg	23000	31000	23000	23000	32000

TABLE 3.1
SUMMARY OF DETECTED COMPOUNDS
PHASE II RESIDENTIAL AREA SAMPLING REPORT

2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP3-SS07-0/3	SSAS2-RAP3-SS08-0/3	SSAS2-RAP4-SS01-0/3	SSAS2-RAP4-SS02-0/3	SSAS2-RAP4-SS03-0/3
LOCATION:		SSAS2-RAP3	SSAS2-RAP3	SSAS2-RAP4	SSAS2-RAP4	SSAS2-RAP4
DEPTH RANGE:		0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
SAMPLE DATE:		2/5/98	2/5/98	2/5/98	2/5/98	2/5/98
MATRIX:		Soil	Soil	Soil	Soil	Soil
SAMPLE TYPE:		Field Sample	Field Sample	Field Sample	Field Sample	Field Sample
LAB SAMPLE ID:		A8B060127008	A8B060127009	A8B060127010	A8B060127011	A8B060127012
EPA SAMPLE ID:		RAP307	RAP308	RAP401	RAP402	RAP403
SAMPLE TYPE:		N1	N1	N1	N1	N1
SDG NO:		CELOTEX2	CELOTEX2	CELOTEX2	CELOTEX2	CELOTEX2
Semivolatile Organic Compounds						
2-Methylnaphthalene	ug/kg	5600 U	450 J1	1200 U	620 U	360 J1
Acenaphthene	ug/kg	2800 J1	2800 J1	630 J1	340 J1	990 J1
Acenaphthylene	ug/kg	5600 U	4400 U	1200 U	620 U	2900 U
Anthracene	ug/kg	4000 J1	3600 J1	1300	780	2600 J1
Benzo(a)Anthracene	ug/kg	18000	16000	4600	2000	7800
Benzo(a)pyrene	ug/kg	21000	25000	5400	2200	7500
Benzo(b)fluoranthene	ug/kg	29000	34000	7300	3200	10000
Benzo(g,h,i)perylene	ug/kg	10000	12000	2300	830	2900 J1
Benzo(k)fluoranthene	ug/kg	10000	11000	2500	890	3300
Chrysene	ug/kg	16000	18000	4200	2000	6500
Dibenz(a,h)anthracene	ug/kg	3200 J1	3600 J1	720 J1	280 J1	1100 J1
Fluoranthene	ug/kg	32000	28000	8300	4500	15000
Fluorene	ug/kg	1400 J1	880 J1	420 J1	220 J1	1100 J1
Indeno(1,2,3-cd)pyrene	ug/kg	10000	12000	2500	890	3100
Naphthalene	ug/kg	1000 J1	1100 J1	220 J1	72 J1	460 J1
Phenanthrene	ug/kg	18000	13000	4700	3000	11000
Pyrene	ug/kg	21000	21000	6300	3200	9700

TABLE 3.1
SUMMARY OF DETECTED COMPOUNDS
PHASE II RESIDENTIAL AREA SAMPLING REPORT

2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP4-SS04-0/3	SSAS2-RAP4-SS05-0/3	SSAS2-RAP4-SS06-0/3	SSAS2-RAP4-SS07-0/3	SSAS2-RAP4-SS08-0/3
LOCATION:		SSAS2-RAP4	SSAS2-RAP4	SSAS2-RAP4	SSAS2-RAP4	SSAS2-RAP4
DEPTH RANGE:		0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
SAMPLE DATE:		2/5/98	2/5/98	2/5/98	2/5/98	2/5/98
MATRIX:		Soil	Soil	Soil	Soil	Soil
SAMPLE TYPE:		Field Sample	Field Sample	Field Sample	Field Sample	Field Sample
LAB SAMPLE ID:		A8B060127013	A8B060127014	A8B060127015	A8B060127016	A8B060127017
EPA SAMPLE ID:		RAP404	RAP405	RAP406	RAP407	RAP408
SAMPLE TYPE:		N1	N1	N1	N1	N1
SDG NO:		CELOTEX2	CELOTEX2	CELOTEX2	CELOTEX2	CELOTEX2
Semivolatile Organic Compounds						
2-Methylnaphthalene	ug/kg	350 J1	2200 U	2300 U	500 U	140 J1
Acenaphthene	ug/kg	840 J1	890 J1	1200 J1	170 J1	430 J1
Acenaphthylene	ug/kg	2000 U	2200 U	2300 U	500 U	1000 U
Anthracene	ug/kg	2700	2000 J1	1500 J1	440 J1	680 J1
Benzo(a)Anthracene	ug/kg	6000	6600	7500	1900	3900
Benzo(a)pyrene	ug/kg	6700	10000	12000	2000	3700
Benzo(b)fluoranthene	ug/kg	8600	12000	16000	3000	5500
Benzo(g,h,i)perylene	ug/kg	2800	4400	5700	800	1800
Benzo(k)fluoranthene	ug/kg	3000	4000	6600	890	1400
Chrysene	ug/kg	5900	8000	9400	1800	3100
Dibenz(a,h)anthracene	ug/kg	900 J1	1500 J1	2500	250 J1	520 J1
Fluoranthene	ug/kg	12000	14000	14000	3800	7100
Fluorene	ug/kg	1100 J1	450 J1	450 J1	110 J1	310 J1
Indeno(1,2,3-cd)pyrene	ug/kg	2800	4800	6100	1100	1800
Naphthalene	ug/kg	510 J1	380 J1	320 J1	61 J1	230 J1
Phenanthrene	ug/kg	8300	7300	6200	1800	3700
Pyrene	ug/kg	9600	11000	12000	3100	5400

TABLE 3.1
SUMMARY OF DETECTED COMPOUNDS
PHASE II RESIDENTIAL AREA SAMPLING REPORT

2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP4-SS96-0/3
LOCATION:		SSAS2-RAP4
DEPTH RANGE:		0 to 3 inches
SAMPLE DATE:		2/5/98
MATRIX:		Soil
SAMPLE TYPE:		Field Duplicate
LAB SAMPLE ID:		A8B060127018
EPA SAMPLE ID:		RAP496
SAMPLE TYPE:		FR1
SDG NO:		CELOTEX2
Semivolatile Organic Compounds		
2-Methylnaphthalene	ug/kg	2300 U
Acenaphthene	ug/kg	1100 J1
Acenaphthylene	ug/kg	2300 U
Anthracene	ug/kg	1200 J1
Benzo(a)Anthracene	ug/kg	7800
Benzo(a)pyrene	ug/kg	9500
Benzo(b)fluoranthene	ug/kg	12000
Benzo(g,h,i)perylene	ug/kg	4900
Benzo(k)fluoranthene	ug/kg	4800
Chrysene	ug/kg	7700
Dibenz(a,h)anthracene	ug/kg	1400 J1
Fluoranthene	ug/kg	12000
Fluorene	ug/kg	440 J1
Indeno(1,2,3-cd)pyrene	ug/kg	4300
Naphthalene	ug/kg	370 J1
Phenanthrene	ug/kg	6700
Pyrene	ug/kg	8800

NOTES:

D Reported from diluted sample run due to calibration exceedance in the original analysis.
U The analyte was analyzed for and is not present above the level of the associated value.
UJ The analyte was analyzed for but not detected. The reported detection limit has been qualified due to a QC anomaly . Refer to the numerical suffixes.
UB Analyte detected in the field or laboratory blank associated with this sample. Reported result should be considered estimated and biased high.
J The analyte was positively identified, but the associated numerical value may be imprecise due to a quality control (QC) anomaly.
J^1 Estimated value, greater than the method detection (MDL) or the instrument detection limit (IDL) but less than the project reporting limit (PRL).
J^5 Accuracy and/or precision outlier reported for MS/MSD or field duplicate samples associated with the reported result. Result should be considered estimated.

