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DATE: February 23, 2000 **REFERENCE NO.:** 8889-05/70/40

PROJECT NAME: GM Clark Avenue Facility

To: Ms. Bridget Pitlock

General Motors Corporation

WFG - Remediation Team

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Mail Code: 482-310-004

Detroit, Michigan 48202

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QUANTITY	DESCRIPTION
3	Groundwater Monitoring Summary Report (Final)
1	Oil Reclamation Facility Phase I ESA (Copy)
1	Oil Reclamation Facility Phase II ESA (Copy)
3	Central Areas Phase V ESA (Final)

☐ As Requested ☐ For Review and Comment

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COMMENTS:

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Prepared at General Motors

Counsel's Request

Copy to: Glenn Turchan, file

Completed by: Sue Neiheisel
[Please Print]

Signed: Sue Neiheisel

Filing: Correspondence File



Privileged and Confidential
Prepared at General Motors
Counsel's Request

**CENTRAL AREAS (DEVELOPER PARCELS A-1, A-2, A-3, A-4,
B-1, B-2, B-3)**
PHASE V ENVIRONMENTAL SITE ASSESSMENT

General Motors Corporation
Clark Avenue Facility
Detroit, Michigan

FEBRUARY 2000
REF. NO. 8889 (35)

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by General Motors Corporation (GM) to conduct a Phase V Environmental Site Assessment (ESA) for a portion of the GM Clark Avenue Facility located at 2860 Clark Avenue in Detroit, Michigan (Site). The Site is defined as Developer Parcels A-1, A-2, A-3, A-4, B-1, B-2, and B-3. The Site location is presented on Figure 1.1. A Site plan is presented on Figure 1.2.

The Phase V ESA for the Site was initiated in order to remediate impacted soils identified during the Phase I, II and III ESA in the period from September, 1996 to February, 1997. The Phase V ESA activities included the excavation of impacted soils for off-Site disposal, or on-Site thermal treatment of free product impacted soils.

This document presents a summary of the Phase V ESA activities for the Site, in the following sections:

- Background
- Scope of Work
- Analytical Results
- Conclusions

2.0 BACKGROUND

CRA completed a Phase II and III ESA at the Site during the period from September, 1996 through February, 1997. The Phase II ESA was designed to confirm or deny a release at the Potential Areas of Concern (PAOCs) identified during the Phase I ESA. The Phase III ESA was designed to delineate the vertical and horizontal extent of impacted soil at each AOC identified during the Phase II ESA.

Based on the results of the Phase I/II/III ESA, the following Areas of Concern (AOCs) were identified and delineated:

<i>AOC Number</i>	<i>Borehole Location</i>	<i>Contaminant of Concern</i>
<u>Parcel A-1</u>		
A-1-6	BH-201-96	Lead
A-1-14	BH-29A-96	Lead
<u>Parcel A-2</u>		
A-2-1	---	BTEX, free product
A-2-6	BH-31-96	Lead
A-2-7	BH-119-96	Lead
A-2-9	BH-166-96, BH-167-96	Lead
<u>Parcel A-3</u>		
A-3-1	---	BTEX, free product
<u>Parcel A-4</u>		
A-4-5	BH-223-96	Lead, benzo(a)pyrene

Parcel B-1

B-1-4	BH-111A-96	benzo(a)pyrene
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Parcel B-2

B-2-1	BH-157-96	Lead
B-2-2	BH-126-96	Lead

Parcel B-3

None

AOC locations are presented on Figure 2.1. Approximate extent of impacted soil is presented on Figures 2.2 through 2.7.

3.0 SCOPE OF WORK

The scope of work for the Phase V ESA involved the excavation of impacted soils for off-Site disposal or the on-Site thermal treatment of soils, with a breakdown as follows:

<i>AOC Number</i>	<i>Scope of Work</i>
<u>Parcel A-1</u>	
A-1-6	Excavation and Off-Site Disposal
A-1-14	Excavation and Off-Site Disposal
<u>Parcel A-2</u>	
A-2-1	On-Site Thermal Treatment
A-2-6	Excavation and Off-Site Disposal
A-2-7	Excavation and Off-Site Disposal
A-2-9	Excavation and Off-Site Disposal
<u>Parcel A-3</u>	
A-3-1 (same as A-2-1)	On-Site Thermal Treatment
<u>Parcel A-4</u>	
A-4-5	Excavation and Off-Site Disposal
<u>Parcel B-1</u>	
B-1-4	On-Site Thermal Treatment
<u>Parcel B-2</u>	
B-2-1	Excavation and Off-Site Disposal
B-2-2	Excavation and Off-Site Disposal

3.1 EXCAVATION OF IMPACTED SOILS FOR OFF-SITE DISPOSAL

3.1.1 EXCAVATION METHODS

Carlo Environmental Technologies (CET), of Clinton Township, Michigan, performed all Phase V ESA excavation activities at the Site, conducted in October/November 1996, December 1997, and February 1998.

Soil was removed with a 235 Excavator, stockpiled and covered with visqueen on Site for future disposition, with the exception of the soil from AOC B-1-4, which was treated on Site along with AOC A-2-1/A-3-1. The limits of excavation areas were determined by the results of the Phase III ESA borings, visual observations of the excavation area and verification sampling.

Verification samples collected from the sidewalls and floor of the excavation are in accordance with the Michigan Department of Environmental Quality (MDEQ) Verification of Soil Remediation (VSR) Guidance Document (April 1994, Revision 1).

Upon receipt of the analytical results, the excavation areas were backfilled with clean fill materials provided by CET from an off-Site source. The backfill was placed in lifts and compacted to at least 95 percent modified proctor density (MPD). Compaction testing was completed by subcontractors hired by CET.

3.1.2 DECONTAMINATION METHODS

Prior to mobilization of sampling equipment, and prior to the commencement of sampling activities, all equipment was thoroughly steam-cleaned to remove oil, grease, mud and other foreign matter.

The excavator and associated equipment were cleaned using the following sequence:

- i) hot, potable water using a high-pressure, low volume wash and hand scrubbing, as necessary, supplemented by non-phosphate detergent (Alconox); and
- ii) hot, potable water using a high-pressure, low-volume rinse.

Sampling equipment and tools were thoroughly cleaned using the following wash sequence:

- i) cleaning with potable water and non-phosphate detergent (Alconox), using a brush to remove particulate matter and surface films;
- ii) rinsing thoroughly with potable water;
- iii) rinsing with isopropanol;
- iv) rinsing thoroughly with deionized water;
- v) allowing the equipment to air dry as long as possible; and
- vi) wrapping with aluminum foil, if appropriate, if the equipment was to be stored or transported.

3.1.3 SAMPLE ANALYSIS/DATA VALIDATION

Soil samples were collected and submitted to Encotec of Ann Arbor, Michigan, and analyzed for lead.

The sample summary tables, Tables 3.1 through 3.5, present a detailed list of which parameters were analyzed for each sample collected. Parameter selection was based on which constituents were identified at each AOC during the Phase II and III ESA for the Site.

Samples were shipped via hand delivery to the analytical laboratory in sealed coolers packed with ice under chain-of-custody protocol. Chain-of-Custody records are included as Appendix A.

Quality assessment and validation of the analytical data reported by Encotec was conducted by CRA's quality assurance officer. The validation of analytical data was based on laboratory blank data, recovery data from matrix and surrogate spikes, and check samples. The analytical data was assessed for accuracy and precision based on review of the blank and spike recovery data. The analytical data was determined to be valid and suitable for quantitative use specific to this project. The data quality assessment and validation memoranda are presented in Appendix B.

The analytical results for the soil samples were compared to Michigan Act 451, Part 201 Generic Industrial Direct Contact Criteria, as defined in the Environmental Response Division Operational Memorandum #14, Revision 2, dated June 6, 1995.

3.2 ON-SITE THERMAL TREATMENT OF SOILS

The scope of work (SOW) for the on-Site treatment of soils consisted of the following activities:

- i) preparation and submission of submittals by the Contractor selected to perform the work, as required by the Project Specifications (CRA; July 14, 1997);
- ii) development, implementation, and maintenance of a Contractor-Specific Site-Specific Health & Safety Plan;
- iii) operation and maintenance of an equipment decontamination facility, impacted soil staging area, personnel decontamination facility, Site offices, and sanitary facilities;
- iv) Site preparation and removal of clean overburden soils; maintenance of overburden staging areas;
- v) excavation and stockpiling of impacted soils;
- vi) treatment of impacted soils using an on-Site thermal treatment unit (TTU);
- vii) backfilling and compaction of excavation area with clean overburden and thermally treated soils;
- viii) grading and restoration of Site with on-Site crushed concrete; and
- ix) project closeout, including decommissioning of TTU and associated facilities, final decontamination of all Site equipment and facilities, and demobilization from the Site.

3.2.1 PROJECT MANAGEMENT

3.2.1.1 CONSTRUCTION MANAGEMENT

CRA was retained by GM to provide oversight and management of the Phase V ESA activities. CRA's responsibilities included daily observation of Site activities, coordination of weekly progress meetings, and liaison with the contractor and GM

representatives. As a minimum, one CRA representative was on Site for the duration of the construction activities.

3.2.1.2 CONTRACTOR

Carlo Environmental Technologies, Inc. (CET) of Clinton Township, Michigan, was retained by GM to perform the Phase V ESA field activities, including the operation of the on-Site TTU.

3.2.1.3 TESTING AND INSPECTING

CTI and Associates, Inc. (CTI) of Flint, Michigan was retained as a subcontractor to CET to provide geotechnical testing services, including compaction testing.

Analytical laboratory services were provided by American Environmental Network, Inc. (AEN) of Schaumburg, Illinois, and Accutest of Dayton, New Jersey. The laboratories were subcontracted by CRA to provide analytical testing services for verification samples from the excavation area and for samples of thermally treated soils.

3.2.2 SCHEDULE

The following presents a summary of key milestone dates throughout completion of the project:

<i>Activity</i>	<i>Date</i>
Mobilization Begins	August 6, 1997
Commencement of Work	August 11, 1997
Completion of Performance Demonstration	August 19-20, 1997
Commencement of Treated Soil Backfilling	September 5, 1997
Completion of Excavation	September 29, 1997
Completion of Thermal Treatment	October 9, 1997
Completion of Backfilling	October 11, 1997
Demobilization Complete	October 15, 1997

3.2.3 EXCAVATION AND BACKFILLING

Excavation and handling of Site soils was performed to meet the following objectives:

- i) excavation of clean overburden materials; and
- ii) excavation of soils impacted with free product.

Excavation generally proceeded in a manner such that there was a sufficient area for backfilling of treated soils. The excavation and backfilling activities are further described in the following sections.

3.2.3.1 IMPACTED SOIL REMOVAL

In accordance with the SOW, approximately 8 feet of overburden materials were removed from the excavation area to reach the impacted soils, based on the observation of free product.

The excavation of impacted material began near RW-1, a former free product recovery well (see Figure 2.4). The excavation extent was directed by CRA, based on the presence of free product. The performance criteria for the removal was based on visual examination and photoionization detector (PID) readings of the remaining soils. All soil saturated with free product greater than 1/8 of an inch was removed. Clean overburden was segregated from the impacted soils and not treated. The average depth of the excavation area was approximately 12 feet below ground surface (bgs).

Verification samples were collected from the excavation sidewalls and floor consistent with the Michigan Department of Environmental Quality (MDEQ) Verification of Soil Remediation (VSR) Guidance Document, dated April 1994. Soil confirmatory sampling and analysis was conducted to ensure all impacted soil above the Michigan Act 451, Part 201 Generic Industrial Direct Contact Values was removed. All laboratory analytical activities were conducted in accordance with the Site-wide Quality Assurance Project Plan (QAPP), submitted to GM on April 10, 1996. A data quality assessment and validation memorandum is included in Appendix A.

A sample summary for verification samples is presented in Table 3.6. Collected samples were analyzed for benzene, toluene, ethylbenzene and xylene (BTEX) and polynuclear aromatic hydrocarbons (PNAs).

Based on visual observations and PID readings, the delineated area of soil impacted with free product was removed and treated by the TTU.

3.2.3.2 BACKFILLING OF EXCAVATION AREAS

All material used for backfilling were clean overburden soils and thermally treated soils. No soils were imported onto the Site. Backfilled soils were placed in 12-inch lifts and compacted to a minimum of 92 percent of the maximum dry density (ASTM D698).

3.2.4 THERMAL TREATMENT OF SOILS

3.2.4.1 PERFORMANCE DEMONSTRATION

A performance demonstration test was completed to determine the operating protocols for the TTU which would result in acceptable TTU performance.

The results of the performance demonstration test were presented in a report prepared by CET, which is included in Appendix C.

3.2.4.2 TTU OPERATION

The TTU was operated by CET from August 19, 1997 until October 9, 1997, when the treatment of all impacted soils was completed.

Table 3.7 presents soil quantities treated on a daily basis. After completion of the performance demonstration, treated soils were placed into 100 ton piles. One soil sample was collected from each pile and analyzed for BTEX and PNAs. A summary of samples collected from the treated soil is presented in Table 3.8.

3.2.5 TRANSPORTATION AND DISPOSAL

The following waste materials were generated during the Phase V ESA which were transported and disposed of off Site or stockpiled on Site (for future disposal):

- i) asphalt removed from excavation area;
- ii) stormwater removed from excavation area;
- iii) concrete removed from excavation area; and
- iv) impacted debris from excavation area.

Approximately 312 cy of broken asphalt were disposed off Site at various disposal locations.

Stormwater removed from the excavation area was disposed off Site as non-hazardous wastewater.

Approximately 400 cy of concrete materials were removed from the excavation area and temporarily stockpiled on Site. The concrete was loaded into trucks and transported off-Site to National Asphalt Products, Inc. (NAPI) located in Shelby Township, Michigan for crushing. The crushed concrete was transported back to the Site for use as backfill.

Impacted debris includes materials removed from the excavation area which were too large to be treated by the TTU (i.e., chunks of wood, concrete). These materials were transported and disposed of at Browning-Ferris Industries (BFI) Waste Systems.

3.2.6 PROJECT CLOSEOUT

Following the completion of the soil treatment and backfilling of the excavation area, CET cleaned and disassembled the TTU and associated facilities in accordance with the Project Specifications. Demobilization of all equipment was completed by October 15, 1997.

4.0 ANALYTICAL RESULTS

4.1 PARCEL A-1

4.1.1 AOC A-1-6

The dimensions of the excavation at AOC A-1-6 were 15.5 feet by 17 feet, with a depth of 10.5 feet below ground surface (bgs). The approximate volume of excavated soil was 103 cubic yards (cy).

Seven soil verification samples were collected (5 sidewalls, 2 floor) and analyzed for lead. Verification sample locations are presented on Figure 4.1.

A summary of detected lead in soil verification samples from AOC A-1-6 is presented in Table 4.1. Lead was not detected above the Michigan Act 451, Part 201 Generic Industrial Direct Contact Criteria in any of the soil samples.

4.1.2 AOC A-1-14

The dimensions of the excavation at AOC A-1-14 were 17 feet by 20 feet, with a depth of 10 feet bgs. The approximate volume of excavated soil was 126 cy.

Six soil verification samples were collected (4 sidewalls, 2 floor) and analyzed for lead. Verification sample locations are presented on Figure 4.2.

A summary of detected lead in soil samples from AOC A-1-14 is presented in Table 4.1. Lead was not detected above the Michigan Act 451, Part 201 Generic Industrial Direct Contact Criteria in any of the soil samples.

4.2 PARCEL A-2

4.2.1 AOC A-2-6

The dimensions of the excavation at AOC A-2-6 were 18 feet by 20 feet, with a depth of 10 feet bgs. The approximate volume of excavated soil was 134 cy.

Six soil verification samples were collected (4 sidewalls, 2 floor) and analyzed for lead. Verification sample locations are presented on Figure 4.3.

A summary of detected lead in soil verification samples from AOC A-2-6 is presented in Table 4.2. Lead was not detected above the Michigan Act 451, Part 201 Generic Industrial Direct Contact Criteria in any of the soil samples.

4.2.2 AOC A-2-7

The dimensions of the excavation at AOC A-2-7 were 18 feet by 22 feet, with a depth of 10 feet bgs. The approximate volume of excavated soil was 147 cy.

Six soil verification samples were collected (4 sidewalls, 2 floor) and analyzed for lead. Verification sample locations are presented on Figure 4.4.

A summary of detected lead in soil samples from AOC A1-13 is presented in Table 4.2. Lead was not detected above the Michigan Act 451, Part 201 Generic Industrial Direct Contact Criteria in any of the soil samples.

4.2.3 AOC A-2-9

The dimensions of the excavation at AOC A-2-9 were 13 feet by 25 feet, with a depth of 7 feet below ground surface (bgs). The approximate volume of excavated soil was 85 cubic yards (cy).

Six soil verification samples were collected (4 sidewalls, 2 floor) and analyzed for lead. Verification sample locations are presented on Figure 4.5.

A summary of detected lead in soil verification samples from AOC A-2-9 is presented in Table 4.2. Lead was not detected above the Michigan Act 451, Part 201 Generic Industrial Direct Contact Criteria in any of the soil samples.

4.2.4 AOC A-2-1/A-3-1

The excavation area and verification sample locations were regularly surveyed by CRA. The final excavation plan and sample locations are presented on Figure 4.6. Approximately 1,253 cubic yards (cy) of clean overburden soil and 4,720 cy of impacted material was excavated.

A summary of detected parameters in soil verification samples is presented in Table 4.3. No parameters were detected above the Michigan Act 451, Part 201 Generic Industrial Direct Contact Soil Criteria.

A summary of detected parameters in samples from thermally treated soils is presented in Table 4.4. No parameters were detected above the Michigan Act 451, Part 201 Generic Industrial Direct Contact Soil Criteria.

4.3 PARCEL A-3

The only AOC located in Parcel A-3 is AOC A-3-1 (A-2-1), which is discussed in Section 4.2.4.

4.4 PARCEL A-4

4.4.1 AOC A-4-5

The dimensions of the excavation at AOC A-4-5 were 24 feet by 30 feet, with a depth of 6 feet bgs. The approximate volume of excavated soil was 160 cy.

Eight soil verification samples were collected (5 sidewalls, 3 floor) and analyzed for lead and PNAs. Verification sample locations are presented on Figure 4.7.

A summary of detected PNAs and lead in soil verification samples from AOC A-4-5 is presented in Table 4.5. No PNAs or lead were detected above the Michigan Act 451, Part 201 Generic Industrial Direct Contact Criteria.

4.5 PARCEL B-1

4.5.1 AOC B-1-4

The dimensions of the excavation at AOC B-1-4 were 10 feet by 12 feet, with a depth of 8 feet bgs. The approximate volume of impacted soils was 36 cy.

Six soil verification samples were collected (4 sidewalls, 2 floor) and analyzed for PNAs. Verification sample locations are presented on Figure 4.8.

A summary of detected PNAs in soil verification samples from AOC B-1-4 is presented in Table 4.6. No parameters were detected above the Michigan Act 451, Part 201 Generic Industrial Direct Contact Criteria in any of the soil samples.

4.6 PARCEL B-2

4.6.1 AOC B-2-1

The approximate dimensions of the excavation at AOC B-2-1 were 23 feet by 20 feet, with a depth of 6 feet bgs. The approximate volume of impacted soils was 103 cy.

Six soil verification samples were collected (4 sidewalls, 2 floor) and analyzed for lead. Verification sample locations are presented on Figure 4.9.

A summary of detected lead in soil verification samples from AOC B-2-1 is presented in Table 4.7. No parameters were detected above the Michigan Act 451, Part 201 Generic Industrial Direct Contact Criteria in any of the soil samples.

4.6.2 AOC B-2-2

The approximate dimensions of the excavation at AOC B-2-2 were 15 feet by 17 feet, with a depth of 10 feet bgs. The approximate volume of impacted soils was 95 cy.

Six soil verification samples were collected (4 sidewalls, 2 floor) and analyzed for lead. Verification sample locations are presented on Figure 4.10.

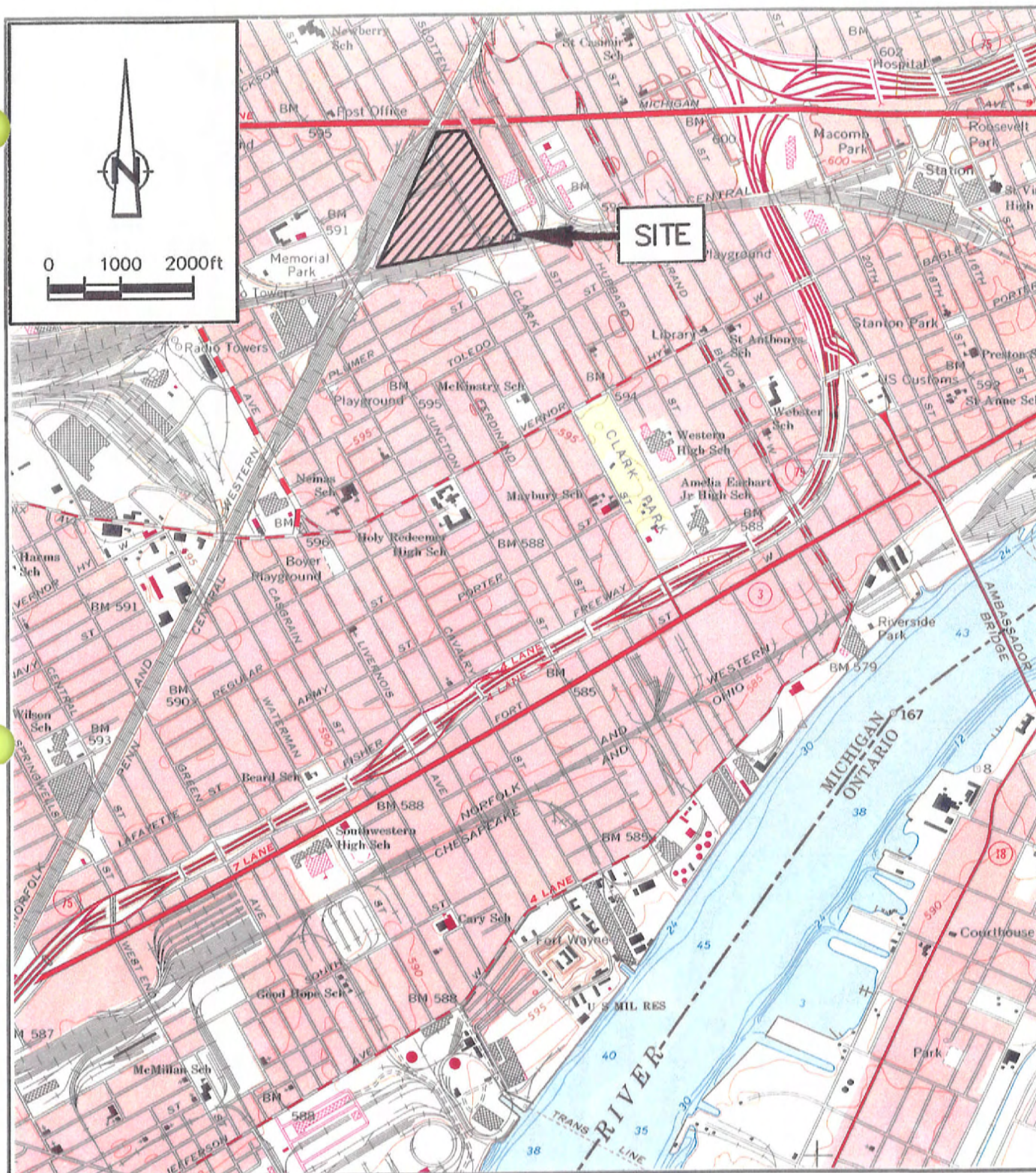
A summary of detected lead in soil verification samples from AOC B-2-2 is presented in Table 4.7. No parameters were detected above the Michigan Act 451, Part 201 Generic Industrial Direct Contact Criteria in any of the soil samples.

4.7 PARCEL B-3

No AOCs were identified in Parcel B-3.

5.0 CONCLUSIONS

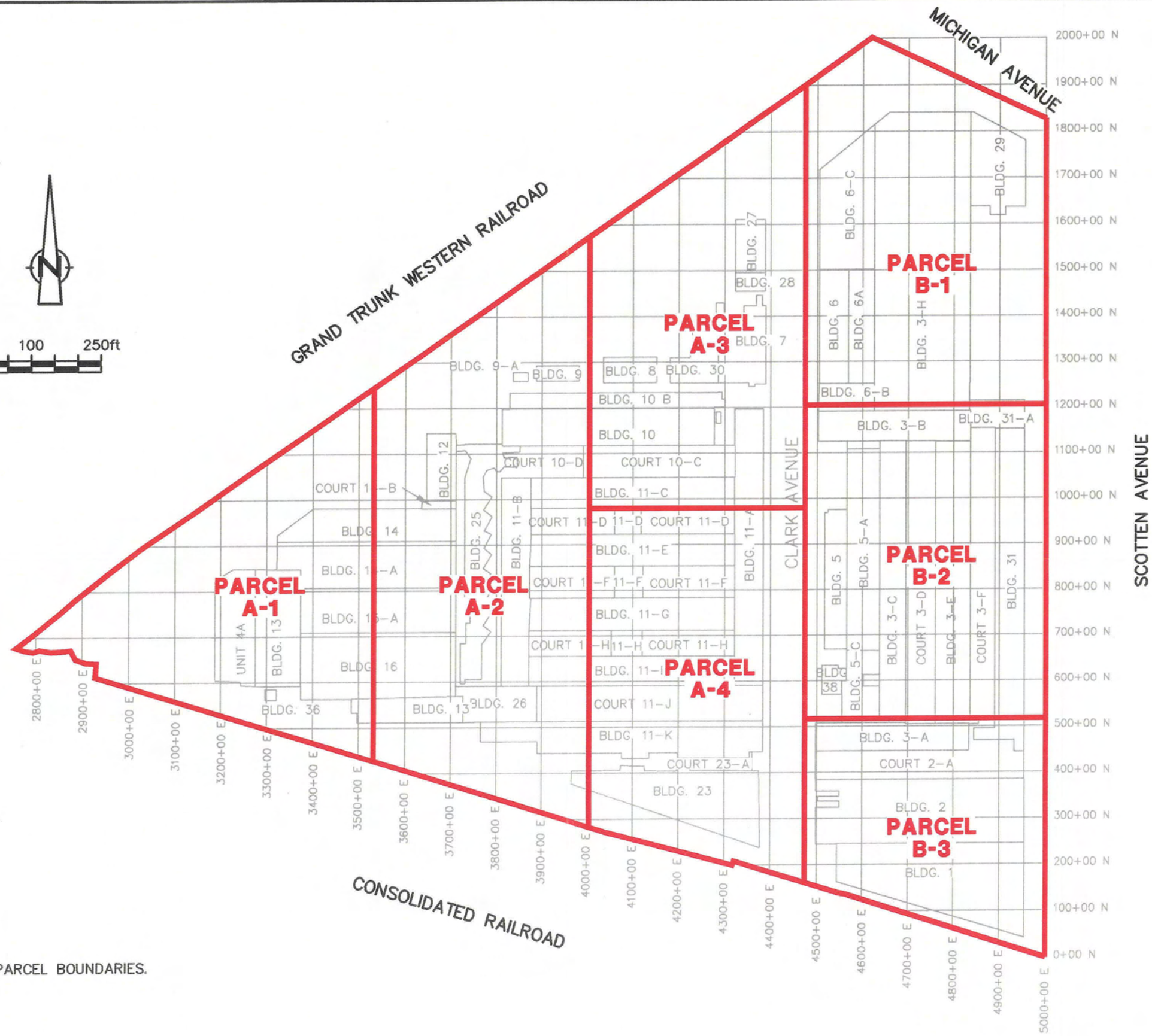
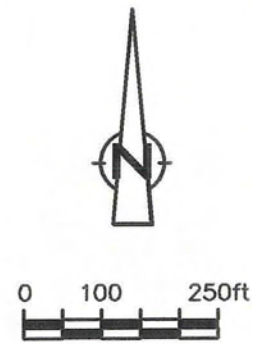
Based on the results of the Phase V ESA for the Site, no further remedial action is warranted. Remediation activities have been completed at the Site by GM which satisfy the criteria for Generic Industrial land use, as defined by the Michigan Department of Environmental Quality (MDEQ), which means that the Site can be used for industrial purposes.



