U. S. EPA STATEMENT OF BASIS

for

Proposed Soil and Groundwater Cleanup

at

The Southend of the
Former General Motors Corporation
North American Operations
(Otherwise known as Buick City)

902 East Leith Street
Flint, Michigan

MID 005 356 712

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Statement of Basis
January 2010

The Former General Motors North American Operations Flint Operations Facility
Area South of Leith Street, Southend (Buick City)
902 East Leith Street
Flint, Michigan
EPA ID #: MID 005 356 712

INTRODUCTION

This Statement of Basis (SB) for the **Southend,** also known as Buick City, of the Former General Motors North American Operations (GM NAO) Facility (now owned by Motors Liquidation Company (MLC)) explains EPA's proposed remedy for cleaning up the contaminated soil and groundwater. In addition, this SB includes summaries of other remedies analyzed for this portion of the facility. The Northend of the facility will be addressed in its own Statement of Basis later in 2010. The site was divided in half for the Statement of Basis in an effort to promote redevelopment for the Southend of the Facility (otherwise known as Buick City). EPA will select a final remedy for the Southend of the facility only after the public comment period has ended and the information submitted during this time has been reviewed and considered. As such, EPA is issuing this SB as part of its public participation responsibilities under the Resource Conservation and Recovery Act (RCRA).

This document summarizes information that can be found in greater detail in the RCRA Facility Investigation (RFI) Report and Corrective Measures Proposal (CMP) and other documents contained in the administrative record for this facility. EPA and the State encourage the public to review these other documents in order to gain a more comprehensive understanding of the facility and RCRA activities that have been conducted to date.

EPA may modify the proposed remedy or select another remedy based on new information or public comments. Therefore, the public is encouraged to review and comment on all alternatives. The public can be involved in the remedy selection process by reviewing the documents contained in the administrative record file and submitting comments to the EPA during the public comment period set for January 28-February 28, 2010.

PROPOSED REMEDIES

EPA proposes that MLC should implement the remedies listed in Table 1 below to address the contaminated soil and groundwater at the former GM NAO facility in Flint, Michigan. Table 1 is a summary of remedies proposed by U. S. EPA. In the following sections more detailed explanation of each remedy is given. In addition to the individual remedies proposed in the table below, MLC will implement the following facility-wide remedies: 1) institutional controls to restrict the land use of the entire MLC property to Industrial/Commercial II, III and IV (as defined under Part 201 of the Michigan Natural Resources and Environmental Protection Act) only; 2) institutional controls to prohibit the use of all on-site groundwater for any purpose beyond sampling and other related investigatory testing; 3) a groundwater

monitoring program that will be developed in the Corrective Measures Implementation Workplan and 4) provide adequate financial assurance to demonstrate that funding will be available to complete construction, monitoring and operation and maintenance of the selected remedies. Institutional Controls are legal mechanisms that will prohibit the use of the property from anything other than industrial uses. So, for example, a residential house could not be built on the property due to the levels of contaminants that are in place there. The institutional control in this case is called a Restrictive Covenant and would be filed with the assessor's office so that anyone wishing to purchase the property in the future would be notified of the restrictions placed on the property.

Table 1-Summary of Remedies Proposed for the Southend of the Former GM-NAO Facility in Flint, Michigan

Contaminated Media	Proposed Remedy
On-site Soil	1) Engineering Controls that would include maintaining the existing slabs that remain from the building demolition and parking lots that are currently on the property.2) Additional institutional controls to limit excavation in those areas where the lead exceeds the exposure criteria for routine industrial workers.
Offsite Soil	Excavation and off-site disposal of soil contaminated with lead and benzo(a)pyrene.
Southend Light Non-Aqueous Phase Liquid (LNAPL)	Steam-enhanced LNAPL recovery
Groundwater	Long-term monitoring for: 1) Measuring the effectiveness of the LNAPL remediation system; 2) Determining compliance with State's cleanup standards for groundwater that discharges to surface waters; 3) Ensuring plume stability
Contaminated Building 40 Tunnel Material	Since the tunnel has been closed (see the discussion on interim measures under "Summary of the Facility Investigation in the Southend"), the final remedy will be to implement institutional controls in the form of a deed notification for the presence of PCBs.

