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Resource Conservation and Recovery Act (RCRA) Revised Corrective Measures Proposal

Addendum No. 2 - Northend Corrective Measures and Site-wide Groundwater Monitoring

Former General Motors Corporation North American Operations Facility (Otherwise known as Buick City)

MID 005 356 712

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1. Introduction

1.1 Background

This report was prepared by ARCADIS on behalf of the Motors Liquidation Company (MLC), formerly known as General Motors Corporation (GMC), for the former GMC North American Operations facility (otherwise known as Buick City) (the Site), located in Flint, Michigan. On June 1, 2009, GMC filed for Chapter 11 protection under U.S. bankruptcy code. On July 10, 2009, GMC was renamed Motors Liquidation Company (MLC). On the same day some of the operating assets of GMC were sold to a newly formed company, "General Motors Company". General Motors Company changed its name to General Motors LLC (GM LLC) on October 16, 2009. Assets not sold to GM LLC remain the property of the MLC, in its capacity as a debtor-in-possession in the bankruptcy case. Currently, GM LLC manufactures automotive components at the northern portion of the Site (also known as the GM Powertrain Flint North facility) under a lease with MLC. MLC retains the requirements and responsibilities associated with EPA I.D. # MID 005 356 712.

On March 2, 2000 (modified November 8, 2001), the United States Environmental Protection Agency (USEPA) and GMC entered into a Resource Conservation and Recovery Act (RCRA) Section 3008(h) Administrative Order on Consent (AOC) R8H-5-00-02 for the Site. The AOC instructs GMC to investigate and, as necessary, stabilize and remediate releases of hazardous waste or hazardous constituents at or from the Site in accordance with the RCRA and relevant USEPA corrective action guidance documentation.

1.2 Corrective Measures History

This *RCRA Revised Corrective Measures Proposal Addendum No. 2 - Northend Corrective Measures and Site-wide Groundwater Monitoring* (CMP Addendum No. 2) was prepared to address corrective measures for the area of the Site located North of Leith Street (Northend) and Site-wide groundwater monitoring. This CMP Addendum No. 2 supersedes the corrective measures for the Northend of the Site and Site-wide groundwater monitoring proposed in the *RCRA Revised Corrective Measures Proposal* (2008 Revised CMP) prepared by ARCADIS and submitted to the USEPA on May 1, 2008 as well as the *RCRA Corrective Measures Proposal* prepared by Blasland, Bouck & Lee, Inc., an ARCADIS Company (BBL), and submitted to the USEPA on December 22, 2006 (December 2006 CMP).

The December 2006 CMP was submitted to fulfill conditions set forth under Section VI.3 of the AOC. The USEPA provided GMC via letter dated April 17, 2007 comments on the December 2006 CMP. GMC responded to USEPA's comments via letter dated October 10, 2007. The 2008 Revised CMP incorporated GMC's October 10, 2007 responses to USEPA's April 17, 2007 comments on the December 2006 CMP, as well as information discussed with USEPA during a project status meeting held at USEPA's offices in Chicago, Illinois on December 13, 2007, with representatives from USEPA, GMC, ARCADIS, and ENVIRON attending (minutes dated January 10, 2008).

Based on subsequent discussions with the USEPA, and given changes anticipated for the disposition of buildings in the Northend of Buick City, MLC has revised the proposed corrective measures to address the occurrence of light non-aqueous phase liquid (LNAPL) at the Northend of the Site and has modified the Site-wide groundwater monitoring plan to include analysis of groundwater discharging to the Flint River via the site storm sewers. This CMP Addendum No. 2 summarizes the interim measures (IMs) initiated in the Northend of the Site prior to and since the effective date of the AOC, describes the final proposed corrective measures for AOI's at the Northend of the Site not included in the Revised 2008 CMP, describes modified corrective measures for LNAPL areas previously addressed in the Revised 2008 CMP, discusses the rationale for the selection of those modified corrective measures, and presents the modified Site-wide groundwater monitoring plan, including an "NPDES Plus" monitoring plan for the site storm sewers.

1.3 **Overview of RFI Activities**

To fulfill the conditions set forth under Section VI.1 of the AOC, GMC completed activities necessary to identify and define the nature and extent of releases of hazardous waste or hazardous constituents at or from the Site. These activities have been presented in the following documents:

- *Description of Current Conditions for Areas South of Leith Street* (BBL, 2000a) (SEDOCC);
- *Description of Current Conditions for Areas North of Leith Street* (BBL, 2000b) (NEDOCC);
- *RCRA Facility Investigation Work Plan* (BBL, 2001) (RFI Work Plan);

- *Resource Conservation and Recovery Act Facility Investigation Phase I Report* (BBL, 2002a) (RFI Phase I Report);

- *Resource Conservation and Recovery Act Facility Investigation Phase II Report* (BBL, 2004 & BBL, 2006) (RFI Phase II Report).

The investigation activities and risk assessments included in these documents serve as the basis for much of this CMP Addendum No. 2, and are incorporated by reference herein. As needed, information previously presented in the SEDOCC, NEDOCC, RFI Phase I Report, and RFI Phase II Report is referenced, restated, or summarized. These documents present a more comprehensive understanding of the Site and the RFI activities that have been conducted at the Site.

1.4 **Report Organization**

This CMP Addendum No. 2 is organized as follows:

- Section 1 presents a general overview of background and Site information.

- Section 2 provides a summary of human health risk assessments and selection of AOIs addressed in the CMP.

- Section 3 provides a summary of former and current IMs in the Northend of the Site.

- Section 4 provides an evaluation of remedial alternatives.

- Section 5 provides a discussion of the additional corrective measures proposed for LNAPL areas located at the Northend of the Site as well as modified corrective measures for LNAPL areas previously included in the Revised 2008 CMP.

- Section 6 provides a summary of the Site-wide enhanced groundwater monitoring program and the NPDES Plus Monitoring program.

- Section 7 presents the schedule for performing the proposed corrective measures.

- Section 8 lists references used in this document.

1.5 Environmental Setting

Information regarding the environmental setting of the Site (e.g. topography, climate, hydrology, geology, hydrogeology, surface water drainage) has previously been presented in the Section 2 of the Revised 2008 CMP, Section 3 of the RFI Phase I Report, and Section 3 of the RFI Phase II Report. With the exception of current Site operations (discussed below), the environmental setting information has not changed substantially since the preparation of the Revised 2008 CMP and therefore is not repeated in this document.

The Site currently consists of three active manufacturing complexes (Factories 05, 10, and 81) with the remainder of the Site buildings in various stages of decommissioning in preparation for demolition. Since the completion of the Revised 2008 CMP, manufacturing operations have ceased in Factory 36, where demolition activities have begun. Current Site operations in Factories 5, 10 and 81 include machining of ferrous and nonferrous metals, heat treating, and assembly of torque converters and transmission components. GM LLC continues to operate the on-site industrial wastewater treatment facility.

2. Summary of Human Health Risk Assessments and Selection of AOIs Addressed in the CMP

2.1 Human Health Risk Assessments

A human health risk assessment (HHRA) was performed as part of the RFI (Section 6 of the RFI Phase II Report). The following sections briefly describe those components of the RFI Phase II Report, as well as supplemental risk evaluations, which were performed since the RFI Phase II Report was submitted.

2.1.1 RFI Phase II HHRA

The scope of the RFI Phase II HHRA is summarized in the conceptual site model (CSM) shown in Table 6.1 of the RFI Phase II Report. The CSM identifies the scenarios for potential human exposure under current and reasonably expected future conditions at and around the Site in terms of the potentially exposed populations, the environmental media to which they could be exposed, and the potential routes of exposure. The CSM was developed based on the available Site information and data. The scenarios for potential human exposure were discussed in Section 6.3 of the RFI Phase II Report.

2.1.2 Revised 2008 CMP Supplemental HHRA

In the Revised 2008 CMP the HHRA was supplemented with an evaluation of potential exposures to groundwater in the event that areas downgradient of the Site are developed for residential use. This supplemental evaluation is provided in Appendix A of the Revised 2008 CMP in a memorandum entitled “Supplemental Evaluation of Potential Residential Exposure to Groundwater”.

2.1.3 CMP Addendum No. 2 Supplemental HHRA

The RFI Phase II HHRA did not include an evaluation of the risks for the redevelopment construction worker working in the Northend of the Site because at that time no redevelopment of the Northend was anticipated. The buildings remaining on the Northend are scheduled for demolition and the future use of Site is now uncertain. As such, an evaluation of this receptor is warranted. This supplemental evaluation is provided in Appendix A of this report.

2.2 Rationale for Selection of AOIs Addressed in the Revised 2008 CMP

Section 8 of the RFI Phase II Report divided the Site AOIs covered by the RFI into following three categories:

- AOIs requiring no further action;
- AOIs that do not contain LNAPL and require action based on the HHRA; and
- AOIs that contain LNAPL.

Tables 8-1 through 8-3 from the RFI Phase II Report were based on the assumption that the future use of the Southend would be residential. However, following completion of the RFI Phase II Report it was determined that the future use of the Southend would be restricted to Michigan Part 201 Industrial and Commercial II, III & IV use scenarios by implementing a deed restriction, even though there are AOIs that meet residential criteria. As such, the entire Site is evaluated based on Industrial and Commercial II, III, and IV use scenarios.

In the Revised 2008 CMP the AOIs were re-grouped into the following three categories:

- AOIs requiring no further action beyond groundwater and land use restrictions;
- AOIs that require further action because they contain PCBs at levels regulated by TSCA; and
- AOIs that require further action based on the RFI.

Tables presented in the Revised 2008 CMP (Tables 3-1, 3-2, and 3-3) summarize the Site AOIs divided per these three categories, respectively, and replace Tables 8-1 through 8-3 of the RFI Phase II Report. The AOIs listed in Revised 2008 CMP were carried forward for evaluation of remedial measures. As discussed in Section 6 of the RFI Phase II Report, the risk estimates for all relevant receptors in each exposure area were compared to the USEPA cumulative cancer risk limit of 10^{-4} and hazard index (HI) limit of 1 for determining whether corrective measures are warranted for each AOI. For lead, the arithmetic mean concentration in each exposure area was compared to the MDEQ industrial lead direct contact criterion of 900 mg/kg. Further action at a Site

AOI was determined by the results of the HHRA and/or the presence of TSCA-regulated LNAPL plumes.

The Revised 2008 CMP Appendix A presented a supplemental human health risk evaluation, involving hypothetical future residential exposures to groundwater via vapor intrusion and non-potable use downgradient of the Site. The estimated risks from these routes of exposure did not exceed the USEPA cumulative cancer risk limit of 10^{-4} or the HI limit of 1. Thus, this evaluation concluded that further action to address downgradient groundwater was not necessary.

2.3 Rationale for Additional AOIs Addressed in this CMP Addendum No.2

The Revised 2008 CMP proposed corrective measures for the AOIs identified during RFI activities as having either: 1) LNAPL in which TSCA-regulated levels of PCBs were detected; or 2) estimated risks higher than USEPA's acceptable risk limits via exposure to hazardous constituents in soil, groundwater, or LNAPL. However, based on additional discussions with the USEPA in 2009, MLC agreed to actively remediate AOIs containing LNAPL as part of the corrective measures for the Site.

Additionally, as discussed in Section 2.1.3, the RFI Phase II HHRA did not include an evaluation of the risks for the redevelopment construction worker working in the Northend of the Site because at that time no redevelopment of the Northend was anticipated. Because GM LLC is terminating manufacturing operations in late 2010, the buildings remaining on the Northend are scheduled for demolition and the future use of Site is now uncertain. As such, an evaluation of this receptor is warranted. This supplemental evaluation is provided in Appendix A.

The redevelopment construction worker evaluation identified four AOIs (81-1, 81-2, 83/84-2, and 83/84-3) where risk management practices are recommended. For these AOIs, it is recommended that a land-use restriction be attached to the Site to require that a Health and Safety Plan be prepared prior to commencing construction. These AOIs are further discussed in Section 5.

3. Interim Measures

As discussed in the RFI Phase II Report, various LNAPL plumes have been observed at the Site, and an LNAPL monitoring program was conducted for several years to measure the depth of LNAPL and to remove LNAPL from the wells, with the results being reported via Quarterly LNAPL Monitoring Reports that were submitted to the USEPA and Michigan Department of Environmental Quality (MDEQ). This program was completed in December 2004 and the final monitoring report was submitted to the USEPA on January 19, 2005. As a result of this program, the various LNAPL plumes identified at the Site have been demonstrated to be relatively stable; however, MLC chose to implement certain interim measures (IMs) to collect LNAPL until final remedial activities were to be proposed.

Interim Measure remedial actions were implemented to recover LNAPL at several of the LNAPL areas located in the Northend of the Site that were delineated during the RFI Phase I and Phase II investigations. Several of the IM remediation systems are no longer in operation due to declining system performance over time. The previous IM remedial actions in the Northend of the Site include:

- Factory 03 Product Recovery Sump (AOI 03-1)
- Factory 05 Building 43 Product Recovery Wells (AOI 05-5)
- Former Tank Farm 37 Product Recovery System (AOI 36-5)
- Building 32 Recovery Well (AOI 83/84-2)
- Building 87/Leith Street Overpass Product Recovery Wells (AOI 86-1)

Several LNAPL recovery systems were still operating in the Northend of the Site in 2010; however, the rate of LNAPL recovery by these systems had become negligible due to the lack of recoverable LNAPL within the capture zone of the systems. Due to the fact that the systems were removing no or negligible amounts of LNAPL; MLC has initiated the following actions with respect to these IMs:

- The Factory 36 Area Exterior Product Recovery and Treatment System (AOI 36-2) was shut down to accommodate the decommissioning and demolition activities associated with Factory 36. It should be noted, however, that the system was no longer collecting LNAPL.

- The following IMs have been terminated as of October 1, 2010:
    - Factory 05 Product Recovery Trench (AOI 05-1)
    - Factory 81 Area Product Recovery System (AOI 81-2)
- The following IMs will be terminated following the shutdown of manufacturing operations in Factory 10 at the end of October 2010:
    - Factory 10 Groundwater Treatment System (AOI 10-1)
    - Factory 10 Scrap yard Area Product Recovery Trench (AOI 10-4)

A second IM associated with Building 87/Leith Street Overpass (AOI 86-1) will remain in operation. This IM consists of a foundation drain and P-traps located adjacent to the Leith Street overpass. The P-traps were installed in the retaining wall drainage system to prevent LNAPL migration into the Outfall 005 storm sewer system.

Section 5 of this CMP Addendum No. 2 presents corrective measures to address each of the LNAPL areas located in the Northend of the Site.

4. Identification and Evaluation of Remedial Alternatives

The corrective measure objectives for the North end are as follows:

1. Protect human health;

2. Reduce contaminant source mass;

3. Eliminate the potential for future LNAPL migration by reducing LNAPL saturation.

MLC has identified two readily implementable LNAPL recovery technologies that satisfy the corrective measure objectives. These technologies include multiphase extraction and LNAPL recovery trenches, as discussed in further detail below.

4.1 Multiphase Extraction

Multiphase extraction (MPE) employs combined LNAPL/groundwater extraction and vacuum application to a recovery well screened across both the vadose and saturated zones. LNAPL and groundwater may be extracted via an in-well liquid pump or via vacuum pumping. Applying a vacuum to the vadose zone as a component of LNAPL/groundwater extraction increases the net effective hydraulic gradient toward the extraction well, thereby reducing the groundwater-table deflection necessary to establish an LNAPL capture zone. Additionally, air flow through the smear zone and vadose zone induced by the application of vacuum enhances recovery of volatile LNAPL components and promotes aerobic biodegradation within the impacted areas.

MPE technology is applicable for fine to medium grain geologic settings such as silty sand or fine to medium sand. Lower permeability geologic settings such as silty clays and clay have limited pneumatic conductivity, which limits the effective MPE zone of influence. Conversely high permeability geologic setting such as coarse sands and gravels may also limit the effective MPE zone of influence due to the large air and groundwater extraction flow rates that may be necessary to induce sufficient hydraulic gradient to induce LNAPL movement towards the extraction well.

4.2 LNAPL Recovery Trenches

LNAPL recovery trenches serve as collection points for LNAPL recovery via gravity drainage. Trenches excavated into LNAPL-smeared soils are filled with high-permeability granular material. LNAPL drains from the LNAPL-smeared soil and

accumulates in the granular trench material. Accumulated LNAPL is manually or automatically extracted from recovery sumps installed in the granular material.

4.3 **Evaluation of Remedial Alternatives**

4.3.1 Initial Screening of Remedial Alternatives

The considered remedial alternatives are effective in reducing the toxicity, mobility, and volume of wastes and both are readily implementable. Both alternatives will be outfitted with appropriate emission controls to eliminate unacceptable community and worker exposure. Therefore, the remedial alternative evaluation predominantly considers the effectiveness of remedial alternatives for addressing the variable LNAPL types and geologic settings found at the site and the cost effectiveness of remedy implementation.

The applicability of the LNAPL remedial alternatives for each AOI were screened by reviewing geologic descriptions, calculating AOI-specific total and potentially recoverable LNAPL volumes, and reviewing available data on the LNAPL type. The influence of each of these factors on technology selection is summarized in **Table 1.** Descriptions of AOI-specific geologic setting and LNAPL type were derived from the RFI Phase I and II reports. A description of the methodology used to calculate LNAPL volume and recoverability is presented in Section 4.3.2 below.

The LNAPL remedial alternatives considered here were selected as baseline presumptive remedies for addressing LNAPL impacts. Select enhanced LNAPL remediation technologies will be bench and pilot-scale tested to 1) assess remedial technology applicability and effectiveness; and 2) to collect design data to form the remedial system basis of design. Multiple bench-scale studies will be conducted to assess LNAPL remedial technology performance on the variable soil types and LNAPL types present at the Site. Bench-scale testing is expected to include the evaluation of physical LNAPL recovery via multi–phase extraction (MPE)/recovery trenches, surfactants, thermal remediation, In-Situ chemical Oxidation (ISCO), and enhanced bioremediation. The results of the bench and field-scale testing may be used to select an alternate remedial technology if it is determine that that technology provides superior contaminant reduction and cost effectiveness to MPE and/or LNAPL Recovery Trenches. Some of the bench scale work from remedial efforts on LNAPL in the Southend of the site will be applicable to the LNAPL areas in the Northend.

4.3.2 LNAPL Volume and Recoverability

Site-specific LNAPL volumes and recoverability were estimated through the use of site data and advanced LNAPL volume calculations developed through the joint work of a number of research universities and private organizations. An ARCADIS-generated LNAPL volume calculation spreadsheet was used to model the expected LNAPL saturation and corresponding specific LNAPL volumes (expressed in terms of gallons per square foot of LNAPL-impacted aquifer) based on input of the physical properties of the product and aquifer matrix and field observations of the degree of LNAPL impact.

In order to calculate the LNAPL volumes and recoverability, the following inputs were required: the area of LNAPL extent; the thickness of LNAPL in monitoring wells; water/LNAPL physical properties data; and soil properties data. The LNAPL area and thickness inputs were based on contours from maximum LNAPL thicknesses as shown on **Figure 2.** The LNAPL smear zone was assumed to be 1.5 times the observed LNAPL thickness in monitoring wells to account for fluctuations in the groundwater table, which would leave residual LNAPL locked in pore spaces over a greater vertical extent than would be assumed using LNAPL thickness in well measurements. The fluid properties data include LNAPL and groundwater density, LNAPL and groundwater viscosity, and interfacial tensions of air, LNAPL, and groundwater. The fluid properties inputs were site-specific values based on samples collected and analyzed in 2001 – 2003, as well as assumed values, where noted. The soil properties inputs were taken from the American Petroleum Institute (API) database values and literature values based on soil types identified in each area on site soil boring logs. The required soil properties data include porosity, van Genuchten fitting parameters alpha and beta, irreducible water saturation, and residual LNAPL saturation.

Details of the LNAPL, fluid, and soil properties used to determine LNAPL volume and recoverability at each LNAPL area are discussed in Sections 5.2 and 5.3.

5. Recommended Corrective Measures

This section presents a summary of the recommended Northend corrective measures based on currently available information. These corrective measures were evaluated with the consideration that certain baseline Site-wide use restrictions will be applied as part of the overall final corrective action for the Site. **Table 2** summarizes the impacts, health risks, and recommended corrective measures identified for each of the AOIs discussed in Sections 5.2, 5.3, and 5.4.

5.1 Site-Wide Use Restrictions

Corrective measures were evaluated with the consideration that certain Baseline Site-wide Use Restrictions would be applied as part of the overall final corrective action for the Site. Baseline restrictions will consist of a restrictive covenant that will be established to prohibit the use of groundwater for any purpose, beyond sampling and other related investigatory testing, and to limit future use of the Site to Part 201 Industrial or Commercial II, III, and IV use only. Additional restrictions above these baseline restrictions may be applied for certain onsite areas, as appropriate, and determined by the proposed remedy for a particular AOI. These additional restrictions are discussed, as appropriate, in Sections 5.2, 5.3, and 5.4.

Based on information included in the RFI Phase II Report and the supplemental HHRA included in Appendix A of the Revised 2008 CMP, the identified potential for unacceptable exposure to groundwater at down gradient off-property areas relates solely to drinking water use. Thus, MLC proposes to also establish a restrictive covenant for downgradient offsite property that will prohibit the use of corresponding groundwater for potable uses. City of Flint Ordinance 9, Code of Ordinances, Chapter 46-25 already restricts the installation of drinking water wells in the City of Flint, and Michigan Department of Community Health Rules (Act 368, Part 127) also prohibits the use of groundwater at a depth of less than 25 feet below ground surface within all of Genesee County. As such, it is not anticipated that MLC will experience significant difficulty in obtaining the necessary restrictive covenants as described.

5.2 Additional Proposed Corrective Measures

This section discusses the corrective measures proposed for AOIs that were not included in the Revised 2008 CMP. The Revised 2008 CMP proposed corrective measures for the AOIs identified during RFI activities as having either: 1) LNAPL in which TSCA-regulated levels of PCBs were detected; or 2) estimated risks higher than

USEPA's acceptable risk limits via exposure to hazardous constituents in soil, groundwater, or LNAPL. The AOIs discussed below do not meet either of these criteria. However, based on additional discussions with the USEPA in 2009, MLC agreed to actively remediate AOIs containing LNAPL as part of the corrective measures for the Site. These additional corrective measures are presented on **Figure 3**. Exceedances of screening criteria for soil and/or groundwater at these AOIs are summarized in **Table 2** and will be addressed either as part of the Baseline Site-wide Use Restrictions as discussed in Section 5.1 and/or with Additional Institutional Controls Above Baseline as discussed in Sections 5.2, 5.3 and 5.4.

5.2.1 AOI 03-1 Quench Oil Plume

5.2.1.1 AOI Overview

AOI 03-1 consists of the overall area of the Factory 03 building complex, including various quenching and cooling oil systems used for various metal forging, quenching, and cooling operations. A quench oil plume was identified in this area. Historically, a roof drain/storm sewer sump located in the southern portion of Building 30A accumulated LNAPL, determined to be S-7 quench oil. As a result, the sump was converted to an IM collection sump with a belt skimmer to recover this oil. This recovery system was successful in recovering free-phase LNAPL only proximate to the recovery sump; hence, operation of this system has been discontinued. LNAPL, believed to be related to this release, is present immediately down gradient at monitoring well 03-03 and is known as the AOI 03-1 quench oil plume.

The physical extent of the AOI 03-1 quench oil plume is approximately 50 feet in diameter. Select monitoring wells in AOI 03-1 were monitored and manually bailed as part of the Site-wide LNAPL monitoring program from 2001 through 2005. A total of approximately 4 gallons of LNAPL was recovered, primarily from monitoring well 03-03.

Based on the HHRA for AOI 03-1 documented in the RFI Phase II Report estimates for potential exposure to subsurface LNAPL in this area does not exceed USEPA's cumulative cancer risk and HI limits. The remedial goal for AOI 03-1 quench oil plume is to remove LNAPL to the extent practicable.

5.2.1.2 LNAPL Characteristics

As discussed in Section 4.3.2 the volume of LNAPL and potentially recoverable volume of LNAPL are based on site specific and/or assumed LNAPL, fluid, aquifer, and soil characteristics. A summary of the characteristics used to calculate the LNAPL volume at AOI 03-1 is presented in **Table 3**.

The total area of measurable LNAPL at AOI 03-1 was calculated to be approximately 2,700 square feet based on the LNAPL thicknesses as shown on **Figure 2.**

Based on an evaluation of Site boring logs, the geology in the vicinity of the AOI 03-1 quench oil plume consists primarily of silt. The soil properties data inputs were selected from the API Parameters Database and from well-recognized literature values by averaging values associated with silt.

The results of the evaluation for the AOI 03-1 quench oil plume indicate a total volume of approximately 15,000 gallons of LNAPL with the potentially recoverable LNAPL volume being estimated as approximately 270 gallons. Based on the results of the volume estimation, the potentially recoverable LNAPL is estimated to be approximately 1.8% of the total LNAPL volume.

5.2.1.3 Rationale for Remedy Selection

A review of the screening factors, as presented in **Table 4,** indicate that the geology at the AOI 03-1 quench oil plume is primarily silt; that the potential recoverability of LNAPL is low; that the quench oil is a low volatility petroleum product; and that there were no detected PCBs in the LNAPL. Based on these factors the remedy selected for AOI 03-1 is a passive LNAPL recovery trench.

As summarized on **Table 4,** the proposed recovery trench will be approximately 80 feet long and 15 feet deep and will include three 8-inch diameter sumps to collect LNAPL. The trench length was determined by evaluating the length of the plume perpendicular to the direction of groundwater flow in probable trench locations. The collected LNAPL will be removed from the sumps via a mobile vacuum truck as necessary.

5.2.1.4 Estimated Remedy Costs

Capital costs (which for the purposes of this CMP include work planning, pilot testing, design and installation) for the proposed recovery trench remedy are expected to be approximately $36,000 with operation, maintenance and monitoring (OM&M) costs over 2 years totaling approximately $200,000.

5.2.2 **AOI 10-1/10-4 Hydraulic Oil Plumes**

5.2.2.1 AOI Overview

AOI 10-1 consists of the overall area of Building 20, including its basement area, manufacturing operations, external areas, and several tanks. AOI 10-4 consists of the scrap yard area immediately south of Building 20 and was used for scrap material storage, vehicle dismantling, and vehicle equipment storage.

In 1991, LNAPL was detected on the water table beneath and south of Building 20 within the Factory 10 Area. Fractions of this LNAPL included both water-soluble and insoluble phases of oil containing PCBs. In May 1997, GMC installed a groundwater collection and treatment system as an IM designed to collect and treat soluble product and affected groundwater from this area. Treated groundwater is discharged to the Site storm sewer system under a National Pollutant Discharge Elimination System (NPDES) permit. The treatment system, known as the Factory 10 treatment system, is still in operation.

Subsurface investigations performed in and around the scrap yard area south of Factory 10 identified the presence of LNAPL containing PCBs on the surface of groundwater outside the southeastern corner of Factory 10 and in the adjacent scrap yard area to the south, outside the influence of the LNAPL collection system installed in 1997. As a result, a second product recovery system consisting of a recovery trench, four manholes, and pumps for both product recovery and groundwater drawdown was constructed further down gradient to recover the PCB-containing LNAPL and create hydraulic control at the down gradient plume edge. The collection trench, sumps, manholes, and product piping of a second IM were installed in January and February 2003.

The recovery trench associated with this system is composed of two segments: one segment is approximately 30 feet long and the other is approximately 210 feet long. Both trench segments are approximately 20 feet deep and 1.5 feet wide, and contain a

perforated pipe lateral and pea stone backfill. Product and groundwater are pumped from four 4-foot diameter recovery manholes equally spaced along the trench. Collected groundwater and product are treated in the groundwater treatment system in Building 20, because of its PCB handling capability.

The treatment system is currently treating less than 5,000 gallons per day and is recovering approximately 55 gallons of oil per month from the extracted groundwater and water from other sources. Due to the high cost of operation and the fact that the system is no longer effective at removing significant amounts of LNAPL, this treatment system is no longer a sustainable solution and will be dismantled.

Based on the HHRA for AOIs 10-1/10-4 documented in the RFI Phase II Report estimates for potential exposure to subsurface LNAPL in this area does not exceed USEPA's cumulative cancer risk and HI limits. The remedial goal established for the AOIs 10-1/10-4 is to remove LNAPL to the extent practicable.

5.2.2.2 LNAPL Characteristics

As discussed in Section 4.3.2 the volume of LNAPL and potentially recoverable volume of LNAPL are based on site specific and/or assumed LNAPL, fluid and soil characteristics. A summary of the characteristics used to calculate the LNAPL volume at AOIs 10-1/10-4 is presented in **Table 3.**

The total area of measurable LNAPL at AOIs 10-1/10-4 was calculated to be approximately 160,000 square feet based on the LNAPL thicknesses as shown on **Figure 2.**

Based on an evaluation of Site boring logs, the geology in the vicinity of the AOI 10-1/10-4 hydraulic oil plumes consist primarily of fine to medium sand. The soil properties data inputs were selected from the API Parameters Database and well recognized literature values associated with fine and medium sands.

The results of the evaluation for the AOI 10-1/10-4 plumes indicate a total volume of approximately 220,000 gallons of LNAPL with the potentially recoverable LNAPL volume being estimated as 9,200 gallons. Based on the results of the volume estimation the potentially recoverable LNAPL is estimated to be approximately 4.1% of the total LNAPL volume.

5.2.2.3 Rationale for Remedy Selection

A review of the screening factors, as presented in **Table 4**, indicate that the geology at the AOI 10-1/10-4 hydraulic oil plumes is primarily fine and medium sands; that the potential recoverability of LNAPL is low; that the hydraulic oil is a low volatility petroleum product; and that there were PCBs have been detected in the LNAPL. LNAPL samples collected from the AOI 10-1/10-4 plumes detected PCBs at a maximum concentration of 44 parts per million (ppm).

Based on these factors the remedy selected for the AOI 10-1/10-4 LNAPL plumes is an active LNAPL recovery trench/well skimming system.

The proposed LNAPL recovery trench/well skimming system will consist of recovery trenches, which will total approximately 730 linear feet and will be approximately 15 feet deep (**Table 4**). The trench length was determined by evaluating the length of the plume perpendicular to the direction of groundwater flow in probable trench locations. Four collection sumps with skimmer pumps will be installed in the trenches. The recovered LNAPL and groundwater will be pumped to a treatment system consisting of an oil water separator followed by liquid phase activated carbon. The proposed treatment system will use components of the existing system to the extent possible.

Also, recently an oil grab sample was collected from the Factory 10 basement, located in AOI 10-1. Analytical results detected PCBs in the oil sample at a concentration of 56 ppm. It is anticipated that Additional Institutional Controls Above Baseline will be recommended at this AOI and the deed will be modified to provide notification of the presence of PCBs. Additional LNAPL delineation activities are planned at AOI 10-1 following the completion of building demolition is completed. **Figure 3** shows the approximate area to be covered by the deed restriction; however, the actual extent will be refined based on LNAPL investigation activities prior to establishing the restrictive covenant.

5.2.2.4 Estimated Remedy Costs

Capital costs for the proposed active LNAPL recovery trench/well skimming remedy are expected to be approximately $570,000 with OM&M costs over 2 years totaling approximately $260,000. The cost associated restrictive covenant is estimated to be $5,000 and includes performing a boundary survey of the area and administering the restrictive covenant.

5.2.3 **AOI 36-1 Mineral Seal/Hydraulic Oil Plume**

5.2.3.1 AOI Overview

AOI 36-1 is located in the northern and central portions of Building 36, and is associated with engine manufacturing and metal machining processes. Two LNAPL plumes have been identified in AOI 36-1. The plumes are identified as the AOI 36-1 Mineral Seal/Hydraulic Oil (AOI 36-1 MS/HO) Plume and the AOI 36-1 Gasoline Plume. The AOI 36-1 MS/HO plume is discussed in this section and the AOI 36-1 Gasoline Plume is discussed in Section 5.3.2.

The AOI 36-1 MS/HO plume is located beneath Building 36 and is approximately 500 feet in diameter. Select monitoring wells in the Building 36 area (which includes the AOI 36-1 MS/HO plume, the AOI 36-1 Gasoline Plume, and The AOI 36-2 MS/HO plume) were monitored and manually bailed during the Site-wide LNAPL monitoring program conducted from 2001 through 2005. A total of approximately 150 gallons of LNAPL was recovered from the AOI 36-1 and AOI 36-2 LNAPL areas.

Based on the HHRA for AOI 36-1 documented in the RFI Phase II Report and summarized in Section 3.2 of the Revised 2008 CMP, estimates of potential exposure for construction workers who could contact the AOI 36-1 Gasoline Plume exceed USEPA's cumulative cancer risk and HI limits. In addition, potential exposure of routine workers to vapors from soil and LNAPL via vapor intrusion exceeds USEPA's cumulative cancer risk and HI limits under future commercial/industrial use scenarios that do not require the application of OSHA regulations (non-OSHA use). These risk estimates are primarily attributed to the concentrations of the constituents present in the AOI 36-1 Gasoline plume. Conditions within the current building do meet current OSHA standards related to vapor concentrations in indoor air as discussed in the RFI Phase II Report.

As discussed above, based on the HHRA for AOI 36-1, the risk estimates are primarily attributed to the concentrations of the constituents present in the AOI 36-1 Gasoline Plume. The remedial goal for AOI 36-1 MS/HO LNAPL plume at this AOI is to remove LNAPL to the extent practicable.

5.2.3.2 LNAPL Characteristics

As discussed in Section 4.3.2 above the volume of LNAPL and potentially recoverable volume of LNAPL are based on site specific and/or assumed LNAPL, fluid and soil

characteristics. A summary of the characteristics used to calculate the LNAPL volume at the AOI 36-1 MS/HO plume is presented in **Table 3.**

The total area of measurable LNAPL at the AOI 36-1MS/HO plume was calculated to be approximately 260,000 square feet based on the LNAPL thicknesses shown on **Figure 2.**

Based on an evaluation of Site boring logs, the geology in the vicinity of the AOI 36-1 MS/HO plume consists primarily of clays to fine sand. The soil properties data inputs were selected from the API Parameters Database and well recognized literature values associated with clays, silts and fine sands.

The results of the evaluation for the AOI 36-1 MS/HO plume indicate a total volume of approximately 1,050,000 gallons of LNAPL with the potentially recoverable LNAPL volume being estimated as approximately 110,000 gallons. Based on the results of the volume estimation the potentially recoverable LNAPL is estimated to be approximately 10.6% of the total LNAPL volume.

5.2.3.3 Rationale for Remedy Selection

A review of the screening factors, as presented in **Table 4,** indicate that the geology at the AOI 36-1 MS/HO plume is primarily fine sand; that the potential recoverability of LNAPL is greater than 5% of total LNAPL volume; that mineral seal and hydraulic oil have low volatility; and that PCBs have not been detected in the LNAPL. Based on these factors the remedy selected for the AOI 36-1 MS/HO plume is multiphase extraction (MPE) and Additional Institutional Controls Above Baseline.

As summarized on **Table 4**, the proposed recovery well system will consist of up to 225 wells, based on an estimated radius of influence (ROI) of 20 feet. The recovery wells will be constructed to an average depth of 15 feet below ground surface (bgs). Recovered LNAPL and groundwater will be pumped to a treatment system, where it will be treated with an oil water separator followed by granular phase activated carbon.

In addition to the LNAPL MPE system, Additional Institutional Controls Above Baseline will be implemented at AOI 36-1. The additional institutional controls will include limiting excavation, preparing a health and safety plan, and requiring evaluation prior to future building construction. The restrictive covenant will be established to require that proper precautions be taken as necessary in order to address potentially significant

risks to future redevelopment construction workers and from volatilization to indoor air, should a new building be designed and constructed at this AOI.

The restrictions will be implemented as a means of preventing and/or controlling potential exposure pathways to identified potential risks associated with VOC concentrations in associated with LNAPL at this AOI. The potential for unacceptable exposures in the future would be mitigated by establishing in the restrictive covenant additional conditions for future building construction. The additional institutional controls include establishing a restrictive covenant limiting excavations and a requirement to prepare a health and safety plan prior to beginning construction in this area. The restrictive covenant will remain with the property deed in perpetuity, or until the area has been remediated to meet the risk level.

5.2.3.4 Estimated Remedy Costs

Capital costs for the proposed MPE system are expected to be approximately $2,750,000 with OM&M costs over 5 years totaling approximately $900,000. The cost associated restrictive covenant is estimated to be $5,000 and includes performing a boundary survey of the area and administering the restrictive covenant.

5.2.4 **AOI 36-2 Exterior Mineral Seal/Hydraulic Oil Plume**

5.2.4.1 AOI Overview

AOI 36-2 consists of the basement area located along the eastern side of the central portion of Building 36 and is associated with metal chip processing. A mineral seal/hydraulic oil plume beneath this area has been identified as the AOI 36-2 Exterior Mineral Seal/Hydraulic Oil Plume (AOI 36-2 MS/HO plume). The AOI 36-2 MS/HO plume is located directly down gradient of the basement and is approximately 375 feet long by 175 feet wide. As discussed in Section 5.2.3.1, during the Site-wide LNAPL monitoring program conducted from 2001 through 2005, a total of approximately 150 gallons of LNAPL was recovered through manual bailing of monitoring wells from the AOI 36-1 and AOI 36-2 LNAPL areas.

A groundwater and LNAPL recovery system has been constructed as an IM along the east side of Building 36, and was placed into operation in 2005. The purpose of this IM was to control potential offsite migration of LNAPL and Site-related constituents and to collect free-phase LNAPL. This system consists of three 12-inch diameter wells (installed in 24-inch diameter boreholes) and pumps for both product recovery and

groundwater drawdown. The recovery wells are approximately 20 feet deep. Product and groundwater are recovered from the wells via product recovery pump(s) and groundwater submersible pump(s), respectively. Collected fluids are transferred to a treatment system that is housed in an enclosure located in the area of the wells and ultimately discharged to the Site storm sewer system (Outfall 002) under an NPDES permit.

To date, the existing treatment system has operated as designed and has been effective in controlling potential off-site migration of LNAPL and site-related constituents. However, given the minimal amounts of LNAPL recovered by the system, a more cost-effective approach is proposed below.

Based on the HHRA for AOI 36-2 documented in the RFI Phase II Report, estimates of potential exposure to LNAPL in this area do not exceed USEPA's cumulative cancer risk and HI limits. The remedial goal for the AOI 36-2 MS/HO plume is to remove LNAPL to the extent practicable.

5.2.4.2 LNAPL Characteristics

As discussed in Section 4.3.2 above the volume of LNAPL and potentially recoverable volume of LNAPL are based on site specific and/or assumed LNAPL, fluid and soil characteristics. A summary of the characteristics used to calculate the LNAPL volume at the AOI 36-2 MS/HO plume is presented in **Table 3.**

The total area of measurable LNAPL at the AOI 36-2MS/HO plume was calculated to be approximately 74,000 square feet based on the LNAPL thicknesses as shown on **Figure 2.**

Based on an evaluation of Site boring logs, the geology in the vicinity of the AOI 36-2 MS/HO plume consists primarily of fine sand. The soil properties data inputs were selected from the API Parameters Database and well recognized literature values associated with fine sand.

The results of the evaluation for the AOI 36-2 MS/HO plume indicate a total volume of approximately 140,000 gallons of LNAPL with the potentially recoverable LNAPL volume being estimated as approximately 9,800 gallons. Based on the results of the volume estimation the potentially recoverable LNAPL is estimated to be approximately 7.1% of the total LNAPL volume.

5.2.4.3 Rationale for Remedy Selection

A review of the screening factors, as presented in **Table 4,** indicate that the geology at the AOI 36-2 MS/HO plume is primarily sand; that the potential recoverability of LNAPL is less than 5% of total LNAPL volume; that mineral seal and hydraulic oil have low volatility; and that PCBs have not been detected in the LNAPL. Based on these factors the remedy selected for the AOI 36-2 MS/HO plume is multiphase extraction.

As summarized on **Table 4,** the proposed recovery well system will consist of up to 37 wells, based on an estimated ROI of 25 feet. The recovery wells will be constructed to an average depth of 15 feet bgs. Recovered LNAPL and groundwater will be pumped to a treatment system, where it will be treated with a blower, an oil water separator, an air treatment system, and a water treatment system.

5.2.4.4 Estimated Remedy Costs

Capital costs for the proposed MPE system are expected to be approximately $600,000 with OM&M costs over 5 years totaling approximately $700,000.

5.2.5 **AOI 36-5 Fuel Oil Plume**

5.2.5.1 AOI Overview

AOI 36-5 is located immediately south of Building 36 and is associated with a former UST farm (also known as former Tank Farm 37) and an active contained AST farm. Both the ASTs and USTs contained gasoline, motor oil, hydraulic oil, and other oil products. A fuel oil plume has been identified to be present in this area. The AOI 36-5 plume is located beneath and to the northwest of the current AST farm and is approximately 75 feet in diameter.

Groundwater and LNAPL recovery trenches were installed along the east and south sides of an excavation area that was part of initial abatement measures in February 1990. These trenches were 3 feet wide and filled with gravel from approximately 2 feet bgs to approximately 14 feet bgs and are sloped toward a 26-inch-diameter recovery well/sump located along the south side of the excavation area. This recovery well/sump was installed to a depth of 17 feet bgs with screen placement at 6 to 13 feet bgs. In addition, a second sump was installed south of the newly constructed tank farm and is approximately a 26-inch-diameter and is constructed to 14 feet bgs. Collected fluids were routed to the Site's industrial wastewater treatment facility. This

IM is no longer in operation due to the fact that the system was no longer effective at removing significant amounts of LNAPL. In addition, select monitoring wells at the AOI 36-5 plume were monitored and manually bailed during the Site-wide LNAPL monitoring program conducted from 2001 through 2005. A total of approximately 18 gallons of LNAPL was recovered from this plume during the bailing program.

Based on the HHRA for AOI 36-5 documented in the RFI Phase II Report, estimates of potential exposure to LNAPL in this area do not exceed USEPA's cumulative cancer risk and HI limits. The remedial goal for AOI 36-5 is to remove LNAPL to the extent practicable.

5.2.5.2 LNAPL Characteristics

As discussed in Section 4.3.2 above the volume of LNAPL and potentially recoverable volume of LNAPL are based on site specific and/or assumed LNAPL, fluid and soil characteristics. A summary of the characteristics used to calculate the LNAPL volume at the AOI 36-5 plume is presented in **Table 3.**

The total area of measurable LNAPL at AOI 36-5 was calculated to be approximately 14,000 square feet based on the LNAPL thicknesses as shown on **Figure 2.**

Based on an evaluation of Site boring logs, the geology in the vicinity of the AOI 36-5 plume consists primarily of silt. The soil properties data inputs were selected from the API Parameters Database and well recognized literature values associated with silt.

The results of the evaluation for the AOI 36-5 plume indicates a total volume of approximately 19,000 gallons of LNAPL with the potentially recoverable LNAPL volume being estimated as approximately 340 gallons. Based on the results of the volume estimation the potentially recoverable LNAPL is estimated to be approximately 1.8% of the total LNAPL volume.

5.2.5.3 Rationale for Remedy Selection

A review of the screening factors, as presented in **Table 4,** indicate that the geology at the AOI 36-5 fuel oil plume is primarily silt; that the potential recoverability of LNAPL is less than 5% of total LNAPL volume; that fuel oil has a low volatility; and that PCBs have not been detected in the LNAPL. Based on these factors the remedy selected for the AOI 36-5 fuel oil plume is a passive recovery trench.

As summarized on **Table 4,** the proposed recovery trench will total approximately 135 feet long and 15 feet deep and will include four 8-inch diameter sumps. The trench length was determined by evaluating the length of the plume perpendicular to the direction of groundwater flow in probable trench locations. The collected LNAPL will be removed from the sumps via a mobile vacuum truck as necessary.

5.2.5.4 Estimated Remedy Costs

Capital costs for the proposed passive recovery trench system are expected to be approximately $46,000 with OM&M costs over 2 years totaling approximately $230,000.

5.2.6 AOI 83/84-4 Cutting Oil Plume

5.2.6.1 AOI Overview

AOI 83/84-4 consists of four former "wet", metal machining operations in the central portion of Building 66, including three process oil collection/recirculation sumps, and an inactive rail loading area (including associated sumps along the north side of Building 66C). The AOI 83/84-4 cutting oil plume has been identified in this area.

The physical extent of LNAPL at the AOI 83/84-4 plume is approximately 50 feet in diameter. Select monitoring wells in the Factory 83/84 area (which includes the AOI 83/84-4 and the AOI 83/84-2 plumes) were monitored and manually bailed during the Site-wide LNAPL monitoring program conducted from 2001 through 2005. A total of approximately 17 gallons of LNAPL was recovered from the AOI 83/84-4 and AOI 83/84-2 LNAPL areas.

Based on the HHRA for AOI 83/84-4 documented in the RFI Phase II Report estimates for potential exposure to subsurface LNAPL in this area do not exceed USEPA's cumulative cancer risk and HI limits. The remedial goal for AOI 83/84-3 cutting oil plume is to remove LNAPL to the extent practicable.

5.2.6.2 LNAPL Characteristics

As discussed in Section 4.3.2 above the volume of LNAPL and potentially recoverable volume of LNAPL are based on site specific and/or assumed LNAPL, fluid and soil characteristics. A summary of the characteristics used to calculate the LNAPL volume at AOI 83/84-4 is presented in **Table 3.**

The total area of measurable LNAPL at AOI 83/84-4 was calculated to be approximately 3,700 square feet based on the LNAPL thicknesses as shown on **Figure 2.**

Based on an evaluation of Site boring logs, the geology in the vicinity of the AOI 83/84-4 plume consists primarily of sand. The soil properties data inputs were selected from the API Parameters Database and well recognized literature values associated with sand.

The results of the evaluation for the AOI 83/84-4 cutting oil plume indicate a total volume of approximately 3,300 gallons of LNAPL with the potentially recoverable LNAPL volume being estimated as approximately 100 gallons. Based on the results of the volume estimation the potentially recoverable LNAPL is estimated to be approximately 3.0% of the total LNAPL volume.

5.2.6.3 Rationale for Remedy Selection

A review of the screening factors, as presented in **Table 4,** indicate that the geology at the AOI 83/84-4 cutting oil plume is primarily sand; that the potential recoverability of LNAPL is less than 5% of total LNAPL volume; that cutting oil has a low volatility; and that PCBs have not been detected in the LNAPL. Based on these factors the remedy selected for the AOI 83/84-4 cutting oil plume is a passive recovery trench.

As summarized on **Table 4,** the proposed recovery trench will total approximately 85 feet long and 15 feet deep and will include three 8-inch diameter sumps. The trench length was determined by evaluating the length of the plume perpendicular to the direction of groundwater flow in probable trench locations. The collected LNAPL will be removed from the sumps via a mobile vacuum truck as necessary.

5.2.6.4 Estimated Remedy Costs

Capital costs for the proposed passive recovery trench system are expected to be approximately $37,000 with OM&M costs over 2 years totaling approximately $120,000.

5.2.7 **AOI 86-1 Fuel Oil Plume**

5.2.7.1 AOI Overview

AOI 86-1 includes the overall area of Building 86 and areas immediately southeast and west of Building 86, collectively associated with a hazardous waste drum accumulation area, a process waste pumping station, a waste transport vehicle storage area, and a former UST farm. Historically a product plume located south of Buildings 86/86A was identified as the AOI 86-1 plume. This plume is likely associated with the former UST farm.

An IM was operated within the AOI 86-1 plume using two product recovery wells in an attempt to eliminate the migration of product into a catch basin connecting to Storm Sewer Outfall 005. These recovery wells were installed adjacent to the Leith Street overpass retaining wall. Recovered product was collected in an oil/water separator and discharged to the Site's industrial wastewater treatment system. This system was successful in recovering free-phase LNAPL in this area, hence operation was discontinued. However, during 2003, LNAPL was observed at two monitoring wells (RFI-86-02 and RFI-86-03) located east of the AOI. Select monitoring wells associated with this plume have been monitored as part of the Site-wide LNAPL monitoring program from 2001 through 2005. A total of approximately 1 gallon of LNAPL was bailed from select monitoring wells located in the AOI 86-1 plume.

Based on the HHRA for AOI 86-1 documented in the RFI Phase II Report estimates for potential exposure to subsurface LNAPL in this area do not exceed USEPA's cumulative cancer risk and HI limits. The remedial goal for AOI 86-1 plume is to remove LNAPL to the extent practicable.

5.2.7.2 LNAPL Characteristics

As discussed in Section 4.3.2 above the volume of LNAPL and potentially recoverable volume of LNAPL are based on site specific and/or assumed LNAPL, fluid and soil characteristics. A summary of the characteristics used to calculate the LNAPL volume at the AOI 86-1 plume are presented in **Table 3.**

The total area of measurable LNAPL at AOI 86-1 was calculated to be approximately 2,300 square feet based on the LNAPL thicknesses as shown on **Figure 2.**

Based on an evaluation of Site boring logs, the geology in the vicinity of the AOI 86-1 LNAPL plume consists primarily of fine to medium sand. The soil properties data inputs were selected from the API Parameters Database and well recognized literature values associated with fine to medium sand.

The results of the evaluation for the AOI 86-1 fuel oil plume indicate a total volume of approximately 2,800 gallons of LNAPL with the potentially recoverable LNAPL volume being estimated as approximately 32 gallons. Based on the results of the volume estimation the potentially recoverable LNAPL is estimated to be approximately 1.2% of the total LNAPL volume.

5.2.7.3 Rationale for Remedy Selection

A review of the screening factors, as presented in **Table 4,** indicate that the geology at the AOI 86-1 plume is primarily fine to medium sand; that the potential recoverability of LNAPL is less than 5% of total LNAPL volume; that fuel oil has a low volatility; and that PCBs have not been detected in the LNAPL. Based on these factors the remedy selected for the AOI 86-1 plume is a passive recovery trench.

As summarized on **Table 4,** the proposed recovery trench will total approximately 60 feet long and 15 feet deep and will include three 8-inch diameter sumps. The trench length was determined by evaluating the length of the plume perpendicular to the direction of groundwater flow in probable trench locations. The collected LNAPL will be removed from the sumps via a mobile vacuum truck, as necessary.

5.2.7.4 Estimated Remedy Costs

Capital costs for the proposed passive recovery trench system are expected to be approximately $33,000 with OM&M costs over 2 years totaling approximately $93,000.

5.3 Summary of Modifications to Measures Proposed in the Revised 2008 CMP

This section discusses the modifications to the corrective measures proposed in the Revised 2008 CMP. Based on negotiations with the USEPA, recent changes to the disposition of the buildings in the north end, and an evaluation of current Site data, MLC has modified the remedial alternatives for the AOI 05-1/05-5 cutting oil plumes, the AOI 36-1 gasoline plume, AOI 81-1 (Soil), AOI 81-2 (LNAPL), AOI 83/84-2 (LNAPL), AOI 83/84-3 (Soil), Outfall 002, Outfalls 003/004 and Outfall 005. The corrective measures are presented on **Figure 3**. Exceedances of screening criteria for

soil and/or groundwater at these AOIs are summarized in **Table 2** and will be addressed as part of the baseline Site-wide use restrictions as discussed in Section 5.1. Additional restrictions above these baseline restrictions will be applied for certain onsite areas as appropriate and determined by the proposed remedy for a particular AOI.

5.3.1 **AOI 5-1/05-5 Cutting Oil Plumes**

5.3.1.1 AOI Overview

AOI 05-1

AOI 05-1 consists of the basement area along the southeast portion of Building 43, and is associated with a former metal machining chip processing operation.

LNAPL was detected during RFI activities in this area and the physical extent of LNAPL was defined. Investigations performed in 1994 in response to suspected oil releases in Building 43 (Factory 05 Area) detected LNAPL on the water table along the southeast side of Building 43. To address the LNAPL, three recovery trenches were installed in the Building 43 area in early 1995, which are still operating today. These recovery trenches are each approximately 14 feet deep, 3 feet wide, 100 feet long, and backfilled with gravel. LNAPL is recovered from these trenches via 30-inch-diameter recovery wells installed near the midpoint of each recovery trench. Automated belt skimming devices in the recovery wells collect LNAPL from the recovery trenches (with approximately 60% groundwater and 40% LNAPL) and transfer it to a temporary storage tote. Recovered water is periodically allowed to flow back into the recovery well and the recovered LNAPL is later drummed for disposal. The current belt skimming system is inefficient in removing LNAPL from the recovery wells.

Based on the HHRA for AOI 05-1 documented in the RFI Phase II Report and summarized in Section 3.2 of the Revised 2008 CMP, estimates of potential exposure LNAPL in this area do not exceed USEPA's cumulative cancer risk and HI limits. However, PCBs were detected in samples of LNAPL collected from the recovery trench system mentioned above at concentrations up to 111 ppm. The presence of PCBs at this concentration requires compliance with TSCA regulations.

AOI 05-5

AOI 05-5 is in the northern and east-central portion of Building 43, and consists of active process machinery, collection trenches, and sumps for both “wet” and “dry” operations.

A release of an estimated 4,000 gallons of cutting oil was identified in April 1997. Three 4-inch-diameter groundwater monitoring wells were installed to the east of the tank from which the release was thought to have occurred. Product was identified in two monitoring wells. Two pneumatic free-product recovery pumps were installed as IMs in the wells. The recovered total fluids were later piped to two product storage tanks located within Building 43. The LNAPL later caused malfunction of the recovery pumps. As such, the system is currently not operating.

Based on the HHRA for AOI 05-5 documented in the RFI Phase II Report and summarized in Section 3.2 of the Revised 2008 CMP, estimates of potential exposure to LNAPL in this area do not exceed USEPA’s cumulative cancer risk and HI limits. However, PCBs were detected in LNAPL samples collected from well RFI-05-11 at a concentration of 160 ppm and from well RW-05-East at a concentration of 130 ppm. The presence of PCBs at this concentration requires compliance with TSCA regulations.

5.3.1.2 LNAPL Characteristics

As discussed in Section 4.3.2 the volume of LNAPL and potentially recoverable volume of LNAPL are based on site specific and/or assumed LNAPL, fluid and soil characteristics. A summary of the characteristics used to calculate the LNAPL volume at the AOIs 05-1/05-5 plumes are presented in **Table 3.**

The total area of measurable LNAPL at AOIs 05-1/05-5 was calculated to be approximately 110,000 square feet based on the LNAPL thicknesses as shown on **Figure 2.**

Based on an evaluation of Site boring logs, the geology in the vicinity of the AOIs 05-1/05-5 plumes consists primarily of fine sand. The soil properties data inputs were selected from the API Parameters Database and well recognized literature values associated with fine sand.

The results of the evaluation for the AOIs 05-1/05-5 cutting oil plumes indicate a total volume of approximately 440,000 gallons of LNAPL with the potentially recoverable LNAPL volume being estimated as approximately 79,000 gallons. Based on the results of the volume estimation the potentially recoverable LNAPL is estimated to be approximately 17.8% of the total LNAPL volume.

5.3.1.3 Rationale for Remedy Modification

A review of the screening factors, as presented in **Table 4,** indicate that the geology at the AOI 05-1/05-5 plumes is primarily fine sand; that the potential recoverability of LNAPL is greater than 5% of total LNAPL volume; that cutting oil has a low volatility; and that PCBs have been detected at TSCA-levels in the LNAPL. Based on these factors the remedy selected for the AOI 05-1/05-5 cutting oil plumes is MPE and Additional Institutional Controls Above Baseline**.**

As summarized on **Table 4,** the proposed recovery well system will consist of up to 41 wells, based on an estimated ROI of 30 feet. The recovery wells will be constructed to an average depth of 15 feet bgs. Recovered LNAPL and groundwater will be pumped to a treatment system, where it will be treated with a blower, an oil water separator, an air treatment system, and a water treatment system.

In addition to the LNAPL MPE system, Additional Institutional Controls Above Baseline be implemented at this AOI. The deed will be modified to provide notification of the presence of PCBs at this AOI.

5.3.1.4 Estimated Modified Remedy Costs

Capital costs for the proposed passive recovery trench system are expected to be approximately $450,000 with OM&M costs over 5 years totaling approximately $2,300,000. The cost associated restrictive covenant is estimated to be $5,000 and includes performing a boundary survey of the area and administering the restrictive covenant.

5.3.2 **AOI 36-1 Gasoline Plume**

5.3.2.1 AOI Overview

AOI 36-1 is located in the northern and central portions of Building 36, and is associated with engine manufacturing and metal machining processes. Two LNAPL

plumes have been identified in AOI 36-1. The AOI 36-1 MS/HO plume is discussed in Section 5.2.3. The AOI 36-1 Gasoline plume is presumably due to historical releases associated with engine testing in this area. This plume is located at the interior of Building 36, and is approximately 75 feet in diameter. As discussed in Section 5.2.3.1, during the Site-wide LNAPL monitoring program conducted from 2001 through 2005, a total of approximately 150 gallons of LNAPL was recovered by bailing from selected monitoring wells in the AOI 36-1 and AOI 36-2 LNAPL areas.

Based on the HHRA for AOI 36-1 documented in the RFI Phase II Report and the supplemental risk assessments presented in the Revised 2008 CMP and Appendix A of this CMP Addendum No.2., estimates of potential exposure for construction workers who could contact the gasoline LNAPL plume exceed USEPA's cumulative cancer risk and HI limits. In addition, potential exposure of routine workers to vapors from soil and LNAPL via vapor intrusion exceeds USEPA's cumulative cancer risk and HI limits under future commercial/industrial use scenarios that do not require the application of OSHA regulations (non-OSHA use). These risk estimates are primarily attributed to the concentrations of the constituents present in the gasoline plume. Conditions within the current building do meet current OSHA standards related to vapor concentrations in indoor air as discussed in the RFI Phase II Report.

Therefore, the remedial goal for LNAPL at this AOI is to address the potential exposure to construction and routine workers to VOCs from the gasoline plume and soil.

5.3.2.2 LNAPL Characteristics

As discussed in Section 4.1.1 the volume of LNAPL and potentially recoverable volume of LNAPL are based on site specific and/or assumed LNAPL, fluid and soil characteristics. A summary of the characteristics used to calculate the LNAPL volume at the AOI 36-1 Gasoline Plume is presented in **Table 3.**

The total area of measurable LNAPL at AOI 36-1 Gasoline Plume was calculated to be approximately 6,100 square feet based on the LNAPL thicknesses as shown on **Figure 2.**

Based on an evaluation of Site boring logs, the geology in the vicinity of the AOI 36-1 Gasoline Plume consists primarily of fine sand. The soil properties data inputs were selected from the API Parameters Database and well recognized literature values associated with fine sand.

The results of the evaluation for the AOI 36-1 Gasoline Plume indicate a total volume of approximately 5,000 gallons of LNAPL with the potentially recoverable LNAPL volume being estimated as approximately 130 gallons. Based on the results of the volume estimation the potentially recoverable LNAPL is estimated to be approximately 2.6% of the total LNAPL volume.

5.3.2.3 Rationale for Remedy Modification

A review of the screening factors, as presented in **Table 4,** indicate that the geology at the AOI 36-1 Gasoline Plume is primarily fine sand; that the potential recoverability of LNAPL is less than 5% of total LNAPL volume; that gasoline has a high volatility; and that PCBs have not been detected in the LNAPL. Furthermore, the LNAPL is the likely source of the gasoline-related compounds (primarily benzene) in the adjacent dissolved-phase plume. Based on these factors the remedy selected for the AOI 36-1 Gasoline Plume is MPE and Additional Institutional Controls Above Baseline.

As summarized on **Table 4,** the proposed recovery well system will consist of up to 4 wells, based on an estimated ROI of 30 feet. The recovery wells will be constructed to an average depth of 15 feet bgs. Recovered LNAPL and groundwater will be pumped to treatment system, where it will be treated with a blower, an oil water separator, an air treatment system, and a water treatment system.

In addition to the LNAPL MPE, Additional Institutional Controls Above Baseline will be implemented at this AOI. The additional institutional controls above baseline include establishing a restrictive covenant to limit excavation, prepare a Health and Safety Plan, and require evaluation prior to future building construction. The restrictive covenant will be established to require that proper precautions be taken as necessary in order to address potentially significant risks to future redevelopment construction workers and to future workers from volatilization to indoor air, should a new building be constructed at this AOI.

The restrictions will be implemented as a means of preventing and/or controlling potential exposure pathways to identified potential risks associated with VOC concentrations in associated with LNAPL at this AOI. The restrictive covenant will remain with the property deed in perpetuity, or until the area has been remediated to meet the risk level.

5.3.2.4 Estimated Modified Remedy Costs

Capital costs for the proposed passive recovery trench system are expected to be approximately $500,000 with OM&M costs over 5 years totaling approximately $690,000. The cost associated restrictive covenant is included in Section 5.2.3.4.

5.3.3 **AOI 81-2 LNAPL (Cutting Oil Plume)**

5.3.3.1 AOI Overview

AOI 81-2 consists of active metal welding and machining, and torque converter assembly operations performed in Buildings 70, 70B, 71, 71A, 72, 73, 73A, 73B, and 74. The AOI 81-2 area was used for storage of foundry sand and steel from the manufacturing process. Subsequent subsurface investigations in this area indicated the presence of LNAPL containing PCBs. An LNAPL recovery trench was installed as an IM in the area in 1996. This recovery trench is approximately 9 feet deep, 3 feet wide, 200 feet long, and includes perforated pipes and gravel backfill, which is still active today. LNAPL is recovered from the trenches via a 4-foot-diameter recovery well installed near the midpoint of the recovery trench. An automated belt skimming device in the recovery well collects product from the recovery trench and transfers it to a temporary storage tank. The collected product is then transferred to the groundwater treatment facility in Factory 10. This system has become ineffective in removing significant quantities of LNAPL due to the lack of recoverable LNAPL within the capture zone of the system. A portion of this LNAPL plume exists outside the area of influence of the existing LNAPL recovery system.

Based on the HHRA for AOI 81-2 documented in the RFI Phase II Report and summarized in Section 3.2 of the Revised 2008 CMP, estimates of potential exposure to subsurface LNAPL in this area do not exceed USEPA's cumulative cancer risk and HI limits. However, PCBs have been detected in LNAPL at this AOI at concentrations greater than 100 ppm. The presence of PCBs at this concentration requires compliance with TSCA regulations.

5.3.3.2 LNAPL Characteristics

As discussed in Section 4.3.2 the volume of LNAPL and potentially recoverable volume of LNAPL are based on site specific and/or assumed LNAPL, fluid and soil characteristics. A summary of the characteristics used to calculate the LNAPL volume at AOI 81-2 is presented in **Table 3.**

The total area of measurable LNAPL at AOI 81-2 was calculated to be approximately 45,000 square feet based on the LNAPL thicknesses as shown on **Figure 2.**

Based on an evaluation of Site boring logs, the geology in the vicinity of the AOI 81-2 plume consists primarily of silt and clay. The soil properties data inputs were selected from the API Parameters Database and well recognized literature values associated with silt and clay.

The results of the evaluation for the AOI 81-2 cutting oil plume indicate a total volume of approximately 150,000 gallons of LNAPL with the potentially recoverable LNAPL volume being estimated as approximately 600 gallons. Based on the results of the volume estimation the potentially recoverable LNAPL is estimated to be approximately 0.4% of the total LNAPL volume.

5.3.3.3 Rationale for Remedy Modification

A review of the screening factors, as presented in **Table 4,** indicate that the geology at the AOI 81-2 cutting oil plume is primarily silt and clay; that the potential recoverability of LNAPL is less than 5% of total LNAPL volume; that cutting oil has a low volatility; and that PCBs have been detected at TSCA-levels in the LNAPL. Based on these factors the remedy selected for the AOI 81-2 is a passive recovery trench and Additional Institutional Controls above Baseline.

As summarized on **Table 4,** the proposed recovery trench will total approximately 310 feet long and 15 feet deep and will include three 8-inch diameter sumps. The trench length was determined by evaluating the length of the plume perpendicular to the direction of groundwater flow in probable trench locations. The collected LNAPL will be removed from the sumps via a mobile vacuum truck as necessary.

In addition to the LNAPL passive recovery system, Additional Institutional Controls Above Baseline will be implemented at this AOI. The deed will be modified to provide notification of the presence of PCBs at this AOI.

5.3.3.4 Estimated Modified Remedy Costs

Capital costs for the proposed passive recovery trench system are expected to be approximately $125,000 with OM&M costs over 2 years totaling approximately $360,000. The cost associated restrictive covenant is estimated to be $5,000 and

includes performing a boundary survey of the area and administering the restrictive covenant.

5.3.4 **AOI 81-2 Soil**

5.3.4.1 AOI Overview

As discussed in Section 5.3.3, AOI 81-2 consists of active metal welding and machining, and torque converter assembly operations performed in Buildings 70, 70B, 71, 71A, 72, 73, 73A, 73B, and 74. The RFI soil data from AOI 81-2 indicate that screening criteria were exceeded for several VOCs and inorganic constituents, and the RFI groundwater data indicate that screening criteria were exceeded for lead and manganese. Compounds exceeding screening criteria at this AOI are contained in a former process pit located immediately beneath the operational floor in the northwest corner of Building 71A (i.e., less than 3 feet below ground surface).

Based on the HHRA for AOI 81-2 documented in the RFI Phase II Report and summarized in Section 3.2 of the Revised 2008 CMP, estimates of potential exposure to groundwater in this area do not exceed USEPA's cumulative cancer risk and HI limits. However, estimates of potential exposure of routine workers to soil via direct contact in this area exceeds the USEPA HI limit. In addition, estimates of potential exposure of routine workers to vapors from soil via vapor intrusion exceeds USEPA's HI limit under future commercial/industrial use scenarios that do not require the application of OSHA regulations (non-OSHA use). Conditions within the current building do meet current OSHA standards related to vapor intrusion as discussed in the RFI Phase II Report. Additionally, the Human Health Risk Assessment for the Redevelopment Construction Worker (Appendix A) also identified VOCs in soil at RFI-81-38 as a concern for the redevelopment construction worker.

The remedial goal for soil at this AOI is to address potentially significant exposures to concentrations of certain VOCs in soil in a near-surface soil sample at the RFI-81-38.

5.3.4.2 Revised 2008 CMP Selected Remedy

The selected remedy for this AOI proposed in the Revised 2008 CMP is Engineering Controls and Additional Institutional Controls above Baseline. This remedy involves implementing engineering controls and additional institutional controls that would provide protection from direct contact and vapor intrusion exposure to future Site users. The engineering controls include maintaining the surface cover consistent with

existing conditions. The additional institutional controls above baseline include establishing a restrictive covenant to limit excavation, prepare a health and safety plan, and require evaluation prior to future building construction. The restrictive covenant will be established to require that proper precautions be taken, as necessary, in order to address potentially unacceptable exposures to future redevelopment construction workers and to future workers from volatilization to indoor air, should a new building be designed and constructed at this AOI. The restrictive covenant will remain with the property deed in perpetuity, or until the area has been remediated to meet the risk level.

This remedy provides adequate protection for human health, and is easily implemented and reliable. These controls would be implemented as a means of preventing and/or controlling potential exposure pathways to identified potential risks associated with VOC concentrations in near-surface soils (up to 4 feet bgs) at this AOI. This remedy provides adequate protection from potential risk to human health based on the risk assessment included in the RFI Phase II Report and Appendix A of this CMP Addendum No. 2.

5.3.4.3 Rationale for Remedy Modification

The proposed remedy modification includes enlarging the area to be restricted, maintained and inspected in order to be more conservative. The revised extents of the AOI 81-2 area are shown on **Figure 3.** In additional as negotiated with the USEPA the maintenance and inspection of the surface cover will continue for 50 years.

5.3.4.4 Estimated Modified Remedy Costs

The O&M cost for this alternative is approximately $220,000, assuming a life cycle of 50 years. The annual cost is assumed to be $4,400.

5.3.5 **AOI 83/84-2 LNAPL (Cutting Oil Plume)**

5.3.5.1 AOI Overview

AOI 83/84-2 is located in the currently inactive Factory 83/84 area, and consists of areas of various former and existing machining operations in Building 32 (including two basements), with both “wet” and “dry” operations. LNAPL has been observed at AOI 83/84-2 floating on the surface of groundwater at select monitoring well locations. The physical extent of LNAPL has been defined to be approximately 150 feet in diameter.

Based on the HHRA for AOI 83/84-2 documented in the RFI Phase II Report and summarized in Section 3.2 of the Revised 2008 CMP, estimates for potential exposure to subsurface LNAPL in this area do not exceed USEPA's cumulative cancer risk and HI limits. However, PCBs were detected in LNAPL samples collected from monitoring wells RFI-83/84-06 and RFI-83/84-49 at concentrations as high as 62 mg/kg. The presence of PCBs at this concentration requires compliance with TSCA regulations.

Corrective measures addressing the soil exceedances identified at AOI 83/84-2 are discussed in Section 5.4.2.

5.3.5.2 LNAPL Characteristics

As discussed in Section 3.1.1 the volume of LNAPL and potentially recoverable volume of LNAPL are based on site specific and/or assumed LNAPL, fluid and soil characteristics. A summary of the characteristics used to calculate the LNAPL volume at AOI 83/84-2 is presented in **Table 3.**

The total area of measurable LNAPL at AOI 83/84-2 was calculated to be approximately 17,000 square feet based on the LNAPL thicknesses as shown on **Figure 2.**

Based on an evaluation of Site boring logs, the geology in the vicinity of the AOI 83/84-2 cutting oil plume consists primarily of fine to medium sand. The soil properties data inputs were selected from the API Parameters Database and well recognized literature values associated with fine to medium sand.

The results of the evaluation for the AOI 83/84-2 cutting oil plume indicate a total volume of approximately 34,000 gallons of LNAPL with the potentially recoverable LNAPL volume being estimated as approximately 1,000 gallons. Based on the results of the volume estimation the potentially recoverable LNAPL is estimated to be approximately 3.1% of the total LNAPL volume.

5.3.5.3 Rationale for Remedy Modification

A review of the screening factors, as presented in **Table 4,** indicate that the geology at the AOI 83/84-2 cutting oil plume is primarily fine to medium sand; that the potential recoverability of LNAPL is less than 5% of total LNAPL volume; that cutting oil has a low volatility; and that PCBs have been detected at TSCA-levels in the LNAPL. Based

on these factors the remedy selected for the AOI 83/84-2 is MPE and Additional Institutional Controls Above Baseline.

As summarized on **Table 4,** the proposed recovery well system will consist of up to 13 wells, based on an estimated ROI of 20 feet. The recovery wells will be constructed to an average depth of 15 feet bgs. Recovered LNAPL and groundwater will be pumped to a treatment system, where it will be treated with a blower, an oil water separator, an air treatment system, and a water treatment system.

In addition to the LNAPL MPE system, Additional Institutional Controls Above Baseline will be implemented at this AOI. The deed will be modified to provide notification of the presence of PCBs at this AOI.

5.3.5.4 Estimated Modified Remedy Costs

Capital costs for the proposed MPE system are expected to be approximately $500,000 with OM&M costs over 5 years totaling approximately $710,000. The cost associated restrictive covenant is estimated to be $5,000 and includes performing a boundary survey of the area and administering the restrictive covenant.

5.3.6 **AOI 83/84-3 Soil**

5.3.6.1 AOI Overview

AOI 83/84-3 consists of areas of various former and existing machining operations in Buildings 66A/66D (both “wet” and “dry” operations). The RFI soil data from AOI 83/84-3 indicate that screening criteria were exceeded for lead, and the RFI groundwater data indicate that screening criteria were exceeded for beryllium and lead.

Based on the HHRA for AOI 83/84-3 documented in the RFI Phase II Report estimates of potential exposure to groundwater in this area do not exceed USEPA’s cumulative cancer risk and HI limits. However, mean lead concentrations in surface and depth-averaged soil exceed 900 mg/kg (i.e., MDEQ industrial direct contact criterion). Therefore, the remedial goal for this area is to address the potential exposure to lead concentrations in soil greater than 900 mg/kg. Additionally, the Human Health Risk Assessment for the Redevelopment Construction Worker (Appendix A) also identified lead as a concern for the redevelopment construction worker.

5.3.6.2 Revised 2008 CMP Selected Remedy

The selected remedy for this AOI presented in the Revised 2008 CMP is Engineering Controls and Additional Institutional Controls above Baseline. This remedy involves implementing engineering controls and additional institutional controls that would provide protection from direct contact to future Site users. The engineering controls include maintaining the surface cover consistent with existing conditions. The institutional controls include establishing a restrictive covenant limiting excavations within the area of soil exceeding 900 mg/kg for lead and a requirement to prepare a health and safety plan prior to beginning construction in this area. These restrictions would run with the property in perpetuity, or until soil containing lead concentrations above 900 mg/kg has been remediated for the appropriate use scenarios. Per GMC's November 21, 2004 response to USEPA's Specific Comment No. 21 of the March 2004 RFI Phase II Report, additional delineation of eastern boundary of contamination in this area will be performed prior to establishing the restrictive covenant.

This remedy protects human health, and is easily implemented and reliable. These controls would be implemented as a means of preventing and/or controlling potential exposure pathways to identified potential risks associated with lead concentrations in soils (up to 6 feet bgs) at this AOI. This remedy provides adequate protection from potential risk to human health based on the risk assessment included in the RFI Phase II Report. The potential for unacceptable exposures in the future would be mitigated by establishing in the deed limits on future excavation within the area of soil exceeding 900 mg/kg for lead.

5.3.6.3 Rationale for Remedy Modification

The proposed remedy modification includes enlarging the area to be restricted, maintained and inspected in order to be more conservative. The revised extents of the AOI 83/84-3 area are shown on **Figure 3.** In additional as negotiated with the USEPA the maintenance and inspection of the surface cover will continue for 50 years.

5.3.6.4 Estimated Modified Remedy Costs

The O&M cost for this alternative is approximately $220,000, assuming a life cycle of 50 years. The annual cost is assumed to be $4,400.

5.3.7 **Outfall 002 Storm Sewer**

5.3.7.1 AOI Overview

As discussed in Sections 3.3.1 and 4.1 of Appendix I of the RFI Phase II Report, evidence of historical groundwater infiltration into Outfall 002 storm sewers has been observed as mineral deposits at pipe joints during video inspection of proposed stretches of the pipe system. Also, the portion of the Outfall 002 storm sewer system between manholes 2-20 and 2-22 runs underneath Stewart Ave. and through an LNAPL area associated with the former Tank Farm 37 UST system (AOI 36-5).

Based on the RFI risk assessment, no unacceptable human health risks were identified for this area. However, certain VOCs were detected in water samples collected from manholes 2-19 and 2-20. The detected VOCs were similar to those detected in groundwater samples surrounding the Outfall 002 storm sewer system in this area. These results suggest that some infiltration of impacted groundwater may be occurring. Groundwater in the area upstream of manhole 2-20 contains concentrations of trichloroethene (TCE), and vinyl chloride, as well as LNAPL, and may be the source of the VOCs detected in the sewer. An inspection of the sewer system revealed no evidence of LNAPL infiltration in the area. Nonetheless, corrective measures are evaluated below for addressing this potential LNAPL infiltration to this sewer system in the area of the former Tank Farm UST system.