SOURCE: USGS QUADRANGLE MAP;
DETROIT, MICHIGAN

figure 1.1
SITE LOCATION
GM CLARK AVENUE FACILITY
Detroit., Michigan

CRA

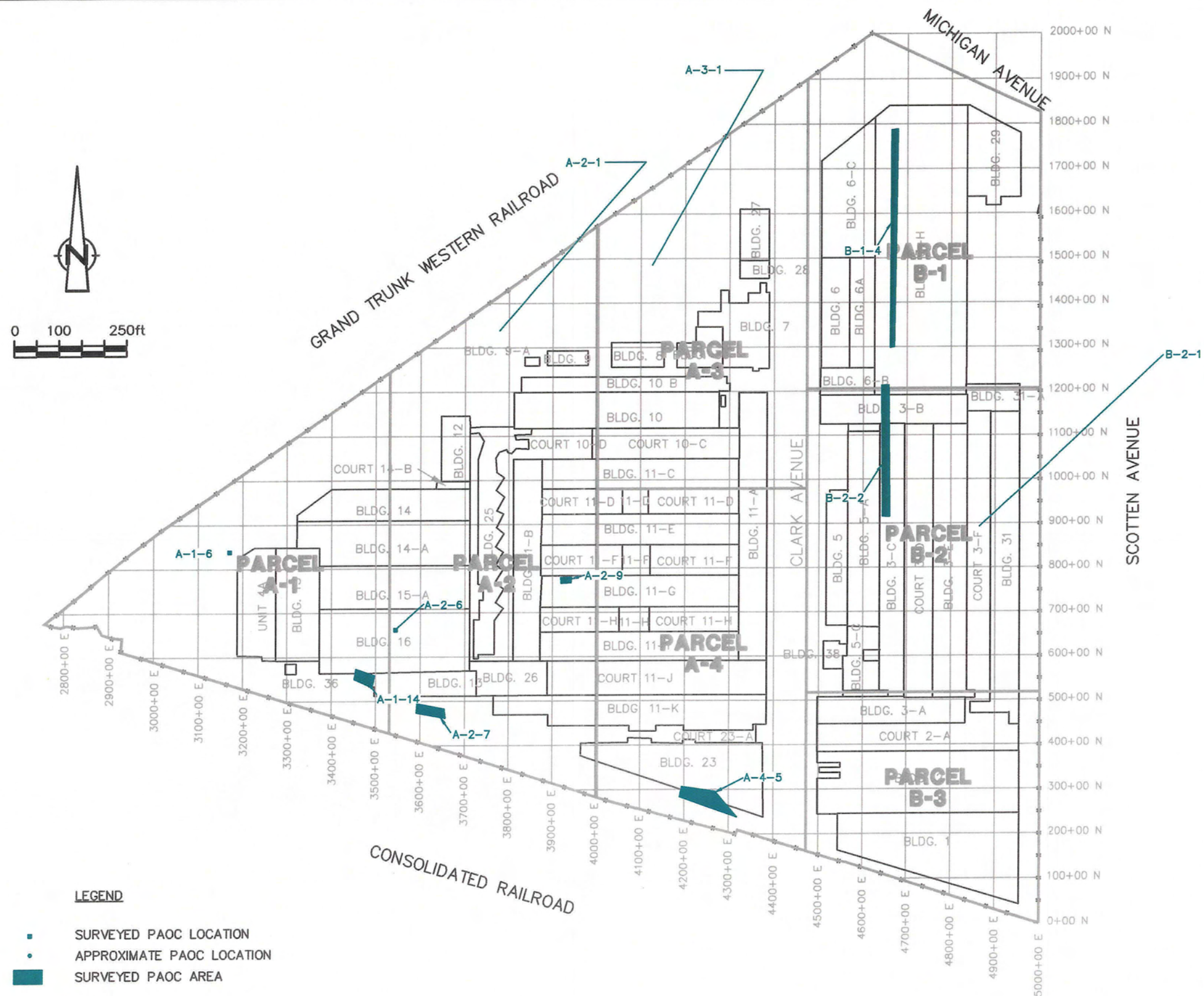


ENGINEERING
BUILDING 40

NOTES

— APPROXIMATE PARCEL BOUNDARIES.

figure 1.2
SITE PLAN
GM CLARK AVENUE FACILITY
Detroit, Michigan

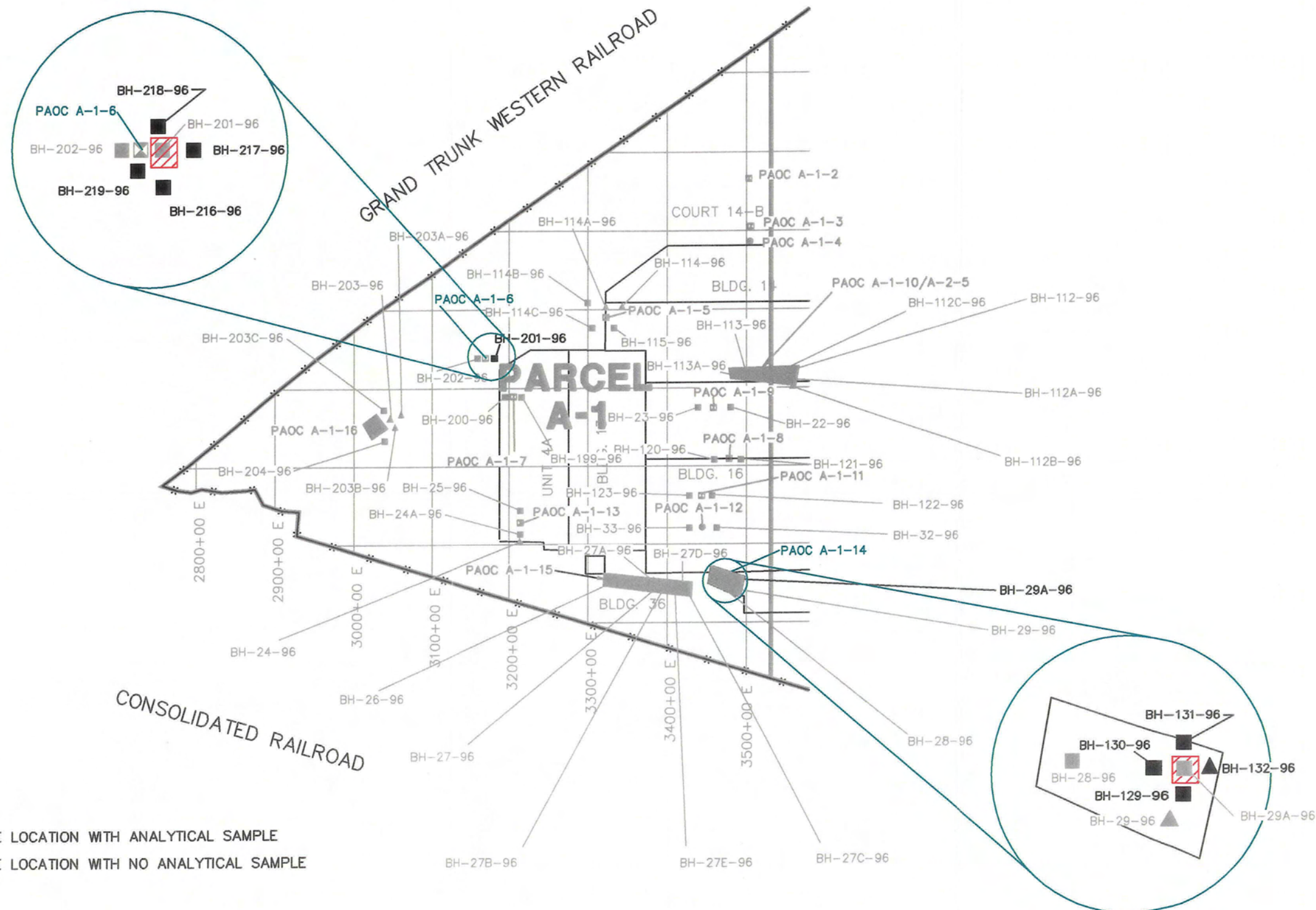
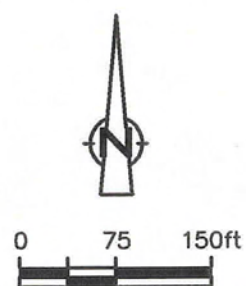


ENGINEERING
BUILDING 40

LEGEND

- SURVEYED PAOC LOCATION
- APPROXIMATE PAOC LOCATION
- SURVEYED PAOC AREA

figure 2.1
LOCATION OF AOCs
GM CLARK AVENUE FACILITY
Detroit, Michigan



LEGEND

- APPROXIMATE PHASE III ESA BOREHOLE LOCATION WITH ANALYTICAL SAMPLE
- ▲ APPROXIMATE PHASE III ESA BOREHOLE LOCATION WITH NO ANALYTICAL SAMPLE
- ▣ SURVEYED PAOC LOCATION
- APPROXIMATE PAOC LOCATION
- SURVEYED PAOC AREA
- APPROXIMATE PHASE II ESA BOREHOLE LOCATION WITH ANALYTICAL SAMPLE
- ▲ APPROXIMATE PHASE II ESA BOREHOLE LOCATION WITH NO ANALYTICAL SAMPLE
- ▨ APPROXIMATE EXTENT OF IMPACTED SOIL

figure 2.2

APPROXIMATE EXTENT OF IMPACTED SOIL—PARCEL A-1
GM CLARK AVENUE FACILITY
Detroit, Michigan

CRA

- LEGEND**
- APPROXIMATE PHASE III ESA BOREHOLE LOCATION WITH ANALYTICAL SAMPLE
 - ▲ APPROXIMATE PHASE III ESA BOREHOLE LOCATION WITH NO ANALYTICAL SAMPLE
 - SURVEYED PAOC LOCATION
 - SURVEYED PAOC AREA
 - APPROXIMATE PHASE II ESA BOREHOLE LOCATION WITH ANALYTICAL SAMPLE
 - ▲ APPROXIMATE PHASE II ESA BOREHOLE LOCATION WITH NO ANALYTICAL SAMPLE
 - ▨ APPROXIMATE EXTENT OF IMPACTED SOIL

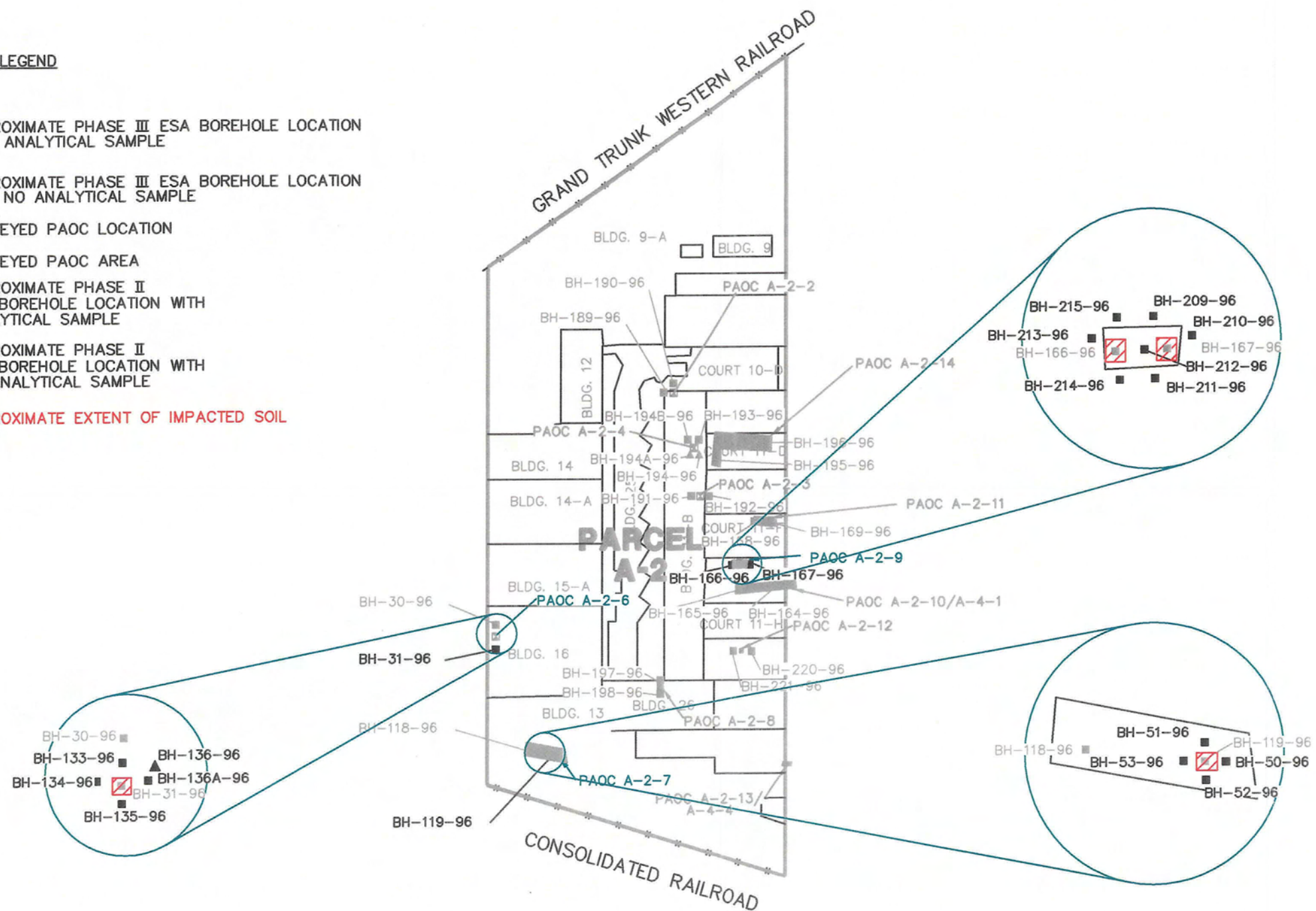
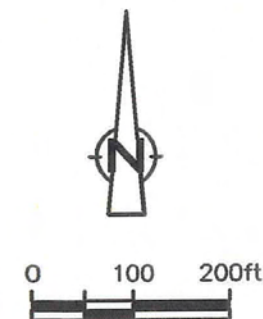
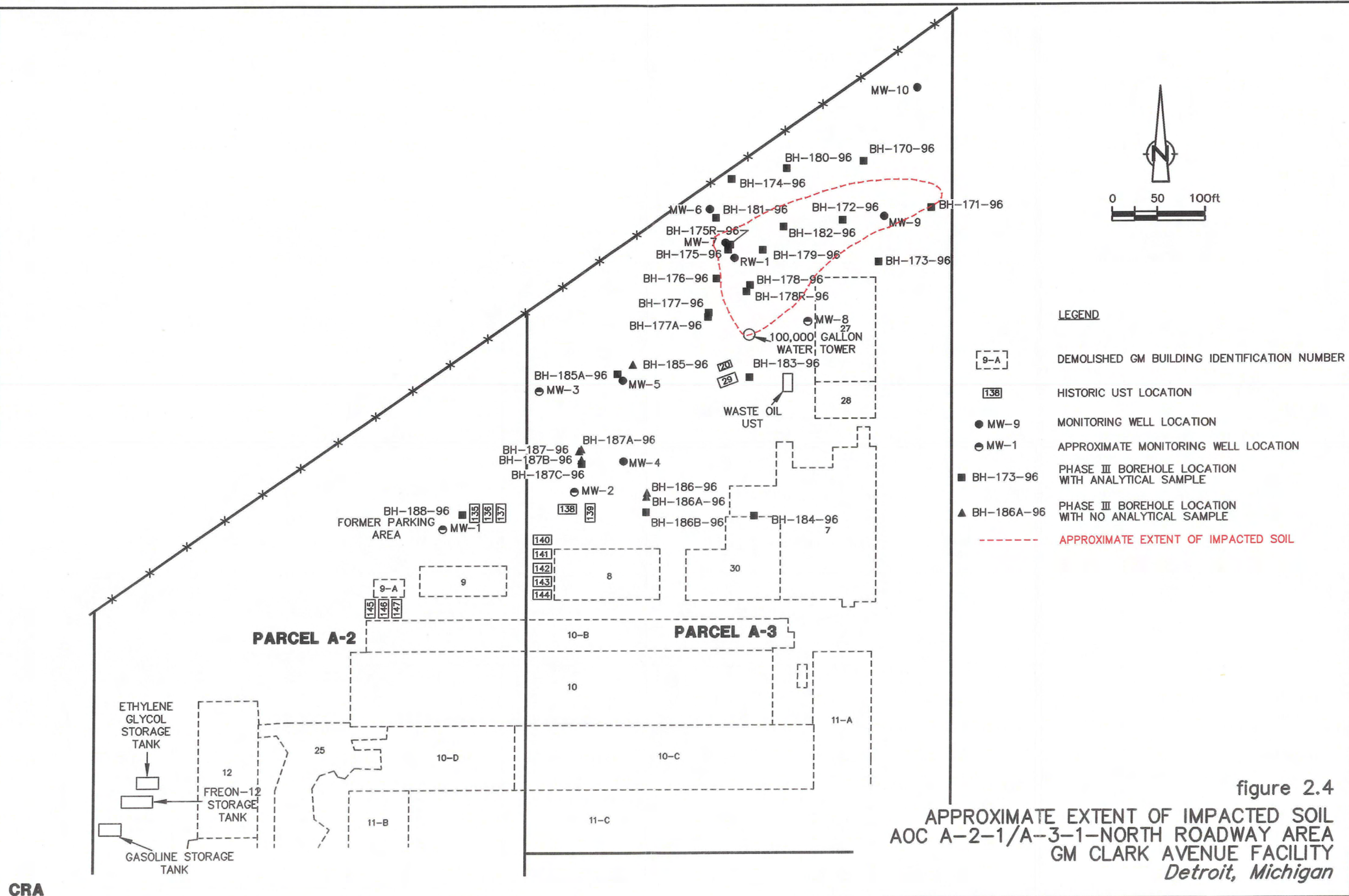
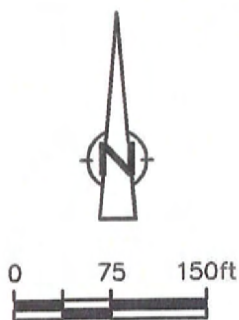


figure 2.3
APPROXIMATE EXTENT OF IMPACTED SOIL—PARCEL A-2
GM CLARK AVENUE FACILITY
Detroit, Michigan

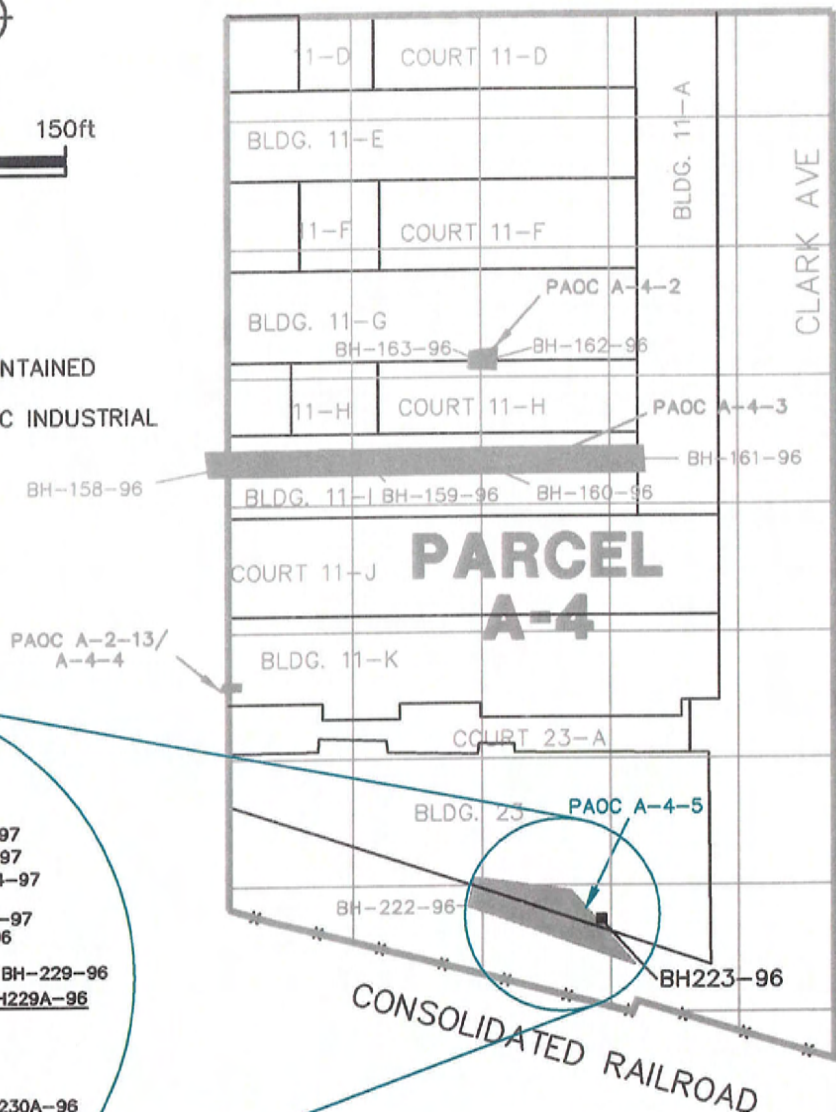


CRA

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NOTE: UNDERLINED BOREHOLES CONTAINED
LEAD ABOVE THE MICHIGAN
ACT 451, PART 201 GENERIC INDUSTRIAL
DIRECT CONTACT CRITERIA



LEGEND

- SURVEYED PHASE III ESA BOREHOLE LOCATION WITH ANALYTICAL SAMPLE
- ▲ APPROXIMATE PHASE III ESA BOREHOLE LOCATION WITH ANALYTICAL SAMPLE
- SURVEYED PHASE III ESA BOREHOLE LOCATION WITH NO ANALYTICAL SAMPLE
- APPROXIMATE PHASE III ESA BOREHOLE LOCATION WITH NO ANALYTICAL SAMPLE
- APPROXIMATE PHASE II ESA BOREHOLE LOCATION WITH ANALYTICAL SAMPLE
- SURVEYED PAOC LOCATION
- SURVEYED PAOC AREA
- APPROXIMATE EXTENT OF IMPACTED SOIL

