

**COMPREHENSIVE PHASE I SAMPLING  
SUMMARY REPORT  
FOR  
DETROIT LEAD ASSESSMENT PROJECT  
DETROIT, WAYNE COUNTY, MICHIGAN**

Prepared for:

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
REMEDIATION AND REDEVELOPMENT DIVISION**  
Detroit Field Office – Cadillac Place  
Suite 2-300  
3058 West Grand Boulevard  
Detroit, Michigan 48202

Prepared by:

**WESTON SOLUTIONS OF MICHIGAN, INC.**  
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Suite 100  
Okemos, Michigan 48864

**March 2004**

W.O. No: 20083.028.001



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## **EXECUTIVE SUMMARY**

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site soil sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. The project consisted of evaluating off-site soil conditions near 10 facilities in the Detroit Metropolitan Area, which had been identified as potential lead smelters. Sampling was conducted on City and State owned properties in the vicinity of the 10 facilities during November and December 2003. During this time 204 samples were collected from 91 properties and locations.

Lead concentrations on properties in the vicinity of the facilities were evaluated against predominant atmospheric conditions, statistical analysis, and spatial distribution to determine if the lead found was indicative of aerial deposition from the historic smelting operations at the facilities. Review of the data supports the conclusion that one of two conditions exists for the facilities investigated under this phase. They are as follows:

- Level 1 – Samples exceeding the screening level were identified downwind, with a clearly defined trend of decreasing concentration with increased distance from the facility that is representative of aerial deposition.
- Level 2 –
  - Samples did not exceed the screening level downwind, but suggest a trend of decreasing concentration with increased distance from the facility that may be representative of aerial deposition, or
  - Samples downwind indicate no characteristics of aerial deposition but contain concentrations of lead above the screening level.

Recommendations for additional work to be performed under Phase II activities are identical for all facilities. The scheduling of the additional work will be based on the category of the facility (i.e. Level 1 facilities will be addressed first, followed by Level 2 facilities that demonstrate a downwind trend, and finally Level 2 facilities with no characteristics of aerial deposition).

The recommendations for additional work include:

- Obtain access to the facility for:
  - Review of existing information related to property transfer (Phase I, Phase II, and development planning);
  - Interview past employees regarding historical facility operations;
  - Perform a facility walk through to determine existing conditions;
  - Collect on-site soil samples to determine the presence, concentration, and extent of lead on the facility (related to the location of former structures, if possible); and
- Collect soil samples from additional downwind properties to confirm and/or determine the extent of downwind contamination.

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- Appendix A** Michigan Smelting Phase I Summary Report
- Appendix B** Great Lakes Smelting Phase I Summary Report
- Appendix C** Acme Metal Company Phase I Summary Report
- Appendix D** Industrial Smelting Phase I Summary Report
- Appendix E** Continental Metal Company Phase I Summary Report
- Appendix F** Federated Metals Division Phase I Summary Report
- Appendix G** Detroit Lead Pipe Works Phase I Summary Report
- Appendix H** Wolverine White Metal Phase I Summary Report
- Appendix I** City Metals Refining Phase I Summary Report
- Appendix J** Aetna Smelting Phase I Summary Report
- Appendix K** Wind Rose Plot



## **SECTION 1**

### **INTRODUCTION**

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site soil sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. The project consisted of evaluating off-site soil conditions near 10 facilities in the Detroit Metropolitan Area, which had been identified as potential lead smelters. The facilities investigated were:

- 1) Michigan Smelting – 7885 Joseph Campau Street;
- 2) Great Lakes Smelting – 1640 East Euclid Street;
- 3) Acme Metal Company – 1436 Holbrook Street;
- 4) Industrial Smelting – 19430 Mt. Elliott Street;
- 5) Continental Metal Company- 11500 Russell Street;
- 6) Federated Metals Division – 11630 Russell Street;
- 7) Detroit Lead Pipe Works – 7001 Lyndon Street;
- 8) Wolverine White Metal – 3421 Gibson Street;
- 9) City Metals Refining – 2945 Hubbard Street; and
- 10) Aetna Smelting – 1826 Illinois Street.