5.3.7.2 Revised 2008 CMP Selected Remedy

The selected remedy for this AOI presented in the Revised 2008 CMP was **Storm Sewer Lining**. Although unacceptable human health risks from potential exposure have not been identified for this area, this alternative limits the potential for migration of LNAPL and groundwater into the Outfall 002 storm sewer system. An Interim Measure Work Plan was submitted to the USEPA on February 13, 2008, for implementing the selected alternative. The USEPA approved the interim measure in a letter to GMC dated April 8, 2008. The approved interim measure has not been installed to date.

5.3.7.3 Rationale for Remedy Modification

Subsequent to the sewer lining IM approval, further evaluation of the Outfall 002 storm sewer in the vicinity of manholes MH 2-20 and MH 2-22 showed several smaller pipes transecting the Outfall 002 storm sewer main. As such, lining of the sewer was determined to be not technically feasible.

In addition, since the GMC bankruptcy, Building 36 is now undergoing demolition. Following the demolition of Building 36, remedial alternatives will be implemented to begin removing LNAPL in the Outfall 002 drainage area. These plumes include the AOI 36-1 MS/HO plume, the AOI 36-1 Gasoline plume, the AOI 36-2 MS/HO plume, and the AOI 36-5 Fuel Oil plume. During demolition and LNAPL source removal activities, booms placed in select manholes as well as at the Outfall 002 discharge point at the Flint River will continue to be monitored for changes in the amount of product being recovered. This information will be used to perform an evaluation of possible corrective measures for Outfall 002, which may include the installation of an in-line oil water separator or placing permanent bulkheads in the Outfall 002 storm sewer to eliminate the pathway for groundwater and LNAPL infiltration.

5.3.7.4 Estimated Modified Remedy Costs

Costs have not been determined as the final corrective measure for Outfall 002 has not been determined.

5.3.8 **Outfall 003 and Outfall 004 Storm Sewers**

5.3.8.1 AOI Overview

A storm sewer investigation was conducted at the Site in 2002 and was reported in the RFI Phase II Report (BBL, 2006a). The storm sewer investigation indicated that LNAPL has been found to be infiltrating into the Outfall 003 and 004 storm sewer systems.

Oil removal systems are in operation at the Outfall 003 and 004 storm sewer systems, which involves the collection of oil sheens using floating oil booms at the outfall, and periodic pumping of the collected material into a tanker truck. The collected oil/water mixture is processed at the Factory 10 Groundwater Recovery and Treatment System.

Although this current system is effective in mitigating LNAPL sheens to the Flint River, it requires substantial operations and maintenance to monitor, collect, and treat the collected LNAPL sheens. As such, this system has been evaluated in comparison with other alternatives.

5.3.8.2 Revised 2008 CMP Selected Remedy

The selected remedy for this AOI presented in the Revised 2008 CMP was End-of-Pipe Treatment System, due to the technical feasibility of this alternative. This alternative is expected to remove LNAPL sheens prior to discharge to the outfall. In addition, this alternative is expected to require less maintenance and operational needs, and provide a higher degree of reliability than continued operation of the current floating boom containment system.

An Interim Measure Work Plan was submitted to the USEPA on February 13, 2008, for implementing the selected alternative. The USEPA approved the interim measure in a letter to GMC dated March 14, 2008.

5.3.8.3 Rationale for Remedy Modification

The revised design for the Outfall 003 and Outfall 004 storm sewer systems is expected to more effectively and cost efficiently address potential LNAPL migration into the storm sewers at various locations for Outfall 003 and 004. The revised Outfall 003 and 004 storm water diversion and treatment system design diverts the dry weather flow and first flush of storm events from the Outfalls 003 and 004 storm sewers to a common "BaySaver"™ debris removal system and then into an oil/water separator for treatment, prior to discharge to the Flint River. Each diversion structure will be equipped with a trash rack to prevent large floatable trash from entering the "BaySaver" ™ and oil/water separator. The "BaySaver" ™ system consists of two manholes that are designed to remove trash and suspended solids that are able to flow through the trash rack. They are also capable of removing a portion of the floating oil and grease. Water exiting the BaySaver will then be consolidated into a common pipe and routed to an oil/water separator that is designed to remove oil from the dry weather flow and wet weather first flush flow. The diversion structures, "BaySaver" ™ debris removal system, and oil/water separator will be monitored and maintained on a regular basis and trash and oil will be removed via vacuum truck as necessary.

The Outfall 003/004 treatment system construction began in late September 2010 and is expected to be completed in November 2010. In addition, as MLC moves forward with demolition of the various buildings at the Northend, storm sewer bulkheading will be evaluated to systematically eliminate the storm sewers as a pathway for LNAPL migration.

5.3.8.4 Estimated Modified Remedy Costs

Capital costs for the proposed storm water treatment and diversion system are expected to be approximately $1,160,000 with OM&M costs over 50 years totaling approximately $3,000,000.

5.3.9 **Outfall 005 Storm Sewer**

5.3.9.1 AOI Overview

Visible sheens have previously been observed at Outfall 005. Inspections of the Outfall 005 storm sewer system revealed that the likely source of the sheens was infiltration into the system near French drain manholes located near the Leith Street underpass. P-traps were installed in two French drain manholes between September and December 2004. The P-traps were installed in the retaining wall drainage system to prevent LNAPL migration into the Outfall 005 storm sewer system.

5.3.9.2 Revised 2008 CMP Selected Remedy

The proposed corrective measure for this AOI presented in the Revised 2008 CMP was Periodic Monitoring to ensure that the P-traps are operating as designed and holding back the LNAPL from entering the French drain. Annual site visits were proposed.

5.3.9.3 Rationale for Remedy Modification

Further evaluation of the Outfall 005 storm sewer in the vicinity of manholes MH 5-5 and MH 5-6 conducted in the Spring of 2010 indicated that oil is likely infiltrating the storm sewer between these manholes.

Following the demolition of Factory 83/84 and Building 86, remedial alternatives will be implemented to begin removing LNAPL in and adjacent to the Outfall 005 drainage area. These plumes include the AOI 83/84-2 cutting oil plume and AOI 86-1 fuel oil plumes. During demolition and LNAPL source removal activities booms placed in select manholes as well as at the Outfall 005 discharge point at the Flint River will continue to be monitored for changes in the amount of LNAPL being recovered. This information will be used to perform an evaluation of possible corrective measures for Outfall 005, which may include placing permanent bulkheads in the Outfall 005 storm

sewer. In addition, as buildings are demolished, select storm sewer lines will be bulkheaded to reduce the amount of LNAPL migration via the storm sewers.

5.3.9.4 Estimated Modified Remedy Costs

Costs have not been determined as the final corrective measure for Outfall 005 has not been determined.

5.4 Summary of Unmodified Measures Proposed in the Revised 2008 CMP

This section provides a summary of the selected corrective measures presented in the Revised 2008 CMP, which have not been modified since the Revised 2008 CMP. This section is provided for informational purposes. Exceedances of screening criteria for soil and/or groundwater at these AOIs are summarized in **Table 2** and will be addressed as part of the baseline Site-wide use restrictions as discussed in Section 5.1. Additional restrictions above these baseline restrictions will be applied for certain onsite areas as appropriate and determined by the proposed remedy for a particular AOI.

5.4.1 AOI 81-1 Soil

5.4.1.1 AOI Overview

AOI 81-1 consists of the basement area beneath the southern and central portions of Building 71B, and is associated with three metal machining chip/cooling and cutting oil filtration/processing operations, as well as an inactive hydraulic elevator, several process waste sumps and tanks, a drum storage area, and a 90-day hazardous waste accumulation area (inactive). The RFI soil data from AOI 81-1 indicate that screening criteria were exceeded for lead.

Based on the HHRA for AOI 81-1 documented in the RFI Phase II Report, mean lead concentrations in deep (depth-averaged) soil exceed 900 mg/kg (i.e., MDEQ industrial direct contact criterion). Therefore, the remedial goal for this area is to address the potential exposure to lead in soil greater than 900 mg/kg. Additionally, the HHRA for the Redevelopment Construction Worker (Appendix A) also identified lead as a concern for the redevelopment construction worker.

5.4.1.2 Revised 2008 CMP Selected Remedy

The selected remedy for this AOI proposed in the Revised 2008 CMP is Additional Institutional Controls above Baseline. This remedy involves implementing additional institutional controls that would provide protection from direct contact to future Site users. The additional institutional controls include establishing a restrictive covenant limiting excavations and a requirement to prepare a health and safety plan prior to future building construction in this area. The restrictive covenant would identify conditions for conducting excavations within the area of soil exceeding 900 mg/kg for lead, and would run with the property in perpetuity, or until soil containing lead concentrations above 900 mg/kg has been remediated.

This remedy provides adequate protection for human health, and is easily implemented and reliable. The institutional controls would be implemented as a means of preventing and/or controlling potential exposure pathways to identified potential risks associated with lead concentrations in deep soil (approximately 10 feet bgs) at this AOI. This remedy provides adequate protection from potential risk to human health based on the risk assessment included in the RFI Phase II Report. The potential for unacceptable exposures in the future would be mitigated by establishing in the deed limits on future excavation within the area of soil exceeding 900 mg/kg for lead.

5.4.1.3 Estimated Modified Remedy Costs

The cost associated with this remedy is estimated to be $5,000 and includes performing a boundary survey of the area and administering the restrictive covenant.

5.4.2 **AOI 83/84-2 Soil**

5.4.2.1 AOI Overview

AOI 83/84-2 is located in the currently inactive Factory 83/84 area, and consists of areas of various former and existing machining operations in Building 32 (including two basements), including both “wet” and “dry” operations. The RFI soil data from AOI 83/84-2 indicate that industrial screening criteria were exceeded for several PAHs and inorganic constituents, and the RFI groundwater data indicate that screening criteria were exceeded for several VOCs and inorganic constituents.

LNAPL was also observed at this AOI and is addressed in Section 5.3.5.

Based on the HHRA for AOI 83/34-2 documented in the RFI Phase II Report, estimates of potential exposure to groundwater in this area do not exceed USEPA's cumulative cancer risk and HI limits. However, mean lead concentrations in deep soil (up to 9 feet bgs) exceed 900 mg/kg (i.e., MDEQ industrial direct contract criterion). Therefore, the remedial goal for soil at this AOI is to address the lead concentrations in soil greater than 900 mg/kg. Additionally, the HHRA for the Redevelopment Construction Worker (Appendix A) identified chromium as a concern for the redevelopment construction worker. The chromium concentration exceeded the health based goal for redevelopment construction workers at one location within this AOI from 1-3 feet bgs.

5.4.2.2 Revised 2008 CMP Selected Remedy

The selected remedy for this AOI presented in the Revised 2008 CMP is Additional Institutional Controls above Baseline. This remedy involves implementing additional institutional controls that would provide protection from direct contact to future Site users. The additional institutional control include establishing a restrictive covenant limiting excavations within the area of soil exceeding 900 mg/kg for lead, and would run with the property in perpetuity, or until soil containing lead concentrations above 900 mg/kg has been remediated. Additionally, the restrictive covenant will require the preparation of a health and safety plan prior to future building construction in this area.

This remedy provides adequate protection for human health, and is easily implemented and reliable. These controls would be implemented as a means of preventing and/or controlling potential exposure pathways to identified potential exposure associated with lead concentrations in deeper soils (up to 9 feet bgs) and chromium in shallow soils (1-3 feet bgs) at this AOI. This remedy provides adequate protection from potential risk to human health based on the risk assessment included in the RFI Phase II Report. The potential for unacceptable exposures in the future would be mitigated by establishing in the deed limits on future excavation within the area of soil exceeding 900 mg/kg for lead.

5.4.2.3 Estimated Modified Remedy Costs

The cost associated with this remedy is estimated to be $5,000 and includes performing a boundary survey of the area and administering the restrictive covenant.

6. Groundwater Monitoring Plans

This section summarizes the revised site-wide annual groundwater monitoring plan and the NPDES Plus Monitoring plan (NPMP) as presented in the *Corrective Measures Implementation (CMI) Work Plan for the Southend of the Former General Motors Corporation North American Operations Facility (Otherwise known as Buick City)*(CMI Work Plan) (ARCADIS, 2010).

6.1 Site-wide Annual Groundwater Monitoring Plan

A groundwater monitoring program that includes the following components will be implemented:

- annual monitoring of groundwater and LNAPL elevations; and,
- annual groundwater quality monitoring.

The purpose of the groundwater and LNAPL elevation monitoring will be to monitor for possible shifts in the groundwater flow pattern or in the distribution of LNAPL at the Site. The groundwater quality monitoring will provide groundwater quality data, primarily at the down-gradient edge of the Site.

The LNAPL monitoring program should be considered preliminary at this time. Additional LNAPL monitoring wells may be installed in support of remedial measures and future monitoring.

6.1.1 Groundwater and LNAPL Elevation Monitoring Program

Groundwater level and LNAPL presence and thickness measurements will be made annually. On a one-time basis, an attempt will be made to collect measurements at each of the 147 locations listed in **Table 5** (Northend) and 131 locations listed in **Table 6** (Southend). The monitoring well locations for the Northend and Southend are shown on **Figures 4 and 5**, respectively. A reduced list of wells will be selected in future years. It is recognized that some wells may not be accessible due to well damage or loss, and the need to replace or substitute an alternate location will be evaluated on an annual basis. Water level and LNAPL measurements will be compiled for inclusion in the annual report (see below) to document groundwater flow directions and the extent and thickness of the LNAPL. The monitoring wells included in the program specifically to monitor for the presence and/or thickness of LNAPL are identified on **Figures 4 and**

5. This portion of the monitoring program will be revised in the future as remedial actions are completed.

6.1.2 Groundwater Quality Monitoring Program

6.1.2.1 Groundwater Sample Locations

Forty-six (46) monitoring wells have been selected for inclusion in the groundwater monitoring program (**Table 7).** The monitoring locations included in the groundwater quality monitoring program and the specific analyses to be completed at each sampled location are shown in **Table 7. Table 7** also includes justification for the inclusion of each monitoring well in the sampling program. Monitoring wells have been included in the sampling program based on analytical data generated as part of the Phase I and II RFI reports, the CA 750 Groundwater Monitoring Program, and the 2008 Revised CMP.

The following considerations were used to develop this groundwater sampling program:

- Samples will be collected near the down-gradient edge of areas previously found to be associated with concentrations above the relevant generic MDNRE PA 451, Part 201 screening criteria. For example, if a plume exhibiting elevated benzene concentrations was identified during a previous sampling event at a series of wells, the well or wells located close to the down-gradient extent of the benzene-impacted area will be sampled.

- Samples will be collected along the edge of the Site, down-gradient of areas previously associated with concentrations above the pertinent generic MDNRE criteria, and at down-gradient offsite locations.

- Samples will be collected at locations in proximity to the Flint River with historical detections above the GSI criteria.

- Three monitoring wells have been included in the monitoring program to monitor possible discharges to the storm sewers in the MP010 drainage area. Cyanide was detected above GSI criteria in the grab samples collected from MP010 and MP013 in March 2010. Cyanide was not detected above GSI criteria in monitoring wells in the MP013 drainage area; however it was

detected above GSI in the monitoring wells in the MP010 drainage area. These locations are identified in **Table 7**.

6.1.2.2 Laboratory Analysis

Groundwater samples will be collected, analyzed, and validated using methods and procedures that are consistent with those employed previously at the Site, as described in the Site's Field Sampling Plan and Quality Assurance Project Plan (FSP/QAPP) (Appendix C of the *RCRA Facility Investigation Work Plan* [BBL, 2001]) (RFI Work Plan); Addendum No. 1 to Appendix C of the March 30, 2001 RCRA Facility Investigation Work Plan – Field Sampling Plan/Quality Assurance Project Plan (BBL, 2005a);and Addendum No. 2 to Appendix C of the March 30, 2001 RCRA Facility Investigation Work Plan – Field Sampling Plan/Quality Assurance Project Plan (BBL, 2005b), except as modified below

Laboratory analyses will be completed for the organic constituent group(s) or individual inorganic constituents of interest at each selected sampling location. This approach was taken to avoid the unnecessary expense of analyzing each sample for the entire Project Analyte List (PAL), while still providing monitoring data. To support the groundwater analyses one sample delivery group (SDG) of these samples will be reported by the laboratory at Level 3 and the remainder at Level 2 as defined in Section 6.3. The data will undergo verification/validation as described in the FSP/QAPP based on USEPA (1995) approach for data review on one SDG at a Tier II and the remainder at Tier I.

To maintain consistency with prior sampling efforts, the samples collected for inorganic and PCB analyses will be submitted for dissolved and/or total inorganic and dissolved and/or total PCBs analyses based on the turbidity of the sample. If the turbidity is less than 10 nephelometric turbidity units (NTUs), the sample will be submitted for total inorganic or total PCB analyses only. If sample turbidity is above 10 NTUs, samples will be filtered. Both unfiltered and filtered aliquots will be submitted for total and dissolved inorganic and PCB analyses, respectively. Monitoring wells will be sampled using low-flow purge and sampling methods in an effort to reduce turbidity in the samples.

6.1.3 Monitoring Network Inspection and Maintenance

Monitoring wells included in the CMI groundwater monitoring program will be inspected annually. The inspection will include an assessment of the physical condition of the

monitoring well protective casing, j-plug and lock, and confirmation of the total depth of the monitoring well. Repairs will be completed in a timely manner as needed.

6.1.4 Reporting

An annual report will be prepared to document the monitoring program results. The report will describe the objectives and scope of the sampling event, and will summarize the procedures used to complete the sampling. Results will be presented in summary tables and also on analytical data box figures to show the data distribution. The annual report will also provide any recommendations regarding changes to the number of wells being monitored, frequency of measurements and analytical sampling, and the analytical parameters. The annual report will present recommendations regarding changes to optimize the cost-effective operation of the recovery systems based on the monitoring data. The annual report will also include proposed well substitutions and replacements, necessitated by site redevelopment activities. Substantial modifications to the monitoring program will be presented to the USEPA for approval prior to implementation.

6.1.5 Contingency Plan

If constituents of concern show a statistically significant increasing trend in concentrations for two consecutive monitoring events and concentrations are approaching criteria, a response plan will be developed for submittal to the USEPA. The response plan may include the sampling or installation of down-gradient monitoring wells or increased sampling frequency.

6.2 NPDES Plus Monitoring Plan Overview

The “NPDES Plus” monitoring program (NPMP) will be implemented at the Site to ensure compliance with Michigan Part 201 GSI criteria for the long-term protection of the Flint River. The USEPA and MDNRE have agreed to the approach of sampling of the storm sewers as a means to address GSI potential GSI impacts. As discussed in further detail below, the NPMP will consist of collecting monthly samples from 11 Site storm sewers to ensure that groundwater infiltrating into the Site storm sewers does not impact the Flint River.

To achieve the program objectives the storm sewer samples will be collected as grab samples during dry weather flow conditions. Sampling during dry weather flow

conditions will provide the most accurate assessment of the condition of the groundwater infiltrating the storm sewers.

6.2.1 NPMP Monitoring Points

Storm sewers associated with the following National Pollutant Discharge Elimination System (NPDES) outfalls are included in the NPMP: Outfalls 001, 002, 003, 004, 005, 006, 007, 009, 010, 011, and 013. Outfalls 008 and 012 are not included in the NPMP. The Outfall 008 storm sewer has been permanently bulkheaded immediately downstream of Monitoring Point 008. The bulkhead was installed because of a no flow condition due to the collapsed storm sewer line. Outfall 008 no longer receives drainage from the Site; therefore, it is not included in the NPMP. During a previous dry weather sampling activity an attempt was made to collect a sample from Monitoring Point 012, located on the Outfall 012 storm sewer. However, there was only a small puddle of water in the storm sewer at the time of sampling indicating that significant groundwater infiltration to Outfall 012 is unlikely; therefore, Outfall 012 is not included in the NPMP.

Samples will be collected from the monitoring point locations identified for each of the storm sewers as shown on **Figure 6.** The NPMP monitoring points are co-located with the monitoring points which have been identified in the current and previous Site NPDES permits, with the exception of Outfall 011. Due to access issues the monitoring point for Outfall 011 is the discharge point of the outfall to the Flint River.

The sampling locations will be reevaluated at the end of each year. If storm sewers are permanently bulkheaded thereby eliminating the GSI pathway into the sewers, the respective monitoring points will be removed from the NPMP.

6.2.2 Storm Sewer Outfall Sampling Parameters and Frequency

The monitoring points included in the NPMP; the specific analyses to be completed at each monitoring point; and the rationale used to determine the analyses are presented on **Table 8.** The following considerations were used to define this sampling program:

- Historical Site groundwater data were compared to criteria to identify potential sources of impacted groundwater in the NPMP drainage areas. Storm sewer samples collected in support of the 2010 NPDES permit renewal application were analyzed for the analytical suites of compounds (metals, volatile organic

compounds [VOCs] and semi-volatile organic compounds [SVOCs]) that were detected in nearby groundwater samples at concentrations exceeding criteria.

- Storm sewer samples collected in support of the 2010 NPDES permit renewal application collected from sewers whose drainage areas contained LNAPL were analyzed for oil and grease and samples collected from sewers whose drainage areas contained PCB -impacted LNAPL were analyzed for PCBs.

- If constituents of concern are detected in storm sewers with contributions from off-site at concentrations greater than Part 201 GSI criteria, these sewers will be sampled at the sewer headwaters to determine if any of these constituents of concern originate from off-site sources.

- The analytical results from the samples collected from the NPMP monitoring points in support of the 2010 NPDES permit renewal application were reviewed.

NPMP sampling activities will be conducted at the Site on a monthly basis for the first year. After the first quarter of monitoring, the monitoring locations, analytical parameters, and frequencies will be reevaluated to determine if modifications to the plan are warranted. Proposed modifications to the plan will be included in the annual report and implemented following USEPA approval.

Although SVOCs were not detected in any of the samples collected in support of the 2010 NPDES permit renewal, the NPMP will include analyzing one round of samples for SVOCs during each of the first three years of the program. The purpose of these samples is to monitor the storm sewers for possible infiltration of SVOC impacted groundwater and to confirm that SVOC concentrations (if detected) are below GSI criteria in the storm sewers.

6.2.3 Analytical Methods

The NPMP samples will be collected during dry weather flow as either grab or 24-hour composite samples as indicated on **Table 8.** The samples will be collected and analyzed using the procedures as described in the Site's Field Sampling Plan and Quality Assurance Project Plan (Appendix C of the *RCRA Facility Investigation Work Plan* [BBL, 2001]) (RFI Work Plan); Addendum No. 1 to Appendix C of the March 30, 2001 RCRA Facility Investigation Work Plan – Field Sampling Plan/Quality Assurance Project Plan (BBL, 2005a);and Addendum No. 2 to Appendix C of the March 30, 2001

RCRA Facility Investigation Work Plan – Field Sampling Plan/Quality Assurance Project Plan (BBL, 2005b), except as modified in Section 6.1.2.2. The storm sewer samples will be submitted for laboratory analysis of Target Compound List (TCL) VOCs, SVOCs, PCBs, cyanide, and/or select metals as summarized in **Table 8.** Samples will be analyzed using the following methods:

- VOCs - EPA Method 8260B (MDNRE List)
- SVOCs – EPA Method 8270C (MDNRE List)
- PCBs – EPA method 608
- Total Metals - EPA Method 200.8
- Mercury – EPA Method 1631 E
- Cyanide - EPA Method 335.4/4500-CN-E

To support the NPMP sample analyses will be reported by the laboratory at Level 2, as defined in Section 6.3. These data will not be subjected to any verification/validation.

6.2.4 Reporting

An annual report will be prepared to document the NPMP sampling results. The first annual report will summarize NPMP sampling activities completed in 2009 and will be submitted to the USEPA by April 1, 2011. Subsequent annual reports will be completed and submitted to the USEPA by April 1 of the following calendar year.

The annual report will describe the objectives and scope of the sampling event, and will summarize the procedures used to complete the sampling. Analytical results will be presented in summary tables including a comparison to GSI criteria. Figures and graphs monitoring constituents of concern (COC) concentrations will be included as appropriate.

The annual report will also provide recommendations regarding changes to the outfalls being monitored, the frequency of analytical sampling, and/or the analytical parameters. Substantial modifications to the NPMP will be presented in the annual report and will be implemented following USEPA approval.

6.2.5 Contingency Plan

In the event that a COC, which historically has been detected below GSI criteria, is detected at a concentration that exceeds GSI criteria, the result will be confirmed by re-sampling for that constituent. If the re-sampling confirms the exceedance the USEPA will be notified to discuss potential actions to address the exceedance.

If COCs show a statistically significant increasing trend in concentrations for two consecutive monitoring events or exceed GSI criteria, a response plan will be developed for submittal to the USEPA. The response plan may include, but not necessarily limited to, some or all of the following:

- Increased sampling frequency or additional sampling locations to further evaluate potential impacts.
- Additional monitoring well sampling and analysis in the identified area(s) of impact.
- Development of plans to address the identified impacts.

6.3 Field Sampling Plan/ Quality Assurance Plan

Samples collected during the annual groundwater sampling event and monthly NPMP sampling events will be collected, analyzed, and verified/validated in accordance with protocols presented in the FSP/QAPP provided as Appendix C of the RFI Work Plan as described in the Site's FSP/QAPP (Appendix C of the *RCRA Facility Investigation Work Plan* [BBL, 2001]) (RFI Work Plan); Addendum No. 1 to Appendix C of the March 30, 2001 RCRA Facility Investigation Work Plan – Field Sampling Plan/Quality Assurance Project Plan (BBL, 2005a);and Addendum No. 2 to Appendix C of the March 30, 2001 RCRA Facility Investigation Work Plan – Field Sampling Plan/Quality Assurance Project Plan (BBL, 2005b). and in the *Health and Safety Plan* (HASP) provided as Appendix E of the RFI Work Plan, except as described in Sections 6.1.2.2, 6.2 and below.

The three levels of laboratory data reporting have been defined as follows:

Level 1 – Minimal Reporting: Minimal or "results only" reporting is used for analyses that, either due to their nature (i.e., field monitoring) or the intended data use (i.e.,

preliminary screening), do not generate or require extensive supporting documentation.

Level 2 – Modified Reporting: Modified reporting is used for analyses that are performed following standard USEPA-approved methods and QA/QC protocols and that, based on the intended data use, require some supporting documentation but not, however, full "Contract Laboratory Program-type" (CLP-type) reporting. These reports will include but are not limited to forms that summarizes the following quality control/quality assurance: method blanks, laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs) percent recoveries (%R) / relative percent difference (RPD), matrix spikes (MS)/matrix spike duplicates (MSDs) results as %R and RPD (as method appropriate), laboratory duplicates, and surrogate recoveries as %R.

Level 3 – Full Reporting: Full "CLP-type" reporting is used for those analyses that, based on intended data use, require full documentation. These laboratory reports will include but not limited to the forms stated in Level 2 reporting. In addition, they will include supporting raw instrument data are sufficient to meet the requirements to support full data validation.

7. Schedule

Consistent with the streamlined manner in which MLC has conducted all of the phases of corrective action for this Site, MLC is proceeding with various aspects of remedies proposed for corrective action outlined in the preceding sections of this Northend CMP as interim measures. Specifically, MLC has provided Interim Measure Work Plans (IMWPs) and USEPA has approved IMWP for the following corrective measure, and MLC plans to implement the related construction activities later this year:

- Installation of an oil-water separator along the Outfall 003 and 004 storm sewer systems

As much of the construction work as practicable pertaining to the remedies proposed in the preceding sections of this Addendum CMP will be completed within eight years after USEPA selects the final remedies, and all remedies will be completed within a reasonable period of time to protect human health. Remediation activities are expected to continue for the next 16 years.

MLC will continue to report project updates, including changes to the above schedule of activities, to USEPA via quarterly reports that will be submitted by the 15th day of every month following a quarter.

8. References

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BBL. 2000. *Description of Current Conditions for Areas North of Leith Street.* November 26, 2000.

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BBL. 2001. *Resource Conservation and Recovery Act Facility Investigation Work Plan.* March 30, 2001.

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BBL. 2005a. *Addendum No. 1 to Appendix C of the March 30, 2001 RCRA Facility Investigation Work Plan – Field Sampling Plan/Quality Assurance Project Plan.* May 13, 2005.

BBL. 2005b. *Addendum No.2 to Appendix C of the March 30, 2001 RCRA Facility Investigation Work Plan– Field Sampling Plan/Quality Assurance Project Plan.* November 7, 2005.BBL, 2006. *Resource Conservation and Recovery Act Facility Investigation Phase II Report.* July 14, 2006.

ARCADIS

Tables

Table 1
General LNAPL Screening Factors and Technology Selection

Motors Liquidation Company
RCRA Revised Corrective Measures Proposal
Addendum No. 2 -Northend and Site-wide Groundwater
Former General Motors Corporation North American Operations Facility (Otherwise known as Buick City)
Flint, Michigan

Screening Factor	MPE Preferred	LNAPL Recovery Trench Preferred
Geologic Setting	Fine to Medium Sand	Silt and Clay
Potentially Recoverable LNAPL Volume	Potentially recoverable LNAPL volume greater than five percent of total LNAPL volume	Potentially recoverable LNAPL volume greater than five percent of total LNAPL volume
LNAPL Type	High volatility petroleum products, e.g. gasoline	Low volatility petroleum products, e.g. cutting oils
PCB-Containing LNAPL	PCB content greater than 50 parts per million	PCB content less than 50 parts per million

Table 2
AOI Summary of Impacts, Health-Risks, and Recommended Corrective Measures

Motors Liquidation Company
RCRA Revised Corrective Measures Proposal
Addendum No. 2 -Northend and Site-wide Groundwater
Former General Motors Corporation North American Operations Facility (Otherwise known as Buick City)
Flint, Michigan

AOI	LNAPL Plume (if Present)	Do Analytical Results Exceed Screening Criteria				Does Human Health Risk Assessment Exceed Cumulative Cancer Risk and/or HI Limits? [1]			Recommended Corrective Measures		
		Soil	Constituents Exceeding Criteria in Soil	Groundwater	Constituents Exceeding Criteria in Groundwater	LNAPL	Soil	Groundwater	LNAPL	Soil	Groundwater
03-1	AOI 03-1 Quench Oil Plume	**Yes**	Benzo(a)pyrene Manganese	**Yes**	Several VOCs and Inorganic Constituents	No	No	No	Passive LNAPL Recovery Trench	Baseline Site-wide Use Restriction	Baseline Site-wide Use Restriction
10-1/10-4	AOI 10-1 Hydraulic Oil Plume	**Yes**	Arsenic Chromium Lead Manganese	**Yes**	Several VOCs and Inorganic Constituents	No	No	No	Active LNAPL Recovery Trench/Well Skimming	Baseline Site-wide Use Restriction	Baseline Site-wide Use Restriction
	AOI 10-4 Hydraulic Oil Plume	No	NA	**Yes**	Benzene Vinyl Chloride	No	No	No		NA	Baseline Site-wide Use Restriction
36-1	AOI 36-1 Mineral Seal/Hydraulic Oil Plume	**Yes**	Several VOCs and Inorganic Constituents	**Yes**	Several VOCs and Inorganic Constituents	No	**Yes - Primarily associated with AOI 36-1 Gasoline Plume Area**	No	Multi-Phase Extraction	Baseline Site-wide Use Restriction	Baseline Site-wide Use Restriction
	AOI 36-1 Gasoline Plume					**Yes**			Multi-Phase Extraction	Additional Controls Above Baseline to Limit Excavation and Prohibit Non-OSHA Use in	Baseline Site-wide Use Restriction
36-2	AOI 36-2 Exterior Mineral Seal/Hydraulic Oil Plume	No	NA	**Yes**	Several VOCs and Inorganic Constituents	No	No	No	Multi-Phase Extraction	Baseline Site-wide Use Restriction	Baseline Site-wide Use Restriction
36-5	AOI 36-5 Fuel Oil Plume	No	NA	**Yes**	Several VOCs and Inorganic Constituents	No	No	No	Passive LNAPL Recovery Trench	Baseline Site-wide Use Restriction	Baseline Site-wide Use Restriction
83/84-4	AOI 83/84-4 Cutting Oil Plume	No	NA	**Yes**	Arsenic Beyllium Lead	No	No	No	Passive LNAPL Recovery Trench	Baseline Site-wide Use Restriction	Baseline Site-wide Use Restriction
86-1	AOI 86-1 Fuel Oil Plume	**Yes**	Arsenic Manganese	**Yes**	Several VOCs and Inorganic Constituents	No	No	No	Passive LNAPL Recovery Trench	Baseline Site-wide Use Restriction	Baseline Site-wide Use Restriction
05-1/05-5	AOI 05-1 Cutting Oil Plume	**Yes**	Lead Manganese	No	NA	No	No	No	Multi-Phase Extraction and Additional Institutional Controls above Baseline to Notify	Baseline Site-wide Use Restriction	Baseline Site-wide Use Restriction
	AOI 05-5 Cutting Oil Plume	No	NA	**Yes**	Arsenic Nickel	No	No	No	Multi-Phase Extraction and Additional Institutional Controls above Baseline to Notify	Baseline Site-wide Use Restriction	Baseline Site-wide Use Restriction
81-2	AOI 81-2 Cutting Oil Plume	**Yes**	Several VOCs and Inorganic Constituents	**Yes**	Lead Manganese	No	**Yes**	No	Passive LNAPL Recovery Trench	Engineering and Additional Institutional Controls Above Baseline to Limit Excavation and Maintain a Surface Cover Consistent with Current Conditions and Prohibit non-OSHA use in Buildings	Baseline Site-wide Use Restriction
83/84-2	AOI 83/84-2 Cutting Oil Plume	**Yes**	Several PAHs and Inorganic Constituents	**Yes**	Several VOCs and Inorganic Constituents	No	**Yes**	No	Multiphase Extraction and Additional Institutional Controls Above baseline to Notify of PCBs Present	Additional Institutional Controls Above Baseline to Limit Excavation	Baseline Site-wide Use Restriction
83/84-3	NA	**Yes**	Lead	**Yes**	Beryllium Lead	NA	**Yes**	No	NA	Engineering and Additional institutional Controls Above Baseline to Limit Excavation and Maintain a Surface Cover Consistent with Existing Conditions	Baseline Site-wide Use Restriction
81-1	NA	**Yes**	Lead	**Yes**	Vinyl Chloride Arsenic Lead	NA	**Yes**	No	NA	Additional Controls Above Baseline to Limit Excavation	Baseline Site-wide Use Restriction

1. Based on the Human-Health Risk Assesment presented in the RFI Phase II Report dated July 14, 2006. Please note that Redevelopment Construction Worker Exposure Pathway was not evaluated for the Northend in this Risk Assessment.

Table 3
LNAPL Volume Calculations

Motors Liquidation Company
RCRA Revised Corrective Measures Proposal
Addendum No. 2 -Northend and Site-wide Groundwater
Former General Motors Corporation North American Operations Facility (Otherwise known as Buick City)
Flint, Michigan

				Fluid Properties:					Aquifer Properties:					Soil Retention Model Used	Summary of Volume Calculations:		
LNAPL Plume Designation	**Total Area of Measurable NAPL**	**NAPL Type**	**Soil Type**	NAPL Density	Water Density	Surface Tension	Air-LNAPL IFT	**LNAPL-Water IFT**	**vanGenuchten alpha**	**vanGenuchten N**	**Porosity**	**Irreducible Water Saturation**	**Residual NAPL Saturation**		**Total LNAPL Volume**	**Recoverable LNAPL Volume**	**Recoverable Portion of Total Volume**
						dynes/cm	dynes/cm	dynes/cm	1/cm						gallons	gallons	%
AOI 03-1 - Quench Oil Plume	2,662	Quench Oil	silt	0.8984	0.9982	65	24	4.5	4.96E-03	1.76	0.50	0.17	0.50	Mualem	15,274	268	1.8%
AOI 10-1/10-4 - Hydraulic Oil Plumes - 20-168 Plume	3,196	Hydraulic Oil	fine sand	0.9223	0.9982	65	27	18	2.54E-02	3.17	0.45	0.12	0.24	Burdine	2,635	4	0.2%
AOI 10-1/10-4 - Hydraulic Oil Plumes - large plume	154,608	Hydraulic Oil	fine to medium sand	0.9223	0.9982	65	27	18	2.22E-02	2.73	0.41	0.20	0.20	Burdine	221,474	9,171	4.1%
AOI 36-1 - Mineral Seal and Hydraulic Oil Plume	256,669	Mineral Seal and Hydraulic Oil	silt and clay	0.9223	0.9982	65	27	18	7.65E-03	2.48	0.43	0.48	0.35	Mualem	1,311,088	3,897	0.3%
AOI 36-1 - Mineral Seal and Hydraulic Oil Plume	256,669	Mineral Seal and Hydraulic Oil	fine sand	0.9223	0.9982	65	27	18	2.54E-02	3.17	0.45	0.12	0.24	Burdine	1,048,630	110,660	10.6%
AOI 36-1 - Mineral Seal and Hydraulic Oil Plume	256,669	Mineral Seal and Hydraulic Oil	sand	0.9223	0.9982	65	27	18	2.14E-02	2.64	0.41	0.21	0.16	Burdine	621,828	52,046	8.4%
AOI 36-2 - Exterior Mineral Seal/Hydraulic Oil Plume	74,323	Mineral Seal and Hydraulic Oil	silty sand	0.8984	0.9982	65	27	24	2.75E-02	2.16	0.43	0.31	0.34	Mualem	305,367	19,279	6.3%
AOI 36-2 - Exterior Mineral Seal/Hydraulic Oil Plume	74,323	Mineral Seal and Hydraulic Oil	sand	0.8984	0.9982	65	27	24	2.14E-02	2.64	0.41	0.21	0.16	Burdine	138,543	9,773	7.1%
AOI 36-5 - Fuel Oil Plume	13,587	Fuel Oil	silt	0.8684	0.9982	65	25	18	4.96E-03	1.76	0.50	0.17	0.16	Mualem	18,972	335	1.8%
AOI 83/84-4 - Cutting Oil Plume	3,738	Cutting Oil	silt	0.8784	0.9982	65	29	17	4.96E-03	1.76	0.50	0.17	0.50	Mualem	12,324	19	0.2%
AOI 83/84-4 - Cutting Oil Plume	3,738	Cutting Oil	sand	0.8784	0.9982	65	29	17	2.14E-02	2.64	0.41	0.21	0.16	Burdine	3,330	101	3.0%
AOI 86-1 - Unknown Fuel Type Plume	1,887	Unknown	fine to medium sand	0.8984	0.9982	65	27	22	2.22E-02	2.73	0.41	0.20	0.20	Burdine	2,662	32	1.2%
AOI 86-1 (RFI-86-03) - Unknown Fuel Type Plume	447	Unknown	fine to medium sand	0.8684	0.9982	65	27	16	2.22E-02	2.73	0.41	0.20	0.20	Burdine	125	0	0.0%
AOI 05-1 - Cutting Oil Plume	109,848	Cutting Oil	fine sand	0.8917	0.9982	65	29	14.33	2.54E-02	3.17	0.45	0.12	0.24	Burdine	427,154	76,236	17.8%
AOI 05-5 - Cutting Oil Plume	3,350	Cutting Oil	fine sand	0.8917	0.9982	65	29	14.33	2.54E-02	3.17	0.45	0.12	0.24	Burdine	15,876	2,679	16.9%
AOI 36-1 - Gasoline Plume	6,137	Gasoline	fine sand	0.7487	0.9982	65	21	29	2.54E-02	3.17	0.45	0.12	0.19	Burdine	4,981	132	2.6%
AOI 81-2 - Cutting Oil Plume	45,161	Cutting Oil	silt and clay	0.9084	0.9982	65	29	16.62	7.65E-03	2.48	0.43	0.48	0.36	Mualem	147,568	591	0.4%
AOI 83/84-2 - Cutting Oil Plume	17,084	Cutting Oil	fine to medium sand	0.8934	0.9982	65	29	25	2.22E-02	2.73	0.41	0.20	0.20	Burdine	33,834	1,046	3.1%

Assumptions

-Soil type was generated from interpretation and assimilation of site soil boring logs.
-When plume-specific fluid properties are not available, then the average of that fluid type is applied.
-Water density and surface tension are universally-applied at 0.9982 g/cc and 65 dynes/cm.
-Air-LNAPL interfacial tensions were derived from Mercer and Cohen, 1990 primarily and then from previous lab experience with similar fluid types. Details follow:
  -Fuel Oil assumed to be No. 2 Fuel Oil in Mercer and Cohen, 1990.
  -Used laboratory results for Cutting Oil from another site.
  -Could not find a reasonable source for Quench Oil; used engineering best judgement.
  -Quench Oil's site-specific LNAPL-Water IFT of 2.8 dynes/cm was too low to provide reasonable results from the model. IFT and LNAPL Impact Thickness in the Subsurface were graphed to find the "break-point" at which output became reasonable yet conservative. This break-point occurred at an IFT of 4.5 dynes/cm.
  -AOI 82-1 Cutting Oil's site-specific LNAPL-Water IFT of 5.6 dynes/cm was too low to provide reasonable results from the model. Therefore, the site-wide and site-specific average of 16.62 dynes/cm for cutting oil was applied to AOI 82-1 calculations.
  -Used engineering best judgement for the unknown fuel type (similar A-O IFT as other fuels with O-W IFTs in the same range of 16-22 dynes/cm).
-See Selected Aquifer Properties tab for all assumptions made for irreducible water saturation, porosity, and van Genuchten parameters.
-For residual saturation values, the following assumptions were made from Mercer and Cohen, 1990:
  -Used equation Sor = R/(n*1000) when only R is given.
  -Gasoline: applied low end of Sr 0.19-0.6 for fine sand.
  -Fuel Oil: applied R=80 for silt to fine sand and R=50 for fine to medium sand
  -Grouped Mineral Oil, Hydraulic Oil, Quench Oil, and Cutting Oil together and referenced Mineral Oil. Loess=silt; glacial till=clay; ottawa sand (dm. 0.18mm)=fine sand; ottawa sand (dm. 0.25mm)=medium sand; fine-v.coarse ottawa sand=sand
  -Used engineering best judgement for the unknown fuel type (similar Sor to the other fuels in fine to medium sand).

Table 4
AOI-Specific LNAPL Screening Factors and Technology Selection

Motors Liquidation Company
RCRA Revised Corrective Measures Proposal
Addendum No. 2 -Northend and Site-wide Groundwater
Former General Motors Corporation North American Operations Facility (Otherwise known as Buick City)
Flint, Michigan

			Summary of Volume Calculations:				Recovery System				
Area	**Soil Type**	**NAPL Type**	**Total Area of Measurable NAPL**	**Total LNAPL Volume**	**Recoverable LNAPL Volume**	**Recoverable Portion of Total Volume**	**Recovery Approach**	**Number of Extraction Wells**	**Recovery Well ROI**	**Linear Feet of Recovery Trench**	**Years of Operation**
			sq ft	gallons	gallons	%			ft	ft	
AOI 03-1 Quench Oil Plume	silt	Quench Oil	2,662	15,274	268	1.8%	Passive Recovery Trench	NA	NA	80	2
AOIs 10-1/10-4 Hydraulic Oil Plumes	Fine to Medium Sand	Hydraulic Oil	157,805	224,109	9,175	4.1%	Active Recovery Trench	NA	NA	730	2
AOI 36-1 - Mineral Seal and Hydraulic Oil Plume	fine sand	Mineral Seal and Hydraulic Oil	256,669	1,048,630	110,660	10.6%	MPE	225	20	NA	5
AOI 36-2 Exterior Mineral Seal/Hydraulic Oil Plume	sand	Mineral Seal and Hydraulic Oil	74,323	138,543	9,773	7.1%	MPE	39	25	NA	5
AOI 36-5 - Fuel Oil Plume	silt	Fuel Oil	13,587	18,972	335	1.8%	Passive Recovery Trench	NA	NA	135	2
AOI 83/84-4 Cutting Oil Plume	sand	Cutting Oil	3,738	3,330	101	3.0%	Passive Recovery Trench	NA	NA	85	2
AOI 86-1 Fuel Oil Plume	fine to medium sand	Unknown	2,333	2,787	32	1.2%	Passive Recovery Trench	NA	NA	60	2
AOIs 05-1/05-5 Cutting Oil Plumes	fine sand	Cutting Oil	113,198	443,030	78,915	17.8%	MPE	41	30	NA	5
AOI 36-1 - Gasoline Plume	fine sand	Gasoline	6,137	4,981	132	2.6%	MPE	4	30	NA	5
AOI 81-2 Cutting Oil Plume	silt and clay	Cutting Oil	45,161	147,568	591	0.4%	Passive Recovery Trench	NA	NA	310	2
AOI 83/84-2 Cutting Oil Plume	fine to medium sand	Cutting Oil	17,084	33,834	1,046	3.1%	MPE	13	20	NA	5
Totals			**692,698**	**2,081,059**	**211,028**	**10.14%**					

Table 5
Groundwater and LNAPL Elevation Monitoring Locations - Northend

Motors Liquidation Company
RCRA Revised Corrective Measures Proposal
Addendum No. 2 -Northend and Site-wide Groundwater
Former General Motors Corporation North American Operations Facility
(Otherwise known as Buick City)
Flint, Michigan

Area of Interest (AOI)	Location	Comments
03-1	03-03R	LNAPL Monitoring Program Location
03-1	03-105R3	LNAPL Monitoring Program Location
03-1	RFI-03-02	LNAPL Monitoring Program Location
03-1	RFI-03-03	Groundwater Elevation Monitoring Location
03-1	70-109	Groundwater Elevation Monitoring Location
03-1	70-100	Groundwater Elevation Monitoring Location
05-1	43-161	LNAPL Monitoring Program Location
05-1	43-165	LNAPL Monitoring Program Location
05-1	43-166	LNAPL Monitoring Program Location
05-1	43-167	LNAPL Monitoring Program Location
05-1	RFI-05-13	LNAPL Monitoring Program Location
05-1	RFI-05-14	LNAPL Monitoring Program Location
05-4	43-103	Groundwater Elevation Monitoring Location
05-5	RFI-05-06	LNAPL Monitoring Program Location
05-5	RFI-05-08	Groundwater Elevation Monitoring Location
05-5	RW-05 North	LNAPL Monitoring Program Location
05-6	43-140	Groundwater Elevation Monitoring Location
05-6	43-242	Groundwater Elevation Monitoring Location
07-1	RFI-07-03	Groundwater Elevation Monitoring Location
07-1	OW-3D	Groundwater Elevation Monitoring Location
07-1	OW-3S	Groundwater Elevation Monitoring Location
07-1	OW-5	Groundwater Elevation Monitoring Location
07-1	OW-40	Groundwater Elevation Monitoring Location
07-1	GM-2	Groundwater Elevation Monitoring Location
07-1	GM-3	Groundwater Elevation Monitoring Location
07-1	GM-4	Groundwater Elevation Monitoring Location
07-1	GM-5	Groundwater Elevation Monitoring Location
07-1	GM-6	Groundwater Elevation Monitoring Location
07-1	GM-7	Groundwater Elevation Monitoring Location
07-1	GM-8	Groundwater Elevation Monitoring Location
07-1	GM-9	Groundwater Elevation Monitoring Location
07-1	GM-10	Groundwater Elevation Monitoring Location
07-1	GM-11	Groundwater Elevation Monitoring Location
07-1	GM-12	Groundwater Elevation Monitoring Location
07-3	07-01	Groundwater Elevation Monitoring Location
07-3	RFI-07-08	Groundwater Elevation Monitoring Location
07-3	RFI-85-14	Groundwater Elevation Monitoring Location
10-1	20-144	Groundwater Elevation Monitoring Location
10-2	RFI-10-24	Groundwater Elevation Monitoring Location
10-2	RFI-10-26	Groundwater Elevation Monitoring Location
10-2	RFI-10-29	Groundwater Elevation Monitoring Location
10-2	RFI-10-33	Groundwater Elevation Monitoring Location
10-2	RFI-10-35	Groundwater Elevation Monitoring Location
10-2	RFI-10-36	Groundwater Elevation Monitoring Location
10-3	RFI-10-07	Groundwater Elevation Monitoring Location
10-3	RFI-10-28	Groundwater Elevation Monitoring Location
10-4	20-145	Groundwater Elevation Monitoring Location
10-4	20-160	LNAPL Monitoring Program Location
10-4	20-162	LNAPL Monitoring Program Location
10-4	20-163R	LNAPL Monitoring Program Location
10-4	20-168	LNAPL Monitoring Program Location
10-4	20-FP10R	Groundwater Elevation Monitoring Location
10-4	20-FP11R	LNAPL Monitoring Program Location
10-4	20-FP8	LNAPL Monitoring Program Location
10-4	20-FP9R	LNAPL Monitoring Program Location
10-4	RFI-03-04	LNAPL Monitoring Program Location

See Notes on Page 3.

Table 5
Groundwater and LNAPL Elevation Monitoring Locations - Northend

Motors Liquidation Company
RCRA Revised Corrective Measures Proposal
Addendum No. 2 -Northend and Site-wide Groundwater
Former General Motors Corporation North American Operations Facility
(Otherwise known as Buick City)
Flint, Michigan

Area of Interest (AOI)	Location	Comments
36-1	36-FP2	LNAPL Monitoring Program Location
36-1	36-FP3	LNAPL Monitoring Program Location
36-1	36-FP4	LNAPL Monitoring Program Location
36-1	36-FP6	LNAPL Monitoring Program Location
36-1	36-FP7	LNAPL Monitoring Program Location
36-1	36-FP8	LNAPL Monitoring Program Location
36-1	RFI-36-04	LNAPL Monitoring Program Location
36-1	RFI-36-05	LNAPL Monitoring Program Location
36-1	RFI-36-06	LNAPL Monitoring Program Location
36-1	RFI-36-07	LNAPL Monitoring Program Location
36-1	RFI-36-20	Groundwater Elevation Monitoring Location
36-1	RFI-36-25R	Groundwater Elevation Monitoring Location
36-1	RFI-36-29R	LNAPL Monitoring Program Location
36-1	RFI-36-46	Groundwater Elevation Monitoring Location
36-1	RFI-36-47	Groundwater Elevation Monitoring Location
36-1	RFI-36-48	Groundwater Elevation Monitoring Location
36-1	RFI-36-49	LNAPL Monitoring Program Location
36-1	RFI-36-55	Groundwater Elevation Monitoring Location
36-1	RFI-36-56	Groundwater Elevation Monitoring Location
36-1	RW-1	LNAPL Monitoring Program Location
36-1	RW-3	LNAPL Monitoring Program Location
36-2	RFI-36-19	Groundwater Elevation Monitoring Location
36-2	RFI-36-37	Groundwater Elevation Monitoring Location
36-4	RFI-36-12	Groundwater Elevation Monitoring Location
36-5	20-500R	Groundwater Elevation Monitoring Location
36-5	20-502	LNAPL Monitoring Program Location
36-5	20-503	LNAPL Monitoring Program Location
36-5	20-506	LNAPL Monitoring Program Location
36-5	37-RW-NORTH	LNAPL Monitoring Program Location
36-5	37-RW-SOUTH	LNAPL Monitoring Program Location
36-5	RFI-36-13	LNAPL Monitoring Program Location
36-5	RFI-36-14	Groundwater Elevation Monitoring Location
38-1	RFI-38-04	Groundwater Elevation Monitoring Location
38-1	RFI-38-05	Groundwater Elevation Monitoring Location
38-1	36-101	Groundwater Elevation Monitoring Location
38-1	38-120	Groundwater Elevation Monitoring Location
38-1	36-121	Groundwater Elevation Monitoring Location
55-1	55-1	Groundwater Elevation Monitoring Location
55-1	55-2	Groundwater Elevation Monitoring Location
55-1	RFI-55-01	Groundwater Elevation Monitoring Location
55-1	RFI-55-02	Groundwater Elevation Monitoring Location
55-1	RFI-55-12	Groundwater Elevation Monitoring Location
65-1	43-141	Groundwater Elevation Monitoring Location
81-1	RFI-81-02	Groundwater Elevation Monitoring Location
81-1	RFI-81-35	Groundwater Elevation Monitoring Location
81-1	RFI-81-43	LNAPL Monitoring Program Location
81-2	70-101	LNAPL Monitoring Program Location
81-2	70-103	LNAPL Monitoring Program Location
81-2	70-105	LNAPL Monitoring Program Location
81-2	70-107	LNAPL Monitoring Program Location
81-2	70-107R	LNAPL Monitoring Program Location
81-2	70-108R	LNAPL Monitoring Program Location
81-2	70-163	Groundwater Elevation Monitoring Location
81-2	70-164	LNAPL Monitoring Program Location
81-2	70-165	Groundwater Elevation Monitoring Location
81-2	RFI-81-03	Groundwater Elevation Monitoring Location
81-2	RFI-81-21	Groundwater Elevation Monitoring Location
81-2	RFI-81-45	Groundwater Elevation Monitoring Location

See Notes on Page 3.

Table 5
Groundwater and LNAPL Elevation Monitoring Locations - Northend

Motors Liquidation Company
RCRA Revised Corrective Measures Proposal
Addendum No. 2 -Northend and Site-wide Groundwater
Former General Motors Corporation North American Operations Facility
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Flint, Michigan

Area of Interest (AOI)	Location	Comments
81-2	RFI-81-49	LNAPL Monitoring Program Location
81-2	RFI-81-50	Groundwater Elevation Monitoring Location
81-3	RFI-81-07	Groundwater Elevation Monitoring Location
81-3	RFI-81-08	Groundwater Elevation Monitoring Location
81-3	RFI-81-33	Groundwater Elevation Monitoring Location
81-3	RFI-81-51	Groundwater Elevation Monitoring Location
83/84-1	RFI-83/84-01	Groundwater Elevation Monitoring Location
83/84-1	RFI-83/84-03	LNAPL Monitoring Program Location
83/84-1	RFI-83/84-07	LNAPL Monitoring Program Location
83/84-1	RFI-83/84-29	Groundwater Elevation Monitoring Location
83/84-2	RFI-83/84-04	LNAPL Monitoring Program Location
83/84-2	RFI-83/84-05	LNAPL Monitoring Program Location
83/84-2	RFI-83/84-23	LNAPL Monitoring Program Location
83/84-2	RFI-83/84-28	LNAPL Monitoring Program Location
83/84-2	RFI-83/84-38	LNAPL Monitoring Program Location
83/84-2	RFI-83/84-53	Groundwater Elevation Monitoring Location
83/84-4	RFI-83/84-54	Groundwater Elevation Monitoring Location
83/84-7	88-7	Groundwater Elevation Monitoring Location
83/84-7	RFI-83/84-11	Groundwater Elevation Monitoring Location
85-1	RFI-85-02R	LNAPL Monitoring Program Location
85-1	RFI-85-04R	Groundwater Elevation Monitoring Location
85-1	RFI-85-05	Groundwater Elevation Monitoring Location
86-1	87-FP1	LNAPL Monitoring Program Location
86-1	87-FPD2	Groundwater Elevation Monitoring Location
86-1	87-FPD3	Groundwater Elevation Monitoring Location
86-1	MW-00-FP6	LNAPL Monitoring Program Location
86-1	RFI-86-02	LNAPL Monitoring Program Location
86-1	RFI-86-03	LNAPL Monitoring Program Location
86-1	RFI-86-06D	LNAPL Monitoring Program Location
86-1	RFI-86-06S	LNAPL Monitoring Program Location
86-1	RFI-86-08R	Groundwater Elevation Monitoring Location
86-1	RFI-86-16R	Groundwater Elevation Monitoring Location

Note:
Measurements will be collected on an annual basis.

Table 6
Groundwater and LNAPL Elevation Monitoring Locations - Southend

Motors Liquidation Company
RCRA Revised Corrective Measures Proposal
Addendum No. 2 -Northend and Site-wide Groundwater
Former General Motors Corporation North American Operations Facility
(Otherwise known as Buick City)
Flint, Michigan

Area of Interest (AOI)	Location	Comments
02-B	RFI-02-12	Groundwater Elevation Monitoring Location
02-B	RFI-02-14	LNAPL Monitoring Program Location
02-B	RFI-02-15	LNAPL Monitoring Program Location
02-B	RFI-02-16	LNAPL Monitoring Program Location
02-B	RFI-02-17	LNAPL Monitoring Program Location
02-B	RFI-02-18	LNAPL Monitoring Program Location
02-B	RFI-02-19	LNAPL Monitoring Program Location
02-B	RFI-02-23	LNAPL Monitoring Program Location
02-B	RFI-02-24	Groundwater Elevation Monitoring Location
02-E	RFI-02-05	Groundwater Elevation Monitoring Location
02-F	RFI-02-07	Groundwater Elevation Monitoring Location
02-F	RFI-02-13	Groundwater Elevation Monitoring Location
02-F	RFI-86-01R	Groundwater Elevation Monitoring Location
04-D	04-1	Groundwater Elevation Monitoring Location
04-D	04-3	Groundwater Elevation Monitoring Location
04-D	04-4	Groundwater Elevation Monitoring Location
09-A	MW-16	Groundwater Elevation Monitoring Location
09-A	MW-17	Groundwater Elevation Monitoring Location
09-A	MW-18	Groundwater Elevation Monitoring Location
09-A	MW-19	Groundwater Elevation Monitoring Location
09-A	MW-25	Groundwater Elevation Monitoring Location
09-A	RFI-09-04R	Groundwater Elevation Monitoring Location
09-A	RFI-09-49R	Groundwater Elevation Monitoring Location
09-A	RFI-09-53	Groundwater Elevation Monitoring Location
09-A	RFI-09-56	Groundwater Elevation Monitoring Location
09-A	RFI-09-57	Groundwater Elevation Monitoring Location
09-A	RFI-09-58	Groundwater Elevation Monitoring Location
09-A	MW-26	Groundwater Elevation Monitoring Location
09-B	RFI-9-46	Groundwater Elevation Monitoring Location
09-B	11-6-2	Groundwater Elevation Monitoring Location
09-B	31-1	Groundwater Elevation Monitoring Location
09-B	31-3	Groundwater Elevation Monitoring Location
09-B	31-4D	Groundwater Elevation Monitoring Location
09-B	31-4S	Groundwater Elevation Monitoring Location
09-B	31-5	Groundwater Elevation Monitoring Location
09-B	31-8	LNAPL Monitoring Program Location
09-B	MW-23	Groundwater Elevation Monitoring Location
09-B	RFI-09-14	Groundwater Elevation Monitoring Location
09-B	RFI-09-40R	LNAPL Monitoring Program Location
09-B	RFI-09-44	LNAPL Monitoring Program Location
09-B	RFI-09-45R	LNAPL Monitoring Program Location
09-B	RFI-09-46	Groundwater Elevation Monitoring Location
09-B	RFI-09-48	Groundwater Elevation Monitoring Location
09-B	RFI-09-52	LNAPL Monitoring Program Location
12-A	RFI-12-01R	LNAPL Monitoring Program Location
12-A	RFI-12-02/02R	LNAPL Monitoring Program Location
12-A	RFI-12-07R2	LNAPL Monitoring Program Location
12-A	RFI-12-08R	LNAPL Monitoring Program Location

See Notes on Page 3.

Table 6
Groundwater and LNAPL Elevation Monitoring Locations - Southend

Motors Liquidation Company
RCRA Revised Corrective Measures Proposal
Addendum No. 2 -Northend and Site-wide Groundwater
Former General Motors Corporation North American Operations Facility
(Otherwise known as Buick City)
Flint, Michigan

Area of Interest (AOI)	Location	Comments
12-A	RFI-12-09R	LNAPL Monitoring Program Location
12-A	RFI-12-15	LNAPL Monitoring Program Location
12-A	RFI-12-21	Groundwater Elevation Monitoring Location
12-A	RFI-12-22R	LNAPL Monitoring Program Location
12-A	RFI-12-24	Groundwater Elevation Monitoring Location
12-A	RFI-12-25	Groundwater Elevation Monitoring Location
12-A	RFI-12-26	LNAPL Monitoring Program Location
12-A	RFI-12-27	LNAPL Monitoring Program Location
12-C	RFI-12-11D	LNAPL Monitoring Program Location
12-C	RFI-12-11S	LNAPL Monitoring Program Location
12-C	RFI-12-14R	LNAPL Monitoring Program Location
12-C	RFI-12-23	LNAPL Monitoring Program Location
12-C	RFI-12-33	Groundwater Elevation Monitoring Location
12-C	RFI-12-34	Groundwater Elevation Monitoring Location
12-C	RFI-12-35	Groundwater Elevation Monitoring Location
12-C	RFI-12-36	Groundwater Elevation Monitoring Location
12-C	RFI-12-38	LNAPL Monitoring Program Location
12-C	RFI-12-40	LNAPL Monitoring Program Location
12-C	RFI-12-41	LNAPL Monitoring Program Location
16-A	RFI-16-01	Groundwater Elevation Monitoring Location
16-C	40-302	LNAPL Monitoring Program Location
16-C	RFI-16-04R	LNAPL Monitoring Program Location
16-C	RFI-16-07	LNAPL Monitoring Program Location
16-C	RFI-16-08	LNAPL Monitoring Program Location
16-C	RFI-16-09	LNAPL Monitoring Program Location
16-C	RFI-16-10	LNAPL Monitoring Program Location
16-C	RFI-16-12	Groundwater Elevation Monitoring Location
16-C	RFI-16-20	LNAPL Monitoring Program Location
16-C	RFI-16-24	Groundwater Elevation Monitoring Location
17-A	RFI-17-02	Groundwater Elevation Monitoring Location
23-A	RFI-23-02R	Groundwater Elevation Monitoring Location
44-A	RFI-44-05	Groundwater Elevation Monitoring Location
40-A	40-3	Groundwater Elevation Monitoring Location
40-A	40-6R	Groundwater Elevation Monitoring Location
40-A	RFI-40-01R2	Groundwater Elevation Monitoring Location
40-A	RFI-40-07	Groundwater Elevation Monitoring Location
40-A	RFI-40-09	Groundwater Elevation Monitoring Location
40-A	RFI-40-15	Groundwater Elevation Monitoring Location
40-B	40-07R2	LNAPL Monitoring Program Location
40-B	RFI-40-02R	LNAPL Monitoring Program Location
40-B	RFI-40-10R	LNAPL Monitoring Program Location
40-B	RFI-40-12R	LNAPL Monitoring Program Location
40-B	RFI-40-13	Groundwater Elevation Monitoring Location
40-B	RFI-40-14R	LNAPL Monitoring Program Location
40-B	RFI-40-20	LNAPL Monitoring Program Location
40-B	RFI-40-25	LNAPL Monitoring Program Location
40-B	RFI-40-26	LNAPL Monitoring Program Location
40-C	RFI-40-03	Groundwater Elevation Monitoring Location
40-D	40-303R	Groundwater Elevation Monitoring Location
40-D	40-304	Groundwater Elevation Monitoring Location

See Notes on Page 3.

Table 6
Groundwater and LNAPL Elevation Monitoring Locations - Southend

Motors Liquidation Company
RCRA Revised Corrective Measures Proposal
Addendum No. 2 -Northend and Site-wide Groundwater
Former General Motors Corporation North American Operations Facility
(Otherwise known as Buick City)
Flint, Michigan

Area of Interest (AOI)	Location	Comments
40-D	40-305	Groundwater Elevation Monitoring Location
40-D	RFI-40-04	Groundwater Elevation Monitoring Location
44-A	04-120	Groundwater Elevation Monitoring Location
44-A	04-140	Groundwater Elevation Monitoring Location
44-A	04-160	Groundwater Elevation Monitoring Location
84-A	RFI-84-06R	Groundwater Elevation Monitoring Location
84-A	MW-23	Groundwater Elevation Monitoring Location
84-D	84-6R2D	Groundwater Elevation Monitoring Location
84-D	84-7D	Groundwater Elevation Monitoring Location
84-D	RFI-17-02D	Groundwater Elevation Monitoring Location
84-D	RFI-84-03S	Groundwater Elevation Monitoring Location
84-D	RFI-84-04D	Groundwater Elevation Monitoring Location
84-D	RFI-84-04I	Groundwater Elevation Monitoring Location
84-D	RFI-84-05	Groundwater Elevation Monitoring Location
84-D	RFI-84-06RD	Groundwater Elevation Monitoring Location
84-D	RFI-84-07S	Groundwater Elevation Monitoring Location
84-D	RFI-84-09D	Groundwater Elevation Monitoring Location
84-D	RFI-84-09S	Groundwater Elevation Monitoring Location
84-D	RFI-84-11S	Groundwater Elevation Monitoring Location
84-D	RFI-84-12	Groundwater Elevation Monitoring Location
84-D	RFI-84-8S	Groundwater Elevation Monitoring Location
84-D	RFI-40-11	Groundwater Elevation Monitoring Location
86-1	RFI-02-08R	Groundwater Elevation Monitoring Location
86-1	RFI-86-01R	Groundwater Elevation Monitoring Location
94-B	RFI-94-08	Groundwater Elevation Monitoring Location
94-B	RFI-94-11	Groundwater Elevation Monitoring Location
94-B	94-100	Groundwater Elevation Monitoring Location
94-D	RFI-02-22	Groundwater Elevation Monitoring Location
94-D	RFI-94-05	Groundwater Elevation Monitoring Location
BD01	BD01-01	Groundwater Elevation Monitoring Location
BD01	BD01-02R	Groundwater Elevation Monitoring Location
BD01	BD01-03	Groundwater Elevation Monitoring Location
BD01	BD01-04	Groundwater Elevation Monitoring Location
Harriet Street	ACSP-B2AR	Groundwater Elevation Monitoring Location

Note:
Measurements will be collected on an annual basis.

Table 7
Groundwater Quality Monitoring Locations

Motors Liquidation Company
RCRA Revised Corrective Measures Proposal
Addendum No. 2 -Northend and Site-wide Groundwater
Former General Motors Corporation North American Operations Facility
(Otherwise known as Buick City)
Flint, Michigan

Area of Interest (AOI)	Sampling Location	Groundwater Analytical Parameters	Sampling Rationale
North of Leith Street			
7-03	07-01	VOCs	Sentinel location downgradient of LNAPL plume.
10-2	RFI-10-24	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
10-2	RFI-10-29	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
10-2	RFI-10-33	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
10-2	RFI-10-35	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
10-2	RFI-10-36	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
10-3	20-500R	VOCs	Sentinel location at downgradient edge of VOC impacted area
10-3	RFI-10-28	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
10-4	20-FP10R	VOCs	Sentinel location at downgradient edge of VOC impacted area
10-4	RFI-10-26	VOCs	Sentinel location at downgradient edge of VOC impacted area
36-1	RFI-36-04	VOCs	Monitoring VOCs downgradient of LNAPL plume.
36-1	RFI-36-19	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
36-1	RFI-36-37	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
36-1	RFI-36-47	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
36-1	RFI-36-48	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
36-1	RFI-36-55	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
36-1	RFI-36-56	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
36-1	RFI-36-20	VOCs	Sentinel location at downgradient edge of VOC impacted area
36-5	RFI-36-14	VOCs	Sentinel location downgradient of LNAPL plume.
81-2	70-165	VOCs and lead	Sentinel location downgradient of LNAPL plume and historical lead exceedance.
81-2	RFI-81-50	VOCs	Sentinel location downgradient of LNAPL plume.
81-3	RFI-81-08	VOCs	Sentinel location at downgradient edge of VOC plume
86-1	RFI-86-16R	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
86-1	RFI-86-01R	VOCs, lead, and manganese	Sentinel location at downgradient edge of VOC and inorganic impacted area
South of Leith Street			
02-E	RFI-02-05	VOCs	Sentinel location at downgradient edge of VOC impacted area
04-D	04-4	Cyanide	Sentinel location upgradient of storm sewer
04-D	04-3	Cyanide	Sentinel location upgradient of storm sewer
09-A	RFI-09-04R	VOCs	Monitoring TCE to confirm stable concentrations.
09-A	RFI-09-53	VOCs	Monitoring to confirm stable concentrations of VOCs.
09-A	MW-26	VOCs	Off-site; sentinel location to confirm VOC plume has not migrated
09-B	RFI-09-14	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
09-B	RFI-09-48	VOCs	Sentinel location at downgradient edge of VOC impacted area.
09-B	RFI-09-46	VOCs	Monitoring benzene concentrations to confirm stable concentrations
17-A	RFI-17-02	VOCs and selenium	Sentinel location at downgradient edge of VOC impacted area and GSI monitoring point
40-D	40-304	VOCs and PCBs	Sentinel location downgradient of building 40 Tunnel (PCBs required by 9/13/2005 EPA letter)
44-A	RFI-44-05	Cyanide	Sentinel location upgradient of storm sewer
84-A	MW-23	VOCs	Off-site; downgradient of VOC impacted area
84-D	RFI-17-02D	VOCs and selenium	Monitoring vinyl chloride to confirm stable concentrations and GSI monitoring point
84-D	RFI-84-06R	VOCs, cyanide, selenium, and silver	Sentinel location at downgradient edge of VOC impacted area and GSI monitoring point
84-D	RFI-84-06RD	VOCs	Sentinel location at downgradient edge of VOC impacted area
84-D	RFI-84-09D	VOCs	Sentinel location at downgradient edge of VOC impacted area
84-D	RFI-84-09S	VOCs	Sentinel location at downgradient edge of VOC impacted area
84-D	RFI-84-11S	VOCs	Sentinel location at downgradient edge of VOC impacted area
84-D	RFI-84-12	VOCs and selenium	Sentinel location at downgradient edge of VOC impacted area and GSI monitoring point
94-B	RFI-94-11	VOCs	Off-site; sentinel location at downgradient edge of VOC impacted area
94-D	RFI-02-22	VOCs	Sentinel locations, downgradient of LNAPL plumes

Note:
VOCs = Volatile Organic Compounds.
LNAPL = light non-aqueous phase liquid.

Table 8
NPMP Monitoring Points and Analyses

Motors Liquidation Company
RCRA Revised Corrective Measures Proposal
Addendum No. 2 -Northend and Site-wide Groundwater
Former General Motors Corporation North American Operations Facility (Otherwise known as Buick City)
Flint, Michigan

Outfall	Monitoring Point	Frequency	Sample Type	Analytes	Sampling Rationale
001	MP001	Monthly	Dry weather - Grab	VOCs (MDNRE List) Metals [1] Cyanide	Select VOCs and metals were detected in the sample collected from Outfall 001 in support of the 2010 NPDES Permit (permit); therefore, the NPMP samples collected from Outfall 001will be analyzed for VOCs (MDNRE list) and metals [1]. Cyanide was not detected in the sample collected from Outfall 001 in support of the permit; however, cyanide was detected above criteria in groundwater samples collected from the Outfall 001 drainage area; therefore, the NPMP samples collected from Outfall 001 will be analyzed for cyanide in order to monitor the storm sewers for possible infiltration of cyanide impacted groundwater. Oil and grease was not detected in the sample collected from Outfall 001 in support of the permit and there is not a GSI criteria for this analyte; therefore, oil and grease will not be analyzed for in the NPMP.
		Yearly [2]	Dry weather - Grab	SVOCs (MDNRE List)	SVOCs were not detected in the sample collected from Outfall 001 in support of the permit and therefore were not included in the NPMP monthly sampling. However, SVOCs were detected above criteria in groundwater samples collected from the Outfall 001 drainage area; therefore, a yearly sample will be collected from Outfall 001 and analyzed for SVOCs (MDNRE List) in order to monitor the storm sewers for possible infiltration of SVOC impacted groundwater.
002	MP002	Monthly	Dry weather - Grab	VOCs (MDNRE List) Metals [1] Cyanide	Select VOCs and metals were detected in the sample collected from Outfall 002 in support of the permit; therefore, the NPMP samples collected from Outfall 002 will be analyzed for VOCs (MDNRE list) and metals[1]. Cyanide was not detected in the sample collected from Outfall 002 in support of the permit; however, cyanide was detected above criteria in groundwater samples collected from the Outfall 002 drainage area; therefore, the NPMP samples collected from Outfall 002 will be analyzed for cyanide in order to monitor the storm sewers for possible infiltration of cyanide impacted groundwater. Oil and grease was not detected in the sample collected from Outfall 002 in support of the permit and there is not a GSI criteria for this analyte; therefore, oil and grease will not be analyzed for in the NPMP.
		Yearly [2]	Dry weather - Grab	SVOCs (MDNRE List)	SVOCs were not detected in the sample collected from Outfall 002 in support of the permit and therefore were not included in the NPMP monthly sampling. However, SVOCs were detected above criteria in groundwater samples collected from the Outfall 002 drainage area; therefore, a yearly sample will be collected from Outfall 002 and analyzed for SVOCs (MDNRE List) in order to monitor the storm sewers for possible infiltration of SVOC impacted groundwater.
003	MP003	Monthly	Dry weather - Grab	VOCs (MDNRE List) Metals [1] Cyanide	Select metals were detected in the sample collected from Outfall 003 in support of the permit; therefore, the NPMP samples collected from Outfall 003 will be analyzed for metals[1]. VOCs and cyanide were not detected in the sample from Outfall 003 in support of the permit; however, VOCs and cyanide were detected above criteria in groundwater samples collected from the Outfall 003 drainage area; therefore, the NPMP samples collected from Outfall 003 will be analyzed for VOCs and cyanide in order to monitor the storm sewers for possible infiltration of impacted groundwater. Oil and grease was not detected in the sample collected from Outfall 001 in support of the permit and there is not a GSI criteria for this analyte; therefore, oil and grease will not be analyzed for in the NPMP.
		Monthly	Dry weather - 24-hr Composite	PCBs	PCBs were not detected in the sample collected from Outfall 003 in support of the permit. However due to the presence of PCB-containing LNAPL in the Outfall 003 drainage area and the presence of oil in the storm sewer, the NPMP samples collected from Outfall 003 will be analyzed for PCBs.
		Yearly [2]	Dry weather - Grab	SVOCs (MDNRE List)	SVOCs were not detected in the sample collected from Outfall 003 in support of the permit and therefore were not included in the NPMP monthly sampling. However, SVOCs were detected above criteria in groundwater samples collected from the Outfall 003 drainage area; therefore, a yearly sample will be collected from Outfall 003 and analyzed for SVOCs(MDNRE List) in order to monitor the storm sewers for possible infiltration of SVOC impacted groundwater.
004	MP004[3]	Monthly	Dry weather - Grab	VOCs (MDNRE List) Metals [1] Cyanide	Select VOCs and metals were detected in the sample collected from Outfall 004 in support of the permit; therefore, the NPMP samples collected from Outfall 004 will be analyzed for VOCs (MDNRE list) and metals[1]. Cyanide was not detected in the sample collected from Outfall 004 in support of the permit; however, cyanide was detected above criteria in groundwater samples collected from the Outfall 004 drainage area; therefore, the NPMP samples collected from Outfall 004 will be analyzed for cyanide in order to monitor the storm sewers for possible infiltration of cyanide impacted groundwater. Oil and grease was not detected in the sample collected from Outfall 004 in support of the permit and there is not a GSI criteria for this analyte; therefore, oil and grease will not be analyzed for in the NPMP.
		Monthly	Dry weather - 24-hr Composite	PCBs	PCBs were not detected in the sample collected from Outfall 004 in support of the permit. However due to the presence of PCB-containing LNAPL in the Outfall 004 drainage area and the presence of oil in the storm sewer, the NPMP samples collected from Outfall 004 will be analyzed for PCBs.
		Yearly [2]	Dry weather - Grab	SVOCs (MDNRE List)	SVOCs were not detected in the sample collected from Outfall 004 in support of the permit and therefore were not included in the NPMP monthly sampling. However, SVOCs were detected above criteria in groundwater samples collected from the Outfall 004 drainage area; therefore, a yearly sample will be collected from Outfall 004 and analyzed for SVOCs (MDNRE List) in order to monitor the storm sewers for possible infiltration of SVOC impacted groundwater.