APPROXIMATE EXTENT OF IMPACTED SOIL
PARCEL A-4
GM CLARK AVENUE FACILITY
Detroit, Michigan

CRA



LEGEND

- BH-1-96 APPROXIMATE PHASE III BOREHOLE LOCATION WITH ANALYTICAL SAMPLE
- SURVEYED PAOC LOCATION
- APPROXIMATE PAOC LOCATION
- BH-1-96 APPROXIMATE PHASE II ESA BOREHOLE LOCATION WITH ANALYTICAL SAMPLES
- ▲ BH-111-96 APPROXIMATE PHASE II ESA BOREHOLE LOCATION WITH NO ANALYTICAL SAMPLES
- APPROXIMATE TEST TRENCH LOCATION
- APPROXIMATE EXTENT OF IMPACTED SOIL

figure 2.6

APPROXIMATE EXTENT OF IMPACTED SOIL—PARCEL B-1
GM CLARK AVENUE FACILITY
Detroit, Michigan

CRA

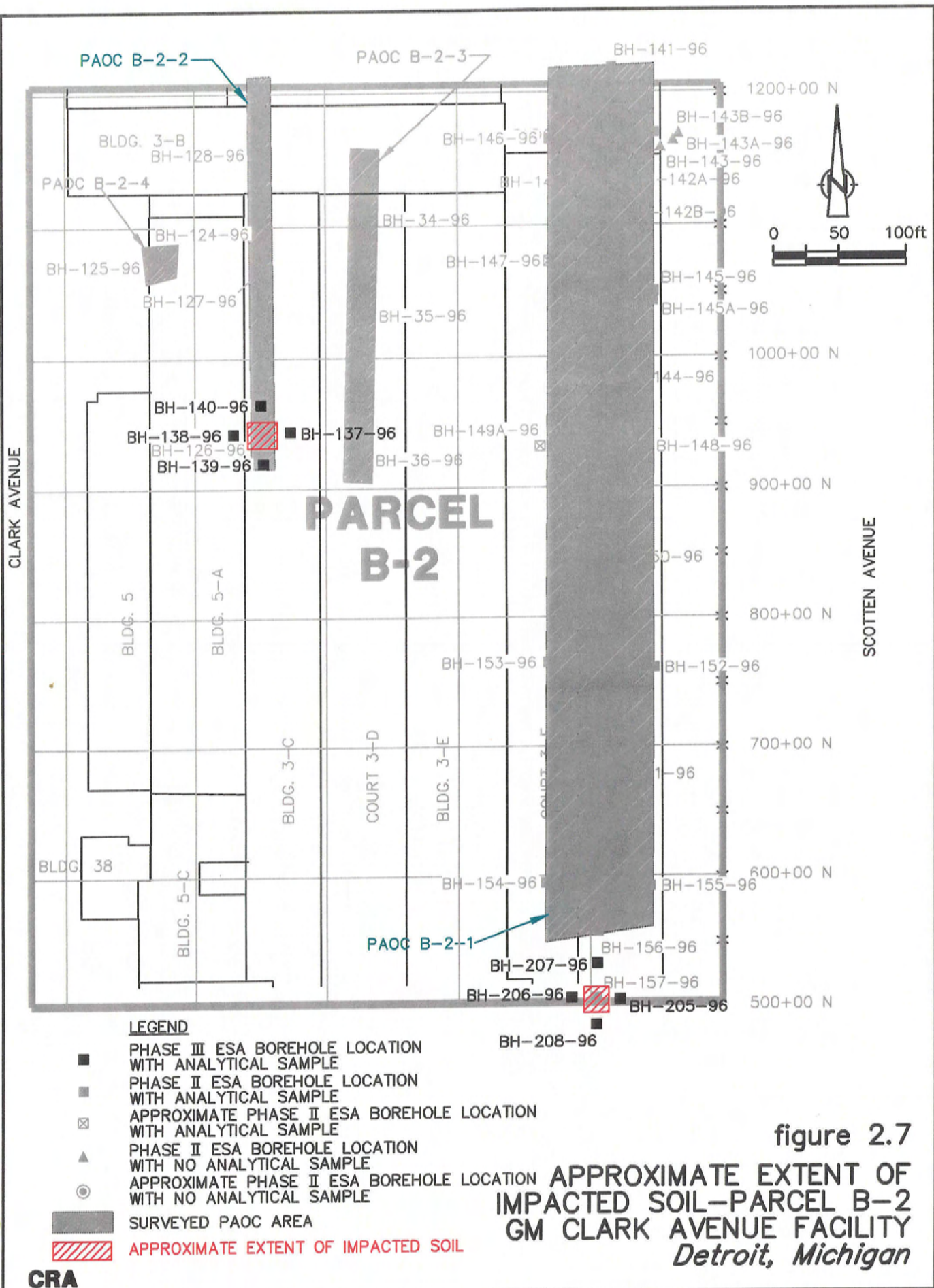
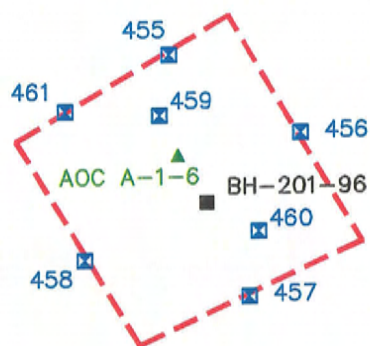
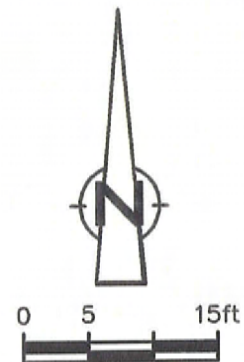


figure 2.7



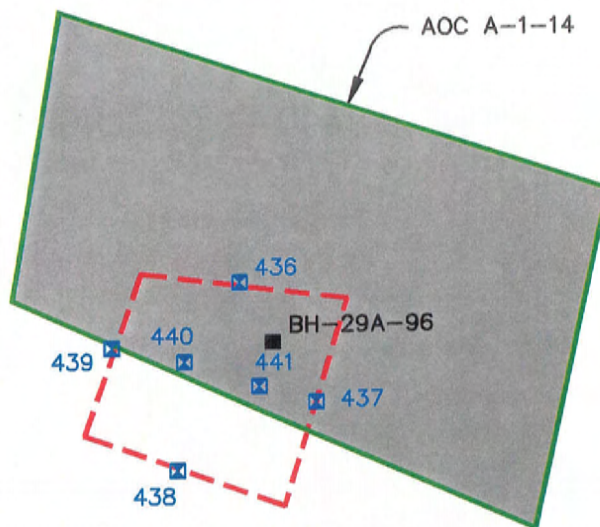
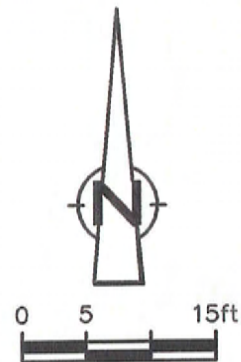
LEGEND

- ▲ AOC A-1-6 AOC LOCATION
- LIMIT OF EXCAVATION
- ☒ 455 VERIFICATION SAMPLE LOCATION
- BH-201-96 PHASE II ESA BOREHOLE SAMPLE LOCATION

NOTE: BUILDING LOCATIONS ARE NOT SURVEYED

figure 4.1

AOC A-1-6 VERIFICATION SAMPLE LOCATIONS
PARCEL A-1
GM CLARK AVENUE FACILITY
Detroit, Michigan



LEGEND



LIMIT OF AOC



LIMIT OF EXCAVATION



436

VERIFICATION SAMPLE LOCATION



BH-29A-96

PHASE II ESA BOREHOLE SAMPLE LOCATION

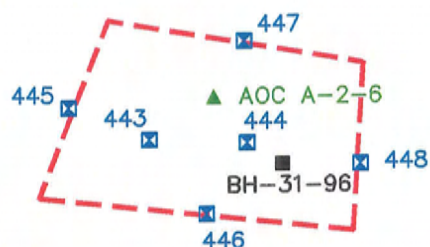
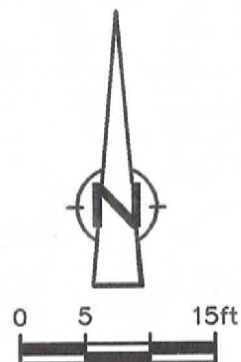
NOTE: BUILDING LOCATIONS ARE NOT SURVEYED

figure 4.2

AOC A-1-14 VERIFICATION SAMPLE LOCATIONS
PARCEL A-1
GM CLARK AVENUE FACILITY
Detroit, Michigan

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LEGEND

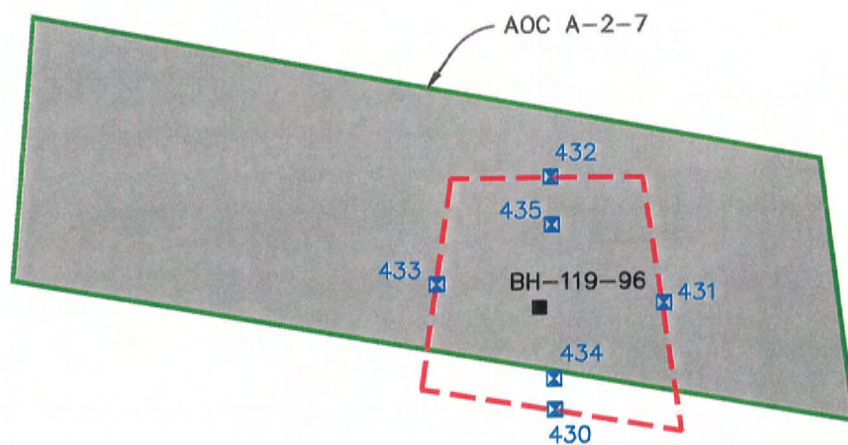
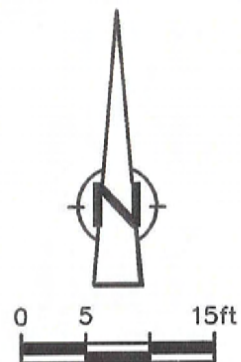
- ▲ AOC A-2-6 AOC LOCATION
- LIMIT OF EXCAVATION
- ☒ 447 VERIFICATION SAMPLE LOCATION
- BH-31-96 PHASE II ESA BOREHOLE SAMPLE LOCATION

NOTE: BUILDING LOCATIONS ARE NOT SURVEYED

figure 4.3

AOC A-2-6 VERIFICATION SAMPLE LOCATIONS
PARCEL A-2
GM CLARK AVENUE FACILITY
Detroit, Michigan

CRA



LEGEND



LIMIT OF AOC



LIMIT OF EXCAVATION



432

VERIFICATION SAMPLE LOCATION



BH-119-96

PHASE II ESA BOREHOLE SAMPLE LOCATION

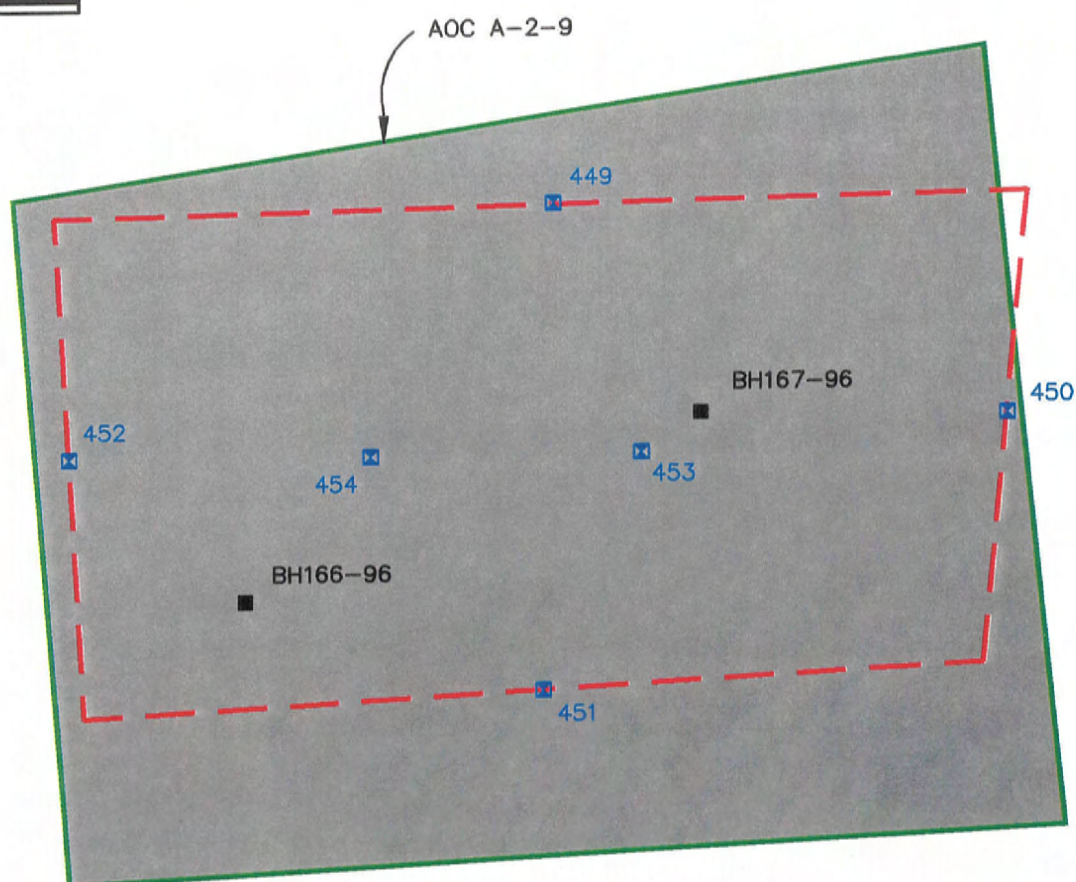
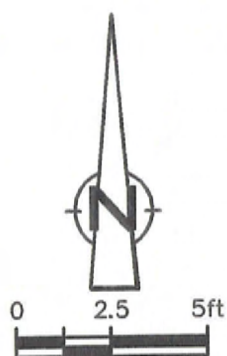
NOTE: BUILDING LOCATIONS ARE NOT SURVEYED

figure 4.4

AOC A-2-7 VERIFICATION SAMPLE LOCATIONS
PARCEL A-2
GM CLARK AVENUE FACILITY
Detroit, Michigan

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LEGEND



LIMIT OF AOC



LIMIT OF EXCAVATION



451

VERIFICATION SAMPLE LOCATION



BH166-96

PHASE II ESA BOREHOLE LOCATION

figure 4.5

AOC A-2-9 VERIFICATION SAMPLE LOCATIONS
PARCEL A-2
GM CLARK AVENUE FACILITY
Detroit, Michigan

CRA

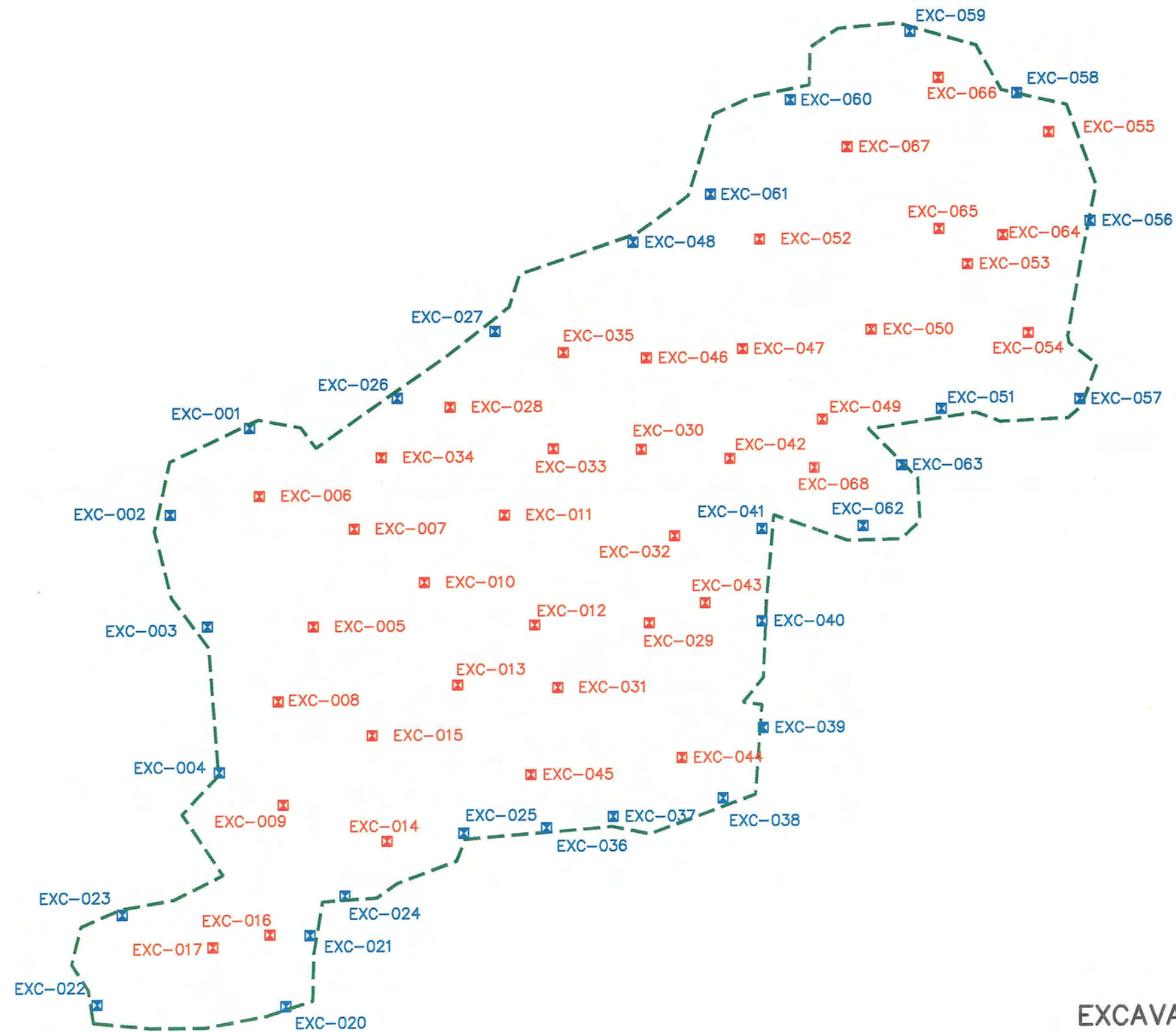
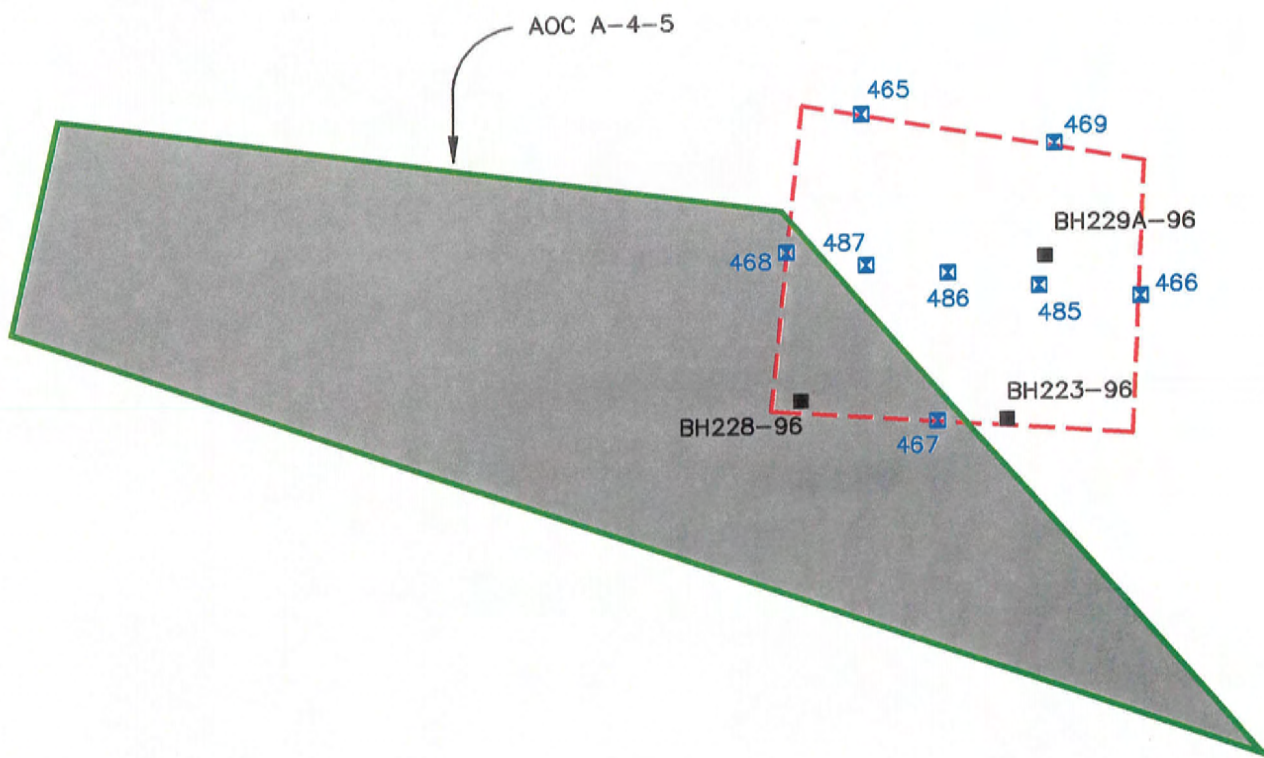


figure 4.6
EXCAVATION AREA PLAN AND SAMPLE LOCATIONS
AOC A-2-1/A-3-1
GM CLARK AVENUE FACILITY
Detroit, Michigan



0 10 20ft



LEGEND



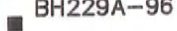
LIMIT OF AOC



LIMIT OF EXCAVATION



VERIFICATION SAMPLE LOCATION



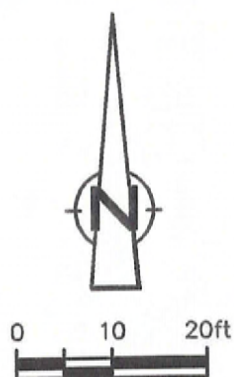
PHASE II/III ESA BOREHOLE LOCATION

figure 4.7

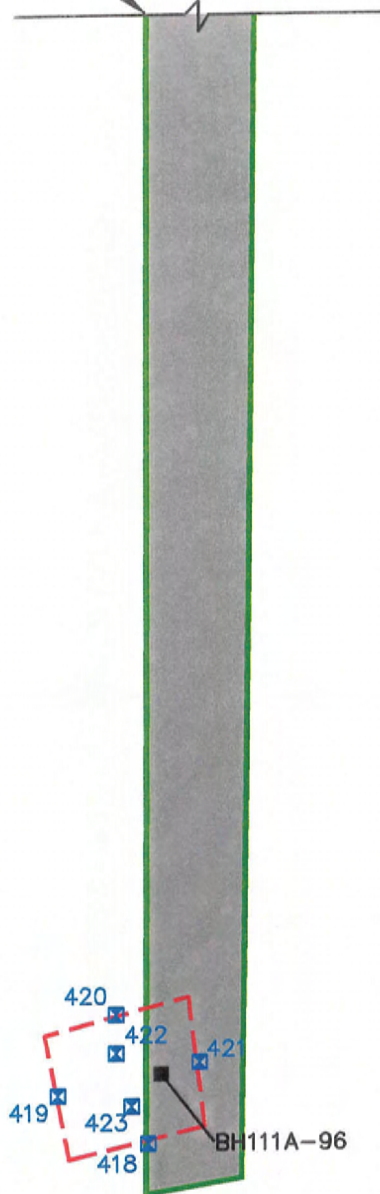
AOC A-4-5 VERIFICATION SAMPLE LOCATIONS
PARCEL A-4
GM CLARK AVENUE FACILITY
Detroit, Michigan

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AOC B-1-4



LEGEND



LIMIT OF AOC



LIMIT OF EXCAVATION



420

VERIFICATION SAMPLE LOCATION



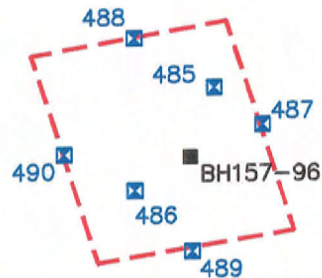
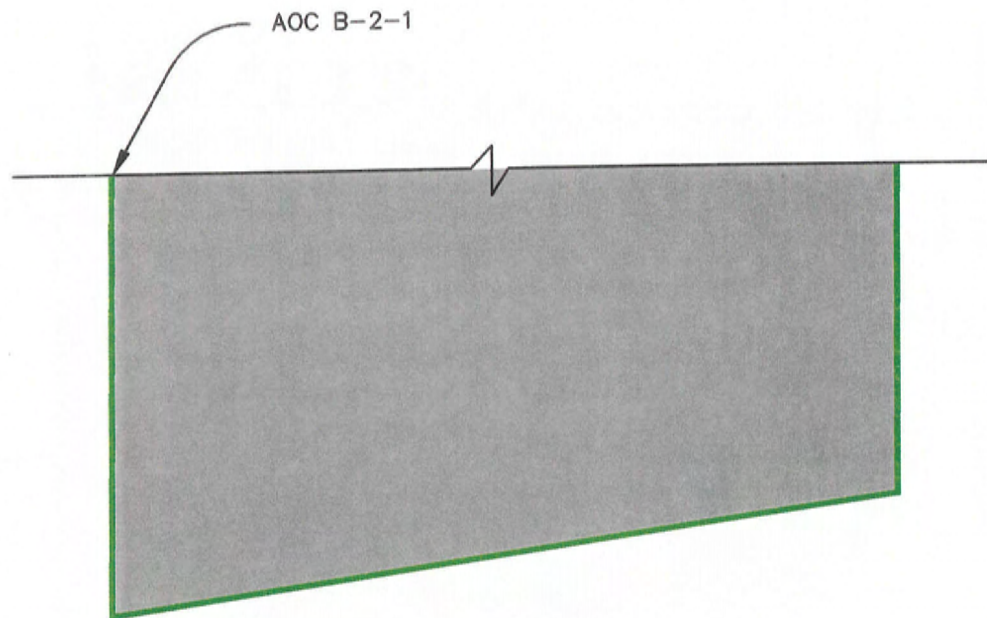
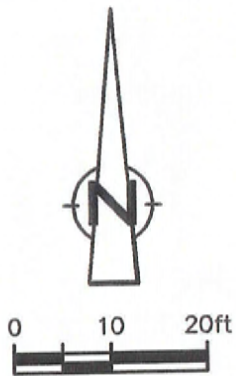
BH111A-96

PHASE II ESA BOREHOLE LOCATION

figure 4.8

AOC B-1-4 VERIFICATION SAMPLE LOCATIONS
PARCEL B-1
GM CLARK AVENUE FACILITY
Detroit, Michigan

CRA



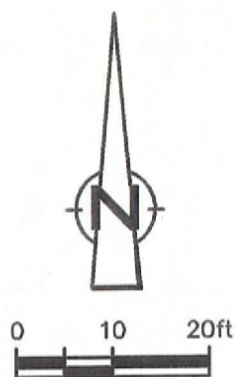
LEGEND

-  LIMIT OF AOC
-  LIMIT OF EXCAVATION
-  488 VERIFICATION SAMPLE LOCATION
-  BH157-96 PHASE II ESA BOREHOLE LOCATION

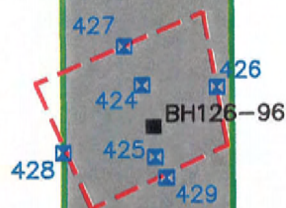
figure 4.9

AOC B-2-1 VERIFICATION SAMPLE LOCATIONS
PARCEL B-2
GM CLARK AVENUE FACILITY
Detroit, Michigan

CRA



AOC B-2-2



LEGEND



LIMIT OF AOC



LIMIT OF EXCAVATION

427

VERIFICATION SAMPLE LOCATION



BH126-96

PHASE II ESA BOREHOLE LOCATION

figure 4.10

AOC B-2-2 VERIFICATION SAMPLE LOCATIONS
PARCEL B-2
GM CLARK AVENUE FACILITY
Detroit, Michigan

CRA

TABLE 3.1

**SAMPLE SUMMARY
PHASE V ESA
PARCEL A-1
GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN**

<i>Sample Number</i>	<i>Sample Location</i>	<i>AOC Number</i>	<i>Analysis</i>
S-8889-111996-TH-436	North Wall	A-1-14	Lead
S-8889-111996-TH-437	East Wall	A-1-14	Lead
S-8889-111996-TH-438	South Wall	A-1-14	Lead
S-8889-111996-TH-439	West Wall	A-1-14	Lead
S-8889-111996-TH-440	West Floor	A-1-14	Lead
S-8889-111996-TH-441	East Floor	A-1-14	Lead
S-8889-121097-SF-455	North Wall	A-1-6	Lead
S-8889-121097-SF-456	East Wall	A-1-6	Lead
S-8889-121097-SF-457	South Wall	A-1-6	Lead
S-8889-121097-SF-458	West Wall	A-1-6	Lead
S-8889-121097-SF-459	North Floor	A-1-6	Lead
S-8889-121097-SF-460	South Floor	A-1-6	Lead
S-8889-121097-SF-461	North Wall	A-1-6	Lead