TABLE 3.2
SUMMARY OF BENZO(A)PYRENE EQUILVALENT CONCENTRATIONS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

	FIELD SAMPLE ID:	SSAS2-RAP1-SS01-0/3	SSAS2-RAP1-SS02-0/3	SSAS2-RAP1-SS92-0/3	SSAS2-RAP1-SS03-0/3	SSAS2-RAP1-SS04-0/3
	LOCATION:	SSAS2-RAP1	SSAS2-RAP1	SSAS2-RAP1	SSAS2-RAP1	SSAS2-RAP1
	DEPTH RANGE:	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
	SAMPLE DATE:	2/4/98	2/4/98	2/4/98	2/4/98	2/4/98
	MATRIX:	Soil	Soil	Soil	Soil	Soil
	SAMPLE TYPE:	Field Sample	Field Sample	Field Duplicate	Field Sample	Field Sample
	LAB SAMPLE ID:	A8B050150001	A8B050150002	A8B050150003	A8B050150004	A8B050150005
	EPA SAMPLE ID:	RAP101	RAP102	RAP192	RAP103	RAP104
	SAMPLE TYPE:	N1	N1	FR1	N1	N1
	SDG NO:	CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX1
Benzo(a)pyrene Equivalents (mg/kg)	Relative Potency					
Benzo(a)anthracene	0.1	3.2	1.5	1.4	4.5	1.8
Chrysene	0.001	0.031	0.017	0.014	0.044	0.019
Benzo(b)fluoranthene	0.1	5	2.2	2.1	5.3	3.1
Benzo(k)fluoranthene	0.01	0.18	0.088	0.091	0.23	0.14
Benzo(a)pyrene	1	38	17	16	48	25
Indeno(1,2,3-cd)pyrene	0.1	1.8	0.87	0.78	2 J1	1.2
Dibenz(a,h)anthracene	1	5.1 J1	2.4 J1	2.1 J1	5.4 J1	3.4 J1
Benzo(a)pyrene (mg/kg)		38	17	16	48	25
Total Benzo(a)pyrene Equivalents (mg/kg)		53.311	24.075	22.485	65.474	34.659

TABLE 3.2
SUMMARY OF BENZO(A)PYRENE EQUILVALENT CONCENTRATIONS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

	FIELD SAMPLE ID:	SSAS2-RAP1-SS05-0/3	SSAS2-RAP1-SS06-0/3	SSAS2-RAP1-SS07-0/3	SSAS2-RAP1-SS08-0/3	SSAS2-RAP2-SS01-0/3
	LOCATION:	SSAS2-RAP1	SSAS2-RAP1	SSAS2-RAP1	SSAS2-RAP1	SSAS2-RAP2
	DEPTH RANGE:	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
	SAMPLE DATE:	2/4/98	2/4/98	2/4/98	2/4/98	2/4/98
	MATRIX:	Soil	Soil	Soil	Soil	Soil
	SAMPLE TYPE:	Field Sample	Field Sample	Field Sample	Field Sample	Field Sample
	LAB SAMPLE ID:	A8B050150006	A8B050150007	A8B050150008	A8B050150009	A8B050150010
	EPA SAMPLE ID:	RAP105	RAP106	RAP107	RAP108	RAP201
	SAMPLE TYPE:	N1	N1	N1	N1	N1
	SDG NO:	CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX1
Benzo(a)pyrene Equivalents (mg/kg)	Relative Potency					
Benzo(a)anthracene	0.1	0.98	3.1	32	1.3	0.61
Chrysene	0.001	0.01	0.03	0.31	0.013	0.0071
Benzo(b)fluoranthene	0.1	1.9	4.1	36	1.9	0.87
Benzo(k)fluoranthene	0.01	0.059	0.18	1.5	0.07	0.034 J1
Benzo(a)pyrene	1	15	35	340	15	6.7
Indeno(1,2,3-cd)pyrene	0.1	0.82	1.6	17	0.72	0.36 J1
Dibenz(a,h)anthracene	1	2.3 J1	4.2 J1	47 J1	2.4 J1	1 J1
Benzo(a)pyrene (mg/kg)		15	35	340	15	6.7
Total Benzo(a)pyrene Equivalents (mg/kg)		21.069	48.21	473.81	21.403	9.5811

TABLE 3.2
SUMMARY OF BENZO(A)PYRENE EQUILVALENT CONCENTRATIONS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

	FIELD SAMPLE ID:	SSAS2-RAP2-SS02-0/3	SSAS2-RAP2-SS03-0/3	SSAS2-RAP2-SS04-0/3	SSAS2-RAP2-SS05-0/3	SSAS2-RAP2-SS95-0/3
	LOCATION:	SSAS2-RAP2	SSAS2-RAP2	SSAS2-RAP2	SSAS2-RAP2	SSAS2-RAP2
	DEPTH RANGE:	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
	SAMPLE DATE:	2/4/98	2/4/98	2/4/98	2/4/98	2/4/98
	MATRIX:	Soil	Soil	Soil	Soil	Soil
	SAMPLE TYPE:	Field Sample	Field Sample	Field Sample	Field Sample	Field Duplicate
	LAB SAMPLE ID:	A8B050150011	A8B050150012	A8B050150013	A8B050150014	A8B050150015
	EPA SAMPLE ID:	RAP202	RAP203	RAP204	RAP205	RAP295
	SAMPLE TYPE:	N1	N1	N1	N1	FR1
	SDG NO:	CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX1
Benzo(a)pyrene Equivalents (mg/kg)	Relative Potency					
Benzo(a)anthracene	0.1	1.6	1.6	2.2	1.3	1.1
Chrysene	0.001	0.016	0.016	0.023	0.014	0.011
Benzo(b)fluoranthene	0.1	2.5	2.5	3.6	2.3	1.8
Benzo(k)fluoranthene	0.01	0.095	0.1	0.12	0.092	0.07
Benzo(a)pyrene	1	19	2	29	18	14
Indeno(1,2,3-cd)pyrene	0.1	0.92	0.91	1.3	0.84	0.67
Dibenz(a,h)anthracene	1	2.8 J1	2.6 J1	3.6 J1	2.2 J1	1.9 J1
Benzo(a)pyrene (mg/kg)		19	2	29	18	14
Total Benzo(a)pyrene Equivalents (mg/kg)		26.931	9.726	39.843	24.746	19.551

TABLE 3.2
SUMMARY OF BENZO(A)PYRENE EQUILVALENT CONCENTRATIONS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

	FIELD SAMPLE ID:	SSAS2-RAP2-SS06-0/3	SSAS2-RAP2-SS07-0/3	SSAS2-RAP2-SS08-0/3	SSAS2-RAP3-SS01-0/3	SSAS2-RAP3-SS02-0/3
	LOCATION:	SSAS2-RAP2	SSAS2-RAP2	SSAS2-RAP2	SSAS2-RAP3	SSAS2-RAP3
	DEPTH RANGE:	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
	SAMPLE DATE:	2/4/98	2/4/98	2/4/98	2/5/98	2/5/98
	MATRIX:	Soil	Soil	Soil	Soil	Soil
	SAMPLE TYPE:	Field Sample	Field Sample	Field Sample	Field Sample	Field Sample
	LAB SAMPLE ID:	A8B050150016	A8B050150017	A8B050150018	A8B060127001	A8B060127002
	EPA SAMPLE ID:	RAP206	RAP207	RAP208	RAP301	RAP302
	SAMPLE TYPE:	N1	N1	N1	N1	N1
	SDG NO:	CELOTEX1	CELOTEX1	CELOTEX1	CELOTEX2	CELOTEX2
Benzo(a)pyrene Equivalents (mg/kg)	Relative Potency					
Benzo(a)anthracene	0.1	1.7	0.99	1	1.6	2.1
Chrysene	0.001	0.019	0.01	0.0098	0.019	0.021
Benzo(b)fluoranthene	0.1	2.5	1.6	1.5	3	3.6
Benzo(k)fluoranthene	0.01	0.083	0.048	0.062 J1	0.12	0.12
Benzo(a)pyrene	1	19	12	13	25	27
Indeno(1,2,3-cd)pyrene	0.1	0.83	0.59	0.68 J1	1.2	1.3
Dibenz(a,h)anthracene	1	2.3 J1	2.3 J1	2 J1	3.3 J1	3.6 J1
Benzo(a)pyrene (mg/kg)		19	12	13	25	27
Total Benzo(a)pyrene Equivalents (mg/kg)		26.432	17.538	18.2518	34.239	37.741