FACILITY BACKGROUND

The entire facility (including both the Southend and the Northend) is 452 acres located at 902 Leith Street in Flint, Michigan in Genesee County. It is bounded to the north by Stewart Avenue and Pierson Road, to the south by Harriet Street, to the east by James P. Cole Boulevard and CSX Railroad, and to the west by Industrial Avenue and North Street. The Southend is approximately 230 acres and consists of the area south of Leith Street and bounded to the east by James P. Cole Boulevard and the Flint River and to the south by Harriet Street. In the late 1800s the facility was developed to produce the "horseless carriage". In 1889, Billy Durant and J. Dallas Dort purchased the Imperial Wheel Company, making it a subsidiary of the Durant/Dort Carriage Company. In September 1903, Flint Wagon Works purchased the Buick Motor Company from David Buick thereby relocating the Buick Motor Company to Flint. During World War I, the Buick Motor Company produced the Liberty Aircraft Engine. In 1942, in response to World War II, the production of automobiles stopped and the production of military equipment began. Facility operations have included machining of ferrous and nonferrous metals, V-6 engine manufacturing, torque converter manufacturing, transmission components manufacturing, engine assembly, and industrial wastewater treatment. All of these processes will be terminated by the end of 2010.

SUMMARY OF THE FACILITY INVESTIGATION IN THE SOUTHEND

Site Specific Characteristics and Physical Setting

Hydrogeological Setting

Groundwater flow within the unconsolidated glacial deposits in the vicinity of the Facility is toward the Flint River and its tributaries to the east and southeast. Regionally, two distinct water-bearing zones are identified: the glacial drift, which is about 30 feet deep, and the bedrock groundwater zones underlying the glacial drift. The glacial drift zone consists of discontinuous sand layers and is not used for a groundwater source due to its limited capacity. The bedrock groundwater zone consists of three different layers: Saginaw Formation, Michigan Formation and Marshall Formation. The Saginaw Formation is the primary source of groundwater in the Flint area. In the past, several industries in the area have used production wells screened in this formation. These wells were eventually taken out of service due to the poor groundwater quality. The Michigan Formation is not considered an important source of groundwater. The Marshall Formation provides a small percentage of the groundwater used in Genessee County. Surface water drainage patterns at the Facility are generally east and southeast, toward the Flint River, which is the nearest surface water body. The Facility as a whole (both the Northend and the Southend) operates under National Pollutant Discharge Elimination System Permits (NPDES) for six outfalls into the Flint River and the entire facility (both the Northend and the Southend) is drained by an additional 15 storm sewers.

Ecological Setting

The facility is located in a heavily industrialized area. The entire facility (Northend and Southend) consists of building slabs, asphalt parking lots, and a few unmaintained vegetative areas. While the Northend currently has some buildings standing, the all structures on the

Southend have been razed and only consist of building slabs and parking lots. There are three areas that could be considered potential ecological habitat areas in the entire site. The first is a 12 acre vacant lot located at the northwest corner of the intersection of Leith Street and James P. Cole Boulevard located in the Northend The second potential habitat is the former wastewater aeration lagoon that is adjacent to the vacant lot (also in the Northend). Finally, the Flint River runs along the eastern boundary of the facility and spans both the Northend and the Southend and is habitat for aquatic and riparian flora and fauna.

Investigation Results

A RCRA Facility Investigation (RFI) was performed at the facility in order to determine the nature and extent of contamination as well as the need for any interim measures. The RFI is the initial investigation in the Corrective Action Process. During the RFI, soil, groundwater, surface water, and any other affected media are sampled and the results are compared against human health and/or ecological screening criteria. If certain chemicals are above the screening criteria, then those chemicals are considered to be contaminants of concern and are assessed further in the risk assessment. At this facility, chemicals in the soil were screened using Michigan Department of Environmental Quality (MDEQ) Part 201 Industrial Worker Direct Contact and Industrial Worker Particulate Inhalation Criteria. The screening criterion for the groundwater was MDEQ Part 201 Industrial Drinking Water, Industrial Direct Contact and for wells 500 feet from the Flint River, the Groundwater/Surface Water Interface (GSI) criteria were used. Due to the complexity and size of the GM-Flint Facility, it was split up into Areas of Interest (AOIs). The Southend AOIs that posed a risk to human health and/or the environment and therefore carried through to the Corrective Measures Proposal (CMP) are listed in Table 2 below. Table 2 is a summary of each AOI, its relative location, the maximum contaminant concentration that was found at an AOI during the RFI, and any interim measures that have been performed to date at the AOI. In addition, Figure 1 depicts the location of the Southend AOIs.