TABLE 3.2

**SAMPLE SUMMARY
 PHASE V ESA
 PARCEL A-2
 GM CLARK AVENUE FACILITY
 DETROIT, MICHIGAN**

<i>Sample Number</i>	<i>Sample Location</i>	<i>AOC Number</i>	<i>Analysis</i>
S-8889-102596-JM-430	South Wall	A-2-7	Lead
S-8889-102596-JM-431	East Wall	A-2-7	Lead
S-8889-102596-JM-432	North Wall	A-2-7	Lead
S-8889-102596-JM-433	West Wall	A-2-7	Lead
S-8889-102596-JM-434	South Floor	A-2-7	Lead
S-8889-102596-JM-435	North Floor	A-2-7	Lead
S-8889-102896-JM-443	West Floor	A-2-6	Lead
S-8889-102896-JM-444	East Floor	A-2-6	Lead
S-8889-102896-JM-445	West Wall	A-2-6	Lead
S-8889-102896-JM-446	South Wall	A-2-6	Lead
S-8889-102896-JM-447	North Wall	A-2-6	Lead
S-8889-102896-JM-448	East Wall	A-2-6	Lead
S-8889-121097-SF-449	North Wall	A-2-9	Lead
S-8889-121097-SF-450	East Wall	A-2-9	Lead
S-8889-121097-SF-451	South Wall	A-2-9	Lead
S-8889-121097-SF-452	West Wall	A-2-9	Lead
S-8889-121097-SF-453	East Floor	A-2-9	Lead
S-8889-121097-SF-454	West Floor	A-2-9	Lead

TABLE 3.3

**SAMPLE SUMMARY
PHASE V ESA
PARCEL A-4
GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN**

<i>Sample Number</i>	<i>Sample Location</i>	<i>AOC Number</i>	<i>Analysis</i>
S-8889-121097-SF-465	North Wall	A-4-5	Lead, PNA
S-8889-121097-SF-466	East Wall	A-4-5	Lead, PNA
S-8889-121097-SF-467	South Wall	A-4-5	Lead, PNA
S-8889-121097-SF-468	West Wall	A-4-5	Lead, PNA
S-8889-121097-SF-469	North Wall	A-4-5	Lead, PNA
S-8889-121097-SF-485	East Floor	A-4-5	Lead, PNA
S-8889-121097-SF-486	Center Floor	A-4-5	Lead, PNA
S-8889-121097-SF-487	West Floor	A-4-5	Lead, PNA

Note:

PNA = Polynuclear Aromatic Hydrocarbons

TABLE 3.4

**SAMPLE SUMMARY
PHASE V ESA
PARCEL B-1
GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN**

<i>Sample Number</i>	<i>Sample Location</i>	<i>AOC Number</i>	<i>Analysis</i>
S-8889-102596-JM-418	South Wall	B-1-4	PNA
S-8889-102596-JM-419	West Wall	B-1-4	PNA
S-8889-102596-JM-420	North Wall	B-1-4	PNA
S-8889-102596-JM-421	East Wall	B-1-4	PNA
S-8889-102596-JM-422	North Floor	B-1-4	PNA
S-8889-102596-JM-423	South Floor	B-1-4	PNA

Note:

PNA = Polynuclear Aromatic Hydrocarbons

TABLE 3.5

**SAMPLE SUMMARY
PHASE V ESA
PARCEL B-2
GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN**

<i>Sample Number</i>	<i>Sample Location</i>	<i>AOC Number</i>	<i>Analysis</i>
S-8889-020598-SF-485	East Floor	B-2-1	Lead
S-8889-020598-SF-486	West Floor	B-2-1	Lead
S-8889-020598-SF-487	East Wall	B-2-1	Lead
S-8889-020598-SF-488	North Wall	B-2-1	Lead
S-8889-020598-SF-489	South Wall	B-2-1	Lead
S-8889-020598-SF-490	West Wall	B-2-1	Lead
S-8889-102596-JM-424	North Floor	B-2-2	Lead
S-8889-102596-JM-425	South Floor	B-2-2	Lead
S-8889-102596-JM-426	East Wall	B-2-2	Lead
S-8889-102596-JM-427	North Wall	B-2-2	Lead
S-8889-102596-JM-428	West Wall	B-2-2	Lead
S-8889-102596-JM-429	South Wall	B-2-2	Lead

SAMPLE SUMMARY
EXCAVATION VERIFICATION SAMPLES - AOC A-2-1/A-3-1
PHASE V ESA
GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN

<i>Sample Number</i>	<i>Location</i>	<i>Analysis</i>
S-082797-8889-EXC-001	Sidewall	BTEX, PNA
S-082797-8889-EXC-002	Sidewall	BTEX, PNA
S-082797-8889-EXC-003	Sidewall	BTEX, PNA
S-082797-8889-EXC-004	Sidewall	BTEX, PNA
S-082797-8889-EXC-005	Floor	BTEX, PNA
S-082797-8889-EXC-006	Floor	BTEX, PNA
S-082797-8889-EXC-007	Floor	BTEX, PNA
S-082797-8889-EXC-008	Floor	BTEX, PNA
S-082797-8889-EXC-009	Floor	BTEX, PNA
S-082797-8889-EXC-010	Floor	BTEX, PNA
S-082797-8889-EXC-011	Floor	BTEX, PNA
S-082797-8889-EXC-012	Floor	BTEX, PNA
S-082797-8889-EXC-013	Floor	BTEX, PNA
S-082797-8889-EXC-014	Floor	BTEX, PNA
S-082797-8889-EXC-015	Floor	BTEX, PNA
S-082997-8889-EXC-016	Floor	BTEX, PNA
S-082997-8889-EXC-017	Floor	BTEX, PNA
S-082997-8889-EXC-018	Floor	BTEX, PNA
S-082997-8889-EXC-019	Floor	BTEX, PNA
S-082997-8889-EXC-020	Sidewall	BTEX, PNA
S-082997-8889-EXC-021	Sidewall	BTEX, PNA
S-090397-8889-EXC-022	Sidewall	BTEX, PNA
S-090397-8889-EXC-023	Sidewall	BTEX, PNA
S-090897-8889-EXC-024	Sidewall	BTEX, PNA
S-090897-8889-EXC-025	Sidewall	BTEX, PNA
S-090897-8889-EXC-026	Sidewall	BTEX, PNA
S-090897-8889-EXC-027	Sidewall	BTEX, PNA
S-090997-8889-EXC-028	Floor	BTEX, PNA
S-090997-8889-EXC-029	Floor	BTEX, PNA
S-090997-8889-EXC-030	Floor	BTEX, PNA
S-090997-8889-EXC-031	Floor	BTEX, PNA
S-090997-8889-EXC-032	Floor	BTEX, PNA
S-090997-8889-EXC-033	Floor	BTEX, PNA
S-090997-8889-EXC-034	Floor	BTEX, PNA
S-090997-8889-EXC-035	Floor	BTEX, PNA
S-091697-8889-EXC-036	Sidewall	BTEX, PNA

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SAMPLE SUMMARY
EXCAVATION VERIFICATION SAMPLES - AOC A-2-1/A-3-1
PHASE V ESA
GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN

<i>Sample Number</i>	<i>Location</i>	<i>Analysis</i>
S-091697-8889-EXC-037	Sidewall	BTEX, PNA
S-091697-8889-EXC-038	Sidewall	BTEX, PNA
S-091697-8889-EXC-039	Sidewall	BTEX, PNA
S-091697-8889-EXC-040	Sidewall	BTEX, PNA
S-091697-8889-EXC-041	Sidewall	BTEX, PNA
S-091697-8889-EXC-042	Floor	BTEX, PNA
S-091697-8889-EXC-043	Floor	BTEX, PNA
S-091697-8889-EXC-044	Floor	BTEX, PNA
S-091697-8889-EXC-045	Floor	BTEX, PNA
S-092297-8889-EXC-046	Floor	BTEX, PNA
S-092297-8889-EXC-047	Floor	BTEX, PNA
S-092297-8889-EXC-048	Sidewall	BTEX, PNA
S-092397-8889-EXC-049	Floor	BTEX, PNA
S-092397-8889-EXC-050	Floor	BTEX, PNA
S-092397-8889-EXC-051	Sidewall	BTEX, PNA
S-092397-8889-EXC-052	Floor	BTEX, PNA
S-092397-8889-EXC-053	Floor	BTEX, PNA
S-092397-8889-EXC-054	Floor	BTEX, PNA
S-092397-8889-EXC-055	Floor	BTEX, PNA
S-092397-8889-EXC-056	Sidewall	BTEX, PNA
S-092697-8889-EXC-057	Sidewall	BTEX, PNA
S-092697-8889-EXC-058	Sidewall	BTEX, PNA
S-092697-8889-EXC-059	Sidewall	BTEX, PNA
S-092697-8889-EXC-060	Sidewall	BTEX, PNA
S-092697-8889-EXC-061	Sidewall	BTEX, PNA
S-092697-8889-EXC-062	Sidewall	BTEX, PNA
S-092697-8889-EXC-063	Sidewall	BTEX, PNA
S-092697-8889-EXC-064	Floor	BTEX, PNA
S-092697-8889-EXC-065	Floor	BTEX, PNA
S-092697-8889-EXC-066	Floor	BTEX, PNA
S-092697-8889-EXC-067	Floor	BTEX, PNA
S-092697-8889-EXC-068	Floor	BTEX, PNA

Notes:

BTEX = Benzene, Toluene, Ethylbenzene, Xylenes

PNA = Polynuclear Aromatic Hydrocarbons

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Counsel's Request

TABLE 3.7

Privileged and Confidential
 Prepared at General Motors
 Counsel's Request

DAILY QUANTITIES OF TREATED SOIL - AOC A-2-1/A-3-1
 PHASE V ESA
 GM CLARK AVENUE FACILITY
 DETROIT, MICHIGAN

Page 1 of 2

<i>Date</i>	<i>Amount of Soil Treated (Tons) (Day/Total)</i>
19-Aug-97	47/47
20-Aug-97	164/211
21-Aug-97	161/372
22-Aug-97	139/511
25-Aug-97	141/652
26-Aug-97	208/870
27-Aug-97	178/1,048
28-Aug-97	177/1,215
29-Aug-97	147/1,362
02-Sep-97	103/1,465
03-Sep-97	133/1,598
04-Sep-97	129/1,727
05-Sep-97	152/1,879
06-Sep-97	191/2,070
08-Sep-97	180/2,250
09-Sep-97	184/2,434
10-Sep-97	88/2,522
11-Sep-97	232/2,754
12-Sep-97	197/2,951
13-Sep-97	210/3,161
15-Sep-97	223/3,384
16-Sep-97	167/3,551
17-Sep-97	217/3,768
18-Sep-97	213/3,981
19-Sep-97	221/4,202
20-Sep-97	196/4,398
22-Sep-97	236/4,634
23-Sep-97	185/4,819
24-Sep-97	234/5,053
25-Sep-97	220/5,273
26-Sep-97	238/5,511
27-Sep-97	124/5,635
29-Sep-97	144/5,779
30-Sep-97	186/5,965
01-Oct-97	139/6,104

TABLE 3.7

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Prepared at General Motors
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DAILY QUANTITIES OF TREATED SOIL - AOC A-2-1/A-3-1
PHASE V ESA
GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN

Page 2 of 2

<i>Date</i>	<i>Amount of Soil Treated (Tons)</i> <i>(Day/Total)</i>
02-Oct-97	212/6,316
03-Oct-97	207/6,523
04-Oct-97	186/6,709
06-Oct-97	260/6,969
07-Oct-97	91/7,060
08-Oct-97	229/7,289
09-Oct-97	97/7,386 (1)

Note:

- (1) Total includes 142 tons processed from AOC B-1-4 excavation which were not related to AOC A-2-1/A-3-1.

TABLE 3.8

Privileged and Confidential
Prepared at General Motors
Counsel's Request

SAMPLE SUMMARY
THERMALLY TREATED SOIL SAMPLES - AOC A-2-1/A-3-1
PHASE V ESA
GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN

<i>Sample Number</i>	<i>Analysis</i>
S-081997-8889-TTU-001	BTEX, PNA
S-082097-8889-TTU-002	BTEX, PNA
S-082097-8889-TTU-003	BTEX, PNA
S-082197-8889-TTU-004	BTEX, PNA
S-082197-8889-TTU-005	BTEX, PNA
S-082697-8889-TTU-006	BTEX, PNA
S-082797-8889-TTU-007	BTEX, PNA
S-082997-8889-TTU-008	BTEX, PNA
S-082997-8889-TTU-009	BTEX, PNA
S-090397-8889-TTU-010	BTEX, PNA
S-090897-8889-TTU-011	BTEX, PNA
S-090897-8889-TTU-012	BTEX, PNA
S-090997-8889-TTU-013	BTEX, PNA
S-091597-8889-TTU-014	BTEX, PNA
S-091597-8889-TTU-015	BTEX, PNA
S-091597-8889-TTU-016	BTEX, PNA
S-091597-8889-TTU-017	BTEX, PNA
S-091697-8889-TTU-018	BTEX, PNA
S-091997-8889-TTU-019	BTEX, PNA
S-091997-8889-TTU-020	BTEX, PNA
S-092297-8889-TTU-021	BTEX, PNA
S-092397-8889-TTU-022	BTEX, PNA
S-092497-8889-TTU-023	BTEX, PNA
S-092697-8889-TTU-024	BTEX, PNA
S-092697-8889-TTU-025	BTEX, PNA
S-092997-8889-TTU-026	BTEX, PNA
S-092997-8889-TTU-027	BTEX, PNA
S-100297-8889-TTU-028	BTEX, PNA
S-100297-8889-TTU-029	BTEX, PNA
S-100297-8889-TTU-030	BTEX, PNA
S-100697-8889-TTU-031	BTEX, PNA
S-100897-8889-TTU-032	BTEX, PNA
S-100897-8889-TTU-033	BTEX, PNA

Notes:

BTEX = Benzene, Toluene, Ethylbenzene, Xylenes

PNA = Polynuclear Aromatic Hydrocarbons

SUMMARY OF DETECTED LEAD IN SOIL VERIFICATION SAMPLES

PHASE V ESA

PARCEL A-1

GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN

AOC No.	Michigan	Michigan	A-1-6	A-1-6	A-1-6	A-1-6	A-1-6	A-1-6	A-1-6	A-1-6
Sample Location	Generic Residential	Generic Industrial	North Wall	East Wall	South Wall	West Wall	North Floor	South Floor	North Wall	North Wall
Sample ID (S-8889-)	Direct Contact	Direct Contact	121097-SF-455	121097-SF-456	121097-SF-457	121097-SF-458	121097-SF-459	121097-SF-460	121097-SF-461	121097-SF-461
Date Sampled	Criteria (1)	Criteria (2)	12/10/97	12/10/97	12/10/97	12/10/97	12/10/97	12/10/97	12/10/97	12/10/97

Parameter (mg/kg)

Lead	400	900 (draft)	21 J	23 J	12 J	8.3 J	15 J	6.9	6.0	
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SUMMARY OF DETECTED LEAD IN SOIL VERIFICATION SAMPLES

PHASE V ESA

PARCEL A-1

GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN

AOC No.	Michigan	Michigan	A-1-14	A-1-14	A-1-14	A-1-14	A-1-14	A-1-14	A-1-14
Sample Location	Generic Residential	Generic Industrial	North Wall	East Wall	South Wall	West Wall	West Floor	East Floor	
Sample ID (S-8889-)	Direct Contact	Direct Contact	111996-TH-436	111996-TH-437	111996-TH-438	111996-TH-439	111996-TH-440	111996-TH-441	
Date Sampled	Criteria (1)	Criteria (2)	11/19/96	11/19/96	11/19/96	11/19/96	11/19/96	11/19/96	
Parameter (mg/kg)									
Lead	400	900 (draft)	30	120	4.3	24	13	22	

Notes:

AOC - Area of Concern.

bgs - below ground surface.

(1) Values taken from MDEQ Operational Memorandum #8, Revision 4, dated June 5, 1996, and January 26, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.

(2) Values taken from MDEQ Operational Memorandum #14, Revision 2, dated June 6, 1995, and January 25, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.

SUMMARY OF DETECTED LEAD IN SOIL VERIFICATION SAMPLES
 PHASE V ESA
 PARCEL A-2
 GM CLARK AVENUE FACILITY
 DETROIT, MICHIGAN

AOC No.	Michigan Generic Residential Direct Contact Criteria (1)	Michigan Generic Industrial Direct Contact Criteria (2)	A-2-6 West Floor 102896-JM-443 10/28/96	A-2-6 East Floor 102896-JM-444 10/28/96	A-2-6 West Wall 102896-JM-445 10/28/96	A-2-6 South Wall 102896-JM-446 10/28/96	A-2-6 North Wall 102896-JM-447 10/28/96
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Parameter (mg/kg)

Lead	400	900 (draft)	26 J	9.8 J	14 J	23 J	110 J
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Privileged and Confidential
 Prepared at General Motors
 Counsel's Request

SUMMARY OF DETECTED LEAD IN SOIL VERIFICATION SAMPLES
 PHASE V ESA
 PARCEL A-2
 GM CLARK AVENUE FACILITY
 DETROIT, MICHIGAN

AOC No.	Michigan Generic Residential Direct Contact Criteria (1)	Michigan Generic Industrial Direct Contact Criteria (2)	A-2-6 East Wall 102896-JM-448 10/28/96	A-2-7 South Wall 102596-JM-430 10/25/96	A-2-7 East Wall 102596-JM-431 10/25/96	A-2-7 North Wall 102596-JM-432 10/25/96	A-2-7 West Wall 102596-JM-433 10/25/96
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Parameter (mg/kg)

Lead	400	900 (draft)	ND(1.0) UJ	11 J	200 J	18 J	6.7 J
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 Prepared at General Motors
 Counsel's Request

SUMMARY OF DETECTED LEAD IN SOIL VERIFICATION SAMPLES

PHASE V ESA
 PARCEL A-2
 GM CLARK AVENUE FACILITY
 DETROIT, MICHIGAN

AOC No.	Michigan Generic Residential Direct Contact Criteria (1)	Michigan Generic Industrial Direct Contact Criteria (2)	A-2-7 South Floor 102596-JM-434 10/25/96	A-2-7 North Floor 102596-JM-435 10/25/96	A-2-9 North Wall 121097-SF-449 12/10/97	A-2-9 East Wall 121097-SF-450 12/10/97	A-2-9 South Wall 121097-SF-451 12/10/97
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Parameter (mg/kg)

Lead

400

900 (draft)

9.7 J

14 J

18 J

11 J

15 J

SUMMARY OF DETECTED LEAD IN SOIL VERIFICATION SAMPLES
 PHASE V ESA
 PARCEL A-2
 GM CLARK AVENUE FACILITY
 DETROIT, MICHIGAN

AOC No.	Michigan Generic Residential Direct Contact Criteria (1)	Michigan Generic Industrial Direct Contact Criteria (2)	A-2-9 West Wall 121097-SF-452 12/10/97	A-2-9 East Floor 121097-SF-453 12/10/97	A-2-9 West Floor 121097-SF-454 12/10/97
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Parameter (mg/kg)

Lead	400	900 (draft)	15 J	13 J	35 J
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Notes:

AOC - Area of Concern.

bgs - below ground surface.

J - The associated numerical value is an estimated quantity.

(1) Values taken from MDEQ Operational Memorandum #8, Revision 4, dated June 5, 1996, and January 26, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.

(2) Values taken from MDEQ Operational Memorandum #14, Revision 2, dated June 6, 1995, and January 25, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.

Privileged and Confidential
 Prepared at General Motors
 Counsel's Request

SUMMARY OF DETECTED PARAMETERS IN SOIL VERIFICATION SAMPLES

PHASE V ESA

AOC A-2-1/A-3-1

GM CLARK AVENUE FACILITY

DETROIT, MICHIGAN

Sample ID	Michigan		Michigan Criteria (2)	S-082797- 8889-EXC-001 8/27/97	S-082797- 8889-EXC-002 8/27/97	S-082797- 8889-EXC-003 8/27/97	S-082797- 8889-EXC-004 8/27/97	S-082797- 8889-EXC-005 8/27/97	S-082797- 8889-EXC-006 8/27/97	S-082797- 8889-EXC-007 8/27/97
	Generic Residential Direct Contact	Generic Industrial Direct Contact								
Date Sampled	Criteria (1)									
<u>Volatile Organic Compounds (VOCs) (µg/kg)</u>										
Benzene	88,000	400,000		ND(10)	ND(500)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Toluene	250,000	250,000		ND(10)	ND(500)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	140,000	140,000		ND(10)	960	ND(10)	16	ND(10)	ND(10)	ND(10)
Xylenes (total)	150,000	150,000		ND(30)	3,200	ND(30)	ND(30)	ND(30)	150	ND(30)
<u>Polynuclear Aromatic Hydrocarbons (µg/kg)</u>										
Acenaphthene	76,000,000	810,000,000		520	10,000	690	5,800	ND(330)	1,000	ND(330)
Acenaphthylene	1,500,000	16,000,000		ND(330)	ND(3,300)	ND(330)	ND(3,300)	ND(330)	ND(330)	ND(330)
Anthracene	420,000,000	1,000,000,000		ND(330)	ND(3,300)	ND(330)	ND(3,300)	ND(330)	ND(330)	ND(330)
Benzo(a)anthracene	14,000	210,000		920	ND(3,300)	ND(330)	ND(3,300)	ND(330)	560	ND(330)
Benzo(b)fluoranthene	14,000	210,000		1,700	ND(3,300)	ND(330)	ND(3,300)	ND(330)	790	ND(330)
Benzo(k)fluoranthene	140,000	2,100,000		670	ND(3,300)	ND(330)	ND(3,300)	ND(330)	490	ND(330)
Benzo(g,h,i)perylene	1,500,000	16,000,000		840	ND(3,300)	ND(330)	ND(3,300)	ND(330)	ND(330)	ND(330)
Benzo(a)pyrene	1,400	21,000		1,000	ND(3,300)	ND(330)	ND(3,300)	ND(330)	570	ND(330)
Chrysene	1,400,000	21,000,000		1,200	ND(3,300)	ND(330)	ND(3,300)	ND(330)	700	ND(330)
Dibenzo(a,h)anthracene	1,400	21,000		ND(330)	ND(3,300)	ND(330)	ND(3,300)	ND(330)	ND(330)	ND(330)
Fluoranthene	51,000,000	540,000,000		1,500	ND(3,300)	ND(330)	ND(3,300)	ND(330)	660	ND(330)
Fluorene	51,000,000	540,000,000		580	11,000	900	8,900	ND(330)	1,200	ND(330)
Indeno(1,2,3-cd)pyrene	14,000	210,000		1,000	ND(3,300)	ND(330)	ND(3,300)	ND(330)	ND(330)	ND(330)
2-Methylnaphthalene	15,000,000	160,000,000		3,500	60,000	ND(330)	36,000	ND(330)	6,300	ND(330)
Naphthalene	15,000,000	160,000,000		2,500	5,800	560	4,800	ND(330)	1,400	ND(330)
Phenanthrene	1,500,000	16,000,000		1,900	30,000	2,100	22,000	ND(330)	3,200	ND(330)
Pyrene	32,000,000	340,000,000		1,600	ND(3,300)	430	ND(3,300)	1,100	1,200	ND(330)

SUMMARY OF DETECTED PARAMETERS IN SOIL VERIFICATION SAMPLES

PHASE V ESA

AOC A-2-1/A-3-1

GM CLARK AVENUE FACILITY

DETROIT, MICHIGAN

Sample ID	Michigan Generic Residential Direct Contact	Michigan Generic Industrial Direct Contact	Criteria (1)	Criteria (2)	S-082797- 8889-EXC-008	S-082797- 8889-EXC-009	S-082797- 8889-EXC-010	S-082797- 8889-EXC-011	S-082797- 8889-EXC-012	S-082797- 8889-EXC-013	S-082797- 8889-EXC-014
Date Sampled					8/27/97	8/27/97	8/27/97	8/27/97	8/27/97	8/27/97	8/27/97
<u>Volatile Organic Compounds (VOCs) (ug/kg)</u>											
Benzene	88,000	400,000			ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Toluene	250,000	250,000			ND(10)	16	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	140,000	140,000			ND(10)	34	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Xylenes (total)	150,000	150,000			ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)
<u>Polynuclear Aromatic Hydrocarbons (ug/kg)</u>											
Acenaphthene	76,000,000	810,000,000			1,500	2,400	ND(330)	510	ND(330)	390	ND(330)
Acenaphthylene	1,500,000	16,000,000			ND(330)	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Anthracene	420,000,000	1,000,000,000			680	1,700	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)anthracene	14,000	210,000			930	1,600	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(b)fluoranthene	14,000	210,000			890	1,300	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(k)fluoranthene	140,000	2,100,000			670	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(g,h,i)perylene	1,500,000	16,000,000			460	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)pyrene	1,400	21,000			780	1,300	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Chrysene	1,400,000	21,000,000			1,100	1,900	ND(330)	ND(330)	ND(330)	390	ND(330)
Dibenzo(a,h)anthracene	1,400	21,000			ND(330)	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Fluoranthene	51,000,000	540,000,000			2,500	5,400	ND(330)	ND(330)	ND(330)	720	ND(330)
Fluorene	51,000,000	540,000,000			1,700	3,100	440	770	ND(330)	470	ND(330)
Indeno(1,2,3-cd)pyrene	14,000	210,000			460	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
2-Methylnaphthalene	15,000,000	160,000,000			7,500	11,000	760	4,300	ND(330)	640	ND(330)
Naphthalene	15,000,000	160,000,000			1,600	2,800	ND(330)	900	ND(330)	ND(330)	ND(330)
Phenanthrene	1,500,000	16,000,000			6,000	9,000	1,400	1,800	ND(330)	1,200	ND(330)
Pyrene	32,000,000	340,000,000			3,300	5,100	800	ND(330)	ND(330)	950	ND(330)

SUMMARY OF DETECTED PARAMETERS IN SOIL VERIFICATION SAMPLES

PHASE V ESA

AOC A-2-1/A-3-1

GM CLARK AVENUE FACILITY

DETROIT, MICHIGAN

Michigan

Generic Residential

Direct Contact

Criteria (1)

Michigan

Generic Industrial

Direct Contact

Criteria (2)

S-082797-

8889-EXC-015

8/27/97

S-082997-

8889-EXC-016

8/29/97

S-082997-

8889-EXC-017

8/29/97

S-082997-

8889-EXC-018

8/29/97

S-082997-

8889-EXC-019

8/29/97

S-082997-

8889-EXC-020

8/29/97

S-082997-

8889-EXC-021

8/29/97

Volatile Organic Compounds (VOCs) (µg/kg)