TABLE 3.2
SUMMARY OF BENZO(A)PYRENE EQUILVALENT CONCENTRATIONS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

	FIELD SAMPLE ID:	SSAS2-RAP3-SS03-0/3	SSAS2-RAP3-SS04-0/3	SSAS2-RAP3-SS05-0/3	SSAS2-RAP3-SS95-0/3	SSAS2-RAP3-SS06-0/3
	LOCATION:	SSAS2-RAP3	SSAS2-RAP3	SSAS2-RAP3	SSAS2-RAP3	SSAS2-RAP3
	DEPTH RANGE:	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
	SAMPLE DATE:	2/5/98	2/5/98	2/5/98	2/5/98	2/5/98
	MATRIX:	Soil	Soil	Soil	Soil	Soil
	SAMPLE TYPE:	Field Sample	Field Sample	Field Sample	Field Duplicate	Field Sample
	LAB SAMPLE ID:	A8B060127003	A8B060127004	A8B060127005	A8B060127006	A8B060127007
	EPA SAMPLE ID:	RAP303	RAP304	RAP305	RAP395	RAP306
	SAMPLE TYPE:	N1	N1	N1	FR1	N1
	SDG NO:	CELOTEX2	CELOTEX2	CELOTEX2	CELOTEX2	CELOTEX2
Benzo(a)pyrene Equivalents (mg/kg)	Relative Potency					
Benzo(a)anthracene	0.1	1.9	2.3	2	1.9	2.4
Chrysene	0.001	0.021	0.026	0.018	0.018	0.025
Benzo(b)fluoranthene	0.1	3.8	4.2	3.1	3.2	4.2
Benzo(k)fluoranthene	0.01	0.11	0.18	0.11	0.1	0.15
Benzo(a)pyrene	1	26	34	24	24	32
Indeno(1,2,3-cd)pyrene	0.1	1.4	1.6	1.2	1.1	1.6
Dibenz(a,h)anthracene	1	3.7 J1	4.9 J1	3.6 J1	2.7 J1	4.6 J1
Benzo(a)pyrene (mg/kg)		26	34	24	24	32
Total Benzo(a)pyrene Equivalents (mg/kg)		36.931	47.206	34.028	33.018	44.975

TABLE 3.2
SUMMARY OF BENZO(A)PYRENE EQUILVALENT CONCENTRATIONS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

	FIELD SAMPLE ID:	SSAS2-RAP3-SS07-0/3	SSAS2-RAP3-SS08-0/3	SSAS2-RAP4-SS01-0/3	SSAS2-RAP4-SS02-0/3	SSAS2-RAP4-SS03-0/3
	LOCATION:	SSAS2-RAP3	SSAS2-RAP3	SSAS2-RAP4	SSAS2-RAP4	SSAS2-RAP4
	DEPTH RANGE:	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
	SAMPLE DATE:	2/5/98	2/5/98	2/5/98	2/5/98	2/5/98
	MATRIX:	Soil	Soil	Soil	Soil	Soil
	SAMPLE TYPE:	Field Sample	Field Sample	Field Sample	Field Sample	Field Sample
	LAB SAMPLE ID:	A8B060127008	A8B060127009	A8B060127010	A8B060127011	A8B060127012
	EPA SAMPLE ID:	RAP307	RAP308	RAP401	RAP402	RAP403
	SAMPLE TYPE:	N1	N1	N1	N1	N1
	SDG NO:	CELOTEX2	CELOTEX2	CELOTEX2	CELOTEX2	CELOTEX2
Benzo(a)pyrene Equivalents (mg/kg)	Relative Potency					
Benzo(a)anthracene	0.1	1.8	1.6	0.46	0.2	0.78
Chrysene	0.001	0.016	0.018	0.0042	0.002	0.0065
Benzo(b)fluoranthene	0.1	2.9	3.4	0.73	0.32	1
Benzo(k)fluoranthene	0.01	0.1	0.11	0.025	0.0089	0.033
Benzo(a)pyrene	1	21	25	5.4	2.2	7.5
Indeno(1,2,3-cd)pyrene	0.1	1	1.2	0.25	0.089	0.31
Dibenz(a,h)anthracene	1	3.2 J1	3.6 J1	0.72 J1	0.28 J1	1.1 J1
Benzo(a)pyrene (mg/kg)		21	25	5.4	2.2	7.5
Total Benzo(a)pyrene Equivalents (mg/kg)		30.016	34.928	7.5892	3.0999	10.7295

TABLE 3.2
SUMMARY OF BENZO(A)PYRENE EQUILVALENT CONCENTRATIONS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

	FIELD SAMPLE ID:	SSAS2-RAP4-SS04-0/3	SSAS2-RAP4-SS05-0/3	SSAS2-RAP4-SS06-0/3	SSAS2-RAP4-SS07-0/3	SSAS2-RAP4-SS08-0/3
	LOCATION:	SSAS2-RAP4	SSAS2-RAP4	SSAS2-RAP4	SSAS2-RAP4	SSAS2-RAP4
	DEPTH RANGE:	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches	0 to 3 inches
	SAMPLE DATE:	2/5/98	2/5/98	2/5/98	2/5/98	2/5/98
	MATRIX:	Soil	Soil	Soil	Soil	Soil
	SAMPLE TYPE:	Field Sample	Field Sample	Field Sample	Field Sample	Field Sample
	LAB SAMPLE ID:	A8B060127013	A8B060127014	A8B060127015	A8B060127016	A8B060127017
	EPA SAMPLE ID:	RAP404	RAP405	RAP406	RAP407	RAP408
	SAMPLE TYPE:	N1	N1	N1	N1	N1
	SDG NO:	CELOTEX2	CELOTEX2	CELOTEX2	CELOTEX2	CELOTEX2
Benzo(a)pyrene Equivalents (mg/kg)	Relative Potency					
Benzo(a)anthracene	0.1	0.6	0.66	0.75	0.19	0.39
Chrysene	0.001	0.0059	0.008	0.0094	0.0018	0.0031
Benzo(b)fluoranthene	0.1	0.86	1.2	1.6	0.3	0.55
Benzo(k)fluoranthene	0.01	0.03	0.04	0.066	0.0089	0.014
Benzo(a)pyrene	1	6.7	10	12	2	3.7
Indeno(1,2,3-cd)pyrene	0.1	0.28	0.48	0.61	0.11	0.18
Dibenz(a,h)anthracene	1	0.9 J1	1.5 J1	2.5	0.25 J1	0.52 J1
Benzo(a)pyrene (mg/kg)		6.7	10	12	2	3.7
Total Benzo(a)pyrene Equivalents (mg/kg)		9.3759	13.888	17.5354	2.8607	5.3571

TABLE 3.2
SUMMARY OF BENZO(A)PYRENE EQUILVALENT CONCENTRATIONS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

	FIELD SAMPLE ID:	SSAS2-RAP4-SS96-0/3
	LOCATION:	SSAS2-RAP4
	DEPTH RANGE:	0 to 3 inches
	SAMPLE DATE:	2/5/98
	MATRIX:	Soil
	SAMPLE TYPE:	Field Duplicate
	LAB SAMPLE ID:	A8B060127018
	EPA SAMPLE ID:	RAP496
	SAMPLE TYPE:	FR1
	SDG NO:	CELOTEX2
Benzo(a)pyrene Equivalents (mg/kg)	Relative Potency	
Benzo(a)anthracene	0.1	0.78
Chrysene	0.001	0.0077
Benzo(b)fluoranthene	0.1	1.2
Benzo(k)fluoranthene	0.01	0.048
Benzo(a)pyrene	1	9.5
Indeno(1,2,3-cd)pyrene	0.1	0.43
Dibenz(a,h)anthracene	1	1.4 J1
Benzo(a)pyrene (mg/kg)		**9.5**
Total Benzo(a)pyrene Equivalents (mg/kg)		**13.3657**

SECTION 4
DATA EVALUATION

The four properties sampled as part of the adaptive sampling program executed during the Phase II RASAP consisted of (1) the residential property at which previous sampling had detected the highest BaPeq concentration (Property No. 1), and (2) the closest three residential properties on each side of Property No. 1 (Property Nos. 2, 3, and 4). The data generated from this adaptive sampling program indicated that the average BaPeq soil concentrations at the three new residential properties which were sampled (Property Nos. 2, 3, and 4) do not exceed the highest average BaPeq sample concentration previously detected at Property No. 1 (61 ppm BaPeq). This confirmed that further sampling may not reveal new locations that have a higher priority to be addressed than those previously identified. Therefore, based on the original sampling design, the new data provides support for stopping the residential sampling process at this point.

However, the new non-composite soil sample data reveal a far higher inter-sample variability in soil sample concentrations within the same properties than was expected based on the composite sample data (past residential data/data trends were generated from the analysis of composite soil samples). Specifically, the non-composite sample data reveal "spikes" of relatively high concentrations that do not appear to be clearly related to or necessarily consistent with a Site-related origin and deposition process.