Table 8
NPMP Monitoring Points and Analyses

Motors Liquidation Company
RCRA Revised Corrective Measures Proposal
Addendum No. 2 -Northend and Site-wide Groundwater
Former General Motors Corporation North American Operations Facility (Otherwise known as Buick City)
Flint, Michigan

Outfall	Monitoring Point	Frequency	Sample Type	Analytes	Sampling Rationale
005	MP005	Monthly	Dry weather - Grab	Metals [1] Cyanide	Select metals were detected in the sample collected from Outfall 005 in support of the permit; therefore, the NPMP samples collected from Outfall 005 will be analyzed for metals[1]. Cyanide was not detected in the sample collected from Outfall 005 in support of the permit; however, cyanide was detected above criteria in groundwater samples collected from the Outfall 005 drainage area; therefore, the NPMP samples collected from Outfall 005 will be analyzed for cyanide in order to monitor the storm sewers for possible infiltration of cyanide impacted groundwater. Oil and grease was not detected in the sample collected from Outfall 005 in support of the permit and there is not a GSI criteria for this analyte; therefore, oil and grease will not be analyzed for in the NPMP.
		Monthly	Dry weather - 24-hr Composite	PCBs	PCBs were not detected in the sample collected from Outfall 005 in support of the permit. However due to the presence of PCB-containing LNAPL in the Outfall 005 drainage area and the presence of oil in the storm sewer, the NPMP samples collected from Outfall 005 will be analyzed for PCBs.
		Yearly [2]	Dry weather - Grab	SVOCs (MDNRE List)	SVOCs were not detected in the sample collected from Outfall 005 in support of the permit and therefore were not included in the NPMP monthly sampling. However, SVOCs were detected above criteria in groundwater samples collected from the Outfall 005 drainage area; therefore, a yearly sample will be collected from Outfall 005 and analyzed for SVOCs (MDNRE List) in order to monitor the storm sewers for possible infiltration of SVOC impacted groundwater.
006	MP006	Monthly	Dry weather - Grab	VOCs (MDNRE List) Metals [1] Cyanide	Select metals were detected in the sample collected from Outfall 006 in support of the permit; therefore, the NPMP samples collected from Outfall 006 will be analyzed for metals[1]. VOCs and cyanide were not detected in the sample from Outfall 006 in support of the permit; however, VOCs and cyanide were detected above criteria in groundwater samples collected from the Outfall 006 drainage area; therefore, the NPMP samples collected from Outfall 006 will be analyzed for VOCs and cyanide in order to monitor the storm sewers for possible infiltration of impacted groundwater.
007	MP007	Monthly	Dry weather - Grab	VOCs (MDNRE List) Metals [1] Cyanide	Select VOCs and metals were detected in the sample collected from Outfall 007 in support of the permit; therefore, the NPMP samples collected from Outfall 007 will be analyzed for VOCs (MDNRE list) and metals[1]. Cyanide was not detected in the sample collected from Outfall 007 in support of the permit; however, cyanide was detected above criteria in groundwater samples collected from the Outfall 007 drainage area; therefore, the NPMP samples collected from Outfall 007 will be analyzed for cyanide in order to monitor the storm sewers for possible infiltration of cyanide impacted groundwater.
		Yearly [2]	Dry weather - Grab	SVOCs (MDNRE List)	SVOCs were not detected in the sample collected from Outfall 007 in support of the permit and therefore were not included in the NPMP monthly sampling. However, SVOCs were detected above criteria in groundwater samples collected from the Outfall 007 drainage area; therefore, a yearly sample will be collected from Outfall 007 and analyzed for SVOCs (MDNRE List) in order to monitor the storm sewers for possible infiltration of SVOC impacted groundwater.
009	MP009	Monthly	Dry weather - Grab	VOCs (MDNRE List) Metals [1] Cyanide	Select VOCs and metals were detected in the sample collected from Outfall 009 in support of the permit; therefore, the NPMP samples collected from Outfall 009 will be analyzed for VOCs (MDNRE list) and metals[1]. Cyanide was not detected in the sample collected from Outfall 009 in support of the permit; however, cyanide was detected above criteria in groundwater samples collected from the Outfall 009 drainage area; therefore, the NPMP samples collected from Outfall 009 will be analyzed for cyanide in order to monitor the storm sewers for possible infiltration of cyanide impacted groundwater. Oil and grease was not detected in the sample collected from Outfall 009 in support of the permit and there is not a GSI criteria for this analyte; therefore, oil and grease will not be analyzed for in the NPMP.
		Yearly [2]	Dry weather - Grab	SVOCs (MDNRE List)	SVOCs were not detected in the sample collected from Outfall 009 in support of the permit and therefore were not included in the NPMP monthly sampling. However, SVOCs were detected above criteria in groundwater samples collected from the Outfall 009 drainage area; therefore, a yearly sample will be collected from Outfall 009 and analyzed for SVOCs (MDNRE List) in order to monitor the storm sewers for possible infiltration of SVOC impacted groundwater.
010	MP010	Monthly	Dry weather - Grab	VOCs (MDNRE List) Metals [1] Cyanide	Select VOCs, metals and cyanide were detected in the sample collected from Outfall 010 in support of the permit; therefore, the NPMP samples collected from Outfall 010 will be analyzed for VOCs (MDNRE list) and metals[1]. Oil and grease was not detected in the sample collected from Outfall 010 in support of the permit and there is not a GSI criteria for this analyte; therefore, oil and grease will not be analyzed for in the NPMP.
		Yearly [2]	Dry weather - Grab	SVOCs (MDNRE List)	SVOCs were not detected in the sample collected from Outfall 010 in support of the permit and therefore were not included in the NPMP monthly sampling. However, SVOCs were detected above criteria in groundwater samples collected from the Outfall 010 drainage area; therefore, a yearly sample will be collected from Outfall 010 and analyzed for SVOCs (MDNRE List) in order to monitor the storm sewers for possible infiltration of SVOC impacted groundwater.
011	DP011	Monthly	Dry weather - Grab	VOCs (MDNRE List) Metals [1] Cyanide	Select VOCs, metals and cyanide were detected in the sample collected from Outfall 011 in support of the permit; therefore, the NPMP samples collected from Outfall 011 will be analyzed for VOCs (MDNRE list) and metals[1]. Oil and grease was not detected in the sample collected from Outfall 011 in support of the permit and there is not a GSI criteria for this analyte; therefore, oil and grease will not be analyzed for in the NPMP.
		Yearly [2]	Dry weather - Grab	SVOCs (MDNRE List)	SVOCs were not detected in the sample collected from Outfall 011 in support of the permit and therefore were not included in the NPMP monthly sampling. However, SVOCs were detected above criteria in groundwater samples collected from the Outfall 011 drainage area; therefore, a yearly sample will be collected from Outfall 011 and analyzed for SVOCs (MDNRE List) in order to monitor the storm sewers for possible infiltration of SVOC impacted groundwater.
013	MP013	Monthly	Dry weather - Grab	Metals [1] Cyanide	Select metals and cyanide were detected in the sample collected from Outfall 013 in support of the permit; therefore, the NPMP samples collected from Outfall 013 will be analyzed for metals[1] and cyanide.

1. Metals analysis to include - Ag, As, Ba, Be, Cd, Cr (total), Co, Cu, Hg, Mn, Ni, Pb, Sb, Se,T, V, and Zn

2. SVOCs will be collected on a yearly basis for the first three years of the NPMP.

3. Following the installation of the oil-water separator and debris removal system in the Outfall 003 and 004 storm sewers, the dry-weather flow from these sewers will be combined into the Outfall 003 storm sewer; thereafter there will be no dry-weather flow in the Outfall 004 storm sewer.

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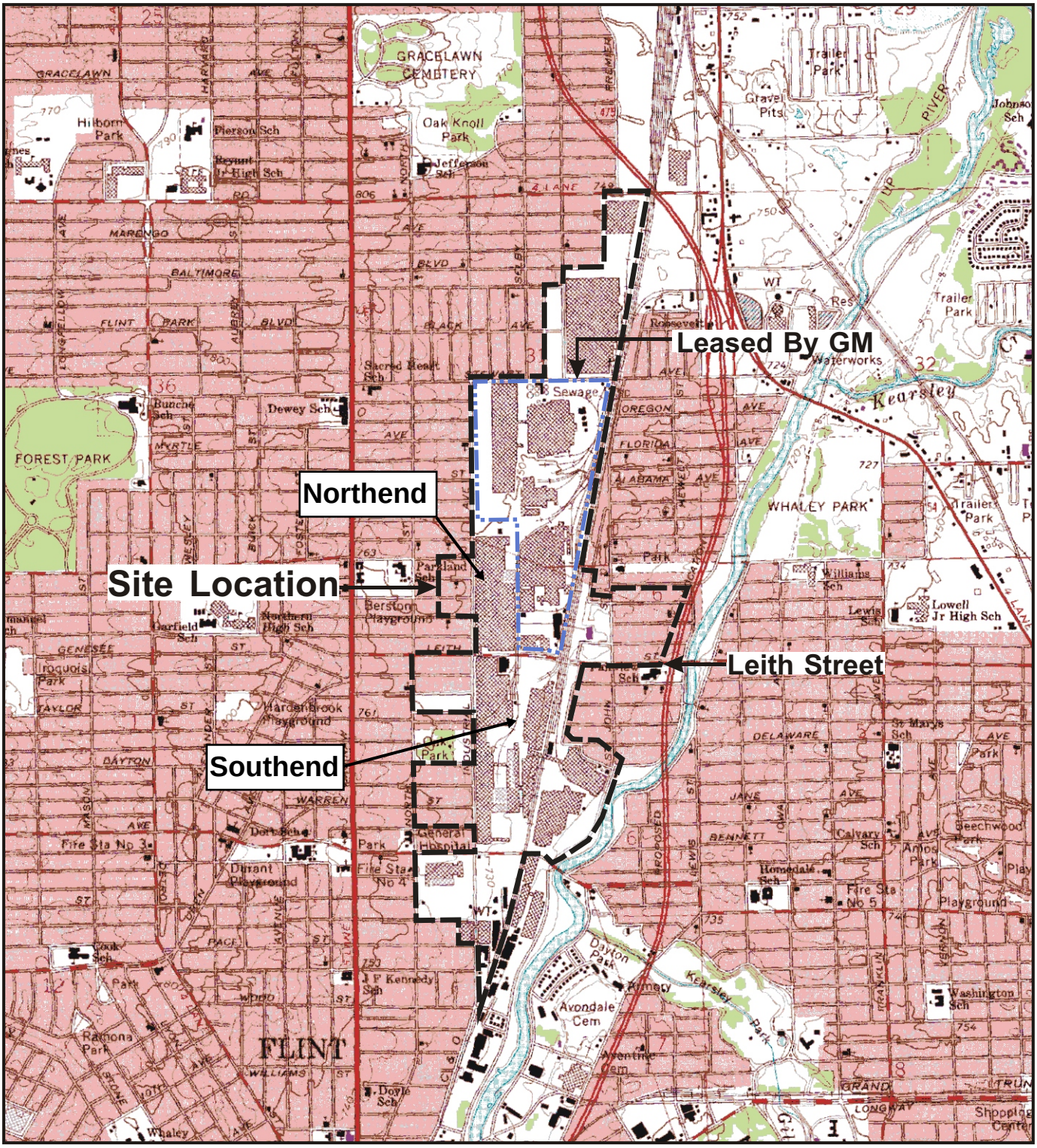
Figures



REFERENCE: Base Map Source: USGS 7.5 Min. Topo. Quad., Flint North, Mich. (1969, Photorevised 1975).

2000' 0 2000'

Approximate Scale: 1" = 2000'

Area Location

MOTORS LIQUIDATIONS COMPANY
NAO FLINT OPERATIONS SITE
FLINT, MICHIGAN

SITE LOCATION MAP

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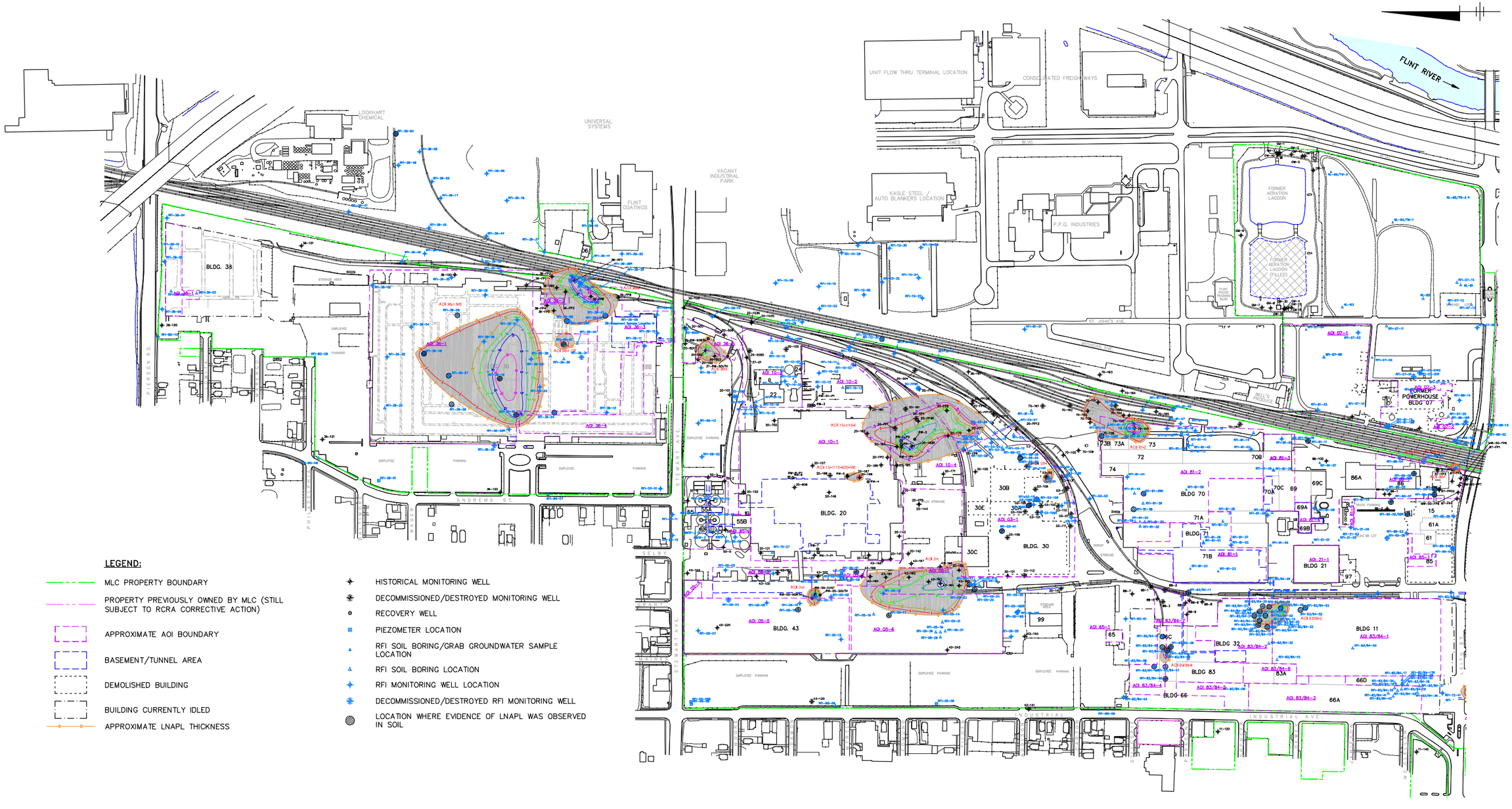
FIGURE
1

04/07/2010 SYRACUSE, NY-ENV/CAD-141-DJHOWES
B0064439/0000/00103/CDR/64439N01.CDR



LEGEND:

- MLC PROPERTY BOUNDARY
- PROPERTY PREVIOUSLY OWNED BY MLC (STILL SUBJECT TO RCRA CORRECTIVE ACTION)
- APPROXIMATE AOI BOUNDARY
- BASEMENT/TUNNEL AREA
- DEMOLISHED BUILDING
- BUILDING CURRENTLY IDLED
- APPROXIMATE LNAPL THICKNESS
- HISTORICAL MONITORING WELL
- DECOMMISSIONED/DESTROYED MONITORING WELL
- RECOVERY WELL
- PIEZOMETER LOCATION
- RFI SOIL BORING/GRAB GROUNDWATER SAMPLE LOCATION
- RFI SOIL BORING LOCATION
- RFI MONITORING WELL LOCATION
- DECOMMISSIONED/DESTROYED RFI MONITORING WELL
- LOCATION WHERE EVIDENCE OF LNAPL WAS OBSERVED IN SOIL

0 250' 500'
APPROXIMATE GRAPHIC SCALE

NOTES:

1. BASE MAP INFORMATION FROM A SURVEY BY BMJ INC., DATED APRIL 2001, AT A SCALE OF 1:100.
2. ALL LOCATIONS ARE APPROXIMATE.
3. LNAPL THICKNESS CONTOURS BASED ON MAXIMUM LNAPL THICKNESS MEASUREMENTS COLLECTED DURING LNAPL MONITORING AND REMOVAL PROGRAM 2003–2005.

MOTORS LIQUIDATION COMPANY
FORMER GENERAL MOTORS CORPORATION NORTH AMERICAN OPERATIONS FACILITY (OTHERWISE KNOWN AS BUICK CITY)

LNAPL THICKNESS CONTOURS - NORTHEND

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FIGURE 2

CITY:SYRACUSE DIV/GROUP:141 DB:GMS LD:G.STOWELL PM:L.McBURNEY PIC:C.PETERS TM:M.MAKI LYR:ON=*;OFF=*REF*;PROPERTY-PREV,ISHID-BUILDING,|HST_SB_B-I,|NAPL_*,|RFI_GRAB,|RFI_SB_B-I,|RFI_SB,|RFI_SS_PIEZ
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XREFS: 64410X01 64410X3A 64410X00 64410X02 64410X99 IMAGES: PROJECTNAME: ---

AOI 36-2 EXTERIOR MINERAL SEAL/HYDRAULIC OIL PLUME MULTI-PHASE EXTRACTION SYSTEM

AOI 36-1
GASOLINE LNAPL PLUME
MULTI-PHASE EXTRACTION SYSTEM
ADDITIONAL CONTROLS ABOVE BASELINE TO LIMIT EXCAVATION, PREPARE A HEALTH AND SAFETY PLAN AND REQUIRE EVALUATION PRIOR TO FUTURE BUILDING CONSTRUCTION

AOI 10-1/10-4 LNAPL
ACTIVE RECOVERY TRENCH
ADDITIONAL CONTROLS
ABOVE BASELINE TO NOTIFY
OF PCBs PRESENT

AOI 36-5 LNAPL
PASSIVE RECOVERY TRENCH

AOI 81-2
LNAPL
PASSIVE RECOVERY TRENCH
ADDITIONAL CONTROL ABOVE BASELINE
TO NOTIFY OF PCBs PRESENT

AOI 03-1 LNAPL
PASSIVE RECOVERY TRENCH

AOI 81-2
SOIL
ENGINEERING AND ADDITIONAL INSTITUTIONAL CONTROLS ABOVE BASELINE TO LIMIT EXCAVATION, PREPARE A HEALTH AND SAFETY PLAN AND REQUIRE EXCAVATION PRIOR TO FUTURE BUILDING CONSTRUCTION AND TO MAINTAIN A SURFACE COVER CONSISTENT WITH EXISTING CONDITIONS

AOI 81-1
ADDITIONAL INSTITUTIONAL CONTROLS ABOVE BASELINE TO LIMIT EXCAVATION AND REQUIRE PREPARATION OF A HEALTH AND SAFETY PLAN PRIOR TO FUTURE BUILDING CONSTRUCTION

OUTFALL 003 AND 004
STORMWATER DIVERSION AND
TREATMENT SYSTEM

AOI 86-1 LNAPL
PASSIVE RECOVERY TRENCH

AOI 36-1
MINERAL SEAL/HYDRAULIC OIL LNAPL PLUME
MULTI-PHASE EXTRACTION SYSTEM ADDITIONAL INSTITUTIONAL CONTROLS ABOVE BASELINE TO LIMIT EXCAVATION, PREPARE A HEALTH AND SAFETY PLAN AND REQUIRE EVALUATION PRIOR TO FUTURE BUILDING CONSTRUCTION

AOI 05-1/05-5
LNAPL
MULTI-PHASE EXTRACTION SYSTEM AND ADDITIONAL INSTITUTIONAL CONTROLS ABOVE BASELINE TO NOTIFY OF PCBs PRESENT

AOI 83/84-4 LNAPL
PASSIVE RECOVERY TRENCH

AOI 83/84-2
LNAPL
MULTI-PHASE EXTRACTION SYSTEM AND ADDITIONAL INSTITUTIONAL CONTROLS ABOVE BASELINE TO NOTIFY OF PCBs PRESENT

AOI 83/84-2
SOIL
ADDITIONAL INSTITUTIONAL CONTROLS ABOVE BASELINE TO LIMIT EXCAVATION AND REQUIRE PREPARATION OF A HEALTH AND SAFETY PLAN PRIOR TO BUILDING CONSTRUCTION

AOI 83/84-3
ENGINEERING AND ADDITIONAL INSTITUTIONAL CONTROLS ABOVE BASELINE TO LIMIT EXCAVATION AND REQUIRE A HEALTH AND SAFETY PLAN PRIOR TO FUTURE BUILDING CONSTRUCTION AND TO MAINTAIN A SURFACE COVER CONSISTENT WITH EXISTING CONDITIONS

LEGEND:

- PROPERTY BOUNDARY
- EXISTING STORM SEWER LINE
- DEMOLISHED BUILDING
- BUILDING CURRENTLY IDLED
- ESTIMATED CURRENT LIMITS OF NON-TSCA AND NON-PCB CONTAINING LNAPL PLUMES
- ESTIMATED CURRENT LIMITS OF TSCA LNAPL PLUMES
- MONITORING WELL
- DECOMMISSIONED/DESTROYED MONITORING WELL
- RECOVERY WELL
- PIEZOMETER LOCATION
- PROPOSED AREA IDENTIFIED FOR ENGINEERING AND/OR ADDITIONAL INSTITUTIONAL CONTROLS SPECIFIED IN A DEED RESTRICTION ABOVE BASELINE RESTRICTIONS, OR FOR REMEDIATION AS DESCRIBED.
- APPROXIMATE AREA OF OUTFALL 003 AND 004 STORMWATER DIVERSION AND TREATMENT SYSTEM

NOTES:

1. BASE MAP INFORMATION FROM A SURVEY BY BMJ INC., DATED APRIL 2001, AT A SCALE OF 1:100.
2. ALL LOCATIONS ARE APPROXIMATE.
3. BASELINE INSTITUTIONAL CONTROL FOR ENTIRE SITE INCLUDES DEED RESTRICTION LIMITING GROUNDWATER AND PROPERTY USE.

0 300' 600'
GRAPHIC SCALE

MOTORS LIQUIDATION COMPANY
FORMER GENERAL MOTORS CORPORATION NORTH AMERICAN OPERATIONS FACILITY (OTHERWISE KNOWN AS BUICK CITY)
RCRA REVISED CMP
ADDENDUM NO. 2 - NORTHEND AND SITE-WIDE GROUNDWATER

PROPOSED CORRECTIVE MEASURES - NORTHEND

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FIGURE
3

CITY: SYRACUSE DIV/GROUP: 141 DB: GWS LD: G. STOWELL PM: L. McBURNEY PIC: C. PETERS TM: M. MAKI LYR: ON=*OFF=*REF*;PROPERTY-PREV;|SHD-BUILDING,|HIST_SB,|HIST_BH,|NAPL_*,|RFI_GRAB,|RFI_SB,|RFI_BH,|RFI_SB_SB,|RFI_SS_PIEZ
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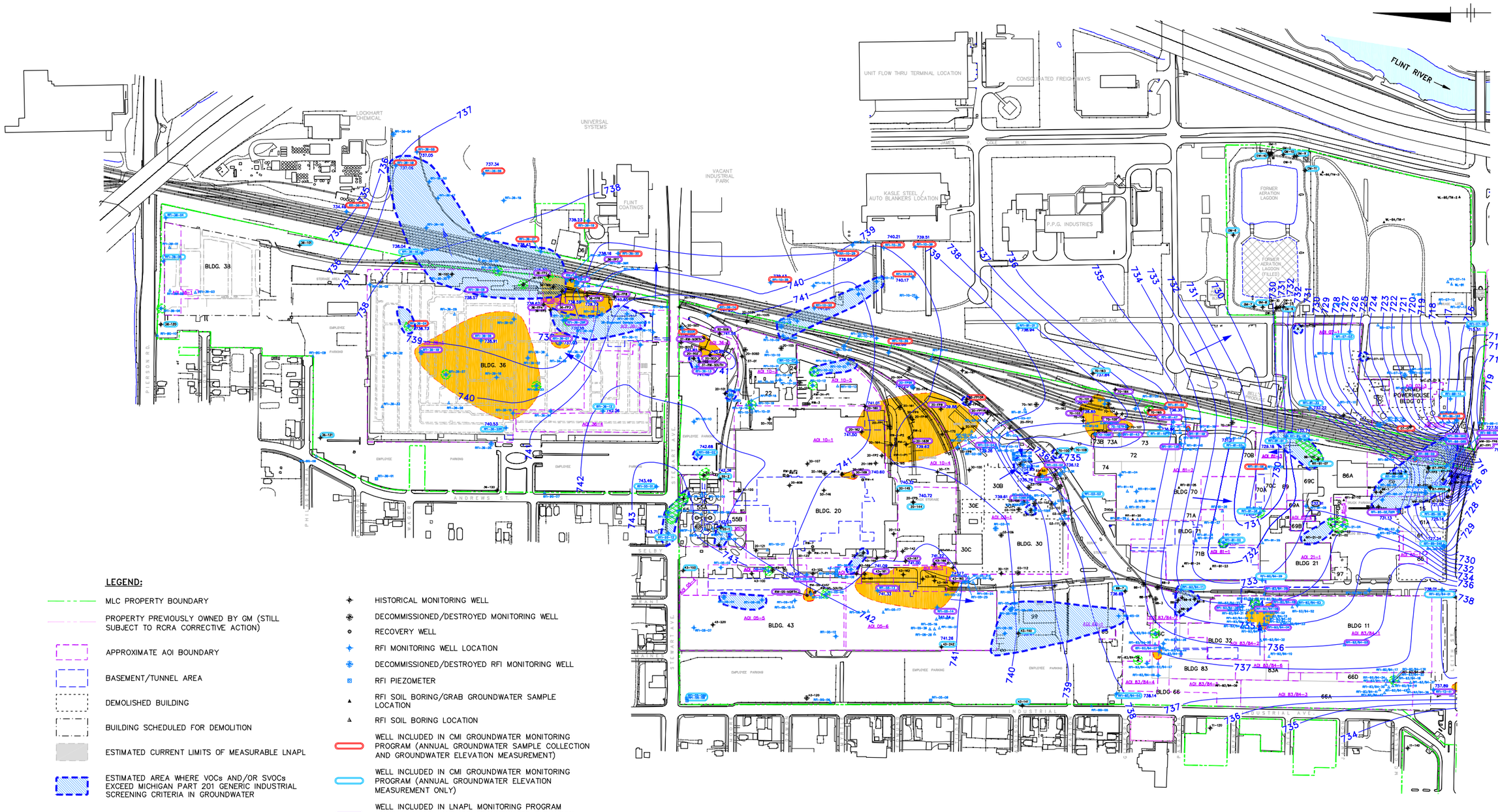
64410X3A
64410X00
64410X07



LEGEND:

- MLC PROPERTY BOUNDARY
- PROPERTY PREVIOUSLY OWNED BY GM (STILL SUBJECT TO RCRA CORRECTIVE ACTION)
- APPROXIMATE AOI BOUNDARY
- BASEMENT/TUNNEL AREA
- DEMOLISHED BUILDING
- BUILDING SCHEDULED FOR DEMOLITION
- ESTIMATED CURRENT LIMITS OF MEASURABLE LNAPL
- ESTIMATED AREA WHERE VOCs AND/OR SVOCs EXCEED MICHIGAN PART 201 GENERIC INDUSTRIAL SCREENING CRITERIA IN GROUNDWATER
- ESTIMATED AREA WHERE INORGANICS EXCEED MICHIGAN PART 201 GENERIC INDUSTRIAL SCREENING CRITERIA IN GROUNDWATER
- HISTORICAL MONITORING WELL
- DECOMMISSIONED/DESTROYED MONITORING WELL
- RECOVERY WELL
- RFI MONITORING WELL LOCATION
- DECOMMISSIONED/DESTROYED RFI MONITORING WELL
- RFI PIEZOMETER
- RFI SOIL BORING/GRAB GROUNDWATER SAMPLE LOCATION
- RFI SOIL BORING LOCATION
- WELL INCLUDED IN CMI GROUNDWATER MONITORING PROGRAM (ANNUAL GROUNDWATER SAMPLE COLLECTION AND GROUNDWATER ELEVATION MEASUREMENT)
- WELL INCLUDED IN CMI GROUNDWATER MONITORING PROGRAM (ANNUAL GROUNDWATER ELEVATION MEASUREMENT ONLY)
- WELL INCLUDED IN LNAPL MONITORING PROGRAM (ANNUAL LNAPL AND/OR GROUNDWATER ELEVATION MEASUREMENT ONLY)
- 742.03 GROUNDWATER ELEVATION (IN FEET)
- 726 GROUNDWATER ELEVATION CONTOUR (IN FEET)
- GENERALIZED FLOW DIRECTION

0 250' 500'
APPROXIMATE GRAPHIC SCALE

NOTES:

1. BASE MAP INFORMATION FROM A SURVEY BY BMJ INC., DATED APRIL 2001, AT A SCALE OF 1:100.
2. ALL LOCATIONS ARE APPROXIMATE.
3. ESTIMATED LIMITS OF MEASURABLE LNAPL BASED ON MEASUREMENTS FROM MARCH 2004 TO JULY 2005.

MOTORS LIQUIDATION COMPANY
FORMER GENERAL MOTORS CORPORATION NORTH AMERICAN OPERATIONS FACILITY (OTHERWISE KNOWN AS BUICK CITY)
RCRA REVISED CMP
ADDENDUM NO. 2 - NORTHEND AND SITE-WIDE GROUNDWATER

GROUNDWATER MONITORING LOCATIONS - NORTH END

ARCADIS

FIGURE 4

CITY:SYRACUSE DIV/GROUP:141 DB:G.STOWELL L.FORAKER LD:GMS PM:L.McBURNEY LYR:ON=*;OFF=*REF*
G:\ENV\CAD\SYRACUSE\ACT\B006441020101001205\DWG\REVISED CMP\64410W01.DWG LAYOUT: 4 SAVED: 8/5/2010 12:10 PM ACADVER: 18.0S (LMS TECH) PAGESETUP: C:\LDB-PDF PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 8/5/2010 12:10 PM BY: FORAKER, LYDIA
XREFS: 64410X02 64410X01 64410X3A 64410X00 64410X06
IMAGES: PROJECTNAME: ---

CITY:SYRACUSE DIV/GROUP:141 DB:G.STOWELL L.FORAKER LD:GMS PM:L.McBURNEY LYR:ON=*;OFF=*REF*
G:\ENV\CAD\SYRACUSE\ACTIVE\00644\10201\01\205\DWG\REVISED CMP\64410W02.DWG LAYOUT: 5 SAVED: 8/6/2010 12:41 PM ACADVER: 18.0S (LMS TECH) PAGESETUP: C:\LDB-PDF PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 8/6/2010 12:41 PM BY: FORAKER, LYDIA
XREFS: IMAGES: PROJECTNAME: ---
64410X01
64410X3A
64410X02
64410X00
64410X06

LEGEND:

- MLC PROPERTY BOUNDARY
- PROPERTY PREVIOUSLY OWNED BY GM (STILL SUBJECT TO RCRA CORRECTIVE ACTION)
- APPROXIMATE AOI BOUNDARY
- BASEMENT/TUNNEL AREA
- DEMOLISHED BUILDING
- BUILDING SCHEDULED FOR DEMOLITION
- ESTIMATED CURRENT LIMITS OF MEASURABLE LNAPL
- ESTIMATED AREA WHERE VOCs AND/OR SVOCs EXCEED MICHIGAN PART 201 GENERIC INDUSTRIAL SCREENING CRITERIA IN GROUNDWATER
- ESTIMATED AREA WHERE INORGANICS EXCEED MICHIGAN PART 201 GENERIC INDUSTRIAL SCREENING CRITERIA IN GROUNDWATER
- HISTORICAL MONITORING WELL
- DECOMMISSIONED/DESTROYED MONITORING WELL
- RECOVERY WELL
- RFI MONITORING WELL LOCATION
- DECOMMISSIONED/DESTROYED RFI MONITORING WELL
- FORMER RIVER GAUGE LOCATION
- CURRENT RIVER GAUGE LOCATION
- RFI PIEZOMETER
- RFI SOIL BORING/GRAB GROUNDWATER SAMPLE LOCATION
- RFI SOIL BORING LOCATION
- WELL INCLUDED IN CMI GROUNDWATER MONITORING PROGRAM (ANNUAL GROUNDWATER SAMPLE COLLECTION AND GROUNDWATER ELEVATION MEASUREMENT)
- WELL INCLUDED IN CMI GROUNDWATER MONITORING PROGRAM (ANNUAL GROUNDWATER ELEVATION MEASUREMENT ONLY)
- WELL INCLUDED IN LNAPL MONITORING PROGRAM (ANNUAL LNAPL AND/OR GROUNDWATER ELEVATION MEASUREMENT ONLY)
- 709.65 GROUNDWATER ELEVATION (IN FEET)
- 726 GROUNDWATER ELEVATION CONTOUR (IN FEET)
- GENERALIZED FLOW DIRECTION

NOTES:

1. BASE MAP INFORMATION FROM A SURVEY BY BMJ INC., DATED APRIL 2001, AT A SCALE OF 1:100.
2. ALL LOCATIONS ARE APPROXIMATE.
3. ESTIMATED LIMITS OF MEASURABLE LNAPL BASED MEASUREMENTS FROM MARCH 2004 TO JULY 2005.

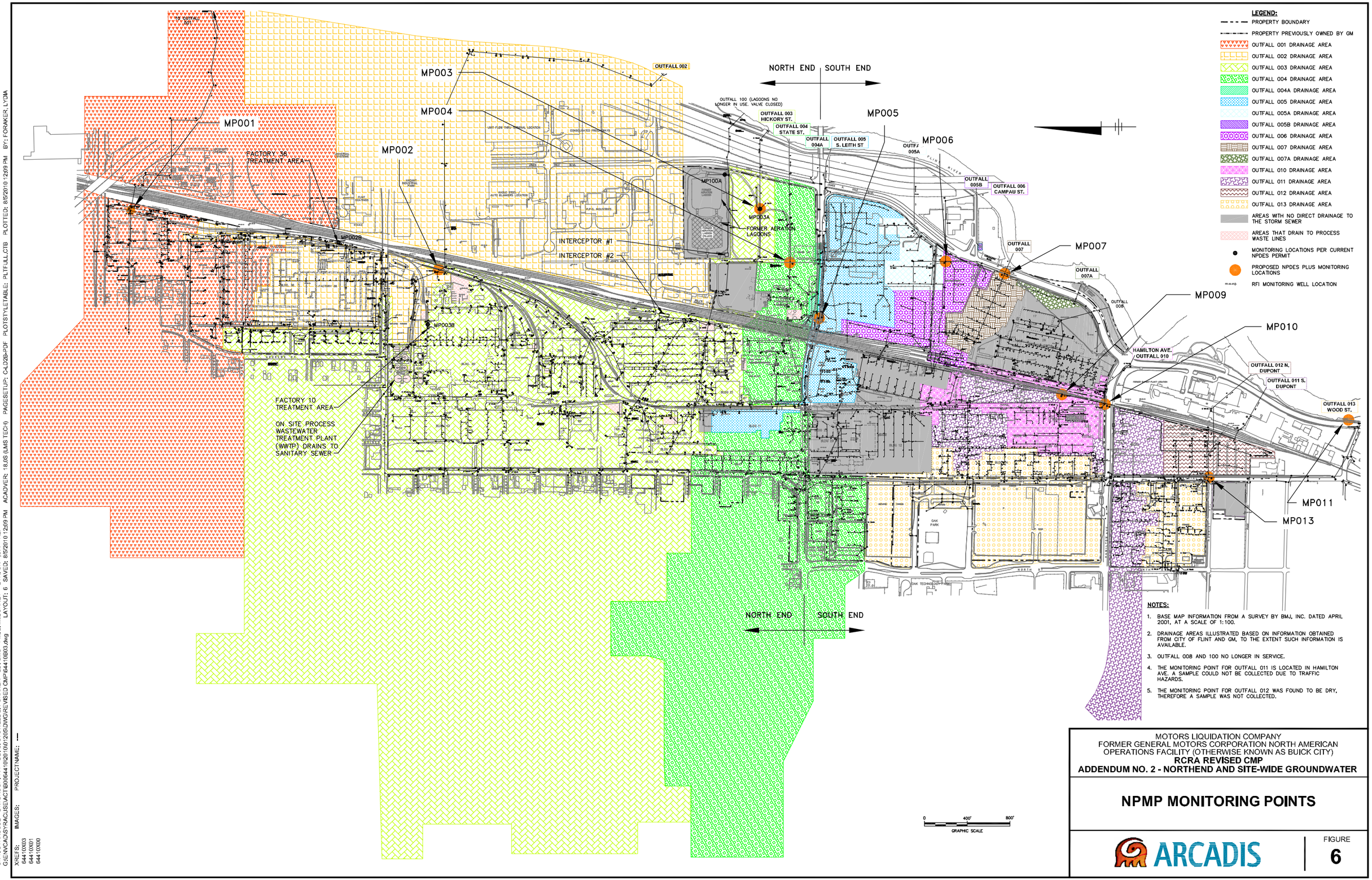
0 200' 400'
APPROXIMATE GRAPHIC SCALE

MOTORS LIQUIDATION COMPANY
FORMER GENERAL MOTORS CORPORATION NORTH AMERICAN OPERATIONS FACILITY (OTHERWISE KNOWN AS BUICK CITY)
RCRA REVISED CMP
ADDENDUM NO. 2 - NORTHEND AND SITE-WIDE GROUNDWATER

GROUNDWATER MONITORING LOCATIONS - SOUTH END

ARCADIS

FIGURE 5



NOTES:

1. BASE MAP INFORMATION FROM A SURVEY BY BMJ, INC. DATED APRIL 2001, AT A SCALE OF 1:100.
2. DRAINAGE AREAS ILLUSTRATED BASED ON INFORMATION OBTAINED FROM CITY OF FLINT AND GM, TO THE EXTENT SUCH INFORMATION IS AVAILABLE.
3. OUTFALL 008 AND 100 NO LONGER IN SERVICE.
4. THE MONITORING POINT FOR OUTFALL 011 IS LOCATED IN HAMILTON AVE. A SAMPLE COULD NOT BE COLLECTED DUE TO TRAFFIC HAZARDS.
5. THE MONITORING POINT FOR OUTFALL 012 WAS FOUND TO BE DRY, THEREFORE A SAMPLE WAS NOT COLLECTED.

MOTORS LIQUIDATION COMPANY
FORMER GENERAL MOTORS CORPORATION NORTH AMERICAN OPERATIONS FACILITY (OTHERWISE KNOWN AS BUICK CITY)
RCRA REVISED CMP
ADDENDUM NO. 2 - NORTHEND AND SITE-WIDE GROUNDWATER

NPMP MONITORING POINTS

ARCADIS

FIGURE
6

CITY: SYRACUSE DIV/GROUP: 141 DB: G. STOWELL L. FORAKER LD: GMS PM: L. McBURNEY LYR: ON=*;OFF=*REF* G:\ENVCAD\SYRACUSE\ACTIVE\60064410\2010\01\2005\DWG\REVISED CMP\60441OB03.dwg LAYOUT: 6 SAVED: 8/5/2010 12:09 PM ACADVER: 18.0S (LMS TECH) PAGESETUP: C-LD2B-PDF PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 8/5/2010 12:09 PM BY: FORAKER, LYDIA
XREFS: 64410X03 64410X01 64410X00 IMAGES: PROJECTNAME: ---

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Appendix **A**

ARCADIS
Infrastructure, environment, buildings

Imagine the result

Motors Liquidation Company

Former General Motors North American Operations
Facility (otherwise known as Buick City)

Flint, Michigan

Appendix A

Human Health Risk Assessment for the Redevelopment Construction Worker

October 2010

Tables

Attachments (Provided on CD)

ARCADIS

Appendix A

Human Health Risk Assessment for the Redevelopment Construction Worker

1. Introduction

The following presents an evaluation of potential risks and hazards for a hypothetical construction worker engaged in redevelopment activities at the Northend of the Former General Motors Corporation North American Operations Facility (otherwise known as Buick City) (Site) (see Figure 1). This construction worker human health risk assessment (HHRA) was used to identify Areas of Interest (AOIs) where additional actions may be warranted to reduce potential redevelopment construction worker exposure to constituents detected in environmental media.

A description and history of the Site can be found in detail in *the Resource Conservation and Recovery Act (RCRA) Facility Investigation Phase I Report* (Phase I RFI) (BBL, 2002) and the *RCRA Facility Investigation Phase II Report* (Phase II RFI) (BBL, 2006). The Phase II RFI also contains a HHRA for both the Northend and Southend of the Site. However, the Phase II RFI HHRA did not include an evaluation of the risks for the redevelopment construction worker working in the Northend of the Site because at that time no redevelopment of the Northend was anticipated. The buildings remaining on the Northend are scheduled for demolition and the future use of Site is now uncertain. As such, an evaluation of this receptor is warranted.

The Northend of the Site consists of 38 AOIs as follows:

- 03-1 AOI 03-1 (Quenching and Cooling Oil Systems)
- 05-1 AOI 05-1 (Former Metal Machining Chip Processing)
- 05-2 AOI 05-2 (Filtration Room, Oil Room, Below-Grade Vault, and Elevator Pit)
- 05-3 AOI 05-3 (Building 43 Basement Containing Process Waste Oil Sumps and Drains)
- 05-4 AOI 05-4 (Metal Forming Operations and Recirculation Trenches and Sumps)
- 05-5 AOI 05-5 (Active Process Machinery, Collection Trenches, and Sumps)
- 05-6 AOI-05-6 (Active Process Machinery, Collection Trenches, and Sumps)
- 07-1 AOI 07-1 (Former Coal Yard)
- 07-2 AOI 07-2 (Inactive Lime “Slaker House” and Inactive Lime Slurry Tank)
- 07-3 AOI 07-3 (Two Elevator Pits and a Bulk Acid AST)
- 10-1 AOI 10-1 (Manufacturing Operations and Several Tanks)
- 10-2 AOI 10-2 (Solid Waste Transfer Area and Former ASTs)
- 10-3 AOI 10-3 (Two Process Waste Oil Sumps)
- 10-4 AOI 10-4 (Scrapyard Area)
- 21-1 AOI 21-1 (Former Metal Chip Briquetting Operations and Current Metal Welding and Tool Grinding Operations)
- 36-1 AOI 36-1 (Engine Manufacturing and Metal Machining Processes)
- 36-2 AOI 36-2 (Metal Chip Processing Area)
- 36-3 AOI 36-3 (Engine Assembly, Waste Oil Collection and Processing, Former USTs)
- 36-4 AOI 36-4 (Former Metal Machining and Active Engine Assembly)
- 36-5 AOI 36-5 (Former UST Farm and Active AST Farm)

38-1	AOI 38-1 (Process Waste Sumps, Trenches, and Former Hydraulic Car Lifts)
55-1	AOI 55-1 (Industrial Wastewater Treatment Facilities)
65-1	AOI 65-1 (Air Compressor Station and a Main Process Waste Pump Station)
81-1	AOI 81-1 (Metal Machining, Chip, Cooling, and Cutting Oil Filtration and Processing, a Hydraulic Elevator, Process Waste Sumps and Tanks, a Drum Storage Area, and an Active Hazardous Waste Accumulation Area)
81-2	AOI 81-2 (Active Metal Welding and Machining and Torque Converter Assembly)
81-3	AOI 81-3 (Former Foundry Operations, an Elevator Pit, Metal Machining Areas, and a Forklift Battery Charging Area)
81-4	AOI 81-4 (Air Compressor Operations)
81-5	AOI 81-5 (Existing and Former ASTs)
83/84-1	AOI 83/84-1 (Former and Existing Machining Operations)
83/84-2	AOI 83/84-2 (Former and Existing Machining Operations)
83/84-3	AOI 83/84-3 (Former and Existing Machining Operations)
83/84-4	AOI 83/84-4 (Former Machining Operations and an Inactive Rail Loading Area)
83/84-5	AOI 83/84-5 (Former Process Trenches and Pits, and an Inactive Heat Treating Tunnel)
83/84-6	AOI 83/84-6 (Forklift Battery Charging Area and Associated Trench and Pit, and a Drum Storage Area)
83/84-7	AOI 83/84-7 (Underground Storage Tanks)
85-1	AOI 85-1 (Elevator Pit and Engine Test Area)
86-1	AOI 86-1 (Hazardous Waste Drum Accumulation Area, Process Waste Sump and Pump Station, Waste Transport Vehicle Storage Area, and Former USTs)
WL-	Aeration Lagoons

Details on the former uses of these AOIs are available in Sections 4.4 and 4.6 of the Phase II RFI (BBL, 2006).

2. Selection of Constituents of Potential Concern (COPCs)

2.1 Screening Approach

The first step of the risk assessment process consists of compiling and evaluating investigation data to identify the risk assessment dataset and then to select the constituents of potential concern (COPCs). The selection of COPCs was based primarily on the magnitude of the measured concentrations in the relevant environmental media. If the maximum detected concentration exceeded the screening level, or no screening level was available, then the constituent was retained as a COPC and was further evaluated.

2.1.1 Data Selection

Soil and water (groundwater, borehole water and basement water) samples were collected as described in the Phase I and II RFIs (see Section 2.3.2 of the Phase I RFI and Section 2.3.2 of the Phase II RFI).

Soil samples were collected from just below the ground surface or under foundations to the saturated zone at the Site. Sample locations are depicted on Figure 2.2 in the Phase II RFI. The on-site soil sample data associated with the AOIs listed in Section 1.1 were selected for inclusion in the risk assessment dataset. The risk assessment dataset for soil is provided in Attachment A-1 (on CD).

Locations of monitoring wells at the Site are depicted on Figure 2.2 in the Phase II RFI. The depth to groundwater ranges from approximately 6 to 16 feet below ground surface (bgs) across this portion of the Site. Contact with groundwater in areas with shallow groundwater may occur during excavation activities. Therefore, all Site groundwater data from monitoring wells associated with the AOIs listed in Section 1 were included in the risk assessment dataset (Attachment A-2, on CD). Water samples were also collected from boreholes and the basement of Building 36, and are included in the risk assessment dataset (Attachments A-3 and A-4, respectively, on CD).

Other media which have been sampled during the Phase I and II RFIs (e.g. light non-aqueous phase liquid [LNAPL], estuary water, building materials, sediment associated with surface water, sludge, solid waste, treated effluent, treatment system water and waste water) were not included in the risk assessment dataset. In addition, samples collected off-site were not included.

The site investigation activities are described and data relied upon in this assessment are provided in the Phase I and II RFIs.

2.1.2 Data Evaluation

The data available for each medium were evaluated in accordance with United States Environmental Protection Agency (USEPA) guidance for risk assessments (USEPA 1989; 1992). The data evaluation guidelines are summarized as follows:

- Constituents that were not detected in any samples evaluated in a medium were not included in the dataset used to evaluate for that medium.

- Analytical results reported as detected or estimated values ("J") were considered to be present at the reported value. Analytical results that are "U" qualified were non-detects.

- Analytical results that were rejected ("R" qualified) were removed from the risk assessment dataset.

Duplicate samples were screened as separate samples for the purposes of COPC selection.

All data are presented in Appendices B, C and D of the Phase II RFI and Appendices B, C, D, and E of the Phase I RFI. The risk assessment dataset is provided in Attachments A-1 through A-4 (on CD).

2.1.3 Identification of Screening Levels

The USEPA Regional Screening Levels (RSLs) (USEPA 2010a) were used for screening soil and groundwater. The carcinogenic RSLs were adjusted for a target cancer risk of 1×10^{-5}. The screening levels are listed in Tables A-1 through A-4.

The industrial worker soil RSLs (direct contact) were used to screen the soil data. Industrial RSLs assume exposure over a longer period and are generally lower, more restrictive, than criteria protective of construction worker direct contact. Constituents detected at concentrations greater than the industrial RSLs were identified as soil COPCs and further evaluated based on a comparison to calculated construction worker criteria.

Constituent concentrations observed in groundwater, borehole water and basement water were compared to the higher of the tap water RSLs and the Maximum Contaminant Levels (MCLs) as a conservative screening step to identify COPCs carried into the site-specific evaluation. Groundwater is not currently used as a drinking water source at the Site and will be restricted in the future.

2.1.4 Comparison to Screening Levels

The maximum detected constituent concentration in each medium was compared with the appropriate screening levels (see Tables A-1 through A-4). Constituents detected at concentrations below the screening levels were not considered further. Those constituents present at concentrations greater than the RSLs, and those for which a RSL was unavailable, were retained for further analysis as COPCs.

2.2 Soil COPCs

A summary table with the results of the screening process is provided as Table A-1. Twenty-nine constituents were selected as COPCs for further evaluation under the construction worker scenario. Table A-5 summarizes soil and water COPCs.

2.3 Groundwater, Borehole Water and Basement Water COPCs

Summary tables providing the results of the screening process for groundwater, borehole water and basement water are provided in Tables A-2 through A-4, respectively. Forty-four constituents were selected as COPCs for groundwater, 19 for borehole water, and seven for basement water. These COPCs will be further evaluated under the construction worker scenario. Table A-5 summarizes soil and water COPCs.

3. Exposure Assessment

The purpose of the exposure assessment is to evaluate the ways receptors might be exposed to constituents at a site. Exposure can occur only when the potential exists for a receptor to contact constituents or when there is a mechanism for constituents to be transported to a receptor. Without exposure, there is no risk; therefore, the exposure assessment is a critical component of the HHRA. The assessment of potential exposure includes characterization of the physical environment, identification of exposure pathways (including migration pathways, exposure points, and exposure routes), and identification of potentially exposed individuals and populations.

An exposure pathway is defined by the following four elements:

- a source and mechanism of constituent release to the environment;
- an environmental transport medium for the released constituent;
- a point of potential contact by the receptor with the medium containing the constituent (the exposure point); and
- a route of exposure to the receptor at the exposure point (e.g., ingestion, inhalation, or dermal contact).

The purpose of the exposure assessment is to identify and evaluate the ways a population may be exposed to constituents at a site. This typically involves estimating concentrations along potential pathways between sources and receptors. This usually is accomplished using site-specific data and, when necessary, mathematical modeling.

3.1 Sources

The Site has historically been associated with automobile manufacturing, and sources include those typical of this type of site. Impacts to the soil and groundwater are present from these historic operations. Section 1 lists the specific AOIs at the Northend of the Site and their associated use.

3.2 Fate and Transport

The fate and transport of constituents in environmental media is influenced by chemical/physical characteristics of the constituents such as volatility and affinity for

organic carbon in the soil. Fate and transport is also influenced by site conditions, including soil type, climate and groundwater characteristics. Chemical-specific characteristics and site-specific conditions, where available, were utilized for evaluating transport of COPCs.

3.3 Receptor

As discussed in the introduction, this HHRA targets only the hypothetical future redevelopment construction worker, as this receptor was not included in the Phase II RFI HHRA for the Northend of the Site. In the future, construction activities could occur at the Site during redevelopment.

3.4 Potentially Complete Exposure Pathways

Construction workers could contact surface and subsurface soil during excavation activities. Groundwater is shallow at the Site, and a construction worker could contact both the shallow soil and the shallow groundwater under potential future redevelopment construction activities. Therefore, exposure of a hypothetical future redevelopment construction worker to soil and groundwater is evaluated.

The relevant exposure routes for the redevelopment construction worker are incidental ingestion of soil, dermal contact with soil on exposed skin, inhalation of volatile COPCs from soil, and inhalation of fugitive dust. The construction worker may also have dermal contact with groundwater in excavations and accidentally ingest small amounts.

3.5 Exposure Point Concentrations

The concentration of COPCs at the receptor point of exposure is known as the exposure point concentration (EPC). This HHRA used the following EPCs:

- The maximum Site concentration of each constituent was used for selection of COPCs.

- The maximum COPC concentrations for each AOI were used for comparison to the health based goals (HBGs) (risk-based, media-specific criteria) for the construction worker.

- For those AOIs where the maximum soil concentration exceeded the relevant HBG, the soil EPC (except for lead) was derived as the upper confidence limit (UCL) on the mean concentration in the AOI (see Section 6.1.1).

- The EPC for lead in soil was the mean concentration in the AOI (see Section 6.1.2).

- The EPCs for groundwater, borehole water and basement water were the maximum detected concentrations for each AOI. The maximum detected concentration was chosen to represent groundwater conditions because a construction worker is likely to works within a relatively limited area.. This is a conservative, but reasonable assumption for this evaluation.

4. Toxicity Assessment

The toxicity assessment evaluates the relationship between the magnitude of exposure to a constituent and the nature and magnitude of adverse health effects that may result from such exposure. Toxicity studies with laboratory animals or epidemiological studies of human populations provide the data used to develop toxicity values. Toxicity values are values that are used in quantitative risk assessment to relate exposure and the potential for toxic effect to occur.

In this HHRA, toxicity values were used to evaluate potential short- and long-term risks. Toxicity values were chosen from sources following the USEPA-approved hierarchy (USEPA 2003b) as listed below:

- USEPA's Integrated Risk Information System (IRIS) (USEPA 2010b);
- Provisional Peer Reviewed Toxicity Values (PPRTVs) derived by USEPA's Superfund Health Risk Technical Support Center (STSC) for the USEPA Superfund program;
- Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs);
- California Environmental Protection Agency (CalEPA)/Office of Environmental Health Hazard Assessment's toxicity values (CalEPA 2010);
- USEPA Superfund program's Health Effects Assessment Summary Tables (USEPA 1997);

The toxicity values for xylene mixtures was used for the analyte "m&p-xylene" as it was more conservative than either the m- or p-xylene toxicity values.

This section discusses the two general categories of toxic effects (noncarcinogenic and carcinogenic) and constituent-specific toxicity values used to calculate potential risks for these two types of toxic effects. Toxicity values for potential noncarcinogenic and carcinogenic effects are identified from available databases.

4.1 Noncarcinogenic Effects

The potential for noncarcinogenic effects is estimated by comparing a calculated exposure dose with a reference dose (RfD) for each individual constituent. The RfD represents a daily exposure level that is designed to be protective of human health, even for sensitive individuals or subpopulations. The reference concentration (RfC) is a comparable level that represents an air concentration designed to be protective of human health, including sensitive individuals and subpopulations.

The RfD represents a daily exposure level that is not expected to cause adverse noncarcinogenic health effects. Chronic RfDs are used to assess long-term exposures ranging from 7 years to a lifetime. Subchronic RfDs are typically used to evaluate the potential for adverse health effects associated with exposure to constituents over a shorter time period up to 7 years and were used for this construction worker scenario.

For the COPCs at the Site, Table A-6 presents the RfDs used to assess oral and dermal exposure, and Table A-7 presents the RfCs used to evaluate inhalation exposure. These tables also present the target organs associated with the noncarcinogenic toxicity values for each constituent varying with the exposure route. USEPA confidence values and uncertainty factors associated with the RfDs are also listed. The uncertainty factor represents areas of uncertainty inherent in the extrapolation from the available data. The confidence levels (low, medium, high) assess the degree of confidence in the extrapolation of available data. These levels account for data deficiencies or uncertainties such as individual sensitivity and variability, interspecies variability (if animal data are used), database deficiency, and the extrapolation between exposure doses/durations.

4.2 Carcinogenic Effects

Constituents are classified as known, probable, or possible human carcinogens based on a USEPA weight-of-evidence scheme in which they are systematically evaluated for their ability to cause cancer in humans or laboratory animals. The USEPA classification scheme (USEPA 1989) contains five classes based on the weight of available evidence. These classifications were updated in USEPA's 2005 cancer guidelines and the classification is now presented as a narrative. Classifications are updated in the USEPA IRIS files as constituents are reviewed.

Constituents in Classes A, B1, and B2 generally are evaluated as carcinogens in risk assessments; however, Class C carcinogens may be evaluated on a case-by-case basis (USEPA 1989).

For the COPCs at the Site, Table A-8 presents the carcinogenic toxicity values for oral and dermal exposure, and Table A-9 presents the carcinogenic toxicity values for inhalation exposure to the COPCs at the Site. The carcinogenic toxicity value used in the calculation of potential cancer risks is the cancer slope factor (CSF), which is derived from the conservative assumption that any dose level has a possibility of causing cancer. The inhalation unit risk factor (IUR) for inhalation exposure is used in the indoor air models as the toxicity value. The cumulative dose, regardless of the particular exposure period, determines the risk; therefore, separate CSFs are not derived for subchronic and chronic exposure periods.

4.3 Dermal Toxicity Values and Dermal Absorption

Whenever possible, route-specific toxicity values have been used; however, the USEPA has not yet developed toxicity values for dermal exposures. For this reason, the oral toxicity values (RfD_o and CSF_o) and the oral absorption efficiency were used to derive adjusted toxicity values (RfD_a and CSF_a) (adjusted to the absorbed dose) for use in assessing dermal exposure (USEPA 1989):

$$RfD_a = RfD_o \times \text{Oral Absorption Efficiency}$$

$$CSF_a = CSF_o / \text{Oral Absorption Efficiency}$$

The adjusted toxicity values presented in Table A-6 and Table A-8 represent the theoretical toxicity of the orally-absorbed dose of the constituent. An oral absorption efficiency factor (or relative absorption factor) describes the ratio of the absorbed fraction of a constituent from a particular exposure medium to the fraction absorbed from the dosing vehicle used in the toxicity study for that constituent. Oral absorption efficiency values are used in the derivations of the risk-based soil and groundwater constituent concentrations to account for differences in the proportion of absorbed constituent in the soil and groundwater compared to the proportion absorbed in the toxicity studies forming the bases of the toxicity reference values. Oral absorption efficiencies are constituent-specific because they depend on unique physical-chemical properties of each constituent. As a conservative measure, the oral absorption efficiencies were assumed to be equal to 1 (i.e., 100 percent absorption) for all constituents via the inhalation pathways. Uncertainty is associated with the adjusted

toxicity values and with the dermal risks derived using these values due to the uncertainty in the oral toxicity values combined with the uncertainty in the oral absorption efficiency default and constituent-specific values. However, the calculated dermal risks are expected to be very conservative and, therefore, will overestimate human health risks.

Table A-12 presents the dermal absorption parameters for the COPCs. The dermal absorption efficiency is used to estimate dermal uptake from a soil matrix. The permeability coefficient and non-steady state dermal absorption parameters are used to estimate dermal uptake from water.

4.4 Constituents of Interest

4.4.1 Lead

Lead is evaluated differently than most constituents. USEPA does not provide toxicity values that can be used in quantitative risk assessment. Rather, the USEPA has developed models to estimate the concentration of lead in blood for adults (the Adult Lead Model; ALM) from soil exposures (USEPA 2003a). A modified version of the ALM was used to evaluate exposure to lead in water.

5. Calculation of Site-Specific Health-Based Goals for Construction Workers

HBGs are concentrations of COPCs in relevant media that are not expected to produce adverse health effects under the assumed exposure conditions. Construction worker HBGs were developed consistent with the methods presented in USEPA's Soil Screening Guidance (2002) and Development of Risk Based Preliminary Remediation Goals (USEPA, 1991). The following sections describe assumptions used to develop site-specific HBGs for construction workers.

5.1 Exposure Assumptions

This HHRA is based on evaluation of reasonable maximum exposure (RME) scenarios and assumptions. The USEPA (1989) defines the concept of RME (using the term High End Exposure scenario) as a potential estimate of the individual exposure for those persons at the upper end of an exposure distribution. In this document, the RME evaluation has been constructed with reasonable maximum input values that are consistent with the risk evaluation envisioned by the USEPA. RME exposure assumptions were estimated for each potential exposure pathway using default factors (USEPA, 2002; 2004c), site-specific information and professional judgment. Values for the construction worker exposure parameters are summarized in Table A-10 and are discussed below.

- Averaging time of 25,550 days (70 years × 365 days/year) for cancer effects; and averaging time of 350 days (50 weeks × 7 days/week) for non-cancer effects (USEPA 2002);

- Adult body weight of 70 kg (USEPA 2002);

- Exposure duration of 1 year (USEPA 2002);

- Exposure frequency of 250 days/year (5 workdays/week for 50 weeks) for soil (USEPA 2002); and 50 days per year for groundwater based on professional judgment. Based on a review of the Site groundwater levels (Phase II RFI, Figure 3-3), approximately 20 percent of the groundwater is less than 10 ft bgs at the Site. It is reasonable to assume that groundwater would not be contacted by construction workers more than 50 days per year.

- Incidental soil ingestion rate of 330 milligrams per day (mg/day) (USEPA 2002);

- Incidental groundwater ingestion rate of 0.005 liters per day (L/day) (professional judgment);

- Exposed skin surface area of 3,300 square centimeters (cm^2), which is the sum of the mean values for hands, forearms, and face for an adult (USEPA 2002); and

- Soil adherence rate of 0.2 milligrams per square centimeter per day ($mg/cm^2/day$) (USEPA 2004c)

A conservative assumption underlying all of the risk calculations is that the constituent concentrations remain constant over the entire period of exposure. The effects of attenuation processes that should reduce the concentrations of certain constituents over time are not considered.

5.2 Physical and Chemical Properties

The environmental fate and transport of the COPCs are dependent on their physical and chemical properties, the environmental transformation processes affecting them, and the media through which they are migrating. The physical and chemical properties that were used to evaluate potential exposure to the constituents detected in environmental media were compiled for each of the COPCs.

The physical and chemical properties, including molecular weight, water solubility, Henry's Law constant, diffusivity in air and water, permeability coefficient (Kp), and the organic-carbon partition coefficient (Koc) for COPCs are presented in Table A-11.

5.3 Dermal Absorption of COPCs in Soil

Dermal absorption efficiencies (ABSd) are used to reflect desorption of the constituent from soil and the absorption of the constituent across the skin. The ABSd are constituent-specific; however, general factors for classes of compounds have been recommended by USEPA (2004c). The constituent-specific ABSd values are provided in Table A-12 and on the risk characterization tables as appropriate.

5.4 Dermal Absorption of COPCs in Water

USEPA (2004c) recommends a non-steady-state approach to estimate the dermally-absorbed dose from water for organic COPCs. The non-steady state approach evaluates the absorption of constituents from water through the skin as a function of

the constituent-specific permeability coefficient (Kp), the thickness of the skin and the duration of exposure. Permeability parameters for COPCs are provided in Table A-12.

5.5 Volatilization Factor for Soil

To evaluate emission of volatiles from soil, constituent-specific volatilization factors (VFs) were calculated using USEPA (2002) guidance. The VF equation can be broken into two separate models: a model to estimate the emissions and a model to estimate the dispersion (reduced to the term Q/C) that simulates the dispersion of volatile constituents in ambient air (see Table A-13). The dispersion term for invasive activities (Q/C_{vol_cwuw}) was used in the calculations to develop a VF which reflects the potential for emissions during excavation. The Henry's Law Constant was adjusted to account for the cooler average soil conditions in Michigan. Default parameters were used for soil characteristics and wind speeds (USEPA 2002). Input parameters and the resulting VFs can be found on Table A-13.

5.6 Particulate Emission Factor for Soil

Under a construction scenario, fugitive dusts may be generated from surface soils by wind erosion, construction vehicle traffic on temporary unpaved roads and other construction activities. The calculation of the site-specific PEF for construction activities (PEF_{sc}) (Table A-14) is based exclusively on emissions from truck traffic, which typically contributes the majority of dust emissions during construction (USEPA 2002). This equation requires estimates of the subchronic air dispersion factor for a straight road (Q/C_{sr}), the number of days with at least 0.01 inches of rainfall, the mean vehicle weight, the sum of fleet vehicle distance traveled during construction, and the total time over which construction occurs. The site-specific Q/C_{sr} was calculated assuming a construction area of 2 acres. Using the USEPA default values for number of vehicles (2), the sum of the total fleet vehicle kilometers (km) traveled was calculated at 45 km. Also, the USEPA default value of 8 tons was used for the mean vehicle weight.

5.7 Recommended Health-Based Goals

Health-based goals were developed based on the following target risks:

- 1×10^{-5} target cancer risk; and,
- A noncarcinogenic hazard quotient of 1.0.

Assumptions and parameter values used to calculate the HBGs were discussed in the sections above, and are tabulated in Tables A-6 through A-14.

The equations used to calculate the HBGs for soil are shown in Table A-15. The resulting soil HBGs are shown in Table A-16. For groundwater, the equations are presented in Table A-17, and the resulting HBGs are show in Table A-18.

A summary of HBGs is presented in Table A-19. HBGs for lead in groundwater are discussed in Section 5.8, below.

5.8 Health-Based Goals for Lead in Groundwater

Lead was detected in groundwater at levels that exceeded the federal drinking water Action Level of 15 µg/L in samples collected from monitoring wells in four AOIs (36-1, 81-2, 83-1, and 83/84-3). Therefore, AOI-specific HBGs for lead in groundwater were calculated for these four AOIs.

Because blood lead levels resulting from exposure at the Site are a result of both lead-impacted soil and groundwater, the groundwater HBG takes into account the blood lead level resulting from exposure to soil and dust in addition to exposures through groundwater. In order to account for both soil and groundwater exposures, HBGs for lead in groundwater were calculated following a two-step process.

1. First, predicted adult blood lead levels due to soil exposures were calculated for each of the four AOIs using AOI-specific soil lead concentrations and the ALM spreadsheets provided by USEPA (2003a).

2. Second, for each AOI, the predicted blood lead level was then used as the baseline blood lead level in the modified ALM to calculate a HBG for lead in groundwater for each of the AOIs. The resulting predicted soil-related adult blood lead levels, summarized in Table A-20, were used as the baseline blood lead level to calculate AOI-specific HBGs for incidental ingestion of groundwater by construction workers based on a 5 percent probability that the blood lead level in a fetus of a pregnant construction worker would exceed the recommended benchmark of 10 µg/dL.

The input parameters are provided in Table A-20, and are discussed below.

General Input Parameters

The USEPA recommended Third National Health and Nutritional Examination Survey (NHANES III) Phases 1 and 2, baseline blood lead level and geometric standard deviation (USEPA 2009) were used in the ALM.

Soil Component Input Parameters

The first step of the groundwater HBG development process required derivation of soil-related blood lead levels. Default input values recommended by USEPA (2003a, 2009) were used in the ALM for soil for the following parameters:

- Fetal/maternal blood lead ratio (0.9);
- Biokinetic slope factor (0.4 micrograms per deciliter per micrograms per day [µg/dL per µg/day]);
- Geometric standard deviation of blood lead (2.1);
- Baseline blood lead level (1.5 µg/dL);
- Absorption fraction for soil (0.12); and
- Averaging time for soil exposures (365 days per year).

The AOI-specific mean lead concentration in soil was used as the soil concentration input. An exposure frequency of 250 days per year (USEPA, 2002) and a soil ingestion rate of 0.33 grams per day (USEPA 1996a, 1996b, 2002) were used, consistent with the exposure parameters used for calculating HBGs for other COPCs (Table A-10).

Groundwater Component Input Parameters

Default values recommended by USEPA (2003a, 2009) were used in the ALM modified for groundwater for the following input parameters:

- Fetal/maternal blood lead ratio (0.9);
- Biokinetic slope factor (0.4 µg/dL per µg/day);
- Geometric standard deviation of blood lead (2.1); and
- Absorption fraction for groundwater (0.2).

The groundwater exposure frequency of 50 days per year and an ingestion rate of 5 ml/day were used in the ALM modified for groundwater were consistent with the exposure factors used for other COPCs (see Table A-10). The model used an averaging time of 90 days, based on time to reach quasi steady state. The baseline blood lead level was set at the soil-related predicted adult blood lead level as described above.

Results

The resulting AOI-specific HBGs for lead in groundwater are presented in Table A-21. ALM spreadsheets are provided in Attachment A-5 (on CD).

New toxicity information provided in the Ambient Air Quality Criteria Document for Lead indicates that adverse health effects may be observed at blood lead levels of 5 µg/dL or lower (USEPA 2006). Using this target level would lower the HBGs for lead in groundwater. The calculated HBGs for lead in groundwater based on a target level of 10 µg/dL yields a 24 percent chance of having a blood lead level of greater than 5 µg/dL.

6. Comparison of Site Data to Construction Worker HBGs

The first step in the evaluation of each AOI was to compare the maximum detected concentration for each COPC to the construction worker HBG. If there were no exceedances, additional evaluation was not warranted. However, if COPCs were detected at levels greater than the HBG, additional work was completed to further refine the evaluation: AOIs with HBG exceedances were identified and exposure point concentrations were calculated as described in Section 3.5..

The maximum detected COPC concentrations in the soil were compared to the HBGs for soil (Table A-22), groundwater (Table A-23), and borehole water (Table A-24). These tables show data from only those AOIs where at least one data point exceeded the HBG. There is no table for basement water because no constituents exceeded the HBGs.

There are six AOIs where at least one constituent other than lead (e.g., arsenic, chromium, vanadium, benzene, 1,1-dichloroethane, ethylbenzene, 1,1,1-trichloroethane, benzo(a)pyrene and naphthalene) exceeds the HBG in at least one soil sample. Lead was the only constituent that exceeded the screening criteria in groundwater, borehole water or basement water.

Lead exceeds the commercial/industrial screening criterion for soil in seven AOIs, and exceeds the drinking water criterion in four AOIs for groundwater and one AOI for borehole water.

In all, 11 AOIs have at least one exceedance that is evaluated further in this section. Table A-25 summarizes the results of the comparison to HBGs.

6.1 Methods for evaluating AOIs with HBG Exceedances

6.1.1 Statistical Analysis of Constituents Other than Lead in Soil

A statistical approach was used to derive an exposure point concentration (EPC) for those AOIs where there was an exceedance of one or more HBG in soil. EPCs were derived only for those COPCs that exceeded the HBG in the AOI, except for lead (see Section 5.9.3).

Consistent with USEPA methodology, the upper confidence limit (UCL) concentrations were calculated for COPCs other than lead. The 95 percent UCL, for example, is a

statistical value calculated to estimate the mean concentration with 95 percent confidence that the true arithmetic mean concentration for the Site will be less than the UCL. The high level of confidence (e.g., 95 percent) is used to compensate for the uncertainty involved in representing the Site conditions with a finite number of samples.

UCLs were calculated using USEPA's statistical software, ProUCL, version 4.00.05 (USEPA 2010c). ProUCL includes rigorous, state-of-the-art parametric and nonparametric (including bootstrap) computation methods which can be used on skewed and unskewed data sets, with or without non-detects. Some of the methods (e.g., Kaplan-Meier method) are applicable to left-censored data sets having multiple detection limits. The ProUCL software selects the best computational method for calculating the UCL for a given data set based on a variety of statistical factors. When duplicate samples were collected, the average of the concentration detected in the parent sample and duplicate sample was used.

Table A-26 presents the EPCs used to evaluate compliance with the HBGs in those AOIs where the maximum concentration exceeded the HBG. For the two COPCs at AOI 81-2, there was only one detection. This detected concentration was used as the EPC. Other EPCs were based on UCLs derived by ProUCL using various methods, as noted in Table A-26. ProUCL printouts are included in Attachment A-6 (on CD).

6.1.2 Statistical Analysis of Lead in Soil

USEPA recommends screening criteria derived from biokinetic modeling (such as the Integrated Exposure Uptake Biokinetic Model [IEUBK] and the Adult Lead Model [ALM]) to the arithmetic mean soil concentration in an exposure unit in order to be consistent with the principles underlying the blood lead modeling approach. USEPA discussed this in its final rulemaking for identification of dangerous levels of lead (USEPA, 2001).

In calculating the EPC for lead, when duplicate samples were collected, the average of the concentration detected in the parent sample and duplicate sample was used. Table A-27 presents the EPCs for lead in soil at the AOIs where the maximum lead concentration exceeded the screening criterion.

6.1.3 Site-Specific HBG for Lead in Groundwater

AOI-specific HBGs for lead in groundwater are presented in Table A-21, along with maximum groundwater concentrations. Methods used to derive the HBGs are

discussed in Section 5.8. For AOIs 36-1, 81-2 and 81-3, maximum groundwater concentrations are below the HBGs. For AOI 83/84-3, the HBG is zero due to high concentrations of lead in soil.

7. Risk Characterization

Risk characterization involves estimating the magnitude of the potential adverse health effects of constituents of concern and forming conclusions about the nature of any identified health risks to the defined receptor populations. It combines the results of the dose-response (toxicity) and exposure assessments and integrates the HHRA and site-specific issues.

The HHRA was performed to evaluate whether constituent concentrations detected in on-site soil, groundwater, borehole water and basement water pose a significant threat to the hypothetical future redevelopment construction worker. Site-specific and default exposure assumptions were used in conjunction with peer-reviewed toxicity values to develop site-specific HGBs.

The USEPA target cancer risk range considered protective of health is 1×10^{-4} to 1×10^{-6} or less. The USEPA benchmark of 1 for non-cancer risks is considered protective. A target cancer risk of 1×10^{-5} and a target hazard quotient of 1 were used to develop the HBGs.