Benzene	88,000	400,000	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1) UJ
Toluene	250,000	250,000	ND(10)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2) UJ	ND(2) UJ
Ethylbenzene	140,000	140,000	ND(10)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2) UJ	ND(2) UJ
Xylenes (total)	150,000	150,000	ND(30)	ND(2)	ND(2)	7	ND(2)	4 J	3 J
<u>Polynuclear Aromatic Hydrocarbons (µg/kg)</u>									
Acenaphthene	76,000,000	810,000,000	ND(330)	ND(330)	ND(330)	1,200	ND(330)	ND(330)	ND(330)
Acenaphthylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Anthracene	420,000,000	1,000,000,000	ND(330)	ND(330)	ND(330)	550	ND(330)	ND(330)	ND(330)
Benzo(a)anthracene	14,000	210,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(b)fluoranthene	14,000	210,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(k)fluoranthene	140,000	2,100,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(g,h,i)perylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)pyrene	1,400	21,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Chrysene	1,400,000	21,000,000	ND(330)	ND(330)	ND(330)	460	ND(330)	ND(330)	ND(330)
Dibenzo(a,h)anthracene	1,400	21,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Fluoranthene	51,000,000	540,000,000	ND(330)	ND(330)	ND(330)	1,400	ND(330)	ND(330)	420
Fluorene	51,000,000	540,000,000	ND(330)	ND(330)	ND(330)	2,300	ND(330)	ND(330)	ND(330)
Indeno(1,2,3-cd)pyrene	14,000	210,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
2-Methylnaphthalene	15,000,000	160,000,000	530	ND(330)	ND(330)	ND(330)	ND(330)	1,900	ND(330)
Naphthalene	15,000,000	160,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	1,200	ND(330)
Phenanthrene	1,500,000	16,000,000	630	ND(330)	ND(330)	4,600	ND(330)	1,300	ND(330)
Pyrene	32,000,000	340,000,000	ND(330)	ND(330)	ND(330)	1,200	ND(330)	620	410

SUMMARY OF DETECTED PARAMETERS IN SOIL VERIFICATION SAMPLES

PHASE V ESA

AOC A-2-1/A-3-1

GM CLARK AVENUE FACILITY

DETROIT, MICHIGAN

Sample ID	Michigan		Michigan Generic Industrial Direct Contact Criteria (2)	DETROIT, MICHIGAN								
	Generic Residential Direct Contact Criteria (1)	Generic Industrial Direct Contact Criteria (2)		S-090397- 8889-EXC-022 9/3/97	S-090397- 8889-EXC-023 9/3/97	S-090897- 8889-EXC-024 9/8/97	S-090897- 8889-EXC-025 9/8/97	S-090897- 8889-EXC-026 9/8/97	S-090897- 8889-EXC-027 9/8/97	S-090997- 8889-EXC-028 9/9/97		
<u>Volatile Organic Compounds (VOCs) (ug/kg)</u>												
Benzene	88,000	400,000	ND(10) UJ	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	970 J	ND(1)	ND(1)	ND(1)
Toluene	250,000	250,000	ND(10) UJ	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	6,500 J	ND(2)	ND(2)	ND(2)
Ethylbenzene	140,000	140,000	ND(10) UJ	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	190	190	12,000 J	3
Xylenes (total)	150,000	150,000	ND(30) UJ	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	130	130	47,000 J	8
<u>Polynuclear Aromatic Hydrocarbons (ug/kg)</u>												
Acenaphthene	76,000,000	810,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	570	570	12,000	ND(330)
Acenaphthylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Anthracene	420,000,000	1,000,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Benzo(a)anthracene	14,000	210,000	1,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Benzo(b)fluoranthene	14,000	210,000	1,100	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Benzo(k)fluoranthene	140,000	2,100,000	620	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Benzo(g,h,i)perylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Benzo(a)pyrene	1,400	21,000	890	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Chrysene	1,400,000	21,000,000	1,500	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Dibenzo(a,h)anthracene	1,400	21,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Fluoranthene	51,000,000	540,000,000	2,200	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Fluorene	51,000,000	540,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Indeno(1,2,3-cd)pyrene	14,000	210,000	560	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	11,000	520
2-Methylnaphthalene	15,000,000	160,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Naphthalene	15,000,000	160,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	5,200	5,200	47,000	ND(330)
Phenanthrene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	680	680	25,000	1,600
Pyrene	32,000,000	340,000,000	2,900	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)

SUMMARY OF DETECTED PARAMETERS IN SOIL VERIFICATION SAMPLES

PHASE V ESA

AOC A-2-1/A-3-1

GM CLARK AVENUE FACILITY

DETROIT, MICHIGAN

Sample ID	Michigan		Michigan		S-090997- 8889-EXC-029 9/9/97	S-090997- 8889-EXC-030 9/9/97	S-090997- 8889-EXC-031 9/9/97	S-090997- 8889-EXC-032 9/9/97	S-090997- 8889-EXC-033 9/9/97	S-090997- 8889-EXC-034 9/9/97	S-090997- 8889-EXC-035 9/9/97
	Generic Residential	Direct Contact	Generic Industrial	Direct Contact							
Date Sampled	Criteria (1)	Criteria (2)									
<u>Volatile Organic Compounds (VOCs) (ug/kg)</u>											
Benzene	88,000	400,000			ND(1)	7	ND(1)	30	ND(1)	ND(1)	ND(1)
Toluene	250,000	250,000			ND(2)	3	ND(2)	6	ND(2)	ND(2)	ND(2)
Ethylbenzene	140,000	140,000			ND(2)	8	ND(2)	31	ND(2)	ND(2)	ND(2)
Xylenes (total)	150,000	150,000			ND(2)	26	ND(2)	78	ND(2)	ND(2)	ND(2)
<u>Polynuclear Aromatic Hydrocarbons (ug/kg)</u>											
Acenaphthene	76,000,000	810,000,000			ND(330)	510	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Acenaphthylene	1,500,000	16,000,000			ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Anthracene	420,000,000	1,000,000,000			ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)anthracene	14,000	210,000			ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(b)fluoranthene	14,000	210,000			ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(k)fluoranthene	140,000	2,100,000			ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(g,h,i)perylene	1,500,000	16,000,000			ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)pyrene	1,400	21,000			ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Chrysene	1,400,000	21,000,000			ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Dibenzo(a,h)anthracene	1,400	21,000			ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Fluoranthene	51,000,000	540,000,000			ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Fluorene	51,000,000	540,000,000			ND(330)	610	ND(330)	460	ND(330)	ND(330)	ND(330)
Indeno(1,2,3-cd)pyrene	14,000	210,000			ND(330)	ND(330)	ND(330)	ND(330)	470	ND(330)	ND(330)
2-Methylnaphthalene	15,000,000	160,000,000			ND(330)	2,100	ND(330)	1,900	ND(330)	ND(330)	460
Naphthalene	15,000,000	160,000,000			ND(330)	ND(330)	ND(330)	450	ND(330)	ND(330)	ND(330)
Phenanthrene	1,500,000	16,000,000			ND(330)	1,100	ND(330)	900	ND(330)	ND(330)	400
Pyrene	32,000,000	340,000,000			ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)

SUMMARY OF DETECTED PARAMETERS IN SOIL VERIFICATION SAMPLES

PHASE V ESA
AOC A-2-1/A-3-1
GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN

DETROIT, MICHIGAN										
Sample ID	Michigan		Michigan Criteria (2)	S-091697- 8889-EXC-036	S-091697- 8889-EXC-037	S-091697- 8889-EXC-038	S-091697- 8889-EXC-039	S-091697- 8889-EXC-040	S-091697- 8889-EXC-041	S-091697- 8889-EXC-042
	Generic Residential Direct Contact Criteria (1)	Generic Industrial Direct Contact Criteria (2)		9/16/97	9/16/97	9/16/97	9/16/97	9/16/97	9/16/97	9/16/97
<u>Volatile Organic Compounds (VOCs) (ug/kg)</u>										
Benzene	88,000	400,000		ND(1)	ND(1)	ND(1)	ND(1)	ND(1) UJ	16	41 J
Toluene	250,000	250,000		ND(2)	ND(2)	ND(2)	ND(2)	ND(2) UJ	38	29 J
Ethylbenzene	140,000	140,000		ND(2)	ND(2)	ND(2)	ND(2)	ND(2) UJ	120	170 J
Xylenes (total)	150,000	150,000		ND(2)	ND(2)	ND(2)	ND(2)	ND(2) UJ	170	870 J
<u>Polynuclear Aromatic Hydrocarbons (ug/kg)</u>										
Acenaphthene	76,000,000	810,000,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Acenaphthylene	1,500,000	16,000,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Anthracene	420,000,000	1,000,000,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Benzo(a)anthracene	14,000	210,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Benzo(b)fluoranthene	14,000	210,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Benzo(k)fluoranthene	140,000	2,100,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Benzo(g,h,i)perylene	1,500,000	16,000,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Benzo(a)pyrene	1,400	21,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Chrysene	1,400,000	21,000,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Dibenzo(a,h)anthracene	1,400	21,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Fluoranthene	51,000,000	540,000,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
Fluorene	51,000,000	540,000,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	930
Indeno(1,2,3-cd)pyrene	14,000	210,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)
2-Methylnaphthalene	15,000,000	160,000,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	8,800	3,300
Naphthalene	15,000,000	160,000,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	870
Phenanthrene	1,500,000	16,000,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	9,100	ND(330)
Pyrene	32,000,000	340,000,000		ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(3,300)	ND(330)

SUMMARY OF DETECTED PARAMETERS IN SOIL VERIFICATION SAMPLES

PHASE V ESA

AOC A-2-1/A-3-1

GM CLARK AVENUE FACILITY

DETROIT, MICHIGAN

Sample ID	Michigan Generic Residential Direct Contact Criteria (1)	Michigan Generic Industrial Direct Contact Criteria (2)	S-091697- 8889-EXC-043 9/16/97	S-091697- 8889-EXC-044 9/16/97	S-091697- 8889-EXC-045 9/16/97	S-092297- 8889-EXC-046 9/22/97	S-092297- 8889-EXC-047 9/22/97	S-092297- 8889-EXC-048 9/22/97	S-092397- 8889-EXC-049 9/23/97
<u>Volatile Organic Compounds (VOCs) (µg/kg)</u>									
Benzene	88,000	400,000	ND(1) UJ	ND(1)	1	ND(10)	ND(10)	34	13
Toluene	250,000	250,000	ND(2) UJ	ND(2)	ND(2)	ND(10)	ND(10)	14	13
Ethylbenzene	140,000	140,000	7 J	ND(2)	ND(2)	ND(10)	ND(10)	34	62
Xylenes (total)	150,000	150,000	11 J	ND(2)	ND(2)	ND(30)	ND(30)	240	120
<u>Polynuclear Aromatic Hydrocarbons (µg/kg)</u>									
Acenaphthene	76,000,000	810,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	1,500	3,700
Acenaphthylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	ND(1,650)
Anthracene	420,000,000	1,000,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	ND(1,650)
Benzo(a)anthracene	14,000	210,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	830	2,200
Benzo(b)fluoranthene	14,000	210,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	840	ND(1,650)
Benzo(k)fluoranthene	140,000	2,100,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	ND(1,650)
Benzo(g,h,i)perylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	ND(1,650)
Benzo(a)pyrene	1,400	21,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	ND(1,650)
Chrysene	1,400,000	21,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	1,100	2,600
Dibenzo(a,h)anthracene	1,400	21,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	ND(1,650)
Fluoranthene	51,000,000	540,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	1,700	4,700
Fluorene	51,000,000	540,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	1,700	5,900
Indeno(1,2,3-cd)pyrene	14,000	210,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	ND(1,650)
2-Methylnaphthalene	15,000,000	160,000,000	680	ND(330)	2,100	ND(330)	450	4,700	13,000
Naphthalene	15,000,000	160,000,000	ND(330)	ND(330)	1,000	ND(330)	ND(330)	3,400	3,100
Phenanthrene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	550	690	6,700	12,000
Pyrene	32,000,000	340,000,000	ND(330)	ND(330)	650	ND(330)	ND(330)	2,500	5,600

SUMMARY OF DETECTED PARAMETERS IN SOIL VERIFICATION SAMPLES

PHASE V ESA

AOC A-2-1/A-3-1

GM CLARK AVENUE FACILITY

DETROIT, MICHIGAN

Sample ID	Michigan		Michigan		DETROIT, MICHIGAN							
	Generic Residential	Generic Industrial	Criteria (2)		S-092397-8889-EXC-050	S-092397-8889-EXC-051	S-092397-8889-EXC-052	S-092397-8889-EXC-053	S-092397-8889-EXC-054	S-092397-8889-EXC-055	S-092397-8889-EXC-056	
	Direct Contact	Direct Contact	Criteria (1)	Criteria (2)	9/23/97	9/23/97	9/23/97	9/23/97	9/23/97	9/23/97	9/23/97	
<u>Volatile Organic Compounds (VOCs) (ug/kg)</u>												
Benzene	88,000	400,000			ND(10)	ND(50)	24	35 J	ND(10)	86 J	ND(10)	
Toluene	250,000	250,000			ND(10)	170	ND(10)	39 J	ND(10)	190 J	ND(10)	
Ethylbenzene	140,000	140,000			ND(10)	550	ND(10)	110 J	ND(10)	490 J	ND(10)	
Xylenes (total)	150,000	150,000			ND(30)	740	140	170 J	ND(30)	1,300 J	ND(30)	
<u>Polynuclear Aromatic Hydrocarbons (ug/kg)</u>												
Acenaphthene	76,000,000	810,000,000			ND(330)	ND(330)	ND(330)	5,700	ND(330)	ND(330)	ND(330)	
Acenaphthylene	1,500,000	16,000,000			ND(330)	ND(330)	ND(330)	ND(1,650)	ND(330)	ND(330)	ND(330)	
Anthracene	420,000,000	1,000,000,000			ND(330)	ND(330)	ND(330)	ND(1,650)	ND(330)	ND(330)	ND(330)	
Benzo(a)anthracene	14,000	210,000			ND(330)	ND(330)	ND(330)	ND(1,650)	ND(330)	ND(330)	ND(330)	
Benzo(b)fluoranthene	14,000	210,000			ND(330)	ND(330)	ND(330)	ND(1,650)	ND(330)	ND(330)	ND(330)	
Benzo(k)fluoranthene	140,000	2,100,000			ND(330)	ND(330)	ND(330)	ND(1,650)	ND(330)	ND(330)	ND(330)	
Benzo(g,h,i)perylene	1,500,000	16,000,000			ND(330)	ND(330)	ND(330)	ND(1,650)	ND(330)	ND(330)	ND(330)	
Benzo(a)pyrene	1,400	21,000			ND(330)	ND(330)	ND(330)	ND(1,650)	ND(330)	ND(330)	ND(330)	
Chrysene	1,400,000	21,000,000			ND(330)	ND(330)	ND(330)	ND(1,650)	ND(330)	ND(330)	ND(330)	
Dibenzo(a,h)anthracene	1,400	21,000			ND(330)	ND(330)	ND(330)	ND(1,650)	ND(330)	ND(330)	ND(330)	
Fluoranthene	51,000,000	540,000,000			ND(330)	ND(330)	ND(330)	ND(1,650)	ND(330)	ND(330)	ND(330)	
Fluorene	51,000,000	540,000,000			ND(330)	530	ND(330)	6,500	ND(330)	450	ND(330)	
Indeno(1,2,3-cd)pyrene	14,000	210,000			ND(330)	ND(330)	ND(330)	ND(1,650)	ND(330)	ND(330)	ND(330)	
2-Methylnaphthalene	15,000,000	160,000,000			ND(330)	3,900	850	33,000	ND(330)	4,500	ND(330)	
Naphthalene	15,000,000	160,000,000			ND(330)	1,700	ND(330)	11,000	ND(330)	2,200	ND(330)	
Phenanthrene	1,500,000	16,000,000			ND(330)	1,000	ND(330)	15,000	ND(330)	ND(330)	ND(330)	
Pyrene	32,000,000	340,000,000			ND(330)	ND(330)	ND(330)	2,500	ND(330)	ND(330)	ND(330)	

SUMMARY OF DETECTED PARAMETERS IN SOIL VERIFICATION SAMPLES

PHASE V ESA

AOC A-2-1/A-3-1

GM CLARK AVENUE FACILITY

DETROIT, MICHIGAN

Sample ID	Michigan		Michigan		DETROIT, MICHIGAN							
	Generic Residential	Generic Industrial	Generic Residential	Generic Industrial	S-092697-8889-EXC-057	S-092697-8889-EXC-058	S-092697-8889-EXC-059	S-092697-8889-EXC-060	S-092697-8889-EXC-061	S-092697-8889-EXC-062	S-092697-8889-EXC-063	
	Direct Contact	Direct Contact	Direct Contact	Direct Contact	9/26/97	9/26/97	9/26/97	9/26/97	9/26/97	9/26/97	9/26/97	
Date Sampled	Criteria (1)	Criteria (2)										
<u>Volatile Organic Compounds (VOCs) (ug/kg)</u>												
Benzene	88,000	400,000	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	130	45	ND(10)	ND(10)	ND(10)
Toluene	250,000	250,000	ND(10)	ND(10)	ND(10)	ND(10)	ND(50)	ND(50)	120	ND(10)	ND(10)	ND(10)
Ethylbenzene	140,000	140,000	ND(10)	ND(10)	ND(10)	ND(10)	1,200	1,200	290	ND(10)	ND(10)	ND(10)
Xylenes (total)	150,000	150,000	ND(30)	ND(30)	ND(30)	ND(30)	3,000	3,000	1,100	ND(30)	ND(30)	ND(30)
<u>Polynuclear Aromatic Hydrocarbons (ug/kg)</u>												
Acenaphthene	76,000,000	810,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	ND(660)	ND(3,300)	ND(330)	ND(330)	ND(330)
Acenaphthylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	ND(660)	ND(3,300)	ND(330)	ND(330)	ND(330)
Anthracene	420,000,000	1,000,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	ND(660)	ND(3,300)	ND(330)	ND(330)	ND(330)
Benzo(a)anthracene	14,000	210,000	510	ND(330)	ND(330)	ND(330)	990	ND(3,300)	ND(3,300)	ND(330)	ND(330)	ND(330)
Benzo(b)fluoranthene	14,000	210,000	570	ND(330)	ND(330)	ND(330)	ND(660)	ND(3,300)	ND(3,300)	ND(330)	ND(330)	ND(330)
Benzo(k)fluoranthene	140,000	2,100,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	ND(3,300)	ND(3,300)	ND(330)	ND(330)	ND(330)
Benzo(g,h,i)perylene	1,500,000	16,000,000	520	ND(330)	ND(330)	ND(330)	ND(660)	ND(3,300)	ND(3,300)	ND(330)	ND(330)	ND(330)
Benzo(a)pyrene	1,400	21,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	ND(3,300)	ND(3,300)	ND(330)	ND(330)	ND(330)
Chrysene	1,400,000	21,000,000	570	650	ND(330)	ND(330)	1,100	ND(3,300)	ND(3,300)	ND(330)	ND(330)	ND(330)
Dibenzo(a,h)anthracene	1,400	21,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	ND(3,300)	ND(3,300)	ND(330)	ND(330)	ND(330)
Fluoranthene	51,000,000	540,000,000	680	690	ND(330)	ND(330)	1,500	ND(3,300)	ND(3,300)	ND(330)	ND(330)	ND(330)
Fluorene	51,000,000	540,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(660)	5,400	ND(3,300)	ND(330)	ND(330)	ND(330)
Indeno(1,2,3-cd)pyrene	14,000	210,000	490	ND(330)	ND(330)	ND(330)	ND(660)	ND(3,300)	ND(3,300)	ND(330)	ND(330)	ND(330)
2-Methylnaphthalene	15,000,000	160,000,000	ND(330)	740	ND(330)	ND(330)	3,300	25,000	ND(3,300)	ND(330)	ND(330)	ND(330)
Naphthalene	15,000,000	160,000,000	ND(330)	620	ND(330)	ND(330)	1,700	10,000	ND(330)	ND(330)	ND(330)	ND(330)
Phenanthrene	1,500,000	16,000,000	650	730	ND(330)	ND(330)	2,200	12,000	ND(330)	ND(330)	ND(330)	ND(330)
Pyrene	32,000,000	340,000,000	1,300	1,100	ND(330)	ND(330)	2,400	ND(3,300)	ND(3,300)	ND(330)	ND(330)	ND(330)

SUMMARY OF DETECTED PARAMETERS IN SOIL VERIFICATION SAMPLES

PHASE V ESA

AOC A-2-1/A-3-1

GM CLARK AVENUE FACILITY

DETROIT, MICHIGAN

Sample ID	Michigan Generic Residential Direct Contact Criteria (1)	Michigan Generic Industrial Direct Contact Criteria (2)	S-092697- 8889-EXC-064 9/26/97	S-092697- 8889-EXC-065 9/26/97	S-092697- 8889-EXC-066 9/26/97	S-092697- 8889-EXC-067 9/26/97	S-092697- 8889-EXC-068 9/26/97
Date Sampled							

Volatile Organic Compounds (VOCs) (ug/kg)

Benzene	88,000	400,000	ND(10)	ND(10)	360	35	ND(10)
Toluene	250,000	250,000	ND(10)	ND(10)	300	20	ND(10)
Ethylbenzene	140,000	140,000	21	42	160	28	ND(10)
Xylenes (total)	150,000	150,000	60	180	430	100	ND(30)

Polynuclear Aromatic Hydrocarbons (ug/kg)

Acenaphthene	76,000,000	810,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Acenaphthylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Anthracene	420,000,000	1,000,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)anthracene	14,000	210,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(b)fluoranthene	14,000	210,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(k)fluoranthene	140,000	2,100,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(g,h,i)perylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)pyrene	1,400	21,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Chrysene	1,400,000	21,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Dibenzo(a,h)anthracene	1,400	21,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Fluoranthene	51,000,000	540,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Fluorene	51,000,000	540,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Indeno(1,2,3-cd)pyrene	14,000	210,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
2-Methylnaphthalene	15,000,000	160,000,000	720	440	ND(330)	ND(330)	ND(330)
Naphthalene	15,000,000	160,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Phenanthrene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Pyrene	32,000,000	340,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)

Notes:

ND() - Parameter was not detected above level in parentheses.

J - The associated numerical value is an estimated quantity.

UF - The compound was analyzed for but not detected. The sample quantitation limit is an estimated value.

(1) Values taken from MDEQ Operational Memorandum #8, Revision 4, dated June 5, 1996, and January 26, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.

(2) Values taken from MDEQ Operational Memorandum #14, Revision 2, dated June 6, 1995, and January 25, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.

SUMMARY OF DETECTED PARAMETERS IN THERMALLY TREATED SOILS

PHASE V ESA

AOC A-2-1/A-3-1

GM CLARK AVENUE FACILITY

DETROIT, MICHIGAN

Michigan

Generic Industrial

Direct Contact

Criteria (2)

Michigan

Generic Residential

Direct Contact

Criteria (1)

Sample ID

Date Sampled

S-081997-

8889-TTU-001

8/19/97

S-082097-

8889-TTU-002

8/20/97

S-082097-

8889-TTU-003

8/20/97

S-082197-

8889-TTU-004

8/21/97

S-082197-

8889-TTU-005

8/21/97

S-082697-

8889-TTU-006

8/26/97

S-082797-

8889-TTU-007

8/27/97

Volatile Organic Compounds (VOCs) (µg/kg)

Benzene	88,000	400,000	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Toluene	250,000	250,000	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	140,000	140,000	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Xylenes (total)	150,000	150,000	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)

Polynuclear Aromatic Hydrocarbons (µg/kg)

Acenaphthene	76,000,000	810,000,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Acenaphthylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Anthracene	420,000,000	1,000,000,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Benzo(a)anthracene	14,000	210,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Benzo(b)fluoranthene	14,000	210,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Benzo(k)fluoranthene	140,000	2,100,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Benzo(g,h,i)perylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Benzo(a)pyrene	1,400	21,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Chrysene	1,400,000	21,000,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Dibenzo(a,h)anthracene	1,400	21,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Fluoranthene	51,000,000	540,000,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Fluorene	51,000,000	540,000,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Indeno(1,2,3-cd)pyrene	14,000	210,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
2-Methylnaphthalene	15,000,000	160,000,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Naphthalene	15,000,000	160,000,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Phenanthrene	1,500,000	16,000,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)
Pyrene	32,000,000	340,000,000	ND(330)	ND(330)	ND(660)	ND(660)	ND(660)	ND(660)	ND(660)

SUMMARY OF DETECTED PARAMETERS IN THERMALLY TREATED SOILS

PHASE V ESA

AOC A-2-1/A-3-1

GM CLARK AVENUE FACILITY

DETROIT, MICHIGAN

Sample ID	Michigan		Michigan		DETROIT, MICHIGAN							S-091597- 8889-TTU-014 9/15/97
	Generic Residential	Generic Industrial			S-082997- 8889-TTU-009 8/29/97	S-090397- 8889-TTU-010 9/3/97	S-090897- 8889-TTU-011 9/8/97	S-090897- 8889-TTU-012 9/8/97	S-090997- 8889-TTU-013 9/9/97			
	Direct Contact	Direct Contact	Criteria (1)	Criteria (2)								
Date Sampled												
<u>Volatile Organic Compounds (VOCs) (ug/kg)</u>												
Benzene	88,000	400,000			ND(2)	ND(10)	ND(10)	ND(10)	ND(1)	ND(11)		
Toluene	250,000	250,000			ND(2)	ND(10)	ND(10)	ND(10)	ND(2)	ND(11)		
Ethylbenzene	140,000	140,000			ND(2)	ND(10)	ND(10)	ND(10)	ND(2)	ND(11)		
Xylenes (total)	150,000	150,000			ND(2)	ND(30)	ND(30)	ND(30)	ND(2)	ND(11)		
<u>Polynuclear Aromatic Hydrocarbons (ug/kg)</u>												
Acenaphthene	76,000,000	810,000,000			ND(330)	ND(330)	ND(1,650)	ND(660)	ND(330)	ND(370)		
Acenaphthylene	1,500,000	16,000,000			ND(330)	ND(330)	ND(1,650)	ND(660)	ND(330)	ND(370)		
Anthracene	420,000,000	1,000,000,000			ND(330)	ND(330)	ND(1,650)	ND(660)	ND(330)	ND(370)		
Benzo(a)anthracene	14,000	210,000			ND(330)	ND(330)	ND(1,650)	ND(660)	ND(330)	ND(370)		
Benzo(b)fluoranthene	14,000	210,000			ND(330)	ND(330)	ND(1,650)	ND(660)	ND(330)	ND(370)		
Benzo(k)fluoranthene	140,000	2,100,000			ND(330)	ND(330)	ND(1,650)	ND(660)	ND(330)	ND(370)		
Benzo(g,h,i)perylene	1,500,000	16,000,000			ND(330)	ND(330)	ND(1,650)	ND(660)	ND(330)	ND(370)		
Benzo(a)pyrene	1,400	21,000			ND(330)	ND(330)	ND(1,650)	ND(660)	ND(330)	ND(370)		
Chrysene	1,400,000	21,000,000			ND(330)	ND(330)	ND(1,650)	ND(660)	ND(330)	ND(370)		
Dibenzo(a,h)anthracene	1,400	21,000			ND(330)	ND(330)	ND(1,650)	ND(660)	ND(330)	ND(370)		
Fluoranthene	51,000,000	540,000,000			ND(330)	ND(330)	ND(1,650)	1,500	ND(330)	ND(370)		
Fluorene	51,000,000	540,000,000			ND(330)	ND(330)	ND(1,650)	ND(660)	ND(330)	ND(370)		
Indeno(1,2,3-cd)pyrene	14,000	210,000			ND(330)	ND(330)	ND(1,650)	ND(660)	ND(330)	ND(370)		
2-Methylnaphthalene	15,000,000	160,000,000			ND(330)	840	ND(1,650)	900	950	ND(370)		
Naphthalene	15,000,000	160,000,000			ND(330)	470	ND(1,650)	ND(660)	ND(330)	ND(370)		
Phenanthrene	1,500,000	16,000,000			380	1,100	1,900	2,200	1,100	ND(370)		
Pyrene	32,000,000	340,000,000			ND(330)	ND(330)	ND(1,650)	1,100	ND(330)	ND(370)		