This very high variability in soil concentrations suggests that additional sampling may not provide very much relevant new information about average soil concentrations. Although this determination could provide further reason to limit additional sampling, it also suggests that the statistical characteristics of soil concentrations have not been fully revealed by the analysis of the composite soil samples previously collected. Specifically, the presence of spikes may reflect contributions from a background process (i.e., non-site-related contamination). If so, these spikes should be removed from consideration when estimating the spatial pattern of site-related contamination. Removing them may lead to a different priority order for evaluating residential properties.

The statistical methodology that is being applied to this residential area evaluation process can be applied equally well to data values with or without the spikes removed. However, for this project, it appears to be desirable to use non-composite soil sample data, since the presence of spikes implies that the composite soil sample data may not represent site-related contamination alone.

Figure 4.1 displays the key data on which these conclusions are based. As specified in the Phase II RASAP, eight investigative soil samples and one field duplicate sample (for a total of nine samples) were collected from each of the four residential properties (RAP1 through RAP4), and the PAH data from each sample was converted to BaPeq (refer to Table 3.2). To evaluate the nature of the data for the nine samples, BaPeq sample concentrations were plotted on a property-by-property basis. Figure 4.1 presents the four plots for these 36 values. To assess the median concentration relative to the data set for each property, Table 4.1 lists the data values, rounded to the nearest integer. From these data evaluation tools, the following determinations were made:

- The median concentrations at each property (the bold value in each row of Table 4.1) typically lie within a factor of about 2 of the other sample values.
- The values in each row typically vary by less than an order of magnitude. (The final column of Table 4.1 shows the ratio of the highest to the lowest observed BaPeq values, rounded to the nearest integer.)
- Row 1 contains a dramatic exception. One observation (474 ppm BaPeq) is about seven times larger than the next highest value, and is over 20 times greater than the smallest of the five values obtained at that property.

The plot for residential property RAP1 (Figure 4.1) shows that this extreme value (474 ppm BaPeq) is inconsistent with the assumption of log-normal distribution. Even when this outlier is removed, Figure 4.2 suggests that the assumption that the four different locations have a common log-normal distribution of BaPeq concentrations may not be very useful.

FIGURE 4.1
PLOT OF BAPEQ SAMPLE CONCENTRATIONS FOR EACH PROPERTY

PHASE II RESIDENTIAL AREA SAMPLING AND ANALYSIS PROGRAM
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

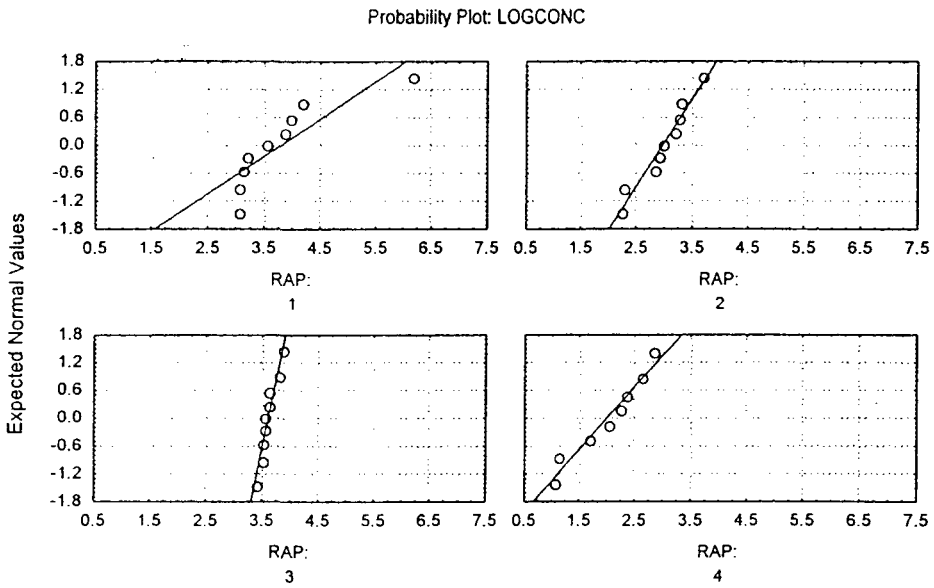
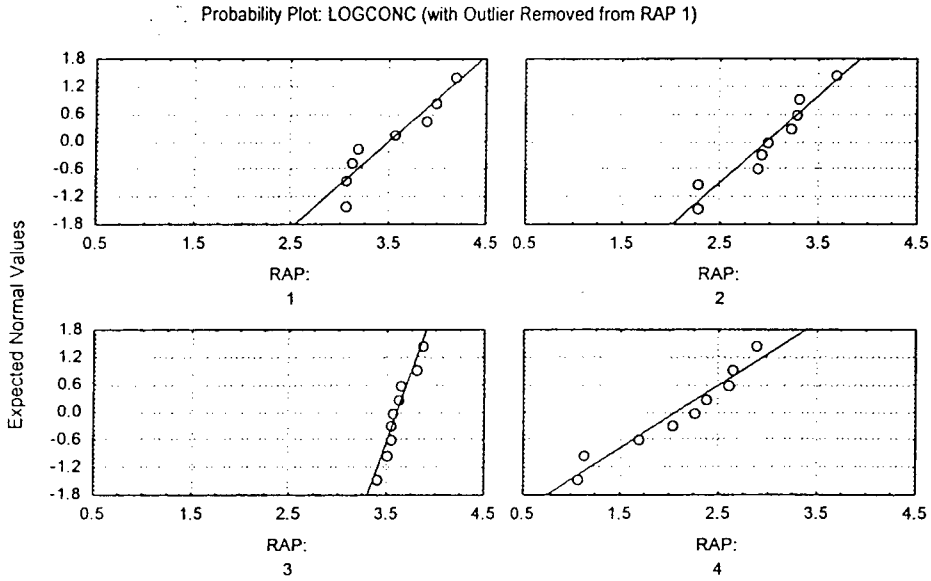


FIGURE 4.2
PLOT COMPARISON OF BAPEQ CONCENTRATIONS FOR EACH PROPERTY AFTER THE OUTLIER AT RAP1 IS REMOVED

PHASE II RESIDENTIAL AREA SAMPLING AND ANALYSIS PROGRAM
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS



In summary, the assumption that concentrations are approximately log-normally distributed, as suggested by the initial analysis of the residential data generated from composited samples, may not be appropriate for these non-composite data. The variation in values at location RAP1 is far greater than would be expected based on the other values (and is somewhat greater even if the extreme value of 474 is ignored). It therefore seems prudent to further evaluate the sources of this extremely high variability before deciding on its implications for priority-setting.

Specifically, it is important to discover how frequently concentration "spikes" (like the value of 474 ppm BaPeq) occur within the residential area of interest. It is also important to decide whether these spikes should be dropped out of the data analysis process as non-site-related artifacts or whether, to the contrary, these data should be used to drive the allocation of remaining investigation and remediation efforts.

Table 4.1 shows clearly that allocating resources based on "median" values, for example, would give a very different priority ordering of locations than allocating resources based on "mean" values with the spike included. This is because the median is resistant to the influence of the outlier(s) while the mean is highly influenced by the outliers. How spikes should be treated will depend on how often they occur, and on whether they occur among background locations which are not considered to be Site-impacted.

Based on these considerations, the Respondents are proposing to perform another round of residential area sampling to clarify the issues noted above. It is noted that this additional round of sampling will have the added benefit of (1) increasing the coverage of sampled residential properties in the foreground (relative to the Site), and (2) expanding the existing data base used to evaluate Site-related impacts to residential properties located in the north-north-east octant. This new round of residential sampling is discussed in Section 5.

TABLE 4.1
STATISTICAL SUMMARY OF THE BAPEQ RESULTS BY PROPERTY

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE SITE
CHICAGO, ILLINOIS

PROPERTY LOCATION	SAMPLE LOCATION AND BAPEQ CONCENTRATIONS IN MG/KG									BAPEQ HIGH/ LOW RATIO
	SS01	SS02	SS03	SS04	SS05	SS06	SS07	SS08	DUP[1]	
RAP1	53	24	65	**35** [2]	21	48	474	21	22	23
RAP2	10	27	10	40	25	26	18	18	**20** [2]	2
RAP3	34	38	37	47	34	45	30	**35** [2]	33	2
RAP4	8	3	11	**9** [2]	14	17	3	5	13	6

Notes
1. This is the duplicate sample result. For RAP1, the duplicate is of SS02; for RAP2, the duplicate is of SS05; for RAP3, the duplicate is of SS05; and for RAP4, the duplicate is of SS06.