For those constituents which had individual exceedances of its HBG in soil, an EPC was calculated for the relevant AOI using USEPA's ProUCL software. For lead exceedances in soil, the EPC was calculated as the arithmetic mean as recommended by USEPA. Exceedances of lead screening criteria in groundwater were evaluated using the ALM to derive an AOI-specific HBG.

7.1 Evaluations of AOIs

This section discusses the potential for risk to redevelopment construction workers at each of the AOIs listed in Table A-25, and the need for risk management practices. This information is summarized in Table A-28.

AOI 05-1

AOI 05-1 had one sample where the screening criterion for lead in soil was exceeded in the 0-2 ft depth range (RFI-05-21). A comparison of the EPC for this AOI to the criteria (Table A-27) indicates that constituents in soil and groundwater in the AOI do not pose a concern for construction workers. No further action for protection of the redevelopment construction worker is recommended.

AOI 05-6

AOI 05-6 had one sample where the screening criterion for lead in soil was exceeded at a depth of 6.9-8.9 ft bgs (RFI-05-18). A comparison of the EPC for this AOI to the criteria (Table A-27) indicates that constituents in soil and groundwater in the AOI do not pose a concern for construction workers. No further action for protection of the redevelopment construction worker is recommended.

AOI 10-1

AOI 10-1 had one sample where the HBG for chromium in soil was exceeded at 9-11 ft bgs (RFI-10-01) and one location where the screening criterion for lead in soil was exceeded at 1-3 ft bgs (RFI-10-01). A comparison of the EPCs for this AOI to the HBGs/lead criterion (Tables A-26 and A-27) indicates that constituents in soil and groundwater in the AOI do not pose a concern for construction workers. No further action for protection of the redevelopment construction is recommended.

AOI 36-1

AOI 36-1 had one exceedance of the HBGs for benzene, ethylbenzene and naphthalene in soil at 12-14 ft bgs (RFI-36-07), as well as one exceedance of the lead screening criterion in groundwater (RFI-36-32). A comparison of the EPCs for the three VOCs in soil and the detected lead concentration to their respective HBGs (Tables A-26 and A-28) indicates that constituents in soil and groundwater in the AOI do not pose a concern for construction workers. No further action for protection of the redevelopment construction worker is recommended based on this analysis based on the constituent specific evaluation.

However, light non-aqueous phase liquid (LNAPL) have been reported in this AOI and the Corrective Measures Plan (CMP) recommends use restrictions for this location due to the presence of LNAPL. Preparation of a Health and Safety Plan prior to beginning excavation activities where LNAPL has been observed or where expected is also recommended.

AOI 36-2

AOI 36-2 had one sample in soil (RFI-36-36) at 1 to 3 feet bgs where the HBG for chromium was exceeded (Table A-26). Three samples were analyzed in AOI 36-2 for both total chromium and chromium VI. The results of these analyses show that

chromium VI makes up less than one percent of the total chromium in this AOI. A sample taken near this location contained total chromium at 220 mg/kg and the Chromium VI concentration was <0.02 mg/kg. Based on this analysis, constituents in soil and groundwater in the AOI do not pose a concern for construction workers. A shallow hydraulic oil plume is present at this AOI, but no restrictions are proposed.

AOI 81-1

The lead was detected at concentrations well above the generic screening level in several locations in soil at AOI 81-1 from 2.5 to 10 ft bgs (Table A-27). A land use restriction for this AOI is recommended based on the concentrations of lead. AOI 81-1 already has planned use restrictions and a requirement for a Health and Safety Plan during construction can be incorporated into these planned restrictions.

AOI 81-2

AOI 81-2 had one location where 1,1-dichloroethane and 1,1,1-trichloroethane were detected at concentrations in soil greater than their HBGs at 1-3 ft bgs (RFI-81-38) (Table A-26). No other COPCs were detected in the other samples collected in this AOI. A UCL was not calculated for these constituents due to the low detection frequency; therefore, the only detected concentrations are used for the ECPs. This area also had one exceedance of the generic soil lead screening level at 1-3 ft bgs (RFI-81-20) and several exceedances of the groundwater screening criterion; however, the lead EPCs are below the screening criteria (Tables A-21 and A-27). Based on the concentrations of 1,1-dichloroethane and 1,1,1-trichloroethane in this AOI, it is recommended that a use restriction be attached to the Site to require that a Health and Safety Plan be prepared prior to commencing construction in this AOI.

The Phase II RFI (BBL, 2006) notes that LNAPL was observed in soil at RFI-81-38. AOI 81-2 already has planned use restrictions due to PCBs in LNAPL, and a requirement for a Health and Safety Plan during construction can be incorporated into these planned restrictions.

AOI 81-3

AOI 81-3 had three exceedances of the screening criterion for lead in groundwater (86-100, RFI-81-11 over two dates). A comparison of the detected lead concentrations to the AOI-specific HBG (Tables A-21) indicates that constituents in soil and groundwater in this AOI do not pose a concern for construction workers. No further action for

protection of the redevelopment construction worker is recommended based on this analysis.

AOI 83/84-2

Chromium, vanadium and benzo(a)pyrene exceed their respective HBGs in one sample each (RFI-83/84-39 for chromium and vanadium, and RFI-83/84-22 for benzo(a)pyrene) in soil at a depth of 1 to 3 feet bgs. The EPCs for vanadium and benzo(a)pyrene are below the HBGs, but the chromium EPC exceeds the HBG (Table A-26). Lead concentrations in soil exceed the screening criterion at several locations between 0 and 9 ft bgs; however, the EPC is below the screening criterion (Table A-27).

One borehole water sample detected lead slightly above the screening criterion (RFI-83/84-05, the only borehole sample collected at this AOI).

Due to the presence of chromium at a concentration above the HBG, it is recommended that a use restriction be attached to the Site that requires a Health and Safety Plan be prepared prior to commencing construction in this area. AOI 83/84-2 already has planned use restrictions due to the presence of PCBs in LNAPL, and a requirement for a Health and Safety Plan during construction can be incorporated into these planned restrictions.

AOI 83/84-3

Lead was detected at concentrations above the generic screening level in soil at AOI 83/84-3 from 0.7-4.8 ft bgs (Table A-27). Lead was also detected in one groundwater sample (RFI-83/84-20) at a concentration above the HBG. It is recommended that a use restriction be attached to the Site to require that a Health and Safety Plan be prepared prior to commencing construction in this AOI. AOI 83/84-3 already has planned use restrictions and a requirement for a Health and Safety Plan during construction can be incorporated into these planned restrictions.

AOI 86-1

AOI 86-1 had two exceedances of the HBG for arsenic (RFI-86-07; RFI-86-17) in soil at 0.7 to 3 feet bgs. A comparison of the EPC for arsenic in soil to the HBG (Table A-26) indicates that constituents in soil and groundwater in this AOI do not pose a

concern for construction workers based on this analysis. No further action for protection of the redevelopment construction worker is recommended.

7.2 Summary and Conclusions

Table A-19 summarizes the HBGs derived for the Site and Table A-25 provides a summary of the constituents exceeding HBGs at each AOI that had at least on exceedances of an HBG. The results of comparing the EPCs to HBGs are presented in Table A-26.

Of the 11 AOIs that had a maximum concentration exceeding the HBG, only four are recommended for risk management practices: 81-1; 81-2; 83/84-2; and 83/84-3. For these AOIs, it is recommended that a land-use restriction be attached to the Site to require that a Health and Safety Plan be prepared prior to commencing construction. All of these AOIs already have planned use restrictions and a requirement for a Health and Safety Plan during construction can be incorporated into these planned restrictions.

8. References

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ARCADIS

Tables

Table A-1
Summary of Soil Sample Analytical Results, Detected Analytes Only
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

Constituent	Units	Industrial Soil RSL	Detection Frequency	Maximum Detected Concentration	Selected as a COPC?
Inorganics					
Antimony	mg/kg	410	175/364	22	no
Arsenic	mg/kg	1.6	551/555	190	**YES**
Barium	mg/kg	190000	545/545	3400	no
Beryllium	mg/kg	2000	444/463	11	no
Cadmium	mg/kg	800	504/545	24	no
Chromium Total [a]	mg/kg	5.6	550/550	2400	**YES**
Chromium VI (Hexavalent)	mg/kg	5.6	2/5	0.34	no
Cobalt	mg/kg	300	463/463	210	no
Copper	mg/kg	41000	466/469	21000	no
Cyanide (total)	mg/kg	20000	179/440	21	no
Lead [b]	mg/kg	800	588/588	69000	**YES**
Manganese	mg/kg	23000	483/483	4700	no
Mercury	mg/kg	34	263/530	5.1	no
Nickel	mg/kg	20000	463/463	340	no
Selenium	mg/kg	5100	343/545	5.4	no
Silver	mg/kg	5100	401/545	9.8	no
Thallium [c]	mg/kg	35	398/463	0.59	no
Vanadium	mg/kg	72	463/463	390	**YES**
Zinc	mg/kg	310000	468/469	5800	no
Volatile Organic Compounds (VOCs)					
Acetone	mg/kg	630000	88/544	1.7	no
Benzene	mg/kg	5.4	51/554	240	**YES**
2-Butanone (Methyl Ethyl Ketone)	mg/kg	200000	72/544	1.1	no
Carbon disulfide	mg/kg	3700	5/544	0.039	no
Chlorobenzene	mg/kg	1400	2/544	2	no
Chloroethane	mg/kg	61000	6/544	0.37	no
Chloroform (Trichloromethane)	mg/kg	1.5	1/544	0.073	no
Chloromethane (Methyl Chloride)	mg/kg	500	11/544	0.22	no
Cyclohexane	mg/kg	29000	64/462	9.9	no
1,2-Dichlorobenzene	mg/kg	9800	2/462	0.074	no
1,4-Dichlorobenzene	mg/kg	12	2/462	0.13	no
Dichlorodifluoromethane (CFC-12)	mg/kg	780	1/462	0.44	no
1,1-Dichloroethane	mg/kg	17	36/544	7000	**YES**
1,1-Dichloroethene	mg/kg	1100	5/544	10	no
cis-1,2-Dichloroethene	mg/kg	10000	26/544	5.2	no
trans-1,2-Dichloroethene	mg/kg	690	9/544	0.6	no
Ethylbenzene	mg/kg	27	80/554	680	**YES**
2-Hexanone	mg/kg	1400	2/544	0.07	no
Isopropylbenzene	mg/kg	11000	51/462	6.6	no
Methyl acetate	mg/kg	1000000	123/462	1	no
Methyl cyclohexane	mg/kg	- -	154/462	15	**YES/No RSL**
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	mg/kg	53000	6/544	3.4	no
Methylene chloride	mg/kg	53	104/544	1.2	no
Tetrachloroethene	mg/kg	2.6	25/544	2.5	no
Toluene	mg/kg	45000	114/554	4100	no
1,2,4-Trichlorobenzene	mg/kg	99	2/462	0.031	no
1,1,1-Trichloroethane	mg/kg	38000	34/544	47000	**YES**
1,1,2-Trichloroethane	mg/kg	5.3	1/544	0.13	no

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Constituent	Units	Industrial Soil RSL	Detection Frequency	Maximum Detected Concentration	Selected as a COPC?
Trichloroethene	mg/kg	14	81/544	7.4	no
Trichlorofluoromethane (CFC-11)	mg/kg	3400	6/462	0.3	no
Trifluorotrichloroethane (Freon 113)	mg/kg	180000	5/462	64000	no
Vinyl chloride	mg/kg	1.7	7/544	0.5	no
Xylenes (total)	mg/kg	2700	171/554	2500	no
m&p-Xylene	mg/kg	2700	170/554	1800	no
o-Xylene	mg/kg	19000	121/554	680	no
Semi Volatile Organic Compounds (SVOCs)					
Acenaphthene	mg/kg	33000	53/537	24	no
Acenaphthylene	mg/kg	- -	16/537	2.1	**YES/No RSL**
Acetophenone	mg/kg	100000	7/459	1.2	no
Anthracene	mg/kg	170000	93/537	61	no
Atrazine	mg/kg	7.5	2/459	0.082	no
Benzaldehyde	mg/kg	100000	7/447	0.22	no
Benzo(a)anthracene	mg/kg	2.1	173/537	81	**YES**
Benzo(a)pyrene	mg/kg	0.21	146/536	66	**YES**
Benzo(b)fluoranthene	mg/kg	2.1	165/536	63	**YES**
Benzo(g,h,i)perylene	mg/kg	- -	97/536	28	**YES/No RSL**
Benzo(k)fluoranthene	mg/kg	21	147/536	59	**YES**
Biphenyl	mg/kg	51000	36/459	3.5	no
bis(2-Chloroethoxy)methane	mg/kg	1800	1/537	0.022	no
bis(2-Chloroethyl)ether	mg/kg	1	2/537	0.025	no
bis(2-Ethylhexyl)phthalate	mg/kg	120	79/537	8.8	no
Butyl benzylphthalate	mg/kg	910	50/537	200	no
Caprolactam	mg/kg	310000	4/459	1.5	no
Carbazole	mg/kg	- -	55/537	40	**YES/No RSL**
2-Chloronaphthalene	mg/kg	82000	2/537	0.099	no
Chrysene	mg/kg	210	196/537	85	no
Dibenz(a,h)anthracene	mg/kg	0.21	23/536	17	**YES**
Dibenzofuran	mg/kg	1000	70/537	17	no
2,4-Dichlorophenol	mg/kg	1800	2/533	0.044	no
Diethyl phthalate	mg/kg	490000	38/537	4	no
Dimethyl phthalate	mg/kg	- -	2/537	0.3	**YES/No RSL**
2,4-Dimethylphenol	mg/kg	12000	7/533	0.17	no
Di-n-butylphthalate	mg/kg	62000	19/537	3.4	no
Di-n-octyl phthalate	mg/kg	- -	5/536	0.25	**YES/No RSL**
Fluoranthene	mg/kg	22000	213/537	180	no
Fluorene	mg/kg	22000	72/537	35	no
Hexachlorobutadiene	mg/kg	22	1/537	0.026	no
Hexachlorocyclopentadiene	mg/kg	3700	1/536	0.15	no
Hexachloroethane	mg/kg	120	1/537	0.021	no
Indeno(1,2,3-cd)pyrene	mg/kg	2.1	94/536	29	**YES**
Isophorone	mg/kg	1800	2/537	0.88	no
2-Methylnaphthalene	mg/kg	4100	94/537	96	no
Methylphenols, Total	mg/kg	91000	4/533	1	no
2-Methylphenol	mg/kg	31000	3/533	0.056	no
3&4-Methylphenol	mg/kg	- -	3/522	1	**YES/No RSL**
4,6-Dinitro-2-methylphenol	mg/kg	49	3/532	0.62	no
Naphthalene	mg/kg	18	118/537	44	**YES**

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Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

Constituent	Units	Industrial Soil RSL	Detection Frequency	Maximum Detected Concentration	Selected as a COPC?
Nitrobenzene	mg/kg	24	1/537	0.032	no
2-Nitrophenol	mg/kg	- -	2/533	0.048	**YES/No RSL**
N-Nitrosodi-n-propylamine	mg/kg	0.25	3/537	0.73	**YES**
N-Nitrosodiphenylamine	mg/kg	350	1/537	0.87	no
2,2'-oxybis(1-Chloropropane)	mg/kg	22	1/537	0.029	no
Pentachlorophenol	mg/kg	9	5/533	7.2	no
Phenanthrene	mg/kg	- -	229/537	190	**YES/No RSL**
Phenol	mg/kg	180000	2/534	1	no
Pyrene	mg/kg	17000	229/537	160	no
2,4,5-Trichlorophenol	mg/kg	62000	4/533	1.1	no
2,4,6-Trichlorophenol	mg/kg	160	2/533	0.24	no
Polychlorinated Biphenyls (PCBs)					
Aroclor-1242 (PCB-1242)	mg/kg	0.74	10/516	4.3	**YES**
Aroclor-1248 (PCB-1248)	mg/kg	0.74	14/516	3.5	**YES**
Aroclor-1254 (PCB-1254)	mg/kg	0.74	68/516	4.1	**YES**
Aroclor-1260 (PCB-1260)	mg/kg	0.74	47/516	0.88	**YES**

Notes:
[a] Chromium VI RSL
[b] Michigan commercial/industrial direct contact criteria
[c] Based on withdrawn IRIS value which is the basis of the MCL

COPC = Constituent of Potential Concern
RSL = U.S.EPA Regional Screening Level (USEPA, May 2010a)

Table A-2
Summary of Groundwater Sample Analytical Results, Detected Analytes Only
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

Constituent	Units	Tapwater RSL	MCL	Higher of RSL and MCL	Detection Frequency	Maximum Detected Concentraiton	Selected as a COPC?
Inorganics							
Antimony	mg/L	0.015	0.006	0.015	23/182	0.0057	no
Arsenic	mg/L	0.000045	0.01	0.01	141/185	0.17	**YES**
Barium	mg/L	7.3	2	7.3	183/183	33	**YES**
Beryllium	mg/L	0.073	0.004	0.073	35/186	0.14	**YES**
Cadmium	mg/L	0.018	0.005	0.018	131/184	0.021	**YES**
Chromium Total [a]	mg/L	0.000043	0.1	0.1	174/182	0.22	**YES**
Cobalt	mg/L	0.011	- -	0.011	179/181	0.099	**YES**
Copper	mg/L	1.5	1.3	1.5	166/181	0.31	no
Cyanide (total)	mg/L	0.73	0.2	0.73	158/278	0.16	no
Lead	mg/L	- -	0.015	0.015	173/197	0.092	**YES**
Manganese	mg/L	0.88	- -	0.88	188/188	16	**YES**
Mercury	mg/L	0.00057	0.002	0.002	18/302	0.00039	no
Nickel	mg/L	0.73	- -	0.73	184/189	0.24	no
Selenium	mg/L	0.18	0.05	0.18	59/181	0.035	no
Silver	mg/L	0.18	- -	0.18	43/181	0.003	no
Thallium	mg/L	- -	0.002	0.002	96/183	0.0049	**YES**
Vanadium	mg/L	0.0026	- -	0.0026	64/181	0.38	**YES**
Zinc	mg/L	11	- -	11	156/183	6	no
Inorganics-Dissolved							
Antimony (Dissolved)	mg/L	0.015	0.006	0.015	12/181	0.0032	no
Arsenic (Dissolved)	mg/L	0.000045	0.01	0.01	142/187	0.12	**YES**
Barium (Dissolved)	mg/L	7.3	2	7.3	183/183	28	**YES**
Beryllium (Dissolved)	mg/L	0.073	0.004	0.073	16/181	0.043	no
Cadmium (Dissolved)	mg/L	0.018	0.005	0.018	58/185	0.0037	no
Chromium Total (Dissolved) [a]	mg/L	0.000043	0.1	0.1	86/186	0.023	no
Cobalt (Dissolved)	mg/L	0.011	- -	0.011	174/182	0.015	**YES**
Copper (Dissolved)	mg/L	1.5	1.3	1.5	159/186	0.05	no
Cyanide (dissolved)	mg/L	0.73	0.2	0.73	121/178	0.099	no
Lead (Dissolved)	mg/L	- -	0.015	0.015	27/186	0.019	**YES**
Manganese (Dissolved)	mg/L	0.88	- -	0.88	183/184	9.2	**YES**
Mercury (Dissolved)	mg/L	0.00057	0.002	0.002	2/186	0.00013	no
Nickel (Dissolved)	mg/L	0.73	- -	0.73	181/183	0.17	no
Selenium (Dissolved)	mg/L	0.18	0.05	0.18	92/186	0.19	**YES**
Silver (Dissolved)	mg/L	0.18	- -	0.18	35/185	0.0077	no
Thallium (Dissolved)	mg/L	- -	0.002	0.002	23/182	0.0034	**YES**
Vanadium (Dissolved)	mg/L	0.0026	- -	0.0026	32/182	0.13	**YES**
Zinc (Dissolved)	mg/L	11	- -	11	165/186	0.66	no
Volatile Organic Compounds (VOCs)							
Acetone	mg/L	22	- -	22	65/445	0.19	no
Benzene	mg/L	0.00041	0.005	0.005	94/450	6	**YES**
Bromodichloromethane	mg/L	0.00012	0.08	0.08	2/450	0.001	no
2-Butanone (Methyl Ethyl Ketone)	mg/L	7.1	- -	7.1	22/450	0.032	no
Carbon disulfide	mg/L	1	- -	1	6/450	0.006	no
Chloroethane	mg/L	21	- -	21	78/450	14	no
Chloroform (Trichloromethane)	mg/L	0.00019	0.08	0.08	22/450	0.012	no
Chloromethane (Methyl Chloride)	mg/L	0.19	- -	0.19	2/450	0.016	no
Cyclohexane	mg/L	13	- -	13	12/446	0.069	no
1,2-Dichlorobenzene	mg/L	0.37	0.6	0.6	1/446	0.00096	no
1,3-Dichlorobenzene	mg/L	- -	- -	- -	8/446	0.0003	**YES/No RSL**
1,1-Dichloroethane	mg/L	0.0024	- -	0.0024	198/450	12	**YES**
1,2-Dichloroethane	mg/L	0.00015	0.005	0.005	54/450	0.017	**YES**
1,1-Dichloroethene	mg/L	0.34	0.007	0.34	68/450	0.13	no
cis-1,2-Dichloroethene	mg/L	0.37	0.07	0.37	176/450	0.45	**YES**
trans-1,2-Dichloroethene	mg/L	0.11	0.1	0.11	64/450	0.02	no
1,2-Dichloropropane	mg/L	0.00039	0.005	0.005	8/450	0.14	**YES**
Ethylbenzene	mg/L	0.0015	0.7	0.7	28/450	1.3	**YES**
2-Hexanone	mg/L	0.047	- -	0.047	1/450	0.0067	no
Isopropylbenzene	mg/L	0.68	- -	0.68	25/446	0.33	no
Methyl acetate	mg/L	37	- -	37	1/446	0.08	no
Methyl cyclohexane	mg/L	- -	- -	- -	23/446	0.15	**YES/No RSL**

Table A-2
Summary of Groundwater Sample Analytical Results, Detected Analytes Only
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

Constituent	Units	Tapwater RSL	MCL	Higher of RSL and MCL	Detection Frequency	Maximum Detected Concentraiton	Selected as a COPC?
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	mg/L	2	- -	2	5/450	0.0098	no
Methyl Tert Butyl Ether	mg/L	0.012	- -	0.012	33/450	0.015	**YES**
Methylene chloride	mg/L	0.0048	0.005	0.005	17/450	0.01	**YES**
Tetrachloroethene	mg/L	0.00011	0.005	0.005	31/450	0.041	**YES**
Toluene	mg/L	2.3	1	2.3	51/450	20	**YES**
1,2,4-Trichlorobenzene	mg/L	0.0023	0.07	0.07	2/446	0.00075	no
1,1,1-Trichloroethane	mg/L	9.1	0.2	9.1	136/450	2.4	no
1,1,2-Trichloroethane	mg/L	0.00024	0.005	0.005	19/450	0.005	no
Trichloroethene	mg/L	0.002	0.005	0.005	158/450	2	**YES**
Trichlorofluoromethane (CFC-11)	mg/L	1.3	- -	1.3	10/446	0.0032	no
Trifluorotrichloroethane (Freon 113)	mg/L	59	- -	59	1/446	0.0021	no
Vinyl chloride	mg/L	0.000016	0.002	0.002	128/450	0.52	**YES**
Xylenes (total)	mg/L	0.2	10	10	40/450	5	no
m&p-Xylene	mg/L	0.2	- -	0.2	37/450	3.4	**YES**
o-Xylene	mg/L	1.2	- -	1.2	31/450	1.6	**YES**
Semi Volatile Organic Compounds (SVOCs)							
Acenaphthene	mg/L	2.2	- -	2.2	5/171	0.012	no
Acetophenone	mg/L	3.7	- -	3.7	2/171	0.00079	no
Benzaldehyde	mg/L	3.7	- -	3.7	1/171	0.0013	no
Benzo(a)anthracene	mg/L	0.000029	- -	0.000029	1/171	0.00089	**YES**
Benzo(a)pyrene	mg/L	0.0000029	0.0002	0.0002	1/171	0.00055	**YES**
Benzo(k)fluoranthene	mg/L	0.00029	- -	0.00029	1/171	0.00072	**YES**
Biphenyl	mg/L	1.8	- -	1.8	3/171	0.011	no
bis(2-Chloroethyl)ether	mg/L	0.000012	- -	0.000012	2/171	0.026	**YES**
bis(2-Ethylhexyl)phthalate	mg/L	0.0048	0.006	0.006	11/171	0.0039	no
Caprolactam	mg/L	18	- -	18	1/171	0.0018	no
Dibenz(a,h)anthracene	mg/L	0.0000029	- -	0.0000029	1/171	0.0005	**YES**
Dibenzofuran	mg/L	0.037	- -	0.037	4/171	0.0027	no
Diethyl phthalate	mg/L	29	- -	29	14/171	0.0028	no
2,4-Dimethylphenol	mg/L	0.73	- -	0.73	4/170	0.097	no
Di-n-butylphthalate	mg/L	3.7	- -	3.7	4/171	0.0026	no
Fluoranthene	mg/L	1.5	- -	1.5	2/171	0.0013	no
Fluorene	mg/L	1.5	- -	1.5	5/171	0.002	no
2-Methylnaphthalene	mg/L	0.15	- -	0.15	7/171	0.055	no
Methylphenols, Total	mg/L	0.93	- -	0.93	2/170	0.062	no
2-Methylphenol	mg/L	1.8	- -	1.8	2/170	0.021	no
3&4-Methylphenol	mg/L	- -	- -	- -	1/163	0.042	**YES/No RSL**
Naphthalene	mg/L	0.00014	- -	0.00014	9/171	0.037	**YES**
Nitrobenzene	mg/L	0.00012	- -	0.00012	1/171	0.00063	**YES**
2,2'-oxybis(1-Chloropropane)	mg/L	0.00032	- -	0.00032	3/171	0.005	**YES**
Phenanthrene	mg/L	- -	- -	- -	3/171	0.00084	**YES/No RSL**
Phenol	mg/L	11	- -	11	1/170	0.0013	no
Pyrene	mg/L	1.1	- -	1.1	2/171	0.0011	no
Polychlorinated Biphenyls (PCBs)							
Total PCBs [b]	mg/L	0.00017	0.0005	0.0005	2/168	0.00033	no

Notes:
[a] Chromium VI RSL
[b] Total PCB RSL is for "low risk"

COPC = Constituent of Potential Concern
MCL = Maximum Contaminant Level
RSL = U.S.EPA Regional Screening Level (USEPA, May 2010a)

Table A-3
Summary of Borehole Water Sample Analytical Results, Detected Analytes Only
General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

Constituent	Units	Tapwater RSL	MCL	Higher of RSL and MCL	Detection Frequency	Maximum Detected Concentraiton	Selected as a COPC?
Inorganics							
Arsenic	mg/L	0.000045	0.01	0.01	1/1	0.1	**YES**
Barium	mg/L	7.3	2	7.3	1/1	0.36	no
Beryllium	mg/L	0.073	0.004	0.073	1/1	0.0046	no
Cadmium	mg/L	0.018	0.005	0.018	1/1	0.002	no
Chromium Total [a]	mg/L	0.000043	0.1	0.1	1/1	0.0024	no
Cobalt	mg/L	0.011	- -	0.011	1/1	0.0061	no
Copper	mg/L	1.5	1.3	1.5	1/1	0.0076	no
Cyanide (total)	mg/L	0.73	0.2	0.73	3/3	0.042	no
Lead	mg/L	- -	0.015	0.015	1/1	0.00039	no
Manganese	mg/L	0.88	- -	0.88	1/1	0.17	no
Nickel	mg/L	0.73	- -	0.73	1/1	0.02	no
Silver	mg/L	0.18	- -	0.18	1/1	0.00092	no
Thallium	mg/L	- -	0.002	0.002	1/1	0.00034	no
Inorganics-Dissolved							
Antimony (Dissolved)	mg/L	0.015	0.006	0.015	3/19	0.0035	no
Arsenic (Dissolved)	mg/L	0.000045	0.01	0.01	21/23	0.095	**YES**
Barium (Dissolved)	mg/L	7.3	2	7.3	23/23	0.85	no
Beryllium (Dissolved)	mg/L	0.073	0.004	0.073	1/19	0.00081	no
Cadmium (Dissolved)	mg/L	0.018	0.005	0.018	10/23	0.0039	no
Chromium Total (Dissolved) [a]	mg/L	0.000043	0.1	0.1	18/23	0.0055	no
Cobalt (Dissolved)	mg/L	0.011	- -	0.011	19/19	0.03	**YES**
Copper (Dissolved)	mg/L	1.5	1.3	1.5	22/23	0.068	no
Cyanide (dissolved)	mg/L	0.73	0.2	0.73	10/19	0.038	no
Lead (Dissolved)	mg/L	- -	0.015	0.015	3/23	0.02	**YES**
Manganese (Dissolved)	mg/L	0.88	- -	0.88	19/19	2.8	**YES**
Nickel (Dissolved)	mg/L	0.73	- -	0.73	16/19	0.091	no
Selenium (Dissolved)	mg/L	0.18	0.05	0.18	13/23	0.029	no
Silver (Dissolved)	mg/L	0.18	- -	0.18	6/23	0.0016	no
Thallium (Dissolved)	mg/L	- -	0.002	0.002	3/19	0.0014	no
Vanadium (Dissolved)	mg/L	0.0026	- -	0.0026	13/19	0.016	**YES**
Zinc (Dissolved)	mg/L	11	- -	11	21/23	0.079	no
Volatile Organic Compounds (VOCs)							
Acetone	mg/L	22	- -	22	5/25	0.014	no
Benzene	mg/L	0.00041	0.005	0.005	5/25	0.0051	**YES**
2-Butanone (Methyl Ethyl Ketone)	mg/L	7.1	- -	7.1	2/25	0.0063	no
Carbon disulfide	mg/L	1	- -	1	1/25	0.0022	no
Chloroethane	mg/L	21	- -	21	1/25	14	no
Chloromethane (Methyl Chloride)	mg/L	0.19	- -	0.19	1/25	0.00069	no
Cyclohexane	mg/L	13	- -	13	1/21	0.001	no
1,1-Dichloroethane	mg/L	0.0024	- -	0.0024	4/25	0.25	**YES**
1,2-Dichloroethane	mg/L	0.00015	0.005	0.005	1/25	0.0054	**YES**
cis-1,2-Dichloroethene	mg/L	0.37	0.07	0.37	9/25	0.075	no
trans-1,2-Dichloroethene	mg/L	0.11	0.1	0.11	4/25	0.013	no
Ethylbenzene	mg/L	0.0015	0.7	0.7	3/25	0.0079	no
Isopropylbenzene	mg/L	0.68	- -	0.68	2/21	0.0089	no
Methyl cyclohexane	mg/L	- -	- -	- -	2/21	0.0036	**YES/No RSL**
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	mg/L	2	- -	2	1/25	0.0015	no
Methylene chloride	mg/L	0.0048	0.005	0.005	1/25	0.0093	**YES**
Toluene	mg/L	2.3	1	2.3	7/25	0.015	no
1,1,1-Trichloroethane	mg/L	9.1	0.2	9.1	2/25	0.022	no
Trichloroethene	mg/L	0.002	0.005	0.005	6/25	0.046	**YES**
Vinyl chloride	mg/L	0.000016	0.002	0.002	7/25	0.069	**YES**
Xylenes (total)	mg/L	0.2	10	10	2/25	0.061	no
m&p-Xylene	mg/L	0.2	- -	0.2	2/25	0.026	no
o-Xylene	mg/L	1.2	- -	1.2	2/25	0.035	no
Semi Volatile Organic Compounds (SVOCs)							
Acetophenone	mg/L	3.7	- -	3.7	1/21	0.031	no
Benzo(a)anthracene	mg/L	0.000029	- -	0.000029	1/25	0.00078	**YES**
Biphenyl	mg/L	1.8	- -	1.8	1/21	0.094	no
bis(2-Ethylhexyl)phthalate	mg/L	0.0048	0.006	0.006	7/25	0.11	**YES**

Table A-3
Summary of Borehole Water Sample Analytical Results, Detected Analytes Only
General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

Constituent	Units	Tapwater RSL	MCL	Higher of RSL and MCL	Detection Frequency	Maximum Detected Concentraiton	Selected as a COPC?
Caprolactam	mg/L	18	- -	18	2/21	0.0029	no
2-Chlorophenol	mg/L	0.18	- -	0.18	1/25	0.002	no
Diethyl phthalate	mg/L	29	- -	29	2/25	0.0014	no
Fluorene	mg/L	1.5	- -	1.5	1/25	0.047	no
2-Methylnaphthalene	mg/L	0.15	- -	0.15	2/25	0.32	**YES**
Methylphenols, Total	mg/L	0.93	- -	0.93	1/25	0.0033	no
2-Methylphenol	mg/L	1.8	- -	1.8	1/25	0.0033	no
Naphthalene	mg/L	0.00014	- -	0.00014	2/25	0.058	**YES**
2-Nitroaniline	mg/L	0.37	- -	0.37	1/25	0.00068	no
N-Nitrosodiphenylamine	mg/L	0.014	- -	0.014	1/25	0.0015	no
Pentachlorophenol	mg/L	0.00056	0.001	0.001	1/25	0.0021	**YES**
Phenanthrene	mg/L	- -	- -	- -	2/25	0.017	**YES/No RSL**
2,4,6-Trichlorophenol	mg/L	0.0061	- -	0.0061	1/25	0.0021	no

Notes:
[a] Chromium VI RSL

COPC = Constituent of Potential Concern
MCL = Maximum Contaminant Level
RSL = U.S.EPA Regional Screening Level (USEPA, May 2010a)

Table A-4
Summary of Basement Water Sample Analytical Results, Detected Analytes Only
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

Constituent	Units	Tapwater RSL	MCL	Higher of RSL and MCL	Detection Frequency	Maximum Detected Concentraiton	Selected as a COPC?
Inorganics-Dissolved							
Arsenic (Dissolved)	mg/L	0.000045	0.01	0.01	2/2	0.033	**YES**
Barium (Dissolved)	mg/L	7.3	2	7.3	2/2	0.26	no
Cadmium (Dissolved)	mg/L	0.018	0.005	0.018	1/2	0.000042	no
Chromium Total (Dissolved) [a]	mg/L	0.000043	0.1	0.1	2/2	0.0013	no
Cobalt (Dissolved)	mg/L	0.011	- -	0.011	1/2	0.00039	no
Copper (Dissolved)	mg/L	1.5	1.3	1.5	2/2	0.065	no
Lead (Dissolved)	mg/L	- -	0.015	0.015	1/2	0.00022	no
Manganese (Dissolved)	mg/L	0.88	- -	0.88	2/2	0.3	no
Nickel (Dissolved)	mg/L	0.73	- -	0.73	2/2	0.01	no
Selenium (Dissolved)	mg/L	0.18	0.05	0.18	2/2	0.01	no
Thallium (Dissolved)	mg/L	- -	0.002	0.002	1/2	0.00026	no
Vanadium (Dissolved)	mg/L	0.0026	- -	0.0026	2/2	0.0023	no
Zinc (Dissolved)	mg/L	11	- -	11	2/2	0.025	no
Volatile Organic Compounds (VOCs)							
Acetone	mg/L	22	- -	22	1/2	0.0047	no
Benzene	mg/L	0.00041	0.005	0.005	2/2	0.014	**YES**
Chloroethane	mg/L	21	- -	21	1/2	0.00082	no
1,1-Dichloroethane	mg/L	0.0024	- -	0.0024	2/2	0.015	**YES**
1,1-Dichloroethene	mg/L	0.34	0.007	0.34	2/2	0.01	no
cis-1,2-Dichloroethene	mg/L	0.37	0.07	0.37	2/2	1	**YES**
trans-1,2-Dichloroethene	mg/L	0.11	0.1	0.11	2/2	0.021	no
Ethylbenzene	mg/L	0.0015	0.7	0.7	1/2	0.00057	no
Tetrachloroethene	mg/L	0.00011	0.005	0.005	2/2	0.15	**YES**
Toluene	mg/L	2.3	1	2.3	1/2	0.00053	no
1,1,2-Trichloroethane	mg/L	0.00024	0.005	0.005	1/2	0.00084	no
Trichloroethene	mg/L	0.002	0.005	0.005	2/2	0.36	**YES**
Vinyl chloride	mg/L	0.000016	0.002	0.002	2/2	0.14	**YES**
Miscellaneous							
Fluoride	mg/L	1.5	- -	1.5	1/1	0.43	no
Fluorine	mg/L	2.2	4	4	1/2	0.02	no

Notes:
[a] Chromium VI RSL

COPC = Constituent of Potential Concern
MCL = Maximum Contaminant Level
RSL = U.S.EPA Regional Screening Level (USEPA, May 2010a)

Table A-5
Summary of Constituents of Potential Concern (COPCs) for Construction Worker Scenario
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

SOIL	GROUNDWATER	BOREHOLE WATER	BASEMENT WATER
Inorganics [a]			
Arsenic Chromium (total) Lead Vanadium	Arsenic Barium Beryllium Cadmium Chromium (total) Cobalt Lead Manganese Selenium Thallium Vanadium	Arsenic Cobalt Lead Manganese Vanadium	Arsenic
Volatile Organic Compounds (VOCs)			
Benzene 1,1-Dichloroethane Ethylbenzene Methyl cyclohexane 1,1,1-Trichloroethane	Benzene 1,3-Dichlorobenzene 1,1-Dichloroethane 1,2-Dichloroethane cis-1,2-Dichloroethene 1,2-Dichloropropane Ethylbenzene Methyl cyclohexane Methyl Tert Butyl Ether Methylene chloride Tetrachloroethene Toluene Trichloroethene Vinyl chloride m&p-Xylene o-Xylene	Benzene 1,1-Dichloroethane 1,2-Dichloroethane Methyl cyclohexane Methylene chloride Trichloroethene Vinyl chloride	Benzene 1,1-Dichloroethane cis-1,2-Dichloroethene Tetrachloroethene Trichloroethene Vinyl chloride
Semi Volatile Organic Compounds (SVOCs)			
Acenaphthylene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Carbazole Dibenz(a,h)anthracene Dimethyl phthalate Di-n-octyl phthalate Indeno(1,2,3-cd)pyrene 3&4-Methylphenol Naphthalene 2-Nitrophenol N-Nitrosodi-n-propylamine Phenanthrene	Benzo(a)anthracene Benzo(a)pyrene Benzo(k)fluoranthene bis(2-Chloroethyl)ether Dibenz(a,h)anthracene 3&4-Methylphenol Naphthalene Nitrobenzene 2,2'-oxybis(1-Chloropropane) Phenanthrene	Benzo(a)anthracene bis(2-Ethylhexyl)phthalate 2-Methylnaphthalene Naphthalene Pentachlorophenol Phenanthrene	
Polychlorinated Biphenyls (PCBs)			
Aroclor-1242 (PCB-1242) Aroclor-1248 (PCB-1248) Aroclor-1254 (PCB-1254) Aroclor-1260 (PCB-1260)			

Notes:
[a] If either total or dissolved inorganics exceed a RSL, it is a COPC

Table A-6
Noncarcinogenic Toxicity Values for Oral and Dermal Exposure
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent		Oral RfD (mg/kg/day) [a] Subchronic	[ref]	Chronic	[ref]	Adjustment Factor [a]	Dermal RfD (mg/kg/day) [a,b] Subchronic	Chronic	Target Site/ Critical Effect	Confidence Level/ Uncertainty Factor
Inorganics										
Arsenic		3.0E-04	c	3.0E-04	I	1	3.0E-04	3.0E-04	NA	medium/3
Barium		2.0E-01	c	2.0E-01	I	0.07	1.4E-02	1.4E-02	kidney	medium/300
Beryllium		5.0E-03	H	2.0E-03	I	0.007	3.5E-05	1.4E-05	intestine	low-medium/300
Cadmium		1.0E-03	c	1.0E-03	I	0.025	2.5E-05	2.5E-05	kidney	NA
Chromium (total)	[c]	2.0E-02	H	3.0E-03	I	0.013	2.6E-04	3.9E-05	NR	low/300
Cobalt		3.0E-04	c	3.0E-04	P	1	3.0E-04	3.0E-04	skin	NA
Lead		NA		NA		1	NA	NA	NA	NA
Manganese		1.4E-01	c	1.4E-01	I	0.04	5.6E-03	5.6E-03	CNS	medium/1
Selenium		5.0E-03	H	5.0E-03	I	1	5.0E-03	5.0E-03	WB	high/3
Thallium		6.7E-05	c	6.7E-05	w	1	6.7E-05	6.7E-05	NA	NA
Vanadium		7.0E-04	P	7.0E-05	P	0.026	1.8E-05	1.8E-06	liver	low/100
Volatile Organic Compounds (VOCs)							0.0E+00			
Benzene		1.0E-02	P	4.0E-03	I	1	1.0E-02	4.0E-03	blood	medium/100
1,1-Dichloroethane		2.0E+00	cx	2.0E-01	P	1	2.0E+00	2.0E-01	NR	NA/1000
1,2-Dichloroethane		2.0E-02	c	2.0E-02	P	1	2.0E-02	2.0E-02	kidney	high/1000
cis-1,2-Dichloroethene		1.0E-01	H	1.0E-02	P	1	1.0E-01	1.0E-02	blood	low/3000
1,2-Dichloropropane		7.0E-02	A	9.0E-02	A	1	7.0E-02	9.0E-02	liver	1.0E+03
1,3-Dichlorobenzene	[d]	9.0E-01	Hw	9.0E-02	Is	1	9.0E-01	9.0E-02	NA	NA
Ethylbenzene		5.0E-02	P	1.0E-01	I	1	5.0E-02	1.0E-01	liver, kidney	high/1000
Methyl cyclohexane		8.6E-01	c	8.6E-01	P	1	8.6E-01	8.6E-01	NA	NA
Methyl Tert Butyl Ether		NA		NA		1	NA	NA	NA	NA
Methylene chloride		6.0E-02	H	6.0E-02	I	1	6.0E-02	6.0E-02	liver	medium/100
Tetrachloroethene		1.0E-01	H	1.0E-02	I	1	1.0E-01	1.0E-02	liver	medium/1000
Toluene		8.0E-01	P	8.0E-02	I	1	8.0E-01	8.0E-02	liver, kidney	medium/3000
1,1,1-Trichloroethane		7.0E+00	I	2.0E+00	I	1	7.0E+00	2.0E+00	reduced body weight	low-medium/1000
Trichloroethene		NA		NA		1	NA	NA	NA	NA
Vinyl chloride		3.0E-03	c	3.0E-03	I	1	3.0E-03	3.0E-03	liver	medium/30
m&p-Xylene		4.0E-01	P	2.0E-01	I	1	4.0E-01	2.0E-01	CNS, WB	medium/100
o-Xylene		4.0E-01	P	2.0E-01	I	1	4.0E-01	2.0E-01	CNS, WB	medium/100
Semi Volatile Organic Compounds (SVOCs)							0.0E+00			
Acenaphthylene	[e]	6.0E-01	Hs	6.0E-02	Is	1	6.0E-01	6.0E-02	liver	low/3000
Benzo(a)anthracene		NA		NA		1	NA	NA	NA	NA
Benzo(a)pyrene		NA		NA		1	NA	NA	NA	NA
Benzo(b)fluoranthene		NA		NA		1	NA	NA	NA	NA
Benzo(g,h,i)perylene	[f]	3.0E-02	cs	3.0E-02	Is	1	3.0E-02	3.0E-02	kidney	NA

Table A-6
Noncarcinogenic Toxicity Values for Oral and Dermal Exposure
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent	Oral RfD (mg/kg/day) [a] Subchronic	[ref]	Chronic	[ref]	Adjustment Factor [a]	Dermal RfD (mg/kg/day) [a,b] Subchronic	Chronic	Target Site/ Critical Effect	Confidence Level/ Uncertainty Factor
Benzo(k)fluoranthene	NA		NA		1	NA	NA	NA	NA
bis(2-Chloroethyl)ether	NA		NA		1	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	2.0E-01	cx	2.0E-02	I	1	2.0E-01	2.0E-02	liver	medium/1000
Carbazole	NA		NA		1	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA		NA		1	NA	NA	NA	NA
Dimethyl phthalate	1.0E+01	c	1.0E+01	H	1	1.0E+01	1.0E+01	kidney	NA
Di-n-octyl phthalate [g]	4.0E-01	Ns	4.0E-02	Ns	1	4.0E-01	4.0E-02	liver	NA/1000
Indeno(1,2,3-cd)pyrene	NA		NA		1	NA	NA	NA	NA
2-Methylnaphthalene	4.0E-03	c	4.0E-03	I	1	4.0E-03	4.0E-03	lungs	low/1000
3&4-Methylphenol	5.0E-03	H	5.0E-03	H	1	5.0E-03	5.0E-03	CNS, WB	low/1000
Naphthalene	2.0E-01	cx	2.0E-02	I	1	2.0E-01	2.0E-02	WB	low/3000
Nitrobenzene	5.0E-03	H	2.0E-03	I	1	5.0E-03	2.0E-03	blood, adrenal, liver, kidney	low/10,000
2-Nitrophenol	NA		NA		1	NA	NA	NA	NA
N-Nitrosodi-n-propylamine	NA		NA		1	NA	NA	NA	NA
2,2'-oxybis(1-Chloropropane)	4.0E-02	H	4.0E-02	I	1	4.0E-02	4.0E-02	blood	low/1000
Pentachlorophenol	3.0E-02	H	3.0E-02	I	1	3.0E-02	3.0E-02	liver, kidney	medium/100
Phenanthrene [h]	3.0E+00	Hs	3.0E-01	Is	1	3.0E+00	3.0E-01	NR	NA
Polychlorinated Biphenyls (PCBs)						0.0E+00			
Aroclor-1242 (PCB-1242)	NA		NA		1	NA	NA	NA	NA
Aroclor-1248 (PCB-1248)	NA		NA		1	NA	NA	NA	NA
Aroclor-1254 (PCB-1254)	5.0E-05	H	2.0E-05	I	1	5.0E-05	2.0E-05	eye, nails, immune system	medium/300
Aroclor-1260 (PCB-1260)	NA		NA		1	NA	NA	NA	NA

References [ref]:

A	Agency for Toxic Substances Disease Registry (ATDSR) (ATSDR 2010).
H	USEPA, Health Effects Summary Table (HEAST; USEPA 1997).
I	USEPA, Integrated Risk Information System (IRIS; USEPA 2010b).
P	Provisional Peer Reviewed Toxicity Values (PPRTV) obtained from the National Center for Environmental Assessment (NCEA 2009) as referenced in USEPA Regional Screening Level Table (USEPA 2010a), or as obtained from the Superfund Health Risk Technical Support Center (SHRTSS, 2009).
w	withdrawn from IRIS
–	Not applicable.
c	The chronic value is used if available.
CNS	Central nervous system.
mg/kg/day	Milligrams per kilogram per day.
NA	Not available.
NR	None reported.

Table A-6
Noncarcinogenic Toxicity Values for Oral and Dermal Exposure
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent	Oral RfD (mg/kg/day) [a] Subchronic	[ref]	Chronic	[ref]	Adjustment Factor [a]	Dermal RfD (mg/kg/day) [a,b] Subchronic	Chronic	Target Site/ Critical Effect	Confidence Level/ Uncertainty Factor

RfD	Reference Dose.
s	Value is based on use of a surrogate compound, as indicated.
WB	Whole body (includes increased mortality and changes to body weight).
x	The uncertainty factor for subchronic to chronic extrapolation was removed.
[a]	Toxicity values were obtained following USEPA recommended hierarchy (USEPA 2003).
[b]	The oral-to-dermal adjustment factor (oral absorption efficiency) as used to calculate the dermal RfD values, USEPA 2004c. RfD (dermal) = RfD (oral) × Adjustment Factor (oral absorption efficiency).
[c]	Assumed as Chromium VI.
[d]	1,2-Dichlorobenzene used as a surrogate.
[e]	Acenaphthene used as a surrogate.
[f]	Pyrene used as a surrogate.
[g]	di-n-Butylphthalate used as a surrogate.
[h]	Anthracene used as a surrogate.

Table A-7
Noncarcinogenic Toxicity Values for Inhalation Exposure
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent		Inhalation RfC (mg/m^3) [a] Subchronic	[ref]	Chronic	[ref]	Target Site/ Critical Effect	Confidence Level/ Uncertainty Factor
Inorganics							
Arsenic		1.5E-05	c	1.5E-05	C	NA	NA
Barium		5.0E-03	H	5.0E-04	H	fetus	NA/1000
Beryllium		2.0E-05	c	2.0E-05	I	lung	medium/10
Cadmium		NA		NA		NA	NA
Chromium (total)	[b]	1.0E-04	c	1.0E-04	I	lung	medium/300
Cobalt		6.0E-06	c	6.0E-06	P	NA	NA
Lead		NA		NA		NA	NA
Manganese		5.0E-05	I	5.0E-05	I	CNS	medium/1000
Selenium		2.0E-02	c	2.0E-02	C	NA	NA
Thallium		NA		NA		NA	NA
Vanadium		NA		1.0E-04	A	NA	NA
Volatile Organic Compounds (VOCs)							
Benzene		8.0E-02	P	3.0E-02	I	blood	medium/100
1,1-Dichloroethane		NA		NA		NA	NA
1,2-Dichloroethane		2.4E+00	c	2.4E+00	A	liver	low/3000
cis-1,2-Dichloroethene		NA		NA		NA	NA
1,2-Dichloropropane		1.3E-02	H	4.0E-03	I	nasal	NA
1,3-Dichlorobenzene		2.0E+00	H	2.0E-01	Hs	NA	NA
Ethylbenzene		9.0E+00	P	1.0E+00	I	developmental	medium/100
Methyl cyclohexane		NA		NA		NA	NA
Methyl Tert Butyl Ether		3.0E+00	c	3.0E+00	I	liver, kidney	medium/100
Methylene chloride		1.0E+00	c	1.0E+00	A	liver	NA/30
Tetrachloroethene		2.7E-01	c	2.7E-01	A	NS	NA
Toluene		5.0E+00	P	5.0E+00	I	CNS	medium/300
1,1,1-Trichloroethane		5.0E+00	I	5.0E+00	I	liver	medium/100
Trichloroethene		NA		NA		NA	NA
Vinyl chloride		1.0E-01	c	1.0E-01	I	liver	medium/30
m&p-Xylene		4.0E-01	P	1.0E-01	I	CNS	medium/300
o-Xylene		4.0E-01	P	7.0E-01	C	CNS	NA

Table A-7
Noncarcinogenic Toxicity Values for Inhalation Exposure
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent	Inhalation RfC (mg/m^3) [a] Subchronic	[ref]	Chronic	[ref]	Target Site/ Critical Effect	Confidence Level/ Uncertainty Factor
Semi Volatile Organic Compounds (SVOCs)						
Acenaphthylene	NA		NA		NA	NA
Benzo(a)anthracene	NA		NA		NA	NA
Benzo(a)pyrene	NA		NA		NA	NA
Benzo(b)fluoranthene	NA		NA		NA	NA
Benzo(g,h,i)perylene	NA		NA		NA	NA
Benzo(k)fluoranthene	NA		NA		NA	NA
bis(2-Chloroethyl)ether	NA		NA		NA	NA
bis(2-Ethylhexyl)phthalate	NA		NA		NA	NA
Carbazole	NA		NA		NA	NA
Dibenz(a,h)anthracene	NA		NA		NA	NA
Dimethyl phthalate	NA		NA		NA	NA
Di-n-octyl phthalate [c]	NA		NA		NA	NA
Indeno(1,2,3-cd)pyrene	NA		NA		NA	NA
2-Methylnaphthalene	NA		NA		NA	NA
3&4-Methylphenol	6.0E-01	c	6.0E-01	C	NA	NA
Naphthalene	3.0E-03	c	3.0E-03	I	nasal	medium/3000
Nitrobenzene	2.0E-02	H	9.0E-03	I	blood, adrenal, liver, kidney	NA/10,000
2-Nitrophenol	5.0E-04	P	5.0E-04	P	NA	NA
N-Nitrosodi-n-propylamine	NA		NA		NA	NA
2,2'-oxybis(1-Chloropropane)	NA		NA		NA	NA
Pentachlorophenol	NA		NA		NA	NA
Phenanthrene	NA		NA		NA	NA
Polychlorinated Biphenyls (PCBs)						
Aroclor-1242 (PCB-1242)	NA		NA		NA	NA
Aroclor-1248 (PCB-1248)	NA		NA		NA	NA
Aroclor-1254 (PCB-1254)	NA		NA		NA	NA
Aroclor-1260 (PCB-1260)	NA		NA		NA	NA

Table A-7
Noncarcinogenic Toxicity Values for Inhalation Exposure
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent	Inhalation RfC (mg/m^3) [a] Subchronic	[ref]	Chronic	[ref]	Target Site/ Critical Effect	Confidence Level/ Uncertainty Factor

References [ref]:

A	Agency for Toxic Substances Disease Registry (ATDSR) (ATSDR 2010).
C	CalEPA, Toxicity Criteria database (CalEPA 2010).
H	USEPA, Health Effects Summary Table (HEAST; USEPA 1997).
I	USEPA, Integrated Risk Information System (IRIS; USEPA 2010b).
P	Provisional Peer Reviewed Toxicity Values (PPRTV) obtained from the National Center for Environmental Assessment (NCEA 2009) as referenced in USEPA Regional Screening Level Table (USEPA 2010a), or as obtained from the Superfund Health Risk Technical Support Center (SHRTSS, 2009).

c	The chronic value is used if available.
CNS	Central nervous system.
mg/m^3	Milligrams per cubic meter.
NA	Not available.
RfC	Reference Concentration.
NS	Nervous system.
s	Value is based on use of a surrogate compound, as indicated.
[a]	Toxicity values were obtained following USEPA recommended hierarchy (USEPA 2003).
[b]	Assumed as Chromium VI.
[c]	di-n-Butylphthalate used as a surrogate.

Table A-8
Carcinogenic Toxicity Values for Oral and Dermal Exposure
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent		Oral CSF [a] (mg/kg/day)$^{-1}$	[ref]	Adjustment Factor [b]	Dermal CSF [a] (mg/kg/day)$^{-1}$	Tumor Site	Weight of Evidence Classification [c]
Inorganics							
Arsenic		1.5E+00	I	1	1.5E+00	skin	A
Barium		NA		0.07	NA	–	D
Beryllium		NA		0.007	NA	–	B1
Cadmium	[d]	NA		0.025	NA	–	D/B1
Chromium (total)	[e]	5.0E-01	J	0.013	3.8E+01	–	D/A
Cobalt	[f]	NA		1	NA	–	[see footnote]
Lead		NA		1	NA	–	B2
Manganese		NA		0.04	NA	–	D
Selenium		NA		1	NA	–	D
Thallium		NA		1	NA	–	NA
Vanadium		NA		0.026	NA	–	NA
Volatile Organic Compounds (VOCs)							
Benzene	[g]	5.5E-02	I	1	5.5E-02	leukemia	A
1,1-Dichloroethane		5.7E-03	C	1	5.7E-03	NA	C
1,2-Dichloroethane		9.1E-02	I	1	9.1E-02	circulatory system	B2
cis-1,2-Dichloroethene		NA		1	NA	–	D
1,2-Dichloropropane		3.6E-02	C	1	3.6E-02	liver	B2
1,3-Dichlorobenzene		NA		1	NA	–	D
Ethylbenzene		1.1E-02	C	1	1.1E-02	–	D
Methyl cyclohexane		NA		1	NA	–	NA
Methyl Tert Butyl Ether		1.8E-03	C	1	1.8E-03	–	NA
Methylene chloride		7.5E-03	I	1	7.5E-03	liver	B2
Tetrachloroethene		5.4E-01	C	1	5.4E-01	liver, kidney	B2
Toluene		NA		1	NA	–	D
1,1,1-Trichloroethane		NA		1	NA	–	D
Trichloroethene		5.9E-03	C	1	5.9E-03	multiple sites	C-B2
Vinyl chloride		7.2E-01	I	1	7.2E-01	liver	A
m&p-Xylene		NA		1	NA	–	D
o-Xylene		NA		1	NA	–	D
Semi Volatile Organic Compounds (SVOCs)							
Acenaphthylene		NA		1	NA	–	D
Benzo(a)anthracene	[h]	7.3E-01	E	1	7.3E-01	stomach	B2

Table A-8
Carcinogenic Toxicity Values for Oral and Dermal Exposure
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent		Oral CSF [a] $(mg/kg/day)^{-1}$	[ref]	Adjustment Factor [b]	Dermal CSF [a] $(mg/kg/day)^{-1}$	Tumor Site	Weight of Evidence Classification [c]
Benzo(a)pyrene		7.3E+00	I	1	7.3E+00	stomach	B2
Benzo(b)fluoranthene	[h]	7.3E-01	E	1	7.3E-01	stomach	B2
Benzo(g,h,i)perylene		NA		1	NA	–	D
Benzo(k)fluoranthene	[h]	7.3E-02	E	1	7.3E-02	stomach	B2
bis(2-Chloroethyl)ether		1.1E+00	I	1	1.1E+00	liver	B2
bis(2-Ethylhexyl)phthalate		1.4E-02	I	1	1.4E-02	liver	B2
Carbazole		2.0E-02		1	2.0E-02	liver	B2
Dibenz(a,h)anthracene	[h]	7.3E+00	E	1	7.3E+00	stomach	B2
Dimethyl phthalate		NA		1	NA	–	D
Di-n-octyl phthalate		NA		1	NA	–	D
Indeno(1,2,3-cd)pyrene	[h]	7.3E-01	E	1	7.3E-01	stomach	B2
2-Methylnaphthalene		NA		1	NA	–	NA
3&4-Methylphenol		NA		1	NA	–	C
Naphthalene		NA		1	NA	–	C
Nitrobenzene		NA		1	NA	–	D
2-Nitrophenol		NA		1	NA	–	NA
N-Nitrosodi-n-propylamine		7.0E+00	I	1	7.0E+00	multiple	B2
2,2'-oxybis(1-Chloropropane)		7.0E-02	H	1	7.0E-02	liver	C
Pentachlorophenol		1.2E-01	I	1	1.2E-01	liver, adrenal	B2
Phenanthrene		NA		1	NA	–	D
Polychlorinated Biphenyls (PCBs)							
Aroclor-1242 (PCB-1242)	[i]	2.0E+00	I	1	2.0E+00	liver	B2
Aroclor-1248 (PCB-1248)	[i]	2.0E+00	I	1	2.0E+00	liver	B2
Aroclor-1254 (PCB-1254)	[i]	2.0E+00	I	1	2.0E+00	liver	B2
Aroclor-1260 (PCB-1260)	[i]	2.0E+00	I	1	2.0E+00	liver	B2

Table A-8
Carcinogenic Toxicity Values for Oral and Dermal Exposure
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent	Oral CSF [a] $(mg/kg/day)^{-1}$	[ref]	Adjustment Factor [b]	Dermal CSF [a] $(mg/kg/day)^{-1}$	Tumor Site	Weight of Evidence Classification [c]

References [ref]:

C	CalEPA, Toxicity Criteria database (CalEPA 2010).
E	Environmental Criteria and Assessment Office as referenced in the USEPA Regional Screening Level Table (USEPA 2010a).
H	USEPA, Health Effects Summary Table (HEAST; USEPA 1997).
I	USEPA, Integrated Risk Information System (IRIS; USEPA 2010b).
J	New Jersey
–	Not applicable.
CSF	Cancer Slope Factor.
$(mg/kg/day)^{-1}$	Inverse milligrams per kilogram per day (risk per unit dose).
NA	Not available.
[a]	Toxicity values were obtained following USEPA recommended hierarchy (USEPA 2003).
[b]	The oral-to-dermal adjustment factor (oral absorption efficiency) as used to calculate the dermal CSFd values, USEPA 2004c. CSF (dermal) = CSF (oral) / Adjustment Factor (oral absorption efficiency)
[c]	USEPA cancer weight-of-evidence categories are as follows: Group A: Human Carcinogen (sufficient evidence of carcinogenicity in humans) Group B: Probable Human Carcinogen B1 - limited evidence of carcinogenicity in humans B2 - sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans Group C: Possible Human Carcinogen (limited evidence of carcinogenicity in animals and inadequate or lack of human data) Group D: Not Classifiable as to Human Carcinogenicity (inadequate or no evidence) Group E: Evidence of Noncarcinogenicity for Humans (no evidence of carcinogenicity in adequate studies)
[d]	Carcinogenic only via inhalation (Class D for oral exposure; Class B1 for inhalation exposure).
[e]	Assumed as Chromium VI.
[f]	PPRTV document (2008) indicates that cobalt is a likely human carcinogen.
[g]	Maximum (most conservative) value of the range of 1.5E-02 to 5.5E-02 (mg/kg/day)-1 presented in the IRIS database.
[h]	Benzo(a)pyrene used as a surrogate, with the application of the appropriate TEF value.
[i]	Toxicity data for Aroclor mixture; values are for soil/water exposure. The oral slope factor is not adjusted to assess dermal exposure.

Table A-9
Carcinogenic Toxicity Values for Inhalation Exposure
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent		Inhalation Unit Risk [a] $(mg/m^3)^{-1}$	[ref]	Tumor Site	Weight of Evidence Classification [b]
Inorganics					
Arsenic		4.3E+00	I	lung	A
Barium		NA	I	–	D
Beryllium		2.4E+00	I	lung	B1
Cadmium		1.8E+00	I	respiratory	D/B1
Chromium (total)	[c]	1.2E+00	I	lung	D/A
Cobalt	[d]	9.0E+00	P	lung	[see footnote]
Lead		NA		–	B2
Manganese		NA		–	D
Selenium		NA	I	–	D
Thallium		NA		–	NA
Vanadium		NA	P	–	NA
Volatile Organic Compounds (VOCs)					
Benzene	[e]	7.8E-03	I	leukemia	A
1,1-Dichloroethane		1.6E-03	P	NA	C
1,2-Dichloroethane		2.6E-02	I	circulatory system	B2
cis-1,2-Dichloroethene		NA	P	–	D
1,2-Dichloropropane		1.0E-02	A	NA	B2
1,3-Dichlorobenzene		NA		–	D
Ethylbenzene		2.5E-03	I	–	D
Methyl cyclohexane		NA		–	NA
Methyl Tert Butyl Ether		2.6E-04	C	–	NA
Methylene chloride		4.7E-04	I	lung, liver	B2
Tetrachloroethene		5.9E-03	I	liver, kidney	B2
Toluene		NA	I	–	D
1,1,1-Trichloroethane		NA	I	–	D
Trichloroethene		2.0E-03	C	lung	C-B2
Vinyl chloride		4.4E-03	I	liver	A
m&p-Xylene		NA	I	–	D
o-Xylene		NA	I	–	D

Table A-9
Carcinogenic Toxicity Values for Inhalation Exposure
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent		Inhalation Unit Risk [a] $(mg/m^3)^{-1}$	[ref]	Tumor Site	Weight of Evidence Classification [b]
Semi Volatile Organic Compounds (SVOCs)					
Acenaphthylene		NA		–	D
Benzo(a)anthracene		1.1E-01	C	respiratory	B2
Benzo(a)pyrene		1.1E+00	C	respiratory	B2
Benzo(b)fluoranthene		1.1E-01	C	respiratory	B2
Benzo(g,h,i)perylene		NA		–	D
Benzo(k)fluoranthene		1.1E-01	C	respiratory	B2
bis(2-Chloroethyl)ether		3.3E-01		liver	B2
bis(2-Ethylhexyl)phthalate		2.4E-03	I	–	B2
Carbazole		NA		–	B2
Dibenz(a,h)anthracene		1.2E+00	C	respiratory	B2
Dimethyl phthalate		NA		–	D
Di-n-octyl phthalate		NA		–	D
Indeno(1,2,3-cd)pyrene		1.1E-01	C	respiratory	B2
2-Methylnaphthalene		NA	I	–	NA
3&4-Methylphenol		NA	H	–	C
Naphthalene		3.4E-02	I	respiratory	C
Nitrobenzene		4.0E-02	I	–	D
2-Nitrophenol		NA		–	NA
N-Nitrosodi-n-propylamine		2.0E+00		multiple	B2
2,2'-oxybis(1-Chloropropane)		1.0E-02	I	lung	C
Pentachlorophenol		5.1E-03	I	liver, adrenal	B2
Phenanthrene		NA		–	D
Polychlorinated Biphenyls (PCBs)					
Aroclor-1242 (PCB-1242)	[f]	5.7E-01		liver	B2
Aroclor-1248 (PCB-1248)	[f]	5.7E-01		liver	B2
Aroclor-1254 (PCB-1254)	[f]	5.7E-01	I	liver	B2
Aroclor-1260 (PCB-1260)	[f]	5.7E-01		liver	B2

Table A-9
Carcinogenic Toxicity Values for Inhalation Exposure
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent	Inhalation Unit Risk [a] $(mg/m^3)^{-1}$	[ref]	Tumor Site	Weight of Evidence Classification [b]

References [ref]:

A Agency for Toxic Substances Disease Registry (ATDSR) (ATSDR 2010).
C CalEPA, Toxicity Criteria database (CalEPA 2010).
H USEPA, Health Effects Summary Table (HEAST; USEPA 1997).
I USEPA, Integrated Risk Information System (IRIS; USEPA 2010b).
P Provisional Peer Reviewed Toxicity Values (PPRTV) obtained from the National Center for Environmental Assessment (NCEA 2009) as referenced in USEPA Regional Screening Level Table (USEPA 2010a), or as obtained from the Superfund Health Risk Technical Support Center (SHRTSS, 2009).

– Not applicable.
$(mg/m^3)^{-1}$ Inverse milligrams per cubic meter.
NA Not available.

[a] Toxicity values were obtained following USEPA recommended hierarchy (USEPA 2003).
[b] USEPA cancer weight-of-evidence categories are as follows:

Group A: Human Carcinogen (sufficient evidence of carcinogenicity in humans)
Group B: Probable Human Carcinogen
B1 - limited evidence of carcinogenicity in humans
B2 - sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans
Group C: Possible Human Carcinogen (limited evidence of carcinogenicity in animals and inadequate or lack of human data)
Group D: Not Classifiable as to Human Carcinogenicity (inadequate or no evidence)
Group E: Evidence of Noncarcinogenicity for Humans (no evidence of carcinogenicity in adequate studies)

[c] Assumed as Chromium VI.
[d] PPRTV document (2008) indicates that cobalt is a likely human carcinogen.
[e] Maximum (most conservative) value of the range of 7.7E-03 to 2.7E-02 (mg/kg/day)-1 [2.2E-03 to 7.8E-03 (mg/m^3)-1 for URi] presented in the IRIS database.
[f] Toxicity data for Aroclor mixture.

Table A-10
Receptor Exposure Parameters
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Parameter	Symbol	units	Construction Worker	
General Factors				
Averaging Time (cancer)	ATc	days	25,550	[a]
Averaging Time (noncancer)	ATnc	days	365	[a]
Body Weight	BW	kg	70	[1,2]
Exposure Frequency - Soil	EF	weeks/year	50	[5]
Exposure Frequency - Soil	EF	days/year	250	[5]
Exposure Frequency - Water	EF	weeks/year	10	[3]
Exposure Frequency - Water	EF	days/year	50	[3]
Exposure Duration - Soil	ED	years	1	[5]
Exposure Duration - Water	ED	years	1	[3]
Inhalation				
Exposure Time	ET	hour/day	8	[3]
Conversion Factor		day/hour	0.042	
Groundwater - Ingestion (Oral)				
Groundwater Incidental Ingestion Rate	IRgw	L/day	0.005	[3]
Groundwater - Dermal Contact				
Exposed Skin Surface Area	SSAgw	cm^2	3,300	[4]
Exposure Time; groundwater contact	ETgw	hours/day	2	[3]
Soil - Ingestion (Oral)				
Incidental Soil Ingestion Rate	IRs	mg/day	330	[5]
Fraction Ingested from Souce	FI	unitless	1	[3]
Soil - Dermal Contact				
Exposed Skin Surface Area	SSAs	cm^2	3,300	[4]
Soil-to-Skin Adherence Rate	SAR	$mg/cm^2/day$	0.2	[4]

References:

[1] U.S.EPA Risk Assessment Guidance for Superfund, Part A (USEPA 1989).
[2] U.S.EPA Risk Assessment Guidance for Superfund, Part B (USEPA 1991).
[3] Professional Judgment.
[4] U.S.EPA Dermal Risk Assessment Guidance (USEPA 2004c).
[5] Soil Screening Level Guidance (USEPA 2002).

[a] The averaging time for cancer risk is the expected lifespan of 70 years expressed in days.
The averaging time for non-cancer hazard is the total exposure duration expressed in days.

cm	Centimeter.	L	Liter.
kg	Kilogram.	mg	Milligram.