SUMMARY OF DETECTED PARAMETERS IN THERMALLY TREATED SOILS
PHASE V ESA
AOC A-2-1/A-3-1
GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN

Sample ID	Michigan		Michigan		DETROIT, MICHIGAN						
	Generic Residential	Generic Industrial			S-091597-	S-091597-	S-091697-	S-091997-	S-091997-	S-092297-	
	Direct Contact	Direct Contact	Criteria (1)	Criteria (2)	8889-TTU-015	8889-TTU-016	8889-TTU-017	8889-TTU-018	8889-TTU-019	8889-TTU-020	
Date Sampled					9/15/97	9/15/97	9/15/97	9/16/97	9/19/97	9/19/97	9/22/97
<u>Volatile Organic Compounds (VOCs) (µg/kg)</u>											
Benzene	88,000	400,000			ND(11)	ND(11)	ND(12)	ND(1) UJ	ND(10)	ND(10)	ND(10)
Toluene	250,000	250,000			ND(11)	ND(11)	ND(12)	ND(2) UJ	ND(10)	ND(10)	ND(10)
Ethylbenzene	140,000	140,000			ND(11)	ND(11)	ND(12)	ND(2) UJ	ND(10)	ND(10)	ND(10)
Xylenes (total)	150,000	150,000			ND(11)	ND(11)	ND(12)	ND(2) UJ	ND(30)	ND(30)	ND(30)
<u>Polynuclear Aromatic Hydrocarbons (µg/kg)</u>											
Acenaphthene	76,000,000	810,000,000			ND(370)	ND(370)	ND(400)	ND(330)	ND(330)	ND(330)	ND(660)
Acenaphthylene	1,500,000	16,000,000			ND(370)	ND(370)	ND(400)	ND(330)	ND(330)	ND(330)	ND(660)
Anthracene	420,000,000	1,000,000,000			ND(370)	ND(370)	ND(400)	ND(330)	ND(330)	ND(330)	ND(660)
Benzo(a)anthracene	14,000	210,000			ND(370)	ND(370)	ND(400)	ND(330)	ND(330)	ND(330)	ND(660)
Benzo(b)fluoranthene	14,000	210,000			ND(370)	ND(370)	ND(400)	ND(330)	ND(330)	ND(330)	ND(660)
Benzo(k)fluoranthene	140,000	2,100,000			ND(370)	ND(370)	ND(400)	ND(330)	ND(330)	ND(330)	ND(660)
Benzo(g,h,i)perylene	1,500,000	16,000,000			ND(370)	ND(370)	ND(400)	ND(330)	ND(330)	ND(330)	ND(660)
Benzo(a)pyrene	1,400	21,000			ND(370)	ND(370)	ND(400)	ND(330)	ND(330)	ND(330)	ND(660)
Chrysene	1,400,000	21,000,000			ND(370)	ND(370)	ND(400)	ND(330)	ND(330)	ND(330)	ND(660)
Dibenzo(a,h)anthracene	1,400	21,000			ND(370)	ND(370)	ND(400)	ND(330)	ND(330)	ND(330)	ND(660)
Fluoranthene	51,000,000	540,000,000			ND(370)	ND(370)	ND(400)	ND(330)	380	ND(330)	ND(660)
Fluorene	51,000,000	540,000,000			ND(370)	ND(370)	ND(400)	ND(330)	ND(330)	ND(330)	ND(660)
Indeno(1,2,3-cd)pyrene	14,000	210,000			ND(370)	ND(370)	ND(400)	ND(330)	ND(330)	ND(330)	ND(660)
2-Methylnaphthalene	15,000,000	160,000,000			ND(370)	ND(370)	ND(400)	ND(330)	990	ND(330)	ND(660)
Naphthalene	15,000,000	160,000,000			ND(370)	ND(370)	ND(400)	ND(330)	590	ND(330)	ND(660)
Phenanthrene	1,500,000	16,000,000			ND(370)	ND(370)	ND(400)	ND(330)	1,200	ND(330)	780
Pyrene	32,000,000	340,000,000			ND(370)	ND(370)	ND(400)	ND(330)	490	ND(330)	ND(660)

SUMMARY OF DETECTED PARAMETERS IN THERMALLY TREATED SOILS

PHASE V ESA

AOC A-2-1/A-3-1

GM CLARK AVENUE FACILITY

DETROIT, MICHIGAN

Sample ID	Michigan		Michigan		Detroit, Michigan		Date Sampled	S-092397- 8889-TTU-022	S-092497- 8889-TTU-023	S-092697- 8889-TTU-024	S-092697- 8889-TTU-025	S-092997- 8889-TTU-026	S-092997- 8889-TTU-027	S-100297- 8889-TTU-028	
	Generic Residential	Generic Industrial	Generic Residential	Generic Industrial	Generic Residential	Generic Industrial									
	Direct Contact	Criteria (1)	Direct Contact	Criteria (2)	Direct Contact	Criteria (2)									
<u>Volatile Organic Compounds (VOCs) (µg/kg)</u>															
Benzene	88,000	400,000	ND(10)	ND(10)	ND(10) UJ	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	
Toluene	250,000	250,000	ND(10)	ND(10)	ND(10) UJ	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	
Ethylbenzene	140,000	140,000	ND(10)	ND(10)	ND(10) UJ	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	
Xylenes (total)	150,000	150,000	ND(30)	ND(30)	ND(30) UJ	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	
<u>Polynuclear Aromatic Hydrocarbons (µg/kg)</u>															
Acenaphthene	76,000,000	810,000,000	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
Acenaphthylene	1,500,000	16,000,000	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
Anthracene	420,000,000	1,000,000,000	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
Benzo(a)anthracene	14,000	210,000	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
Benzo(b)fluoranthene	14,000	210,000	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
Benzo(k)fluoranthene	140,000	2,100,000	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
Benzo(g,h,i)perylene	1,500,000	16,000,000	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
Benzo(a)pyrene	1,400	21,000	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
Chrysene	1,400,000	21,000,000	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
Dibenzo(a,h)anthracene	1,400	21,000	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
Fluoranthene	51,000,000	540,000,000	1,100	ND(330)	550	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	490	ND(330)	
Fluorene	51,000,000	540,000,000	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
Indeno(1,2,3-cd)pyrene	14,000	210,000	ND(660)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
2-Methylnaphthalene	15,000,000	160,000,000	ND(660)	1,100	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
Naphthalene	15,000,000	160,000,000	ND(660)	640	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	
Phenanthrene	1,500,000	16,000,000	2,100	1,300	720	ND(330)	540	ND(330)	ND(330)	ND(330)	ND(330)	840	550	ND(330)	
Pyrene	32,000,000	340,000,000	1,600	410	510	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	500	ND(330)	ND(330)	

SUMMARY OF DETECTED PARAMETERS IN THERMALLY TREATED SOILS
PHASE V ESA
AOC A-2-1/A-3-1
GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN

Sample ID	Michigan Generic Residential Direct Contact Criteria (1)	Michigan Generic Industrial Direct Contact Criteria (2)	S-100297- 8889-TTU-029 10/2/97	S-100297- 8889-TTU-030 10/2/97	S-100697- 8889-TTU-031 10/6/97	S-100897- 8889-TTU-032 10/8/97	S-100897- 8889-TTU-033 10/8/97
<u>Volatile Organic Compounds (VOCs) (µg/kg)</u>							
Benzene	88,000	400,000	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Toluene	250,000	250,000	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	140,000	140,000	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Xylenes (total)	150,000	150,000	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)
<u>Polynuclear Aromatic Hydrocarbons (µg/kg)</u>							
Acenaphthene	76,000,000	810,000,000	ND(330)	ND(330)	ND(660)	ND(1,650)	ND(660)
Acenaphthylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(660)	ND(1,650)	ND(660)
Anthracene	420,000,000	1,000,000,000	ND(330)	ND(330)	ND(660)	ND(1,650)	ND(660)
Benzo(a)anthracene	14,000	210,000	ND(330)	ND(330)	ND(660)	ND(1,650)	ND(660)
Benzo(b)fluoranthene	14,000	210,000	ND(330)	ND(330)	ND(660)	ND(1,650)	ND(660)
Benzo(k)fluoranthene	140,000	2,100,000	ND(330)	ND(330)	ND(660)	ND(1,650)	ND(660)
Benzo(g,h,i)perylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(660)	ND(1,650)	ND(660)
Benzo(a)pyrene	1,400	21,000	ND(330)	ND(330)	ND(660)	ND(1,650)	ND(660)
Chrysene	1,400,000	21,000,000	ND(330)	510	ND(660)	ND(1,650)	ND(660)
Dibenzo(a,h)anthracene	1,400	21,000	ND(330)	ND(330)	ND(660)	ND(1,650)	ND(660)
Fluoranthene	51,000,000	540,000,000	ND(330)	1,100	1,500	ND(1,650)	ND(660)
Fluorene	51,000,000	540,000,000	ND(330)	ND(330)	ND(660)	ND(1,650)	ND(660)
Indeno(1,2,3-cd)pyrene	14,000	210,000	ND(330)	ND(330)	ND(660)	ND(1,650)	ND(660)
2-Methylnaphthalene	15,000,000	160,000,000	ND(330)	ND(330)	ND(660)	ND(1,650)	ND(660)
Naphthalene	15,000,000	160,000,000	ND(330)	ND(330)	ND(660)	ND(1,650)	ND(660)
Phenanthrene	1,500,000	16,000,000	680	1,200	1,800	ND(1,650)	1,400
Pyrene	32,000,000	340,000,000	ND(330)	1,100	1,400	ND(1,650)	ND(660)

Notes:

ND() - Parameter was not detected above level in parentheses.

J - The associated numerical value is an estimated quantity.

UJ - The compound was analyzed for but not detected. The sample quantitation limit is an estimated value.

(1) Values taken from MDEQ Operational Memorandum #8, Revision 4, dated June 5, 1996, and January 26, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.

(2) Values taken from MDEQ Operational Memorandum #14, Revision 2, dated June 6, 1995, and January 25, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.

Privileged and Confidential
Prepared at General Motors Counsel's Request

TABLE 4.5
SUMMARY OF DETECTED PARAMETERS IN SOIL VERIFICATION SAMPLES
PHASE V ESA
PARCEL A-4
GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN

AOC No. Sample Location Sample ID (S-8889-) Date Sampled	Michigan Generic Residential Direct Contact Criteria (1)	Michigan Generic Industrial Direct Contact Criteria (2)	A-4-5 North Wall 121097-SF-465 12/10/97	A-4-5 East Wall 121097-SF-466 12/10/97	A-4-5 South Wall 121097-SF-467 12/10/97	A-4-5 West Wall 121097-SF-468 12/10/97	A-4-5 North Wall 121097-SF-469 12/10/97	A-4-5 East Floor 121097-SF-485 12/10/97	A-4-5 Center Floor 121097-SF-486 12/10/97	A-4-5 West Floor 121097-SF-487 12/10/97
Parameter										
<u>Polynuclear Aromatic Hydrocarbons (ug/kg)</u>										
Acenaphthene	76,000,000	810,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Acenaphthylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Anthracene	420,000,000	1,000,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)anthracene	14,000	210,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)pyrene	1,400	21,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(b)fluoranthene	14,000	210,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(g,h,i)perylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(k)fluoranthene	140,000	2,100,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Chrysene	1,400,000	21,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Dibenz(a,h)anthracene	1,400	21,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Fluoranthene	51,000,000	540,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Fluorene	51,000,000	540,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Indeno(1,2,3-cd)pyrene	14,000	210,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Naphthalene	15,000,000	160,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Phenanthrene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Pyrene	32,000,000	340,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
<u>Inorganic Compounds (mg/kg)</u>										
Lead	400	900 (draft)	30	13	10	9.5	11	11	12	11

Notes:

- ND() - Parameter was not detected above level in parentheses.
bgs - below ground surface.
AOC - Area of Concern.
- (1) Values taken from MDEQ Operational Memorandum #8, Revision 4, dated June 5, 1996, and January 26, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.
(2) Values taken from MDEQ Operational Memorandum #14, Revision 2, dated June 6, 1995, and January 25, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.

TABLE 4.6
SUMMARY OF DETECTED PARAMETERS IN SOIL
VERIFICATION SAMPLES
PHASE V ESA
PARCEL B-1
GM CLARK AVENUE FACILITY
DETROIT, MICHIGAN

Sample Location Sample ID (S-8889-) Date Sampled	Michigan Generic Residential Direct Contact Criteria (1)	Michigan Generic Industrial Direct Contact Criteria (2)	South Sidewall 102596-JM-418 10/25/96	West Sidewall 102596-JM-419 10/25/96	North Sidewall 102596-JM-420 10/25/96	East Sidewall 102596-JM-421 10/25/96	Floor 102596-JM-422 10/25/96	Floor 102596-JM-423 10/25/96
<u>Parameter (µg/kg)</u>								
Acenaphthene	76,000,000	810,000,000	ND(330)	ND(330)	ND(330)	410	ND(330)	ND(330)
Acenaphthylene	1,500,000	16,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Anthracene	420,000,000	1,000,000,000	470	ND(330)	ND(330)	980	ND(330)	ND(330)
Benzo (a) anthracene	14,000	210,000	660	ND(330)	ND(330)	1,500	ND(330)	ND(330)
Benzo (b) fluoranthene	14,000	210,000	400	ND(330)	ND(330)	1,200	ND(330)	ND(330)
Benzo (k) fluoranthene	140,000	2,100,000	560	ND(330)	ND(330)	1,000	ND(330)	ND(330)
Benzo (a) pyrene	1,400	21,000	ND(330)	ND(330)	ND(330)	1,100	ND(330)	ND(330)
Benzo (g,h,i) perylene	1,500,000	16,000,000	380	ND(330)	ND(330)	790	ND(330)	ND(330)
Chrysene	1,400,000	21,000,000	1,100	ND(330)	ND(330)	2,100	ND(330)	ND(330)
Dibenz (a,h) anthracene	1,400	21,000	ND(330)	ND(330)	ND(330)	340	ND(330)	ND(330)
Fluoranthene	51,000,000	540,000,000	1,800	370	ND(330)	3,300	ND(330)	ND(330)
Fluorene	51,000,000	540,000,000	ND(330)	ND(330)	ND(330)	390	ND(330)	ND(330)
Indeno (1,2,3-c,d) pyrene	14,000	210,000	330	ND(330)	ND(330)	650	ND(330)	ND(330)
Naphthalene	15,000,000	160,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Phenanthrene	1,500,000	16,000,000	1,600	ND(330)	ND(330)	3,800	ND(330)	ND(330)
Pyrene	32,000,000	340,000,000	1,500	ND(330)	ND(330)	2,700	ND(330)	ND(330)
2-Methylnaphthalene	15,000,000	160,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)

Notes:

ND() - Parameter was not detected above the level in parenthesis.

- (1) Values taken from MDEQ Operational Memorandum #8, Revision 4, dated June 5, 1996, and January 26, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.
- (2) Values taken from MDEQ Operational Memorandum #14, Revision 2, dated June 6, 1995, and January 25, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.

SUMMARY OF DETECTED LEAD IN SOIL VERIFICATION SAMPLES
 PHASE V ESA
 PARCEL B-2
 GM CLARK AVENUE FACILITY
 DETROIT, MICHIGAN

AOC No.	Michigan Generic Residential	Michigan Generic Industrial	B-2-1 East Floor	B-2-1 West Floor	B-2-1 East Wall	B-2-1 North Wall	B-2-1 South Wall	B-2-1 West Wall
Sample Location	Direct Contact	Direct Contact	020598-SF-485	020598-SF-486	020598-SF-487	020598-SF-488	020598-SF-489	020598-SF-490
Sample ID (S-8889-)	Criteria (1)	Criteria (2)	2/5/98	2/5/98	2/5/98	2/5/98	2/5/98	2/5/98
Date Sampled								
<u>Parameter (mg/kg)</u>								
Lead	400	900 (draft)	12 J	10 J	6.7 J	9.9 J	96 J	10 J

SUMMARY OF DETECTED LEAD IN SOIL VERIFICATION SAMPLES
 PHASE V ESA
 PARCEL B-2
 GM CLARK AVENUE FACILITY
 DETROIT, MICHIGAN

AOC No.	Michigan Generic Residential	Michigan Generic Industrial	B-2-2 North Floor	B-2-2 South Floor	B-2-2 East Wall	B-2-2 North Wall	B-2-2 West Wall	B-2-2 South Wall
Sample Location	Direct Contact	Direct Contact	102596-JM-424	102596-JM-425	102596-JM-426	102596-JM-427	102596-JM-428	102596-JM-429
Sample ID (S-8889-)	Criteria (1)	Criteria (2)	10/25/96	10/25/96	10/25/96	10/25/96	10/25/96	10/25/96
Date Sampled								

Parameter (mg/kg)

Lead	400	900 (draft)	7.9 J	8.4 J	230 J	130 J	48 J	48 J
------	-----	-------------	-------	-------	-------	-------	------	------

Notes:

AOC - Area of Concern.

bgs - below ground surface.

J - The associated numerical value is an estimated quantity.

(1) Values taken from MDEQ Operational Memorandum #8, Revision 4, dated June 5, 1996, and January 26, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.

(2) Values taken from MDEQ Operational Memorandum #14, Revision 2, dated June 6, 1995, and January 25, 1996 Revision, as defined in MDEQ-ERD Training Material, March 1998.

Privileged and Confidential
 Prepared at General Motors
 Counsel's Request

)

APPENDIX A
CHAIN-OF-CUSTODY RECORDS

CRA

CONESTOGA-ROVERS & ASSOCIATES
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: Frank W. Ring

SHIPPED TO (Labo. Name):

IEA - Schaumburg

REFERENCE NUMBER:

8889-4Z

PROJECT NAME:

GM Clark St. - NRW

PARAMETERS

BITX

SAMPLE TYPE

soil

SEQ. No. DATE TIME

1 8/29

5-082997-8889-TTU-008

2

-009

3

5-082997-8889-EXC-016

4

-017

5

-018

6

-019

7

-020

8

-021

REMARKS

72 1125

TOTAL NUMBER OF CONTAINERS

16

RELINQUISHED BY:

Frank W. Ring

DATE: 8/29/97

DATE:

1. Frank W. Ring

TIME: 1800

1.

RECEIVED BY:

TIME:

RELINQUISHED BY:

DATE:

RECEIVED BY:

DATE:

2.

TIME:

2.

RECEIVED BY:

TIME:

RELINQUISHED BY:

DATE:

RECEIVED BY:

DATE:

3.

TIME:

1.

RECEIVED BY:

TIME:

METHOD OF SHIPMENT: FED Ex

AIR BILL No.

White

-Fully Executed Copy

Pink

-Shipper Copy

Yellow

-Receiving Laboratory Copy

Goldenrod

-Sampler Copy

SAMPLE TEAM:

Frank W. Ring

RECEIVED FOR LABORATORY BY:

No

2968

DATE:

TIME:

CONESTOGA-ROVERS & ASSOCIATES
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

IEA Schumburg

REFERENCE NUMBER:	PROJECT NAME:
-------------------	---------------

GM Clark Street - DKW

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: Frank W. King PRINTED NAME: Frank W. King

Frank W. Ring

SEQ:	DATE	TIME
No.		

1	9/3
---	-----

S-090397-8889-7TU-010

2	973
---	-----

5-090397-9999-EXC-077

3	9/3
---	-----

S-190397-886A-E-XC-1173

REMARKS

PARAMETERS

87EX
DNA

58

ing	SAMPLE TYPE
-----	----------------

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: /

1

RECEIVED BY:

1.

RELINQUISHED BY:

2.

RELINQUISHED BY:

RELINQUISHED BY:

METHOD OF SHIPMENT:

17

AIR BILL No.

White	-Fully Executed Copy	Pink	-Shipper Copy
Yellow	-Receiving Laboratory Copy	Goldenrod	-Sampler Copy

SAMPLE TEAM:

RECEIVED FOR LABORATORY BY:

No. 2967

DATE: _____ TIME: _____

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: Frank W. Ring

SEQ. No. DATE TIME

1 9/18/97

2

3

4

5

6

5-090897-8889-TTU-011

-022

5-090897-8889-EXC-024

-025

-026

-027

SAMPLE TYPE

SOIL

↓

↓

↓

↓

REFERENCE NUMBER: 8889-42

PROJECT NAME: GM Clark Street - UPW

PARAMETERS

CONTAINERS

BTX

PAH

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

REMARKS

TOTAL NUMBER OF CONTAINERS 12

RELINQUISHED BY:

1. Frank W. Ring

DATE: 9/18/97 TIME: 11:00

RELINQUISHED BY:

2.

DATE: TIME:

RELINQUISHED BY:

3.

DATE: TIME:

RECEIVED BY:

1.

DATE: TIME:

RECEIVED BY:

2.

DATE: TIME:

RECEIVED BY:

1.

DATE: TIME:

METHOD OF SHIPMENT: FED EX

AIR BILL No.

White - Fully Executed Copy Pink - Shipper Copy
Yellow - Receiving Laboratory Copy Goldenrod - Sampler Copy

SAMPLE TEAM: F. Ring

RECEIVED FOR LABORATORY BY:

DATE: TIME:

DATE: TIME:

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: Frank W.D. Ring PRINTED NAME: Frank W. Ring

SHIPPED TO (Laboratory Name):

IEA

REFERENCE NUMBER:

8889-42

PROJECT NAME:

GM Clark Street - NRW

PARAMETERS

CONTAINERS

SAMPLE TYPE

REMARKS

SEQ. No.

DATE

TIME

1

9/19/97

S-090997-8889-EXC-028

SOIL

2

X

X

X

X

X

X

X

X

X

X

X

2

9/19/97

-029

SOIL

2

X

X

X

X

X

X

X

X

X

X

X

3

9/19/97

-030

SOIL

2

X

X

X

X

X

X

X

X

X

X

X

4

9/19/97

-031

SOIL

2

X

X

X

X

X

X

X

X

X

X

X

5

9/19/97

-032

SOIL

2

X

X

X

X

X

X

X

X

X

X

X

6

9/19/97

-033

SOIL

2

X

X

X

X

X

X

X

X

X

X

X

7

9/19/97

-034

SOIL

2

X

X

X

X

X

X

X

X

X

X

X

8

9/19/97

-035

SOIL

2

X

X

X

X

X

X

X

X

X

X

X

9

9/19/97

S-090997-8889-TTV-013

SOIL

2

X

X

X

X

X

X

X

X

X

X

X

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY:

Frank W.D. Ring

DATE:

9/19/97

RECEIVED BY:

1.

DATE:

TIME:

RELINQUISHED BY:

Frank W.D. Ring

DATE:

9/19/97

RECEIVED BY:

2.

DATE:

TIME:

RELINQUISHED BY:

Frank W.D. Ring

DATE:

9/19/97

RECEIVED BY:

3.

DATE:

TIME:

METHOD OF SHIPMENT: FED EX

AIR BILL No.

White

Fully Executed Copy

Pink

Goldenrod

Shipper Copy

Sampler Copy

RECEIVED FOR LABORATORY BY:

DATE:

TIME:

RECEIVED FOR LABORATORY BY:

DATE:

TIME:

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: Frank W. Ring

SEQ. No. DATE TIME

1 9/15/97 5-091597-8889-TTU-014
2
3
4

SAMPLE TYPE

SOIL
↓
↓

CONTAINERS

2
2
2
2

PARAMETERS

X
X
X
X

REMARKS

24 HR TAT
↓
48 HR TAT

SHIPPED TO (Laboratory Name):

ACCUTEST

REFERENCE NUMBER:

8889-42

PROJECT NAME:

GM Clark Street - URW

R-16

TOTAL NUMBER OF CONTAINERS

8

RELINQUISHED BY:

Frank W. Ring

DATE:

9/15/97

RECEIVED BY:

1.

DATE:

TIME:

RELINQUISHED BY:

DATE:

1990

RECEIVED BY:

2.

DATE:

TIME:

RELINQUISHED BY:

DATE:

1.

RECEIVED BY:

DATE:

TIME:

METHOD OF SHIPMENT: FED Ex

AIR BILL No. 9395549332

White
Yellow

-Fully Executed Copy
-Receiving Laboratory Copy

SAMPLE TEAM:

F. Ring

RECEIVED FOR LABORATORY BY:

DATE: TIME:

5

10

PROJECT NAME:

PARAMETERS

REMARKS

[illegible]

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: _____	DATE: _____	RECEIVED BY: _____	DATE: _____
1. _____	TIME: _____	1. _____	TIME: _____
RELINQUISHED BY: _____	DATE: _____	RECEIVED BY: _____	DATE: _____
2. _____	TIME: _____	2. _____	TIME: _____
RELINQUISHED BY: _____	DATE: _____	RECEIVED BY: _____	DATE: _____
3. _____	TIME: _____	1. _____	TIME: _____

METHOD OF SHIPMENT:

AIR BILL No.

White	-Fully Executed Copy	Pink	-Shipper Copy
Yellow	-Receiving Laboratory Copy	Goldenrod	-Sampler Copy

SAMPLE TEAM:

RECEIVED FOR LABORATORY BY:

DATE: _____ TIME: _____

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

IEA LABORATORY

PROJECT NAME:

9359-42

THOMAS D. JOHNSON

[illegible]

✕	✕
✕	✕
2	2

REMARKS

TOTAL NUMBER OF CONTAINERS

DATE: 4/19/97
TIME: 17:30

RECEIVED BY:
1. _____

DATE:
TIME:DATE: _____
TIME: _____

RECEIVED BY:
2. _____

DATE: _____
TIME: _____DATE: _____
TIME: _____

RECEIVED BY:
1

DATE: _____
TIME: _____

AIR BILL No. 9395549355

SAMPLE TEAM:

RECEIVED FOR LABORATORY BY:

DATE: _____ TIME: _____

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

IFA LA POL 1702 Y

6M CLARK AVE. N. ROADWAY

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: 

PRINTED NAME: _____

PRINTED
NAME: FLORENCE 7

[illegible]

TOTAL NUMBER OF CONTAINERS

RECEIVED BY:

DATE: _____

1.

DATE: 07/25/15
TIME: 17:20

TIME:

RECEIVED BY:

TIME: 17:30

DATE:

DATE: _____

2

DATE: _____

TIME: _____

TIME.