2. These bolded values represent the median BaPeq concentration value for each property (i.e., the middle sample concentration when the sample data are ordered from lowest to highest concentration on a property-by-property basis).

SECTION 5
PROPOSED PHASE III ACTIVITIES

5.1 OVERVIEW

As discussed previously in Section 4, the non-composited samples collected as part of the most recent round of sampling revealed a higher inter-sample variability in soil sample concentrations within an individual property than might have been expected based on the previous composite sample data. To provide an adequate set of non-composite data values for use in further adaptive sampling activities and/or decision-making, and to better understand the phenomenon of concentration spikes in the residential area of interest (relative to background), it is considered essential to acquire additional data that is based on non-composite soil samples. As a result, the Respondents are proposing to perform additional residential area sampling.

This Phase III sampling event will entail collecting non-composite soil samples from various foreground and background properties. The data from this additional sampling effort will not replace the data generated previously from composite sample analysis; it will supplement this data base by providing the information needed to refine the adaptive sampling parameters. Once this is done, the data generated from the residential sampling programs (composite and/or non composite data) will be assessed based on the adaptive sampling optimization process, to determine follow-up measures. The manner of this assessment will be depend on what is determined relative to the concentration spikes. The approach for this Phase III sampling program is discussed further in the following subsections.

5.2 PROPOSED PHASE III SAMPLING AND ANALYSIS PROGRAM

Adaptive sampling plans which are based on composite samples typically recommend between 0 and 20 new "seeds" or sampling locations (properties) depending on how the goals for minimizing Type-1 and Type-2 errors are weighted. Furthermore, to evaluate the issue of "spikes" it is necessary to know what is the frequency of occurrence and the magnitude of the PAH spike concentrations in surface

soils located on properties within the foreground and background areas. To make these determinations, non-composite soil samples will be collected from residential properties located in both the foreground and the background. The proposed Phase III soil sample data collection activities are described below.

5.2.1 Foreground Sampling

There are approximately 49 residential properties within the north-north-east octant foreground area of concern (the area within 1200 feet from the Site). It is proposed that eight non-composited soil samples be collected from each of 10 additional residential properties located in the north-north-east octant. It is believed that data from these 10 properties (combined with the data from the four properties sampled during the Phase II RASAP) should provide sufficient non-composite data values to estimate adaptive sampling parameters for non-composite data.

The additional 10 properties will be selected at random; however, measures will be taken to ensure that the chosen properties are not too tightly clustered. The data from these properties will be used to interpolate sets of probable values at other nearby property locations via the adaptive sampling optimization procedure; therefore, the sampled properties need to be spaced across the entirety of the specified foreground area, to facilitate useful spatial interpolation.

An example of one approach that could be used to select the ten additional properties is partitioning the specified foreground area into a grid of three angular sectors with three distance bands within each sector, resulting in nine regions. One property could then be randomly selected from each of the nine regions, and the tenth property could be randomly selected from any of the nine regions. Other methods include using a random number generator computer program to select the properties based on specific minimum property distance separation criteria. The final decision on the selection process will be made prior to implementing the sampling program.

5.2.2 Background Sampling

The approach to sampling residential properties located in "background" areas near the Site is very similar to that described above for the foreground. It is proposed that eight non-composited soil samples be collected from each of 10 residential properties located in background locations within the vicinity of the Site. The residential area that will be targeted for this background sampling program is the area located to the west of the Site, beyond 1200 feet from the center of the Site. The goal of the residential background sampling program is to better understand how frequently (if at all) concentration spikes occur in background soil samples. The decision to sample 10 residential properties is somewhat arbitrary. However, if no concentration spikes or outliers are found in these 80 background soil samples, it may be prudent to conclude that the spikes observed in the north-north-east octant (1) could be site-related, and (2) should be included with the other data values when evaluating which locations to further investigate and/or remediate.

5.2.3 Summary

The Phase III residential area sampling program proposed by the Respondents will entail the sampling of 20 additional residential properties: 10 inside the area of greatest concern and 10 within background These data will be used to better characterize the statistical distribution of non-composite soil concentrations, including the likely existence (or not) of concentration spikes among background locations.

Specifically, the new background data will be analyzed using mixture modeling, to determine whether there is evidence of more than one component in the observed distribution of background concentrations. Technical references such as *Everitt BS, An Introduction to Finite Mixture Distributions, Stat Methods Med Res 1996 Jun;5(2):107-127*; and *Bohning et al., Recent Developments in Computer-Assisted Analysis of Mixtures, Biometrics 1998 Jun;54(2):525-536,* provide discussion on the topic of mixtures.

The site-related component that has been assumed to date, is one that follows a spatial gradient in which concentrations tend to decrease with increasing distance from the Site and is overlaid on a uniform background distribution that may be approximately log-normal. It now appears that there may be several components to the background distribution, including at least one that can produce very high "spikes" such as the spike that was seen in the Phase II non-composite data set. Mixture modeling will be used to study this issue and to characterize the composition of the background concentration distribution in terms of two or more components, if these components are evident based on the evaluation of new Phase II and III data. Specifically, this evaluation process will consist of the following steps:

1. Express the background distribution as a mixture of two or more component distributions having significantly different means. One component will contain the "spikes" or "outliers". The number of components must be estimated from the data, but is unlikely to exceed two or three. (If only one component can be found, then the background distribution will be treated as a single distribution without further decomposition.)

2. Estimate the proportion of the background data that is contributed by each component distribution. This will be done using the EM algorithm cited in the above references, or using similar statistical methods.

The practical value of this evaluation process will be to allow the sampling and remediation decisions to focus more accurately on site-related, rather than background-related, contributions to soil PAH concentrations. Depending on the outcome of this evaluation process, the expected result is that concentration spikes will be treated as either (1) potentially important parts of the site-related contamination, or (2) likely components of the background distribution.

The data generated from the Phase III sampling program (in conjunction with the Phase II non-composite data) will also be used to estimate parameter values for optimal adaptive sampling with non-composite data values. (Refer to Subsection 4.2 of the RACWP for the detailed discussion of the Adaptive Spatial Sampling Plan initially outlined for the residential area sampling program). The parameter values (N, K, S,

and T mentioned in Subsection 4.2 of the RACWP) were previously estimated to minimize expected errors based on composite data. Now that it appears that the non-composite data could be exhibiting a much higher concentration variance than indicated by the composite data (even if spikes are excluded), it may prove appropriate to change one or more of these parameter values to take into account the greater-than-expected variability in concentrations, relative to optimal sampling. To this end, the new sample data will be used to quantify the variability (e.g., the interquantile ranges) of the non-composite data. Comparing this variability to the variability of the composite data will provide an indication of how much the latter distribution must be dilated (if at all) to reproduce the distribution of the non-composite values. This information can be used in optimizing the adaptive sampling process (specifically, in the multiple imputation step for missing data values) to reflect the true variability in the non-composite values. The result may be a change in the parameter values that is expected to minimize errors when this true variability is taken into account.

A goal of this next phase is to obtain sufficient new data so that additional rounds of residential sampling will not be required. Whether this goal is met will depend on (and be determined by) the data values obtained during the Phase III residential sampling event. If, based on the new data, the adaptive sampling procedure determines that no further sampling is justified, sampling will cease. Otherwise, an additional, final round of sampling will be undertaken to reflect what has been learned from the non-composite data. The analytical, quality control, and sampling procedures that will be utilized during the Phase III RASAP will be identical to those used during the Phase II program.