Table A-11
Physical and Chemical Properties
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent	Molecular Weight (g/mol)	[ref]	Water Solubility (mg/L 25 °C)	[ref]	Vapor Pressure (mm Hg 25 °C)	[ref]	Henry's Law Constant (unitless) (25 °C)	[ref]	Diffusivity in Air (cm²/sec)	[ref]	Diffusivity in Water (cm²/sec)	[ref]	Koc or Kd (mL/g)	[ref]	Log Kow	[ref]	Enthalpy of vaporization at boiling point, $\Delta H_{v,b}$ (cal/mol)	[ref]	Normal boiling point Tb (°K)		Critical temperature, Tc (°K)	
Inorganics																						
Arsenic	7.49E+01	*HSDB*	insoluble	*HSDB*	—	—	—	—	—	—	—	—	2.90E+01	*Kd-SCDM*	6.80E-01	*SCDM*	—	—	7.47E+02	*EPI*	1.12E+03	*calc*
Barium	1.37E+02	*SCDM*	insoluble	*SCDM*	—	—	—	—	—	—	—	—	4.10E+01	*Kd-SCDM*	2.30E-01	*EPI*	—	—	1.91E+03	*SCDM*	2.87E+03	*calc*
Beryllium	9.01E+00	*SCDM*	insoluble	*SCDM*	—	—	—	—	—	—	—	—	7.90E+02	*Kd-SCDM*	-5.70E-01	*EPI*	—	—	3.24E+03	*SCDM*	4.86E+03	*calc*
Cadmium	1.12E+02	*SCDM*	insoluble	*SCDM*	—	—	—	—	—	—	—	—	7.50E+01	*Kd-SCDM*	-7.00E-02	*EPI*	—	—	1.04E+03	*SCDM*	1.56E+03	*calc*
Chromium (total)	5.20E+01	*SCDM*	insoluble	*SCDM*	—	—	—	—	—	—	—	—	1.90E+01	*Kd-SCDM*	2.30E-01	*EPI*	—	—	2.92E+03	*SCDM*	4.37E+03	*calc*
Cobalt	5.89E+01	*SCDM*	insoluble	*SCDM*	—	—	—	—	—	—	—	—	4.50E+01	*Kd-SCDM*	2.30E-01	*EPI*	—	—	3.37E+03	*SCDM*	5.06E+03	*calc*
Lead	2.07E+02	*HSDB*	insoluble	*SCDM*	—	—	—	—	—	—	—	—	9.00E+02	*Kd-SCDM*	7.30E-01	*SCDM*	—	—	2.01E+03	*HSDB*	3.02E+03	*calc*
Manganese	5.49E+01	*SCDM*	insoluble	*SCDM*	—	—	—	—	—	—	—	—	6.50E+01	*Kd-SCDM*	2.30E-01	*EPI*	—	—	2.24E+03	*SCDM*	3.35E+03	*calc*
Selenium	7.90E+01	*SCDM*	insoluble	*SCDM*	—	—	—	—	—	—	—	—	3.00E+02	*Kd-SCDM*	2.40E-01	*EPI*	—	—	9.57E+02	*SCDM*	1.44E+03	*calc*
Thallium	2.04E+02	*SCDM*	insoluble	*SCDM*	—	—	—	—	—	—	—	—	1.50E+03	*Kd-SCDM*	2.30E-01	*EPI*	—	—	1.73E+03	*SCDM*	2.60E+03	*calc*
Vanadium	5.09E+01	*SCDM*	insoluble	*SCDM*	—	—	—	—	—	—	—	—	1.00E+03	*Kd-SCDM*	2.30E-01	*EPI*	—	—	—	—	—	*calc*
Volatile Organic Compounds (VOCs)																						
Benzene	7.81E+01	*SCDM*	1.79E+03	*J&E*	9.50E+01	*SCDM*	2.26E-01	*J&E*	8.80E-02	*J&E*	9.80E-06	*J&E*	5.89E+01	*J&E*	2.13E+00	*SCDM*	7.34E+03	*J&E*	3.53E+02	*SCDM*	5.62E+02	*J&E*
1,1-Dichloroethane	9.90E+01	*SCDM*	5.06E+03	*J&E*	2.27E+02	*SCDM*	2.29E-01	*J&E*	7.42E-02	*J&E*	1.05E-05	*J&E*	3.16E+01	*J&E*	1.79E+00	*SCDM*	6.90E+03	*J&E*	3.31E+02	*SCDM*	5.23E+02	*J&E*
1,2-Dichloroethane	9.90E+01	*SCDM*	8.52E+03	*J&E*	7.89E+01	*SCDM*	3.99E-02	*J&E*	1.04E-01	*J&E*	9.90E-06	*J&E*	1.74E+01	*J&E*	1.47E+00	*SCDM*	7.64E+03	*J&E*	3.57E+02	*SCDM*	5.61E+02	*J&E*
cis-1,2-Dichloroethene	9.69E+01	*SCDM*	3.50E+03	*J&E*	2.03E+02	*SCDM*	1.66E-01	*J&E*	7.36E-02	*J&E*	1.13E-05	*J&E*	3.55E+01	*J&E*	1.86E+00	*CFATE*	7.19E+03	*J&E*	3.34E+02	*SCDM*	5.44E+02	*J&E*
1,2-Dichloropropane	1.13E+02	*SCDM*	2.80E+03	*J&E*	5.20E+01	*SCDM*	1.14E-01	*J&E*	7.82E-02	*J&E*	8.73E-06	*J&E*	4.37E+01	*J&E*	1.97E+00	*SCDM*	7.59E+03	*J&E*	3.70E+02	*SCDM*	5.72E+02	*J&E*
1,3-Dichlorobenzene	1.47E+02	*SCDM*	1.34E+02	*J&E*	2.15E+00	*SCDM*	1.26E-01	*J&E*	6.92E-02	*J&E*	7.86E-06	*J&E*	1.98E+03	*J&E*	3.60E+00	*CFATE*	9.23E+03	*J&E*	4.46E+02	*SCDM*	6.84E+02	*J&E*
Ethylbenzene	1.06E+02	*SCDM*	1.69E+02	*J&E*	9.60E+00	*SCDM*	3.21E-01	*J&E*	7.50E-02	*J&E*	7.80E-06	*J&E*	3.63E+02	*J&E*	3.15E+00	*CFATE*	8.50E+03	*J&E*	4.09E+02	*SCDM*	6.17E+02	*J&E*
Methyl cyclohexane	9.80E+01	*NMED*	1.40E+01	*J&E*	4.60E+01	*RAIS*	4.20E+00	*J&E*	7.35E-02	*J&E*	8.52E-06	*J&E*	7.85E+01	*J&E*	3.61E+00	*RAIS*	—	—	3.74E+02	*RAIS*	5.72E+02	*J&E*
Methyl Tert Butyl Ether	8.82E+01	*CFATE*	5.10E+04	*J&E*	2.49E+02	*CFATE*	2.55E-02	*J&E*	1.02E-01	*J&E*	1.05E-05	*J&E*	7.26E+00	*J&E*	1.24E+00	*CFATE*	6.68E+03	*J&E*	3.28E+02	*RAIS*	4.97E+02	*J&E*
Methylene chloride	8.49E+01	*SCDM*	1.30E+04	*J&E*	4.33E+02	*SCDM*	8.93E-02	*J&E*	1.01E-01	*J&E*	1.17E-05	*J&E*	1.17E+01	*J&E*	1.25E+00	*SCDM*	6.71E+03	*J&E*	3.13E+02	*SCDM*	5.10E+02	*J&E*
Tetrachloroethene	1.66E+02	*SCDM*	2.00E+02	*J&E*	1.86E+01	*SCDM*	7.50E-01	*J&E*	7.20E-02	*J&E*	8.20E-06	*J&E*	1.55E+02	*J&E*	3.40E+00	*CFATE*	8.29E+03	*J&E*	3.94E+02	*SCDM*	6.20E+02	*J&E*
Toluene	9.21E+01	*SCDM*	5.26E+02	*J&E*	2.84E+01	*SCDM*	2.71E-01	*J&E*	8.70E-02	*J&E*	8.60E-06	*J&E*	1.82E+02	*J&E*	2.73E+00	*CFATE*	7.93E+03	*J&E*	3.84E+02	*SCDM*	5.92E+02	*J&E*
1,1,1-Trichloroethane	1.33E+02	*SCDM*	1.33E+03	*J&E*	1.24E+02	*SCDM*	7.01E-01	*J&E*	7.80E-02	*J&E*	8.80E-06	*J&E*	1.10E+02	*J&E*	2.48E+00	*SCDM*	7.14E+03	*J&E*	3.47E+02	*SCDM*	5.45E+02	*J&E*
Trichloroethene	1.31E+02	*SCDM*	1.47E+03	*J&E*	7.35E+01	*SCDM*	4.20E-01	*J&E*	7.90E-02	*J&E*	9.10E-06	*J&E*	1.66E+02	*J&E*	2.42E+00	*CFATE*	7.51E+03	*J&E*	3.60E+02	*SCDM*	5.44E+02	*J&E*
Vinyl chloride	6.25E+01	*SCDM*	8.80E+03	*J&E*	2.98E+03	*SCDM*	1.10E+00	*J&E*	1.06E-01	*J&E*	1.23E-05	*J&E*	1.86E+01	*J&E*	1.36E+00	*CFATE*	5.25E+03	*J&E*	2.59E+02	*SCDM*	4.32E+02	*J&E*
m&p-Xylene	1.06E+02	*SCDM*	1.75E+02	*SCDM*	7.99E+00	*RAIS*	2.71E-01	*RAIS*	7.14E-02	*RAIS*	9.34E-06	*RAIS*	1.60E+02	*RAIS*	3.15E+00	*RAIS*	8.53E+03	*J&E*	4.14E+02	*est'd*	6.21E+02	*calc*
o-Xylene	1.06E+02	*SCDM*	1.78E+02	*J&E*	6.61E+00	*SCDM*	2.12E-01	*J&E*	8.70E-02	*J&E*	1.00E-05	*J&E*	3.63E+02	*J&E*	3.13E+00	*SCDM*	8.66E+03	*J&E*	4.18E+02	*SCDM*	6.30E+02	*J&E*
Semi Volatile Organic Compounds (SVOCs)																						
Acenaphthylene	1.52E+02	*SCDM*	1.61E+01	*SCDM*	9.12E-04	*SCDM*	4.62E-03	*SCDM*	4.39E-02	*RAIS*	7.53E-06	*RAIS*	3.09E+03	*SCDM*	3.94E+00	*CFATE*	1.34E+04	*calc*	5.53E+02	*SCDM*	8.30E+02	*calc*
Benzo(a)anthracene	2.28E+02	*CFATE*	9.40E-03	*CFATE*	1.05E-07	*CFATE*	1.37E-04	*CFATE*	5.10E-02	*SSG2*	9.00E-06	*SSG2*	3.98E+05	*SSG2*	5.66E+00	*CFATE*	1.66E+04	*calc*	7.11E+02	*CFATE*	1.07E+03	*calc*
Benzo(a)pyrene	2.52E+02	*CFATE*	1.62E-03	*CFATE*	5.49E-09	*CFATE*	4.62E-05	*CFATE*	4.30E-02	*SSG2*	9.00E-06	*SSG2*	1.02E+06	*SSG2*	5.97E+00	*CFATE*	1.75E+04	*calc*	7.68E+02	*CFATE*	1.15E+03	*calc*
Benzo(b)fluoranthene	2.52E+02	*CFATE*	1.50E-03	*J&E*	5.00E-07	*CFATE*	4.52E-03	*J&E*	2.26E-02	*J&E*	5.56E-06	*J&E*	1.23E+06	*J&E*	6.12E+00	*CFATE*	1.70E+04	*J&E*	7.16E+02	*EPI*	9.69E+02	*J&E*
Benzo(g,h,i)perylene	2.76E+02	*SCDM*	2.60E-04	*SCDM*	1.01E-10	*SCDM*	5.76E-06	*SCDM*	4.20E-02	*L90-calc*	4.81E-06	*L90-calc*	3.86E+06	*SCDM*	6.58E+00	*CFATE*	2.02E+04	*calc*	7.73E+02	*CFATE*	1.16E+03	*calc*
Benzo(k)fluoranthene	2.52E+02	*SCDM*	8.00E-04	*SCDM*	2.00E-09	*SCDM*	3.39E-05	*SCDM*	2.26E-02	*J&E*	5.56E-06	*J&E*	1.24E+06	*SCDM*	6.20E+00	*SCDM*	—	—	7.53E+02	*SCDM*	1.13E+03	*calc*
bis(2-Chloroethyl)ether	1.43E+02	*SCDM*	1.72E+04	*J&E*	1.55E+00	*SCDM*	7.34E-04	*J&E*	6.92E-02	*J&E*	7.53E-06	*J&E*	1.55E+01	*J&E*	1.29E+00	*CFATE*	1.08E+04	*J&E*	4.51E+02	*SCDM*	6.60E+02	*J&E*
bis(2-Ethylhexyl)phthalate	3.91E+02	*SCDM*	3.40E-01	*SCDM*	6.45E-06	*SCDM*	4.17E-06	*SCDM*	3.51E-02	*J&E*	3.66E-06	*J&E*	8.74E+04	*CFATE*	5.11E+00	*CFATE*	—	—	6.57E+02	*SCDM*	9.86E+02	*calc*
Carbazole	1.67E+02	*SCDM*	7.48E+00	*SCDM*	5.19E-07	*SCDM*	6.25E-07	*SCDM*	3.90E-02	*J&E*	7.03E-06	*J&E*	3.38E+03	*SCDM*	3.72E+00	*CFATE*	6.35E+03	*calc*	6.28E+02	*SCDM*	9.42E+02	*calc*
Dibenz(a,h)anthracene	2.78E+02	*CFATE*	2.49E-03	*CFATE*	1.00E-10	*CFATE*	6.01E-07	*CFATE*	2.02E-02	*J&E*	5.18E-06	*J&E*	3.80E+06	*SSG2*	6.50E+00	*CFATE*	1.25E+04	*calc*	7.97E+02	*CFATE*	1.20E+03	*calc*
Dimethyl phthalate	1.94E+02	*SCDM*	4.00E+03	*SCDM*	1.65E-03	*SCDM*	4.29E-06	*SCDM*	5.68E-02	*RAIS*	6.29E-06	*RAIS*	3.50E+01	*SCDM*	1.57E+00	*SCDM*	—	—	5.57E+02	*SCDM*	8.35E+02	*calc*
Di-n-octyl phthalate	3.91E+02	*SCDM*	2.00E-02	*SCDM*	2.60E-06	*SCDM*	2.73E-03	*SCDM*	1.51E-02	*J&E*	3.58E-06	*J&E*	8.38E+07	*SCDM*	8.06E+00	*SCDM*	4.35E+03	*calc*	7.04E+02	*EPI*	1.06E+03	*calc*
Indeno(1,2,3-cd)pyrene	2.76E+02	*CFATE*	2.20E-05	*CFATE*	1.00E-10	*CFATE*	6.54E-05	*CFATE*	1.90E-02	*SSG2*	5.66E-06	*SSG2*	3.47E+06	*SSG2*	6.58E+00	*CFATE*	—	—	7.70E+02	*CFATE*	1.16E+03	*calc*
2-Methylnaphthalene	1.42E+02	*SCDM*	2.46E+01	*J&E*	5.50E-02	*SCDM*	2.11E-02	*J&E*	5.22E-02	*J&E*	7.75E-06	*J&E*	2.81E+03	*J&E*	3.94E+00	*SCDM*	1.26E+04	*J&E*	5.14E+02	*SCDM*	7.61E+02	*J&E*
3&4-Methylphenol	1.08E+02	*SCDM*	2.15E+04	*SCDM*	1.10E-01	*SCDM*	3.24E-05	*SCDM*	7.40E-02	*RAIS*	1.00E-05	*RAIS*	8.26E+01	*SCDM*	1.95E+00	*SCDM*	7.20E+02	*calc*	4.75E+02	*SCDM*	7.13E+02	*calc*
Naphthalene	1.28E+02	*SCDM*	3.10E+01	*J&E*	8.50E-02	*SCDM*	1.97E-02	*J&E*	5.90E-02	*J&E*	7.50E-06	*J&E*	2.00E+03	*J&E*	3.30E+00	*CFATE*	1.04E+04	*J&E*	4.91E+02	*SCDM*	7.48E+02	*J&E*
Nitrobenzene	1.23E+02	*SCDM*	2.09E+03	*J&E*	2.45E-01	*SCDM*	9.78E-04	*J&E*	7.60E-02	*J&E*	8.60E-06	*J&E*	6.46E+01	*J&E*	1.84E+00	*SCDM*	1.06E+04	*J&E*	4.84E+02	*SCDM*	7.19E+02	*J&E*
2-Nitrophenol	1.39E+02	*SCDM*	2.19E+03	*SCDM*	1.13E-01	*SCDM*	3.87E-04	*SCDM*	7.15E-02	*L90-calc*	1.00E-05	*est'd*	5.50E+01	*SCDM*	1.77E+00	*SCDM*	—	—	4.89E+02	*SCDM*	7.34E+02	*calc*
N-Nitrosodi-n-propylamine	1.30E+02	*SCDM*	9.89E+03	*SCDM*	1.30E-01	*SCDM*	9.19E-05	*SCDM*	5.45E-02	*J&E*	8.17E-06	*J&E*	2.38E+01	*SCDM*	1.36E+00	*CFATE*	1.28E+04	*calc*	4.79E+02	*SCDM*	7.19E+02	*calc*
2,2'-oxybis(1-Chloropropane)	1.71E+02	*SCDM*	1.70E+03	*SCDM*	8.80E-01	*SCDM*	4.78E-03	*SCDM*	3.50E-02	*RAIS*	7.36E-06	*RAIS*	2.74E+02	*SCDM*	2.48E+00	*SCDM*	—	—	4.60E+02	*SCDM*	6.90E+02	*calc*
Pentachlorophenol	2.66E+02	*SCDM*	1.95E+03	*SCDM*	3.17E-05	*SCDM*	9.97E-07	*SCDM*	5.60E-02	*J&E*	6.10E-06	*J&E*	5.92E+02	*SCDM*	5.09E+00	*SCDM*	1.57E+04	*calc*	—	—	—	*calc*
Phenanthrene	1.78E+02	*SCDM*	1.15E+00	*SCDM*	1.12E-04	*SCDM*	9.52E-04	*SCDM*	5.43E-02	*L90-calc*	5.85E-06	*L90-calc*	2.97E+04	*SCDM*	4.46E+00	*CFATE*	1.33E+04	*calc*	6.13E+02	*SCDM*	9.20E+02	*calc*
Polychlorinated Biphenyls (PCBs)																						
Aroclor-1242 (PCB-1242)	2.61E+02	*HSDB*	3.40E-01	*RAIS*	1.30E-03	*HSDB*	2.28E-02	*EPI*	2.14E-02	*J&E*	5.31E-06	*J&E*	3.30E+04	*RAIS*	6.29E+00	*EPI*	—	—	6.33E+02	*EPI*	9.49E+02	*calc*
Aroclor-1248 (PCB-1248)	2.88E+02	*HSDB*	5.40E-02	*HSDB*	4.94E-04	*HSDB*	7.23E-03	*EPI*	4.97E-02	*L90-calc*	4.84E-06	*L90-calc*	5.03E+05	*RAIS*	6.34E+00	*EPI*	1.37E+03	*calc*	6.33E+02	*EPI*	9.49E+02	*calc*
Aroclor-1254 (PCB-1254)	3.27E+02	*HSDB*	6.00E-02	*RAIS*	6.53E-06	*EPI*	5.93E-03	*EPI*	1.56E-02	*J&E*	5.00E-06	*J&E*	2.00E+05	*RAIS*	6.79E+00	*EPI*	1.33E+03	*calc*	6.51E+02	*EPI*	9.77E+02	*calc*
Aroclor-1260 (PCB-1260)	3.76E+02	*HSDB*	8.00E-02	*RAIS*	4.05E-05	*HSDB*	3.02E-03	*HSDB*	1.38E-02	*J&E*	4.32E-06	*J&E*	2.90E+05	*RAIS*	8.27E+00	*EPI*	1.25E+03	*calc*	6.89E+02	*EPI*	1.03E+03	*calc*

Table A-11
Physical and Chemical Properties
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent	Molecular Weight (g/mol) *[ref]*	Water Solubility (mg/L 25 °C) *[ref]*	Vapor Pressure (mm Hg 25 °C) *[ref]*	Henry's Law Constant (unitless) (25 °C) *[ref]*	Diffusivity in Air (cm^2/sec) *[ref]*	Diffusivity in Water (cm^2/sec) *[ref]*	Koc or Kd (mL/g) *[ref]*	Log Kow *[ref]*	Enthalpy of vaporization at boiling point, $\Delta H_{v,b}$ (cal/mol) *[ref]*	Normal boiling point Tb (^{o}K)	Critical temperature, Tc (^{o}K)

References [ref]:
CFATE (SRC 2008); HSDB (NLM 2008); EPISuite (USEPA 2004a); J&E (USEPA 2003); RAIS (ORNL 2010); SCDM (USEPA 2004b); SSG2 (USEPA 2002).

–	Not applicable.
atm-m^3/mol	Atmospheres × cubic meters per mole.
°C	Degrees Celsius.
cm^2/sec	Square centimeters per second.
calc'd	Calculated.
est'd	Estimated.
g/mol	Grams per mole.
Kd	Soil-water distribution coefficient (inorganics).
Koc	Organic carbon partition coefficient (organics).
Kow	Octanol-water partition coefficient.
L/kg	Liters per kilogram.
mg/L	Milligrams per liter.
mL/g	Milliliters per gram.
mm Hg	Millimeters of mercury.
NA	Not available.

Table A-12
Dermal Absorption Parameters
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent of Potential Concern	ABSd [a]	Permeability Constant Kp (cm/hour) [b]		Non-Steady State Dermal Absorption Parameters [c]					DA_1hr [d]
		Value	[Ref]	FA (unitless)	τ (hour)	t* (hour)	B (unitless)	Source	(L/cm²/event)
Inorganics									
Arsenic	0.03	1.0E-03	W	—	—	—	—		1.00E-06
Barium	0	1.0E-03	W	—	—	—	—		1.00E-06
Beryllium	0	1.0E-03	W	—	—	—	—		1.00E-06
Cadmium	0.001	1.0E-03	DRA	—	—	—	—		1.00E-06
Chromium (total)	0	2.0E-03	DRA	—	—	—	—		2.00E-06
Cobalt	0	4.0E-04	DRA	—	—	—	—		4.00E-07
Lead	0	1.0E-04	DRA	—	—	—	—		1.00E-07
Manganese	0	1.0E-03	W	—	—	—	—		1.00E-06
Selenium	0	1.0E-03	W	—	—	—	—		1.00E-06
Thallium	0	1.0E-03	W	—	—	—	—		1.00E-06
Vanadium	0	1.0E-03	W	—	—	—	—		1.00E-06
Volatile Organic Compounds (VOCs)									
Benzene	0	1.5E-02	DRA	1.0	0.29	0.70	0.0501	DRA	2.34E-05
1,1-Dichloroethane	0	6.7E-03	DRA	1.0	0.38	0.92	0.0257	DRA	1.18E-05
1,2-Dichloroethane	0	4.2E-03	DRA	1.0	0.38	0.92	0.0158	DRA	7.38E-06
cis-1,2-Dichloroethene	0	7.7E-03	calc	1.0	0.37	0.89	0.029	calc	1.33E-05
1,2-Dichloropropane	0	7.8E-03	DRA	1.0	0.46	1.10	0.0319	DRA	1.46E-05
1,3-Dichlorobenzene	0	5.8E-02	DRA	1.0	0.71	1.71	0.2705	DRA	1.35E-04
Ethylbenzene	0	4.9E-02	DRA	1.0	0.42	1.01	0.192	DRA	8.78E-05
Methyl cyclohexane	0	1.8E-01	RAIS	—	—	—	—		1.75E-04
Methyl Tert Butyl Ether	0	3.4E-03	calc	1.0	0.33	0.79	0.012	calc	5.63E-06
Methylene chloride	0	3.5E-03	DRA	1.0	0.32	0.76	0.0126	DRA	5.72E-06
Tetrachloroethene	0	3.3E-02	DRA	1.0	0.91	2.18	0.163	DRA	8.70E-05
Toluene	0	3.1E-02	DRA	1.0	0.35	0.84	0.113	DRA	5.20E-05
1,1,1-Trichloroethane	0	1.3E-02	DRA	1.0	0.60	1.43	0.0577	DRA	2.78E-05
Trichloroethene	0	1.2E-02	DRA	1.0	0.58	1.39	0.0529	DRA	2.53E-05
Vinyl chloride	0	5.6E-03	DRA	1.0	0.24	0.57	0.017	DRA	8.24E-06
m&p-Xylene	0	5.3E-02	DRA	1.0	0.42	1.01	0.21	DRA	9.49E-05
o-Xylene	0	5.3E-02	DRA	1.0	0.42	1.01	0.21	DRA	9.49E-05
Semi Volatile Organic Compounds (SVOCs)									
Acenaphthylene	0.13	1.4E-01	EPI	1.0	0.75	2.94	0.669	calc	3.38E-04
Benzo(a)anthracene	0.13	4.7E-01	DRA	1.0	2.03	8.53	2.8	DRA	1.85E-03
Benzo(a)pyrene	0.13	7.0E-01	DRA	1.0	2.69	11.67	4.28	DRA	3.17E-03
Benzo(b)fluoranthene	0.13	7.0E-01	DRA	1.0	2.77	12.03	4.28	DRA	3.22E-03

Table A-12
Dermal Absorption Parameters
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent of Potential Concern	ABSd [a]	Permeability Constant Kp (cm/hour) [b]		Non-Steady State Dermal Absorption Parameters [c]					DA_1hr [d]
		Value	[Ref]	FA (unitless)	τ (hour)	t* (hour)	B (unitless)	Source	(L/cm²/event)
Benzo(g,h,i)perylene	0.13	1.9E+00	EPI	0.6	3.70	16.86	11.83	calc	5.90E-03
Benzo(k)fluoranthene	0.13	1.2E+00	EPI	0.8	2.72	12.17	7.331	calc	4.38E-03
bis(2-Chloroethyl)ether	0	1.8E-03	DRA	1.0	0.68	1.62	0.0082	DRA	4.10E-06
bis(2-Ethylhexyl)phthalate	0.1	2.5E-02	DRA	0.8	16.64	39.93	0.19	DRA	2.25E-04
Carbazole	0.1	8.0E-02	EPI	1.0	0.91	2.18	0.396	calc	2.10E-04
Dibenz(a,h)anthracene	0.13	1.5E+00	DRA	0.6	3.88	17.57	9.7	DRA	4.90E-03
Dimethyl phthalate	0.1	1.4E-03	DRA	1.0	1.30	3.13	0.0075	DRA	4.41E-06
Di-n-octyl phthalate	0.1	4.5E+00	EPI	0.3	16.16	75.22	33.82	calc	1.48E-02
Indeno(1,2,3-cd)pyrene	0.13	1.0E+00	DRA	0.6	3.78	16.83	6.7	DRA	3.22E-03
2-Methylnaphthalene	0.13	1.4E-01	EPI	1.0	0.66	2.60	0.651	calc	3.19E-04
3&4-Methylphenol	0.1	7.7E-03	DRA	1.0	0.43	1.03	0.0314	DRA	1.40E-05
Naphthalene	0.13	4.7E-02	DRA	1.0	0.56	1.34	0.205	DRA	9.72E-05
Nitrobenzene	0	5.6E-03	calc	1.0	0.51	1.20	0.024	calc	1.11E-05
2-Nitrophenol	0.1	4.1E-03	DRA	1.0	0.63	1.50	0.018	calc	8.99E-06
N-Nitrosodi-n-propylamine	0.1	2.3E-03	DRA	1.0	0.57	1.37	0.0103	DRA	4.80E-06
2,2'-oxybis(1-Chloropropane)	0	8.0E-03	calc	1.0	0.95	2.30	0.04	calc	2.16E-05
Pentachlorophenol	0.25	3.9E-01	DRA	0.9	3.33	13.82	2.448	DRA	1.77E-03
Phenanthrene	0.13	1.4E-01	DRA	1.0	1.06	4.11	0.719	DRA	3.98E-04
Polychlorinated Biphenyls (PCBs)									
Aroclor-1242 (PCB-1242)	0.14	9.2E-01	EPI	0.8	3.04	13.43	5.73	calc	3.55E-03
Aroclor-1248 (PCB-1248)	0.14	9.9E-01	EPI	0.7	4.31	19.16	6.47	calc	3.98E-03
Aroclor-1254 (PCB-1254)	0.14	1.3E+00	EPI	0.6	7.12	32.12	8.97	calc	5.71E-03
Aroclor-1260 (PCB-1260)	0.14	5.5E+00	EPI	0.1	12.39	57.78	40.5	calc	5.33E-03

References [ref]:

calc	Calculated value (USEPA 2004c).
DRA	Dermal Risk Assessment Guidance (USEPA 2004c). The B values are calculated but are consistent with values presented in the guidance.
EPI	EPI Suite (USEPA 2004a).
RAIS	Oak Ridge National Laboratory (ORNL), Risk Assessment Information System (RAIS; ORNL 2010).
W	Assumed to be equal to the value for water (USEPA 2004c).

cm	Centimeter.
L	Liter.

[a] Dermal absorption efficiency for uptake of constituents from a soil matrix (unitless) (USEPA 2004c).

Table A-12
Dermal Absorption Parameters
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent of Potential Concern	ABSd [a]	Permeability Constant Kp (cm/hour) [b]		Non-Steady State Dermal Absorption Parameters [c]					DA_1hr [d]
		Value	[Ref]	FA (unitless)	τ (hour)	t* (hour)	B (unitless)	Source	(L/cm²/event)

[b] Permeability coefficient for dermal contact with constituents in water (centimeters per hour).

[c] Absorption parameters for use in the non-steady state model for dermal contact with constituents in water.

τ = Lag time for dermal absorption through the skin.

B = Ratio of the permeability coefficient through the stratus corneum relative to the permeability coefficient across the viable epidermis.

FA = Fraction of absorbed water.

t* = Time required to reach steady state.

[d] Dermal absorption (DA) calculated according to equations presented in USEPA 2004 based on exposure time (ET) = 1 hour.

Table A-13
Soil Volatilization Factors
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Volatilization Factors: (calculated only for volatile organic compounds)								
Constituent	Solubility in Water (mg/L) (S)	Saturation Limit in Soil (mg/kg) (Csat) [a]	Diffusivity in Air (cm^2/sec) (D_{air})	Diffusivity in Water (cm^2/sec) (D_{wat})	Henry's Law Constant (unitless) at 10 °C (H_o)	Partition Coefficient (mL/g) (Koc)	Apparent Diffusivity (cm^2/sec) (D_A)	Volatilization Factor (m^3/kg - VF) Soil Invasive
Inorganics								
Arsenic	insoluble	—	—	—	—	—	—	—
Barium	insoluble	—	—	—	—	—	—	—
Beryllium	insoluble	—	—	—	—	—	—	—
Cadmium	insoluble	—	—	—	—	—	—	—
Chromium (total)	insoluble	—	—	—	—	—	—	—
Cobalt	insoluble	—	—	—	—	—	—	—
Lead	insoluble	—	—	—	—	—	—	—
Manganese	insoluble	—	—	—	—	—	—	—
Selenium	insoluble	—	—	—	—	—	—	—
Thallium	insoluble	—	—	—	—	—	—	—
Vanadium	insoluble	—	—	—	—	—	—	—
Volatile Organic Compounds (VOCs)								
Benzene	1.79E+03	2.73E+03	8.80E-02	9.80E-06	9.05E-02	5.89E+01	2.99E-03	1.56E+02
1,1-Dichloroethane	5.06E+03	6.91E+03	7.42E-02	1.05E-05	9.16E-02	3.16E+01	2.85E-03	1.60E+02
1,2-Dichloroethane	8.52E+03	9.68E+03	1.04E-01	9.90E-06	1.60E-02	1.74E+01	8.39E-04	2.94E+02
cis-1,2-Dichloroethene	3.50E+03	4.69E+03	7.36E-02	1.13E-05	6.65E-02	3.55E+01	2.09E-03	1.86E+02
1,2-Dichloropropane	2.80E+03	3.78E+03	7.82E-02	8.73E-06	4.57E-02	4.37E+01	1.52E-03	2.19E+02
1,3-Dichlorobenzene	1.34E+02	1.70E+03	6.92E-02	7.86E-06	5.05E-02	1.98E+03	1.55E-04	6.85E+02
Ethylbenzene	1.69E+02	5.80E+02	7.50E-02	7.80E-06	1.28E-01	3.63E+02	1.61E-03	2.12E+02
Methyl cyclohexane	1.40E+01	6.60E+01	7.35E-02	8.52E-06	1.68E+00	7.85E+01	1.50E-02	6.95E+01
Methyl Tert Butyl Ether	5.10E+04	5.42E+04	1.02E-01	1.05E-05	1.02E-02	7.26E+00	5.63E-04	3.59E+02
Methylene chloride	1.30E+04	1.48E+04	1.01E-01	1.17E-05	3.57E-02	1.17E+01	1.82E-03	2.00E+02
Tetrachloroethene	2.00E+02	5.00E+02	7.20E-02	8.20E-06	3.00E-01	1.55E+02	4.93E-03	1.21E+02
Toluene	5.26E+02	1.21E+03	8.70E-02	8.60E-06	1.08E-01	1.82E+02	2.35E-03	1.76E+02
1,1,1-Trichloroethane	1.33E+03	2.94E+03	7.80E-02	8.80E-06	2.80E-01	1.10E+02	5.70E-03	1.13E+02
Trichloroethene	1.47E+03	3.40E+03	7.90E-02	9.10E-06	1.68E-01	1.66E+02	3.28E-03	1.49E+02
Vinyl chloride	8.80E+03	1.73E+04	1.06E-01	1.23E-05	4.40E-01	1.86E+01	1.36E-02	7.30E+01
m&p-Xylene	1.75E+02	3.80E+02	7.14E-02	9.34E-06	1.08E-01	1.60E+02	2.04E-03	1.88E+02
o-Xylene	1.78E+02	5.90E+02	8.70E-02	1.00E-05	8.46E-02	3.63E+02	1.26E-03	2.40E+02

Table A-13
Soil Volatilization Factors
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Semi Volatile Organic Compounds (SVOCs)								
Acenaphthylene	1.61E+01	—	4.39E-02	7.53E-06	1.85E-03	3.09E+03	2.40E-06	5.50E+03
Benzo(a)anthracene	9.40E-03	—	5.10E-02	9.00E-06	5.48E-05	3.98E+05	9.12E-10	—
Benzo(a)pyrene	1.62E-03	—	4.30E-02	9.00E-06	1.85E-05	1.02E+06	1.69E-10	—
Benzo(b)fluoranthene	1.50E-03	—	2.26E-02	5.56E-06	1.81E-03	1.23E+06	3.22E-09	—
Benzo(g,h,i)perylene	2.60E-04	—	4.20E-02	4.81E-06	2.30E-06	3.86E+06	1.57E-11	—
Benzo(k)fluoranthene	8.00E-04	—	2.26E-02	5.56E-06	1.36E-05	1.24E+06	7.16E-11	—
bis(2-Chloroethyl)ether	1.72E+04	1.88E+04	6.92E-02	7.53E-06	2.93E-04	1.55E+01	1.11E-05	2.56E+03
bis(2-Ethylhexyl)phthalate	3.40E-01	1.80E+02	3.51E-02	3.66E-06	1.67E-06	8.74E+04	5.11E-10	—
Carbazole	7.48E+00	—	3.90E-02	7.03E-06	2.50E-07	3.38E+03	2.15E-08	—
Dibenz(a,h)anthracene	2.49E-03	—	2.02E-02	5.18E-06	2.40E-07	3.80E+06	1.47E-11	—
Dimethyl phthalate	4.00E+03	4.84E+03	5.68E-02	6.29E-06	1.72E-06	3.50E+01	3.80E-07	—
Di-n-octyl phthalate	2.00E-02	1.00E+04	1.51E-02	3.58E-06	1.09E-03	8.38E+07	1.92E-11	—
Indeno(1,2,3-cd)pyrene	2.20E-05	—	1.90E-02	5.66E-06	2.62E-05	3.47E+06	3.11E-11	—
2-Methylnaphthalene	2.46E+01	—	5.22E-02	7.75E-06	8.45E-03	2.81E+03	1.42E-05	2.27E+03
3&4-Methylphenol	2.15E+04	—	7.40E-02	1.00E-05	1.29E-05	8.26E+01	7.97E-07	—
Naphthalene	3.10E+01	—	5.90E-02	7.50E-06	7.88E-03	2.00E+03	2.05E-05	1.88E+03
Nitrobenzene	2.09E+03	2.91E+03	7.60E-02	8.60E-06	3.91E-04	6.46E+01	1.27E-05	2.39E+03
2-Nitrophenol	2.19E+03	—	7.15E-02	1.00E-05	1.55E-04	5.50E+01	5.25E-06	—
N-Nitrosodi-n-propylamine	9.89E+03	1.13E+04	5.45E-02	8.17E-06	3.68E-05	2.38E+01	1.46E-06	—
2,2'-oxybis(1-Chloropropane)	1.70E+03	4.50E+03	3.50E-02	7.36E-06	1.91E-03	2.74E+02	1.47E-05	2.23E+03
Pentachlorophenol	1.95E+03	—	5.60E-02	6.10E-06	3.99E-07	5.92E+02	8.89E-08	—
Phenanthrene	1.15E+00	—	5.43E-02	5.85E-06	3.81E-04	2.97E+04	6.82E-08	3.26E+04
Polychlorinated Biphenyls (PCBs)								
Aroclor-1242 (PCB-1242)	3.40E-01	—	2.14E-02	5.31E-06	9.14E-03	3.30E+04	5.65E-07	—
Aroclor-1248 (PCB-1248)	5.40E-02	—	4.97E-02	4.84E-06	2.89E-03	5.03E+05	2.74E-08	—
Aroclor-1254 (PCB-1254)	6.00E-02	—	1.56E-02	5.00E-06	2.37E-03	2.00E+05	1.79E-08	—
Aroclor-1260 (PCB-1260)	8.00E-02	—	1.38E-02	4.32E-06	1.21E-03	2.90E+05	5.65E-09	—

Model Input Parameters:

	Passive		
Soil =	SI	Silt	Predominant soil type in the vadose zone (SI = 1.82)
Ts =	10	^{o}C	Annual average soil temperature in Michigan (MDEQ 2007)
Foc =	0.006	unitless	Fraction organic carbon (USEPA 2002, default)

Table A-13
Soil Volatilization Factors
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

ρ_b =	0.167	g/cm³	Soil dry bulk density for Silt soil (USEPA 2003).
θ_T =	0.489	unitless	Total soil porosity for Silt soil (USEPA 2003).
θ_{as} =	0.322	unitless	Air-filled soil porosity [= θ_T - θ_{ws}]
θ_{ws} =	0.167	unitless	Water-filled soil porosity for Silt soil (USEPA 2003).
Q/C_{vol_cwuw} =	14.31	(g/m²/sec)/(kg/m³)	Volatilization flux per unit concentration under soil invasive conditions (USEPA 2002, default)
T =	1.3E+06	sec	Exposure interval (site-specific ED=365 days)

—	Not available.	kg	Kilogram.	mL	Milliliter.
atm	Atmosphere.	L	Liter.	mol	Mole.
cm	Centimeter.	m	Meter.	sec	Second.
g	Gram.	mg	Milligram.		

[a] Csat was calculated for constituents that might potentially be liquid at soil temperature of 30°C (i.e. for constituents whose melting point is less than 30°C).

Table A-14
Particulate Emission Factor for Construction Activities
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

$$PEF_{sc} = Q/C_{sr} \times \frac{1}{F_D} \times \left[\frac{T \times A_R}{556 \times \left(\frac{W}{3}\right)^{0.4} \times \frac{365 - p}{365} \times \sum VKT} \right]$$

PEF_{sc}	**=**	Subchronic particulate emission factor for trucking activities (m^3/kg) =	**1.60E+07**	
where:				
Q/C_{sr}	=	Inverse of 1-hr avg. air concentration at center of the square emission source (g/m^2-s per kg/m^3) =	18.44	Calculated
where Q/C_{sr} = A * exp[(ln A_c - B)^2/C]				
A	=	Constant =	12.9351	USEPA, 2002
B	=	Constant =	5.7383	USEPA, 2002
C	=	Constant =	71.7711	USEPA, 2002
A_c	=	Areal extent of site (acres) =	2	Site-specific
F_D	=	Dispersion correction factor (unitless) =	1.88E-01	Calculated
where FD = 0.1852+(5.3537/t_c)+(-9.6318/t_c^2) =				
t_c	=	Duration of activity (8-hour days) (hr) =	2000	Calculated
	where:	Number of days of activity per year * number of years =	250	USEPA, 2002
T	=	Total activity time (seconds) =	7.20E+06	Calculated
A_R	=	Surface area of road (m^2) =	540	Calculated
	where:	A_R = L_R x W_R		
		L_R = (A_c acres x 4047 m^2/acre)$^{0.5}$	90	Calculated
		W_R = (meters)	6.0	USEPA, 2002
W	=	Mean vehicle weight (20 2-ton cars and 10 20-ton trucks) (tons) =	8	USEPA, 2002
p	=	Number of days with 0.01 inces of precipitation (days/year) =	130	USEPA, 2002
ΣVKT	=	Sum of fleet vehicle kilometers traveled (km) = (Number of vehicles x L_R x Number of Active Days per year x number of years)	45	Calculated
	where:	Number of vehicles	2	Professional Judgment

Table A-15 Health-Based Concentration Goal Equations for Redevelopment Construction Worker Exposure to Soil, Former General Motors North American Operations Facility (otherwise known as Buick City), Flint, Michigan

ROUTE-SPECIFIC CONCENTRATION GOALS:

Oral:

$$(HBG_o)_{C\ or\ NC} = \frac{(TCR\ or\ THQ) \times BW \times (AT_C\ or\ AT_{NC}) \times (10^6\ mg/kg)}{IRs \times FI \times EF \times ED \times (CSF_o\ or\ [1/RfD_o])}$$

Dermal:

$$(HBG_d)_{C\ or\ NC} = \frac{(TCR\ or\ THQ) \times BW \times (AT_C\ or\ AT_{NC}) \times (10^6\ mg/kg)}{SSAs \times SAR \times ABSd \times EF \times ED \times (CSF_a\ or\ [1/RfD_a])}$$

Inhalation: (VOCs)

$$(HBG_i)_{C\ or\ NC} = \frac{(TCR\ or\ THQ) \times BW \times VF_{SC} \times (AT_C\ or\ AT_{NC})}{BRs \times EF \times ED \times (CSF_i\ or\ [1/RfD_i])}$$

$$VF_{SC} = \frac{Q/C_{sa} \times (1/F_D) \times [3.14 \times D_A \times T]^{1/2}}{2 \times \rho_b \times D_A \times (10{,}000\ cm^2/m^2)}$$

$$D_A = \frac{[(\theta_{as}^{3.33} \times D_{air} \times H_o) + (\theta_{ws}^{3.33} \times D_{wat})] / \theta_T^2}{(\rho_b \times Koc \times Foc) + \theta_{ws} + (\theta_{as} \times H_o)}$$

Inhalation: (non-VOCs)

$$(HBG_i)_{C\ or\ NC} = \frac{(TCR\ or\ THQ) \times BW \times PEF_{SC} \times (AT_C\ or\ AT_{NC})}{BRs \times EF \times ED \times (CSF_i\ or\ [1/RfD_i])}$$

$$PEF_{SC} = \frac{Q/C_{sr} \times (1/F_D) \times T \times A_R}{556 \times (W/3)^{0.4} \times [(365 - p)/365] \times \Sigma VKT}$$

CONCENTRATION GOAL BASED ON CANCER EFFECTS: (combining all exposure routes)

$$HBG_C = \frac{1}{[1/(HBG_o)_C] + [1/(HBG_d)_C] + [1/(HBG_i)_C]}$$

CONCENTRATION GOAL BASED ON NON-CANCER EFFECTS: (combining all exposure routes)

$$HBG_{NC} = \frac{1}{[1/(HBG_o)_{NC}] + [1/(HBG_d)_{NC}] + [1/(HBG_i)_{NC}]}$$

HBG = MINIMUM of HBG_C and HBG_{NC}

RBG for VOCs with melting point less than 30°C should not exceed the soil saturation limit (C_{sat}):

$$C_{sat} = \frac{S}{\rho_b} \times [(Koc \times Foc \times \rho_b) + \theta_{ws} + (H_o \times \theta_{as})]$$

Variable Definitions:

θ_{as}	Air-filled porosity of the soil (unitless).
θ_T	Total soil porosity (unitless).
θ_{ws}	Water-filled porosity of the soil (unitless).
ρ_b	Dry soil bulk density (g/cm³).
ABSd	Dermal absorption efficiency (unitless) (Table A-12).

Table A-15 Health-Based Concentration Goal Equations for Redevelopment Construction Worker Exposure to Soil, Former General Motors North American Operations Facility (otherwise known as Buick City), Flint, Michigan

A_R	Surface area of contaminated road segment (m^2).
AT_C	Averaging time for cancer effects (days) (Table A-10).
AT_{NC}	Averaging time for non-cancer effects (days) (Table A-10).
BRs	Breathing rate for soil exposure scenario (m^3/day) (20).
BW	Body weight (kg) (Table A-10).
C_{sat}	Constituent saturation limit in soil (mg/kg).
CSF	Cancer slope factor for oral (CSFo), dermal (adjusted to an absorbed dose, CSFa), or inhalation (CSFi) exposure (kg-day/mg [inverse mg/kg/day]) (Tables A-8 and A-9).
D_A	Apparent diffusivity in soil (cm^2/sec).
D_{air}	Constituent diffusivity in air (cm^2/sec) (Table A-11).
D_{wat}	Constituent diffusivity in water (cm^2/sec) (Table A-11).
ED	Exposure duration (years) (Table A-10).
EF	Exposure frequency (days/year) (Table A-10).
FI	Fraction ingested from area of concern (unitless) (Table A-10).
Foc	Fraction organic carbon in the soil (unitless).
F_D	Dispersion correction factor (unitless) (0.185) (USEPA 2002).
H	Henry's law constant (atm-m^3/mol) (Table A-11).
H_o	Dimensionless Henry's law constant (unitless); calculated as Ho = H / RT.
HBG	Health-based concentration goal for soil (mg/kg).
IRs	Ingestion rate of soil (mg/day) (Table A-10).
Koc	Organic carbon partition coefficient (cm^3/g = mL/g = L/kg) (Table A-11).
p	Number of days with at least 0.01 inches of precipitation (days/year)
PEF_{SC}	Subchronic road particulate emission factor (m^3/kg); used for non-VOCs.
Q/C_{sa}	Volatilization flux per unit concentration for construction scenario [(g/m^2/sec)/(kg/m^3)].
Q/C_{sr}	Particulate emission flux per unit concentration for construction scenario [(g/m^2/sec)/(kg/m^3)].
RfD	Reference dose for oral (RfDo), dermal (adjusted to an absorbed dose, RfDa), or inhalation (RfDi) exposure (mg/kg/day) (Tables A-6 and A-7).
RT	Product of the universal gas constant (R = 8.206 × 10-5 atm-m3/mol/K) and the relevant Kelvin temperature (T = 298.15 K); RT = 0.02447 atm-m3/mol.
S	Constituent solubility limit in water (mg/L).
SAR	Soil-to-skin adherence rate (mg/cm^2/day) (Table A-10).
SSAs	Exposed skin surface area for soil contact (cm^2) (Table A-10).
T	Exposure interval (sec).
TCR	Target cancer risk (unitless).
THQ	Target hazard quotient for non-cancer effects (unitless).
VF_{SC}	Volatilization factor for construction worker scenario (m^3/kg); used for VOCs.
ΣVKT	Sum of vehicle kilometers traveled during the exposure duration (km).
W	Mean vehicle weight (tons).

VOCs Volatile organic compounds.

Table A-16
Health-Based Concentration Goal Calculations for Exposure to Soil for a Hypothetical Construction Worker Receptor
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent	VF *or* PEF [a] (m^3/kg)		CANCER EFFECTS: Route-Specific HBG (mg/kg) (TCR = 10^{-5}) Oral $(HBG_o)_C$	Dermal $(HBG_d)_C$	Inhalation $(HBG_i)_C$	HBG (mg/kg) TCR = 1E-05	NON-CANCER EFFECTS: Route-Specific HBG (mg/kg) (THQ = 1) Oral $(HBG_o)_{NC}$	Dermal $(HBG_d)_{NC}$	Inhalation $(HBG_i)_{NC}$	HBG_{NC} (mg/kg) THQ = 1	Minimum HBG (mg/kg) [b]	
Inorganics												
Arsenic	6.82E+08	P	1.4E+02	2.4E+03	4.8E+05	1.4E+02	9.3E+01	1.5E+03	4.4E+04	8.7E+01	8.7E+01	N
Chromium (total)	1.60E+07	P	4.3E+02	—	4.1E+04	4.3E+02	6.2E+03	—	7.0E+03	3.3E+03	4.3E+02	C
Lead [c]	6.82E+08	P	NA	—	NA	NA	NA	—	NA	NA	NA	
Vanadium	6.82E+08	P	NA	—	NA	NA	2.2E+02	—	NA	2.2E+02	2.2E+02	N
Volatile Organic Compounds (VOCs)												
Benzene	1.56E+02	V	3.9E+03	—	6.1E+01	6.0E+01	3.1E+03	—	5.4E+01	5.3E+01	5.3E+01	N
1,1-Dichloroethane	1.60E+02	V	3.8E+04	—	3.0E+02	3.0E+02	6.2E+05	—	NA	6.2E+05	3.0E+02	C
Ethylbenzene	2.12E+02	V	2.0E+04	—	2.6E+02	2.5E+02	1.5E+04	—	8.3E+03	5.4E+03	2.5E+02	C
Methyl cyclohexane	6.95E+01	V	NA	—	NA	NA	2.7E+05	—	NA	2.7E+05	2.7E+05	N
1,1,1-Trichloroethane	1.13E+02	V	NA	—	NA	NA	2.2E+06	—	2.5E+03	2.5E+03	2.5E+03	N
Semi Volatile Organic Compounds (SVOCs)												
Acenaphthylene	5.50E+03	V	NA	NA	NA	NA	1.9E+05	7.1E+05	NA	1.5E+05	1.5E+05	N
Benzo(a)anthracene	6.82E+08	P	3.0E+02	1.1E+03	1.9E+07	2.4E+02	NA	NA	NA	NA	2.4E+02	C
Benzo(a)pyrene	6.82E+08	P	3.0E+01	1.1E+02	1.9E+06	2.4E+01	NA	NA	NA	NA	2.4E+01	C
Benzo(b)fluoranthene	6.82E+08	P	3.0E+02	1.1E+03	1.9E+07	2.4E+02	NA	NA	NA	NA	2.4E+02	C
Benzo(g,h,i)perylene	6.82E+08	P	NA	NA	NA	NA	9.3E+03	3.6E+04	NA	7.4E+03	7.4E+03	N
Benzo(k)fluoranthene	6.82E+08	P	3.0E+03	1.1E+04	1.9E+07	2.4E+03	NA	NA	NA	NA	2.4E+03	C
Carbazole	6.82E+08	P	1.1E+04	5.4E+04	NA	9.0E+03	NA	NA	NA	NA	9.0E+03	C
Dibenz(a,h)anthracene	6.82E+08	P	3.0E+01	1.1E+02	1.7E+06	2.4E+01	NA	NA	NA	NA	2.4E+01	C
Dimethyl phthalate	6.82E+08	P	NA	NA	NA	NA	3.1E+06	1.5E+07	NA	2.6E+06	2.6E+06	N
Di-n-octyl phthalate	6.82E+08	P	NA	NA	NA	NA	1.2E+05	6.2E+05	NA	1.0E+05	1.0E+05	N
Indeno(1,2,3-cd)pyrene	6.82E+08	P	3.0E+02	1.1E+03	1.9E+07	2.4E+02	NA	NA	NA	NA	2.4E+02	C
3&4-Methylphenol	6.82E+08	P	NA	NA	NA	NA	1.5E+03	7.7E+03	1.8E+09	1.3E+03	1.3E+03	N
Naphthalene	1.88E+03	V	NA	NA	1.7E+02	1.7E+02	6.2E+04	2.4E+05	2.5E+01	2.5E+01	2.5E+01	N
2-Nitrophenol	6.82E+08	P	NA	NA	NA	NA	NA	NA	1.5E+06	1.5E+06	1.5E+06	N
N-Nitrosodi-n-propylamine	6.82E+08	P	3.1E+01	1.5E+02	1.0E+06	2.6E+01	NA	NA	NA	NA	2.6E+01	C
Phenanthrene	3.26E+04	V	NA	NA	NA	NA	9.3E+05	3.6E+06	NA	7.4E+05	7.4E+05	N
Polychlorinated Biphenyls (PCBs)												
Aroclor-1242 (PCB-1242)	6.82E+08	P	1.1E+02	3.9E+02	3.6E+06	8.5E+01	NA	NA	NA	NA	8.5E+01	C
Aroclor-1248 (PCB-1248)	6.82E+08	P	1.1E+02	3.9E+02	3.6E+06	8.5E+01	NA	NA	NA	NA	8.5E+01	C
Aroclor-1254 (PCB-1254)	6.82E+08	P	1.1E+02	3.9E+02	3.6E+06	8.5E+01	1.5E+01	5.5E+01	NA	1.2E+01	1.2E+01	N
Aroclor-1260 (PCB-1260)	6.82E+08	P	1.1E+02	3.9E+02	3.6E+06	8.5E+01	NA	NA	NA	NA	8.5E+01	C

Table A-16
Health-Based Concentration Goal Calculations for Exposure to Soil for a Hypothetical Construction Worker Receptor
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent	VF *or* PEF [a] (m^3/kg)	CANCER EFFECTS				NON-CANCER EFFECTS				Minimum HBG (mg/kg) [b]
		Route-Specific HBG (mg/kg) (TCR = 10^{-5})			HBG (mg/kg)	Route-Specific HBG (mg/kg) (THQ = 1)			HBG_{NC} (mg/kg)	
		Oral $(HBG_o)_C$	Dermal $(HBG_d)_C$	Inhalation $(HBG_i)_C$	TCR = 1E-05	Oral $(HBG_o)_{NC}$	Dermal $(HBG_d)_{NC}$	Inhalation $(HBG_i)_{NC}$	THQ = 1	

[a] Minimum of the volatilization factor (identified with [V]) and the particulate emission factor (identified with [P]), both derived on Table A-9.
[b] Minimum of the HBG_C (identified by "C") and HBG_{NC} (identified by "N") for TCR = 10-6 and RBGNC for THQ = 1.
[c] HBGs for lead can not be calculated using these methods.

—	Not applicable.	PEF	Particulate emission factor.
HBG	Heath-based concentration goal.	TCR	Target cancer risk.
NA	Not available; insufficient data.	THQ	Target hazard quotient for non-cancer effects.
m^3/kg	Cubic meters per kilogram.	VOCs	Volatile organic compounds.
mg/kg	Milligrams per kilogram.		

Equations:

(HBGo)c = (TCR × 70 × 25,550 × 1,000,000) / (330 × 1 × 250 × 1 × CSFo)
(HBGd)c = (TCR × 70 × 25,550 × 1,000,000) / (3,300 × 0.2 × ABSd × 250 × 1 × CSFa)
(HBGi)c = (TCR × [VF or PEF] × 25,550) / (0.042 × 8 × 250 × 1 × IUR)

(HBGo)nc = (THQ × 70 × 350× 1,000,000) / (330 × 1 × 250 × 1 × [1/RfDo])
(HBGd)nc = (THQ × 70 × 350 × 1,000,000) / (3,300 × 0.2 × ABSd × 250 × 1 × [1/RfDa])
(HBGi)nc = (THQ × [VF or PEF] × 350) / (0.042 × 8 × 250 × 1 × [1/RfC])

Table A-17 Health-Based Concentration Goal Equations for Groundwater Based on Redevelopment Construction Worker Exposure, Former General Motors North American Operations Facility (otherwise known as Buick City), Flint, Michigan

ROUTE-SPECIFIC CONCENTRATION GOALS:

Oral: $$(HBG_o)_{C\ or\ NC} = \frac{(TCR\ or\ THQ) \times BW \times (AT_C\ or\ AT_{NC})}{IRgw \times EF \times ED \times [\ CSF_o\ or\ (1/RfD_o)\ ]}$$

Dermal: $$(HBG_d)_{C\ or\ NC} = \frac{(TCR\ or\ THQ) \times BW \times (AT_C\ or\ AT_{NC})}{SSAgw \times DA \times EF \times ED \times [\ CSF_a\ or\ (1/RfD_a)\ ]}$$

Inorganics: $$DA\ [0] = \frac{K_p \times ETgw}{1000\ cm^3/L}$$

Organics: $$DA\ [1] = \frac{2\ FA \times K_p}{1000\ cm^3/L} \times \sqrt{(6\ \tau \times ETgw)/\pi} \quad \text{if } ETgw \le t^*$$

or $$DA\ [2] = \frac{FA \times K_p}{1000\ cm^3/L} \times \left(\frac{ETgw}{1+B} + \frac{2\tau(1+3B+3B^2)}{(1+B)^2} \right) \quad \text{if } ETgw > t^*$$

Inhalation: $$(HBG_i)_{C\ or\ NC} = \frac{(TCR\ or\ THQ) \times BW \times (AT_C\ or\ AT_{NC})}{VFsw \times BRgw \times EF \times ED \times [\ CSF_i\ or\ (1/RfD_i)\ ]}$$

where: $$VFsw = \frac{(1000\ L/m^3)}{(1/k_l) + [1/(H_o \times k_g)]} \times \frac{SA}{Hb \times Wb \times Um}$$

CONCENTRATION GOAL BASED ON CANCER EFFECTS: (combining all exposure routes)

$$HBG_C = \frac{1}{[\ 1/(HBG_o)_C\ ] + [\ 1/(HBG_d)_C\ ] + [\ 1/(HBG_i)_C\ ]}$$

CONCENTRATION GOAL BASED ON NON-CANCER EFFECTS: (combining all exposure routes)

$$HBG_{NC} = \frac{1}{[\ 1/(HBG_o)_{NC}\ ] + [\ 1/(HBG_d)_{NC}\ ] + [\ 1/(HBG_i)_{NC}\ ]}$$

HBG = MINIMUM of HBG_C and HBG_{NC}

Variable Definitions:	
τ	Lag time for dermal absorption through the skin (hour) (Table A-12).
AT_C	Averaging time for cancer effects (days) (Table A-10).
AT_{NC}	Averaging time for non-cancer effects (days) (Table A-10).
B	Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (unitless) (Table A-12).
BRgw	Breathing rate for groundwater exposure (m^3/day) (Table A-10).
BW	Body weight (kg) (Table A-10).
CSF	Cancer slope factor for oral (CSFo), dermal (adjusted to an absorbed dose, CSFa), or inhalation (CSFi) exposure (kg-day/mg [inverse mg/kg/day]) (Tables A-8 and A-9).
DA	Dermal absorption factor (L/cm^2/day), calculated using Equation [0], [1], or [2], as appropriate.
ED	Exposure duration (years) (Table A-10).

Table A-17 Health-Based Concentration Goal Equations for Groundwater Based on Redevelopment Construction Worker Exposure, Former General Motors North American Operations Facility (otherwise known as Buick City), Flint, Michigan

EF	Exposure frequency (days/year) (Table A-10).
ETgw	Exposure time for groundwater contact (hours/day) (Table A-10).
FA	Fraction of absorbed water (unitless) (Table A-12).
H	Henry's law constant (atm-m^3/mol) (Table A-11).
Hb	Height of mixing zone (2 m).
HBG	Health-based concentration goal for groundwater (mg/L).
H_o	Dimensionless Henry's law constant (unitless); calculated as Ho = H/RT.
IRgw	Incidental ingestion rate of groundwater (L/day) (Table A-10).
k_g	Gas-phase mass transfer coefficient (m/sec) » (8.3 × 10-3 m/sec) × [(18 g/mol)/MW]1/2.
k_l	Liquid-phase mass transfer coefficient (m/sec) » (5.6 × 10-5 m/sec) × [(44 g/mol)/MW]1/2.
K_p	Permeability coefficient (cm/hour) (Table A-12).
MW	Molecular weight (g/mol) (Table A-11).
RfD	Reference dose for oral (RfDo), dermal (adjusted to an absorbed dose, RfDa), or inhalation (RfDi) exposure (mg/kg/day) (Tables A-6 and A-7).
RT	Product of the universal gas constant (R = 8.206 × 10-5 atm-m3/mol/K) and the relevant Kelvin temperature (T = 298.15 K); RT = 0.02447 atm-m3/mol.
SA	Source area (1 m2).
SSAgw	Exposed skin surface area for groundwater contact (cm^2) (Table A-10).
t*	Time required to reach steady state (hour) (Table A-12).
TCR	Target cancer risk (unitless).
THQ	Target hazard quotient for non-cancer effects (unitless).
Um	Mean wind speed (m/sec).
VFsw	Volatilization factor from surface water (L/m^3).
Wb	Width of mixing zone (1 m).

Table A-18

Health-Based Concentration Goal Calculations for Exposure to Groundwater for a Hypothetical Construction Worker Receptor

Former General Motors North American Operations Facility (otherwise known as Buick City)

Flint, Mchigan

Constituent	DA [a] ($L/cm^2/day$)		CANCER EFFECTS				NON-CANCER EFFECTS				Minimum HBG [b] (mg/L)	
			Route-Specific HBG (mg/L)			HBG_C (mg/L)	Route-Specific HBG (mg/L)			HBG_{NC} (mg/L)		
			Oral $(HBG_o)_C$	Dermal $(HBG_d)_C$	Inhalation $(HBG_i)_C$	TCR = 1E-05	Oral $(HBG_o)_{NC}$	Dermal $(HBG_d)_{NC}$	Inhalation $(HBG_i)_{NC}$	THQ = 1		
Inorganics												
Arsenic	2.00E-06	[0]	4.8E+01	3.6E+01	—	2.1E+01	3.1E+01	2.3E+01	—	1.3E+01	1.3E+01	N
Barium	2.00E-06	[0]	NA	NA	—	NA	2.0E+04	1.1E+03	—	1.0E+03	1.0E+03	N
Beryllium	2.00E-06	[0]	NA	NA	—	NA	5.1E+02	2.7E+00	—	2.7E+00	2.7E+00	N
Cadmium	2.00E-06	[0]	NA	NA	—	NA	1.0E+02	1.9E+00	—	1.9E+00	1.9E+00	N
Chromium (total)	4.00E-06	[0]	1.4E+02	7.0E-01	—	7.0E-01	2.0E+03	1.0E+01	—	1.0E+01	7.0E-01	C
Cobalt	8.00E-07	[0]	NA	NA	—	NA	3.1E+01	5.8E+01	—	2.0E+01	2.0E+01	N
Lead [c]	2.00E-07	[0]	NA	NA	—	NA	NA	NA	—	NA	NA	
Manganese	2.00E-06	[0]	NA	NA	—	NA	1.4E+04	4.3E+02	—	4.2E+02	4.2E+02	N
Selenium	2.00E-06	[0]	NA	NA	—	NA	5.1E+02	3.9E+02	—	2.2E+02	2.2E+02	N
Thallium	2.00E-06	[0]	NA	NA	—	NA	6.8E+00	5.2E+00	—	3.0E+00	3.0E+00	N
Vanadium	2.00E-06	[0]	NA	NA	—	NA	7.2E+01	1.4E+00	—	1.4E+00	1.4E+00	N
Volatile Organic Compounds (VOCs)												
Benzene	3.86E-05	[2]	1.3E+03	5.1E+01	1.6E+01	1.2E+01	1.0E+03	4.0E+01	1.4E+01	1.0E+01	1.0E+01	N
1,1-Dichloroethane	1.86E-05	[2]	1.3E+04	1.0E+03	7.6E+01	7.0E+01	2.0E+05	1.7E+04	NA	1.5E+04	7.0E+01	C
1,2-Dichloroethane	1.16E-05	[2]	7.9E+02	1.0E+02	4.7E+00	4.4E+00	2.0E+03	2.7E+02	4.2E+02	1.5E+02	4.4E+00	C
cis-1,2-Dichloroethene	2.12E-05	[2]	NA	NA	NA	NA	1.0E+04	7.3E+02	NA	6.8E+02	6.8E+02	N
1,2-Dichloropropane	2.30E-05	[2]	2.0E+03	1.3E+02	1.2E+01	1.1E+01	7.2E+03	4.7E+02	2.3E+00	2.2E+00	2.2E+00	N
1,3-Dichlorobenzene	2.52E-04	[2]	NA	NA	NA	NA	9.2E+04	5.5E+02	3.5E+02	2.1E+02	2.1E+02	N
Ethylbenzene	1.50E-04	[2]	6.5E+03	6.6E+01	4.9E+01	2.8E+01	5.1E+03	5.2E+01	1.6E+03	4.9E+01	2.8E+01	C
Methyl cyclohexane	3.50E-04	[0]	NA	NA	NA	NA	8.8E+04	3.8E+02	NA	3.8E+02	3.8E+02	N
Methyl Tert Butyl Ether	9.05E-06	[2]	4.0E+04	6.7E+03	4.7E+02	4.3E+02	NA	NA	5.2E+02	5.2E+02	4.3E+02	C
Methylene chloride	9.24E-06	[2]	9.5E+03	1.6E+03	2.6E+02	2.2E+02	6.1E+03	1.0E+03	1.7E+02	1.4E+02	1.4E+02	N
Tetrachloroethene	1.23E-04	[1]	1.3E+02	1.6E+00	2.1E+01	1.5E+00	1.0E+04	1.3E+02	4.7E+01	3.4E+01	1.5E+00	C
Toluene	8.54E-05	[2]	NA	NA	NA	NA	8.2E+04	1.5E+03	8.7E+02	5.4E+02	5.4E+02	N
Trichloroethene	3.90E-05	[2]	1.2E+04	4.7E+02	6.1E+01	5.4E+01	NA	NA	NA	NA	5.4E+01	C
Vinyl chloride	1.38E-05	[2]	9.9E+01	1.1E+01	2.8E+01	7.2E+00	3.1E+02	3.4E+01	1.7E+01	1.1E+01	7.2E+00	C
m&p-Xylene	1.64E-04	[2]	NA	NA	NA	NA	4.1E+04	3.8E+02	7.0E+01	5.9E+01	5.9E+01	N
o-Xylene	1.64E-04	[2]	NA	NA	NA	NA	4.1E+04	3.8E+02	7.0E+01	5.9E+01	5.9E+01	N
Semi Volatile Organic Compounds (SVOCs)												
Benzo(a)anthracene	2.62E-03	[1]	9.8E+01	5.7E-02	—	5.7E-02	NA	NA	—	NA	5.7E-02	C
Benzo(a)pyrene	4.49E-03	[1]	9.8E+00	3.3E-03	—	3.3E-03	NA	NA	—	NA	3.3E-03	C
Benzo(k)fluoranthene	6.19E-03	[1]	9.8E+02	2.4E-01	—	2.4E-01	NA	NA	—	NA	2.4E-01	C
bis(2-Chloroethyl)ether	6.08E-06	[2]	6.5E+01	1.6E+01	3.7E-01	3.6E-01	NA	NA	NA	NA	3.6E-01	C
bis(2-Ethylhexyl)phthalate	3.19E-04	[1]	5.1E+03	2.4E+01	—	2.4E+01	2.0E+04	9.7E+01	—	9.7E+01	2.4E+01	C

Table A-18

Health-Based Concentration Goal Calculations for Exposure to Groundwater for a Hypothetical Construction Worker Receptor

Former General Motors North American Operations Facility (otherwise known as Buick City)

Flint, Mchigan

Constituent	DA [a] (L/cm²/day)		CANCER EFFECTS				NON-CANCER EFFECTS				Minimum HBG [b] (mg/L)	
			Route-Specific HBG (mg/L)			HBG_C (mg/L)	Route-Specific HBG (mg/L)			HBG_{NC} (mg/L)		
			Oral	Dermal	Inhalation		Oral	Dermal	Inhalation			
			$(HBG_o)_C$	$(HBG_d)_C$	$(HBG_i)_C$	TCR = 1E-05	$(HBG_o)_{NC}$	$(HBG_d)_{NC}$	$(HBG_i)_{NC}$	THQ = 1		
Dibenz(a,h)anthracene	6.93E-03	[1]	9.8E+00	2.1E-03	—	2.1E-03	NA	NA	—	NA	2.1E-03	C
2-Methylnaphthalene	4.51E-04	[1]	NA	NA	NA	NA	4.1E+02	1.4E+00	NA	1.4E+00	1.4E+00	N
3&4-Methylphenol	2.22E-05	[2]	NA	NA	—	NA	5.1E+02	3.5E+01	—	3.3E+01	3.3E+01	N
Naphthalene	1.68E-04	[2]	NA	NA	3.6E+00	3.6E+00	2.0E+04	1.8E+02	5.2E-01	5.2E-01	5.2E-01	N
Nitrobenzene	1.71E-05	[2]	NA	NA	3.0E+00	3.0E+00	5.1E+02	4.5E+01	3.5E+00	3.2E+00	3.0E+00	C
2,2'-oxybis(1-Chloropropane)	3.05E-05	[1]	1.0E+03	5.1E+01	1.2E+01	9.7E+00	4.1E+03	2.0E+02	NA	1.9E+02	9.7E+00	C
Pentachlorophenol	2.50E-03	[1]	6.0E+02	3.6E-01	—	3.6E-01	3.1E+03	1.9E+00	—	1.9E+00	3.6E-01	C
Phenanthrene	5.63E-04	[1]	NA	NA	NA	NA	3.1E+05	8.2E+02	NA	8.2E+02	8.2E+02	N

[a] The dermal absorption factor was calculated using Equation [0], [1], or [2], as indicated, from Table A-8.

[b] Minimum of the HBG_C (identified by "C") and HBG_{NC} (identified by "N").

[c] HBGs for lead can not be calculated using these methods.

— Not applicable.

HBG Health-based concentration goal for groundwater.

mg/L Milligrams per liter.

NA Not available; insufficient data.

TCR Target cancer risk.

THQ Target hazard quotient for noncancer effects.

Equations:

(HBGo)c = (TCR × 70 × 25,550) / (0.005 × 50 × 1 × CSFo)

(HBGd)c = (TCR × 70 × 25,550) / (3,300 × DA × 50 × 1 × CSFa)

(HBGi)c [VOCs] = (TCR × 25,550) / (0.5 × 0.42 × 2.00 × 50 × 1 × IUR)

(HBGo)nc = (THQ × 70 × 350) / (0.005 × 50 × 1 × [1/RfDo])

(HBGd)nc = (THQ × 70 × 350) / (3,300 × DA × 50 × 1 × [1/RfDa])

(HBGi)nc [VOCs] = (THQ × 350) / (0.5 × 0.042 × 2.00 × 50 × 1 × [1/RfC])

Table A-19
Summary of Calculated Health Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent	Minimum Soil HBG (mg/kg)	Minimum Groundwater HBG (mg/L)
	Construction Worker	Construction Worker
Inorganics		
Arsenic	8.7E+01	1.3E+01
Barium	—	1.0E+03
Beryllium	—	2.7E+00
Cadmium	—	1.9E+00
Chromium (total)	4.3E+02	7.0E-01
Cobalt	—	2.0E+01
Lead [a]	—	—
Manganese	—	4.2E+02
Selenium	—	2.2E+02
Thallium	—	3.0E+00
Vanadium	2.2E+02	1.4E+00
Volatile Organic Compounds (VOCs)		
Benzene	5.3E+01	1.0E+01
1,1-Dichloroethane	3.0E+02	7.0E+01
1,2-Dichloroethane	—	4.4E+00
cis-1,2-Dichloroethene	—	6.8E+02
1,2-Dichloropropane	—	2.2E+00
1,3-Dichlorobenzene	—	2.1E+02
Ethylbenzene	2.5E+02	2.8E+01
Methyl cyclohexane	2.7E+05	3.8E+02
Methyl Tert Butyl Ether	—	4.3E+02
Methylene chloride	—	1.4E+02
Tetrachloroethene	—	1.5E+00
Toluene	—	5.4E+02
1,1,1-Trichloroethane	2.5E+03	—
Trichloroethene	—	5.4E+01
Vinyl chloride	—	7.2E+00
m&p-Xylene	—	5.9E+01
o-Xylene	—	5.9E+01
Semi Volatile Organic Compounds (SVOCs)		
Acenaphthylene	1.5E+05	—
Benzo(a)anthracene	2.4E+02	5.7E-02
Benzo(a)pyrene	2.4E+01	3.3E-03
Benzo(b)fluoranthene	2.4E+02	—
Benzo(g,h,i)perylene	7.4E+03	—
Benzo(k)fluoranthene	2.4E+03	2.4E-01
bis(2-Chloroethyl)ether	—	3.6E-01
bis(2-Ethylhexyl)phthalate	—	2.4E+01
Carbazole	9.0E+03	—
Dibenz(a,h)anthracene	2.4E+01	2.1E-03
Dimethyl phthalate	2.6E+06	—
Di-n-octyl phthalate	1.0E+05	—
Indeno(1,2,3-cd)pyrene	2.4E+02	—
2-Methylnaphthalene	—	1.4E+00
3&4-Methylphenol	1.3E+03	3.3E+01
Naphthalene	2.5E+01	5.2E-01
Nitrobenzene	—	3.0E+00
2-Nitrophenol	1.5E+06	—
N-Nitrosodi-n-propylamine	2.6E+01	—
2,2'-oxybis(1-Chloropropane)	—	9.7E+00
Pentachlorophenol	—	3.6E-01
Phenanthrene	7.4E+05	8.2E+02
Polychlorinated Biphenyls (PCBs)		

Table A-19
Summary of Calculated Health Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Mchigan

Constituent	Minimum Soil HBG (mg/kg)	Minimum Groundwater HBG (mg/L)
	Construction Worker	Construction Worker
Aroclor-1242 (PCB-1242)	8.5E+01	—
Aroclor-1248 (PCB-1248)	8.5E+01	—
Aroclor-1254 (PCB-1254)	1.2E+01	—
Aroclor-1260 (PCB-1260)	8.5E+01	—

[a] HBGs for lead can not be calculated using these methods.

— Not applicable for this media.
HBG Health-based concentration goal.
mg/kg Milligrams per kilogram.