The project is being conducted using a phased approach. Phase I, which was addressed in this report, consists of an initial evaluation of each facility, as described below. Additional phases may be required based on the Phase I findings. Lead concentrations if identified on properties in the vicinity of the facilities was evaluated against predominant atmospheric conditions, statistical analysis, and spatial distribution to determine if the lead detected was indicative of aerial deposition from the historic smelting operations at the facilities.

The initial project tasks at each location consisted of the collection of soil samples from upwind and downwind parcels located within approximately 1,000 feet (ft.) of each facility. Originally, the scope of work called for soil sample collection from four upwind and six downwind parcels. Following a meeting with the MDEQ regarding statistical use of the resulting data prior to the

sampling event, the number of upwind parcels was revised to include six parcels. WESTON collected two composite samples from each parcel.

## **1.1 SAMPLING OBJECTIVES**

The primary objective of the sampling was to characterize the off-site soil in the vicinity of the facilities. WESTON's methods, and conclusions of the historical data review, are included in the report entitled "*Summary Report for Data Investigation*" dated September 2003. Soil characterization of off-site soils at properties located within approximately 1,000 ft. of the facilities was an initial step in evaluating the potential impact of possible former smelting operations on neighboring areas located within expected depositional areas. Soil samples were collected from State and/or City owned properties upwind and downwind to further evaluate the presence of a smelter-related release. All samples were analyzed for lead using United States Environmental Protection Agency (U.S. EPA) Method 6010B.

## **1.2 SUMMARY REPORT FORMAT**

This Comprehensive Sampling Summary Report (Report) has been organized in a format that is intended to facilitate and effectively meet the objectives of the Phase I investigation. The Report is organized into the following sections:

- **Section 1** – Introduction,
- **Section 2** – Field Activities and Procedures, and
- **Section 3** – Conclusions and Recommendations.

Appendices to this Report include the following:

- **Appendix A** – Michigan Smelting Phase I Summary Report,
- **Appendix B** – Great Lakes Smelting Phase I Summary Report,
- **Appendix C** – Acme Metal Company Phase I Summary Report,
- **Appendix D** – Industrial Smelting Phase I Summary Report,
- **Appendix E** – Continental Metal Company Phase I Summary Report,

- **Appendix F** – Federated Metals Division Phase I Summary Report,
- **Appendix G** – Detroit Lead Pipe Works Phase I Summary Report,
- **Appendix H** – Wolverine White Metal Phase I Summary Report,
- **Appendix I** – City Metals Refining Phase I Summary Report,
- **Appendix J** – Aetna Smelting Phase I Summary Report, and
- **Appendix K** – Wind Rose Plot.

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## **SECTION 2**

### **FIELD ACTIVITIES AND PROCEDURES**

#### **2.1 OVERVIEW OF SAMPLING ACTIVITIES**

Experience with previous lead investigations indicated that if lead concentrations were present from aerial deposition, they would be detected within a 1,000 foot to 1,500 foot radius of the facilities. Soil samples were to be collected from city and/or state owned properties within approximately 1,000 ft. of each facility. However, due to various circumstances (development around facilities, lack of State and/or City owned properties), samples could not always be collected within the 1,000 foot radius stated in the Phase I Quality Assurance Sampling Plan (QASP) for Detroit Lead Assessment Project, dated October 2003. Variances are described for each Facility in their respective summary reports contained in **Appendices A through J**. Prior to sample collection, upwind and downwind sampling areas were established based on mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Appendix K**. Soil samples were collected from city and/or state owned properties located within these established areas.

The City and/or State owned parcels identified for sampling were those closest to the average wind direction and at varying distances from the facilities. Where individual City and/or State owned parcels were not available, rights-of-way, utility corridors, and alleyways ('greenways') were used and have been identified on the figures included with each individual summary report. Photographs of the sampling locations are also included in the summary reports. Exposure units and appropriate sample grids were established in accordance with the QASP to guide the sampling activities.