Table 2 Southend RFI Summary and AOI Description

AOI Number	AOI Description	Maximum Contaminant Concentrations Found	Screening Criteria	Interim Measures
02-B	The releases in this area are related to an elevator pit.	Soil: Results were below screening criteria Groundwater: Manganese-*3.0 mg/L* LNAPL (free product)	Groundwater Manganese-*0.05 mg/L*	LNAPL Recovery System
02-C	The releases in this area were related to the sump in the Materials Laboratory that managed laboratory wastes.	Soil: Chromium-*390 mg/kg* Lead-*2,000 mg/kg* Groundwater: Results were below screening criteria	Soil Chromium-*240 mg/kg* Lead-*900 mg/kg*	No interim measure was required.
29-A	This area is related to releases from an elevator pit and an observed oil stain in Building 29. The wastes handled in this area were hydraulic and cutting oils.	Soil: Lead-*1,500 mg/kg* Groundwater: Results were below screening criteria	Soil Lead-*900 mg/kg*	No interim measure was required.

Table 2 Southend RFI Summary and AOI Description (con't)

AOI Number	AOI Description	Maximum Contaminant Concentrations Found	Screening Criteria	Interim Measures
12-A	This area is related to releases from press pits, sumps, trenches, traps, and floor staining and is located within former Building 12. The wastes handled at this AOI are process waste oils and hydraulic oils.	Soil: Lead-*11,000 mg/kg* Chromium-*360 mg/kg* Manganese-*1,500 mg/kg* Groundwater: Tetrachloroethene-*0.0057 mg/L* Vinyl Chloride-*0.040 mg/L* Arsenic-*0.06 mg/L* Beryllium-*0.27 mg/L* Cadmium-*0.007 mg/L* Chromium-0.12 *mg/L* Lead-*0.059 mg/L* Nickel-*0.12 mg/L* Thallium-*0.004 mg/L* Vanadium-*0.14 mg/L* LNAPL (free product)	Soil Lead-*900 mg/kg* Chromium-*240 mg/kg* Manganese-*1,500 mg/kg* Groundwater Tetrachloroethene-*0.005 mg/L* Vinyl Chloride-*0.002 mg/L* Arsenic-*0.05 mg/L* Beryllium-*0.004 mg/L* Cadmium-*0.005 mg/L* Chromium-*0.1 mg/L* Lead-*0.004 mg/L* Nickel-0.1 mg/L Thallium-0.002 mg/L Vanadium-0.062 mg/L	LNAPL recovery system
12-B	The releases are related to a truck loading dock drain and sump in the Building 12 area.	Soil: Manganese-*1,900 mg/kg* Groundwater: No results were above screening criteria. LNAPL (free product)	Soil Manganese-*1,500 mg/kg*	LNAPL recovery system
12-C	The releases are related to a sump in the battery charging area, deep steam pipe, and a utility pit containing oil and water	Soil: No results were above screening criteria Groundwater: Vanadium-*0.076 mg/L* LNAPL (free product)	Groundwater: Vanadium-*0.004 mg/L*	LNAPL recovery system

Table 2 Southend RFI Summary and AOI Description (con't)

AOI Number	AOI Description	Maximum Contaminant Concentrations Found	Screening Criteria	Interim Measures
12-D	The releases are related to an abandoned, flooded utility tunnel	LNAPL (free product)		LNAPL recovery system
40-A	The releases from this area are thought to have come from a former underground storage tank farm located in the vicinity of Building 40.	Soil: Benzo(a)pyrene-*36 mg/kg* Groundwater: Benzene-*5.5 mg/L* Ethylbenzene-*0.8 mg/L* Arsenic-*0.44 mg/L* Beryllium-*0.19 mg/L* Cyanide-*0.44 mg/L* Lead-*0.0064 mg/L* LNAPL (free product)	Soil Benzo(a)pyrene-*8 mg/kg* Groundwater: Benzene-*0.005 mg/L* Ethylbenzene-*0.7 mg/L* Arsenic-*0.05 mg/L* Beryllium-*0.004 mg/L* Cyanide-*0.2 mg/L* Lead-*0.059 mg/L*	LNAPL recovery system
40-B	The releases in this area are related to an elevator pit in the former Building 40	Soil: results were below screening criteria Groundwater: cis-1,2-Dichloroethylene-*0.93 mg/L* Trichloroethene (TCE) *0.10 mg/L* Vinyl Chloride *0.0078 mg/L* LNAPL (free product)	Groundwater cis-1,2-Dichloroethylene-*0.07 mg/L* Trichloroethene (TCE)-*0.005 mg/L* Vinyl Chloride-*0.002 mg/L*	LNAPL recovery system
40-D	This area was a flooded basement tunnel in Building 40.	Soil: results were below screening criteria. Groundwater: Vinyl Chloride-*0.0058 mg/L* Lead-*0.004 mg/L* LNAPL (free product)	Groundwater Vinyl Chloride-*0.002 mg/L* Lead-*0.004 mg/L*	The water in the tunnel was pumped out and disposed of off-site. In addition, the tunnel was demolished.