Table A-20
Input Parameters for the Adult Lead Model
Former General Motors North American Operations (otherwise known as Buick City)
Flint, Michigan

Variable	Description of Variable	Units	Value - GSDi and PbBo from Analysis of NHANES III (Phases 1&2)	Comments
Soil Model Input Parameters				
PbS	Soil lead concentration	ug/g or ppm	AOI-Specific	Mean concentration
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	default
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	default
GSD_i	Geometric standard deviation PbB	--	2.1	default
PbB_0	Baseline PbB	ug/dL	1.50	default
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.330	default for construction worker (USEPA 1996, 2002a, 2002b)
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--	
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	
K_{SD}	Mass fraction of soil in dust	--	--	
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12	default
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	250	Professional judgment
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365	default
PbB_{adult}	PbB of adult worker, geometric mean	ug/dL	calculated	used as baseline blood lead level in grondwater model
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	calculated	
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	calculated	
$P(PbB_{fetal} > PbB_t)$	Probability that fetal PbB > PbB_t, assuming lognormal distribution	%	calculated	
Groundwater Model Input Parameters				
$PbB_{recptor,central}$	PbB of adult worker, geometric mean	ug/dL	calculated	
$PbB_{receptor,baseline}$	Typical blood lead concentration in adults	ug/dL	AOI-specific PbB_{adult}	calculated using soil model
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	default
IRw	Water Intake Rate	L/day	0.005	Professional judgment
AFw	Absorption fraction from water	--	0.2	default
EFw	Exposure frequency for water	days/yr	50	Professional judgment
ATw	Averaging time for water	days	90	time to reach quasi steady state

Table A-21
Predicted Blood Lead Levels due to Ingestion of Soil and Resulting Health-Based Goals for Lead in Groundwater
Former General Motors North American Operations Facility
Flint, Michigan

AOI	Predicted Adult Blood Lead Level Due to Exposure to Soil (ug/dL)	Calculated Health-Based Goal for Lead in Groundwater (mg/L)	Maximum Groundwater Ccncentration in AOI (mg/k)
36-1	1.6	7.6	0.022
81-2	3.2	0.41	0.092
81-3	1.9	6.2	0.047
83/84-3	36.2	0	0.017

Notes:
ug/dL - micrograms per deciliter

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

AOI Number | Location ID:					AOI 05-1											
Sample Depth(ft BGS):		Construction Worker Soil HBG	Maximum Detected Concentration	Exceeds Construction Worker HBG?	05-1 | RFI-05-13 0 - 2	05-1 | RFI-05-13 8 - 10	05-1 | RFI-05-13 10 - 12	05-1 | RFI-05-14 0 - 2	05-1 | RFI-05-14 8 - 10	05-1 | RFI-05-14 10 - 12	05-1 | RFI-05-21 0 - 2	05-1 | RFI-05-21 6 - 8	05-1 | RFI-05-22 0.5 - 2.5	05-1 | RFI-05-22 4 - 6	05-1 | RFI-05-23 1.3 - 3	05-1 | RFI-05-23 4 - 6
Date Collected:					01/26/01	01/22/01	01/22/01	01/26/01	01/22/01	01/22/01	06/26/01	06/26/01	11/26/01	11/26/01	11/26/01	11/26/01
Sample Name:	Units				RFI-05-13(00-02)	RFI-05-13(08-10)	RFI-05-13(10-12)	RFI-05-14(00-02)	RFI-05-14(08-10)	RFI-05-14(10-12)	RFI-05-21(00-02)	RFI-05-21(06-08)	RFI-05-22(0.5-2.5)	RFI-05-22(04-06)	RFI-05-23(1.3-3.0)	RFI-05-23(04-06)
Inorganics																
Arsenic	mg/kg	8.7E+01	190	**YES**	4.7	4.9	7.4	4.7	3.4	6.9	4.2	4.6	NA	4.6	NA	12
Chromium (total) [a]	mg/kg	4.3E+02	2400	**YES**	7	12	8.8	9.1	9.2	8.9	15	13	NA	43	NA	76
Lead [b]	mg/kg	8.0E+02	69000	**YES**	8.5	11	7.3	6.8	4.7	6.2	**3100**	78	14	310	92	21
Vanadium	mg/kg	2.2E+02	390	**YES**	NA	NA	NA	NA	NA	NA	12	18	NA	12	NA	31
Volatile Organic Compounds (VOCs)																
Benzene	mg/kg	5.3E+01	240	**YES**	<0.041	<0.042	<0.042	<0.039	<0.041	<0.041	<0.039	<0.043	NA	<0.041	NA	<0.036
1,1-Dichloroethane	mg/kg	3.0E+02	7000	**YES**	<0.041	<0.042	<0.042	<0.039	<0.041	<0.041	<0.039	<0.043	NA	<0.041	NA	<0.036
Ethylbenzene	mg/kg	2.5E+02	680	**YES**	<0.041	<0.042	<0.042	<0.039	<0.041	<0.041	<0.039	<0.043	NA	<0.041	NA	<0.036
Methyl cyclohexane	mg/kg	2.7E+05	11	no	NA	NA	NA	NA	NA	NA	0.08	0.04	NA	<0.17	NA	0.032
1,1,1-Trichloroethane	mg/kg	2.5E+03	47000	**YES**	<0.041	<0.042	<0.042	<0.039	<0.041	<0.041	<0.039	<0.043	NA	<0.041	NA	<0.036
Semi Volatile Organic Compounds (SVOCs)																
Acenaphthylene	mg/kg	1.5E+05	2.1	no	<0.18	<0.19	<0.20	<0.18	<0.19	<0.20	<0.94	0.094	NA	0.044	NA	<0.18
Benzo(a)anthracene	mg/kg	2.4E+02	81	no	<0.18	<0.19	<0.20	<0.18	<0.19	<0.20	1.3	1.3	NA	2.5	NA	0.58
Benzo(a)pyrene	mg/kg	2.4E+01	66	**YES**	<0.18	<0.19	<0.20	<0.18	<0.19	<0.20	1.7	1.3	NA	2.1	NA	0.4
Benzo(b)fluoranthene	mg/kg	2.4E+02	63	no	<0.18	<0.19	<0.20	<0.18	<0.19	<0.20	1.8	1.3	NA	2.6	NA	0.35
Benzo(g,h,i)perylene	mg/kg	7.4E+03	28	no	<0.18	<0.19	<0.20	<0.18	<0.19	<0.20	0.86	0.73	NA	1	NA	0.72
Benzo(k)fluoranthene	mg/kg	2.4E+03	59	no	<0.18	<0.19	<0.20	<0.18	<0.19	<0.20	1.4	1.2	NA	3	NA	0.27
Carbazole	mg/kg	9.0E+03	40	no	<0.18	<0.19	<0.20	<0.18	<0.19	<0.20	<0.94	0.18	NA	1.4	NA	0.13
Dibenz(a,h)anthracene	mg/kg	2.4E+01	17	no	<0.18	<0.19	<0.20	<0.18	<0.19	<0.20	<0.94	<0.21	NA	<0.19	NA	<0.18
Dimethyl phthalate	mg/kg	2.6E+06	0.3	no	<0.18	<0.19	<0.20	<0.18	<0.19	<0.20	<0.94	<0.21	NA	<0.19	NA	<0.18
Di-n-octyl phthalate	mg/kg	1.0E+05	0.25	no	<0.18	<0.19	<0.20	<0.18	<0.19	<0.20	<0.94	<0.21	NA	<0.19	NA	<0.18
Indeno(1,2,3-cd)pyrene	mg/kg	2.4E+02	29	no	<0.18	<0.19	<0.20	<0.18	<0.19	<0.20	0.88	0.66	NA	0.92	NA	0.57
3&4-Methylphenol	mg/kg	1.3E+03	1	no	<0.35	<0.36	<0.39	<0.35	<0.36	<0.39	<1.9	<0.43	NA	<0.39	NA	<0.36
Naphthalene	mg/kg	2.5E+01	44	**YES**	<0.18	<0.19	<0.20	<0.18	<0.19	0.26	<0.94	<0.21	NA	0.17	NA	0.31
2-Nitrophenol	mg/kg	1.5E+06	ND	no	<0.18	<0.19	<0.20	<0.18	<0.19	<0.20	<0.94	<0.21	NA	<0.19	NA	<0.18
N-Nitrosodi-n-propylamine	mg/kg	2.6E+01	0.45	no	<0.18	<0.19	<0.20	<0.18	<0.19	<0.20	<0.94	<0.21	NA	<0.19	NA	<0.18
Phenanthrene	mg/kg	7.4E+05	190	no	<0.18	<0.19	<0.20	<0.18	<0.19	0.69	0.32	1	NA	3.4	NA	1.2
Polychlorinated Biphenyls (PCBs)																
Aroclor-1242 (PCB-1242)	mg/kg	8.5E+01	1.1	no	<0.035	<0.036	<0.039	<0.035	<0.036	<0.040	<0.039	<0.044	NA	<0.040	NA	<0.037
Aroclor-1248 (PCB-1248)	mg/kg	8.5E+01	3.5	no	<0.035	<0.036	<0.039	<0.035	<0.036	<0.040	<0.039	<0.044	NA	<0.040	NA	<0.037
Aroclor-1254 (PCB-1254)	mg/kg	1.2E+01	4.1	no	<0.035	<0.036	<0.039	<0.035	<0.036	<0.040	<0.039	<0.044	NA	<0.040	NA	<0.037
Aroclor-1260 (PCB-1260)	mg/kg	8.5E+01	0.88	no	<0.035	<0.036	<0.039	<0.035	<0.036	<0.040	0.25	<0.044	NA	<0.040	NA	<0.037

AOI Number | Location ID:
Sample Depth(ft BGS):
Date Collected:
Sample Name:

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 05-1 cont.		
	05-1 | RFI-05-24 1 - 3 11/26/01 RFI-05-24(01-03)	05-1 | RFI-05-24 3 - 5 11/26/01 RFI-05-24(03-05)	05-1 | RFI-05-25 0 - 2 11/30/01 RFI-05-25(00-02)
Inorganics			
Arsenic	NA	NA	4.2
Chromium (total) [a]	NA	NA	13
Lead [b]	42	34	50
Vanadium	NA	NA	14
Volatile Organic Compounds			
Benzene	NA	NA	<0.039
1,1-Dichloroethane	NA	NA	<0.039
Ethylbenzene	NA	NA	<0.039
Methyl cyclohexane	NA	NA	<0.17
1,1,1-Trichloroethane	NA	NA	<0.039
Semi Volatile Organic Comp			
Acenaphthylene	NA	NA	<0.19
Benzo(a)anthracene	NA	NA	<0.95
Benzo(a)pyrene	NA	NA	<0.95
Benzo(b)fluoranthene	NA	NA	<0.95
Benzo(g,h,i)perylene	NA	NA	<0.95
Benzo(k)fluoranthene	NA	NA	<0.95
Carbazole	NA	NA	<0.19
Dibenz(a,h)anthracene	NA	NA	<0.95
Dimethyl phthalate	NA	NA	<0.19
Di-n-octyl phthalate	NA	NA	<0.95
Indeno(1,2,3-cd)pyrene	NA	NA	<0.95
3&4-Methylphenol	NA	NA	<1.9
Naphthalene	NA	NA	0.19
2-Nitrophenol	NA	NA	<0.19
N-Nitrosodi-n-propylamine	NA	NA	<0.19
Phenanthrene	NA	NA	0.52
Polychlorinated Biphenyls (F			
Aroclor-1242 (PCB-1242)	NA	NA	0.46
Aroclor-1248 (PCB-1248)	NA	NA	<0.039
Aroclor-1254 (PCB-1254)	NA	NA	0.22
Aroclor-1260 (PCB-1260)	NA	NA	<0.039

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
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	AOI 05-6													
AOI Number | Location ID:	**05-6 | RFI-05-09**	**05-6 | RFI-05-09**	**05-6 | RFI-05-16**	**05-6 | RFI-05-16**	**05-6 | RFI-05-16**	**05-6 | RFI-05-17**	**05-6 | RFI-05-17**	**05-6 | RFI-05-17**	**05-6 | RFI-05-17**	**05-6 | RFI-05-18**	**05-6 | RFI-05-18**	**05-6 | RFI-05-18**	**05-6 | RFI-05-19S**
Sample Depth(ft BGS):	**0.2 - 2.2**	**6.2 - 8.2**	**0.8 - 2.8**	**8.8 - 10.8**	**10.8 - 12.8**	**0.9 - 2.9**	**8.9 - 10.9**	**10.9 - 12.9**	**10.9 - 12.9**	**0.9 - 2.9**	**6.9 - 8.9**	**8.9 - 10.9**	**0.8 - 2.8**
Date Collected:	**06/27/01**	**06/27/01**	**09/08/01**	**09/08/01**	**09/08/01**	**09/08/01**	**09/08/01**	**09/08/01**	**09/08/01**	**09/08/01**	**09/08/01**	**09/08/01**	**06/26/01**
Sample Name:	**RFI-05-09(0.2-2.2)**	**RFI-05-09(6.2-8.2)**	**RFI-05-16(0.8-2.8)**	**RFI-05-16(8.8-10.8)**	**RFI-05-16(10.8-12.8)**	**RFI-05-17(0.9-2.9)**	**RFI-05-17(8.9-10.9)**	**RFI-05-17(10.9-12.9)**	**RFI-05-DUP-56**	**RFI-05-18(0.9-2.9)**	**RFI-05-18(6.9-8.9)**	**RFI-05-18(8.9-10.9)**	**RFI-05-19S(0.8-2.8)**
Inorganics													
Arsenic	6.1	4.7	4.2	4.9	7.9	4.8	5.1	4.8	3.8	3.8	9.5	5.8	1.7
Chromium (total) [a]	56	8.1	6.4	9.3	5.8	8.2	7	4.4	4.1	4.7	19	7.8	4.6
Lead [b]	28	29	6	7.1	7.4	12	6	6.6	4.8	6.3	**3500**	51	8.2
Vanadium	12	14	11	13	10	13	12	7.2	7.3	7.9	23	13	6
Volatile Organic Compounds													
Benzene	<0.042	<0.041	<0.044	<0.042	<0.040	<0.036	<0.038	<0.036	<0.037	<0.036	<0.039	<0.041	<0.038
1,1-Dichloroethane	<0.042	<0.041	<0.044	<0.042	<0.040	<0.036	<0.038	<0.036	<0.037	<0.036	<0.039	<0.041	<0.038
Ethylbenzene	<0.042	<0.041	<0.044	<0.042	<0.040	<0.036	<0.038	<0.036	<0.037	<0.036	<0.039	<0.041	<0.038
Methyl cyclohexane	0.068	<0.18	<0.19	<0.18	<0.17	<0.16	<0.16	<0.15	<0.16	<0.15	0.041	0.033	<0.16
1,1,1-Trichloroethane	<0.042	<0.041	<0.044	<0.042	<0.040	<0.036	<0.038	<0.036	<0.037	<0.036	<0.039	<0.041	<0.038
Semi Volatile Organic Comp													
Acenaphthylene	<0.20	0.2	<0.21	<0.20	<0.20	<0.18	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18
Benzo(a)anthracene	0.37	1.6	<0.21	<0.20	<0.20	0.087	<0.18	<0.18	<0.18	0.038	1.3	0.089	<0.18
Benzo(a)pyrene	0.33	1.8	<0.21	<0.20	<0.20	0.12	<0.18	<0.18	<0.18	0.04	0.95	<0.19	<0.18
Benzo(b)fluoranthene	0.35	1.8	<0.21	<0.20	<0.20	0.15	<0.18	<0.18	<0.18	0.048	1.1	<0.19	<0.18
Benzo(g,h,i)perylene	0.12	1.5	<0.21	<0.20	<0.20	0.093	<0.18	<0.18	<0.18	<0.18	0.53	<0.19	<0.18
Benzo(k)fluoranthene	0.36	1.9	<0.21	<0.20	<0.20	0.1	<0.18	<0.18	<0.18	0.048	1	<0.19	<0.18
Carbazole	0.11	0.26	<0.21	<0.20	<0.20	<0.18	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18
Dibenz(a,h)anthracene	<0.20	<0.99	<0.21	<0.20	<0.20	<0.18	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18
Dimethyl phthalate	<0.20	<0.99	<0.21	<0.20	<0.20	<0.18	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18
Di-n-octyl phthalate	<0.20	<0.99	<0.21	<0.20	<0.20	<0.18	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18
Indeno(1,2,3-cd)pyrene	0.11	1	<0.21	<0.20	<0.20	0.073	<0.18	<0.18	<0.18	<0.18	0.48	<0.19	<0.18
3&4-Methylphenol	0.084	<2.0	<0.43	<0.40	<0.39	<0.36	<0.37	<0.36	<0.36	<0.35	<0.38	<0.39	<0.37
Naphthalene	0.47	<0.99	<0.21	<0.20	<0.20	<0.18	<0.18	<0.18	<0.18	<0.18	0.13	<0.19	<0.18
2-Nitrophenol	<0.20	<0.99	<0.21	<0.20	<0.20	<0.18	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18
N-Nitrosodi-n-propylamine	<0.20	<0.99	<0.21	<0.20	<0.20	<0.18	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18
Phenanthrene	1.2	2.9	<0.21	<0.20	<0.20	0.057	<0.18	<0.18	<0.18	0.05	3.2	<0.19	<0.18
Polychlorinated Biphenyls (F													
Aroclor-1242 (PCB-1242)	<0.041	<0.041	<0.044	<0.041	<0.040	<0.037	<0.038	<0.037	<0.037	<0.036	<0.039	<0.040	<0.038
Aroclor-1248 (PCB-1248)	<0.041	<0.041	<0.044	<0.041	<0.040	<0.037	<0.038	<0.037	<0.037	<0.036	0.22	<0.040	<0.038
Aroclor-1254 (PCB-1254)	0.065	<0.041	<0.044	<0.041	<0.040	<0.037	<0.038	<0.037	<0.037	<0.036	0.14	<0.040	<0.038
Aroclor-1260 (PCB-1260)	<0.041	<0.041	<0.044	<0.041	<0.040	<0.037	<0.038	<0.037	<0.037	<0.036	<0.039	<0.040	<0.038

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
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	AOI 05-6 cont.								
AOI Number | Location ID:	**05-6 | RFI-05-19S**	**05-6 | RFI-05-20**	**05-6 | RFI-05-20**	**05-6 | RFI-05-26**	**05-6 | RFI-05-27**	**05-6 | RFI-05-29**	**05-6 | RFI-05-30**	**05-6 | RFI-05-30**	**05-6 | RFI-05-31**
Sample Depth(ft BGS):	**6.8 - 8.8**	**0.7 - 2.7**	**6.7 - 8.6**	**7 - 9**	**7 - 9**	**7 - 9**	**0 - 2**	**6 - 8**	**7 - 9**
Date Collected:	**06/26/01**	**06/22/01**	**06/22/01**	**04/12/02**	**12/10/01**	**12/10/01**	**01/10/02**	**01/10/02**	**03/11/03**
Sample Name:	**RFI-05-19S(6.8-8.8)**	**RFI-05-20(0.7-2.7)**	**RFI-05-20(6.7-8.6)**	**RFI-05-26(07-09)**	**RFI-05-27(07-09)**	**RFI-05-29(07-09)**	**RFI-05-30(00-02)**	**RFI-05-30(06-08)**	**RFI-05-31(07-09)**
Inorganics									
Arsenic	3.7	5.7	4.1	NA	NA	NA	8.4	3.4	NA
Chromium (total) [a]	6.2	19	9.2	NA	NA	NA	14	4.4	NA
Lead [b]	4.5	54	14	540	5.5	46	32	3.9	83
Vanadium	8.7	18	14	NA	NA	NA	18	7.9	NA
Volatile Organic Compounds									
Benzene	<0.038	<0.040	<0.041	NA	NA	NA	<0.039	<0.038	NA
1,1-Dichloroethane	<0.038	<0.040	<0.041	NA	NA	NA	<0.039	<0.038	NA
Ethylbenzene	<0.038	<0.040	<0.041	NA	NA	NA	<0.039	<0.038	NA
Methyl cyclohexane	<0.16	<0.17	<0.18	NA	NA	NA	<0.17	<0.16	NA
1,1,1-Trichloroethane	<0.038	<0.040	<0.041	NA	NA	NA	<0.039	<0.038	NA
Semi Volatile Organic Comp									
Acenaphthylene	<0.18	<0.20	<0.20	NA	NA	NA	<0.19	<0.18	NA
Benzo(a)anthracene	<0.18	0.038	0.052	NA	NA	NA	0.078	<0.18	NA
Benzo(a)pyrene	<0.18	0.038	0.046	NA	NA	NA	0.14	<0.18	NA
Benzo(b)fluoranthene	<0.18	<0.20	0.049	NA	NA	NA	0.22	<0.18	NA
Benzo(g,h,i)perylene	<0.18	<0.20	<0.20	NA	NA	NA	0.21	<0.18	NA
Benzo(k)fluoranthene	<0.18	<0.20	0.052	NA	NA	NA	0.12	<0.18	NA
Carbazole	<0.18	<0.20	<0.20	NA	NA	NA	<0.19	<0.18	NA
Dibenz(a,h)anthracene	<0.18	<0.20	<0.20	NA	NA	NA	<0.19	<0.18	NA
Dimethyl phthalate	<0.18	<0.20	<0.20	NA	NA	NA	<0.19	<0.18	NA
Di-n-octyl phthalate	<0.18	<0.20	<0.20	NA	NA	NA	<0.19	<0.18	NA
Indeno(1,2,3-cd)pyrene	<0.18	<0.20	<0.20	NA	NA	NA	0.12	<0.18	NA
3&4-Methylphenol	<0.37	<0.39	<0.40	NA	NA	NA	<0.38	<0.37	NA
Naphthalene	<0.18	<0.20	<0.20	NA	NA	NA	<0.19	<0.18	NA
2-Nitrophenol	<0.18	<0.20	<0.20	NA	NA	NA	<0.19	<0.18	NA
N-Nitrosodi-n-propylamine	<0.18	<0.20	<0.20	NA	NA	NA	<0.19	<0.18	NA
Phenanthrene	<0.18	<0.20	<0.20	NA	NA	NA	0.058	<0.18	NA
Polychlorinated Biphenyls (F									
Aroclor-1242 (PCB-1242)	<0.038	<0.040	<0.041	NA	NA	NA	<0.040	<0.038	NA
Aroclor-1248 (PCB-1248)	<0.038	<0.040	<0.041	NA	NA	NA	<0.040	<0.038	NA
Aroclor-1254 (PCB-1254)	<0.038	<0.040	<0.041	NA	NA	NA	<0.040	<0.038	NA
Aroclor-1260 (PCB-1260)	<0.038	<0.040	<0.041	NA	NA	NA	0.028	<0.038	NA

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
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	AOI 10-1													
AOI Number | Location ID:	**10-1 | RFI-10-01**	**10-1 | RFI-10-01**	**10-1 | RFI-10-01**	**10-1 | RFI-10-01**	**10-1 | RFI-10-01**	**10-1 | RFI-10-16**	**10-1 | RFI-10-16**	**10-1 | RFI-10-17**	**10-1 | RFI-10-17**	**10-1 | RFI-10-18**	**10-1 | RFI-10-18**	**10-1 | RFI-10-19**	**10-1 | RFI-10-19**	**10-1 | RFI-10-27**
Sample Depth(ft BGS):	**0.7 - 2.7**	**1 - 3**	**1 - 3**	**5 - 7**	**9 - 11**	**1.9 - 3.9**	**3.9 - 5.9**	**1 - 3**	**3 - 5**	**1.3 - 3.3**	**3.3 - 5.3**	**2 - 4**	**4 - 6**	**1 - 3**
Date Collected:	**07/20/01**	**07/26/01**	**07/26/01**	**07/26/01**	**07/20/01**	**12/11/01**	**12/11/01**	**11/30/01**	**11/30/01**	**11/30/01**	**11/30/01**	**11/30/01**	**11/30/01**	**01/15/02**
Sample Name:	**RFI-10-01(0.7-2.5)**	**RFI-10-01(01-03)**	**RFI-10-Dup-41**	**RFI-10-01(05-07)**	**RFI-10-01(09-11)**	**RFI-10-16(1.9-3.9)**	**RFI-10-16(3.9-5.9)**	**RFI-10-17(01-03)**	**RFI-10-17(03-05)**	**RFI-10-18(1.3-3.3)**	**RFI-10-18(3.3-5.3)**	**RFI-10-19(02-04)**	**RFI-10-19(04-06)**	**RFI-10-27(01-03)**
Inorganics														
Arsenic	4.2	6	5.4	8.1	40	NA	NA	NA	NA	3.6	3.5	NA	NA	3.7
Chromium (total) [a]	22	35	61	59	**750**	NA	NA	NA	NA	47	25	NA	NA	46
Lead [b]	43	180	**2200**	380	71	310	18	220	290	61	120	41	19	220
Vanadium	8.6	16	15	14	44	NA	NA	NA	NA	18	12	NA	NA	5.3
Volatile Organic Compounds														
Benzene	0.083	<0.039	<0.038	<0.039	<0.13	NA	NA	NA	NA	<0.040	<0.040	NA	NA	<0.038
1,1-Dichloroethane	0.38	0.057	0.06	0.089	0.6	NA	NA	NA	NA	<0.040	<0.040	NA	NA	<0.038
Ethylbenzene	0.18	<0.039	<0.038	<0.039	<0.13	NA	NA	NA	NA	<0.040	<0.040	NA	NA	<0.038
Methyl cyclohexane	1.4	<0.17	0.028	<0.17	<0.63	NA	NA	NA	NA	0.033	<0.17	NA	NA	<0.16
1,1,1-Trichloroethane	0.12	<0.039	<0.038	<0.039	<0.13	NA	NA	NA	NA	<0.040	<0.040	NA	NA	<0.038
Semi Volatile Organic Comp														
Acenaphthylene	<0.18	<0.93	<1.8	<0.19	<49	NA	NA	NA	NA	<0.19	<0.19	NA	NA	<0.19
Benzo(a)anthracene	0.089	0.83	<1.8	<0.19	<49	NA	NA	NA	NA	1.5	<0.96	NA	NA	<0.19
Benzo(a)pyrene	0.12	<0.93	<1.8	<0.19	<49	NA	NA	NA	NA	<1.9	<0.96	NA	NA	<0.19
Benzo(b)fluoranthene	0.12	1.7	<1.8	<0.19	<49	NA	NA	NA	NA	1.1	<0.96	NA	NA	<0.19
Benzo(g,h,i)perylene	<0.18	<0.93	<1.8	<0.19	<49	NA	NA	NA	NA	<1.9	<0.96	NA	NA	<0.19
Benzo(k)fluoranthene	0.12	0.92	<1.8	<0.19	<49	NA	NA	NA	NA	<1.9	<0.96	NA	NA	<0.19
Carbazole	<0.18	<0.93	<1.8	<0.19	<49	NA	NA	NA	NA	<0.19	<0.19	NA	NA	<0.19
Dibenz(a,h)anthracene	<0.18	<0.93	<1.8	<0.19	<49	NA	NA	NA	NA	0.19	<0.96	NA	NA	<0.19
Dimethyl phthalate	<0.18	<0.93	<1.8	<0.19	<49	NA	NA	NA	NA	<0.19	<0.19	NA	NA	<0.19
Di-n-octyl phthalate	<0.18	<0.93	<1.8	<0.19	<49	NA	NA	NA	NA	<1.9	<0.96	NA	NA	<0.19
Indeno(1,2,3-cd)pyrene	<0.18	<0.93	<1.8	<0.19	<49	NA	NA	NA	NA	<1.9	<0.96	NA	NA	<0.19
3&4-Methylphenol	<0.36	<1.9	<3.7	<0.38	<99	NA	NA	NA	NA	<3.8	<1.9	NA	NA	<0.37
Naphthalene	0.063	<0.93	<1.8	0.22	<49	NA	NA	NA	NA	0.14	0.15	NA	NA	<0.19
2-Nitrophenol	<0.18	<0.93	<1.8	<0.19	<49	NA	NA	NA	NA	<0.19	<0.19	NA	NA	<0.19
N-Nitrosodi-n-propylamine	<0.18	<0.93	<1.8	<0.19	<49	NA	NA	NA	NA	<0.19	<0.19	NA	NA	<0.19
Phenanthrene	0.14	1.3	1.1	<0.19	<49	NA	NA	NA	NA	1.8	1.2	NA	NA	<0.19
Polychlorinated Biphenyls (F														
Aroclor-1242 (PCB-1242)	<0.037	<0.038	<0.038	<0.040	<0.99	NA	NA	NA	NA	<0.039	<0.039	NA	NA	<0.039
Aroclor-1248 (PCB-1248)	<0.037	<0.038	<0.038	<0.040	<0.99	NA	NA	NA	NA	<0.039	<0.039	NA	NA	<0.039
Aroclor-1254 (PCB-1254)	<0.037	0.26	0.14	<0.040	<0.99	NA	NA	NA	NA	0.18	0.086	NA	NA	<0.039
Aroclor-1260 (PCB-1260)	<0.037	0.042	0.025	<0.040	<0.99	NA	NA	NA	NA	<0.039	0.021	NA	NA	<0.039

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 10-1 cont.	
AOI Number | Location ID:	**10-1 | RFI-10-27**	**10-1 | RFI-10-27**
Sample Depth(ft BGS):	**7 - 9**	**9 - 11**
Date Collected:	**01/15/02**	**01/15/02**
Sample Name:	**RFI-10-27(07-09)**	**RFI-10-27(09-11)**
Inorganics		
Arsenic	8.4	3.8
Chromium (total) [a]	22	5
Lead [b]	11	5.4
Vanadium	30	11
Volatile Organic Compounds		
Benzene	<0.042	<0.040
1,1-Dichloroethane	<0.042	<0.040
Ethylbenzene	<0.042	<0.040
Methyl cyclohexane	<0.18	<0.17
1,1,1-Trichloroethane	0.053	<0.040
Semi Volatile Organic Comp		
Acenaphthylene	<0.20	<0.19
Benzo(a)anthracene	<0.20	<0.19
Benzo(a)pyrene	<0.20	<0.19
Benzo(b)fluoranthene	<0.20	<0.19
Benzo(g,h,i)perylene	<0.20	<0.19
Benzo(k)fluoranthene	<0.20	<0.19
Carbazole	<0.20	<0.19
Dibenz(a,h)anthracene	<0.20	<0.19
Dimethyl phthalate	<0.20	<0.19
Di-n-octyl phthalate	<0.20	<0.19
Indeno(1,2,3-cd)pyrene	<0.20	<0.19
3&4-Methylphenol	<0.41	<0.38
Naphthalene	<0.20	<0.19
2-Nitrophenol	<0.20	<0.19
N-Nitrosodi-n-propylamine	<0.20	<0.19
Phenanthrene	<0.20	<0.19
Polychlorinated Biphenyls (P		
Aroclor-1242 (PCB-1242)	<0.042	<0.039
Aroclor-1248 (PCB-1248)	<0.042	<0.039
Aroclor-1254 (PCB-1254)	<0.042	<0.039
Aroclor-1260 (PCB-1260)	<0.042	<0.039

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 36-1													
AOI Number | Location ID:	**36-1 | RFI DUP 1-UNKPAR**	**36-1 | RFI-36-01**	**36-1 | RFI-36-01**	**36-1 | RFI-36-01**	**36-1 | RFI-36-01**	**36-1 | RFI-36-02**	**36-1 | RFI-36-02**	**36-1 | RFI-36-02**	**36-1 | RFI-36-02**	**36-1 | RFI-36-02**	**36-1 | RFI-36-03**	**36-1 | RFI-36-03**	**36-1 | RFI-36-03**	**36-1 | RFI-36-03**
Sample Depth(ft BGS):		**0.5 - 2.5**	**8.5 - 10.5**	**8.5 - 10.5**	**12.5 - 14.5**	**1 - 3**	**7 - 9**	**9 - 11**	**9 - 11**	**13 - 15**	**0.8 - 2**	**8 - 10**	**14 - 16**	**14 - 16**
Date Collected:	**03/27/01**	**08/21/01**	**08/21/01**	**08/21/01**	**08/21/01**	**09/17/01**	**09/17/01**	**09/17/01**	**09/17/01**	**09/17/01**	**12/20/00**	**12/20/00**	**12/20/00**	**12/20/00**
Sample Name:	**RFI-DUP-01**	**RFI-36-01(0.5-2.5)**	**RFI-36-01(8.5-10.5)**	**RFI-36-DUP-47**	**RFI-36-01(12.5-14.5)**	**RFI-36-02(01-03)**	**RFI-36-02(07-09)**	**RFI-36-02(09-11)**	**RFI-81-DUP-60**	**RFI-36-02(13-15)**	**RFI-36-03(0.8-02)**	**RFI-36-03(08-10)**	**RFI-36-03(14-16)**	**RFI-36-DUP-02**
Inorganics														
Arsenic	6	5.5	3.2	5.1	2.5	3.6	4.2	3.1	NA	4	4.5	7.6	3.8	3.4
Chromium (total) [a]	11	12	18	15	5.2	5	7.6	4.5	NA	4.2	11	6.4	4.4	13
Lead [b]	11	62	8.2	8.7	3	5	6.3	4.1	NA	5.1	12	5.7	4.3	4.7
Vanadium	15	16	20	23	9.3	8.6	10	7.8	NA	7.2	NA	NA	NA	NA
Volatile Organic Compounds														
Benzene	<0.037	<0.040	<0.039	<0.041	<0.037	<0.037	<0.044	<0.037	<0.036	<0.037	<0.036	<0.041	<0.041	<0.042
1,1-Dichloroethane	<0.037	<0.040	<0.039	<0.041	<0.037	<0.037	<0.044	<0.037	<0.036	<0.037	<0.036	<0.041	<0.041	<0.042
Ethylbenzene	<0.037	<0.040	<0.039	<0.041	<0.037	<0.037	<0.044	<0.037	<0.036	<0.037	<0.036	<0.041	<0.041	<0.042
Methyl cyclohexane	<0.16	0.033	<0.17	<0.17	<0.16	<0.16	<0.19	<0.16	<0.15	<0.16	NA	NA	NA	NA
1,1,1-Trichloroethane	0.077	<0.040	<0.039	<0.041	<0.037	<0.037	<0.044	<0.037	<0.036	<0.037	<0.036	<0.041	<0.041	<0.042
Semi Volatile Organic Comp														
Acenaphthylene	<0.18	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
Benzo(a)anthracene	<0.18	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
Benzo(a)pyrene	<0.18	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
Benzo(b)fluoranthene	<0.18	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
Benzo(g,h,i)perylene	<0.18	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
Benzo(k)fluoranthene	<0.18	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
Carbazole	<0.18	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
Dibenz(a,h)anthracene	<0.18	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
Dimethyl phthalate	<0.18	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
Di-n-octyl phthalate	0.25	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	0.21	<0.18	<0.21	<0.21
Indeno(1,2,3-cd)pyrene	<0.18	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
3&4-Methylphenol	<0.37	<0.39	<0.38	<0.40	<0.36	<0.37	<0.43	<0.36	NA	<0.36	<0.37	<0.35	<0.40	<0.41
Naphthalene	<0.18	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
2-Nitrophenol	<0.18	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
N-Nitrosodi-n-propylamine	<0.18	<0.19	<0.19	<0.20	0.45	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
Phenanthrene	<0.18	<0.19	<0.19	<0.20	<0.18	<0.19	<0.22	<0.18	NA	<0.18	<0.19	<0.18	<0.21	<0.21
Polychlorinated Biphenyls (F														
Aroclor-1242 (PCB-1242)	<0.038	<0.040	<0.039	<0.041	<0.037	<0.038	<0.044	<0.037	NA	<0.037	NA	NA	NA	NA
Aroclor-1248 (PCB-1248)	<0.038	<0.040	<0.039	<0.041	<0.037	<0.038	<0.044	<0.037	NA	<0.037	NA	NA	NA	NA
Aroclor-1254 (PCB-1254)	<0.038	<0.040	<0.039	<0.041	<0.037	<0.038	<0.044	<0.037	NA	<0.037	NA	NA	NA	NA
Aroclor-1260 (PCB-1260)	<0.038	<0.040	<0.039	<0.041	<0.037	<0.038	<0.044	<0.037	NA	<0.037	NA	NA	NA	NA

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
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	AOI 36-1 cont.														
AOI Number | Location ID:	**36-1 | RFI-36-04**	**36-1 | RFI-36-04**	**36-1 | RFI-36-04**	**36-1 | RFI-36-04**	**36-1 | RFI-36-05**	**36-1 | RFI-36-05**	**36-1 | RFI-36-05**	**36-1 | RFI-36-06**	**36-1 | RFI-36-06**	**36-1 | RFI-36-06**	**36-1 | RFI-36-07**	**36-1 | RFI-36-07**	**36-1 | RFI-36-07**	**36-1 | RFI-36-15**	**36-1 | RFI-36-15**
Sample Depth(ft BGS):	**0.6 - 2**	**8 - 10**	**18 - 20**	**18 - 20**	**0.8 - 2**	**8 - 10**	**16 - 18**	**0.7 - 2**	**6 - 8**	**16 - 17**	**0.8 - 2**	**8 - 10**	**12 - 14**	**0.8 - 2**	**8 - 10**
Date Collected:	**12/19/00**	**12/19/00**	**12/19/00**	**12/19/00**	**12/18/00**	**12/18/00**	**12/18/00**	**12/19/00**	**12/19/00**	**12/19/00**	**12/20/00**	**12/20/00**	**12/20/00**	**12/20/00**	**12/20/00**
Sample Name:	**RFI-36-04(0.6-02)**	**RFI-36-04(08-10)**	**RFI-36-04(18-20)**	**RFI-36-DUP1**	**RFI-36-05(0.8-02)**	**RFI-36-05(08-10)**	**RFI-36-05(16-18)**	**RFI-36-06(0.7-02)**	**RFI-36-06(06-08)**	**RFI-36-06(16-17)**	**RFI-36-07(0.8-02)**	**RFI-36-07(08-10)**	**RFI-36-07(12-14)**	**RFI-36-15(0.8-02)**	**RFI-36-15(08-10)**
Inorganics															
Arsenic	5.6	4.8	2.7	2.7	3.4	5.3	2.5	3	8.2	1.6	4.8	3	3.8	4	3.3
Chromium (total) [a]	16	9.4	3.5	4.4	6.8	12	5.9	25	11	1.9	13	3.8	7	7.5	6.3
Lead [b]	14	12	3.6	4.2	6.1	12	4.9	9	8.4	2.2	8.7	3.5	4.8	12	9.7
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds															
Benzene	<0.033	<0.037	<0.042	<0.042	<0.042	<0.042	<0.045	<0.036	<0.033	<0.041	<0.037	<0.043	**240**	<0.035	<0.036
1,1-Dichloroethane	<0.033	<0.037	<0.042	<0.042	<0.042	<0.042	<0.045	0.04	<0.033	<0.041	<0.037	<0.043	<2.0	<0.035	<0.036
Ethylbenzene	<0.033	<0.037	<0.042	<0.042	<0.042	<0.042	<0.045	<0.036	<0.033	<0.041	<0.037	<0.043	**680**	<0.035	<0.036
Methyl cyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	<0.033	<0.037	<0.042	<0.042	<0.042	<0.042	<0.045	<0.036	<0.033	<0.041	<0.037	<0.043	<2.0	<0.035	<0.036
Semi Volatile Organic Comp															
Acenaphthylene	<0.19	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	<38	<3.6	<0.18
Benzo(a)anthracene	0.78	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	<38	<3.6	<0.18
Benzo(a)pyrene	1.1	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	<38	<3.6	<0.18
Benzo(b)fluoranthene	1.2	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	<38	<3.6	<0.18
Benzo(g,h,i)perylene	0.47	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	<38	<3.6	<0.18
Benzo(k)fluoranthene	0.85	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	<38	<3.6	<0.18
Carbazole	<0.19	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	<38	<3.6	<0.18
Dibenz(a,h)anthracene	<0.19	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	<38	<3.6	<0.18
Dimethyl phthalate	<0.19	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	<38	<3.6	<0.18
Di-n-octyl phthalate	<0.19	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	0.24	<38	<3.6	<0.18
Indeno(1,2,3-cd)pyrene	0.58	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	<38	<3.6	<0.18
3&4-Methylphenol	<0.37	<0.36	<0.39	<0.40	<0.35	<0.35	<0.35	<9.0	<0.37	<3.4	<18	<0.35	<73	<6.9	<0.35
Naphthalene	<0.19	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	**44**	<3.6	<0.18
2-Nitrophenol	<0.19	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	<38	<3.6	<0.18
N-Nitrosodi-n-propylamine	<0.19	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	<38	<3.6	<0.18
Phenanthrene	<0.19	<0.19	<0.20	<0.21	<0.18	<0.18	<0.18	<4.6	<0.19	<1.8	<9.3	<0.18	<38	<3.6	<0.18
Polychlorinated Biphenyls (F															
Aroclor-1242 (PCB-1242)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248 (PCB-1248)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254 (PCB-1254)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260 (PCB-1260)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A-22

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	AOI 36-1 cont.														
AOI Number | Location ID:	**36-1 | RFI-36-15**	**36-1 | RFI-36-16**	**36-1 | RFI-36-16**	**36-1 | RFI-36-16**	**36-1 | RFI-36-21**	**36-1 | RFI-36-21**	**36-1 | RFI-36-21**	**36-1 | RFI-36-21**	**36-1 | RFI-36-22**	**36-1 | RFI-36-22**	**36-1 | RFI-36-22**	**36-1 | RFI-36-22**	**36-1 | RFI-36-23**	**36-1 | RFI-36-23**	**36-1 | RFI-36-23**
Sample Depth(ft BGS):	**14 - 16**	**0.9 - 2**	**8 - 10**	**18 - 20**	**6 - 8**	**8 - 10**	**10 - 12**	**12 - 14**	**0 - 2**	**8 - 10**	**10 - 12**	**10 - 12**	**0 - 2**	**8 - 10**	**10 - 12**
Date Collected:	**12/20/00**	**12/19/00**	**12/19/00**	**12/19/00**	**03/28/01**	**03/28/01**	**03/28/01**	**03/28/01**	**03/27/01**	**03/27/01**	**03/27/01**	**03/27/01**	**03/27/01**	**03/27/01**	**03/27/01**
Sample Name:	**RFI-36-15(14-16)**	**RFI-36-16(0.9-02)**	**RFI-36-16(08-10)**	**RFI-36-16(18-20)**	**RFI-36-21(06-08)**	**RFI-36-21(08-10)**	**RFI-36-21(10-12)**	**RFI-36-21(12-14)**	**RFI-36-22(00-02)**	**RFI-36-22(08-10)**	**36-22 (10-12)DUP**	**RFI-36-22(10-12)**	**RFI-36-23(00-02)**	**RFI-36-23(08-10)**	**RFI-36-23(10-12)**
Inorganics															
Arsenic	39	3.2	3.1	8.1	4.6	3.5	9.5	1.7	2.5	3.6	2.9	2.5	6.7	3.6	6.4
Chromium (total) [a]	7.3	32	4.2	9.1	8	4.8	46	2.4	11	6.1	4.5	6.2	21	6.4	8.8
Lead [b]	4.3	19	3.4	5.9	6.5	4.6	52	2	7.8	4.9	3.6	3	21	5.3	8.2
Vanadium	NA	NA	NA	NA	9.6	7.2	13	3.6	5.1	7.9	5.9	6.3	21	6.9	11
Volatile Organic Compounds															
Benzene	<0.041	<0.034	<0.039	<0.041	<0.041	<0.036	0.13	<0.036	<0.036	<0.038	<0.038	<0.037	<0.037	<0.037	<0.037
1,1-Dichloroethane	0.057	0.066	<0.039	<0.041	<0.041	<0.036	0.22	<0.036	<0.036	<0.038	<0.038	0.17	<0.037	<0.037	0.061
Ethylbenzene	<0.041	<0.034	<0.039	<0.041	<0.041	<0.036	0.37	<0.036	<0.036	<0.038	<0.038	<0.037	<0.037	<0.037	<0.037
Methyl cyclohexane	NA	NA	NA	NA	<0.17	<0.15	<0.16	<0.15	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16
1,1,1-Trichloroethane	<0.041	<0.034	<0.039	<0.041	<0.041	<0.036	<0.038	<0.036	<0.036	<0.038	<0.038	<0.037	<0.037	<0.037	<0.037
Semi Volatile Organic Comp															
Acenaphthylene	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	<0.19	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Benzo(a)anthracene	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	1.1	<0.18	0.089	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Benzo(a)pyrene	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	0.9	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Benzo(b)fluoranthene	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	1.2	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Benzo(g,h,i)perylene	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	0.47	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Benzo(k)fluoranthene	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	0.87	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Carbazole	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	0.35	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Dibenz(a,h)anthracene	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	<0.19	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Dimethyl phthalate	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	<0.19	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Di-n-octyl phthalate	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	<0.19	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Indeno(1,2,3-cd)pyrene	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	0.5	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
3&4-Methylphenol	<8.0	<3.5	<0.35	<2.0	<0.38	<0.35	<0.37	<0.35	<0.36	<0.37	<0.36	<0.36	<0.36	<0.36	<0.36
Naphthalene	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	<0.19	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
2-Nitrophenol	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	<0.19	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
N-Nitrosodi-n-propylamine	<4.1	<1.8	<0.18	<1.0	<0.19	<0.18	<0.19	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Phenanthrene	16	<1.8	<0.18	1.2	<0.19	<0.18	1.9	<0.18	0.12	<0.18	<0.18	<0.18	<0.18	0.17	<0.18
Polychlorinated Biphenyls (F															
Aroclor-1242 (PCB-1242)	NA	NA	NA	NA	<0.038	<0.034	<0.036	<0.18	<0.035	<0.036	<0.035	<0.036	<0.036	<0.036	<0.035
Aroclor-1248 (PCB-1248)	NA	NA	NA	NA	<0.038	<0.034	<0.036	<0.18	<0.035	<0.036	<0.035	<0.036	<0.036	<0.036	<0.035
Aroclor-1254 (PCB-1254)	NA	NA	NA	NA	<0.038	<0.034	<0.036	<0.18	<0.035	<0.036	<0.035	<0.036	<0.036	<0.036	<0.035
Aroclor-1260 (PCB-1260)	NA	NA	NA	NA	<0.038	<0.034	<0.036	<0.18	<0.035	<0.036	<0.035	<0.036	<0.036	<0.036	<0.035

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 36-1 cont.														
AOI Number | Location ID:	**36-1 | RFI-36-24**	**36-1 | RFI-36-24**	**36-1 | RFI-36-24**	**36-1 | RFI-36-24**	**36-1 | RFI-36-24**	**36-1 | RFI-36-25**	**36-1 | RFI-36-25**	**36-1 | RFI-36-25**	**36-1 | RFI-36-25R**	**36-1 | RFI-36-25R**	**36-1 | RFI-36-25R**	**36-1 | RFI-36-26**	**36-1 | RFI-36-26**	**36-1 | RFI-36-26**
Sample Depth(ft BGS):	**0 - 2**	**6 - 8**	**8 - 10**	**10 - 12**	**10 - 12**	**0 - 2**	**8 - 10**	**12 - 14**	**1 - 3**	**7 - 9**	**11 - 13**	**0 - 2**	**2 - 4**	**8 - 10**
Date Collected:	**03/26/01**	**03/26/01**	**03/26/01**	**03/26/01**	**03/26/01**	**03/27/01**	**03/27/01**	**03/27/01**	**12/15/01**	**12/15/01**	**12/15/01**	**03/27/01**	**03/27/01**	**03/27/01**
Sample Name:	**RFI-36-24(00-02)**	**RFI-36-24(06-08)**	**RFI-36-24(08-10)**	**DUP-02**	**RFI-36-24(10-12)**	**RFI-36-25(00-02)**	**RFI-36-25(08-10)**	**RFI-36-25(12-14)**	**RFI-36-25R(01-03)**	**RFI-36-25R(07-09)**	**RFI-36-25R(11-13)**	**RFI-36-26(00-02)**	**RFI-36-26(02-04)**	**RFI-36-26(08-10)**
Inorganics														
Arsenic	7.1	4.6	6.3	4.8	3.3	7.8	3.5	3.8	3	6.8	2.4	3.3	4.6	2.4
Chromium (total) [a]	39	22	5.4	4.2	14	28	3.2	5.1	13	21	4.7	13	28	3.4
Lead [b]	15	11	5.6	4	7.8	11	4	4.9	10	12	3.9	8.5	11	3.2
Vanadium	11	12	10	8.1	12	19	5.9	9.7	13	26	9.9	5.7	8.2	5.2
Volatile Organic Compounds														
Benzene	<0.036	<0.037	<0.035	<0.036	<0.038	<0.039	<0.037	<0.042	<0.040	<0.044	<0.038	<0.038	<0.036	<0.038
1,1-Dichloroethane	<0.036	0.062	<0.035	<0.036	<0.038	<0.039	<0.037	<0.042	<0.040	<0.044	<0.038	0.87	1.6	<0.038
Ethylbenzene	<0.036	<0.037	<0.035	<0.036	<0.038	<0.039	<0.037	<0.042	<0.040	<0.044	<0.038	<0.038	<0.036	<0.038
Methyl cyclohexane	<0.16	<0.16	<0.15	<0.16	<0.16	<0.17	<0.16	<0.18	<0.17	<0.19	<0.16	<0.16	<0.15	<0.16
1,1,1-Trichloroethane	<0.036	<0.037	<0.035	<0.036	<0.038	<0.039	<0.037	<0.042	<0.040	<0.044	<0.038	<0.038	<0.036	<0.038
Semi Volatile Organic Comp														
Acenaphthylene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18	<0.20	<0.20	<0.21	<0.19	<0.18	<0.18	<0.18
Benzo(a)anthracene	<0.18	0.11	<0.18	<0.18	<0.19	<0.19	<0.18	<0.20	0.041	<0.21	<0.19	<0.18	<0.18	<0.18
Benzo(a)pyrene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	0.15	<0.20	0.042	<0.21	<0.19	<0.18	<0.18	<0.18
Benzo(b)fluoranthene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	0.12	<0.20	<0.20	<0.21	<0.19	<0.18	<0.18	<0.18
Benzo(g,h,i)perylene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	0.11	<0.20	<0.20	<0.21	<0.19	<0.18	<0.18	<0.18
Benzo(k)fluoranthene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	0.13	<0.20	<0.20	<0.21	<0.19	<0.18	<0.18	<0.18
Carbazole	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18	<0.20	<0.20	<0.21	<0.19	<0.18	<0.18	<0.18
Dibenz(a,h)anthracene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18	<0.20	<0.20	<0.21	<0.19	<0.18	<0.18	<0.18
Dimethyl phthalate	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18	<0.20	<0.20	<0.21	<0.19	<0.18	<0.18	<0.18
Di-n-octyl phthalate	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	0.13	<0.20	<0.20	<0.21	<0.19	<0.18	<0.18	<0.18
Indeno(1,2,3-cd)pyrene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18	<0.20	<0.20	<0.21	<0.19	<0.18	<0.18	<0.18
3&4-Methylphenol	<0.36	<0.36	<0.35	<0.35	<0.38	<0.38	<0.36	<0.40	<0.39	<0.43	<0.37	<0.36	<0.36	<0.36
Naphthalene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18	<0.20	0.064	<0.21	<0.19	<0.18	<0.18	<0.18
2-Nitrophenol	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18	<0.20	<0.20	<0.21	<0.19	<0.18	<0.18	<0.18
N-Nitrosodi-n-propylamine	<0.18	<0.18	<0.18	<0.18	<0.19	<0.19	<0.18	<0.20	<0.20	<0.21	<0.19	<0.18	<0.18	<0.18
Phenanthrene	0.12	0.1	0.86	<0.18	0.37	<0.19	<0.18	<0.20	0.12	<0.21	<0.19	0.21	0.21	<0.18
Polychlorinated Biphenyls (F														
Aroclor-1242 (PCB-1242)	<0.035	<0.037	<0.036	<0.035	<0.037	R	<0.036	<0.041	<0.040	<0.044	<0.038	<0.036	R	<0.036
Aroclor-1248 (PCB-1248)	<0.035	<0.037	<0.036	<0.035	<0.037	R	<0.036	<0.041	<0.040	<0.044	<0.038	<0.036	R	<0.036
Aroclor-1254 (PCB-1254)	0.08	<0.037	<0.036	0.028	<0.037	R	<0.036	<0.041	<0.040	<0.044	<0.038	0.06	R	<0.036
Aroclor-1260 (PCB-1260)	<0.035	<0.037	<0.036	<0.035	<0.037	R	<0.036	<0.041	<0.040	<0.044	<0.038	<0.036	R	<0.036

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 36-1 cont.														
AOI Number | Location ID:	**36-1 | RFI-36-26**	**36-1 | RFI-36-27**	**36-1 | RFI-36-27**	**36-1 | RFI-36-27**	**36-1 | RFI-36-27**	**36-1 | RFI-36-28**	**36-1 | RFI-36-28**	**36-1 | RFI-36-28**	**36-1 | RFI-36-28**	**36-1 | RFI-36-28**	**36-1 | RFI-36-29**	**36-1 | RFI-36-29**	**36-1 | RFI-36-29**	**36-1 | RFI-36-29**	**36-1 | RFI-36-30**
Sample Depth(ft BGS):	**10 - 12**	**0 - 2**	**8 - 10**	**12 - 14**	**14 - 16**	**0 - 2**	**8 - 10**	**8 - 10**	**10 - 12**	**14 - 16**	**0 - 2**	**8 - 10**	**10 - 12**	**10 - 12**	**0 - 2**
Date Collected:	**03/27/01**	**03/26/01**	**03/26/01**	**03/26/01**	**03/26/01**	**03/29/01**	**03/29/01**	**03/29/01**	**03/29/01**	**03/29/01**	**03/28/01**	**03/28/01**	**03/28/01**	**03/28/01**	**03/28/01**
Sample Name:	**RFI-36-26(10-12)**	**RFI-36-27(00-02)**	**RFI-36-27(08-10)**	**RFI-36-27(12-14)**	**RFI-36-27(14-16)**	**RFI-36-28(00-02)**	**DUP-06**	**RFI-36-28(08-10)**	**RFI-36-28(10-12)**	**RFI-36-28(14-16)**	**RFI-36-29(00-02)**	**RFI-36-29(08-10)**	**RFI-36-29(10-12)**	**RFI-DUP-03**	**RFI-36-30(00-02)**
Inorganics															
Arsenic	2.7	3.4	3.9	1.7	3.3	2.3	3.2	3.5	4.3	5.7	2.3	2.4	2.9	2.4	3.8
Chromium (total) [a]	5.8	8.7	5.7	3.5	4.8	7.9	15	10	2.5	6.5	11	3.3	6.7	5.5	23
Lead [b]	3.6	7.4	4.6	2.8	5.2	7.1	9.7	13	4.5	7.1	16	2.7	4.7	3.3	24
Vanadium	6.1	7.7	8.6	4.9	7.5	4.3	8.9	10	3.6	8.9	13	5.5	7.6	6.7	17
Volatile Organic Compounds															
Benzene	<0.036	<0.038	<0.037	<0.037	<0.039	<0.042	<0.037	<0.039	<0.037	<0.037	<0.039	<0.036	0.23	0.19	1.5
1,1-Dichloroethane	0.41	<0.038	<0.037	<0.037	<0.039	<0.042	<0.037	<0.039	<0.037	<0.037	<0.039	<0.036	<0.036	<0.036	<0.037
Ethylbenzene	<0.036	<0.038	<0.037	<0.037	<0.039	<0.042	<0.037	<0.039	<0.037	<0.037	<0.039	<0.036	0.047	0.042	0.54
Methyl cyclohexane	<0.16	<0.16	<0.16	<0.16	<0.17	<0.18	<0.16	<0.17	<0.16	<0.16	0.12	<0.15	0.073	0.069	0.048
1,1,1-Trichloroethane	<0.036	<0.038	<0.037	<0.037	<0.039	<0.042	0.092	0.15	<0.037	<0.037	<0.039	<0.036	<0.036	<0.036	<0.037
Semi Volatile Organic Comp															
Acenaphthylene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.20	<0.18	<0.18	<0.18	<0.17	<0.19	<0.17	<0.18	<0.18	<0.18
Benzo(a)anthracene	<0.18	<0.18	<0.18	<0.18	0.2	<0.20	<0.18	<0.18	<0.18	<0.17	0.23	<0.17	<0.18	0.4	<0.18
Benzo(a)pyrene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.20	<0.18	<0.18	<0.18	<0.17	<0.19	<0.17	<0.18	<0.18	<0.18
Benzo(b)fluoranthene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.20	<0.18	<0.18	<0.18	<0.17	<0.19	<0.17	<0.18	<0.18	<0.18
Benzo(g,h,i)perylene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.20	<0.18	<0.18	<0.18	<0.17	<0.19	<0.17	<0.18	<0.18	<0.18
Benzo(k)fluoranthene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.20	<0.18	<0.18	<0.18	<0.17	<0.19	<0.17	<0.18	<0.18	<0.18
Carbazole	<0.18	<0.18	<0.18	<0.18	<0.19	<0.20	<0.18	<0.18	<0.18	<0.17	<0.19	<0.17	<0.18	<0.18	<0.18
Dibenz(a,h)anthracene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.20	<0.18	<0.18	<0.18	<0.17	<0.19	<0.17	<0.18	<0.18	<0.18
Dimethyl phthalate	<0.18	<0.18	<0.18	<0.18	<0.19	<0.20	<0.18	<0.18	<0.18	<0.17	<0.19	<0.17	<0.18	<0.18	<0.18
Di-n-octyl phthalate	<0.18	<0.18	<0.18	<0.18	<0.19	<0.20	<0.18	<0.18	<0.18	<0.17	<0.19	<0.17	<0.18	<0.18	<0.18
Indeno(1,2,3-cd)pyrene	<0.18	<0.18	<0.18	<0.18	<0.19	<0.20	<0.18	<0.18	<0.18	<0.17	<0.19	<0.17	<0.18	<0.18	<0.18
3&4-Methylphenol	<0.35	<0.36	<0.37	<0.35	<0.37	<0.39	<0.36	<0.36	<0.35	<0.35	<0.38	<0.35	<0.35	<0.35	<0.36
Naphthalene	<0.18	<0.18	<0.18	<0.18	0.22	<0.20	<0.18	<0.18	<0.18	<0.17	<0.19	<0.17	<0.18	<0.18	<0.18
2-Nitrophenol	<0.18	<0.18	<0.18	<0.18	<0.19	<0.20	<0.18	<0.18	<0.18	<0.17	<0.19	<0.17	<0.18	<0.18	<0.18
N-Nitrosodi-n-propylamine	<0.18	<0.18	<0.18	<0.18	<0.19	<0.20	<0.18	<0.18	<0.18	<0.17	<0.19	<0.17	<0.18	<0.18	<0.18
Phenanthrene	<0.18	0.073	<0.18	4.6	10	<0.20	<0.18	0.33	<0.18	<0.17	1.2	<0.17	<0.18	1.9	0.49
Polychlorinated Biphenyls (F															
Aroclor-1242 (PCB-1242)	<0.036	<0.037	<0.038	<0.034	<0.038	<0.038	<0.036	<0.036	<0.035	<0.034	<0.037	<0.036	<0.036	<0.036	<0.038
Aroclor-1248 (PCB-1248)	<0.036	<0.037	<0.038	<0.034	<0.038	<0.038	<0.036	<0.036	<0.035	<0.034	<0.037	<0.036	<0.036	<0.036	<0.038
Aroclor-1254 (PCB-1254)	<0.036	<0.037	<0.038	<0.034	<0.038	<0.038	<0.036	<0.036	<0.035	<0.034	<0.037	<0.036	<0.036	<0.036	<0.038
Aroclor-1260 (PCB-1260)	<0.036	<0.037	<0.038	<0.034	<0.038	<0.038	<0.036	<0.036	<0.035	<0.034	<0.037	<0.036	<0.036	<0.036	<0.038

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 36-1 cont.														
AOI Number | Location ID:	**36-1 | RFI-36-30**	**36-1 | RFI-36-30**	**36-1 | RFI-36-31**	**36-1 | RFI-36-31**	**36-1 | RFI-36-31**	**36-1 | RFI-36-32**	**36-1 | RFI-36-32**	**36-1 | RFI-36-32**	**36-1 | RFI-36-32**	**36-1 | RFI-36-32**	**36-1 | RFI-36-33**	**36-1 | RFI-36-33**	**36-1 | RFI-36-33**	**36-1 | RFI-36-35**	**36-1 | RFI-36-35**
Sample Depth(ft BGS):	**8 - 10**	**10 - 12**	**0 - 2**	**8 - 10**	**10 - 12**	**0 - 2**	**8 - 10**	**12 - 14**	**16 - 18**	**16 - 18**	**0 - 2**	**8 - 10**	**16 - 18**	**0 - 2**	**8 - 10**
Date Collected:	**03/28/01**	**03/28/01**	**03/28/01**	**03/28/01**	**03/28/01**	**03/28/01**	**03/28/01**	**03/28/01**	**03/28/01**	**03/28/01**	**03/29/01**	**03/29/01**	**03/29/01**	**03/27/01**	**03/27/01**
Sample Name:	**RFI-36-30(08-10)**	**RFI-36-30(10-12)**	**RFI-36-31(00-02)**	**RFI-36-31(08-10)**	**RFI-36-31(10-12)**	**RFI-36-32(00-02)**	**RFI-36-32(08-10)**	**RFI-36-32(12-14)**	**DUP-05**	**RFI-36-32(16-18)**	**RFI-36-33(00-02)**	**RFI-36-33(08-10)**	**RFI-36-33(16-18)**	**RFI-36-35(00-02)**	**RFI-36-35(08-10)**
Inorganics															
Arsenic	2.5	3.6	2.2	3.8	2.6	3.3	7.4	4	3	2.9	8.2	7.2	10	3.5	4.3
Chromium (total) [a]	3.1	4.2	13	7.8	3.1	10	12	3.1	3.1	5.9	41	9.5	2.6	8.2	4.4
Lead [b]	3.4	3.8	5.8	5.7	2.9	15	10	4.3	3.1	3	91	9.6	4	7.3	4.1
Vanadium	5.3	6.2	6.9	5.8	4.6	7	17	4.8	4	3.6	20	15	3.9	9.2	6.9
Volatile Organic Compounds															
Benzene	9.3	1.3	<0.039	0.056	<0.037	<0.039	<0.039	<0.036	<0.036	<0.036	<0.038	<0.040	<0.036	<0.039	<0.038
1,1-Dichloroethane	<0.037	<0.035	<0.039	<0.038	<0.037	<0.039	<0.039	<0.036	<0.036	<0.036	<0.038	<0.040	<0.036	<0.039	<0.038
Ethylbenzene	28	7.8	<0.039	0.11	0.069	<0.039	<0.039	<0.036	<0.036	<0.036	<0.038	<0.040	<0.036	<0.039	<0.038
Methyl cyclohexane	1	0.27	<0.17	<0.16	<0.16	<0.17	<0.17	<0.15	<0.15	<0.15	<0.16	<0.17	<0.15	<0.17	<0.16
1,1,1-Trichloroethane	<0.037	<0.035	<0.039	<0.038	<0.037	<0.039	<0.039	<0.036	<0.036	<0.036	<0.038	<0.040	<0.036	<0.039	0.07
Semi Volatile Organic Comp															
Acenaphthylene	<0.18	<0.18	<0.19	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
Benzo(a)anthracene	<0.18	<0.18	7	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
Benzo(a)pyrene	<0.18	<0.18	6.2	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
Benzo(b)fluoranthene	<0.18	<0.18	6.2	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
Benzo(g,h,i)perylene	<0.18	<0.18	6.9	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
Benzo(k)fluoranthene	<0.18	<0.18	4	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
Carbazole	<0.18	<0.18	2.5	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
Dibenz(a,h)anthracene	<0.18	<0.18	1.1	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
Dimethyl phthalate	<0.18	<0.18	<0.19	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
Di-n-octyl phthalate	<0.18	<0.18	<0.19	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
Indeno(1,2,3-cd)pyrene	<0.18	<0.18	6.8	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
3&4-Methylphenol	<0.36	<0.35	1	<0.38	<0.36	<0.37	<0.38	<0.35	<0.35	<0.35	<0.38	<0.38	<0.35	<0.38	<0.37
Naphthalene	0.53	0.3	0.18	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
2-Nitrophenol	<0.18	<0.18	<0.19	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
N-Nitrosodi-n-propylamine	<0.18	<0.18	<0.19	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	<0.17	<0.19	<0.18
Phenanthrene	0.71	<0.18	9.3	<0.19	<0.18	<0.19	<0.19	<0.18	<0.17	<0.17	<0.19	<0.19	1.7	<0.19	<0.18
Polychlorinated Biphenyls (F															
Aroclor-1242 (PCB-1242)	<0.037	<0.035	<0.037	<0.039	<0.036	<0.036	<0.039	<0.036	<0.034	<0.036	<0.037	<0.038	<0.034	<0.037	<0.038
Aroclor-1248 (PCB-1248)	<0.037	<0.035	<0.037	<0.039	<0.036	<0.036	<0.039	<0.036	<0.034	<0.036	<0.037	<0.038	<0.034	<0.037	<0.038
Aroclor-1254 (PCB-1254)	<0.037	<0.035	<0.037	<0.039	<0.036	0.05	<0.039	<0.036	<0.034	<0.036	<0.037	<0.038	<0.034	<0.037	<0.038
Aroclor-1260 (PCB-1260)	<0.037	<0.035	<0.037	<0.039	<0.036	<0.036	<0.039	<0.036	<0.034	<0.036	<0.037	<0.038	<0.034	<0.037	<0.038

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
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	AOI 36-1 cont.												
AOI Number | Location ID:	**36-1 | RFI-36-35**	**36-1 | RFI-36-38**	**36-1 | RFI-36-38**	**36-1 | RFI-36-38**	**36-1 | RFI-36-38**	**36-1 | RFI-36-39**	**36-1 | RFI-36-39**	**36-1 | RFI-36-39**	**36-1 | RFI-36-40**	**36-1 | RFI-36-40**	**36-1 | RFI-36-40**	**36-1 | RFI-36-46**	**36-1 | RFI-36-46**
Sample Depth(ft BGS):	**12 - 14**	**0.5 - 2.5**	**8.5 - 10.5**	**10.5 - 12.5**	**10.5 - 12.5**	**0.5 - 2.5**	**8.5 - 10.5**	**10.5 - 12.5**	**0.5 - 2.5**	**8.5 - 10.5**	**12.5 - 14.5**	**0 - 2**	**8 - 10**
Date Collected:	**03/27/01**	**12/16/01**	**12/16/01**	**12/16/01**	**12/16/01**	**12/16/01**	**12/16/01**	**12/16/01**	**12/16/01**	**12/16/01**	**12/16/01**	**01/10/02**	**01/10/02**
Sample Name:	**RFI-36-35(12-14)**	**RFI-36-38(0.5-2.5)**	**RFI-36-38(8.5-10.5)**	**RFI-36-38(10.5-12.5)**	**RFI-36-BTEX-DUP-1**	**RFI-36-39(0.5-2.5)**	**RFI-36-39(8.5-10.5)**	**RFI-36-39(10.5-12.5)**	**RFI-36-40(0.5-2.5)**	**RFI-36-40(8.5-10.5)**	**RFI-36-40(12.5-14.5)**	**RFI-36-46(00-02)**	**RFI-36-46(08-10)**
Inorganics													
Arsenic	3.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.6	3.8
Chromium (total) [a]	3.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	24	11
Lead [b]	4.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	29	5.7
Vanadium	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19	14
Volatile Organic Compounds													
Benzene	<0.040	<0.011	<0.011	<0.010	<0.012	<0.011	<0.011	<0.010	0.056	4.7	6.3	<0.041	<0.039
1,1-Dichloroethane	<0.040	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.041	<0.039
Ethylbenzene	<0.040	<0.011	<0.011	<0.010	<0.012	<0.011	<0.011	<0.010	<0.011	2.6	52	<0.041	<0.039
Methyl cyclohexane	<0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2	<0.17
1,1,1-Trichloroethane	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.041	<0.039
Semi Volatile Organic Comp													
Acenaphthylene	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
Benzo(a)anthracene	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
Benzo(a)pyrene	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
Benzo(b)fluoranthene	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
Benzo(g,h,i)perylene	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
Benzo(k)fluoranthene	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
Carbazole	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
Dibenz(a,h)anthracene	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
Dimethyl phthalate	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
Di-n-octyl phthalate	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
Indeno(1,2,3-cd)pyrene	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
3&4-Methylphenol	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<4.0	<0.37
Naphthalene	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
2-Nitrophenol	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
N-Nitrosodi-n-propylamine	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
Phenanthrene	<0.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	<0.19
Polychlorinated Biphenyls (F													
Aroclor-1242 (PCB-1242)	<0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.041	<0.038
Aroclor-1248 (PCB-1248)	<0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.041	<0.038
Aroclor-1254 (PCB-1254)	<0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.041	<0.038
Aroclor-1260 (PCB-1260)	<0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.041	<0.038

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	AOI 36-1 cont.							
AOI Number | Location ID:	**36-1 | RFI-36-46**	**36-1 | RFI-36-46**	**36-1 | RFI-36-49**	**36-1 | RFI-36-49**	**36-1 | RFI-36-49**	**36-1 | RFI-36-53**	**36-1 | RFI-36-53**	**36-1 | RFI-36-53**
Sample Depth(ft BGS):	**8 - 10**	**10 - 12**	**1 - 3**	**7 - 9**	**17 - 19**	**0 - 2**	**8 - 10**	**12 - 14**
Date Collected:	**01/10/02**	**01/10/02**	**04/05/03**	**04/05/03**	**04/05/03**	**03/09/05**	**03/09/05**	**03/09/05**
Sample Name:	**RFI-36-DUP-209**	**RFI-36-46(10-12)**	**RFI-36-49(01-03)**	**RFI-36-49(07-09)**	**RFI-36-49(17-19)**	**RFI-36-52(0-2)**	**RFI-36-52(8-10)**	**RFI-36-52(12-14)**
Inorganics								
Arsenic	2.5	3.1	2.3	4.5	2.7	0.81	1.2	1.6
Chromium (total) [a]	7.8	6.3	8.8	15	4	5.2	2.1	2
Lead [b]	6.2	5.2	5.8	11	3.4	7	3.2	3.2
Vanadium	16	11	8.3	24	8.3	6.1	3.1	3.5
Volatile Organic Compounds								
Benzene	<0.039	<0.038	<0.037	<0.039	<0.037	<0.060	<0.050	<0.060
1,1-Dichloroethane	<0.039	<0.038	0.036	<0.039	<0.037	<0.060	<0.050	<0.060
Ethylbenzene	<0.039	<0.038	<0.037	<0.039	<0.037	<0.060	<0.050	0.13
Methyl cyclohexane	<0.17	<0.16	<0.16	<0.17	<0.16	<0.060	<0.050	0.22
1,1,1-Trichloroethane	<0.039	<0.038	<0.037	<0.039	<0.037	<0.060	<0.050	<0.060
Semi Volatile Organic Comp								
Acenaphthylene	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	0.7
Benzo(a)anthracene	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	<0.30
Benzo(a)pyrene	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	<0.30
Benzo(b)fluoranthene	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	<0.30
Benzo(g,h,i)perylene	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	<0.30
Benzo(k)fluoranthene	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	<0.30
Carbazole	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	1.5
Dibenz(a,h)anthracene	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	<0.30
Dimethyl phthalate	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	0.3
Di-n-octyl phthalate	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	<0.30
Indeno(1,2,3-cd)pyrene	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	<0.30
3&4-Methylphenol	<0.37	<0.37	<8.9	<0.39	<9.0	NA	NA	NA
Naphthalene	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	9.5
2-Nitrophenol	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	<0.30
N-Nitrosodi-n-propylamine	<0.19	<0.19	<4.4	<0.20	<4.5	<0.30	<0.30	<0.30
Phenanthrene	<0.19	<0.19	2.3	<0.20	6	<0.30	<0.30	18
Polychlorinated Biphenyls (F								
Aroclor-1242 (PCB-1242)	<0.038	<0.038	<0.037	<0.041	<0.037	<0.33	<0.33	<0.33
Aroclor-1248 (PCB-1248)	<0.038	<0.038	<0.037	<0.041	<0.037	<0.33	<0.33	<0.33
Aroclor-1254 (PCB-1254)	<0.038	<0.038	<0.037	<0.041	0.039	<0.33	<0.33	<0.33
Aroclor-1260 (PCB-1260)	<0.038	<0.038	<0.037	<0.041	<0.037	<0.33	<0.33	<0.33

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AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
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Flint, Michigan

	AOI 36-2													
AOI Number | Location ID:	**36-2 | RFI-36-19**	**36-2 | RFI-36-19**	**36-2 | RFI-36-19**	**36-2 | RFI-36-34**	**36-2 | RFI-36-34**	**36-2 | RFI-36-36**	**36-2 | RFI-36-36**	**36-2 | RFI-36-36R**	**36-2 | RFI-36-37**	**36-2 | RFI-36-37**	**36-2 | RFI-36-37**	**36-2 | RFI-36-37**	**36-2 | RFI-36-41**	**36-2 | RFI-36-42**
Sample Depth(ft BGS):	**0 - 2**	**8 - 10**	**10 - 12**	**0.9 - 2.9**	**6.9 - 8.9**	**1 - 3**	**5 - 7**	**1 - 3**	**0 - 2**	**6 - 8**	**8 - 10**	**14 - 16**	**1 - 3**	**0.1 - 1.5**
Date Collected:	**08/28/01**	**08/28/01**	**08/28/01**	**06/28/01**	**06/28/01**	**06/29/01**	**06/29/01**	**11/29/01**	**09/04/01**	**09/04/01**	**09/04/01**	**09/04/01**	**11/29/01**	**11/29/01**
Sample Name:	**RFI-36-19(00-02)**	**RFI-36-19(08-10)**	**RFI-36-19(10-12)**	**RFI-36-34(0.9-2.9)**	**RFI-36-34(6.9-8.9)**	**RFI-36-36(01-03)**	**RFI-36-36(05-07)**	**RFI-36-36R(01-03)**	**RFI-36-37(00-02)**	**RFI-36-37(06-08)**	**RFI-36-37(08-10)**	**RFI-36-37(14-16)**	**RFI-36-41(01-03)**	**RFI-36-42(0.1-1.5)**
Inorganics														
Arsenic	NA	NA	NA	5.2	3.4	5.8	3.8	NA	NA	NA	NA	NA	NA	NA
Chromium (total) [a]	NA	NA	NA	13	5.2	**450**	54	220	NA	NA	NA	NA	110	8.7
Lead [b]	NA	NA	NA	7.1	3.9	40	14	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	18	11	120	22	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds														
Benzene	<0.037	<0.037	<0.036	<0.039	<0.040	<0.038	<0.040	NA	<0.037	<0.036	<0.036	<0.038	NA	NA
1,1-Dichloroethane	<0.037	<0.037	<0.036	<0.039	<0.040	<0.038	<0.040	NA	<0.037	<0.036	<0.036	<0.038	NA	NA
Ethylbenzene	<0.037	<0.037	<0.036	<0.039	<0.040	<0.038	<0.040	NA	<0.037	<0.036	<0.036	<0.038	NA	NA
Methyl cyclohexane	<0.16	<0.16	<0.15	<0.17	<0.17	<0.16	<0.17	NA	0.08	<0.16	<0.15	<0.16	NA	NA
1,1,1-Trichloroethane	<0.037	<0.037	<0.036	<0.039	<0.040	<0.038	<0.040	NA	<0.037	<0.036	<0.036	<0.038	NA	NA
Semi Volatile Organic Comp														
Acenaphthylene	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	<0.18	<0.18	<0.17	<0.19	NA	NA
Benzo(a)anthracene	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	0.093	<0.18	<0.17	<0.19	NA	NA
Benzo(a)pyrene	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	0.09	<0.18	<0.17	<0.19	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	0.093	<0.18	<0.17	<0.19	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	0.055	<0.18	<0.17	<0.19	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	0.088	<0.18	<0.17	<0.19	NA	NA
Carbazole	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	<0.18	<0.18	<0.17	<0.19	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	<0.18	<0.18	<0.17	<0.19	NA	NA
Dimethyl phthalate	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	<0.18	<0.18	<0.17	<0.19	NA	NA
Di-n-octyl phthalate	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	<0.18	<0.18	<0.17	<0.19	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	0.051	<0.18	<0.17	<0.19	NA	NA
3&4-Methylphenol	NA	NA	NA	<0.38	<0.38	<1.8	<2.0	NA	<0.36	<0.35	<0.35	<0.37	NA	NA
Naphthalene	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	<0.18	<0.18	<0.17	<0.19	NA	NA
2-Nitrophenol	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	<0.18	<0.18	<0.17	<0.19	NA	NA
N-Nitrosodi-n-propylamine	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	<0.18	<0.18	<0.17	<0.19	NA	NA
Phenanthrene	NA	NA	NA	<0.19	<0.19	<0.92	<0.98	NA	0.058	<0.18	<0.17	<0.19	NA	NA
Polychlorinated Biphenyls (F														
Aroclor-1242 (PCB-1242)	NA	NA	NA	<0.039	<0.039	<0.038	<0.040	NA	NA	NA	<0.036	NA	NA	NA
Aroclor-1248 (PCB-1248)	NA	NA	NA	<0.039	<0.039	<0.038	<0.040	NA	NA	NA	<0.036	NA	NA	NA
Aroclor-1254 (PCB-1254)	NA	NA	NA	<0.039	<0.039	<0.038	<0.040	NA	NA	NA	<0.036	NA	NA	NA
Aroclor-1260 (PCB-1260)	NA	NA	NA	<0.039	<0.039	<0.038	<0.040	NA	NA	NA	<0.036	NA	NA	NA

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 81-1											
AOI Number | Location ID:	**81-1 | RFI-81-01**	**81-1 | RFI-81-02**	**81-1 | RFI-81-02**	**81-1 | RFI-81-02**	**81-1 | RFI-81-23**	**81-1 | RFI-81-25**	**81-1 | RFI-81-25**	**81-1 | RFI-81-35**	**81-1 | RFI-81-35**	**81-1 | RFI-81-35**	**81-1 | RFI-81-36**	**81-1 | RFI-81-37**
Sample Depth(ft BGS):	**2.5 - 4.5**	**4 - 6**	**8 - 10**	**12 - 14**	**0.9 - 1.7**	**0.8 - 2.8**	**8 - 10**	**0.8 - 2.8**	**8 - 10**	**12 - 14**	**8 - 10**	**8 - 10**
Date Collected:	**09/09/01**	**09/09/01**	**09/09/01**	**09/09/01**	**09/07/01**	**12/03/01**	**12/03/01**	**01/22/02**	**01/22/02**	**01/22/02**	**03/12/03**	**03/12/03**
Sample Name:	**RFI-81-01(2.5-4.5)**	**RFI-81-02(04-06)**	**RFI-81-02(08-10)**	**RFI-81-02(12-14)**	**RFI-81-23(0.9-1.7)**	**RFI-81-25(0.8-2.8)**	**RFI-81-25(8-10)**	**RFI-81-35(0.8-2.8)**	**RFI-81-35(08-10)**	**RFI-81-35(12-14)**	**RFI-81-36(08-10)**	**RFI-81-37(08-10)**
Inorganics												
Arsenic	14	10	19	5.8	3.7	NA	NA	3.6	7.3	8	NA	NA
Chromium (total) [a]	230	42	190	8.9	7.4	NA	NA	8.3	15	18	NA	NA
Lead [b]	**5500**	**1600**	**69000**	140	25	550	110	120	**1000**	13	**12000**	**5000**
Vanadium	38	18	35	13	12	NA	NA	11	19	21	NA	NA
Volatile Organic Compounds												
Benzene	<0.039	<0.040	0.13	<0.040	0.062	NA	NA	<0.036	<0.037	<0.059	NA	NA
1,1-Dichloroethane	<0.039	<0.040	<0.042	<0.040	<0.040	NA	NA	<0.036	<0.037	<0.059	NA	NA
Ethylbenzene	<0.039	<0.040	<0.042	<0.040	0.066	NA	NA	<0.036	<0.037	<0.059	NA	NA
Methyl cyclohexane	0.06	0.11	<0.18	<0.17	<0.17	NA	NA	0.081	0.25	<0.25	NA	NA
1,1,1-Trichloroethane	<0.039	<0.040	<0.042	<0.040	<0.040	NA	NA	<0.036	<0.037	<0.059	NA	NA
Semi Volatile Organic Comp												
Acenaphthylene	<0.19	<0.20	<0.20	<0.19	<0.19	NA	NA	<0.18	<0.18	<0.29	NA	NA
Benzo(a)anthracene	0.13	0.26	3.6	<0.19	0.069	NA	NA	0.046	<0.18	0.28	NA	NA
Benzo(a)pyrene	0.12	0.24	3.9	<0.19	0.057	NA	NA	0.048	<0.18	0.16	NA	NA
Benzo(b)fluoranthene	0.23	0.3	2.7	<0.19	0.073	NA	NA	0.058	<0.18	0.14	NA	NA
Benzo(g,h,i)perylene	0.099	0.29	4.1	<0.19	<0.19	NA	NA	<0.18	<0.18	0.086	NA	NA
Benzo(k)fluoranthene	0.16	0.24	2.7	<0.19	0.07	NA	NA	0.054	<0.18	0.093	NA	NA
Carbazole	<0.19	<0.20	0.095	<0.19	<0.19	NA	NA	<0.18	<0.18	<0.29	NA	NA
Dibenz(a,h)anthracene	<0.19	<0.20	<0.20	<0.19	<0.19	NA	NA	<0.18	<0.18	<0.29	NA	NA
Dimethyl phthalate	<0.19	<0.20	<0.20	<0.19	<0.19	NA	NA	<0.18	<0.18	<0.29	NA	NA
Di-n-octyl phthalate	<0.19	<0.20	<0.20	<0.19	<0.19	NA	NA	<0.18	<0.18	<0.29	NA	NA
Indeno(1,2,3-cd)pyrene	0.088	0.21	3	<0.19	<0.19	NA	NA	0.033	<0.18	0.056	NA	NA
3&4-Methylphenol	<0.37	<0.40	<0.41	<0.39	<0.39	NA	NA	<0.36	<0.37	<0.58	NA	NA
Naphthalene	0.07	0.11	0.59	<0.19	0.16	NA	NA	<0.18	0.064	<0.29	NA	NA
2-Nitrophenol	<0.19	<0.20	<0.20	<0.19	<0.19	NA	NA	<0.18	<0.18	<0.29	NA	NA
N-Nitrosodi-n-propylamine	<0.19	<0.20	<0.20	<0.19	<0.19	NA	NA	<0.18	<0.18	<0.29	NA	NA
Phenanthrene	0.23	0.38	1.4	0.049	0.58	NA	NA	<0.18	0.082	0.11	NA	NA
Polychlorinated Biphenyls (F												
Aroclor-1242 (PCB-1242)	<0.038	<0.041	<0.042	<0.040	<0.040	NA	NA	<0.037	<0.038	<0.059	NA	NA
Aroclor-1248 (PCB-1248)	<0.038	<0.041	<0.042	<0.040	<0.040	NA	NA	<0.037	<0.038	<0.059	NA	NA
Aroclor-1254 (PCB-1254)	<0.038	<0.041	<0.042	<0.040	<0.040	NA	NA	<0.037	<0.038	<0.059	NA	NA
Aroclor-1260 (PCB-1260)	<0.038	<0.041	<0.042	<0.040	<0.040	NA	NA	<0.037	<0.038	<0.059	NA	NA