APPENDIX A

TABLE A.1
SUMMARY OF ALL ANALYTICAL RESULTS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP1-SS01-0/3		SSAS2-RAP1-SS02-0/3		SSAS2-RAP1-SS92-0/3		SSAS2-RAP1-SS03-0/3		SSAS2-RAP1-SS04-0/3	
LOCATION:		SSAS2-RAP1		SSAS2-RAP1		SSAS2-RAP1		SSAS2-RAP1		SSAS2-RAP1	
DEPTH RANGE:		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet	
SAMPLE DATE:		2/4/98		2/4/98		2/4/98		2/4/98		2/4/98	
MATRIX:		Soil		Soil		Soil		Soil		Soil	
SAMPLE TYPE:		Field Sample		Field Sample		Field Sample		Field Sample		Field Sample	
LAB SAMPLE ID:		A8B050150001		A8B050150002		A8B050150003		A8B050150004		A8B050150005	
EPA SAMPLE ID:		RAP101		RAP102		RAP192		RAP103		RAP104	
SAMPLE TYPE:		N1		N1		FR1		N1		N1	
SDG NO:		CELOTEX1		CELOTEX1		CELOTEX1		CELOTEX1		CELOTEX1	
PAHs											
2-Methylnaphthalene	ug/kg	1700	J1	600	J1	430	J1	14000	J1	4900	U
Acenaphthene	ug/kg	7000	J1	2400	J1	2100	J1	20000	J1	3400	J1
Acenaphthylene	ug/kg	8600	U	4200	U	3900	U	21000	U	4900	U
Anthracene	ug/kg	8100	J1	3600	J1	3000	J1	28000		3400	J1
Benzo(a)Anthracene	ug/kg	32000		15000		14000		45000		18000	
Benzo(a)pyrene	ug/kg	38000		17000		16000		48000		25000	
Benzo(b)fluoranthene	ug/kg	50000		22000		21000		53000		31000	
Benzo(g,h,i)perylene	ug/kg	17000		8300		7300		20000	J1	12000	
Benzo(k)fluoranthene	ug/kg	18000		8800		9100		23000		14000	
Chrysene	ug/kg	31000		17000		14000		44000		19000	
Dibenz(a,h)anthracene	ug/kg	5100	J1	2400	J1	2100	J1	5400	J1	3400	J1
Fluoranthene	ug/kg	51000		25000		22000		95000		29000	
Fluorene	ug/kg	3500	J1	1200	J1	1200	J1	17000	J1	1300	J1
Indeno(1,2,3-cd)pyrene	ug/kg	18000		8700		7800		20000	J1	12000	
Naphthalene	ug/kg	3900	J1	1300	J1	1200	J1	34000		1200	J1
Phenanthrene	ug/kg	34000		16000		13000		95000		15000	
Pyrene	ug/kg	38000		19000		16000		76000		20000	
Terphenyl-d14	%	68		67		75		0	D	56	
Nitrobenzene-d5	%	64		57		65		0	D	44	
Phenol-d5	%	58		56		70		0	D	51	
1,2-Dichlorobenzene-d4	%	114		95		100		150	D	76	
2-Chlorophenol-d4	%	61		62		73		0	D	59	
2-Fluorobiphenyl	%	73		67		75		0	D	64	
2-Fluorophenol	%	70		62		70		0	D	59	
2,4,6-Tribromophenol	%	54		47		67		0	D	51	

TABLE A.1
SUMMARY OF ALL ANALYTICAL RESULTS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP1-SS05-0/3		SSAS2-RAP1-SS06-0/3		SSAS2-RAP1-SS07-0/3		SSAS2-RAP1-SS08-0/3		SSAS2-RAP2-SS01-0/3	
LOCATION:		SSAS2-RAP1		SSAS2-RAP1		SSAS2-RAP1		SSAS2-RAP1		SSAS2-RAP2	
DEPTH RANGE:		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet	
SAMPLE DATE:		2/4/98		2/4/98		2/4/98		2/4/98		2/4/98	
MATRIX:		Soil		Soil		Soil		Soil		Soil	
SAMPLE TYPE:		Field Sample		Field Sample		Field Sample		Field Sample		Field Sample	
LAB SAMPLE ID:		A8B050150006		A8B050150007		A8B050150008		A8B050150009		A8B050150010	
EPA SAMPLE ID:		RAP105		RAP106		RAP107		RAP108		RAP201	
SAMPLE TYPE:		N1		N1		N1		N1		N1	
SDG NO:		CELOTEX1		CELOTEX1		CELOTEX1		CELOTEX1		CELOTEX1	
PAHs											
2-Methylnaphthalene	ug/kg	1700	J1	3800	J1	52000	J1	700	J1	4300	U
Acenaphthene	ug/kg	1000	J1	8400	J1	110000	J1	2000	J1	540	J1
Acenaphthylene	ug/kg	4700	U	10000	U	120000	U	6000	U	4300	U
Anthracene	ug/kg	1400	J1	11000		190000		3500	J1	1300	J1
Benzo(a)Anthracene	ug/kg	9800		31000		320000		13000		6100	
Benzo(a)pyrene	ug/kg	15000		35000		340000		15000		6700	
Benzo(b)fluoranthene	ug/kg	19000		41000		360000		19000		8700	
Benzo(g,h,i)perylene	ug/kg	8100		15000		140000		7100		4200	J1
Benzo(k)fluoranthene	ug/kg	5900		18000		150000		7000		3400	J1
Chrysene	ug/kg	10000		30000		310000		13000		7100	
Dibenz(a,h)anthracene	ug/kg	2300	J1	4200	J1	47000	J1	2400	J1	1000	J1
Fluoranthene	ug/kg	15000		54000		660000		25000		12000	
Fluorene	ug/kg	4700	U	5500	J1	110000	J1	1100	J1	4300	U
Indeno(1,2,3-cd)pyrene	ug/kg	8200		16000		170000		7200		3600	J1
Naphthalene	ug/kg	1200	J1	10000	J1	120000	J1	980	J1	4300	U
Phenanthrene	ug/kg	5400		41000		650000		12000		5800	
Pyrene	ug/kg	10000		40000		530000		18000	J5	9500	
Terphenyl-d14	%	83		71		0	D	74		82	
Nitrobenzene-d5	%	62		0	D	0	D	43		40	
Phenol-d5	%	50		0	D	0	D	47		25	
1,2-Dichlorobenzene-d4	%	83		67		0	D	78		86	
2-Chlorophenol-d4	%	72		45		0	D	47		54	
2-Fluorobiphenyl	%	75		71		0	D	65		82	
2-Fluorophenol	%	67		55		0	D	50		58	
2,4,6-Tribromophenol	%	64		61		0	D	62		64	

TABLE A.1
SUMMARY OF ALL ANALYTICAL RESULTS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP2-SS02-0/3		SSAS2-RAP2-SS03-0/3		SSAS2-RAP2-SS04-0/3		SSAS2-RAP2-SS05-0/3		SSAS2-RAP2-SS95-0/3	
LOCATION:		SSAS2-RAP2		SSAS2-RAP2		SSAS2-RAP2		SSAS2-RAP2		SSAS2-RAP2	
DEPTH RANGE:		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet	
SAMPLE DATE:		2/4/98		2/4/98		2/4/98		2/4/98		2/4/98	
MATRIX:		Soil		Soil		Soil		Soil		Soil	
SAMPLE TYPE:		Field Sample		Field Sample		Field Sample		Field Sample		Field Sample	
LAB SAMPLE ID:		A8B050150011		A8B050150012		A8B050150013		A8B050150014		A8B050150015	
EPA SAMPLE ID:		RAP202		RAP203		RAP204		RAP205		RAP295	
SAMPLE TYPE:		N1		N1		N1		N1		FR1	
SDG NO:		CELOTEX1		CELOTEX1		CELOTEX1		CELOTEX1		CELOTEX1	
PAHs											
2-Methylnaphthalene	ug/kg	4400	U	4900	U	690	J1	480	J1	490	J1
Acenaphthene	ug/kg	2000	J1	2200	J1	3300	J1	1900	J1	1600	J1
Acenaphthylene	ug/kg	4400	U	4900	U	6500	U	4500	U	4400	U
Anthracene	ug/kg	2600	J1	2700	J1	3900	J1	3200	J1	2500	J1
Benzo(a)Anthracene	ug/kg	16000		16000		22000		13000		11000	
Benzo(a)pyrene	ug/kg	19000		20000		29000		18000		14000	
Benzo(b)fluoranthene	ug/kg	25000		25000		36000		23000		18000	
Benzo(g,h,i)perylene	ug/kg	8700		8700		13000		7900		6800	
Benzo(k)fluoranthene	ug/kg	9500		10000		12000		9200		7000	
Chrysene	ug/kg	16000		16000		23000		14000		11000	
Dibenz(a,h)anthracene	ug/kg	2800	J1	2600	J1	3600	J1	2200	J1	1900	J1
Fluoranthene	ug/kg	26000		26000		35000		22000		20000	
Fluorene	ug/kg	860	J1	940	J1	1300	J1	1100	J1	980	J1
Indeno(1,2,3-cd)pyrene	ug/kg	9200		9100		13000		8400		6700	
Naphthalene	ug/kg	1000	J1	920	J1	1500	J1	920	J1	890	J1
Phenanthrene	ug/kg	11000		12000		17000		12000		10000	
Pyrene	ug/kg	22000		23000		30000		20000		16000	
Terphenyl-d14	%	86		64		68		78		64	
Nitrobenzene-d5	%	42		22	D	0	D	27		0	D
Phenol-d5	%	24	D	24	D	46		29		29	
1,2-Dichlorobenzene-d4	%	73		64		76		96		45	
2-Chlorophenol-d4	%	45		40		43		47		28	
2-Fluorobiphenyl	%	73		60		60		70		36	
2-Fluorophenol	%	42		38		49		56		26	
2,4,6-Tribromophenol	%	67		54		43		56		47	