All properties sampled were inspected and divided into exposure units of approximately 500 square feet in area. Soil samples were collected at random locations within the units. On vacant parcels where it was apparent that a house had previously existed, the units were selected from an area in front of where the porch would have been located, and an area in back of where the house would have been located. Houses on surrounding parcels were used to estimate the former house location. Samples were not to be collected within a 5 foot buffer from house drip lines or

within a 5 foot buffer of any painted structure or from locations where flaked paint or visibly stained soil existed. Greenways samples were collected from the furthest practicable point from the curb line to avoid contamination from vehicle exhaust. All samples from each exposure unit were composited in the field and were analyzed for lead using U.S. EPA Method 6010B.

For all sample locations, the WESTON sampler selected random sample locations based on a random number generation system; collected samples; logged the activities at each sample location in the field logbook; and verified the sample documentation. Sample documentation and preparation was the responsibility of WESTON. Details of soil sample collection methodologies and procedures are provided below.

### **2.1.1 Sampling Approach**

Details regarding the number, type, and locations of the samples related to the facilities are included in the summary reports (**Appendices A through J**). Generally, each composite soil sample consisted of five randomly located discrete surface soil sample aliquots (0 to 3 inches below ground surface) of approximately equal volume collected from the sampling unit. All discrete soil sample aliquots were collected from undisturbed areas (i.e., no signs of recent landscaped areas, gardens, etc.). Soil sampling procedures consisted of removing a volume of soil approximately 3 inches in diameter and 3 inches in depth using a pre-cleaned, stainless steel trowel. The soil was placed directly into a large, plastic Ziploc® bag. Foreign material, such as vegetation, large rocks, and pebbles, etc., was removed from the sample and discarded. Following sample collection, the location was restored using the remaining soil and grass was replaced.

During sampling, all information regarding soil description, location, and other distinguishable features present at the sample location were recorded in the field logbook. A field sketch was prepared (on 8.5 inch by 11 inch graph paper) for each exposure unit. Site sketches include all sample locations and their sample number, physical features (sidewalks, building corners, utility poles), measurements between sample points and physical features, and any information necessary to relocate the area (address, street name, etc.). These sample sketches are included in the summary reports contained in **Appendices A through J**.

Investigative soil samples were designated for matrix spike/matrix spike duplicate (MS/MSD) analysis at a frequency of one per five soil samples. The sampler recorded the MS/MSD location in the field logbook and designated it with the appropriate one digit identifier in the sample identification as specified in the QASP. When non-dedicated sample equipment (stainless steel trowels) was used, equipment blanks were collected at a rate of one per sampling team per day to assess the effectiveness of decontamination procedures. Following decontamination the equipment blanks were collected by running distilled water over the stainless steel trowel was used during the sampling event.

### **2.1.2 Sampling and Sample Handling Procedures**

Clean, decontaminated sampling equipment and sample containers were maintained in a clean, segregated area prior to use. Sampling personnel changed gloves between each sample collection/handling to prevent cross contamination. All samples were assembled and catalogued prior to shipping to the State Laboratory in Lansing, Michigan. Sample preservation, containers, and hold times for analytical methods associated with this work are presented in **Subsection 2.1.4.**

### **2.1.3 Decontamination**

The non-dedicated sampling equipment (soil samplers, hand trowels, etc.) that were used during sample collection were thoroughly decontaminated before the initial use, between sample locations, and at the end of the field investigation. Equipment decontamination was completed as follows:

- Water spray or brush, if needed, to remove soil/sediment from the equipment;
- Non-phosphate detergent and potable water wash to clean the equipment;
- Final potable water rinse;
- Equipment air dried; and
- Placed in clean and marked bucket.

#### **2.1.4 Sample Preservation, Containers, and Hold Times**

After collection, the samples were securely stored in a cooler until they were submitted for analysis. The samples were transmitted to the State Laboratory by WESTON field personnel or a common carrier, typically every other day. Soil and rinsate blank samples were preserved on ice.