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 81-2														
AOI Number | Location ID:	**81-2 | RFI-81-03**	**81-2 | RFI-81-03**	**81-2 | RFI-81-03**	**81-2 | RFI-81-04**	**81-2 | RFI-81-05**	**81-2 | RFI-81-05**	**81-2 | RFI-81-05**	**81-2 | RFI-81-13**	**81-2 | RFI-81-13**	**81-2 | RFI-81-13**	**81-2 | RFI-81-13R**	**81-2 | RFI-81-14**	**81-2 | RFI-81-15**	**81-2 | RFI-81-16**	**81-2 | RFI-81-17**
Sample Depth(ft BGS):	**0 - 2**	**8 - 10**	**10 - 12**	**8 - 10**	**3 - 5**	**3 - 5**	**9 - 11**	**0 - 2**	**6 - 8**	**10 - 12**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**
Date Collected:	**06/21/01**	**06/21/01**	**06/21/01**	**01/25/01**	**08/04/01**	**08/04/01**	**08/04/01**	**08/27/01**	**08/27/01**	**08/27/01**	**10/16/02**	**06/18/01**	**06/18/01**	**06/18/01**	**06/18/01**
Sample Name:	**RFI-81-03(00-02)**	**RFI-81-03(08-10)**	**RFI-81-03(10-12)**	**RFI-81-04(8-10)**	**RFI-81-05(03-05)**	**RFI-81-Dup-50**	**RFI-81-05(09-11)**	**RFI-81-13(00-02)**	**RFI-81-13(06-08)**	**RFI-81-13(10-12)**	**RFI-81-13R(00-02)**	**RFI-81-14(00-02)**	**RFI-81-15(00-02)**	**RFI-81-16(00-02)**	**RFI-81-17(00-02)**
Inorganics															
Arsenic	13	3	5.2	7.9	2.1	1.5	1.6	56	<4.0	<5.5	NA	3.5	4.7	7	6.7
Chromium (total) [a]	45	10	20	15	4.2	5.4	5.1	270	9.3	12	16	11	11	17	5.2
Lead [b]	160	6	23	13	5.4	6.6	6.9	27	42	36	NA	19	22	17	13
Vanadium	17	13	17	NA	4.3	4.7	4.9	30	8.9	12	NA	17	18	25	7.7
Volatile Organic Compounds															
Benzene	0.47	<0.038	<0.039	<0.039	0.11	0.12	0.056	<0.040	<0.038	NA	NA	<0.038	<0.040	<0.039	<0.038
1,1-Dichloroethane	<0.038	<0.038	<0.039	<0.039	<0.037	<0.035	<0.040	<0.040	<0.038	NA	NA	<0.038	<0.040	<0.039	<0.038
Ethylbenzene	0.57	<0.038	<0.039	<0.039	0.13	0.13	0.082	<0.040	<0.038	NA	NA	<0.038	<0.040	<0.039	<0.038
Methyl cyclohexane	3.5	0.069	0.089	NA	0.96	0.97	0.62	0.13	0.05	NA	NA	<0.16	<0.17	<0.17	0.043
1,1,1-Trichloroethane	<0.038	<0.038	<0.039	<0.039	<0.037	<0.035	<0.040	<0.040	<0.038	NA	NA	<0.038	<0.040	<0.039	<0.038
Semi Volatile Organic Comp															
Acenaphthylene	<0.18	<0.18	<0.19	<0.18	<0.17	<0.17	<0.19	<0.20	<0.19	<0.19	NA	<0.19	<0.20	<0.19	<0.18
Benzo(a)anthracene	3.3	0.38	0.13	0.34	0.057	0.063	0.051	0.094	0.084	0.08	NA	0.042	<0.20	<0.19	<0.18
Benzo(a)pyrene	3.4	0.43	0.13	0.31	<0.17	<0.17	<0.19	0.12	0.061	0.082	NA	0.038	<0.20	<0.19	<0.18
Benzo(b)fluoranthene	3.2	0.59	0.24	0.33	0.068	0.05	<0.19	0.12	0.1	0.07	NA	<0.19	<0.20	<0.19	<0.18
Benzo(g,h,i)perylene	1.6	0.36	0.12	<0.18	<0.17	<0.17	<0.19	0.098	<0.19	0.11	NA	<0.19	<0.20	<0.19	<0.18
Benzo(k)fluoranthene	3.3	0.38	0.12	0.3	0.036	<0.17	<0.19	0.1	0.066	0.071	NA	<0.19	<0.20	<0.19	<0.18
Carbazole	0.94	0.044	<0.19	<0.18	<0.17	<0.17	<0.19	<0.20	<0.19	<0.19	NA	<0.19	<0.20	<0.19	<0.18
Dibenz(a,h)anthracene	0.77	<0.18	<0.19	<0.18	<0.17	<0.17	<0.19	<0.20	<0.19	<0.19	NA	<0.19	<0.20	<0.19	<0.18
Dimethyl phthalate	<0.18	<0.18	<0.19	<0.18	<0.17	<0.17	<0.19	<0.20	<0.19	<0.19	NA	<0.19	<0.20	<0.19	<0.18
Di-n-octyl phthalate	<0.18	<0.18	<0.19	<0.18	<0.17	<0.17	<0.19	<0.20	<0.19	<0.19	NA	<0.19	<0.20	<0.19	<0.18
Indeno(1,2,3-cd)pyrene	1.6	0.28	0.089	<0.18	<0.17	<0.17	<0.19	0.075	<0.19	0.18	NA	<0.19	<0.20	<0.19	<0.18
3&4-Methylphenol	<0.36	<0.37	<0.38	<0.36	<0.35	<0.35	<0.38	<0.40	<0.38	<0.38	NA	<0.38	<0.39	<0.38	<0.36
Naphthalene	1	0.045	<0.19	<0.18	0.5	0.7	0.42	0.15	<0.19	0.055	NA	<0.19	<0.20	<0.19	<0.18
2-Nitrophenol	<0.18	<0.18	<0.19	<0.18	<0.17	<0.17	<0.19	<0.20	<0.19	<0.19	NA	<0.19	<0.20	<0.19	<0.18
N-Nitrosodi-n-propylamine	<0.18	<0.18	<0.19	<0.18	<0.17	<0.17	<0.19	<0.20	<0.19	<0.19	NA	<0.19	<0.20	<0.19	<0.18
Phenanthrene	3.8	0.41	0.15	0.48	0.55	0.63	0.39	0.26	0.1	0.14	NA	0.049	<0.20	<0.19	<0.18
Polychlorinated Biphenyls (F															
Aroclor-1242 (PCB-1242)	<0.038	<0.038	<0.039	NA	<0.036	<0.036	<0.039	<0.041	<0.039	<0.039	NA	<0.039	<0.040	<0.039	<0.037
Aroclor-1248 (PCB-1248)	<0.038	<0.038	<0.039	NA	<0.036	<0.036	<0.039	0.026	0.026	0.046	NA	<0.039	<0.040	<0.039	<0.037
Aroclor-1254 (PCB-1254)	0.14	0.061	0.24	NA	<0.036	<0.036	<0.039	0.076	0.036	0.096	NA	<0.039	<0.040	<0.039	0.36
Aroclor-1260 (PCB-1260)	0.041	<0.038	0.041	NA	0.028	<0.036	<0.039	<0.041	<0.039	<0.039	NA	<0.039	<0.040	<0.039	0.073

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
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	AOI 81-2 cont.													
AOI Number | Location ID:	**81-2 | RFI-81-18**	**81-2 | RFI-81-19**	**81-2 | RFI-81-20**	**81-2 | RFI-81-20**	**81-2 | RFI-81-20**	**81-2 | RFI-81-22**	**81-2 | RFI-81-30**	**81-2 | RFI-81-30**	**81-2 | RFI-81-32**	**81-2 | RFI-81-32**	**81-2 | RFI-81-38**	**81-2 | RFI-81-39R**	**81-2 | RFI-81-39R**	**81-2 | RFI-81-40**
Sample Depth(ft BGS):	**0 - 2**	**0 - 2**	**1 - 3**	**3 - 5**	**7 - 9**	**0 - 2**	**1.2 - 3.2**	**3.2 - 5.2**	**1 - 3**	**3 - 5**	**1 - 3**	**1.7 - 3.7**	**7.7 - 9.7**	**0 - 2**
Date Collected:	**06/18/01**	**09/17/01**	**08/04/01**	**08/04/01**	**08/04/01**	**06/21/01**	**12/13/01**	**12/13/01**	**12/13/01**	**12/13/01**	**03/12/03**	**04/05/03**	**04/05/03**	**03/12/03**
Sample Name:	**RFI-81-18(00-02)**	**RFI-81-19(00-02)**	**RFI-81-20(01-03)**	**RFI-81-20(03-05)**	**RFI-81-20(07-09)**	**RFI-81-22(00-02)**	**RFI-81-30(1.2-3.2)**	**RFI-81-30(3.2-5.2)**	**RFI-81-32(01-03)**	**RFI-81-32(03-05)**	**RFI-81-38(01-03)**	**RFI-81-39R(1.7-3.7)**	**RFI-81-39R(7.7-9.7)**	**RFI-81-40(00-02)**
Inorganics														
Arsenic	7.2	12	9.2	2.8	3.6	24	NA	NA	NA	NA	2.1	6.2	1.7	8.1
Chromium (total) [a]	21	9.8	160	63	19	110	NA	NA	NA	NA	3.7	24	5.3	NA
Lead [b]	63	37	**3100**	94	30	82	92	140	13	210	5.8	49	5.8	NA
Vanadium	13	10	43	18	12	16	NA	NA	NA	NA	2.2	19	7.2	NA
Volatile Organic Compounds														
Benzene	0.062	0.26	<0.037	0.03	<0.044	0.56	NA	NA	NA	NA	<0.041	<0.037	<0.035	NA
1,1-Dichloroethane	<0.038	<0.039	<0.037	<0.036	<0.044	<0.038	NA	NA	NA	NA	**7000**	<0.037	<0.035	NA
Ethylbenzene	0.057	0.34	<0.037	<0.036	<0.044	1.3	NA	NA	NA	NA	0.056	0.83	0.73	NA
Methyl cyclohexane	0.29	3.8	0.13	0.094	0.037	11	NA	NA	NA	NA	<0.18	0.16	0.24	NA
1,1,1-Trichloroethane	<0.038	<0.039	<0.037	<0.036	<0.044	<0.038	NA	NA	NA	NA	**47000**	<0.037	<0.035	NA
Semi Volatile Organic Comp														
Acenaphthylene	0.043	<0.19	<0.18	<0.18	<0.22	<0.95	NA	NA	NA	NA	<5.2	<0.91	<0.88	NA
Benzo(a)anthracene	0.1	<0.19	0.96	0.26	0.2	<0.95	NA	NA	NA	NA	<5.2	<0.91	<0.88	NA
Benzo(a)pyrene	0.13	<0.19	0.81	0.28	0.12	<0.95	NA	NA	NA	NA	<5.2	<0.91	<0.88	NA
Benzo(b)fluoranthene	0.13	<0.19	0.8	0.28	0.2	<0.95	NA	NA	NA	NA	<5.2	<0.91	<0.88	NA
Benzo(g,h,i)perylene	0.15	<0.19	0.4	0.18	<0.22	<0.95	NA	NA	NA	NA	<5.2	<0.91	<0.88	NA
Benzo(k)fluoranthene	0.11	<0.19	1.1	0.32	0.13	<0.95	NA	NA	NA	NA	<5.2	<0.91	<0.88	NA
Carbazole	<0.19	<0.19	0.21	<0.18	0.053	<0.95	NA	NA	NA	NA	<5.2	<0.91	<0.88	NA
Dibenz(a,h)anthracene	0.051	<0.19	<0.18	<0.18	<0.22	<0.95	NA	NA	NA	NA	<5.2	<0.91	<0.88	NA
Dimethyl phthalate	<0.19	<0.19	<0.18	<0.18	<0.22	<0.95	NA	NA	NA	NA	<5.2	<0.91	<0.88	NA
Di-n-octyl phthalate	<0.19	<0.19	<0.18	<0.18	<0.22	<0.95	NA	NA	NA	NA	<5.2	<0.91	<0.88	NA
Indeno(1,2,3-cd)pyrene	0.12	<0.19	0.39	0.16	<0.22	<0.95	NA	NA	NA	NA	<5.2	<0.91	<0.88	NA
3&4-Methylphenol	<0.37	<0.38	<0.36	<0.36	<0.43	<1.9	NA	NA	NA	NA	R	<1.8	<1.8	NA
Naphthalene	<0.19	<0.19	0.084	<0.18	0.076	<0.95	NA	NA	NA	NA	5.9	5.4	7.8	NA
2-Nitrophenol	<0.19	<0.19	<0.18	<0.18	<0.22	<0.95	NA	NA	NA	NA	R	<0.91	<0.88	NA
N-Nitrosodi-n-propylamine	<0.19	<0.19	<0.18	<0.18	<0.22	<0.95	NA	NA	NA	NA	<5.2	<0.91	<0.88	NA
Phenanthrene	0.22	<0.19	1.8	0.25	0.49	0.52	NA	NA	NA	NA	<5.2	1.9	0.54	NA
Polychlorinated Biphenyls (F														
Aroclor-1242 (PCB-1242)	<0.038	<0.039	<0.037	<0.037	<0.045	<0.39	NA	NA	NA	NA	<0.043	<0.037	<0.036	NA
Aroclor-1248 (PCB-1248)	<0.038	<0.039	<0.037	<0.037	<0.045	<0.39	NA	NA	NA	NA	<0.043	<0.037	<0.036	NA
Aroclor-1254 (PCB-1254)	0.74	0.2	<0.037	<0.037	<0.045	4.1	NA	NA	NA	NA	<0.043	<0.037	<0.036	NA
Aroclor-1260 (PCB-1260)	0.21	0.054	<0.037	<0.037	<0.045	0.88	NA	NA	NA	NA	<0.043	<0.037	<0.036	NA

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
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	AOI 81-2 cont.			
AOI Number | Location ID:	**81-2 | RFI-81-41**	**81-2 | RFI-81-42**	**81-2 | RFI-81-50**	**81-2 | RFI-81-50**
Sample Depth(ft BGS):	**0 - 2**	**0.7 - 2**	**4 - 6**	**4 - 6**
Date Collected:	**03/12/03**	**04/05/03**	**03/09/05**	**03/09/05**
Sample Name:	**RFI-81-41(00-02)**	**RFI-81-42(0.7-2.0)**	**Duplicate 2 (030905)**	**RFI-81-50(4-6)**
Inorganics				
Arsenic	5.1	3.6	0.83	0.8
Chromium (total) [a]	NA	26	3.4	4.1
Lead [b]	NA	200	5.4	5.5
Vanadium	NA	14	5.1	6.3
Volatile Organic Compounds				
Benzene	NA	<0.038	<0.060	<0.060
1,1-Dichloroethane	NA	<0.038	<0.060	<0.060
Ethylbenzene	NA	0.09	<0.060	<0.060
Methyl cyclohexane	NA	0.056	<0.060	<0.060
1,1,1-Trichloroethane	NA	<0.038	<0.060	<0.060
Semi Volatile Organic Comp				
Acenaphthylene	NA	<0.96	<0.30	<0.30
Benzo(a)anthracene	NA	1.9	<0.30	<0.30
Benzo(a)pyrene	NA	2	<0.30	<0.30
Benzo(b)fluoranthene	NA	2.1	<0.30	<0.30
Benzo(g,h,i)perylene	NA	2	<0.30	<0.30
Benzo(k)fluoranthene	NA	2.1	<0.30	<0.30
Carbazole	NA	0.44	<0.30	<0.30
Dibenz(a,h)anthracene	NA	0.72	<0.30	<0.30
Dimethyl phthalate	NA	<0.96	<0.30	<0.30
Di-n-octyl phthalate	NA	<0.96	<0.30	<0.30
Indeno(1,2,3-cd)pyrene	NA	1.4	<0.30	<0.30
3&4-Methylphenol	NA	R	NA	NA
Naphthalene	NA	1.2	<0.30	<0.30
2-Nitrophenol	NA	R	<0.30	<0.30
N-Nitrosodi-n-propylamine	NA	<0.96	<0.30	<0.30
Phenanthrene	NA	2.8	<0.30	<0.30
Polychlorinated Biphenyls (F				
Aroclor-1242 (PCB-1242)	NA	1.1	<0.33	<0.33
Aroclor-1248 (PCB-1248)	NA	<0.039	<0.33	<0.33
Aroclor-1254 (PCB-1254)	NA	0.81	<0.33	<0.33
Aroclor-1260 (PCB-1260)	NA	<0.039	<0.33	<0.33

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
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	AOI 83/84-2										
AOI Number | Location ID:	**83/84-2 | RFI-83/84-04**	**83/84-2 | RFI-83/84-04**	**83/84-2 | RFI-83/84-04**	**83/84-2 | RFI-83/84-06**	**83/84-2 | RFI-83/84-06**	**83/84-2 | RFI-83/84-06**	**83/84-2 | RFI-83/84-12**	**83/84-2 | RFI-83/84-12**	**83/84-2 | RFI-83/84-13**	**83/84-2 | RFI-83/84-13**	**83/84-2 | RFI-83/84-14**
Sample Depth(ft BGS):	**0 - 2**	**8 - 10**	**12 - 14**	**1 - 3**	**7 - 9**	**9 - 11**	**0.7 - 2.7**	**2.7 - 4.7**	**1.1 - 3.1**	**3.1 - 5.1**	**0.8 - 1**
Date Collected:	**01/29/01**	**01/29/01**	**01/29/01**	**09/12/01**	**09/12/01**	**09/12/01**	**12/07/01**	**12/07/01**	**12/07/01**	**12/07/01**	**12/10/01**
Sample Name:	**RFI-83/84-04(00-02)**	**RFI-83/84-04(08-10)**	**RFI-83/84-04(12-14)**	**RFI-83/84-06(01-03)**	**RFI-83/84-06(07-09)**	**RFI-83/84-06(09-11)**	**RFI-83/84-12(0.7-2.7)**	**RFI-83/84-12(2.7-4.7)**	**RFI-83/84-13(1.1-3.1)**	**RFI-83/84-13(3.1-5.1)**	**RFI-83/84-14(0.8-1.0)**
Inorganics											
Arsenic	11	3.9	4	3.3	15	5.1	7.5	32	NA	NA	NA
Chromium (total) [a]	38	16	15	5.2	29	28	37	73	NA	NA	NA
Lead [b]	**1600**	15	11	8.6	**2300**	25	150	**2900**	78	640	**3600**
Vanadium	NA	NA	NA	7.6	22	14	18	33	NA	NA	NA
Volatile Organic Compounds											
Benzene	<0.041	<0.041	<0.029	<0.036	0.41	0.031	<0.040	<0.042	NA	NA	NA
1,1-Dichloroethane	<0.041	<0.041	<0.029	<0.036	<0.040	<0.040	<0.040	<0.042	NA	NA	NA
Ethylbenzene	<0.041	<0.041	<0.029	<0.036	0.61	0.1	0.077	<0.042	NA	NA	NA
Methyl cyclohexane	NA	NA	NA	<0.15	1.7	0.23	0.083	<0.18	NA	NA	NA
1,1,1-Trichloroethane	<0.041	<0.041	<0.029	<0.036	<0.040	<0.040	<0.040	<0.042	NA	NA	NA
Semi Volatile Organic Comp											
Acenaphthylene	0.2	<0.20	<0.20	<0.17	<0.19	<0.19	<0.98	<2.0	NA	NA	NA
Benzo(a)anthracene	1.3	<0.20	<0.20	0.099	0.44	<0.19	0.66	0.45	NA	NA	NA
Benzo(a)pyrene	1.4	<0.20	<0.20	<0.17	<0.19	<0.19	<0.98	<2.0	NA	NA	NA
Benzo(b)fluoranthene	1.5	<0.20	<0.20	0.047	0.12	<0.19	0.44	<2.0	NA	NA	NA
Benzo(g,h,i)perylene	1.6	<0.20	<0.20	<0.17	0.16	<0.19	<0.98	<2.0	NA	NA	NA
Benzo(k)fluoranthene	1.5	<0.20	<0.20	<0.17	0.056	<0.19	0.72	<2.0	NA	NA	NA
Carbazole	0.23	<0.20	<0.20	<0.17	<0.19	<0.19	<0.98	<2.0	NA	NA	NA
Dibenz(a,h)anthracene	0.3	<0.20	<0.20	<0.17	<0.19	<0.19	<0.98	<2.0	NA	NA	NA
Dimethyl phthalate	<0.19	<0.20	<0.20	<0.17	<0.19	<0.19	<0.98	<2.0	NA	NA	NA
Di-n-octyl phthalate	<0.19	<0.20	<0.20	<0.17	<0.19	<0.19	<0.98	<2.0	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.3	<0.20	<0.20	<0.17	<0.19	<0.19	<0.98	<2.0	NA	NA	NA
3&4-Methylphenol	<0.37	<0.39	<0.38	R	<0.38	<0.39	<2.0	R	NA	NA	NA
Naphthalene	<0.19	<0.20	<0.20	<0.17	0.38	0.048	<0.98	<2.0	NA	NA	NA
2-Nitrophenol	<0.19	<0.20	<0.20	R	<0.19	<0.19	<0.98	R	NA	NA	NA
N-Nitrosodi-n-propylamine	<0.19	<0.20	<0.20	<0.17	<0.19	<0.19	<0.98	<2.0	NA	NA	NA
Phenanthrene	1.1	<0.20	<0.20	0.16	0.88	<0.19	4.5	2.9	NA	NA	NA
Polychlorinated Biphenyls (F											
Aroclor-1242 (PCB-1242)	NA	NA	NA	<0.036	<0.039	<0.040	<0.040	<0.042	NA	NA	NA
Aroclor-1248 (PCB-1248)	NA	NA	NA	<0.036	<0.039	<0.040	<0.040	<0.042	NA	NA	NA
Aroclor-1254 (PCB-1254)	NA	NA	NA	<0.036	<0.039	<0.040	<0.040	<0.042	NA	NA	NA
Aroclor-1260 (PCB-1260)	NA	NA	NA	<0.036	<0.039	<0.040	<0.040	0.04	NA	NA	NA

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AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
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	AOI 83/84-2 cont.										
AOI Number | Location ID:	**83/84-2 | RFI-83/84-15**	**83/84-2 | RFI-83/84-21**	**83/84-2 | RFI-83/84-21**	**83/84-2 | RFI-83/84-22**	**83/84-2 | RFI-83/84-22**	**83/84-2 | RFI-83/84-22**	**83/84-2 | RFI-83/84-23**	**83/84-2 | RFI-83/84-23**	**83/84-2 | RFI-83/84-23**	**83/84-2 | RFI-83/84-24**	**83/84-2 | RFI-83/84-24**
Sample Depth(ft BGS):	**1.2 - 3**	**0.7 - 2.7**	**6.7 - 8.7**	**1.1 - 3.1**	**3.1 - 5.1**	**7.1 - 9.1**	**1 - 3**	**1 - 3**	**5 - 7**	**0.8 - 2.8**	**0.8 - 2.8**
Date Collected:	**12/10/01**	**12/07/01**	**12/07/01**	**12/07/01**	**12/07/01**	**12/07/01**	**12/07/01**	**12/07/01**	**12/07/01**	**12/07/01**	**12/07/01**
Sample Name:	**RFI-83/84-15(1.2-3.0)**	**RFI-83/84-21(0.7-2.7)**	**RFI-83/84-21(6.7-8.7)**	**RFI-83/84-22(1.1-3.1)**	**RFI-83/84-22(3.1-5.1)**	**RFI-83/84-22(7.1-9.1)**	**RFI-83/84-23(01-03)**	**RFI-83/84-DUP-206**	**RFI-83/84-23(05-07)**	**RFI-83/84-24(0.8-2.8)**	**RFI-83/84-DUP-205**
Inorganics											
Arsenic	NA	5.5	47	2.5	7.2	5.8	2.8	2.4	28	2.7	2.8
Chromium (total) [a]	NA	36	270	20	37	11	6.6	5.5	99	6.1	4.8
Lead [b]	35	220	**2900**	530	300	9.5	10	7.5	**6500**	5.3	4.8
Vanadium	NA	7.3	66	5.3	12	16	7.6	7.4	51	6.2	6.4
Volatile Organic Compounds											
Benzene	NA	0.36	0.62	0.22	0.081	<0.040	<0.035	<0.035	1.4	<0.037	<0.036
1,1-Dichloroethane	NA	<0.038	<0.044	<0.037	<0.039	<0.040	<0.035	<0.035	0.077	<0.037	<0.036
Ethylbenzene	NA	0.043	0.12	0.51	0.27	0.066	<0.035	<0.035	0.31	<0.037	<0.036
Methyl cyclohexane	NA	0.091	0.15	2	1	1.1	<0.15	<0.15	0.23	<0.16	<0.15
1,1,1-Trichloroethane	NA	<0.038	<0.044	<0.037	<0.039	<0.040	<0.035	<0.035	<0.038	<0.037	<0.036
Semi Volatile Organic Comp											
Acenaphthylene	NA	<0.18	<2.1	<0.90	<9.4	<0.19	<0.17	<0.17	<0.94	<0.17	<0.17
Benzo(a)anthracene	NA	0.74	13	1.1	81	0.3	0.14	0.084	1.3	<0.17	<0.17
Benzo(a)pyrene	NA	0.76	13	1.6	**66**	<0.19	<0.17	<0.17	0.61	<0.17	<0.17
Benzo(b)fluoranthene	NA	0.74	11	1.4	63	<0.19	<0.17	<0.17	0.68	<0.17	<0.17
Benzo(g,h,i)perylene	NA	0.64	6	1.2	28	<0.19	<0.17	<0.17	<0.94	<0.17	<0.17
Benzo(k)fluoranthene	NA	0.75	11	0.84	59	<0.19	<0.17	<0.17	0.66	<0.17	<0.17
Carbazole	NA	0.14	2.7	<0.90	40	<0.19	0.04	<0.17	<0.94	<0.17	<0.17
Dibenz(a,h)anthracene	NA	<0.18	2.8	<0.90	17	<0.19	<0.17	<0.17	<0.94	<0.17	<0.17
Dimethyl phthalate	NA	<0.18	<2.1	<0.90	<9.4	<0.19	<0.17	<0.17	<0.94	<0.17	<0.17
Di-n-octyl phthalate	NA	<0.18	<2.1	<0.90	<9.4	<0.19	<0.17	<0.17	<0.94	<0.17	<0.17
Indeno(1,2,3-cd)pyrene	NA	0.47	13	0.93	29	<0.19	<0.17	<0.17	<0.94	<0.17	<0.17
3&4-Methylphenol	NA	<0.36	<4.2	<1.8	<19	<0.38	<0.35	<0.35	<1.9	<0.35	<0.35
Naphthalene	NA	0.1	1.8	0.63	4.8	0.1	<0.17	<0.17	0.36	0.035	<0.17
2-Nitrophenol	NA	<0.18	<2.1	<0.90	<9.4	<0.19	<0.17	<0.17	<0.94	<0.17	<0.17
N-Nitrosodi-n-propylamine	NA	<0.18	<2.1	<0.90	<9.4	<0.19	<0.17	<0.17	<0.94	<0.17	<0.17
Phenanthrene	NA	0.98	20	2	190	0.81	0.3	0.21	2.1	<0.17	<0.17
Polychlorinated Biphenyls (F											
Aroclor-1242 (PCB-1242)	NA	<0.037	<0.044	<0.037	<0.039	<0.039	<0.036	<0.036	<0.039	<0.036	<0.036
Aroclor-1248 (PCB-1248)	NA	<0.037	<0.044	<0.037	<0.039	<0.039	<0.036	<0.036	<0.039	<0.036	<0.036
Aroclor-1254 (PCB-1254)	NA	<0.037	<0.044	0.23	0.098	<0.039	<0.036	<0.036	<0.039	<0.036	<0.036
Aroclor-1260 (PCB-1260)	NA	<0.037	<0.044	0.053	<0.039	<0.039	<0.036	<0.036	<0.039	<0.036	<0.036

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AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
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	AOI 83/84-2 cont.										
AOI Number | Location ID:	**83/84-2 | RFI-83/84-24**	**83/84-2 | RFI-83/84-24**	**83/84-2 | RFI-83/84-25**	**83/84-2 | RFI-83/84-25**	**83/84-2 | RFI-83/84-25**	**83/84-2 | RFI-83/84-27**	**83/84-2 | RFI-83/84-27**	**83/84-2 | RFI-83/84-27**	**83/84-2 | RFI-83/84-27**	**83/84-2 | RFI-83/84-28**	**83/84-2 | RFI-83/84-28**
Sample Depth(ft BGS):	**4.8 - 6.8**	**6.8 - 8.8**	**0.7 - 2.7**	**8.7 - 10.7**	**10.7 - 12.7**	**0.7 - 2.7**	**6.7 - 8.7**	**8.7 - 10.7**	**8.7 - 10.7**	**0.7 - 2.7**	**2.7 - 4.7**
Date Collected:	**12/07/01**	**12/07/01**	**12/05/01**	**12/05/01**	**12/05/01**	**12/13/01**	**12/13/01**	**12/13/01**	**12/13/01**	**12/13/01**	**12/13/01**
Sample Name:	**RFI-83/84-24(4.8-6.8)**	**RFI-83/84-24(6.8-8.8)**	**RFI-83/84-25(0.7-2.7)**	**RFI-83/84-25(8.7-10.7)**	**RFI-83/84-25(10.7-12.7)**	**RFI-83/84-27(0.7-2.7)**	**RFI-83/84-27(6.7-8.7)**	**RFI-83/84-27(8.7-10.7)**	**RFI-83/84-DUP-208**	**RFI-83/84-28(0.7-2.7)**	**RFI-83/84-28(2.7-4.7)**
Inorganics											
Arsenic	11	10	2	2.3	2.2	2.5	1.8	2.4	2	6.1	4.1
Chromium (total) [a]	180	28	22	6.6	5.8	23	18	31	25	47	11
Lead [b]	**3200**	600	2.6	5.5	4.6	7	3.5	4.7	7.3	66	6.9
Vanadium	38	18	4.8	9.8	7	4.7	4.8	7.1	7	9.1	17
Volatile Organic Compounds											
Benzene	0.17	0.08	<0.037	<0.038	<0.040	<0.037	<0.037	<0.037	<0.037	<0.040	<0.041
1,1-Dichloroethane	<0.038	<0.040	<0.037	<0.038	<0.040	<0.037	<0.037	<0.037	<0.037	<0.040	<0.041
Ethylbenzene	0.59	0.11	<0.037	<0.038	<0.040	<0.037	<0.037	<0.037	<0.037	<0.040	<0.041
Methyl cyclohexane	1.8	1.2	<0.16	<0.16	<0.17	<0.16	0.11	<0.16	0.035	0.11	<0.18
1,1,1-Trichloroethane	<0.038	<0.040	<0.037	<0.038	<0.040	<0.037	<0.037	<0.037	<0.037	<0.040	<0.041
Semi Volatile Organic Comp											
Acenaphthylene	<0.94	<0.98	<0.18	<0.18	<0.20	<0.18	<0.18	<0.18	<0.18	<0.98	<0.20
Benzo(a)anthracene	1.6	1.5	0.034	<0.18	1.2	0.038	0.17	0.066	0.066	5.4	<0.20
Benzo(a)pyrene	<0.94	0.41	<0.18	<0.18	1.1	0.036	0.15	0.063	0.069	5.6	<0.20
Benzo(b)fluoranthene	<0.94	0.7	<0.18	<0.18	1.1	<0.18	0.14	0.061	0.057	6.2	<0.20
Benzo(g,h,i)perylene	<0.94	0.36	<0.18	<0.18	0.57	<0.18	0.091	0.047	0.04	2.9	<0.20
Benzo(k)fluoranthene	<0.94	0.32	<0.18	<0.18	0.95	<0.18	0.15	0.065	0.061	5.1	<0.20
Carbazole	<0.94	<0.98	<0.18	<0.18	0.4	<0.18	0.05	<0.18	<0.18	1.6	<0.20
Dibenz(a,h)anthracene	<0.94	<0.98	<0.18	<0.18	0.26	<0.18	<0.18	<0.18	<0.18	<0.98	<0.20
Dimethyl phthalate	<0.94	<0.98	<0.18	<0.18	<0.20	<0.18	<0.18	<0.18	<0.18	<0.98	<0.20
Di-n-octyl phthalate	<0.94	<0.98	<0.18	<0.18	<0.20	<0.18	<0.18	<0.18	<0.18	<0.98	<0.20
Indeno(1,2,3-cd)pyrene	<0.94	0.37	<0.18	<0.18	0.59	<0.18	0.093	0.041	0.04	2.7	<0.20
3&4-Methylphenol	<1.9	<2.0	<0.36	<0.37	<0.39	<0.36	<0.36	<0.36	<0.36	<2.0	<0.39
Naphthalene	2.3	1.3	<0.18	<0.18	0.055	0.047	0.055	0.047	0.039	0.99	<0.20
2-Nitrophenol	<0.94	<0.98	<0.18	<0.18	<0.20	<0.18	<0.18	<0.18	<0.18	<0.98	<0.20
N-Nitrosodi-n-propylamine	<0.94	<0.98	<0.18	<0.18	<0.20	<0.18	<0.18	<0.18	<0.18	<0.98	<0.20
Phenanthrene	3	6.1	0.081	<0.18	3.1	0.069	0.39	0.12	0.12	9.4	<0.20
Polychlorinated Biphenyls (F											
Aroclor-1242 (PCB-1242)	<0.039	<0.040	<0.037	<0.038	<0.041	<0.037	<0.037	<0.037	<0.037	<0.040	<0.040
Aroclor-1248 (PCB-1248)	<0.039	<0.040	<0.037	<0.038	<0.041	<0.037	<0.037	<0.037	<0.037	<0.040	<0.040
Aroclor-1254 (PCB-1254)	<0.039	0.18	<0.037	<0.038	<0.041	<0.037	<0.037	<0.037	<0.037	0.049	<0.040
Aroclor-1260 (PCB-1260)	<0.039	<0.040	<0.037	<0.038	<0.041	<0.037	<0.037	<0.037	<0.037	0.027	<0.040

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AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
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	AOI 83/84-2 cont.										
AOI Number | Location ID:	**83/84-2 | RFI-83/84-29**	**83/84-2 | RFI-83/84-29**	**83/84-2 | RFI-83/84-30**	**83/84-2 | RFI-83/84-30**	**83/84-2 | RFI-83/84-31**	**83/84-2 | RFI-83/84-31**	**83/84-2 | RFI-83/84-32**	**83/84-2 | RFI-83/84-33**	**83/84-2 | RFI-83/84-33**	**83/84-2 | RFI-83/84-33**	**83/84-2 | RFI-83/84-38**
Sample Depth(ft BGS):	**1 - 3**	**9 - 11**	**0.7 - 2.7**	**8.7 - 10.7**	**1 - 3**	**7 - 9**	**0.7 - 2.7**	**1.2 - 3.2**	**1.2 - 3.2**	**7.2 - 9.2**	**5 - 7**
Date Collected:	**01/17/02**	**01/17/02**	**09/04/02**	**09/04/02**	**09/04/02**	**09/04/02**	**09/04/02**	**09/04/02**	**09/04/02**	**09/04/02**	**03/12/03**
Sample Name:	**RFI-83/84-29(01-03)**	**RFI-83/84-29(09-11)**	**RFI-83/84-30(0.7-2.7)**	**RFI-83/84-30(8.7-10.7)**	**RFI-83/84-31(01-03)**	**RFI-83/84-31(07-09)**	**RFI-83/84-32(0.7-1.5)**	**RFI-83/84-33(1.2-3.2)**	**RFI-83/84-DUP-415**	**RFI-83/84-33(7.2-9.2)**	**RFI-83/84-38(05-07)**
Inorganics											
Arsenic	11	1.5	2.4	6.2	3	2.2	5	4.7	4.2	6.4	NA
Chromium (total) [a]	22	12	24	24	5.6	24	27	14	9.5	17	NA
Lead [b]	95	6.4	42	73	3.6	37	110	51	70	53	12
Vanadium	16	7.7	6.8	29	9.4	10	9.2	21	17	27	NA
Volatile Organic Compounds											
Benzene	<0.040	<0.061	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	<0.040	<0.061	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	0.029	<0.061	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl cyclohexane	0.44	<0.26	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	<0.040	<0.061	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi Volatile Organic Comp											
Acenaphthylene	<0.19	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.052	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.063	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.058	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	0.043	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.051	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	<0.19	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	<0.19	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	<0.19	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	<0.19	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	<0.19	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
3&4-Methylphenol	<0.38	<0.59	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	0.039	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	<0.19	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodi-n-propylamine	<0.19	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	0.11	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (F											
Aroclor-1242 (PCB-1242)	<0.039	<0.061	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248 (PCB-1248)	<0.039	<0.061	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254 (PCB-1254)	<0.039	<0.061	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260 (PCB-1260)	<0.039	<0.061	NA	NA	NA	NA	NA	NA	NA	NA	NA

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AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
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	AOI 83/84-2 cont.										
AOI Number | Location ID:	**83/84-2 | RFI-83/84-39**	**83/84-2 | RFI-83/84-39**	**83/84-2 | RFI-83/84-39**	**83/84-2 | RFI-83/84-40**	**83/84-2 | RFI-83/84-49**	**83/84-2 | RFI-83/84-49**	**83/84-2 | RFI-83/84-49**	**83/84-2 | RFI-83/84-49**	**83/84-2 | RFI-83/84-52**	**83/84-2 | RFI-83/84-52**	**83/84-2 | RFI-83/84-52**
Sample Depth(ft BGS):	**0.9 - 2.9**	**1.1 - 3.1**	**5.1 - 7.1**	**1 - 2.5**	**0.9 - 2.9**	**4.5 - 6.5**	**8.5 - 10.5**	**8.5 - 10.5**	**0.9 - 2.9**	**2.9 - 4.9**	**2.9 - 4.9**
Date Collected:	**03/07/03**	**03/19/03**	**03/19/03**	**03/06/03**	**04/09/03**	**04/09/03**	**04/09/03**	**04/09/03**	**04/11/03**	**04/11/03**	**04/11/03**
Sample Name:	**RFI-83/84-39(0.9-2.9)**	**RFI-83/84-39(1.1-3.1)**	**RFI-83/84-39(5.1-7.1)**	**RFI-83/84-40(1.0-2.5)**	**RFI-83/84-49(0.9-2.9)**	**RFI-83/84-49(4.5-6.5)**	**RFI-83/84-49(8.5-10.5)**	**RFI-83/84-DUP-437**	**RFI-83/84-52(0.9-2.9)**	**RFI-83/84-52(2.9-4.9)**	**RFI-83/84-DUP-441**
Inorganics											
Arsenic	13	0.99	0.98	NA	3.3	35	2.9	15	4.5	4.1	3.5
Chromium (total) [a]	**2400**	3.4	2.9	NA	26	20	22	21	12	9.6	8.6
Lead [b]	96	3	2.3	**3000**	65	**1200**	13	590	8.4	7.1	7
Vanadium	**390**	5	5	NA	10	18	22	23	21	18	18
Volatile Organic Compounds											
Benzene	<0.037	<0.036	<0.036	NA	<0.038	<0.040	<0.041	<0.040	<0.038	<0.038	<0.038
1,1-Dichloroethane	<0.037	<0.036	<0.036	NA	0.14	<0.040	<0.041	<0.040	<0.038	<0.038	<0.038
Ethylbenzene	<0.037	<0.036	<0.036	NA	<0.038	<0.040	<0.041	<0.040	<0.038	<0.038	<0.038
Methyl cyclohexane	0.087	<0.15	<0.15	NA	<0.16	0.26	0.069	0.04	<0.16	<0.16	0.028
1,1,1-Trichloroethane	<0.037	<0.036	<0.036	NA	<0.038	<0.040	<0.041	<0.040	<0.038	<0.038	<0.038
Semi Volatile Organic Comp											
Acenaphthylene	<4.6	<0.18	<0.18	NA	<4.7	<1.9	<0.21	<1.9	<1.9	<2.9	<0.56
Benzo(a)anthracene	<4.6	<0.18	<0.18	NA	3.3	<1.9	0.077	<1.9	<1.9	<2.9	0.45
Benzo(a)pyrene	<4.6	<0.18	<0.18	NA	3.6	<1.9	<0.21	<1.9	<1.9	<2.9	<0.56
Benzo(b)fluoranthene	<4.6	<0.18	<0.18	NA	3.8	<1.9	<0.21	<1.9	<1.9	<2.9	<0.56
Benzo(g,h,i)perylene	<4.6	<0.18	<0.18	NA	<4.7	<1.9	<0.21	<1.9	<1.9	<2.9	<0.56
Benzo(k)fluoranthene	<4.6	<0.18	<0.18	NA	4.4	<1.9	<0.21	<1.9	<1.9	<2.9	<0.56
Carbazole	<4.6	<0.18	<0.18	NA	1.7	<1.9	<0.21	<1.9	<1.9	<2.9	<0.56
Dibenz(a,h)anthracene	<4.6	<0.18	<0.18	NA	<4.7	<1.9	<0.21	<1.9	<1.9	<2.9	<0.56
Dimethyl phthalate	<4.6	<0.18	<0.18	NA	<4.7	<1.9	<0.21	<1.9	<1.9	<2.9	<0.56
Di-n-octyl phthalate	<4.6	<0.18	<0.18	NA	<4.7	<1.9	<0.21	<1.9	<1.9	<2.9	<0.56
Indeno(1,2,3-cd)pyrene	<4.6	<0.18	<0.18	NA	<4.7	<1.9	<0.21	<1.9	<1.9	<2.9	<0.56
3&4-Methylphenol	<9.3	<0.35	<0.36	NA	<9.4	<3.9	<0.41	<3.9	<3.7	<5.7	<1.1
Naphthalene	<4.6	<0.18	<0.18	NA	4.6	<1.9	<0.21	<1.9	<1.9	<2.9	0.63
2-Nitrophenol	<4.6	<0.18	<0.18	NA	<4.7	<1.9	<0.21	<1.9	<1.9	<2.9	<0.56
N-Nitrosodi-n-propylamine	<4.6	<0.18	<0.18	NA	<4.7	<1.9	<0.21	<1.9	<1.9	<2.9	<0.56
Phenanthrene	<4.6	<0.18	<0.18	NA	9.7	1.5	0.27	<1.9	1.4	2.7	2.6
Polychlorinated Biphenyls (F											
Aroclor-1242 (PCB-1242)	<0.038	<0.036	<0.037	NA	<0.039	<0.040	0.1	0.19	0.054	0.096	0.13
Aroclor-1248 (PCB-1248)	<0.038	<0.036	<0.037	NA	0.12	<0.040	<0.042	<0.040	<0.038	<0.039	<0.039
Aroclor-1254 (PCB-1254)	<0.038	<0.036	<0.037	NA	0.22	<0.040	<0.042	0.06	<0.038	<0.039	<0.039
Aroclor-1260 (PCB-1260)	<0.038	<0.036	<0.037	NA	<0.039	<0.040	<0.042	<0.040	<0.038	<0.039	<0.039

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AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
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	AOI 83/84-2 cont.			
AOI Number | Location ID:	**83/84-2 | RFI-83/84-52**	**83/84-2 | RFI-83/84-53**	**83/84-2 | RFI-83/84-53**	**83/84-2 | RFI-83/84-53**
Sample Depth(ft BGS):	**6.9 - 8.9**	**0.9 - 2.9**	**6.9 - 8.9**	**8.9 - 10.9**
Date Collected:	**04/11/03**	**04/11/03**	**04/11/03**	**04/11/03**
Sample Name:	**RFI-83/84-52(6.9-8.9)**	**RFI-83/84-53(0.9-2.9)**	**RFI-83/84-53(6.9-8.9)**	**RFI-83/84-53(8.9-10.9)**
Inorganics				
Arsenic	10	3.2	2.2	4.5
Chromium (total) [a]	26	15	5.3	16
Lead [b]	16	8.8	3.8	9.8
Vanadium	42	18	9.9	28
Volatile Organic Compounds				
Benzene	<0.044	<0.037	<0.036	<0.041
1,1-Dichloroethane	<0.044	<0.037	<0.036	<0.041
Ethylbenzene	<0.044	<0.037	<0.036	<0.041
Methyl cyclohexane	<0.19	<0.16	0.58	0.092
1,1,1-Trichloroethane	<0.044	<0.037	<0.036	<0.041
Semi Volatile Organic Comp				
Acenaphthylene	<0.22	<3.7	<1.8	<4.0
Benzo(a)anthracene	0.19	2.2	<1.8	<4.0
Benzo(a)pyrene	<0.22	1.6	<1.8	<4.0
Benzo(b)fluoranthene	<0.22	2.4	<1.8	<4.0
Benzo(g,h,i)perylene	<0.22	<3.7	<1.8	<4.0
Benzo(k)fluoranthene	<0.22	1.6	<1.8	<4.0
Carbazole	<0.22	<3.7	<1.8	<4.0
Dibenz(a,h)anthracene	<0.22	<3.7	<1.8	<4.0
Dimethyl phthalate	<0.22	<3.7	<1.8	<4.0
Di-n-octyl phthalate	<0.22	<3.7	<1.8	<4.0
Indeno(1,2,3-cd)pyrene	<0.22	<3.7	<1.8	<4.0
3&4-Methylphenol	<0.44	<7.4	<3.6	<8.1
Naphthalene	0.15	<3.7	<1.8	<4.0
2-Nitrophenol	<0.22	<3.7	<1.8	<4.0
N-Nitrosodi-n-propylamine	<0.22	<3.7	<1.8	<4.0
Phenanthrene	0.97	8.7	1.5	2.4
Polychlorinated Biphenyls (F				
Aroclor-1242 (PCB-1242)	<0.045	0.041	0.057	<0.042
Aroclor-1248 (PCB-1248)	<0.045	<0.038	<0.037	<0.042
Aroclor-1254 (PCB-1254)	<0.045	<0.038	<0.037	<0.042
Aroclor-1260 (PCB-1260)	<0.045	<0.038	<0.037	<0.042

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	AOI 83/84-3										
AOI Number | Location ID:	**83/84-3 | RFI-83/84-05**	**83/84-3 | RFI-83/84-05**	**83/84-3 | RFI-83/84-16**	**83/84-3 | RFI-83/84-16**	**83/84-3 | RFI-83/84-16**	**83/84-3 | RFI-83/84-17R**	**83/84-3 | RFI-83/84-18**	**83/84-3 | RFI-83/84-18**	**83/84-3 | RFI-83/84-19**	**83/84-3 | RFI-83/84-19**	**83/84-3 | RFI-83/84-34**
Sample Depth(ft BGS):	**0.7 - 2.7**	**6.7 - 8.7**	**0.8 - 2.8**	**0.8 - 2.8**	**2.8 - 4.8**	**1 - 3**	**0.8 - 2.8**	**2.8 - 4.8**	**0.8 - 2.8**	**2.8 - 3.4**	**0.7 - 2.7**
Date Collected:	**07/24/01**	**07/24/01**	**12/10/01**	**12/10/01**	**12/10/01**	**03/06/03**	**12/10/01**	**12/10/01**	**12/10/01**	**12/10/01**	**09/04/02**
Sample Name:	**RFI-83/84-05(0.7-2.7)**	**RFI-83/84-05(6.7-8.7)**	**RFI-83/84-16(0.8-2.8)**	**RFI-83/84-DUP-207**	**RFI-83/84-16(2.8-4.8)**	**RFI-83/84-17R(01-03)**	**RFI-83/84-18(0.8-2.8)**	**RFI-83/84-18(2.8-4.8)**	**RFI-83/84-19(0.8-2.8)**	**RFI-83/84-19(2.8-3.4)**	**RFI-83/84-34(0.7-2.7)**
Inorganics											
Arsenic	5.7	3.7	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium (total) [a]	17	6.8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead [b]	**42000**	6.4	670	**870**	**2500**	**1800**	400	**1100**	110	38	35
Vanadium	14	10	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	<0.039	<0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	<0.039	<0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	<0.039	<0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl cyclohexane	0.097	<0.16	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	<0.039	<0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi Volatile Organic Comp											
Acenaphthylene	<0.19	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	4.4	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	4	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	4.1	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	1.6	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	4.3	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	0.81	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	<0.19	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	<0.19	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	<0.19	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.7	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
3&4-Methylphenol	<0.38	<0.36	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	0.052	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	<0.19	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodi-n-propylamine	<0.19	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	4.4	<0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (F											
Aroclor-1242 (PCB-1242)	<0.039	<0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248 (PCB-1248)	<0.039	<0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254 (PCB-1254)	<0.039	<0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260 (PCB-1260)	<0.039	<0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA

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	AOI 83/84-3 cont.					
AOI Number | Location ID:	**83/84-3 | RFI-83/84-35**	**83/84-3 | RFI-83/84-36**	**83/84-3 | RFI-83/84-37**	**83/84-3 | RFI-83/84-41**	**83/84-3 | RFI-83/84-42**	**83/84-3 | RFI-83/84-43**
Sample Depth(ft BGS):	**0.7 - 2.7**	**0.7 - 2.7**	**0.7 - 2.7**	**1 - 2**	**1 - 3**	**1.5 - 3.5**
Date Collected:	**09/04/02**	**09/04/02**	**09/04/02**	**03/05/03**	**03/05/03**	**03/05/03**
Sample Name:	**RFI-83/84-35(0.7-2.7)**	**RFI-83/84-36(0.7-2.7)**	**RFI-83/84-37(0.7-2.7)**	**RFI-83/84-41(01-02)**	**RFI-83/84-42(01-03)**	**RFI-83/84-43(1.5-3.5)**
Inorganics						
Arsenic	NA	NA	NA	NA	NA	NA
Chromium (total) [a]	NA	NA	NA	NA	NA	NA
Lead [b]	**3900**	200	290	10	47	400
Vanadium	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds						
Benzene	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA	NA
Methyl cyclohexane	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA
Semi Volatile Organic Comp						
Acenaphthylene	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA
3&4-Methylphenol	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA
N-Nitrosodi-n-propylamine	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (F						
Aroclor-1242 (PCB-1242)	NA	NA	NA	NA	NA	NA
Aroclor-1248 (PCB-1248)	NA	NA	NA	NA	NA	NA
Aroclor-1254 (PCB-1254)	NA	NA	NA	NA	NA	NA
Aroclor-1260 (PCB-1260)	NA	NA	NA	NA	NA	NA

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 86-1													
AOI Number | Location ID:	**86-1 | RFI-02-08**	**86-1 | RFI-02-08**	**86-1 | RFI-86-01**	**86-1 | RFI-86-01**	**86-1 | RFI-86-01**	**86-1 | RFI-86-01**	**86-1 | RFI-86-02**	**86-1 | RFI-86-02**	**86-1 | RFI-86-02**	**86-1 | RFI-86-03**	**86-1 | RFI-86-03**	**86-1 | RFI-86-04**	**86-1 | RFI-86-04**	**86-1 | RFI-86-05**
Sample Depth(ft BGS):	**0.7 - 2**	**4 - 6**	**0.5 - 2.5**	**4.5 - 6.5**	**8.5 - 10.5**	**8.5 - 10.5**	**1 - 3**	**7 - 9**	**7 - 9**	**2 - 4**	**4 - 6**	**1 - 3**	**3 - 5**	**1 - 3**
Date Collected:	**05/21/01**	**05/21/01**	**05/23/01**	**05/23/01**	**05/23/01**	**05/23/01**	**07/31/01**	**07/31/01**	**07/31/01**	**06/20/01**	**06/20/01**	**07/24/01**	**07/24/01**	**06/20/01**
Sample Name:	**RFI-02-08(0.7-02)**	**RFI-02-08(04-06)**	**RFI-86-01(0.5-2.5)**	**RFI-86-01(4.5-6.5)**	**RFI-86-01(8.5-10.5)**	**RFI-86-DUP-15S**	**RFI-86-02(01-03)**	**RFI-86-02(07-09)**	**RFI-86-Dup-43**	**RFI-86-03(02-04)**	**RFI-86-03(04-06)**	**RFI-86-04(01-03)**	**RFI-86-04(03-05)**	**RFI-86-05(01-03)**
Inorganics														
Arsenic	10	4.1	12	7.4	3.3	3	2.7	3.5	2.9	9.8	34	4.5	4.5	5.8
Chromium (total) [a]	38	25	17	8.1	8.9	4.7	4.8	7	4.7	30	8.5	19	20	16
Lead [b]	190	10	110	7.7	6.4	2.9	2.8	6	3.6	14	4.7	630	460	27
Vanadium	25	37	15	14	13	5.7	10	12	8.6	48	13	15	9.3	16
Volatile Organic Compounds														
Benzene	0.011	<0.042	0.1	<0.037	<0.040	<0.040	<0.039	<0.037	<0.037	<0.043	<0.042	<0.040	<0.040	<0.038
1,1-Dichloroethane	<0.039	<0.042	<0.038	<0.037	<0.040	<0.040	<0.039	<0.037	<0.037	<0.043	<0.042	<0.040	<0.040	<0.038
Ethylbenzene	0.022	0.014	0.18	0.0091	<0.040	<0.040	<0.039	0.028	0.039	0.065	<0.042	<0.040	<0.040	0.032
Methyl cyclohexane	0.15	<0.18	1.5	0.045	<0.17	<0.17	<0.17	<0.16	0.033	<0.18	<0.18	0.12	0.038	0.19
1,1,1-Trichloroethane	<0.039	<0.042	<0.038	<0.037	<0.040	<0.040	<0.039	<0.037	<0.037	<0.043	0.05	<0.040	<0.040	0.19
Semi Volatile Organic Comp														
Acenaphthylene	<0.19	<0.20	0.61	<0.18	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	<0.20	0.056	<0.19	<0.19
Benzo(a)anthracene	0.41	<0.20	2.5	0.068	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	<0.20	0.11	<0.19	0.037
Benzo(a)pyrene	0.56	<0.20	3.9	0.073	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	<0.20	0.18	<0.19	<0.19
Benzo(b)fluoranthene	0.61	<0.20	4.3	0.078	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	0.13	0.4	<0.19	0.15
Benzo(g,h,i)perylene	0.55	<0.20	4.5	0.065	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	<0.20	<0.19	<0.19	<0.19
Benzo(k)fluoranthene	0.49	<0.20	3.5	0.057	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	<0.20	0.21	<0.19	<0.19
Carbazole	0.055	<0.20	0.14	<0.18	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	<0.20	<0.19	<0.19	<0.19
Dibenz(a,h)anthracene	0.16	<0.20	1.3	<0.18	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	<0.20	<0.19	<0.19	<0.19
Dimethyl phthalate	<0.19	<0.20	<0.19	<0.18	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	<0.20	<0.19	<0.19	<0.19
Di-n-octyl phthalate	<0.19	<0.20	<0.19	<0.18	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	<0.20	<0.19	<0.19	<0.19
Indeno(1,2,3-cd)pyrene	0.47	<0.20	4	0.06	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	<0.20	<0.19	<0.19	<0.19
3&4-Methylphenol	<0.38	<0.40	<0.37	<0.37	<0.39	<0.39	<0.37	<1.8	<1.8	<0.42	<0.41	<0.38	<0.39	<0.38
Naphthalene	0.043	<0.20	0.44	<0.18	<0.19	0.19	<0.19	1.9	1.8	<0.21	<0.20	<0.19	<0.19	0.06
2-Nitrophenol	<0.19	<0.20	<0.19	<0.18	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	<0.20	<0.19	<0.19	<0.19
N-Nitrosodi-n-propylamine	<0.19	<0.20	<0.19	<0.18	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	<0.20	<0.19	<0.19	<0.19
Phenanthrene	0.45	<0.20	1	0.063	<0.19	<0.19	<0.19	<0.90	<0.89	<0.21	<0.20	0.14	<0.19	0.093
Polychlorinated Biphenyls (F														
Aroclor-1242 (PCB-1242)	<0.039	<0.042	<0.039	<0.038	<0.040	<0.040	<0.039	<0.037	<0.037	<0.043	<0.042	<0.039	<0.040	<0.039
Aroclor-1248 (PCB-1248)	<0.039	<0.042	<0.039	<0.038	<0.040	<0.040	<0.039	<0.037	<0.037	<0.043	<0.042	<0.039	<0.040	<0.039
Aroclor-1254 (PCB-1254)	<0.039	<0.042	0.073	<0.038	<0.040	<0.040	<0.039	<0.037	<0.037	<0.043	<0.042	0.041	<0.040	0.067
Aroclor-1260 (PCB-1260)	<0.039	<0.042	0.039	<0.038	<0.040	<0.040	<0.039	<0.037	<0.037	<0.043	<0.042	0.022	<0.040	0.037

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 86-1 cont.														
AOI Number | Location ID:	**86-1 | RFI-86-05**	**86-1 | RFI-86-05**	**86-1 | RFI-86-06D**	**86-1 | RFI-86-06D**	**86-1 | RFI-86-07**	**86-1 | RFI-86-07**	**86-1 | RFI-86-07**	**86-1 | RFI-86-08**	**86-1 | RFI-86-08**	**86-1 | RFI-86-08**	**86-1 | RFI-86-10**	**86-1 | RFI-86-11**	**86-1 | RFI-86-11**	**86-1 | RFI-86-12**
Sample Depth(ft BGS):	**3 - 5**	**5 - 7**	**2 - 4**	**6 - 8**	**0.7 - 2.7**	**0.7 - 2.7**	**8.7 - 10.7**	**0.6 - 2.6**	**8.6 - 10.6**	**10.6 - 12.6**	**6.5 - 8.5**	**0.7 - 2.7**	**2.7 - 4.7**	**0.8 - 2.8**
Date Collected:	**06/20/01**	**06/20/01**	**06/15/01**	**06/15/01**	**05/23/01**	**05/23/01**	**05/23/01**	**07/20/01**	**07/20/01**	**07/20/01**	**11/21/01**	**11/21/01**	**11/21/01**	**11/21/01**
Sample Name:	**RFI-86-05(03-05)**	**RFI-86-05(05-07)**	**RFI-86-06D(02-04)**	**RFI-86-06D(06-08)**	**RFI-86-07(0.7-2.7)**	**RFI-86-DUP-14**	**RFI-86-07(8.7-10.7)**	**RFI-86-08(0.6-2.6)**	**RFI-86-08(8.6-10.6)**	**RFI-86-08(10.6-12.6)**	**RFI-86-10(6.5-8.5)**	**RFI-86-11(0.7-2.7)**	**RFI-86-11(2.7-4.7)**	**RFI-86-12(0.8-2.8)**
Inorganics														
Arsenic	3.1	4	4.8	13	**110**	**110**	9.1	8.4	12	9.5	NA	35	8.5	56
Chromium (total) [a]	15	11	13	28	5.4	5.5	21	25	21	22	NA	NA	NA	NA
Lead [b]	7.6	10	110	260	7.3	7.5	12	170	99	14	NA	NA	NA	NA
Vanadium	11	15	16	29	15	16	30	18	23	38	NA	NA	NA	NA
Volatile Organic Compounds														
Benzene	<0.038	<0.041	<0.042	<0.052	0.0074	<0.040	<0.045	0.08	<0.045	<0.044	NA	NA	NA	NA
1,1-Dichloroethane	<0.038	<0.041	<0.042	<0.052	<0.040	<0.040	<0.045	0.039	0.098	<0.044	NA	NA	NA	NA
Ethylbenzene	<0.038	<0.041	<0.042	<0.052	0.011	0.014	<0.045	0.035	<0.045	<0.044	NA	NA	NA	NA
Methyl cyclohexane	0.13	<0.17	<0.18	0.045	0.024	0.1	<0.19	0.36	0.05	<0.19	NA	NA	NA	NA
1,1,1-Trichloroethane	0.29	0.064	<0.042	<0.052	<0.040	<0.040	<0.045	1.5	0.77	<0.044	NA	NA	NA	NA
Semi Volatile Organic Comp														
Acenaphthylene	<0.18	<0.19	<0.20	<0.26	<0.19	<0.19	<0.22	0.12	<0.22	<0.21	NA	NA	NA	NA
Benzo(a)anthracene	<0.18	<0.19	0.05	0.067	0.082	0.052	<0.22	1.3	<0.22	<0.21	NA	NA	NA	NA
Benzo(a)pyrene	<0.18	<0.19	0.058	0.074	0.071	0.046	<0.22	1.7	<0.22	<0.21	NA	NA	NA	NA
Benzo(b)fluoranthene	0.13	0.13	0.16	0.21	0.062	<0.19	<0.22	1.5	<0.22	<0.21	NA	NA	NA	NA
Benzo(g,h,i)perylene	<0.18	<0.19	<0.20	<0.26	0.06	<0.19	<0.22	1.1	<0.22	<0.21	NA	NA	NA	NA
Benzo(k)fluoranthene	<0.18	<0.19	0.16	0.21	0.049	<0.19	<0.22	1.2	<0.22	<0.21	NA	NA	NA	NA
Carbazole	<0.18	<0.19	<0.20	<0.26	<0.19	<0.19	<0.22	0.068	<0.22	<0.21	NA	NA	NA	NA
Dibenz(a,h)anthracene	<0.18	<0.19	<0.20	<0.26	<0.19	<0.19	<0.22	<0.19	<0.22	<0.21	NA	NA	NA	NA
Dimethyl phthalate	<0.18	<0.19	<0.20	<0.26	<0.19	<0.19	<0.22	<0.19	<0.22	<0.21	NA	NA	NA	NA
Di-n-octyl phthalate	<0.18	<0.19	<0.20	<0.26	<0.19	<0.19	<0.22	<0.19	<0.22	<0.21	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	<0.18	<0.19	0.032	<0.26	0.052	<0.19	<0.22	1	<0.22	<0.21	NA	NA	NA	NA
3&4-Methylphenol	<0.36	<0.39	<0.40	<0.52	<0.38	<0.38	<0.43	<0.37	<0.43	<0.42	NA	NA	NA	NA
Naphthalene	<0.18	<0.19	<0.20	<0.26	<0.19	0.039	<0.22	0.093	<0.22	<0.21	NA	NA	NA	NA
2-Nitrophenol	<0.18	<0.19	<0.20	<0.26	<0.19	<0.19	<0.22	<0.19	<0.22	<0.21	NA	NA	NA	NA
N-Nitrosodi-n-propylamine	<0.18	<0.19	<0.20	<0.26	<0.19	<0.19	<0.22	<0.19	<0.22	<0.21	NA	NA	NA	NA
Phenanthrene	0.041	<0.19	0.067	0.071	0.17	0.11	<0.22	0.79	<0.22	<0.21	NA	NA	NA	NA
Polychlorinated Biphenyls (F														
Aroclor-1242 (PCB-1242)	<0.037	<0.040	<0.041	<0.053	<0.19	<0.039	<0.045	<0.039	<0.045	<0.043	NA	NA	NA	NA
Aroclor-1248 (PCB-1248)	<0.037	<0.040	0.054	<0.053	3.5	1.6	<0.045	<0.039	<0.045	<0.043	NA	NA	NA	NA
Aroclor-1254 (PCB-1254)	0.026	<0.040	<0.041	<0.053	<0.19	<0.039	<0.045	<0.039	<0.045	<0.043	NA	NA	NA	NA
Aroclor-1260 (PCB-1260)	0.014	<0.040	<0.041	<0.053	<0.19	<0.039	<0.045	<0.039	<0.045	<0.043	NA	NA	NA	NA

Table A-22

AOIs with Soil Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 86-1 cont.										
AOI Number | Location ID:	**86-1 | RFI-86-12**	**86-1 | RFI-86-13**	**86-1 | RFI-86-13**	**86-1 | RFI-86-14**	**86-1 | RFI-86-14**	**86-1 | RFI-86-15**	**86-1 | RFI-86-16**	**86-1 | RFI-86-16**	**86-1 | RFI-86-16**	**86-1 | RFI-86-17**	**86-1 | RFI-86-18**
Sample Depth(ft BGS):	**2.8 - 4.8**	**0.8 - 2.8**	**2.8 - 4.8**	**0.5 - 2.5**	**4.5 - 6.5**	**0.3 - 2.3**	**0.8 - 2.8**	**7.8 - 9.8**	**9.8 - 11.8**	**1 - 3**	**1 - 3**
Date Collected:	**11/21/01**	**11/21/01**	**11/21/01**	**01/09/02**	**01/09/02**	**01/14/02**	**02/27/03**	**02/27/03**	**02/27/03**	**03/12/03**	**03/12/03**
Sample Name:	**RFI-86-12(2.8-4.8)**	**RFI-86-13(0.8-2.8)**	**RFI-86-13(2.8-4.8)**	**RFI-86-14(0.5-2.5)**	**RFI-86-14(4.5-6.5)**	**RFI-86-15(0.3-2.3)**	**RFI-86-16(0.8-2.8)**	**RFI-86-16(7.8-9.8)**	**RFI-86-16(9.8-11.8)**	**RFI-86-17(01-03)**	**RFI-86-18(01-03)**
Inorganics											
Arsenic	4.7	11	6.2	2.4	6.7	3.3	3.9	6.2	7.9	**190**	19
Chromium (total) [a]	NA	NA	NA	5.3	24	6.3	7	23	29	NA	NA
Lead [b]	NA	NA	NA	4	10	9.6	9.5	12	14	NA	NA
Vanadium	NA	NA	NA	8	38	10	12	35	42	NA	NA
Volatile Organic Compounds											
Benzene	NA	NA	NA	<0.037	<0.041	<0.039	<0.036	<0.043	<0.047	NA	NA
1,1-Dichloroethane	NA	NA	NA	<0.037	<0.041	<0.039	<0.036	<0.043	<0.047	NA	NA
Ethylbenzene	NA	NA	NA	<0.037	<0.041	<0.039	<0.036	<0.043	<0.047	NA	NA
Methyl cyclohexane	NA	NA	NA	<0.16	<0.18	<0.17	<0.15	<0.19	<0.20	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	<0.037	<0.041	<0.039	<0.036	<0.043	<0.047	NA	NA
Semi Volatile Organic Comp											
Acenaphthylene	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
Benzo(a)anthracene	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
Benzo(a)pyrene	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
Carbazole	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
Dimethyl phthalate	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
Di-n-octyl phthalate	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
3&4-Methylphenol	NA	NA	NA	<0.36	<0.40	<0.37	<0.36	<0.43	<0.45	NA	NA
Naphthalene	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
2-Nitrophenol	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
N-Nitrosodi-n-propylamine	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
Phenanthrene	NA	NA	NA	<0.18	<0.20	<0.19	<0.18	<0.21	<0.23	NA	NA
Polychlorinated Biphenyls (F											
Aroclor-1242 (PCB-1242)	NA	NA	NA	<0.037	<0.041	<0.039	<0.037	<0.044	<0.047	NA	NA
Aroclor-1248 (PCB-1248)	NA	NA	NA	<0.037	<0.041	<0.039	<0.037	<0.044	<0.047	NA	NA
Aroclor-1254 (PCB-1254)	NA	NA	NA	<0.037	<0.041	<0.039	<0.037	<0.044	<0.047	NA	NA
Aroclor-1260 (PCB-1260)	NA	NA	NA	<0.037	<0.041	<0.039	<0.037	<0.044	<0.047	NA	NA

Table A-23
AOIs with Groundwater Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

AOI Number | Location ID:					AOI 36-1												
Date Collected:		Construction Worker Water HBG	Maximum Detected Concentraiton	Exceeds Construction Worker HBG?	36-1 | 36-100 09/27/01	36-1 | 36-100 09/27/01	36-1 | 36-100 06/13/02	36-1 | 36-100 03/25/03	36-1 | 36-100 06/10/05	36-1 | 36-120 09/27/01	36-1 | 36-120 09/27/01	36-1 | 36-121 09/27/01	36-1 | 36-121 09/27/01	36-1 | RFI-36-02 10/04/01	36-1 | RFI-36-02 10/04/01	36-1 | RFI-36-02 06/13/02	36-1 | RFI-36-02 03/25/03
Sample Name:	Units				36-100(092701)	36-100D(092701)	36-100(061302)	36-100(032503)	36-100(061005)	36-120(092701)	36-120D(092701)	36-121(092701)	36-121D(092701)	RFI-36-02(100401)	RFI-36-02D(100401)	RFI-36-02(061302)	RFI-36-02(032503)
Inorganics																	
Arsenic	mg/L	1.3E+01	0.14	no	0.021	NA	0.012	0.012	NA	NA	NA	NA	NA	0.085	NA	0.091	0.019
Barium	mg/L	1.0E+03	1.4	no	0.84	NA	0.25	0.21	NA	NA	NA	NA	NA	0.4	NA	0.23	0.17
Beryllium	mg/L	2.7E+00	0.0036	no	0.00054	NA	<0.00040	<0.00040	NA	NA	NA	NA	NA	0.00074	NA	<0.00040	<0.00040
Cadmium	mg/L	1.9E+00	0.021	no	0.00022	NA	0.00023	0.00033	NA	NA	NA	NA	NA	<0.00020	NA	<0.00020	0.00014
Chromium (total) [a]	mg/L	7.0E-01	0.22	no	0.001	NA	0.0008	0.0016	NA	NA	NA	NA	NA	0.001	NA	0.0005	0.00043
Cobalt	mg/L	2.0E+01	0.072	no	0.0078	NA	0.006	0.0034	NA	NA	NA	NA	NA	0.014	NA	0.0053	0.012
Lead [b]	mg/L	1.5E-02	0.092	**YES**	0.00034	NA	0.00033	0.00093	NA	NA	NA	NA	NA	0.00051	NA	0.00042	0.0013
Manganese	mg/L	4.2E+02	3.3	no	1.6	NA	1.8	0.63	NA	NA	NA	NA	NA	1.2	NA	1.4	0.64
Thallium	mg/L	3.0E+00	0.0013	no	0.0003	NA	0.00015	0.000082	NA	NA	NA	NA	NA	<0.00020	NA	<0.00020	<0.00020
Vanadium	mg/L	1.4E+00	0.21	no	<0.00080	NA	<0.00080	0.000097	NA	NA	NA	NA	NA	<0.00080	NA	<0.00080	<0.00080
Inorganics-Dissolved																	
Arsenic	mg/L	1.3E+01	0.081	no	NA	0.017	NA	NA	NA	NA	<0.0010	NA	<0.0010	NA	0.057	NA	NA
Barium	mg/L	1.0E+03	2.5	no	NA	0.63	NA	NA	NA	NA	0.26	NA	0.064	NA	R	NA	NA
Cobalt	mg/L	2.0E+01	0.011	no	NA	0.006	NA	NA	NA	NA	0.001	NA	0.0024	NA	0.0084	NA	NA
Lead [b]	mg/L	1.5E-02	0.019	**YES**	NA	<0.00040	NA	NA	NA	NA	<0.00040	NA	<0.00040	NA	<0.00040	NA	NA
Manganese	mg/L	4.2E+02	2.5	no	NA	1.5	NA	NA	NA	NA	0.13	NA	0.77	NA	0.78	NA	NA
Selenium	mg/L	2.2E+02	0.017	no	NA	0.0024	NA	NA	NA	NA	<0.0023	NA	0.0023	NA	0.0014	NA	NA
Thallium	mg/L	3.0E+00	0.00071	no	NA	<0.00020	NA	NA	NA	NA	<0.00020	NA	<0.00020	NA	<0.00020	NA	NA
Vanadium	mg/L	1.4E+00	0.0027	no	NA	<0.00080	NA	NA	NA	NA	<0.00080	NA	<0.00080	NA	<0.00080	NA	NA
Volatile Organic Compounds (VOCs)																	
Benzene	mg/L	1.0E+01	0.36	no	0.08	NA	0.051	0.0032	0.008	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA
1,3-Dichlorobenzene	mg/L	2.1E+02	0.0001	no	<0.0010	NA	<0.0010	<0.0010	<0.0050	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA
1,1-Dichloroethane	mg/L	7.0E+01	1.3	no	1.3	NA	0.78	0.17	0.32	<0.0010	NA	<0.0010	NA	0.00076	NA	NA	NA
1,2-Dichloroethane	mg/L	4.4E+00	0.0093	no	<0.0010	NA	0.003	<0.0010	<0.0050	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA
cis-1,2-Dichloroethene	mg/L	6.8E+02	0.23	no	0.037	NA	0.033	0.003	0.004	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA
1,2-Dichloropropane	mg/L	2.2E+00	ND	no	<0.0010	NA	<0.0010	<0.0010	<0.0050	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA
Ethylbenzene	mg/L	2.8E+01	0.004	no	<0.0010	NA	<0.0010	<0.0010	<0.0050	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA
Methyl cyclohexane	mg/L	3.8E+02	0.001	no	<0.0010	NA	<0.0010	<0.0010	<0.10	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA
Methyl Tert Butyl Ether	mg/L	4.3E+02	0.015	no	0.0069	NA	0.0067	<0.0050	0.004	<0.0050	NA	<0.0050	NA	<0.0050	NA	NA	NA
Methylene chloride	mg/L	1.4E+02	0.0004	no	<0.0050	NA	<0.0050	<0.0050	<0.030	<0.0050	NA	<0.0050	NA	<0.0050	NA	NA	NA
Tetrachloroethene	mg/L	1.5E+00	0.006	no	<0.0010	NA	<0.0010	<0.0010	<0.0050	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA
Toluene	mg/L	5.4E+02	0.0029	no	0.001	NA	0.00078	<0.0010	<0.0050	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA
Trichloroethene	mg/L	5.4E+01	0.099	no	0.0031	NA	0.0036	0.0037	0.008	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA
Vinyl chloride	mg/L	7.2E+00	0.093	no	0.026	NA	0.0063	<0.0010	0.009	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA
m&p-Xylene	mg/L	5.9E+01	0.009	no	<0.0020	NA	<0.0020	<0.0020	<0.0050	<0.0020	NA	<0.0020	NA	<0.0020	NA	NA	NA
o-Xylene	mg/L	5.9E+01	0.004	no	0.004	NA	0.003	<0.0010	<0.0050	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA
Semi Volatile Organic Compounds (SVOCs)																	
Benzo(a)anthracene	mg/L	5.7E-02	0.00089	no	<0.0010	NA	NA	NA	NA	<0.0010	NA	<0.0011	NA	<0.0010	NA	NA	NA
Benzo(a)pyrene	mg/L	3.3E-03	0.00055	no	<0.0020	NA	NA	NA	NA	<0.0020	NA	<0.0021	NA	<0.0020	NA	NA	NA
Benzo(k)fluoranthene	mg/L	2.4E-01	0.00072	no	<0.0050	NA	NA	NA	NA	<0.0051	NA	<0.0053	NA	<0.0050	NA	NA	NA
bis(2-Chloroethyl)ether	mg/L	3.6E-01	ND	no	<0.0010	NA	NA	NA	NA	<0.0010	NA	<0.0011	NA	<0.0010	NA	NA	NA
Dibenz(a,h)anthracene	mg/L	2.1E-03	ND	no	<0.0020	NA	NA	NA	NA	<0.0020	NA	<0.0021	NA	<0.0020	NA	NA	NA
3&4-Methylphenol	mg/L	3.3E+01	ND	no	<0.010	NA	NA	NA	NA	<0.010	NA	<0.011	NA	<0.010	NA	NA	NA
Naphthalene	mg/L	5.2E-01	ND	no	<0.0050	NA	NA	NA	NA	<0.0051	NA	<0.0053	NA	<0.0050	NA	NA	NA
Nitrobenzene	mg/L	3.0E+00	ND	no	<0.0020	NA	NA	NA	NA	<0.0020	NA	<0.0021	NA	<0.0020	NA	NA	NA
2,2'-oxybis(1-Chloropropane)	mg/L	9.7E+00	ND	no	<0.0050	NA	NA	NA	NA	<0.0051	NA	<0.0053	NA	<0.0050	NA	NA	NA
Phenanthrene	mg/L	8.2E+02	ND	no	<0.0050	NA	NA	NA	NA	<0.0051	NA	<0.0053	NA	<0.0050	NA	NA	NA