TABLE A.1
SUMMARY OF ALL ANALYTICAL RESULTS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP2-SS06-0/3		SSAS2-RAP2-SS07-0/3		SSAS2-RAP2-SS08-0/3		SSAS2-RAP3-SS01-0/3		SSAS2-RAP3-SS02-0/3	
LOCATION:		SSAS2-RAP2		SSAS2-RAP2		SSAS2-RAP2		SSAS2-RAP3		SSAS2-RAP3	
DEPTH RANGE:		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet	
SAMPLE DATE:		2/4/98		2/4/98		2/4/98		2/5/98		2/5/98	
MATRIX:		Soil		Soil		Soil		Soil		Soil	
SAMPLE TYPE:		Field Sample		Field Sample		Field Sample		Field Sample		Field Sample	
LAB SAMPLE ID:		A8B050150016		A8B050150017		A8B050150018		A8B060127001		A8B060127002	
EPA SAMPLE ID:		RAP206		RAP207		RAP208		RAP301		RAP302	
SAMPLE TYPE:		N1		N1		N1		N1		N1	
SDG NO:		CELOTEX1		CELOTEX1		CELOTEX1		CELOTEX2		CELOTEX2	
PAHs											
2-Methylnaphthalene	ug/kg	5400	U	320	J1	9200	U	730	J1	6300	U
Acenaphthene	ug/kg	1200	J1	1700	J1	1400	J1	3400	J1	3000	J1
Acenaphthylene	ug/kg	5400	U	2800	U	9200	U	5800	U	6300	U
Anthracene	ug/kg	5000	J1	1800	J1	1900	J1	3700	J1	3800	J1
Benzo(a)Anthracene	ug/kg	17000		9900		10000		16000		21000	
Benzo(a)pyrene	ug/kg	19000		12000		13000		25000		27000	
Benzo(b)fluoranthene	ug/kg	25000		16000		15000		30000		36000	
Benzo(g,h,i)perylene	ug/kg	7200		5800		7300	J1	12000		13000	
Benzo(k)fluoranthene	ug/kg	8300		4800		6200	J1	12000		12000	
Chrysene	ug/kg	19000		10000		9800		19000		21000	
Dibenz(a,h)anthracene	ug/kg	2300	J1	2300	J1	2000	J1	3300	J1	3600	J1
Fluoranthene	ug/kg	33000		16000		16000		28000		32000	
Fluorene	ug/kg	1200	J1	690	J1	970	J1	1700	J1	1400	J1
Indeno(1,2,3-cd)pyrene	ug/kg	8300		5900		6800	J1	12000		13000	
Naphthalene	ug/kg	5400	U	790	J1	9200	U	3100	J1	1300	J1
Phenanthrene	ug/kg	17000		8200		7900	J1	15000		17000	
Pyrene	ug/kg	29000		17000		11000		22000		26000	
Terphenyl-d14	%	85		95		83		61		52	
Nitrobenzene-d5	%	37		29		0	D	33		26	
Phenol-d5	%	34		24	D	34		40		32	
1,2-Dichlorobenzene-d4	%	63		67		78		70		64	
2-Chlorophenol-d4	%	51		53		63		51		39	
2-Fluorobiphenyl	%	59		67		70		65		52	
2-Fluorophenol	%	54		47		63		54		50	
2,4,6-Tribromophenol	%	44		56		51		51		47	

TABLE A.1
SUMMARY OF ALL ANALYTICAL RESULTS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP3-SS03-0/3		SSAS2-RAP3-SS04-0/3		SSAS2-RAP3-SS05-0/3		SSAS2-RAP3-SS95-0/3		SSAS2-RAP3-SS06-0/3	
LOCATION:		SSAS2-RAP3		SSAS2-RAP3		SSAS2-RAP3		SSAS2-RAP3		SSAS2-RAP3	
DEPTH RANGE:		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet	
SAMPLE DATE:		2/5/98		2/5/98		2/5/98		2/5/98		2/5/98	
MATRIX:		Soil		Soil		Soil		Soil		Soil	
SAMPLE TYPE:		Field Sample		Field Sample		Field Sample		Field Sample		Field Sample	
LAB SAMPLE ID:		A8B060127003		A8B060127004		A8B060127005		A8B060127006		A8B060127007	
EPA SAMPLE ID:		RAP303		RAP304		RAP305		RAP395		RAP306	
SAMPLE TYPE:		N1		N1		N1		FR1		N1	
SDG NO:		CELOTEX2		CELOTEX2		CELOTEX2		CELOTEX2		CELOTEX2	
PAHs											
2-Methylnaphthalene	ug/kg	5600	U	9200	U	1900	J1	2500	J1	1000	J1
Acenaphthene	ug/kg	2800	J1	4200	J1	4300	J1	4800		4700	J1
Acenaphthylene	ug/kg	5600	U	9200	U	6200	U	4700	U	8600	U
Anthracene	ug/kg	3500	J1	4800	J1	4700	J1	5400		5800	J1
Benzo(a)Anthracene	ug/kg	19000		23000		20000		19000		24000	
Benzo(a)pyrene	ug/kg	26000		34000		24000		24000		32000	
Benzo(b)fluoranthene	ug/kg	38000		42000		31000		32000		42000	
Benzo(g,h,i)perylene	ug/kg	13000		15000		11000		11000		15000	
Benzo(k)fluoranthene	ug/kg	11000		18000		11000		10000		15000	
Chrysene	ug/kg	21000		26000		18000		18000		25000	
Dibenz(a,h)anthracene	ug/kg	3700	J1	4900	J1	3600	J1	2700	J1	4600	J1
Fluoranthene	ug/kg	31000		39000		34000		33000		43000	
Fluorene	ug/kg	1100	J1	2000	J1	2700	J1	3000	J1	2000	J1
Indeno(1,2,3-cd)pyrene	ug/kg	14000		16000		12000		11000		16000	
Naphthalene	ug/kg	1100	J1	2400	J1	4600	J1	7300		2800	J1
Phenanthrene	ug/kg	14000		20000		19000		23000		23000	
Pyrene	ug/kg	23000		31000		23000		23000		32000	
Terphenyl-d14	%	68		56		60		58		59	
Nitrobenzene-d5	%	0	D	0	D	56		46		0	D
Phenol-d5	%	28		0	D	59		54		0	D
1,2-Dichlorobenzene-d4	%	82		83		76		83		91	
2-Chlorophenol-d4	%	56		41		59		57		59	
2-Fluorobiphenyl	%	68		61		68		67		73	
2-Fluorophenol	%	47		62		59		57		50	
2,4,6-Tribromophenol	%	53		0	D	59		48		0	D