Table 2 Southend RFI Summary and AOI Description (con't)

AOI Number	AOI Description	Maximum Contaminant Concentrations Found	Screening Criteria	Interim Measures
09-A	This area is related to releases from underground storage tanks, floor trenches, and above ground storage tanks in Building 09.	Soil: Benzo(a)pyrene-*57 mg/kg* Dibenzo(a,h)anthrace *11 mg/kg* Lead-*120,000 mg/kg* Manganese-*8,300 mg/kg* Groundwater: 1,1,1-Trichloroethane-*0.258 mg/L* Trichloroethene-*0.184 mg/L* Vinyl chloride-*0.0038 mg/L* Antimony-*0.016 mg/L* Lead-*0.026 mg/L* LNAPL (free product)	Soil: Benzo(a)pyrene-*8.0 mg/kg* Dibenzo(a,h)anthracene *8.0 mg/kg* Lead-*900 mg/kg* Manganese-*1,500 mg/kg* Groundwater 1,1,1-Trichloroethane-*0.2 mg/L* Trichloroethene-*0.005 mg/L* Vinyl chloride-*0.002 mg/L* Antimony-*0.006 mg/L* Lead-*0.004 mg/L*	LNAPL recovery system

Table 2 Southend RFI Summary and AOI Description (con't)

AOI Number	AOI Description	Maximum Contaminant Concentrations Found	Screening Criteria	Interim Measures
09-B	This area is related to releases from the Hamilton Avenue Underground Storage Tank Farm.	Soil: Benzo(a)pyrene-*13 mg/kg* Lead-*1,200 mg/kg* Manganese-*1,800 mg/kg* Groundwater: Benzene-*1.21 mg/L* Ethylbenzene *1.0 mg/L* Methylene chloride-*0.0074 mg/L* Total Xylenes-*0.053 mg/L* Total PCBs-*0.0017 mg/L* Antimony-*0.0068 mg/L* Arsenic-*0.061 mg/L* Barium-*1.5 mg/L* Lead-*0.0058 mg/L* Selenium-*0.052 mg/L* LNAPL (free product)	Soil: Benzo(a)pyrene-*8.0 mg/kg* Lead-*900 mg/kg* Manganese-*1,500 mg/kg* Groundwater: Benzene-*0.005 mg/L* Ethylbenzene-*0.70 mg/L* Methylene chloride-*0.005 mg/L* Total Xylenes-*0.035 mg/L (GSI)* Total PCBs-*0.005 mg/L* Antimony-*0.006 mg/L* Arsenic-*0.050 mg/L* Barium-*0.82 mg/L* Lead-*0.004 mg/L* Selenium-*0.050 mg/L*	LNAPL Recovery System
16-C	The releases in this area from hydraulic oil, a former AST and former USTs around the former Building 16	Soil: results below screening criteria Groundwater: Benzene-*0.21 mg/L* Beryllium-*0.044 mg/L* Selenium-*0.18 mg/L* LNAPL (free product)	Groundwater Benzene-*0.005 mg/L* Beryllium-*0.004 mg/L* Selenium-*0.05 mg/L*	LNAPL recovery system

Interim Measures

Interim Measures were performed in some of the AOIs at the site in order to mitigate imminent threats to human health and the environment and to stabilize and/or control sources of potential contamination to the soil, groundwater, and/or surface water. Interim measures performed at the Southend were LNAPL recovery and removing contaminated water and subsequently closing an abandoned tunnel in the basement of Building 40 (AOI 40-D).

LNAPL Recovery Systems

Interim Measures (IMs) have been implemented to recover LNAPL at the majority of the LNAPL areas of the Southend before the RFI risk assessment was performed. The recovery systems involved pumping LNAPL from the ground to a holding tank where the LNAPL was sent to an off-site disposal facility. These recovery systems have proven effective at getting the majority of the LNAPL out of the ground; however, most of them are no longer effective and have been taken out of service. Some recovery system are still operating and pumping out minimal amounts of LNAPL. See Table 2 for those AOIs with LNAPL recovery systems.