Table A-23
AOIs with Groundwater Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

AOI Number | Location ID:	AOI 36-1 cont.													
	36-1 | RFI-36-02	36-1 | RFI-36-02	36-1 | RFI-36-02	36-1 | RFI-36-02	36-1 | RFI-36-03	36-1 | RFI-36-03	36-1 | RFI-36-03	36-1 | RFI-36-03	36-1 | RFI-36-03	36-1 | RFI-36-03	36-1 | RFI-36-03	36-1 | RFI-36-03	36-1 | RFI-36-03	36-1 | RFI-36-04
Date Collected:	10/13/04	11/02/06	11/02/06	11/14/07	09/27/01	09/27/01	06/18/02	03/25/03	06/09/05	11/02/06	04/23/07	06/26/07	06/26/07	09/28/01
Sample Name:	RFI-36-02(101304)	Dup-2(110206)	RFI-36-02(110206)	RFI-36-02 (111407)	RFI-36-03(092701)	RFI-36-03D(092701)	RFI-36-03(061802)	RFI-36-03(032503)	RFI-36-03(060905)	RFI-36-03(110206)	RFI-36-03(04/23/07)	Dup-01(062607)	RFI-36-03(062607)	RFI-36-04(092801)
Inorganics														
Arsenic	0.013	NA	NA	NA	<0.0015	NA	<0.0019	0.0028	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	0.15	NA	0.2	0.15	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	0.00074	NA	<0.00040	<0.00040	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	0.00031	NA	0.00049	0.021	NA	NA	NA	NA	NA	NA
Chromium (total) [a]	NA	NA	NA	NA	0.002	NA	0.0012	0.0029	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	0.00084	NA	0.0053	0.0092	NA	NA	NA	NA	NA	NA
Lead [b]	NA	NA	NA	NA	0.00037	NA	0.00019	0.0052	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	0.11	NA	0.43	0.25	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	<0.00020	NA	0.00042	0.00023	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	<0.00080	NA	<0.00080	0.0023	NA	NA	NA	NA	NA	NA
Inorganics-Dissolved														
Arsenic	NA	NA	NA	NA	NA	0.0014	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	0.17	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	0.00078	NA	NA	NA	NA	NA	NA	NA	NA
Lead [b]	NA	NA	NA	NA	NA	<0.00040	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	0.12	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	0.0042	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	<0.00020	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	<0.00080	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compound														
Benzene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	0.0028	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,3-Dichlorobenzene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,1-Dichloroethane	0.004	0.002	0.001	0.001	0.0045	NA	0.086	0.16	<0.0010	0.0008	0.001	0.003	0.003	0.00082
1,2-Dichloroethane	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	0.0019	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
cis-1,2-Dichloroethene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	0.00077	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,2-Dichloropropane	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethylbenzene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Methyl cyclohexane	<0.020	<0.020	<0.020	<0.020	<0.0010	NA	<0.0010	<0.0010	<0.020	<0.020	<0.020	<0.020	<0.020	<0.0010
Methyl Tert Butyl Ether	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	0.00065	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Methylene chloride	0.0004	<0.0050	<0.0050	<0.0050	<0.0050	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tetrachloroethene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Toluene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Trichloroethene	<0.0010	<0.0010	<0.0010	<0.0010	0.00068	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Vinyl chloride	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	0.0019	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
m&p-Xylene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	NA	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020
o-Xylene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Semi Volatile Organic Com														
Benzo(a)anthracene	NA	NA	NA	NA	<0.0010	NA	NA	NA	NA	NA	NA	NA	NA	<0.0010
Benzo(a)pyrene	NA	NA	NA	NA	<0.0021	NA	NA	NA	NA	NA	NA	NA	NA	<0.0021
Benzo(k)fluoranthene	NA	NA	NA	NA	<0.0051	NA	NA	NA	NA	NA	NA	NA	NA	<0.0051
bis(2-Chloroethyl)ether	NA	NA	NA	NA	<0.0010	NA	NA	NA	NA	NA	NA	NA	NA	<0.0010
Dibenz(a,h)anthracene	NA	NA	NA	NA	<0.0021	NA	NA	NA	NA	NA	NA	NA	NA	<0.0021
3&4-Methylphenol	NA	NA	NA	NA	<0.010	NA	NA	NA	NA	NA	NA	NA	NA	<0.010
Naphthalene	NA	NA	NA	NA	<0.0051	NA	NA	NA	NA	NA	NA	NA	NA	<0.0051
Nitrobenzene	NA	NA	NA	NA	<0.0021	NA	NA	NA	NA	NA	NA	NA	NA	<0.0021
2,2'-oxybis(1-Chloropropane)	NA	NA	NA	NA	<0.0051	NA	NA	NA	NA	NA	NA	NA	NA	<0.0051
Phenanthrene	NA	NA	NA	NA	<0.0051	NA	NA	NA	NA	NA	NA	NA	NA	<0.0051

Table A-23
AOIs with Groundwater Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 36-1 cont.													
AOI Number | Location ID:	**36-1 | RFI-36-04**	**36-1 | RFI-36-04**	**36-1 | RFI-36-04**	**36-1 | RFI-36-04**	**36-1 | RFI-36-04**	**36-1 | RFI-36-05**	**36-1 | RFI-36-05**	**36-1 | RFI-36-05**	**36-1 | RFI-36-05**	**36-1 | RFI-36-05**	**36-1 | RFI-36-05**	**36-1 | RFI-36-05**	**36-1 | RFI-36-23**	**36-1 | RFI-36-23**
Date Collected:	**09/28/01**	**06/18/02**	**06/18/02**	**04/02/03**	**09/18/08**	**09/21/01**	**09/21/01**	**09/21/01**	**09/21/01**	**12/16/02**	**04/02/03**	**06/10/05**	**02/20/02**	**02/20/02**
Sample Name:	**RFI-36-04D(092801)**	**RFI-36-04(061802)**	**RFI-36-DUP-402**	**RFI-36-04(040203)**	**RFI-36-04(091808)**	**RFI-36-05(092101)**	**RFI-36-05D(092101)**	**RFI-36-DUP-106**	**RFI-36-DUP-106D**	**RFI-36-05(121602)**	**RFI-36-05(040203)**	**RFI-36-05(061005)**	**RFI-36-23(022002)**	**RFI-36-23d(022002)**
Inorganics														
Arsenic	NA	0.08	0.08	0.087	NA	NA	NA	NA	NA	0.0045	NA	NA	NA	NA
Barium	NA	0.46	0.53	0.41	NA	NA	NA	NA	NA	0.15	NA	NA	NA	NA
Beryllium	NA	<0.00040	0.00013	<0.00040	NA	NA	NA	NA	NA	<0.00040	NA	NA	NA	NA
Cadmium	NA	<0.00020	0.00012	0.00019	NA	NA	NA	NA	NA	0.00014	NA	NA	NA	NA
Chromium (total) [a]	NA	0.00071	0.00067	0.0033	NA	NA	NA	NA	NA	0.0022	NA	NA	NA	NA
Cobalt	NA	0.0029	0.0031	0.003	NA	NA	NA	NA	NA	0.011	NA	NA	NA	NA
Lead [b]	NA	0.001	0.00091	0.0018	NA	NA	NA	NA	NA	0.00096	NA	NA	NA	NA
Manganese	NA	0.44	0.56	0.6	NA	NA	NA	NA	NA	1.4	NA	NA	NA	NA
Thallium	NA	<0.00021	0.00012	0.00022	NA	NA	NA	NA	NA	0.0008	NA	NA	NA	NA
Vanadium	NA	0.00021	<0.00080	0.00065	NA	NA	NA	NA	NA	0.00022	NA	NA	NA	NA
Inorganics-Dissolved														
Arsenic	0.081	NA	NA	NA	NA	NA	0.0051	NA	0.0046	NA	NA	NA	NA	0.077
Barium	0.48	NA	NA	NA	NA	NA	0.22	NA	0.22	NA	NA	NA	NA	0.042
Cobalt	0.0026	NA	NA	NA	NA	NA	0.011	NA	0.011	NA	NA	NA	NA	0.00032
Lead [b]	<0.00040	NA	NA	NA	NA	NA	0.00061	NA	0.00063	NA	NA	NA	NA	<0.00040
Manganese	0.33	NA	NA	NA	NA	NA	1.1	NA	1.1	NA	NA	NA	NA	0.058
Selenium	0.0029	NA	NA	NA	NA	NA	0.0018	NA	<0.0014	NA	NA	NA	NA	<0.0014
Thallium	<0.00020	NA	NA	NA	NA	NA	<0.00020	NA	<0.00020	NA	NA	NA	NA	<0.00020
Vanadium	<0.00080	NA	NA	NA	NA	NA	<0.00080	NA	<0.00080	NA	NA	NA	NA	0.0017
Volatile Organic Compound														
Benzene	NA	NA	NA	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0050	<0.0010	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0050	<0.0010	NA
1,1-Dichloroethane	NA	NA	NA	NA	0.002	0.49	NA	0.45	NA	0.33	0.24	0.4	0.0017	NA
1,2-Dichloroethane	NA	NA	NA	NA	<0.0010	0.0007	NA	0.00076	NA	<0.0010	<0.0010	<0.0050	0.00084	NA
cis-1,2-Dichloroethene	NA	NA	NA	NA	0.001	0.0045	NA	0.0043	NA	0.0019	0.001	0.003	<0.0010	NA
1,2-Dichloropropane	NA	NA	NA	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0050	<0.0010	NA
Ethylbenzene	NA	NA	NA	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0050	<0.0010	NA
Methyl cyclohexane	NA	NA	NA	NA	<0.020	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.10	<0.0010	NA
Methyl Tert Butyl Ether	NA	NA	NA	NA	<0.0050	0.0074	NA	0.0076	NA	0.0047	<0.0050	0.003	<0.0050	NA
Methylene chloride	NA	NA	NA	NA	<0.0050	<0.0050	NA	<0.0050	NA	<0.0050	<0.0050	<0.030	<0.0050	NA
Tetrachloroethene	NA	NA	NA	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0050	<0.0010	NA
Toluene	NA	NA	NA	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0050	<0.0010	NA
Trichloroethene	NA	NA	NA	NA	<0.0010	0.0063	NA	0.0062	NA	0.0023	0.0014	<0.0050	<0.0010	NA
Vinyl chloride	NA	NA	NA	NA	0.003	0.008	NA	0.0076	NA	0.00069	<0.0010	0.019	<0.0010	NA
m&p-Xylene	NA	NA	NA	NA	<0.0010	<0.0020	NA	<0.0020	NA	<0.0020	<0.0020	<0.0050	<0.0020	NA
o-Xylene	NA	NA	NA	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0050	<0.0010	NA
Semi Volatile Organic Com														
Benzo(a)anthracene	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	NA	NA	<0.0011	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	<0.0020	NA	<0.0020	NA	NA	NA	NA	<0.0022	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	<0.0050	NA	<0.0050	NA	NA	NA	NA	<0.0056	NA
bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	NA	NA	<0.0011	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	<0.0020	NA	<0.0020	NA	NA	NA	NA	<0.0022	NA
3&4-Methylphenol	NA	NA	NA	NA	NA	<0.010	NA	<0.010	NA	NA	NA	NA	<0.011	NA
Naphthalene	NA	NA	NA	NA	NA	<0.0050	NA	<0.0050	NA	NA	NA	NA	<0.0056	NA
Nitrobenzene	NA	NA	NA	NA	NA	<0.0020	NA	<0.0020	NA	NA	NA	NA	<0.0022	NA
2,2'-oxybis(1-Chloropropane)	NA	NA	NA	NA	NA	<0.0050	NA	<0.0050	NA	NA	NA	NA	<0.0056	NA
Phenanthrene	NA	NA	NA	NA	NA	<0.0050	NA	<0.0050	NA	NA	NA	NA	<0.0056	NA

Table A-23
AOIs with Groundwater Exceedances of the Construction Worker Health-Based Goals
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	AOI 36-1 cont.													
AOI Number | Location ID:	**36-1 | RFI-36-23**	**36-1 | RFI-36-24**	**36-1 | RFI-36-24**	**36-1 | RFI-36-24**	**36-1 | RFI-36-25R**	**36-1 | RFI-36-25R**	**36-1 | RFI-36-25R**	**36-1 | RFI-36-27**	**36-1 | RFI-36-27**	**36-1 | RFI-36-29**	**36-1 | RFI-36-29R**	**36-1 | RFI-36-29R**	**36-1 | RFI-36-29R**	**36-1 | RFI-36-29R**
Date Collected:	**06/19/02**	**10/05/01**	**10/05/01**	**06/19/02**	**02/26/02**	**02/26/02**	**06/19/02**	**02/20/02**	**02/20/02**	**10/03/01**	**02/26/02**	**02/26/02**	**02/26/02**	**02/26/02**
Sample Name:	**RFI-36-23(061902)**	**RFI-36-24(100501)**	**RFI-36-24D(100501)**	**RFI-36-24(061902)**	**RFI-36-25R(022602)**	**RFI-36-25Rd(022602)**	**RFI-36-25R(061902)**	**RFI-36-27(022002)**	**RFI-36-27d(022002)**	**RFI-36-29(100301)**	**RFI-36-29R(022602)**	**RFI-36-29Rd(022602)**	**RFI-36-DUP-301**	**RFI-36-DUP-301d**
Inorganics														
Arsenic	0.093	NA	NA	NA	NA	NA	0.0036	NA	NA	NA	NA	NA	NA	NA
Barium	0.075	NA	NA	NA	NA	NA	0.39	NA	NA	NA	NA	NA	NA	NA
Beryllium	<0.00040	NA	NA	NA	NA	NA	<0.00040	NA	NA	NA	NA	NA	NA	NA
Cadmium	<0.00020	NA	NA	NA	NA	NA	<0.00020	NA	NA	NA	NA	NA	NA	NA
Chromium (total) [a]	0.001	NA	NA	NA	NA	NA	0.001	NA	NA	NA	NA	NA	NA	NA
Cobalt	0.0009	NA	NA	NA	NA	NA	0.00076	NA	NA	NA	NA	NA	NA	NA
Lead [b]	0.00017	NA	NA	NA	NA	NA	0.00044	NA	NA	NA	NA	NA	NA	NA
Manganese	0.098	NA	NA	NA	NA	NA	0.57	NA	NA	NA	NA	NA	NA	NA
Thallium	<0.00020	NA	NA	NA	NA	NA	0.000057	NA	NA	NA	NA	NA	NA	NA
Vanadium	0.0038	NA	NA	NA	NA	NA	0.0005	NA	NA	NA	NA	NA	NA	NA
Inorganics-Dissolved														
Arsenic	NA	NA	0.0016	NA	NA	0.005	NA	NA	0.076	NA	NA	0.079	NA	0.081
Barium	NA	NA	R	NA	NA	0.42	NA	NA	0.43	NA	NA	0.15	NA	0.16
Cobalt	NA	NA	0.00065	NA	NA	0.0011	NA	NA	0.0041	NA	NA	0.0016	NA	0.0013
Lead [b]	NA	NA	0.00091	NA	NA	<0.00040	NA	NA	0.0011	NA	NA	0.00047	NA	<0.00040
Manganese	NA	NA	0.25	NA	NA	0.63	NA	NA	0.27	NA	NA	0.11	NA	0.11
Selenium	NA	NA	<0.0014	NA	NA	0.0024	NA	NA	<0.0060	NA	NA	0.0015	NA	<0.0014
Thallium	NA	NA	<0.00020	NA	NA	0.00035	NA	NA	<0.00091	NA	NA	0.00063	NA	0.00035
Vanadium	NA	NA	<0.00080	NA	NA	0.0027	NA	NA	<0.00080	NA	NA	0.0015	NA	0.0018
Volatile Organic Compound														
Benzene	<0.0010	0.0006	NA	<0.0010	<0.0010	NA	NA	<0.0010	NA	0.087	0.045	NA	0.047	NA
1,3-Dichlorobenzene	<0.0010	<0.0010	NA	<0.0010	<0.0010	NA	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	NA
1,1-Dichloroethane	<0.0010	0.068	NA	0.0064	0.0018	NA	NA	0.00083	NA	0.049	0.024	NA	0.026	NA
1,2-Dichloroethane	<0.0010	<0.0010	NA	<0.0010	<0.0010	NA	NA	<0.0010	NA	0.0021	0.002	NA	0.0024	NA
cis-1,2-Dichloroethene	<0.0010	0.15	NA	<0.0010	<0.0010	NA	NA	<0.0010	NA	0.0072	0.0058	NA	0.0066	NA
1,2-Dichloropropane	<0.0010	<0.0010	NA	<0.0010	<0.0010	NA	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	NA
Ethylbenzene	<0.0010	<0.0010	NA	<0.0010	<0.0010	NA	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	NA
Methyl cyclohexane	<0.0010	<0.0010	NA	<0.0010	<0.0010	NA	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	NA
Methyl Tert Butyl Ether	<0.0050	<0.0050	NA	<0.0050	<0.0050	NA	NA	<0.0050	NA	0.015	0.0071	NA	0.0072	NA
Methylene chloride	<0.0050	<0.0050	NA	<0.0050	<0.0050	NA	NA	<0.0050	NA	<0.0050	<0.0050	NA	<0.0050	NA
Tetrachloroethene	<0.0010	<0.0010	NA	<0.0010	<0.0010	NA	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	NA
Toluene	<0.0010	<0.0010	NA	<0.0010	<0.0010	NA	NA	<0.0010	NA	<0.0017	0.0026	NA	0.0029	NA
Trichloroethene	<0.0010	0.099	NA	<0.0010	<0.0010	NA	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	NA
Vinyl chloride	<0.0010	0.0046	NA	<0.0010	<0.0010	NA	NA	<0.0010	NA	0.004	0.058	NA	0.06	NA
m&p-Xylene	<0.0020	<0.0020	NA	<0.0020	0.00062	NA	NA	<0.0020	NA	<0.0020	0.0008	NA	0.0008	NA
o-Xylene	<0.0010	<0.0010	NA	<0.0010	<0.0010	NA	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	NA
Semi Volatile Organic Com														
Benzo(a)anthracene	NA	<0.0010	NA	NA	<0.0010	NA	NA	<0.0010	NA	NA	<0.0010	NA	<0.0010	NA
Benzo(a)pyrene	NA	<0.0020	NA	NA	<0.0020	NA	NA	<0.0020	NA	NA	0.00055	NA	<0.0020	NA
Benzo(k)fluoranthene	NA	<0.0050	NA	NA	<0.0050	NA	NA	<0.0050	NA	NA	0.00072	NA	<0.0050	NA
bis(2-Chloroethyl)ether	NA	<0.0010	NA	NA	<0.0010	NA	NA	<0.0010	NA	NA	<0.0010	NA	<0.0010	NA
Dibenz(a,h)anthracene	NA	<0.0020	NA	NA	<0.0020	NA	NA	<0.0020	NA	NA	<0.0020	NA	<0.0020	NA
3&4-Methylphenol	NA	<0.010	NA	NA	<0.010	NA	NA	<0.010	NA	NA	<0.010	NA	<0.010	NA
Naphthalene	NA	<0.0050	NA	NA	<0.0050	NA	NA	<0.0050	NA	NA	<0.0050	NA	<0.0050	NA
Nitrobenzene	NA	<0.0020	NA	NA	<0.0020	NA	NA	<0.0020	NA	NA	<0.0020	NA	<0.0020	NA
2,2'-oxybis(1-Chloropropane)	NA	<0.0050	NA	NA	<0.0050	NA	NA	<0.0050	NA	NA	<0.0050	NA	<0.0050	NA
Phenanthrene	NA	<0.0050	NA	NA	<0.0050	NA	NA	<0.0050	NA	NA	<0.0050	NA	<0.0050	NA

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AOIs with Groundwater Exceedances of the Construction Worker Health-Based Goals
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	AOI 36-1 cont.													
AOI Number | Location ID:	**36-1 | RFI-36-29R**	**36-1 | RFI-36-29R**	**36-1 | RFI-36-29R**	**36-1 | RFI-36-29R**	**36-1 | RFI-36-31**	**36-1 | RFI-36-31**	**36-1 | RFI-36-32**	**36-1 | RFI-36-32**	**36-1 | RFI-36-32**	**36-1 | RFI-36-32**	**36-1 | RFI-36-35**	**36-1 | RFI-36-35**	**36-1 | RFI-36-35**	**36-1 | RFI-36-35**
Date Collected:	**06/20/02**	**06/20/02**	**04/03/03**	**04/03/03**	**10/05/01**	**10/05/01**	**09/28/01**	**09/28/01**	**12/19/02**	**04/02/03**	**09/27/01**	**09/27/01**	**06/18/02**	**06/18/02**
Sample Name:	**RFI-36-29R(062002)**	**RFI-36-DUP-403**	**RFI-36-29R(040303)**	**RFI-36-29R(040303)d**	**RFI-36-31(100501)**	**RFI-36-31D(100501)**	**RFI-36-32(092801)**	**RFI-36-32D(092801)**	**RFI-36-32(121902)**	**RFI-36-32(040203)**	**RFI-36-35(092701)**	**RFI-36-35D(092701)**	**RFI-36-35(061802)**	**RFI-36-35d(061802)**
Inorganics														
Arsenic	0.085	0.1	0.14	NA	NA	NA	NA	NA	0.076	0.037	0.02	NA	0.015	NA
Barium	0.15	0.19	0.18	NA	NA	NA	NA	NA	0.32	0.23	0.7	NA	0.42	NA
Beryllium	<0.00040	<0.00040	<0.00040	NA	NA	NA	NA	NA	0.00045	<0.00040	0.0036	NA	<0.00040	NA
Cadmium	0.00025	0.00027	<0.00020	NA	NA	NA	NA	NA	0.0032	0.00016	0.0013	NA	0.00027	NA
Chromium (total) [a]	0.0017	0.0016	0.001	NA	NA	NA	NA	NA	0.025	0.0019	0.22	NA	0.003	NA
Cobalt	0.0014	0.0018	0.0021	NA	NA	NA	NA	NA	0.01	0.0037	0.009	NA	0.0041	NA
Lead [b]	0.0019	0.0021	0.0013	NA	NA	NA	NA	NA	**0.022**	0.0002	0.0025	NA	0.0022	NA
Manganese	0.12	0.15	0.1	NA	NA	NA	NA	NA	2.2	1.2	0.85	NA	1.1	NA
Thallium	0.00019	0.00012	0.00029	NA	NA	NA	NA	NA	0.0013	0.00016	<0.00058	NA	<0.00020	NA
Vanadium	0.001	0.0012	0.0013	NA	NA	NA	NA	NA	0.025	<0.00080	0.21	NA	0.0025	NA
Inorganics-Dissolved														
Arsenic	NA	NA	NA	0.05	NA	0.0047	NA	0.05	NA	NA	NA	0.005	NA	0.012
Barium	NA	NA	NA	0.16	NA	R	NA	0.21	NA	NA	NA	0.49	NA	0.34
Cobalt	NA	NA	NA	0.0015	NA	0.0012	NA	0.0033	NA	NA	NA	0.0063	NA	0.0032
Lead [b]	NA	NA	NA	0.00018	NA	<0.00040	NA	0.0018	NA	NA	NA	0.0039	NA	0.00091
Manganese	NA	NA	NA	0.086	NA	0.71	NA	1.6	NA	NA	NA	0.5	NA	0.89
Selenium	NA	NA	NA	<0.0016	NA	<0.0014	NA	<0.0014	NA	NA	NA	<0.0014	NA	0.0022
Thallium	NA	NA	NA	<0.00020	NA	<0.00020	NA	<0.00020	NA	NA	NA	<0.00020	NA	<0.00020
Vanadium	NA	NA	NA	0.0017	NA	<0.00080	NA	<0.00080	NA	NA	NA	<0.00080	NA	0.0017
Volatile Organic Compound														
Benzene	0.05	0.085	0.36	NA	<0.0010	NA	0.00053	NA	NA	NA	0.00052	NA	0.0023	NA
1,3-Dichlorobenzene	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA
1,1-Dichloroethane	0.018	0.028	0.081	NA	0.0061	NA	<0.0010	NA	NA	NA	0.061	NA	0.78	NA
1,2-Dichloroethane	0.0017	0.0027	0.0069	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	0.0093	NA
cis-1,2-Dichloroethene	0.0043	0.0068	0.018	NA	<0.0010	NA	<0.0010	NA	NA	NA	0.011	NA	0.017	NA
1,2-Dichloropropane	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA
Ethylbenzene	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA
Methyl cyclohexane	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA
Methyl Tert Butyl Ether	0.0057	0.0077	0.012	NA	<0.0050	NA	<0.0050	NA	NA	NA	<0.0050	NA	0.0057	NA
Methylene chloride	<0.0050	<0.0050	<0.0050	NA	<0.0050	NA	<0.0050	NA	NA	NA	<0.0050	NA	<0.0050	NA
Tetrachloroethene	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA
Toluene	0.00057	0.001	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA
Trichloroethene	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	0.0027	NA	<0.0010	NA
Vinyl chloride	0.029	0.05	0.078	NA	<0.0010	NA	<0.0010	NA	NA	NA	0.00083	NA	0.093	NA
m&p-Xylene	<0.0020	<0.0020	<0.0020	NA	<0.0020	NA	<0.0020	NA	NA	NA	<0.0020	NA	<0.0020	NA
o-Xylene	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA
Semi Volatile Organic Com														
Benzo(a)anthracene	NA	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	<0.0020	NA	<0.0021	NA	NA	NA	<0.0021	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	<0.0050	NA	<0.0051	NA	NA	NA	<0.0051	NA	NA	NA
bis(2-Chloroethyl)ether	NA	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	<0.0020	NA	<0.0021	NA	NA	NA	<0.0021	NA	NA	NA
3&4-Methylphenol	NA	NA	NA	NA	<0.010	NA	<0.010	NA	NA	NA	<0.010	NA	NA	NA
Naphthalene	NA	NA	NA	NA	<0.0050	NA	<0.0051	NA	NA	NA	<0.0051	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	<0.0020	NA	<0.0021	NA	NA	NA	<0.0021	NA	NA	NA
2,2'-oxybis(1-Chloropropane)	NA	NA	NA	NA	<0.0050	NA	<0.0051	NA	NA	NA	<0.0051	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	<0.0050	NA	<0.0051	NA	NA	NA	<0.0051	NA	NA	NA

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AOIs with Groundwater Exceedances of the Construction Worker Health-Based Goals
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	AOI 36-1 cont.									
AOI Number | Location ID:	**36-1 | RFI-36-46**	**36-1 | RFI-36-46**	**36-1 | RFI-36-46**	**36-1 | RFI-36-46**	**36-1 | RFI-36-46**	**36-1 | RFI-36-46**	**36-1 | RFI-36-46**	**36-1 | RFI-36-46**	**36-1 | RFI-36-53**	**36-1 | RFI-36-53**
Date Collected:	**02/25/02**	**06/17/02**	**03/25/03**	**10/11/04**	**06/09/05**	**11/02/06**	**04/23/07**	**06/26/07**	**04/04/05**	**06/10/05**
Sample Name:	**RFI-36-46(022502)**	**RFI-36-46(061702)**	**RFI-36-46(032503)**	**RFI-36-46(101104)**	**RFI-36-46(060905)**	**RFI-36-46(110206)**	**RFI-36-46(04/23/07)**	**RFI-36-46(062607)**	**RFI-36-53(040405)**	**RFI-36-53(061005)**
Inorganics										
Arsenic	NA	0.00048	<0.0010	NA	NA	NA	NA	NA	NA	NA
Barium	NA	0.32	0.3	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	<0.00040	<0.00040	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	0.00015	0.00024	NA	NA	NA	NA	NA	NA	NA
Chromium (total) [a]	NA	0.00028	0.0014	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	0.0043	0.004	NA	NA	NA	NA	NA	NA	NA
Lead [b]	NA	0.00014	<0.00040	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	1.6	1.2	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	<0.00020	0.00072	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	<0.00080	<0.00080	NA	NA	NA	NA	NA	NA	NA
Inorganics-Dissolved										
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead [b]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounc										
Benzene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,3-Dichlorobenzene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,1-Dichloroethane	0.055	0.11	0.049	0.016	0.021	0.01	0.003	0.007	0.003	0.001
1,2-Dichloroethane	0.00076	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
cis-1,2-Dichloroethene	<0.0010	0.00089	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,2-Dichloropropane	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethylbenzene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.004	0.003
Methyl cyclohexane	<0.0010	<0.0010	<0.0010	<0.020	<0.020	<0.020	<0.020	<0.020	0.0008	0.001
Methyl Tert Butyl Ether	0.001	0.0008	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.001	0.0009
Methylene chloride	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tetrachloroethene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Toluene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0001	<0.0010	0.0004	0.0003
Trichloroethene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Vinyl chloride	0.0012	0.00059	<0.0010	<0.0010	<0.0010	0.0003	<0.0010	<0.0010	0.013	0.013
m&p-Xylene	<0.0020	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.009	0.007
o-Xylene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.002	0.001
Semi Volatile Organic Com										
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3&4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2'-oxybis(1-Chloropropane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A-23
AOIs with Groundwater Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 81-2																
AOI Number | Location ID:	**81-2 | 70-102**	**81-2 | 70-102**	**81-2 | 70-160**	**81-2 | 70-160**	**81-2 | 70-160**	**81-2 | 70-160**	**81-2 | 70-160**	**81-2 | 70-160**	**81-2 | 70-163**	**81-2 | 70-163**	**81-2 | 70-163**	**81-2 | 70-163**	**81-2 | 70-163**	**81-2 | 70-165**	**81-2 | 70-165**	**81-2 | 70-165**	**81-2 | 70-165**
Date Collected:	**09/27/01**	**09/27/01**	**09/26/01**	**09/26/01**	**06/17/02**	**06/17/02**	**03/28/03**	**03/28/03**	**09/28/01**	**09/28/01**	**06/20/02**	**06/20/02**	**03/28/03**	**09/26/01**	**09/26/01**	**06/22/02**	**06/22/02**
Sample Name:	**70-102(092701)**	**70-102D(092701)**	**70-160(092601)**	**70-160D(092601)**	**70-160(061702)**	**70-160d(061702)**	**70-160(032803)**	**RFI-DUP-429**	**70-163(092801)**	**70-163D(092801)**	**70-163(062002)**	**70-163d(062002)**	**70-163(032803)**	**70-165(092601)**	**70-165D(092601)**	**70-165(062202)**	**70-165d(062202)**
Inorganics																	
Arsenic	0.0046	NA	NA	NA	0.02	NA	0.024	0.025	0.01	NA	0.0036	NA	0.0053	NA	NA	0.0027	NA
Barium	0.085	NA	NA	NA	0.28	NA	0.29	0.29	0.068	NA	0.026	NA	0.038	NA	NA	0.02	NA
Beryllium	0.00075	NA	NA	NA	<0.00040	NA	<0.00040	<0.00040	0.0023	NA	<0.00040	NA	<0.00040	NA	NA	<0.00040	NA
Cadmium	<0.00020	NA	NA	NA	<0.00020	NA	<0.00020	<0.00020	0.00044	NA	0.00019	NA	0.00013	NA	NA	0.000064	NA
Chromium (total) [a]	0.001	NA	NA	NA	<0.00060	NA	0.0014	0.0014	0.0013	NA	0.00054	NA	0.00089	NA	NA	0.00042	NA
Cobalt	0.0011	NA	NA	NA	0.00034	NA	0.00096	0.00094	0.016	NA	0.0076	NA	0.014	NA	NA	0.0019	NA
Lead [b]	0.0004	NA	NA	NA	0.000083	NA	0.00042	0.00042	0.00029	NA	0.00037	NA	0.0003	NA	NA	0.00023	NA
Manganese	0.46	NA	NA	NA	0.11	NA	0.14	0.14	3.2	NA	2.1	NA	2.4	NA	NA	1.2	NA
Thallium	<0.00020	NA	NA	NA	<0.00020	NA	<0.00020	<0.00020	<0.00067	NA	0.00017	NA	0.00018	NA	NA	<0.00020	NA
Vanadium	<0.00080	NA	NA	NA	<0.00080	NA	0.0012	0.0012	<0.00080	NA	0.00027	NA	0.00024	NA	NA	0.0003	NA
Inorganics-Dissolved																	
Arsenic	NA	0.0028	NA	0.035	NA	0.022	NA	NA	NA	<0.0075	NA	0.0019	NA	NA	0.0013	NA	0.0029
Barium	NA	0.057	NA	0.31	NA	0.27	NA	NA	NA	0.044	NA	0.019	NA	NA	0.037	NA	0.017
Cobalt	NA	0.00091	NA	0.00034	NA	0.00031	NA	NA	NA	0.01	NA	0.0059	NA	NA	0.0011	NA	0.0017
Lead [b]	NA	<0.00040	NA	<0.00040	NA	<0.00040	NA	NA	NA	<0.00040	NA	<0.00040	NA	NA	**0.019**	NA	<0.00040
Manganese	NA	0.41	NA	0.11	NA	0.11	NA	NA	NA	2.5	NA	1.6	NA	NA	0.72	NA	1.1
Selenium	NA	0.017	NA	<0.0014	NA	<0.0014	NA	NA	NA	0.0039	NA	<0.0014	NA	NA	0.0042	NA	0.0027
Thallium	NA	<0.00020	NA	<0.00020	NA	<0.00020	NA	NA	NA	0.00021	NA	<0.00020	NA	NA	<0.00020	NA	<0.00020
Vanadium	NA	<0.00080	NA	<0.00080	NA	<0.00080	NA	NA	NA	<0.00080	NA	<0.00080	NA	NA	<0.00080	NA	<0.00080
Volatile Organic Compound																	
Benzene	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	NA	NA	NA	<0.0010	NA	NA	NA
1,3-Dichlorobenzene	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	NA	NA	NA	<0.0010	NA	NA	NA
1,1-Dichloroethane	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	NA	NA	NA	<0.0010	NA	NA	NA
1,2-Dichloroethane	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	NA	NA	NA	<0.0010	NA	NA	NA
cis-1,2-Dichloroethene	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	0.0032	NA	NA	NA	NA	<0.0010	NA	NA	NA
1,2-Dichloropropane	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	NA	NA	NA	<0.0010	NA	NA	NA
Ethylbenzene	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	NA	NA	NA	<0.0010	NA	NA	NA
Methyl cyclohexane	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	NA	NA	NA	<0.0010	NA	NA	NA
Methyl Tert Butyl Ether	<0.0050	NA	<0.0050	NA	<0.0050	NA	NA	NA	<0.0050	NA	NA	NA	NA	<0.0050	NA	NA	NA
Methylene chloride	<0.0050	NA	<0.0050	NA	<0.0050	NA	NA	NA	<0.0050	NA	NA	NA	NA	<0.0050	NA	NA	NA
Tetrachloroethene	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	NA	NA	NA	<0.0010	NA	NA	NA
Toluene	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	NA	NA	NA	<0.0010	NA	NA	NA
Trichloroethene	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	0.0021	NA	NA	NA	NA	<0.0010	NA	NA	NA
Vinyl chloride	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	0.00063	NA	NA	NA	NA	<0.0010	NA	NA	NA
m&p-Xylene	<0.0020	NA	<0.0020	NA	<0.0020	NA	NA	NA	<0.0020	NA	NA	NA	NA	<0.0020	NA	NA	NA
o-Xylene	<0.0010	NA	<0.0010	NA	<0.0010	NA	NA	NA	<0.0010	NA	NA	NA	NA	<0.0010	NA	NA	NA
Semi Volatile Organic Com																	
Benzo(a)anthracene	<0.0010	NA	<0.0011	NA	NA	NA	NA	NA	<0.0010	NA	NA	NA	NA	<0.0010	NA	NA	NA
Benzo(a)pyrene	<0.0020	NA	<0.0022	NA	NA	NA	NA	NA	<0.0021	NA	NA	NA	NA	<0.0020	NA	NA	NA
Benzo(k)fluoranthene	<0.0051	NA	<0.0054	NA	NA	NA	NA	NA	<0.0051	NA	NA	NA	NA	<0.0050	NA	NA	NA
bis(2-Chloroethyl)ether	<0.0010	NA	<0.0011	NA	NA	NA	NA	NA	<0.0010	NA	NA	NA	NA	<0.0010	NA	NA	NA
Dibenz(a,h)anthracene	<0.0020	NA	<0.0022	NA	NA	NA	NA	NA	<0.0021	NA	NA	NA	NA	<0.0020	NA	NA	NA
3&4-Methylphenol	<0.010	NA	<0.011	NA	NA	NA	NA	NA	<0.010	NA	NA	NA	NA	<0.010	NA	NA	NA
Naphthalene	<0.0051	NA	<0.0054	NA	NA	NA	NA	NA	<0.0051	NA	NA	NA	NA	<0.0050	NA	NA	NA
Nitrobenzene	<0.0020	NA	<0.0022	NA	NA	NA	NA	NA	<0.0021	NA	NA	NA	NA	<0.0020	NA	NA	NA
2,2'-oxybis(1-Chloropropane)	<0.0051	NA	<0.0054	NA	NA	NA	NA	NA	<0.0051	NA	NA	NA	NA	<0.0050	NA	NA	NA
Phenanthrene	<0.0051	NA	<0.0054	NA	NA	NA	NA	NA	<0.0051	NA	NA	NA	NA	<0.0050	NA	NA	NA

Table A-23
AOIs with Groundwater Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 81-2 cont.														
AOI Number | Location ID:	**81-2 | 70-165**	**81-2 | 70-165**	**81-2 | 70-165**	**81-2 | 70-165**	**81-2 | 70-165**	**81-2 | 70-165**	**81-2 | 70-165**	**81-2 | RFI-81-03**	**81-2 | RFI-81-03**	**81-2 | RFI-81-03**	**81-2 | RFI-81-03**	**81-2 | RFI-81-13**	**81-2 | RFI-81-13**	**81-2 | RFI-81-13**	**81-2 | RFI-81-39R**
Date Collected:	**03/28/03**	**10/07/04**	**10/29/07**	**09/16/08**	**09/16/08**	**09/24/09**	**09/24/09**	**09/28/01**	**09/28/01**	**03/27/03**	**02/28/05**	**09/24/01**	**09/24/01**	**03/27/03**	**09/17/03**
Sample Name:	**70-165(032803)**	**70-165(100704)**	**70-165(10/29/07)**	**70-165(091608)**	**Duplicate-4(091608)**	**70-165(092409)**	**Duplicate-2(092409)**	**RFI-81-03(092501)**	**RFI-81-03D(092501)**	**RFI-81-03(032703)**	**RFI-81-03(022805)**	**RFI-81-13(092401)**	**RFI-81-13D(092401)**	**RFI-81-13(032703)**	**RFI-81-39R(091703)**
Inorganics															
Arsenic	0.0029	NA	NA	NA	NA	NA	NA	NA	NA	0.00091	NA	NA	NA	0.001	NA
Barium	0.043	NA	NA	NA	NA	NA	NA	NA	NA	0.086	NA	NA	NA	0.5	NA
Beryllium	<0.00040	NA	NA	NA	NA	NA	NA	NA	NA	<0.00040	NA	NA	NA	<0.00040	NA
Cadmium	<0.00020	NA	NA	NA	NA	NA	NA	NA	NA	0.000081	NA	NA	NA	<0.00020	NA
Chromium (total) [a]	0.00093	NA	NA	NA	NA	NA	NA	NA	NA	0.0019	NA	NA	NA	0.00086	NA
Cobalt	0.0012	NA	NA	NA	NA	NA	NA	NA	NA	0.00033	NA	NA	NA	0.00018	NA
Lead [b]	**0.027**	**0.055**	**0.054**	**0.09**	**0.092**	**0.049**	**0.049**	NA	NA	0.00082	NA	NA	NA	0.00045	NA
Manganese	0.46	NA	NA	NA	NA	NA	NA	NA	NA	0.045	NA	NA	NA	0.18	NA
Thallium	<0.00020	NA	NA	NA	NA	NA	NA	NA	NA	0.00048	NA	NA	NA	<0.00020	NA
Vanadium	0.0002	NA	NA	NA	NA	NA	NA	NA	NA	0.00054	NA	NA	NA	<0.00080	NA
Inorganics-Dissolved															
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	<0.0010	NA	NA	NA	0.0023	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	0.059	NA	NA	NA	0.5	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	0.00073	NA	NA	NA	0.00028	NA	NA
Lead [b]	NA	NA	NA	NA	NA	NA	NA	NA	<0.00040	NA	NA	NA	<0.00040	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	0.52	NA	NA	NA	0.16	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	<0.0014	NA	NA	NA	<0.0014	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	<0.00020	NA	NA	NA	<0.00020	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	<0.00080	NA	NA	NA	<0.00080	NA	NA
Volatile Organic Compound															
Benzene	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	<0.0010	<0.0010	NA	NA	0.00043
1,3-Dichlorobenzene	NA	<0.0010	NA	NA	NA	0.0001	NA	<0.0010	NA	NA	<0.0010	<0.0010	NA	NA	<0.0010
1,1-Dichloroethane	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	<0.0010	0.0016	NA	NA	0.00069
1,2-Dichloroethane	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	<0.0010	<0.0010	NA	NA	<0.0010
cis-1,2-Dichloroethene	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	<0.0010	<0.0010	NA	NA	<0.0010
1,2-Dichloropropane	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	<0.0010	<0.0010	NA	NA	<0.0010
Ethylbenzene	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	<0.0010	<0.0010	NA	NA	0.0012
Methyl cyclohexane	NA	<0.020	NA	NA	NA	<0.020	NA	<0.0010	NA	NA	<0.020	<0.0010	NA	NA	0.00086
Methyl Tert Butyl Ether	NA	<0.0050	NA	NA	NA	<0.0050	NA	<0.0050	NA	NA	<0.0050	<0.0050	NA	NA	<0.0050
Methylene chloride	NA	<0.0050	NA	NA	NA	<0.0050	NA	<0.0050	NA	NA	<0.0050	<0.0050	NA	NA	<0.0050
Tetrachloroethene	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	<0.0010	<0.0010	NA	NA	<0.0010
Toluene	NA	<0.0010	NA	NA	NA	0.0001	NA	<0.0010	NA	NA	<0.0010	<0.0010	NA	NA	<0.0010
Trichloroethene	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	<0.0010	0.0029	NA	NA	<0.0010
Vinyl chloride	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	<0.0010	<0.0010	NA	NA	<0.0010
m&p-Xylene	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0020	NA	NA	<0.0010	<0.0020	NA	NA	0.0017
o-Xylene	NA	<0.0010	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	<0.0010	<0.0010	NA	NA	0.0005
Semi Volatile Organic Com															
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	0.00089	NA	NA	NA	<0.0011	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	<0.0022	NA	NA	NA	<0.0021	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	<0.0056	NA	NA	NA	<0.0053	NA	NA	NA
bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	<0.0011	NA	NA	NA	<0.0011	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	<0.0022	NA	NA	NA	<0.0021	NA	NA	NA
3&4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	<0.011	NA	NA	NA	<0.011	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	<0.0056	NA	NA	NA	<0.0053	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	<0.0022	NA	NA	NA	<0.0021	NA	NA	NA
2,2'-oxybis(1-Chloropropane)	NA	NA	NA	NA	NA	NA	NA	<0.0056	NA	NA	NA	<0.0053	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	<0.0056	NA	NA	NA	<0.0053	NA	NA	NA

Table A-23
AOIs with Groundwater Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 81-2 cont.						
AOI Number | Location ID:	**81-2 | RFI-81-39R**	**81-2 | RFI-81-50**	**81-2 | RFI-81-50**	**81-2 | RFI-81-50**	**81-2 | RFI-81-50**	**81-2 | RFI-81-50**	**81-2 | RFI-81-50**
Date Collected:	**10/11/04**	**04/04/05**	**04/04/05**	**11/02/06**	**10/31/07**	**09/16/08**	**09/24/09**
Sample Name:	**RFI-81-39R(101104)**	**Dupe 02(040405)**	**RFI-81-50(040405)**	**RFI-81-50(110206)**	**RFI-81-50(10/31/07)**	**RFI-81-50(091608)**	**RFI-81-50(092409)**
Inorganics							
Arsenic	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA
Chromium (total) [a]	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA
Lead [b]	NA	<0.0030	<0.0030	NA	<0.0030	NA	<0.0030
Manganese	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Inorganics-Dissolved							
Arsenic	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA
Lead [b]	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compound							
Benzene	0.0005	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010
1,3-Dichlorobenzene	<0.0010	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010
1,1-Dichloroethane	0.0007	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010
1,2-Dichloroethane	<0.0010	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010
cis-1,2-Dichloroethene	<0.0010	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010
1,2-Dichloropropane	<0.0010	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010
Ethylbenzene	<0.0010	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010
Methyl cyclohexane	0.001	NA	NA	<0.020	<0.020	<0.020	<0.020
Methyl Tert Butyl Ether	<0.0050	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050
Methylene chloride	<0.0050	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050
Tetrachloroethene	<0.0010	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010
Toluene	0.0002	NA	NA	<0.0010	<0.0010	<0.0010	0.0002
Trichloroethene	<0.0010	NA	NA	0.0004	0.0002	<0.0010	0.0008
Vinyl chloride	<0.0010	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010
m&p-Xylene	<0.0010	NA	NA	0.0001	<0.0010	<0.0010	0.0003
o-Xylene	<0.0010	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010
Semi Volatile Organic Com							
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
3&4-Methylphenol	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA
2,2'-oxybis(1-Chloropropane)	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA

Table A-23
AOIs with Groundwater Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 81-3															
AOI Number | Location ID:	**81-3 | 86-100**	**81-3 | 86-100**	**81-3 | 86-100**	**81-3 | 86-100**	**81-3 | 86-100**	**81-3 | RFI-81-08**	**81-3 | RFI-81-08**	**81-3 | RFI-81-08**	**81-3 | RFI-81-08**	**81-3 | RFI-81-08**	**81-3 | RFI-81-08**	**81-3 | RFI-81-08**	**81-3 | RFI-81-11**	**81-3 | RFI-81-11**	**81-3 | RFI-81-11**
Date Collected:	**09/24/01**	**09/24/01**	**06/18/02**	**04/01/03**	**10/07/04**	**09/24/01**	**09/24/01**	**06/17/02**	**06/17/02**	**04/01/03**	**10/07/04**	**02/24/05**	**09/24/01**	**09/24/01**	**06/19/02**
Sample Name:	**86-100(092401)**	**86-100D(092401)**	**86-100(061802)**	**86-100(040103)**	**86-100(100704)**	**RFI-81-08(092401)**	**RFI-81-08D(092401)**	**RFI-81-08(061702)**	**RFI-81-08d(061702)**	**RFI-81-08(040103)**	**RFI-81-08(100704)**	**RFI-81-08(022405)**	**RFI-81-11(092401)**	**RFI-81-11D(092401)**	**RFI-81-11(061902)**
Inorganics															
Arsenic	NA	NA	0.0029	0.003	NA	NA	NA	0.0011	NA	0.0073	NA	NA	NA	NA	0.011
Barium	NA	NA	1.2	0.66	1.4	NA	NA	0.13	NA	1	NA	NA	NA	NA	0.22
Beryllium	NA	NA	<0.00040	<0.00040	NA	NA	NA	<0.00040	NA	<0.00040	NA	NA	NA	NA	<0.00040
Cadmium	NA	NA	0.00035	0.0098	0.0008	NA	NA	<0.00020	NA	<0.00020	NA	NA	NA	NA	<0.00020
Chromium (total) [a]	NA	NA	0.0006	0.0034	NA	NA	NA	0.00054	NA	0.0013	NA	NA	NA	NA	0.00097
Cobalt	NA	NA	0.0019	0.072	NA	NA	NA	0.00058	NA	0.0033	NA	NA	NA	NA	0.00026
Lead [b]	NA	NA	0.0034	**0.033**	0.006	NA	NA	0.00067	NA	0.00039	<0.0030	NA	NA	NA	**0.047**
Manganese	NA	NA	1.2	1.7	NA	NA	NA	1.4	NA	3.3	1.4	NA	NA	NA	0.45
Thallium	NA	NA	<0.00020	0.00045	NA	NA	NA	<0.00020	NA	<0.00020	NA	NA	NA	NA	<0.00020
Vanadium	NA	NA	<0.00080	<0.00080	NA	NA	NA	<0.00080	NA	<0.00080	NA	NA	NA	NA	0.0005
Inorganics-Dissolved															
Arsenic	NA	0.0058	NA	NA	NA	NA	0.0078	NA	0.001	NA	NA	NA	NA	0.013	NA
Barium	NA	2.5	NA	NA	NA	NA	0.43	NA	0.14	NA	NA	NA	NA	0.37	NA
Cobalt	NA	0.0049	NA	NA	NA	NA	0.0023	NA	0.0006	NA	NA	NA	NA	0.00029	NA
Lead [b]	NA	0.0013	NA	NA	NA	NA	<0.00040	NA	<0.00040	NA	NA	NA	NA	<0.00040	NA
Manganese	NA	1.1	NA	NA	NA	NA	1.9	NA	1.6	NA	NA	NA	NA	0.46	NA
Selenium	NA	<0.0014	NA	NA	NA	NA	<0.0023	NA	<0.0014	NA	NA	NA	NA	<0.0014	NA
Thallium	NA	<0.00020	NA	NA	NA	NA	<0.00020	NA	<0.00020	NA	NA	NA	NA	<0.00020	NA
Vanadium	NA	<0.00080	NA	NA	NA	NA	<0.00080	NA	<0.00080	NA	NA	NA	NA	<0.00080	NA
Volatile Organic Compound															
Benzene	<0.0010	NA	<0.0010	<0.0010	0.0003	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010
1,3-Dichlorobenzene	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010
1,1-Dichloroethane	<0.0010	NA	<0.0010	<0.0010	<0.0010	0.0031	NA	0.0011	NA	0.0047	0.002	0.002	0.0043	NA	0.0036
1,2-Dichloroethane	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010
cis-1,2-Dichloroethene	0.0052	NA	0.047	0.0027	0.008	0.0036	NA	0.0014	NA	0.05	0.025	0.024	0.00055	NA	<0.0010
1,2-Dichloropropane	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010
Ethylbenzene	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010
Methyl cyclohexane	<0.0010	NA	<0.0010	<0.0010	<0.020	<0.0010	NA	<0.0010	NA	<0.0010	<0.020	<0.020	<0.0010	NA	<0.0010
Methyl Tert Butyl Ether	<0.0050	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<0.0050	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<0.0050
Methylene chloride	<0.0050	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<0.0050	NA	<0.0050	<0.0050	<0.0050	<0.0050	NA	<0.0050
Tetrachloroethene	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010
Toluene	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010
Trichloroethene	0.0038	NA	0.032	0.0018	0.007	0.011	NA	0.0077	NA	0.0026	0.002	0.002	<0.0010	NA	<0.0010
Vinyl chloride	0.0034	NA	0.047	<0.0010	0.009	0.0067	NA	0.0006	NA	0.029	0.008	0.012	0.0016	NA	0.0012
m&p-Xylene	<0.0020	NA	<0.0020	<0.0020	<0.0010	<0.0020	NA	<0.0020	NA	<0.0020	<0.0010	<0.0010	<0.0020	NA	<0.0020
o-Xylene	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	NA	<0.0010
Semi Volatile Organic Com															
Benzo(a)anthracene	<0.0011	NA	NA	NA	NA	<0.0011	NA	NA	NA	NA	NA	NA	<0.0011	NA	NA
Benzo(a)pyrene	<0.0022	NA	NA	NA	NA	<0.0022	NA	NA	NA	NA	NA	NA	<0.0022	NA	NA
Benzo(k)fluoranthene	<0.0056	NA	NA	NA	NA	<0.0056	NA	NA	NA	NA	NA	NA	<0.0055	NA	NA
bis(2-Chloroethyl)ether	<0.0011	NA	NA	NA	NA	<0.0011	NA	NA	NA	NA	NA	NA	<0.0011	NA	NA
Dibenz(a,h)anthracene	<0.0022	NA	NA	NA	NA	<0.0022	NA	NA	NA	NA	NA	NA	<0.0022	NA	NA
3&4-Methylphenol	<0.011	NA	NA	NA	NA	<0.011	NA	NA	NA	NA	NA	NA	<0.011	NA	NA
Naphthalene	<0.0056	NA	NA	NA	NA	<0.0056	NA	NA	NA	NA	NA	NA	<0.0055	NA	NA
Nitrobenzene	<0.0022	NA	NA	NA	NA	<0.0022	NA	NA	NA	NA	NA	NA	<0.0022	NA	NA
2,2'-oxybis(1-Chloropropane)	<0.0056	NA	NA	NA	NA	<0.0056	NA	NA	NA	NA	NA	NA	<0.0055	NA	NA
Phenanthrene	<0.0056	NA	NA	NA	NA	<0.0056	NA	NA	NA	NA	NA	NA	<0.0055	NA	NA

Table A-23
AOIs with Groundwater Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

AOI Number | Location ID:	81-3 | RFI-81-11	81-3 | RFI-81-11	81-3 | RFI-81-12R	81-3 | RFI-81-12R	81-3 | RFI-81-12R	81-3 | RFI-81-12R	81-3 | RFI-81-33	81-3 | RFI-81-33	81-3 | RFI-81-33	81-3 | RFI-81-33	81-3 | RFI-81-33	81-3 | RFI-81-51	81-3 | RFI-81-51	81-3 | RFI-81-51
Date Collected:	06/19/02	04/01/03	12/07/01	12/07/01	06/20/02	06/20/02	02/19/02	06/20/02	06/20/02	04/03/03	10/06/04	04/04/05	04/04/05	10/29/07
Sample Name:	RFI-81-11d(061902)	RFI-81-11(040103)	RFI-81-12R(120701)	RFI-81-12Rd(120701)	RFI-81-12R(062002)	RFI-81-12Rd(062002)	RFI-81-33(021902)	RFI-81-33(062002)	RFI-81-33d(062002)	RFI-81-33(040303)	RFI-81-33(100604)	Dupe 01(040405)	RFI-81-51(040405)	RFI-81-51(10/29/07)
Inorganics														
Arsenic	NA	0.0064	0.0079	NA	0.0014	NA	NA	0.0056	NA	0.0049	NA	NA	NA	NA
Barium	NA	1	0.13	NA	0.12	NA	NA	0.12	NA	0.11	0.12	NA	NA	NA
Beryllium	NA	<0.00040	0.00023	NA	<0.00040	NA	NA	<0.00040	NA	<0.00040	NA	NA	NA	NA
Cadmium	NA	<0.00020	0.00016	NA	0.000093	NA	NA	<0.00020	NA	0.000072	<0.00050	NA	NA	NA
Chromium (total) [a]	NA	0.0019	0.0056	NA	0.0015	NA	NA	0.00046	NA	0.00026	NA	NA	NA	NA
Cobalt	NA	0.0012	0.0034	NA	0.0022	NA	NA	0.0013	NA	0.0014	NA	NA	NA	NA
Lead [b]	NA	**0.021**	0.0029	NA	0.0008	NA	NA	0.00025	NA	0.00015	<0.0030	NA	NA	NA
Manganese	NA	2	0.38	NA	0.27	NA	NA	0.88	NA	0.79	NA	NA	NA	NA
Thallium	NA	<0.00020	0.00015	NA	0.00015	NA	NA	<0.00020	NA	<0.00020	NA	NA	NA	NA
Vanadium	NA	<0.00080	0.0086	NA	0.0014	NA	NA	<0.00080	NA	0.000098	NA	NA	NA	NA
Inorganics-Dissolved														
Arsenic	0.0097	NA	NA	0.0034	NA	<0.0010	NA	NA	0.0048	NA	NA	NA	NA	NA
Barium	0.19	NA	NA	0.096	NA	0.087	NA	NA	0.1	NA	NA	NA	NA	NA
Cobalt	0.00022	NA	NA	0.0014	NA	0.0012	NA	NA	0.0012	NA	NA	NA	NA	NA
Lead [b]	<0.00040	NA	NA	<0.00040	NA	<0.00040	NA	NA	<0.00040	NA	NA	NA	NA	NA
Manganese	0.37	NA	NA	0.28	NA	0.2	NA	NA	0.77	NA	NA	NA	NA	NA
Selenium	<0.0016	NA	NA	0.0024	NA	<0.0014	NA	NA	<0.0014	NA	NA	NA	NA	NA
Thallium	<0.00020	NA	NA	<0.00020	NA	<0.00020	NA	NA	<0.00020	NA	NA	NA	NA	NA
Vanadium	0.00085	NA	NA	0.0012	NA	0.00081	NA	NA	0.00093	NA	NA	NA	NA	NA
Volatile Organic Compound														
Benzene	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,3-Dichlorobenzene	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,1-Dichloroethane	NA	0.0013	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	<0.0010	0.004	0.004	0.004
1,2-Dichloroethane	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
cis-1,2-Dichloroethene	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	<0.0010	0.16	0.16	0.16
1,2-Dichloropropane	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethylbenzene	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Methyl cyclohexane	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	<0.020	<0.020	<0.020	<0.020
Methyl Tert Butyl Ether	NA	<0.0050	<0.0050	NA	<0.0050	NA	<0.0050	<0.0050	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Methylene chloride	NA	<0.0050	<0.0050	NA	<0.0050	NA	<0.0050	<0.0050	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tetrachloroethene	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	0.002
Toluene	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Trichloroethene	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	<0.0010	0.0008	0.0008	0.025
Vinyl chloride	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	<0.0010	0.065	0.064	0.054
m&p-Xylene	NA	<0.0020	<0.0020	NA	<0.0020	NA	<0.0020	<0.0020	NA	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010
o-Xylene	NA	<0.0010	<0.0010	NA	<0.0010	NA	<0.0010	<0.0010	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Semi Volatile Organic Com														
Benzo(a)anthracene	NA	NA	<0.0010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	<0.0020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	NA	NA	<0.0010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	<0.0020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3&4-Methylphenol	NA	NA	<0.010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	<0.0020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2'-oxybis(1-Chloropropane)	NA	NA	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A-23
AOIs with Groundwater Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 81-3 cont.	
AOI Number | Location ID:	**81-3 | RFI-81-51**	**81-3 | RFI-81-51**
Date Collected:	**09/16/08**	**09/24/09**
Sample Name:	**RFI-81-51(091608)**	**RFI-81-51(092409)**
Inorganics		
Arsenic	NA	NA
Barium	NA	NA
Beryllium	NA	NA
Cadmium	NA	NA
Chromium (total) [a]	NA	NA
Cobalt	NA	NA
Lead [b]	NA	NA
Manganese	NA	NA
Thallium	NA	NA
Vanadium	NA	NA
Inorganics-Dissolved		
Arsenic	NA	NA
Barium	NA	NA
Cobalt	NA	NA
Lead [b]	NA	NA
Manganese	NA	NA
Selenium	NA	NA
Thallium	NA	NA
Vanadium	NA	NA
Volatile Organic Compounc		
Benzene	<0.0010	0.0006
1,3-Dichlorobenzene	<0.0010	<0.0050 Y
1,1-Dichloroethane	0.001	0.005
1,2-Dichloroethane	<0.0010	<0.0050 Y
cis-1,2-Dichloroethene	0.003	0.23
1,2-Dichloropropane	<0.0010	<0.0050 Y
Ethylbenzene	<0.0010	<0.0050 Y
Methyl cyclohexane	<0.020	<0.10 Y
Methyl Tert Butyl Ether	<0.0050	<0.030 Y
Methylene chloride	<0.0050	<0.030 Y
Tetrachloroethene	0.006	0.001
Toluene	<0.0010	<0.0050 Y
Trichloroethene	0.07	0.01
Vinyl chloride	0.0003	0.068
m&p-Xylene	<0.0010	<0.0050 Y
o-Xylene	<0.0010	<0.0050 Y
Semi Volatile Organic Com		
Benzo(a)anthracene	NA	NA
Benzo(a)pyrene	NA	NA
Benzo(k)fluoranthene	NA	NA
bis(2-Chloroethyl)ether	NA	NA
Dibenz(a,h)anthracene	NA	NA
3&4-Methylphenol	NA	NA
Naphthalene	NA	NA
Nitrobenzene	NA	NA
2,2'-oxybis(1-Chloropropane)	NA	NA
Phenanthrene	NA	NA

Table A-23
AOIs with Groundwater Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

	AOI 83/84-3					
AOI Number | Location ID:	**83/84-3 | 11-140**	**83/84-3 | 11-140**	**83/84-3 | RFI-83/84-20**	**83/84-3 | RFI-83/84-20**	**83/84-3 | RFI-83/84-20**	**83/84-3 | RFI-83/84-20**
Date Collected:	**09/28/01**	**09/28/01**	**02/22/02**	**02/22/02**	**06/20/02**	**04/02/03**
Sample Name:	**11-140(092801)**	**11-140D(092801)**	**RFI-83/84-20(022202)**	**RFI-83/84-20d(022202)**	**RFI-83/84-20(062002)**	**RFI-83/84-20(040203)**
Inorganics						
Arsenic	NA	NA	NA	NA	0.014	0.023
Barium	NA	NA	NA	NA	0.12	0.13
Beryllium	NA	NA	NA	NA	<0.00040	<0.00040
Cadmium	NA	NA	NA	NA	0.00014	<0.00020
Chromium (total) [a]	NA	NA	NA	NA	0.00061	0.00029
Cobalt	NA	NA	NA	NA	0.006	0.0024
Lead [b]	NA	NA	NA	NA	**0.017**	0.0016
Manganese	NA	NA	NA	NA	0.61	0.6
Thallium	NA	NA	NA	NA	0.000073	<0.00020
Vanadium	NA	NA	NA	NA	<0.00080	0.00009
Inorganics-Dissolved						
Arsenic	NA	<0.0010	NA	0.017	NA	NA
Barium	NA	R	NA	0.13	NA	NA
Cobalt	NA	0.0019	NA	0.006	NA	NA
Lead [b]	NA	<0.00040	NA	0.0033	NA	NA
Manganese	NA	0.22	NA	0.92	NA	NA
Selenium	NA	0.002	NA	0.0026	NA	NA
Thallium	NA	<0.00020	NA	0.00071	NA	NA
Vanadium	NA	<0.00080	NA	0.0023	NA	NA
Volatile Organic Compound						
Benzene	<0.0010	NA	<0.0010	NA	NA	NA
1,3-Dichlorobenzene	<0.0010	NA	<0.0010	NA	NA	NA
1,1-Dichloroethane	<0.0010	NA	<0.0010	NA	NA	NA
1,2-Dichloroethane	<0.0010	NA	<0.0010	NA	NA	NA
cis-1,2-Dichloroethene	<0.0010	NA	0.00083	NA	NA	NA
1,2-Dichloropropane	<0.0010	NA	<0.0010	NA	NA	NA
Ethylbenzene	<0.0010	NA	<0.0010	NA	NA	NA
Methyl cyclohexane	<0.0010	NA	<0.0010	NA	NA	NA
Methyl Tert Butyl Ether	<0.0050	NA	<0.0050	NA	NA	NA
Methylene chloride	<0.0050	NA	<0.0050	NA	NA	NA
Tetrachloroethene	<0.0010	NA	<0.0010	NA	NA	NA
Toluene	0.00078	NA	<0.0010	NA	NA	NA
Trichloroethene	<0.0010	NA	0.0015	NA	NA	NA
Vinyl chloride	<0.0010	NA	<0.0010	NA	NA	NA
m&p-Xylene	<0.0020	NA	<0.0020	NA	NA	NA
o-Xylene	<0.0010	NA	<0.0010	NA	NA	NA
Semi Volatile Organic Com						
Benzo(a)anthracene	<0.0011	NA	<0.0010	NA	NA	NA
Benzo(a)pyrene	<0.0022	NA	<0.0020	NA	NA	NA
Benzo(k)fluoranthene	<0.0056	NA	<0.0050	NA	NA	NA
bis(2-Chloroethyl)ether	<0.0011	NA	<0.0010	NA	NA	NA
Dibenz(a,h)anthracene	<0.0022	NA	<0.0020	NA	NA	NA
3&4-Methylphenol	<0.011	NA	<0.010	NA	NA	NA
Naphthalene	<0.0056	NA	<0.0050	NA	NA	NA
Nitrobenzene	<0.0022	NA	<0.0020	NA	NA	NA
2,2'-oxybis(1-Chloropropane)	<0.0056	NA	<0.0050	NA	NA	NA
Phenanthrene	<0.0056	NA	<0.0050	NA	NA	NA

Notes:
[a] HBG based on chromium VI
[b] Lead HBG could not be calculated using these methods.
Drinking water action level used for screening. See text.

Highlighted data exceed the corresponding HBG

HBG = Health-Based Goal
NA = Not analyzed
ND = Not detected at these AOIs

Table A-24
AOIs with Borehole Water Exceedances of the Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

AOI Number | Location ID: Date Collected: Sample Name:	Units	Construction Worker Water HBG	Maximum Detected Concentraiton	Exceeds Construction Worker HBG?	AOI 83/84-3 83/84-3 | RFI-83/84-05 07/31/01 RFI-83/84-05(073101)
Inorganics					
Arsenic	mg/L	1.3E+01	0.1	no	NA
Inorganics-Dissolved					
Arsenic	mg/L	1.3E+01	0.095	no	0.036
Cobalt	mg/L	2.0E+01	0.03	no	0.0054
Lead [a]	mg/L	1.5E-02	0.02	**YES**	**0.02**
Manganese	mg/L	4.2E+02	2.8	no	0.41
Vanadium	mg/L	1.4E+00	0.016	no	0.0014
Volatile Organic Compounds (VOCs)					
Benzene	mg/L	1.0E+01	0.0051	no	<0.0010
1,1-Dichloroethane	mg/L	7.0E+01	0.25	no	<0.0010
1,2-Dichloroethane	mg/L	4.4E+00	0.0054	no	<0.0010
Methyl cyclohexane	mg/L	3.8E+02	0.0036	no	<0.0010
Methylene chloride	mg/L	1.4E+02	0.0093	no	<0.0050
Trichloroethene	mg/L	5.4E+01	0.046	no	0.0041
Vinyl chloride	mg/L	7.2E+00	0.069	no	<0.0010
Semi Volatile Organic Compounds (SVOCs)					
Benzo(a)anthracene	mg/L	5.7E-02	0.00078	no	<0.0010
bis(2-Ethylhexyl)phthalate	mg/L	2.4E+01	0.11	no	<0.0050
2-Methylnaphthalene	mg/L	1.4E+00	0.32	no	<0.0050
Naphthalene	mg/L	5.2E-01	0.058	no	<0.0050
Pentachlorophenol	mg/L	3.6E-01	0.0021	no	<0.020
Phenanthrene	mg/L	8.2E+02	0.017	no	<0.0050

Notes:
[a] Lead HBG could not be calculated using these methods.
Drinking water action level used for screening. See text.

Highlighted data exceed the corresponding HBG

HBG = Health-Based Goal
NA = Not analyzed

Table A-25
Summary of Exceedances of Construction Worker Health-Based Goals
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

AOI	Soil	Groundwater	Borehole Water
05-1	Lead	---	---
05-6	Lead	---	---
10-1	Lead Chromium	---	---
36-1	Benzene Ethylbenzene Naphthalene	Lead	---
36-2	Chromium (total)	---	---
81-1	Lead	---	---
81-2	Lead 1,1-Dichloroethane 1,1,1-Trichloroethane	Lead	--- ---
81-3	---	Lead	---
83/84-2	Lead Chromium (total) Vanadium Benzo(a)pyrene	---	Lead
83/84-3	Lead	Lead	---
86-1	Arsenic	---	---

Table A-26
Calculation of Exposure Point Concentrations for Soil
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

Area of Interest	Construction Worker HBG (mg/kg)	EPC (mg/kg)	Basis of Exposure Point Concentration	Notes
AOI 10-1				
Chromium (total)	426	225	95% Chebyshev (MVUE) UCL	LNAPL present in this area.
AOI 36-1				
Benzene	53	19	97.5% KM (Chebyshev) UCL	LNAPL in groundwater present at this AOI.
Ethylbenzene	255	20	95% KM (t) UCL	LNAPL in groundwater present at this AOI.
Naphthalene	25	4	97.5% KM (Chebyshev) UCL	LNAPL in groundwater present at this AOI.
AOI 36-2				
Chromium (total)	426	438	95% Approximate Gamma UCL	LNAPL present in this area.
AOI 81-2				
1,1-Dichloroethane	301	7000	NP/EPC = detected concentration	LNAPL observed in soil at this boring location.
1,1,1-Trichloroethane	2450	47000	NP/EPC = detected concentration	LNAPL observed in soil at this boring location.
AOI 83/84-2				
Chromium (total)	426	587	99% Chebyshev (Mean, Sd) UCL	LNAPL present in this area.
Vanadium	217	63	95% Chebyshev (Mean, Sd) UCL	LNAPL present in this area.
Benzo(a)pyrene	44	19	99% KM (Chebyshev) UCL	LNAPL present in this area.
AOI 86-1				
Arsenic	87	79	99% Chebyshev (Mean, Sd) UCL	LNAPL present in this area.

Shading indicates EPC exceeds HBG

AOI = Area of interest
EPC = Exposure point concentration
HBG - Health-based goal
LNAPL = Light non-aqueous phase liquid
NP = The data set could not be processed by ProUCL because consituent was only detected in one sample.
UCL - Upper confidence limit.

Table A-27
Calculation of Exposure Point Concentrations for Lead in Soil
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

Area of Interest	Exposure Point Concentration Based on Mean Lead Level (mg/kg)	Commercial/Industrial Screening Criteria (mg/kg)
AOI 05-1	252	900
AOI 05-6	212	900
AOI 10-1	200	900
AOI 81-1	7922	900
AOI 81-2	161	900
83/84-2	469	900
83/84-3	3199	900

Shading indicates EPC exceeds screening criteria

AOI = Area of interest
EPC = Exposure point concentration

Table A-28
Recommendations by Area of Interest
Former General Motors North American Operations Facility (otherwise known as Buick City)
Flint, Michigan

AOI	Recommended Action	Basis of Recommendation
05-1	No action for construction worker	EPC for lead is below soil screening criteria
05-6	No action for construction worker	EPC for lead is below soil screening criteria
10-1	No action for construction worker	EPCs for lead and chromium are below soil screening criteria
36-1	No action for construction worker	EPCs for lead and VOCs are below soil and groundwater HBGs
36-2	No action for construction worker	Chromium EPC exceeds HBG at one location near the railroad tracks (RFI-36-36); however, speciated data in the area indicate that chromium VI would be below the HBG
81-1	Require construction worker Health and Safety Plan as part of planned restrictions	Lead concentrations are a potential risk to construction workers
81-2	Require construction worker Health and Safety Plan as part of planned restrictions	NAPL in soil results in elevated VOC concentrations at RFI-81-38
81-3	No action for construction worker	EPC for lead is below groundwater HBG
83/84-2	Require construction worker Health and Safety Plan as part of planned restrictions	Chromium EPC exceeds HBG
83/84-3	Require construction worker Health and Safety Plan as part of planned restrictions	Lead concentrations are a potential risk to construction workers
86-1	No action for construction worker	EPC for arsenic is below HBG

AOI = Area of interest
EPC = Exposure point concentration
HBG - Health-based goal
LNAPL = Light non-aqueous phase liquid

ARCADIS

Attachment A

Attached CD

Attachment A-1
Soil Risk Assessment Dataset and Screening for COPCs

Attachment A-2
Groundwater Risk Assessment Dataset and Screening for COPCs

Attachment A-3
Borehole Water Risk Assessment Dataset and Screening for COPCs

Attachment A-4
Basement Water Risk Assessment Dataset and Screening for COPCs

Attachment A-5
Adult Lead Model

Attachment A-6
ProUCL Output