RECEIVED BY:

DATE _____

TIME _____

DATE:

1

DATE: _____
TIME: _____

DATE: _____

METHOD OF SHIPMENT:

AIR BILL No.

White	-Fully Executed Copy	Pink	-Shipper Copy
Yellow	-Receiving Laboratory Copy	Goldenrod	-Sampler Copy

SAMPLE TEAM:

RECEIVED FOR LABORATORY BY:

SAMPLE TEAM: T. Johnson

DATE: _____ TIME: _____

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name):

TEA LABORATORY

REFERENCE NUMBER:

68839-42

PROJECT NAME:

G.M. CLARK AVE N. ROADWAY

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: [Signature] PRINTED NAME: THOMAS SANDERS

SEQ. No.	DATE	TIME	SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS	REMARKS
1	4/29/93		SOIL	2	X	48 IN TAT
2				2	X	
3				2	X	
4				2	X	
5				2	X	
6				2	X	
7				2	X	
8				2	X	
9				2	X	
10				2	X	
11				2	X	
12				2	X	
13				2	X	
14				2	X	
15				2	X	
16				2	X	
17				2	X	
18				2	X	
TOTAL NUMBER OF CONTAINERS					18	

RELINQUISHED BY: <u>[Signature]</u>	DATE: 04/29/93	RECEIVED BY: 1.	DATE: _____
	TIME: 13:30		TIME: _____
RELINQUISHED BY: 2.	DATE: _____	RECEIVED BY: 2.	DATE: _____
	TIME: _____		TIME: _____
RELINQUISHED BY: 3.	DATE: _____	RECEIVED BY: 1.	DATE: _____
	TIME: _____		TIME: _____

METHOD OF SHIPMENT: FED EX

AIR BILL No.

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy

SAMPLE TEAM:

T. JOHNSON

RECEIVED FOR LABORATORY BY:

DATE: _____ TIME: _____

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name):

IEA - SCIAMBURG

4216

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: [Signature] PRINTED NAME: THOMAS WILSON

REFERENCE NUMBER:

0099-42

PROJECT NAME:

GM CUNY AVE. N. ROADWAY

SEQ. No.	DATE	TIME	SAMPLE TYPE	CONTAINERS	PARAMETERS										REMARKS
					PH	PH	PH	PH	PH	PH	PH	PH	PH	PH	
1	012697	10:00	5-092697-0599-EXC-057	2	X	X	X	X	X	X	X	X	X	X	48 HR. T.A.T
2			-058	2	X	X	X	X	X	X	X	X	X	X	
3			-054	2	X	X	X	X	X	X	X	X	X	X	
4			-060	2	X	X	X	X	X	X	X	X	X	X	
5			-061	2	X	X	X	X	X	X	X	X	X	X	
6			-062	2	X	X	X	X	X	X	X	X	X	X	
7			-063	2	X	X	X	X	X	X	X	X	X	X	
8			-064	2	X	X	X	X	X	X	X	X	X	X	
9			-065	2	X	X	X	X	X	X	X	X	X	X	
10			-066	2	X	X	X	X	X	X	X	X	X	X	
11			-067	2	X	X	X	X	X	X	X	X	X	X	
12		10:30	5-092697-0599-EXC-060	2	X	X	X	X	X	X	X	X	X	X	
13		10:40	5-092697-0599-TIV-024	2	X	X	X	X	X	X	X	X	X	X	
14	092697	10:40	5-092697-0599-TIV-025	2	X	X	X	X	X	X	X	X	X	X	
TOTAL NUMBER OF CONTAINERS				28											

RELINQUISHED BY: <u>[Signature]</u>	DATE: 092697	RECEIVED BY:	DATE:
	TIME: 13:00	1.	TIME:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:	2.	TIME:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:	1.	TIME:

METHOD OF SHIPMENT: FED EX AIR BILL No. _____

SAMPLE TEAM: <u>T. JOHNSON</u>		RECEIVED FOR LABORATORY BY: _____	
White	- Fully Executed Copy	DATE: _____	TIME: _____
Yellow	- Receiving Laboratory Copy		
Pink	- Shipper Copy		
Goldenrod	- Sampler Copy		

CRA

CONESTOGA-ROVERS & ASSOCIATES

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Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name):

TEA Schaumburg

Name):

12-17

REFERENCE NUMBER:

88887-42

PROJECT NAME:

GM Clark Street - NW

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: Frank W. King

PRINTED NAME:

Frank W. King

PARAMETERS

CONTAINERS

NO. OF

SAMPLE TYPE

TIME

DATE

TIME

DATE

TIME

DATE

TIME

DATE

REMARKS

48 hr TAT
48 hr TAT

TOTAL NUMBER OF CONTAINERS

4

RELINQUISHED BY: Frank W. King

DATE: 9/7/99

TIME: 1600

RECEIVED BY: 1.

DATE: 9/7/99

TIME: 1600

RECEIVED BY: 2.

DATE: 9/7/99

TIME: 1600

RECEIVED BY: 3.

DATE: 9/7/99

TIME: 1600

DATE: 9/7/99

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TIME:

DATE:

METHOD OF SHIPMENT: FED EX

AIR BILL No.

SAMPLE TEAM:

F. King

RECEIVED FOR LABORATORY BY:

DATE: TIME:

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy

Pink - Shipper Copy
Goldenrod - Sampler Copy

No. 2974

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name):

IEH - Schaumburg

R-18

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: Frank W. King PRINTED NAME: Frank W. King

REFERENCE NUMBER:

94281-112

PROJECT NAME:

5th Clark Street - North roadway

PARAMETERS		CONTAINERS		REMARKS	
SEQ. No.	DATE	TIME	SAMPLE TYPE	NO. OF	
1	10/17/91	17:00	Soil	1	48 HR
2	10/17/91	17:00	Soil	1	TAT
3	10/17/91	17:00	Soil	1	
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
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95					
96					
97					
98					
99					
100					

TOTAL NUMBER OF CONTAINERS

63

RELINQUISHED BY: Frank W. King DATE: 10/17/91 RECEIVED BY: 1. DATE:

TIME: 1800 TIME:

RELINQUISHED BY: DATE: RECEIVED BY: 2. DATE:

TIME: TIME:

RELINQUISHED BY: DATE: RECEIVED BY: 1. DATE:

TIME: TIME:

METHOD OF SHIPMENT: 10/17/91 AIR BILL No.

SAMPLE TEAM:

White - Fully Executed Copy Pink - Shipper Copy
Yellow - Receiving Laboratory Copy Goldentrod - Sampler Copy

RECEIVED FOR LABORATORY BY:

DATE: TIME:

9-20)

PROJECT NAME: Clark Street - Nk W

REFERENCE NUMBER: 6889-12

Frank W. Long

[illegible]

TOTAL NUMBER OF CONTAINERS

4.

RELINQUISHED BY:	DATE: 10/31/17	RECEIVED BY:	DATE:
1. <i>[Signature]</i>	TIME: 11:00	1. _____	TIME: _____
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
2. _____	TIME:	2. _____	TIME: _____
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
3. _____	TIME:	1. _____	TIME: _____

METHOD OF SHIPMENT: FED EX AIR BILL No.

RECEIVED FOR LABORATORY BY:

SAMPLE TEAM:

White	-Fully Executed Copy	Pink	-Shipper Copy
Yellow	-Receiving Laboratory Copy	Goldenrod	-Sampler Copy

DATE: _____ TIME: _____

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

Name: IEA - Selmanovic

CHAIN OF CUSTODY RECORD

PROJECT NAME:

8889-47

PROJECT NAME: CLARK STREET

SAMPLER'S SIGNATURE: Frank W R PRINTED NAME: Frank W R

Frank W. Ring

PARAMETERS

REMARKS

[illegible]

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY:

DATE: 8/18/07 RECEIVED BY:

1. F. Long
RELINQUISHED BY:
2

DATE: 10/27/11
TIME: 1700

BEI INOITISHED BY

TIME: 11:00	RECEIVED BY:
DATE:	

DECLASSIFIED BY: 6032

DATE.	RECEIVED BY:
TIME	?

2. _____

TIME:	2.
-------	----

RELINQUISHED BY:

DATE:	RECEIVED BY:
-------	--------------

METHOD OF SHIPMENT: FED EX

AIR BILL No.

White	Fully Executed Copy	Pink	Shipper Copy
Yellow	Receiving Laboratory Copy	Goldenrod	Sampler Copy

SAMPLE TEAM:

RECEIVED FOR LABORATORY BY:

Pink	-Shipper Copy
Goldenrod	-Sampler Copy

IPLE TEAM:
E. KING

DATE: _____ TIME: _____

CRA

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11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name):

Encotec

REFERENCE NUMBER:

8889-40

PROJECT NAME:

GM Clark Street

SAMPLER'S SIGNATURE: *Susan Fulek* PRINTED NAME: *Susan Fulek*

SAMPLE TYPE

SEQ. No. DATE TIME

1 12/10/97 1030

2 1232

3 1232

4 1030

5 1233

6 1240

7 1155

8 1200

9 1205

10 1208

11 1210

12 1215

13 1208

14 1303

SAMPLE TYPE

Soil

-450

-451

-452

-453

-454

-455

-456

-457

-458

-459

-460

-461

-462

CONTAINERS

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

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1

PARAMETERS

24 Hour TAT

24 Hour TAT

24 Hour TAT

24 Hour TAT

24 Hour TAT

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24 Hour TAT

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24 Hour TAT

24 Hour TAT

24 Hour TAT

24 Hour TAT

TOTAL NUMBER OF CONTAINERS

14

RELINQUISHED BY:

Susan Fulek

RELINQUISHED BY:

RELINQUISHED BY:

RELINQUISHED BY:

RECEIVED BY:

1. DATE: 12/10/97

TIME: 1330

RECEIVED BY:

2. DATE: TIME:

RECEIVED BY:

1. DATE: TIME:

AIR BILL No.

Drop off by *CPH*

METHOD OF SHIPMENT:

SAMPLE TEAM:

S Fulek

RECEIVED FOR LABORATORY BY:

DATE: 12/10/97 TIME:

White - Fully Executed Copy Pink - Shipper Copy

Yellow - Receiving Laboratory Copy Goldenrod - Sampler Copy

4278

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name):

Encotec

CHAIN OF CUSTODY RECORD

REFERENCE NUMBER:

8889-40

PROJECT NAME:

6m Clark Street

SAMPLER'S

SIGNATURE: Susan Gulek

PRINTED NAME: Susan Gulek

SEQ. No.	DATE	TIME	SAMPLE TYPE	NO OF CONTAINERS	PARAMETERS	REMARKS
15	12/24/97	1310	5-8889-121097-SF-4631	1	✓	24 Hour TAT
16	1312		-4641	1	✓	
17			-465	2	✓	
18			-466	2	✓	
19			-467	2	✓	
20			-468	2	✓	
21			-469	2	✓	
22			-470	2	✓	
23			-471	2	✓	
24			-472	2	✓	
25			-473	1	✓	
26			-474	1	✓	
27			-475	1	✓	
28			-476	1	✓	
TOTAL NUMBER OF CONTAINERS				22		

RELINQUISHED BY: Susan Gulek

DATE: 12/10/97

TIME: 1830

RELINQUISHED BY:

DATE:

TIME:

RELINQUISHED BY:

DATE:

TIME:

DATE:

TIME:

DATE:

TIME:

DATE:

TIME:

METHOD OF SHIPMENT: Dropoff by CRA

AIR BILL No.

White
Yellow

- Fully Executed Copy
- Receiving Laboratory Copy

SAMPLE TEAM:

S. Gulek

RECEIVED FOR LABORATORY BY:

DATE: 12/10/97 TIME: 1830

4279

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name):

Envco Tec

23

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: *J.L. McClellan* PRINTED NAME: *J.L. McClellan*

REFERENCE NUMBER: *8889-40*

PROJECT NAME: *GUM CLARK STREET*

PARAMETERS

LEAD

REMARKS

SEQ. No. DATE TIME

1 10-25-96 10:30 5-8889-102596-JM-418

2 419

3 420

4 421

5 422

6 423

7 424

8 425

9 426

10 427

11 428

12 429

13 430

14 431

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: *J.L. McClellan* RECEIVED BY: *David J. Taylor* DATE: 10/25/96 TIME: 10:30

RELINQUISHED BY: DATE: TIME: RECEIVED BY: DATE: TIME:

RELINQUISHED BY: DATE: TIME: RECEIVED BY: DATE: TIME:

METHOD OF SHIPMENT: *Hand Delivered* AIR BILL No.

SAMPLE TEAM: *J. McClellan* RECEIVED FOR LABORATORY BY: DATE: TIME:

White - Fully Executed Copy Pink - Shipper Copy
Yellow - Receiving Laboratory Copy Goldenrod - Sampler Copy

3466

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name):

Exotec

23

CHAIN OF CUSTODY RECORD

PROJECT NAME:

GMA CLARK STREET

REFERENCE NUMBER:

0089-40

SAMPLER'S
SIGNATURE: *J.L. McClellan*

PRINTED
NAME: *J.L. McClellan*

PARAMETERS

CONTAINERS

SAMPLE
TYPE

SEQ. No. DATE TIME

15 10-25-90 14:30 5-8887-102546-JM1-432
16 10-25-90 14:33 433
17 10-25-90 14:34 434
18 10-25-90 14:35 435
19 10-25-90 16:00 10-8887-102546-JM1-412

REMARKS

29 HR TAT

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: *J.L. McClellan* DATE: 10-25-90 TIME: 17:31
RECEIVED BY: *J. Taylor* DATE: 10/25/90 TIME: 1840
RELINQUISHED BY: DATE: TIME:
RECEIVED BY: DATE: TIME:
RELINQUISHED BY: DATE: TIME:
RECEIVED BY: DATE: TIME:

METHOD OF SHIPMENT:

AIR BILL No.

Hand Delivered

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy

Pink - Shipper Copy
Goldenrod - Sampler Copy

SAMPLE TEAM:

J. McClellan

RECEIVED FOR LABORATORY BY:

3472

DATE: TIME:

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Labo. Name):

ENCOTECH

REFERENCE NUMBER:

8885

PROJECT NAME:

Clark ST

SAMPLER'S SIGNATURE: *[Signature]* PRINTED NAME: *Tim Harlow*

PARAMETERS

LEAD

SEQ. No.	DATE	TIME	SAMPLE TYPE	No. of CONTAINERS
1	10/28/96	1630A	Soil	1
2	10/28/96	1630A	Soil	1
3	10/28/96	1630A	Soil	1
4	10/28/96	1630A	Soil	1
5	10/28/96	1630A	Soil	1
6	10/28/96	1630A	Soil	1

REMARKS

2-1 11A
PAT

TOTAL NUMBER OF CONTAINERS

63

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
1. <i>[Signature]</i>	10/28/96	1630	1. <i>David J. Taylor</i>	10/28/96	1825
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
2. _____	_____	_____	2. _____	_____	_____
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
3. _____	_____	_____	3. _____	_____	_____

AIR BILL No.

METHOD OF SHIPMENT: *[Signature]*

RECEIVED FOR LABORATORY BY:

SAMPLE TEAM: *Tim Harlow*
Jim Nickle

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Shipper Copy
Goldendrod - Sampler Copy

3705

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name):

Enotec

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: Susan Fielek PRINTED NAME: Susan Fielek

REFERENCE NUMBER:

8889-40

PROJECT NAME:

6M Clark Street

PARAMETERS

Lead

CONTAINERS

SAMPLE TYPE

SEQ. No. DATE TIME

1 020598 S-8889-020598-SF-485

2 -486

3 -487

4 -488

5 -489

6 -490

REMARKS

24 Hour TAT

TOTAL NUMBER OF CONTAINERS

6

RELINQUISHED BY: Susan Fielek

DATE: 020598
TIME: 1205

RECEIVED BY: Everett M. Johnston

DATE: 2/5/98
TIME: 12pm

RELINQUISHED BY:

DATE:
TIME:

RECEIVED BY:

DATE:
TIME:

RELINQUISHED BY:

DATE:
TIME:

RECEIVED BY:

DATE:
TIME:

METHOD OF SHIPMENT: Drop off by CRA

AIR BILL No.

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy

SAMPLE TEAM: S. Fielek

RECEIVED FOR LABORATORY BY: Everett M. Johnston

DATE: 2/5/98 TIME: 12pm

4831

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name):

Encotec

REFERENCE NUMBER:

8889-40

PROJECT NAME:

GM Clark Street

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: Susan Fulek PRINTED NAME: Susan Fulek

SEQ. No.	DATE	TIME	SAMPLE TYPE	NO. OF CONTAINERS	PARAMETERS	REMARKS
29	12/10/97		SF - 477	1	✓	24 Hour TAT
30			-478	1	✓	
31			-479	1	✓	
32			-480	1	✓	
33			-481	1	✓	① DO NOT ANALYZE
34			-482	1	✓	
35			-483	1	✓	
36			-484	1	✓	
37			-485	2	✓	
38			-486	2	✓	
39			-487	1	✓	
TOTAL NUMBER OF CONTAINERS						13

56 12/10/97

RELINQUISHED BY:

Susan Fulek

DATE: 12/10/97

RECEIVED BY:

DATE:

TIME: 1830

TIME:

RELINQUISHED BY:

DATE:

RECEIVED BY:

DATE:

TIME:

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RELINQUISHED BY:

DATE:

RECEIVED BY:

DATE:

TIME:

TIME:

METHOD OF SHIPMENT: Drop off by CRA

AIR BILL No.

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy

SAMPLE TEAM:

RECEIVED FOR LABORATORY BY:

S. Fulek
DATE: 12/11/97 TIME: 9:07 AM

4992

APPENDIX B
DATA VALIDATION MEMORANDA

11100 Metro Airport Center Drive
Suite 160
Romulus, MI 48174
(313) 942-0909

MEMO

REFERENCE NO: 8889

DATE: November 8, 1996

RE: Data Quality Assessment and Validation for Soil Samples Collected from the General Motors Clark Street Site in Detroit, Michigan

The following details a quality assessment and validation of the analytical data resulting from the October 25, 1996, collection of six (6) soil samples from the General Motors Clark Street Site in Detroit, Michigan. The samples identified in Table 1 were analyzed for polynuclear aromatics (PNA). Sample analysis was completed at Rollins Environmental Inc. (ENCOTEC), Ann Arbor, Michigan, facility in accordance with the method SW-846 8270 presented in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846 3rd Edition, and Promulgated Updates, November 1986. The quality control criteria used to assess the data were established by the methods and the quality assurance project plan (QAPP).¹

Holding Time Period and Sample Analysis

The holding time period is as follows:

Polynuclear Aromatics	- 14 days from sample collection to extraction, - 40 days from extraction to completion of analysis.
-----------------------	---

The samples, as indicated by the sample collection, extraction and analysis dates on the chain-of-custody forms and analytical reports provided by ENCOTEC, were prepared and analyzed within the required holding time periods.

Method Blank Samples

Contamination of samples contributed by laboratory conditions or procedures was monitored by concurrent preparation and analysis of method blank samples. The method blank sample was reported to be free from detectable levels of target analytes, indicating no laboratory-attributable contamination occurred.

Laboratory Control Sample (LCS)

The laboratory control sample analyses serve as a monitor of the overall performance in all steps of the sample analysis. The LCS percent recoveries were within the laboratory control limits, indicating that an acceptable level of overall performance was achieved.

¹ Application of quality assurance criteria was consistent with "Draft National Functional Guideline for Organic Data Review," December, 1990, revised June, 1991.

Surrogate Compound Percent Recoveries (Surrogate Recoveries)

Individual sample performance for the PNA analyses was monitored by assessing the results of surrogate compound percent recoveries. The surrogate recovery acceptance criteria was met for all of the samples.

Matrix Spike/Matrix Spike Duplicate Percent Recoveries

To assess the long term accuracy and precision of the analytical methods on various matrices, matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and the relative percent difference (RPD) of the recoveries were determined. The percent recoveries and RPDs acceptance criteria were met for all analyses.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision, based on the provided information.

TABLE 1

**SAMPLE IDENTIFICATION NUMBERS
GM CLARK STREET SITE
DETROIT, MICHIGAN**

S-8889-102596-JM-418

S-8889-102596-JM-419

S-8889-102596-JM-420

S-8889-102596-JM-421

S-8889-102596-JM-422

S-8889-102596-JM-423

CRA

11100 Metro Airport Center Drive
Suite 160
Romulus, MI 48174
(313) 942-0909

MEMO

TO: Glenn Turchan

REFERENCE NO: 8889-42

FROM: Mary Cameron/dfh/36/Det. *mc*

DATE: November 24, 1997

RE: Data Quality Assessment and Validation for Soil Samples Collected
from the General Motors Clark Street Site in Detroit, Michigan

The following details a quality assessment and validation of the analytical data resulting from the August through October, 1997, collection of 101 soil samples from the General Motors Clark Street Site in Detroit, Michigan. The samples identified in Table 1 were analyzed for benzene, toluene, ethylbenzene and xylenes (total) (BTEX) and polynuclear aromatics (PNA). Sample analysis was completed at IEA's American Environmental Network, Inc., Schaumburg, Illinois facility (IEA/AEN) and Accutest Dayton, New Jersey facility (Accutest) in accordance with the methodologies presented in Table 2. The quality control criteria used to assess the data were established by the methods and the quality assurance project plan (QAPP).¹

Holding Time Period and Sample Analysis

The holding time periods are presented in Table 3. The samples, as indicated by the sample collection, extraction and analysis dates on the chain-of-custody forms and analytical reports provided by AEN/IEA and Accutest, were prepared and analyzed within the required holding time periods.

Method Blank Samples

Contamination of samples contributed by laboratory conditions or procedures was monitored by concurrent preparation and analysis of method blank samples. The method blank samples were reported to be free from detectable concentrations of target analytes, indicating no laboratory-attributable contamination occurred.

Laboratory Control Sample Analysis

The laboratory control sample (LCS) analyses serve as a monitor of the overall performance in all steps of the sample analysis. The LCS percent recoveries were within the laboratory control limits, indicating that an acceptable level of overall performance was achieved.

¹ Application of quality assurance criteria was consistent with "Draft National functional Guideline for Organic Data Review," December, 1990, revised June, 1991 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis," Draft October 1989.

Surrogate Compound Percent Recoveries (Surrogate Recoveries)

Individual sample performance for the organic analyses was monitored by assessing the results of surrogate compound percent recoveries. The sample analyses that violated surrogate acceptance criteria are identified and qualified in Table 4. The surrogate recovery acceptance criteria was met for the remaining samples.

Matrix Spike/Matrix Spike Duplicate Percent Recoveries

To assess the long term accuracy and precision of the analytical methods on various matrices, matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and the relative percent difference (RPD) of the recoveries were determined. The reported BTEX quantitation limit for sample S-091597-8889-TTU-014 should be qualified as estimated (UJ) values due to violation of MS/MSD percent recovery acceptance criteria. The percent recoveries and RPDs acceptance criteria were met for the remaining analyses.

Sample Quantitation - Organic Analyses

Data from samples diluted were flagged by the laboratory with a "D". The practical quantitation limit (PQL) or report limit should be multiplied by the dilution factor detailed for the flagged results.

The PNA sample analysis resulted in a concentration in excess of the calibration range. The laboratory flagged the result with an "E". This result should be additional qualified as an estimated "J" concentration.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision, based on the provided information, and may be used with the qualifications noted.

TABLE 1

**SAMPLE IDENTIFICATION NUMBERS
GENERAL MOTORS CLARK STREET SITE
DETROIT, MICHIGAN**

S-081997-8889-TTU-001	S-082797-8889-EXC-001	S-090997-8889-EXC-035
S-082097-8889-TTU-002	S-082797-8889-EXC-002	S-091697-8889-EXC-036
S-082097-8889-TTU-003	S-082797-8889-EXC-003	S-091697-8889-EXC-037
S-082197-8889-TTU-004	S-082797-8889-EXC-004	S-091697-8889-EXC-038
S-082197-8889-TTU-005	S-082797-8889-EXC-005	S-091697-8889-EXC-039
S-082697-8889-TTU-006	S-082797-8889-EXC-006	S-091697-8889-EXC-040
S-082797-8889-TTU-007	S-082797-8889-EXC-007	S-091697-8889-EXC-041
S-082997-8889-TTU-008	S-082797-8889-EXC-008	S-091697-8889-EXC-042
S-082997-8889-TTU-009	S-082797-8889-EXC-009	S-091697-8889-EXC-043
S-090397-8889-TTU-010	S-082797-8889-EXC-010	S-091697-8889-EXC-044
S-090897-8889-TTU-011	S-082797-8889-EXC-011	S-091697-8889-EXC-045
S-090897-8889-TTU-012	S-082797-8889-EXC-012	S-092297-8889-EXC-046
S-090997-8889-TTU-013	S-082797-8889-EXC-013	S-092297-8889-EXC-047
S-091597-8889-TTU-014	S-082797-8889-EXC-014	S-092297-8889-EXC-048
S-091597-8889-TTU-015	S-082797-8889-EXC-015	S-092397-8889-EXC-049
S-091597-8889-TTU-016	S-082997-8889-EXC-016	S-092397-8889-EXC-050
S-091597-8889-TTU-017	S-082997-8889-EXC-017	S-092397-8889-EXC-051
S-091697-8889-TTU-018	S-082997-8889-EXC-018	S-092397-8889-EXC-052
S-091997-8889-TTU-019	S-082997-8889-EXC-019	S-092397-8889-EXC-053
S-091997-8889-TTU-020	S-082997-8889-EXC-020	S-092397-8889-EXC-054
S-092297-8889-TTU-021	S-082997-8889-EXC-021	S-092397-8889-EXC-055
S-092397-8889-TTU-022	S-090397-8889-EXC-022	S-092397-8889-EXC-056
S-092497-8889-TTU-023	S-090397-8889-EXC-023	S-092697-8889-EXC-057
S-092697-8889-TTU-024	S-090897-8889-EXC-024	S-092697-8889-EXC-058
S-092697-8889-TTU-025	S-090897-8889-EXC-025	S-092697-8889-EXC-059
S-092997-8889-TTU-026	S-090897-8889-EXC-026	S-092697-8889-EXC-060
S-092997-8889-TTU-027	S-090897-8889-EXC-027	S-092697-8889-EXC-061
S-100297-8889-TTU-028	S-090997-8889-EXC-028	S-092697-8889-EXC-062
S-100297-8889-TTU-029	S-090997-8889-EXC-029	S-092697-8889-EXC-063
S-100297-8889-TTU-030	S-090997-8889-EXC-030	S-092697-8889-EXC-064
S-100697-8889-TTU-031	S-090997-8889-EXC-031	S-092697-8889-EXC-065
S-100897-8889-TTU-032	S-090997-8889-EXC-032	S-092697-8889-EXC-066
S-100897-8889-TTU-033	S-090997-8889-EXC-033	S-092697-8889-EXC-067
	S-090997-8889-EXC-034	S-092697-8889-EXC-068

TABLE 2

SUMMARY OF ANALYTICAL METHODS
GENERAL MOTORS CLARK STREET SITE
DETROIT, MICHIGAN

<i>Parameter</i>	<i>Method</i>
BTEX	SW-846 8010/8020 ¹
PNA	SW-846 8270

¹SW-846 - Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, SW-846 3rd edition, November 1986.