AOI 40-D-Interim Measure

The Former Building 40 tunnel conveyed materials, personnel, and equipment between former Building 40 and former Building 06/16 assembly areas. The tunnel was flooded with water, and the water level was approximately 4 feet above the floor of the basement. As part of the interim measures, the basement floor and lower two feet of the walls were cleaned using a foam-applied aqueous-based solvent to extract PCBs from the concrete. Other activities since then have included removal of small quantities of floating oil from the tunnel and basement. The report "Cleanup and Disposal of PCB Remediation Waste, Building 40 Tunnel and Basement" (BBL, January 2004) (Cleanup Report), described detailed plans to remove the basement floor of the former Building 40. The removal plan included breaking the basement floor and allowing it to collapse into the underlying tunnel. The Cleanup Report required that the tunnel and basement floor be demolished. This was done on June 12, 2006. The initial water level in the former basement was approximately 8 feet below the surrounding grade. Some oil droplets (1 to 4 inches in diameter) were observed floating on the water surface. The oil was sampled and submitted for analysis of PCBs. The analysis indicated that the oil contained PCBs at a concentration of 2.5 parts per million. The oil was recovered using oil absorbent booms and pads prior to the backfilling the basement/tunnel with clean fill. The oil absorbent booms and pads were disposed of at a permitted landfill. For the final remedy for this AOI, an additional deed restriction must be placed on this portion of the property warning future owners of the presence of PCBs.

SUMMARY OF FACILITY RISKS

Human Health Risk Assessment

During the RFI and after contaminant levels were identified, a human health risk assessment was performed to determine the health or environmental problems that could result if the contamination at the facility was not cleaned up. The first step in the assessment is to make assumptions about future land use. In this case, the facility is zoned for industrial use and has a long history of being used as an industrial facility. Therefore, in the future, it will be restricted to industrial use by a restrictive covenant filed with the local assessor's office. Therefore, the human health risks were evaluated based on routine exposures to industrial workers. If those contaminants pose a cancer risk, then EPA's acceptable risk range is $1x10^{-6}$ to $1x10^{-4}$, which means a 1-in-1 million to 1-in-10,000 chance of developing an additional incident of cancer from the contamination alone. EPA's preference is to select cleanup remedies that are at the more protective end of the risk range. The Michigan Department of Environmental Quality (MDEQ) has developed a set of risk-based cleanup standards that are at the midpoint of EPA's acceptable risk range. The Agency has decided the MDEQ standards should be the media cleanup standards for this project. If the contaminants are noncancerous but could cause other health problems, then a hazard index quotient is used. To be acceptable to the EPA, the hazard index quotient for all contaminants must be less than one. The hazard index is the ratio of the concentration of a contaminant to its human health screening value. Table 3 shows the cumulative cancer risk and hazard index quotients for the different areas of interest in the Southend. As noted in Table 3 below, three areas of interest were above MDEQ's upper risk range: AOI 09-A, 09-B, and 16-C.

Table 3-Cumulative Risk for Each AOI in the Southend

AOI	Cumulative Cancer Risk	Hazard Index
02-C	$8x10^{-7}$	$6x10^{-2}$
23-A	$2x10^{-6}$	$4x10^{-6}$
29-A	$1x10^{-6}$	$5x10^{-2}$
12-A	$2x10^{-5}$	$6x10^{-1}$
40-D	$2x10^{-6}$	$2x10^{-2}$
09-A	$3x10^{-4}$	$8x10^{-1}$
09-B	$8x10^{-5}$	$6x10^{-2}$
16-C	$3x10^{-5}$	$2x10^{-1}$

Ecological Risk Assessment

EPA's Ecological Risk Assessment (ERA) Guidance was followed to determine whether contaminants at the facility posed a risk to the local ecology. An ecological risk assessment is the process through which scientists evaluate the likelihood that adverse ecological effects might occur, or are occurring, due to exposure to one or more stressors, such as contamination. The process begins with a Screening Level Risk Assessment (SLERA) which is a study to determine whether a more comprehensive Baseline ERA is needed.

For both the Northend and Southend, a SLERA was developed beginning with a facility visit in 2001 to determine the types of ecological habitat present at the Facility. Three areas were identified as potential ecological habitat: a vacant lot (Northend), wastewater aeration lagoons (Northend), and the Flint River (spanning both the Northend and the Southend). These areas were evaluated and sampled to determine their habitat quality and potential for unacceptable exposures to receptors from contaminated media.

The vacant lot is 12 acres in size and is covered with grass that is mowed three or four times per year. A habitat assessment was performed in this area which was found to be low-quality and not significant, due to the ongoing disturbance from quarterly mowing. One of the former wastewater aeration lagoons has been backfilled with concrete. At the other lagoon, the sludge had been removed for disposal; subsequent sampling showed concentrations below ecological risk-screening criteria for soils. In addition, the lagoon was not considered to be a viable habitat due to its small size. Sediment sampled in the Flint River was found to contain no contaminant levels at or above levels of concern. Based on the SLERA, EPA concluded that there were no unacceptable ecological risk affects at any of these areas and that further ecological risk evaluation was not needed at the Facility.