TABLE A.1
SUMMARY OF ALL ANALYTICAL RESULTS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP3-SS07-0/3		SSAS2-RAP3-SS08-0/3		SSAS2-RAP4-SS01-0/3		SSAS2-RAP4-SS02-0/3		SSAS2-RAP4-SS03-0/3	
LOCATION:		SSAS2-RAP3		SSAS2-RAP3		SSAS2-RAP4		SSAS2-RAP4		SSAS2-RAP4	
DEPTH RANGE:		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet	
SAMPLE DATE:		2/5/98		2/5/98		2/5/98		2/5/98		2/5/98	
MATRIX:		Soil		Soil		Soil		Soil		Soil	
SAMPLE TYPE:		Field Sample		Field Sample		Field Sample		Field Sample		Field Sample	
LAB SAMPLE ID:		A8B060127008		A8B060127009		A8B060127010		A8B060127011		A8B060127012	
EPA SAMPLE ID:		RAP307		RAP308		RAP401		RAP402		RAP403	
SAMPLE TYPE:		N1		N1		N1		N1		N1	
SDG NO:		CELOTEX2		CELOTEX2		CELOTEX2		CELOTEX2		CELOTEX2	
PAHs											
2-Methylnaphthalene	ug/kg	5600	U	450	J1	1200	U	620	U	360	J1
Acenaphthene	ug/kg	2800	J1	2800	J1	630	J1	340	J1	990	J1
Acenaphthylene	ug/kg	5600	U	4400	U	1200	U	620	U	2900	U
Anthracene	ug/kg	4000	J1	3600	J1	1300		780		2600	J1
Benzo(a)Anthracene	ug/kg	18000		16000		4600		2000		7800	
Benzo(a)pyrene	ug/kg	21000		25000		5400		2200		7500	
Benzo(b)fluoranthene	ug/kg	29000		34000		7300		3200		10000	
Benzo(g,h,i)perylene	ug/kg	10000		12000		2300		830		2900	J1
Benzo(k)fluoranthene	ug/kg	10000		11000		2500		890		3300	
Chrysene	ug/kg	16000		18000		4200		2000		6500	
Dibenz(a,h)anthracene	ug/kg	3200	J1	3600	J1	720	J1	280	J1	1100	J1
Fluoranthene	ug/kg	32000		28000		8300		4500		15000	
Fluorene	ug/kg	1400	J1	880	J1	420	J1	220	J1	1100	J1
Indeno(1,2,3-cd)pyrene	ug/kg	10000		12000		2500		890		3100	
Naphthalene	ug/kg	1000	J1	1100	J1	220	J1	72	J1	460	J1
Phenanthrene	ug/kg	18000		13000		4700		3000		11000	
Pyrene	ug/kg	21000		21000		6300		3200		9700	
Terphenyl-d14	%	59		73		67		70		73	
Nitrobenzene-d5	%	59		22	D	54		61		54	
Phenol-d5	%	59		45		39		57		67	
1,2-Dichlorobenzene-d4	%	82		91		75		78		91	
2-Chlorophenol-d4	%	56		58		56		63		73	
2-Fluorobiphenyl	%	68		64		62		61		77	
2-Fluorophenol	%	62		67		72		77		70	
2,4,6-Tribromophenol	%	44		58		53		51		76	

TABLE A.1
SUMMARY OF ALL ANALYTICAL RESULTS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP4-SS04-0/3		SSAS2-RAP4-SS05-0/3		SSAS2-RAP4-SS06-0/3		SSAS2-RAP4-SS07-0/3		SSAS2-RAP4-SS08-0/3	
LOCATION:		SSAS2-RAP4		SSAS2-RAP4		SSAS2-RAP4		SSAS2-RAP4		SSAS2-RAP4	
DEPTH RANGE:		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet		0 to 3 feet	
SAMPLE DATE:		2/5/98		2/5/98		2/5/98		2/5/98		2/5/98	
MATRIX:		Soil		Soil		Soil		Soil		Soil	
SAMPLE TYPE:		Field Sample		Field Sample		Field Sample		Field Sample		Field Sample	
LAB SAMPLE ID:		A8B060127013		A8B060127014		A8B060127015		A8B060127016		A8B060127017	
EPA SAMPLE ID:		RAP404		RAP405		RAP406		RAP407		RAP408	
SAMPLE TYPE:		N1		N1		N1		N1		N1	
SDG NO:		CELOTEX2		CELOTEX2		CELOTEX2		CELOTEX2		CELOTEX2	
PAHs											
2-Methylnaphthalene	ug/kg	350	J1	2200	U	2300	U	500	U	140	J1
Acenaphthene	ug/kg	840	J1	890	J1	1200	J1	170	J1	430	J1
Acenaphthylene	ug/kg	2000	U	2200	U	2300	U	500	U	1000	U
Anthracene	ug/kg	2700		2000	J1	1500	J1	440	J1	680	J1
Benzo(a)Anthracene	ug/kg	6000		6600		7500		1900		3900	
Benzo(a)pyrene	ug/kg	6700		10000		12000		2000		3700	
Benzo(b)fluoranthene	ug/kg	8600		12000		16000		3000		5500	
Benzo(g,h,i)perylene	ug/kg	2800		4400		5700		800		1800	
Benzo(k)fluoranthene	ug/kg	3000		4000		6600		890		1400	
Chrysene	ug/kg	5900		8000		9400		1800		3100	
Dibenz(a,h)anthracene	ug/kg	900	J1	1500	J1	2500		250	J1	520	J1
Fluoranthene	ug/kg	12000		14000		14000		3800		7100	
Fluorene	ug/kg	1100	J1	450	J1	450	J1	110	J1	310	J1
Indeno(1,2,3-cd)pyrene	ug/kg	2800		4800		6100		1100		1800	
Naphthalene	ug/kg	510	J1	380	J1	320	J1	61	J1	230	J1
Phenanthrene	ug/kg	8300		7300		6200		1800		3700	
Pyrene	ug/kg	9600		11000		12000		3100		5400	
Terphenyl-d14	%	75		82		83		89		86	
Nitrobenzene-d5	%	38		26		14	D	68		67	
Phenol-d5	%	21	D	15	D	16	D	50		87	
1,2-Dichlorobenzene-d4	%	80		86		92		84		86	
2-Chlorophenol-d4	%	58		54		60		68		81	
2-Fluorobiphenyl	%	70		59		71		68		71	
2-Fluorophenol	%	61		73		80		82		84	
2,4,6-Tribromophenol	%	45		42		48		71		81	

TABLE A.1
SUMMARY OF ALL ANALYTICAL RESULTS

PHASE II RESIDENTIAL AREA SAMPLING REPORT
2800 SOUTH SACRAMENTO AVENUE
CHICAGO, ILLINOIS

FIELD SAMPLE ID:		SSAS2-RAP4-SS96-0/3	
LOCATION:		SSAS2-RAP4	
DEPTH RANGE:		0 to 3 feet	
SAMPLE DATE:		2/5/98	
MATRIX:		Soil	
SAMPLE TYPE:		Field Sample	
LAB SAMPLE ID:		A8B060127018	
EPA SAMPLE ID:		RAP496	
SAMPLE TYPE:		FR1	
SDG NO:		CELOTEX2	
PAHs			
2-Methylnaphthalene	ug/kg	2300	U
Acenaphthene	ug/kg	1100	J1
Acenaphthylene	ug/kg	2300	U
Anthracene	ug/kg	1200	J1
Benzo(a)Anthracene	ug/kg	7800	
Benzo(a)pyrene	ug/kg	9500	
Benzo(b)fluoranthene	ug/kg	12000	
Benzo(g,h,i)perylene	ug/kg	4900	
Benzo(k)fluoranthene	ug/kg	4800	
Chrysene	ug/kg	7700	
Dibenz(a,h)anthracene	ug/kg	1400	J1
Fluoranthene	ug/kg	12000	
Fluorene	ug/kg	440	J1
Indeno(1,2,3-cd)pyrene	ug/kg	4300	
Naphthalene	ug/kg	370	J1
Phenanthrene	ug/kg	6700	
Pyrene	ug/kg	8800	
Terphenyl-d14	%	74	
Nitrobenzene-d5	%	70	
Phenol-d5	%	71	
1,2-Dichlorobenzene-d4	%	83	
2-Chlorophenol-d4	%	71	
2-Fluorobiphenyl	%	78	
2-Fluorophenol	%	71	
2,4,6-Tribromophenol	%	74	

NOTES:

D Reported from diluted sample run due to calibration exceedance in the original analysis.
U The analyte was analyzed for and is not present above the level of the associated value.
UJ The analyte was analyzed for but not detected. The reported detection limit has been qualified due to a QC anomaly . Refer to the numerical suffixes.
UB Analyte detected in the field or laboratory blank associated with this sample. Reported result should be considered estimated and biased high.
J The analyte was positively identified, but the associated numerical value may be imprecise due to a quality control (QC) anomaly.
J^1 Estimated value, greater than the method detection (MDL) or the instrument detection limit (IDL) but less than the project reporting limit (PRL).
J^5 Accuracy and/or precision outlier reported for MS/MSD or field duplicate samples associated with the reported result. Result should be considered estimated.