TABLE 3

HOLDING TIME PERIODS
GENERAL MOTORS CLARK STREET SITE
DETROIT, MICHIGAN

<i>Analysis</i>	<i>Holding Time Period</i>
BTEX	- 14 days from sample collection to completion of analysis
PNA	- 14 days from sample collection to extraction - 40 days from extraction to completion of analysis

TABLE 4

SUMMARY OF QUALIFIED SAMPLE DATA DUE TO
VIOLATION OF SURROGATE PERCENT RECOVERY CRITERIA
GENERAL MOTORS CLARK STREET SITE
DETROIT, MICHIGAN

<i>Analysis</i>	<i>Associated Samples</i>	<i>Qualifier¹</i>
BTEX	S-082697-8889-TTU-006	UJ
	S-091697-8889-TTU-018	UJ
	S-092697-8889-TTU-024	UJ
	S-082997-8889-EXC-020	J, UJ
	S-082997-8889-EXC-021	J, UJ
	S-090397-8889-EXC-022	UJ
	S-090897-8889-EXC-027	J
	S-091697-8889-EXC-040	UJ
	S-091697-8889-EXC-042	J
	S-091697-8889-EXC-043	J, UJ
	S-092397-8889-EXC-053	J
	S-092397-8889-EXC-055	J

¹ The analysis parameter results should be qualified for the associated samples as:

J - The analyte was positively identified; the associated numerical value is the estimated concentration of the analyte in the sample (for detected parameters).

UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is estimated and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample (for non-detected parameters).

CRA

11100 Metro Airport Center Drive
Suite 160
Romulus, MI 48174
(313) 942-0909

MEMO

TO: Sara Anderson

REFERENCE NO: 8889

FROM: Mary Cameron/dfh/42/Det. *MC*

DATE: January 19, 1998

RE: Data Quality Assessment and Validation for Phase V Soil Samples
Collected from the General Motors Clark Street Site in Detroit, Michigan

The following details a quality assessment and validation of the analytical data resulting from the December 10, 1997, collection of 21 soil samples from the General Motors Clark Street Site in Detroit, Michigan. The samples identified in Table 1 were selectively analyzed for polynuclear aromatic hydrocarbons (PAH) and lead. Sample analysis was completed at Laidlaw Environmental, Inc./Encotec Ann Arbor, Michigan facility (Encotec) in accordance with the methodologies presented in Table 2. The quality control criteria used to assess the data were established by the methods and the quality assurance project plan (QAPP).¹

Holding Time Period and Sample Analysis

The holding time periods are presented in Table 3. The samples, as indicated by the sample collection, extraction and analysis dates on the chain-of-custody forms and analytical reports provided by Encotec, were prepared and analyzed within the required holding time periods.

Method Blank Samples

Contamination of samples contributed by laboratory conditions or procedures was monitored by concurrent preparation and analysis of method blank samples. The method blank samples were reported to be free from detectable concentrations of target analytes, indicating no laboratory-attributable contamination occurred.

Laboratory Control Sample Analysis

The laboratory control sample (LCS) analyses serve as a monitor of the overall performance in all steps of the sample analysis. The LCS percent recoveries were within the laboratory control limits, indicating that an acceptable level of overall performance was achieved.

Surrogate Compound Percent Recoveries (Surrogate Recoveries)

Individual sample performance for the organic analyses was monitored by assessing the results of surrogate compound percent recoveries. The surrogate recovery acceptance criteria was met for all samples.

¹ Application of quality assurance criteria was consistent with "Draft National Functional Guideline for Organic Data Review," December, 1990, revised June, 1991 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis," Draft October 1989.

Matrix Spike Analysis - Lead Analyses

Matrix spike samples were monitored to determine the effects of sample matrix on the laboratories digestion and measurement methods. The lead matrix spike percent recovery criteria was exceeded but the unspiked sample concentration was more than four times the amount spiked therefore, no qualification was required. The remainder of the data were within the acceptance criteria.

Duplicate Sample Analyses - Lead Analyses

The laboratory precision of matrix-specific metal methods was monitored by the analyses of duplicate samples. The duplicate relative percent difference (RPD) data for the samples outlined in Table 4 violated the acceptance criteria. The remaining samples were within the acceptance criteria.

Matrix Spike/Matrix Spike Duplicate Percent Recoveries - Organic Analyses

To assess the long term accuracy and precision of the analytical methods on various matrices, matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and the RPD of the recoveries were determined. The MS/MSD percent recoveries and RPDs acceptance criteria were met for all analyses.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision, based on the provided information, and may be used with the qualifications noted.

TABLE 1

**SAMPLE IDENTIFICATION NUMBERS
GENERAL MOTORS CLARK STREET SITE
DETROIT, MICHIGAN**

S-8889-121097-SF-449
S-8889-121097-SF-450
S-8889-121097-SF-451
S-8889-121097-SF-452
S-8889-121097-SF-453
S-8889-121097-SF-454
S-8889-121097-SF-455
S-8889-121097-SF-456
S-8889-121097-SF-457
S-8889-121097-SF-458
S-8889-121097-SF-459
S-8889-121097-SF-460
S-8889-121097-SF-461
S-8889-121097-SF-465
S-8889-121097-SF-466
S-8889-121097-SF-467
S-8889-121097-SF-468
S-8889-121097-SF-469
S-8889-121097-SF-485
S-8889-121097-SF-486
S-8889-121097-SF-487

TABLE 2

SUMMARY OF ANALYTICAL METHODS
GENERAL MOTORS CLARK STREET SITE
DETROIT, MICHIGAN

<i>Parameter</i>	<i>Method</i>
Polynuclear Aromatics Hydrocarbons (PAH)	SW-846 8270 ¹
Lead	SW-846 6020

¹ "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd Edition, and Promulgated Updates, November 1986.

TABLE 3
HOLDING TIME PERIODS
GENERAL MOTORS CLARK STREET SITE
DETROIT, MICHIGAN

<i>Analysis</i>	<i>Holding Time Period</i>
PAH	- 14 days from sample collection to extraction - 40 days from extraction to completion of analysis
Lead	- 180 days from sample collection to completion of analysis

TABLE 4

SUMMARY OF QUALIFIED SAMPLE DATA DUE TO
OUTLYING DUPLICATE RPDS-INORGANICS
GENERAL MOTORS CLARK STREET SITE
DETROIT, MICHIGAN

<i>Parameter</i>	<i>Associated Samples</i>	<i>Qualifier¹</i>
Lead	S-8889-121097-SF-449	J
	S-8889-121097-SF-450	J
	S-8889-121097-SF-451	J
	S-8889-121097-SF-452	J
	S-8889-121097-SF-453	J
	S-8889-121097-SF-454	J
	S-8889-121097-SF-455	J
	S-8889-121097-SF-456	J
	S-8889-121097-SF-457	J
	S-8889-121097-SF-458	J
	S-8889-121097-SF-459	J

¹ The parameter result should be qualified for the listed samples as:

- J - The analyte was analyzed for and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

CRA

11100 Metro Airport Center Drive
Suite 160
Romulus, MI 48174
(313) 942-0909

MEMO

TO: Sara Anderson

REFERENCE NO: 8889

FROM: Mary Cameron/mbc/49/Det.

DATE: March 2, 1998

RE: Data Quality Assessment and Validation for Soil Samples Collected
from the General Motors Clark Street Site in Detroit, Michigan

The following details a quality assessment and validation of the analytical data resulting from the October and November 1996, collection of 30 soil samples from the General Motors Clark Street Site in Detroit, Michigan. The samples identified in Table 1 were analyzed for lead. Sample analysis was completed at Laidlaw Environmental Inc./Encotec in Ann Arbor, Michigan (Encotec) in accordance with "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, November 1986, Method 6010. The quality control criteria used to assess the data were established by the methods and the quality assurance project plan (QAPP).¹

Holding Time Period and Sample Analysis

The holding time period for lead analysis is 180 days from sample collection to sample analysis. The samples, as indicated by the sample collection, extraction and analysis dates on the chain-of-custody forms and analytical reports provided by Encotec, were prepared and analyzed within the required holding time periods.

Method Blank Samples

Contamination of samples contributed by laboratory conditions or procedures was monitored by concurrent preparation and analysis of method blank samples. The method blank samples were reported to be free from detectable concentrations of target analytes, indicating no laboratory-attributable contamination occurred.

Laboratory Control Sample Analysis

The laboratory control sample (LCS) analyses serve as a monitor of the overall performance in all steps of the sample analysis. The LCS percent recoveries were within the laboratory control limits, indicating that an acceptable level of overall performance was achieved.

Matrix Spike Analysis

Matrix spike samples were monitored to determine the effects of sample matrix on the laboratories digestion and measurement methods. The samples that should be qualified due to violation of matrix spike recovery criteria are outlined in Table 2. The remainder of the data were within the acceptance criteria.

¹ Application of quality assurance criteria was consistent with "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis", Draft October 1989.

Duplicate Sample Analyses

The laboratory precision of matrix-specific metals methods was monitored by the analyses of duplicate samples. The duplicate relative percent difference (RPD) data for the samples outlined in Table 3 violated the acceptance criteria. The remaining samples were within the acceptance criteria.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision, based on the provided information, and may be used with the qualifications noted.

TABLE 1

**SAMPLE IDENTIFICATION NUMBERS
GENERAL MOTORS CLARK STREET SITE
DETROIT, MICHIGAN**

S-8889-102596-JM-424
S-8889-102596-JM-425
S-8889-102596-JM-426
S-8889-102596-JM-427
S-8889-102596-JM-428
S-8889-102596-JM-429
S-8889-102596-JM-430
S-8889-102596-JM-431
S-8889-102596-JM-432
S-8889-102596-JM-433
S-8889-102596-JM-434
S-8889-102596-JM-435
S-8889-111996-TH-436
S-8889-111996-TH-437
S-8889-111996-TH-438
S-8889-111996-TH-439
S-8889-111996-TH-440
S-8889-111996-TH-441
S-8889-102896-JM-443
S-8889-102896-JM-444
S-8889-102896-JM-445
S-8889-102896-JM-446
S-8889-102896-JM-447
S-8889-102896-JM-448

TABLE 2

SUMMARY OF QUALIFIED SAMPLE DATA DUE TO OUTLYING
MATRIX SPIKE RECOVERY DATA
GENERAL MOTORS CLARK STREET
DETROIT, MICHIGAN

<i>Parameter</i>	<i>Associated Samples</i>	<i>Qualifier¹</i>
Lead	S-8889-102596-JM-424	J
	S-8889-102596-JM-425	
	S-8889-102596-JM-426	
	S-8889-102596-JM-427	
	S-8889-102596-JM-428	
	S-8889-102596-JM-429	
	S-8889-102596-JM-430	
	S-8889-102596-JM-431	
	S-8889-102596-JM-432	
	S-8889-102596-JM-433	
	S-8889-102596-JM-434	
	S-8889-102596-JM-435	

¹ The parameter results should be qualified for the listed samples as:

J - The analyte was analyzed for and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

TABLE 3

SUMMARY OF QUALIFIED SAMPLE DATA DUE TO
OUTLYING DUPLICATE RPDS
GENERAL MOTORS CLARK STREET SITE
DETROIT, MICHIGAN

<i>Parameter</i>	<i>Associated Samples</i>	<i>Qualifier¹</i>
Lead	S-8889-102896-JM-443	J/UJ
	S-8889-102896-JM-444	
	S-8889-102896-JM-445	
	S-8889-102896-JM-446	
	S-8889-102896-JM-447	
	S-8889-102896-JM-448	

¹ The parameter results should be qualified for the listed samples as:

- J - The analyte was analyzed for and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

CRA

11100 Metro Airport Center Drive
Suite 160
Romulus, MI 48174
(313) 942-0909

MEMO

TO: Sara Anderson

REFERENCE NO: 8889-40

FROM: Mary Cameron/mc/63/Det. *MS*

DATE: May 18, 1998

RE: Data Quality Assessment and Validation for Soil Samples Collected from
the General Motors Clark Street Site in Detroit, Michigan

The following details a quality assessment and validation of the analytical data resulting from the February 5, 1998, collection of six (6) soil samples from the General Motors Clark Street Site in Detroit, Michigan. The samples identified in Table 1 were analyzed for lead by method SW-846 6010/6020 from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, November 1986 by Laidlaw Environmental, Inc./Encotec in Ann Arbor, Michigan (Encotec). The quality control criteria used to assess the data were established by the methods and the quality assurance project plan (QAPP).¹

Holding Time Period and Sample Analysis

The holding time period for lead analysis is 180 days from sample collection to completion of analysis. The samples, as indicated by the sample collection, extraction and analysis dates on the chain-of-custody forms and analytical reports provided by Encotec, were prepared and analyzed within the required holding time periods.

Method Blank Samples

Contamination of samples contributed by laboratory conditions or procedures was monitored by concurrent preparation and analysis of method blank samples. The method blank samples were reported to be free from detectable concentrations of target analytes, indicating no laboratory-attributable contamination occurred.

Laboratory Control Sample Analysis

The laboratory control sample (LCS) analyses serve as a monitor of the overall performance in all steps of the sample analysis. The LCS percent recoveries were within the laboratory control limits, indicating that an acceptable level of overall performance was achieved.

Matrix Spike Analysis

Matrix spike samples were monitored to determine the effects of sample matrix on the laboratories digestion and measurement methods. The data were within the acceptance criteria.

¹ Application of quality assurance criteria was consistent with "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis", Draft October 1989.

Duplicate Sample Analyses

The laboratory precision of matrix-specific metals methods was monitored by the analyses of duplicate samples. The samples that should be qualified due to violation of duplicate relative percent difference (RPD) acceptance criteria are summarized in Table 2.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision, based on the provided information, and may be used with the qualifications noted.

TABLE 1

**SAMPLE IDENTIFICATION NUMBERS
GENERAL MOTORS CLARK STREET SITE
DETROIT, MICHIGAN**

S-8889-020598-SF-485

S-8889-020598-SF-486

S-8889-020598-SF-487

S-8889-020598-SF-488

S-8889-020598-SF-489

S-8889-020598-SF-490

TABLE 2

SUMMARY OF QUALIFIED SAMPLE DATA DUE TO OUTLYING
DUPLICATE RPD CRITERIA
GENERAL MOTORS CLARK STREET SITE
DETROIT, MICHIGAN

<i>Parameter</i>	<i>Associated Samples</i>	<i>Qualifier¹</i>
Lead	S-8889-020598-SF-485	J
	S-8889-020598-SF-486	
	S-8889-020598-SF-487	
	S-8889-020598-SF-488	
	S-8889-020598-SF-489	
	S-8889-020598-SF-490	

¹ The parameter results should be qualified for each of the listed samples as:

J - The analyte was analyzed for and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample (for detected parameters).

)

APPENDIX C

PERFORMANCE DEMONSTRATION REPORT

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**PERFORMANCE DEMONSTRATION
REPORT FOR NORTH ROADWAY REMOVAL
ACTION AT GM CLARK AVENUE FACILITY**

**CARLO ENVIRONMENTAL TECHNOLOGIES, INC.
SEPTEMBER 29, 1997**

PREPARED BY: E. CALLAHAN

1.0 INTRODUCTION

The Medium Temperature Thermal Treatment Unit (TTU) was mobilized to the North Roadway Area of the General Motors (GM) Clark Avenue site in Detroit, Michigan (site) on August 6, 1997. Mobilization and setup of the TTU and associated facilities was completed on August 19, 1997. A performance demonstration of the TTU was conducted according to the submitted performance demonstration plan prior to full scale operation.

2.0 PERFORMANCE DEMONSTRATION

The performance demonstration was conducted by CET on August 19 and 20, 1997, at the direction of CRA. Four stockpiles of processed soil were treated by the TTU at minimum temperatures of 700°F in the dryer with an average retention time of 7 minutes and minimum temperature of 1450°F in the oxidizer with a 1.45 retention time.

Sampling proceeded as follows:

File No.	Size of Pile	Sampled Collected	Analysis
1	50 tons	S-081997-TTU-001	BTEX,PNA
2	50 tons	S-082097-TTU-002	BTEX,PNA
3	100 tons	S-082097-TTU-003	BTEX,PNA
4	200 tons	S-082097-TTU-004	BTEX,PNA

Notes: BTEX-Benzene, Toluene, Ethylbenzene, Xylenes
PNA- Polynuclear, Aromatic, Hydrocarbons (naphthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a) anthracene, chrysene, benzo(b) fluoranthene, benzo(k) fluoranthene, benzo(a) pyrene, indeno (1,2,3-cd) pyrene, dibenzo(a,h) anthracene, benzo(g,h,i) perylene)

The composite samples were collected by CRA and delivered to Industrial & Environmental Analysts (IEA) Laboratories in Schaumburg, Illinois, for analysis. During the performance demonstration, the TTU operations and safety controls were monitored by CET.

3.0 RESULTS

The TTU performed without incident and to the specified standards stated in the Wayne County Air Pollution Control Division Permit. The carbon monoxide emission rate did not exceed 2.03 pounds per hour as reported on the continuous CO/CO₂ monitor within the stack. No visible dust emissions were noted from the TTU stack during the performance demonstration.

CET received the analytical data reports for the samples collected from the processed soil piles on September 3, 1997. The analytical results indicated that the site specific soil treatment levels, as specified in the project specifications, section 13186, subparagraph 2.1 (A)(1) had been achieved. Copies of the analytical data reports are included in Attachment A.

4.0 CONCLUSION

Based on the results of the performance demonstration, full scale operation of the TTU is currently underway. The results indicated that the TTU is operating in accordance with the project specifications for the north roadway area removal action (dated July 1997) and the parameters of the Wayne County Air Use Permit.

APPENDIX A

ANALYTICAL RESULTS FOR TREATED SOIL

Client : Conestoga-Rovers
Project ID : 8889
Site : CLARK STREET

**Purgeable Aromatic Compounds--BTEX
GC Volatiles Analysis**

Lab Sample Number : L72972021-001
Client ID : S-081997-8889-TTU-001

Method: 8020/602
Matrix : SOIL

Compound	Result	POL	Units	Dilution Factor	Sample Date	Analysis Date
Benzene	< 10	10	ug/Kg	1	8/18/97	8/20/97
Toluene	< 10	10	ug/Kg	1	8/18/97	8/20/97
Ethylbenzene	< 10	10	ug/Kg	1	8/18/97	8/20/97
Xylenes, Total	< 30	30	ug/Kg	1	8/18/97	8/20/97

	<u>% Recovery</u>	<u>Acceptance Criteria</u>
Surrogate Recovery	65 %	44-108%

Note : Results are based on wet weight

Client : Conestoga-Rovers
Project ID : 8889
Site : CLARK STREET

**Purgeable Aromatic Compounds-BTEX
GC Volatiles Analysis**

Lab Sample Number : L72972025-001**Client ID : S-082097-8889-TTU-002****Method: 8020/602****Matrix : SOIL**

<u>Compound</u>	<u>Result</u>	<u>POL</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>Sample Date</u>	<u>Analysis Date</u>
Benzene	< 10	10	ug/Kg	1	8/20/97	8/22/97
Toluene	< 10	10	ug/Kg	1	8/20/97	8/22/97
Ethylbenzene	< 10	10	ug/Kg	1	8/20/97	8/22/97
Xylenes, Total	< 30	30	ug/Kg	1	8/20/97	8/22/97

	<u>% Recovery</u>	<u>Acceptance Criteria</u>
Surrogate Recovery	57 %	44-108%

Note : Results are dry weight corrected

Lab Sample Number : L72972025-002**Client ID : S-082097-8889-TTU-003****Method: 8020/602****Matrix : SOIL**

<u>Compound</u>	<u>Result</u>	<u>POL</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>Sample Date</u>	<u>Analysis Date</u>
Benzene	< 10	10	ug/Kg	1	8/20/97	8/22/97
Toluene	< 10	10	ug/Kg	1	8/20/97	8/22/97
Ethylbenzene	< 10	10	ug/Kg	1	8/20/97	8/22/97
Xylenes, Total	< 30	30	ug/Kg	1	8/20/97	8/22/97

	<u>% Recovery</u>	<u>Acceptance Criteria</u>
Surrogate Recovery	54 %	44-108%

Note : Results are dry weight corrected

Client : Conestoga-Rovers
Project ID : 8889
Site : CLARK STREET

**Purgeable Aromatic Compounds--BTEX
GC Volatiles Analysis**

Lab Sample Number : L72972039-001
Client ID : S-082197-8889-TTU-004

Method: 8020/602
Matrix : SOIL

Compound	Result	POL	Units	Dilution Factor	Sample Date	Analysis Date
Benzene	< 10	10	ug/Kg	1	8/21/97	8/22/97
Toluene	< 10	10	ug/Kg	1	8/21/97	8/22/97
Ethylbenzene	< 10	10	ug/Kg	1	8/21/97	8/22/97
Xylenes, Total	< 30	30	ug/Kg	1	8/21/97	8/22/97

	% Recovery	Acceptance Criteria
Surrogate Recovery	77 %	44-108%

Note : Results are dry weight corrected

Lab Sample Number : L72972039-002
Client ID : S-082197-8889-TTU-005

Method: 8020/602
Matrix : SOIL

Compound	Result	POL	Units	Dilution Factor	Sample Date	Analysis Date
Benzene	< 10	10	ug/Kg	1	8/21/97	8/22/97
Toluene	< 10	10	ug/Kg	1	8/21/97	8/22/97
Ethylbenzene	< 10	10	ug/Kg	1	8/21/97	8/22/97
Xylenes, Total	< 30	30	ug/Kg	1	8/21/97	8/22/97

	% Recovery	Acceptance Criteria
Surrogate Recovery	90 %	44-108%

Note : Results are dry weight corrected

Client: Conestoga - Rovers
 IEA Job#: L72972021
 Project ID: 8889
 Matrix: Soil
 Method: 8270

Michigan Act 307 List
 Polynuclear Aromatic Hydrocarbons (PNA)
 µg/Kg-Dry Weight

Percent Solids	84%	---				PQL
	Dilution Factor	1	1			
Method Blank	SS0820	SS0820				
Client ID	S-081997-	METHOD				
	0889-TTU-001	BLANK				
Compound	Lab ID	001	SS0820			
Naphthalene	U	U				330
2-Methylnaphthalene	U	U				330
Acenaphthylene	U	U				330
Acenaphthene	U	U				330
Fluorene	U	U				330
Phenanthrene	U	U				330
Anthracene	U	U				330
Fluoranthene	U	U				330
Pyrene	U	U				330
Benzo(a)anthracene	U	U				330
Chrysene	U	U				330
Benzo(b)fluoranthene	U	U				330
Benzo(k)fluoranthene	U	U				330
Benzo(a)pyrene	U	U				330
Indeno(1,2,3-cd)pyrene	U	U				330
Dibenzo(a,h)anthracene	U	U				330
Benzo(g,h,i)perylene	U	U				330
Date Sampled	8/18/97	---				
Date Received	8/20/97	---				
Date Extracted	8/20/97	8/20/97				
Date Analyzed	8/21/97	8/21/97				

PQL = Practical Quantitation Limit

To obtain the sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

Client: Conestoga - Rovers
 IEA Job#: L72972025
 Project ID: 8889
 Matrix: Soil
 Method: 8270

Michigan Act 307 List
 Polynuclear Aromatics Hydrocarbons (PNA)
 $\mu\text{g/Kg-Dry Weight}$

Percent Solids	90%	89%	—			
Dilution Factor	1	1	1			
Method Blank	SS0821	SS0821	SS0821			
Client ID	S-082097- 8889-TTU-002	S-082097- 8889-TTU-003	METHOD BLANK			
Lab ID	001	002	SS0821			PQL
Naphthalene	U	U	U			330
2-Methylnaphthalene	U	770	U			330
Acenaphthylene	U	U	U			330
Acenaphthene	U	U	U			330
Fluorene	U	U	U			330
Phenanthrene	430	U	U			330
Anthracene	U	U	U			330
Fluoranthene	580	U	U			330
Pyrene	560	U	U			330
Benzo(a)anthracene	U	U	U			330
Chrysene	410	U	U			330
Benzo(b)fluoranthene	U	U	U			330
Benzo(k)fluoranthene	U	U	U			330
Benzo(a)pyrene	U	U	U			330
Indeno(1,2,3-cd)pyrene	U	U	U			330
Dibenzo(a,h)anthracene	U	U	U			330
Benzo(g,h,i)perylene	U	U	U			330
Date Sampled	8/20/97	8/20/97	—			
Date Received	8/21/97	8/21/97	—			
Date Extracted	8/21/97	8/21/97	8/21/97			
Date Analyzed	8/24/97	8/24/97	8/23/97			

PQL = Practical Quantitation Limit

To obtain the sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

Client: Conestoga - Rovers
 IEA Job#: L72972039
 Project ID: 8889
 Matrix: Soil
 Method: 8270

Michigan Act 307 List
 Polynuclear Aromatic Hydrocarbons (PNA)
 µg/Kg-Dry Weight

Percent Solids	92%	88%	—			
Dilution Factor	2	2	1			
Method Blank	SS0823	SS0823	SS0823			
Client ID	S-082197	S 082197	METHOD			
Lab ID	8829-TTU-004	8829-TTU-005	BLANK			
Compound	Lab ID	001	002	SS0823		PQL
Naphthalene	UD	UD	U			330
2-Methylnaphthalene	UD	UD	U			330
Acenaphthylene	UD	UD	U			330
Acenaphthene	UD	UD	U			330
Fluorene	UD	UD	U			330
Phenanthrene	UD	820	U			330
Anthracene	UD	UD	U			330
Fluoranthene	UD	UD	U			330
Pyrene	UD	UD	U			330
Benzo(a)anthracene	UD	UD	U			330
Chrysene	UD	UD	U			330
Benzo(b)fluoranthene	UD	UD	U			330
Benzo(k)fluoranthene	UD	UD	U			330
Benzo(a)pyrene	UD	UD	U			330
Indeno(1,2,3-cd)pyrene	UD	UD	U			330
Dibenzo(a,h)anthracene	UD	UD	U			330
Benzo(g,h,i)perylene	UD	UD	U			330
Date Sampled	8/21/97	8/21/97	—			
Date Received	8/22/97	8/22/97	—			
Date Extracted	8/23/97	8/23/97	8/23/97			
Date Analyzed	8/24/97	8/24/97	8/23/97			

PQL = Practical Quantitation Limit

To obtain the sample-specific quantitation limit, multiply the PQL by the Dilution Factor.