SCOPE OF CORRECTIVE ACTION FOR THE SOUTHEND

Considering the reasonable anticipated future use of the property, the goals of the chosen corrective measures for the Southend are the following: 1) to protect human health and the environment now and in the future and, 2) to clean up groundwater to the maximum beneficial use in order to protect the environmental integrity of the groundwater resource in the area.

The recommended corrective measures will include facility-wide institutional controls to limit the future use of the entire property to industrial use only.. In the areas on the Southend of the property with lead contaminated soil, the remedy will use institutional controls to limit excavation and engineering controls in the form of concrete slabs to protect workers from being directly exposed to the contamination. Since the use of the land will remain industrial via the facility-wide deed restriction, this will be protective by preventing worker exposure to the lead underneath the concrete slabs and preventing workers from digging without the proper safety precautions. For the areas with free product (LNAPL) still remaining, a more aggressive treatment process than the current interim measures will be performed. This will be steam-enhanced LNAPL recovery. The LNAPL treatment technology will remove the maximum amount of LNAPL in the shortest time thereby removing the greatest amount of the source of dissolved constituents in the groundwater and restoring the aquifer in the shortest amount of time. In addition, these actions will provide the greatest amount of protection to the Flint River from potentially being affected by the dissolved contaminants in the groundwater. A long-term monitoring program will also be developed in order to monitor the effectiveness of the LNAPL remedy, the stability of the plume, and whether the MDEQ's groundwater/surface water interaction (GSI) criteria is being met and the river continues to be protected.

SUMMARY OF ALTERNATIVES

The alternatives analyzed for the Southend of the GM-Flint NAO Facility are presented in detail below and are listed by area of interest (AOI). As mentioned above, there are four facility-wide remedies, or baseline controls, that must be implemented by MLC, which are as follows: 1) institutional controls to restrict the land use of the entire MLC property to Industrial/Commercial II, III and IV only; 2) institutional controls to prohibit the use of all on-facility groundwater for any purpose beyond sampling and other related investigatory testing; 3) a groundwater monitoring program summarized in the paragraphs below and 4) provide adequate financial assurance to demonstrate that adequate funding will be available to complete the construction, monitoring and operation and maintenance of the selected remedies. Table 4 summarizes the cost associated with each remedy alternative for each AOI in the Southend.

Table 4-Cost Associated with Each Remedy Alternative in the Southend

Media/Area of Concern	AOI	Remedy Alternatives	Cost
On-site Soil	02-C, 09-B, 12-A	Alternative 1: Engineering Controls and Additional Institutional Controls Above Baseline	$15,000.00
		Alternative 2: Excavation of Lead Contaminated Soil	$2,862,000.00
Off-site Soil	09-A	Alternative 1: Engineering Controls and Additional Institutional Controls Above Baseline	$15,000.00
		Alternative 2: Off-site Excavation of Lead and Benzo(a)pyrene Contaminated and Soil	$408,000.00
Southend LNAPL	09-B, 12-A, 12-C, 12-D, 02-B, 40-A, 40-B, 16-C	Alternative 1: Institutional Control Above Baseline	$15,000.00
		Alternative 2: LNAPL-Only Extraction and Additional Institutional Controls Above Baseline	$4,000,000.00
		Alternative 3: Steam-enhanced LNAPL Extraction	$2,580,000.00
Groundwater Monitoring	All AOIs	Monitoring	$2,887,500.00
Other-Building 40 Tunnel	40-D	Institutional controls to notify any future property owner of the presence of PCBs.	$15,000.00

On-site Soil Remedy Alternatives

Soil on-site in the Southend of the property is contaminated mainly with lead. The following areas of the facility have been found to have contaminated soil levels presenting unacceptable risks:

- AOI 02-C
- AOI 09-A
- AOI 09-B
- AOI 12

Alternative 1: Engineering Controls and Additional Institutional Controls above Baseline

This alternative would involve implementing engineering controls and additional institutional controls that would provide protection from direct contact to future Facility users. The engineering controls would include maintaining the surface cover consistent with existing conditions. The institutional controls would include establishing a deed restriction limiting excavations within the area of soil exceeding 900 mg/kg for lead. These restrictions would run with the property in perpetuity, or until soil containing concentrations above 900 mg/kg has been remediated.