#### **2.1.5 Sample Custody Procedures**

Due to the evidentiary nature of sample collection, the possession of samples (chain-of-custody) must be traceable from the time the samples are collected until they are introduced as evidence in legal proceedings. Following sample collection and identification, the samples were maintained under chain-of-custody procedures, as described below.

The chain-of-custody procedures were made available to all personnel involved with the sampling. A typical chain-of-custody record was completed each time a sample or group of samples was prepared for shipment to the State Laboratory. The record repeated the information on each of the sample labels and served as documentation of custody during collection and shipment. A copy of this record remained with the shipped samples at all times, and another copy was retained by the sampling team member that originally relinquished the samples. WESTON personnel completed a chain-of-custody form for all samples sent to the State Laboratory.

#### **2.1.6 Photo Documentation**

WESTON took photographs to document site conditions, sample locations, and the exposure units as they related to adjacent areas. The photographs showed typical operations and operating conditions as well as special situations and conditions that arose during sampling.

All photographs were taken with a digital camera. Each photograph was recorded in the logbook with the location of the photographer, the direction the photograph was taken, the subject of the photograph, and its significance (i.e., why the picture was taken). Photographs were labeled using the street abbreviation/street number-exposure unit-and picture number starting at 01 for



each property sampled. The photograph location, direction, and subject were also shown on the sample sketch.

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## SECTION 3 CONCLUSIONS AND RECOMMENDATIONS

### 3.1 CONCLUSIONS

Following completion of fieldwork, the analytical data was tabulated and evaluated. The results are presented in the summary reports for each of the 10 facilities (**Appendices A through J**). The analytical results were evaluated to determine if patterns of lead concentrations that could be attributable to factors such as atmospheric conditions, land use, and wind direction were evident. The analytical results were also compared to the MDEQ Residential and Commercial I Direct Contact Criteria for soils, as established under Part 201 Environmental Response of the Natural Resources and Environmental Protection Act 1994, as amended. These criteria were developed by the State of Michigan following a risk-based model.

Facilities were reviewed for several factors to determine the potential impact on downwind properties, if any, from the historic smelting operations. Lead concentrations at upwind and downwind properties were evaluated for discernable trends that suggested downwind aerial deposition of lead. The analytical results were also evaluated to determine if the distribution of upwind and downwind lead concentrations were statistically consistent and if the data for the upwind and downwind sampling groups represented differing conditions. Data were evaluated using MDEQ online Statistical software, for both normal and lognormal distributions. Summary reports for the best fitting distribution were compared and used for reporting mean concentrations and relative frequency distribution (included in **Attachment F** of the individual Summary Reports).

Review of the data supports the conclusion that one of two conditions exist for the facilities investigated under this phase. They are as follows:

- Level 1 – Samples exceeding the screening level were identified downwind, with a clearly defined trend of decreasing concentration with increased distance from the facility that is representative of aerial deposition.

- Level 2 –
  - Samples did not exceed the screening level downwind, but suggest a trend of decreasing concentration with increased distance from the facility that may be representative of aerial deposition, or
  - Samples downwind indicate no characteristics of aerial deposition but contain concentrations of lead above the screening level.

#### Summary of Findings

Category	Companies
Level 1	Continental Metal Company Federated Metals Division Michigan Smelting
Level 2	Aetna Smelting                      Great Lakes Smelting City Metals Refining              Detroit Lead Pipe Works Industrial Smelting                Wolverine White Metal Acme Metal Company

### 3.2 RECOMMENDATIONS

Recommendations for additional work to be performed under Phase II activities are identical for all facilities. The scheduling of the additional work will be based on the category of the facility (i.e. Level 1 facilities will be addressed first, followed by Level 2 facilities that demonstrate a downwind trend, and finally Level 2 facilities with no characteristics of aerial deposition).

The recommendations for additional work include:

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  - Review of existing information related to property transfer (Phase I, Phase II, and development planning);
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