Alternative 2: Excavation

This alternative would involve excavating soil exceeding 900 mg/kg for lead, and disposing of this soil offsite at an appropriate facility. The estimated volume of soil to be excavated would be 10,470 cubic yards. Sampling of the soil prior to excavation would be performed to both better define the appropriate excavation limits and establish proper disposal requirements.

Off-site Soil Remedy Alternatives

This remedy relates to AOI 09-A-Building 09. The releases from this area came from underground storage tank (UST) floor trenches and concrete containment for an above-ground storage tank (AST) which migrated to an off-site area now owned by the CSX Railroad.

Alternative 1: Engineering Controls and Additional Institutional Controls above Baseline

This alternative would involve implementing engineering controls and additional institutional controls that would provide protection from direct contact to users of the affected area. The engineering control would be to maintain the surface cover consistent with existing conditions. The institutional controls would include establishing a deed restriction limiting excavations in both MLC's and CSX's property deed. The deed restriction would run with the properties in perpetuity, or until the area has been remediated.

Alternative 2: Excavation

This alternative would include the excavation and offsite disposal of approximately 900 cubic yards of soil. The size of the excavation would be based on the removal of soil associated with this AOI that contains lead and benzo(a)pyrene exceeding above the EPA risk

limits for unrestricted use. The resulting excavation would be backfilled with appropriate fill imported from an offsite source.

Southend LNAPL Remedy Alternatives

There are several areas where LNAPL remains despite interim measures that have been performed. This section discusses different alternatives that could be performed in order to extract more LNAPL, which acts as a source of contamination to the groundwater that has potential to migrate to the Flint River. Table 5 below lists AOIs that will require further remediation and the approximate amount of remaining LNAPL in each AOI. Figures 2 and 3 also depict the current LNAPL (horizontal and vertical extent of the LNAPL contamination) and associated contamination that is dissolved in the groundwater.

Table 5 – AOIs with LNAPL

AOI	Wastes Associated with LNAPL	Approximate LNAPL Plume Size
Former Building 12 (12-A, 12-B, and 12-C)	Commingled mixture of oils mostly including hydraulic oil.	12-A: 2,000 square feet 12-B: 25,000 square feet 12-C: 30,000 square feet The apparent thickness in these areas range from less than 6 inches to 2 feet.
Former Building 02 (02-B)	Mixture of oils mostly including hydraulic and fuel oil	3,000 square feet The apparent thickness in this area is approximately 6 feet.
Former Building 16 and 40(16-C, 40-A, 40-B)	Commingled mixture of oils mostly including hydraulic and fuel oil	16-C, 40-A and 40-C: total of 8,000 square feet The apparent thickness in these areas is approximately 2.5 feet.
Former Building 31/Hamiliton Avenue Tank Farm (09-B)	Gasoline	5,000 square feet The apparent thickness in this area is 3 feet.

Alternative 1: Institutional Controls Above Baseline

This alternative would restrict direct contact with LNAPL in the groundwater in addition to the baseline deed restriction and groundwater use restrictions mentioned above by preventing excavation in the area where LNAPL is present but would not remove any additional LNAPL that is currently at the facility.

Alternative 2: LNAPL-Only Extraction and Additional Institutional Controls Above Baseline

This alternative involves collecting as much LNAPL from the subsurface as is technically practical and disposing of the collected LNAPL at an appropriate offsite facility. This alternative would consist of installing one to six new LNAPL recovery wells in each area with LNAPL. Submersible pumps designed to collect only LNAPL would also be installed in existing monitoring wells. In addition, oleophillic absorbent (oil absorbing) socks would be installed in existing monitoring wells in each of the areas. This system will be designed to enhance and maximize the effectiveness of the existing LNAPL extraction system. All collected LNAPL would be stored in drums or other suitable containers near the wellheads until sufficient LNAPL are collected for offsite disposal. It is expected that there would be a 30 year operation and maintenance for this system. If the levels do not achieve the groundwater-surface water interaction (GSI) criteria within a reasonable period of time or the contaminated groundwater plume is not stabilized through this extraction system, contingent measures would be implemented.

Alternative 3: Steam-enhanced LNAPL Extraction

This alternative involves collecting as much LNAPL from the subsurface as is technically practical and disposing of the collected LNAPL at an appropriate offsite facility. In this alternative, a subsurface network of steam injection and fluid extraction well fields would be installed in each of the plumes. Steam will be injected through these wells into the contamination trapped in the geologic material underground. The steam will "strip" or clean the contamination from the underground geology, mobilizing the contamination into the liquid phase. By mobilizing the contaminants in a controlled system, the LNAPL can be removed much more quickly and efficiently. A high vacuum fluid removal system would remove the liquid and the extracted material would go through oil/water separation, air stripping, and clay/carbon treatment to remove the newly mobilized contamination. All collected LNAPL would be stored in drums or other suitable containers near the wellheads until sufficient LNAPL are collected for offsite disposal. Other extracted and treated liquids would be discharged to the storm sewer. It is anticipated that the operation and maintenance on this system will be approximately two years. If unacceptable levels of LNAPL remain after the system has achieved its maximum amount of extraction (based on ongoing evaluation of the extraction rate and effectiveness of the system), institutional controls above baseline to limit excavation will be placed on the property (as described in Alternative 1). If the levels exceed GSI criteria, the chosen technology is not proven to be effective, or the contaminated groundwater plume does not remain stable, contingent measures will be implemented.

If new information or data presents itself, MLC may conduct pilot testing of other technologies to enhance LNAPL recovery, such as multi-phase extraction, surfactant enhancement, or biological enhancement, in addition to pilot testing steam-enhanced extraction. A workplan to begin any pilot tests for alternative remedies shall be submitted to EPA for review and approval within 30 days after EPA selects the final remedy. MLC should evaluate the results of the pilot testing in light of the four threshold criteria and the five balancing criteria described in the *Evaluation of the Proposed Remedy and Alternatives* section below. MLC will then submit a proposal to implement either steam-enhanced extraction or some other better technology to EPA for review and approval within six months after the workplan submittal date.

EVALUATION OF THE PROPOSED REMEDY AND ALTERNATIVES

This Section profiles the proposed remedy against the four threshold criteria and the five balancing criteria, noting how it compares to the other options under consideration.

On-site Soil Remedy

Selected Remedy-Alternative 1: Engineering Controls and Institutional Controls Above Baseline

1. Overall Protection: Both alternatives would provide adequate protection of human health and the environment by eliminating, reducing, or controlling the risk through removal and treatment, engineering controls and/or implementing institutional controls in order to limit excavation in the areas with contaminated soil. The selected remedy is protective of workers on site as it will provide a barrier between the contaminated soil and direct exposure to the worker.
2. Attainment of Media Cleanup Standards: Both alternatives would address their respective media cleanup standards of Federal and State environmental laws by eliminating the exposure pathway. The proposed remedy will prevent worker exposure to the contaminated soil in the short term and long term as long as the barriers are maintained. Alternative 2 would remove soils exceeding the 900 mg/kg industrial worker exposure standard.
3. Controlling the Sources of Releases: Both alternatives would be effective at reducing, to the extent practicable, further releases of contaminants. By choosing alternative 1,(an engineering control such as leaving the concrete slab in place), further groundwater infiltration will be mitigated and it will provide a barrier to worker exposure to the contaminated soil. Alternative 2, would remove the contamination directly through excavation.
4. Compliance with Waste Management Standards: If excavation (Alternative 2) was chosen, then disposal of the soil would have to meet state and federal waste management standards and would have to go to a licensed landfill. Alternative 1 does not require waste disposal for the remedy to be complete.
5. Long-term Reliability and Effectiveness: Alternative 1 would reduce the inherent hazards posed by the lead-contaminated soil by essentially capping it in place, and as long as the cap remains intact, this remedy will be very effective at preventing worker exposure to lead. That potential for direct exposure is the only source of unacceptable health risks. Alternative 2 (excavation) would not require long term maintenance to remain effective.
6. Reduction of Toxicity, Mobility, or Volume of Wastes: Alternative 1 would not reduce the volume or toxicity of the wastes but would reduce the potential mobility of the lead in the soil by providing a barrier to groundwater from infiltrating the area where soil is contaminated with lead. Alternative 2 would reduce the volume of the lead-contaminated soil by removing all soil with lead concentrations above MDEQ's Part 201 standard for industrial land use, which is 900 mg/kg.
7. Short-term Effectiveness: In Alternative 1, the concrete barriers already in place prevent exposure to the soil contaminated with lead underneath them, and will continue to do so. In the case of Alternative 2, excavation could create exposures

in the short-term due to dust production and transportation of the contaminated soil.

8. Implementability: Alternative 1 is easily implemented since the barriers currently exist at the facility and because the owner can readily place appropriate use restrictions on its property. Alternative 2 would require finding an approved disposal facility and transporting hundreds of truck loads of contaminated soils off site.
9. Cost: The present worth cost of Alternative 1 is $15,000 versus the estimated cost associated with Alternative 2 which is $2,862,000.00. Given the fact that the property use is anticipated to remain industrial, and that there is no current exposure pathway to the contamination, the added benefit from excavating and disturbing significant volumes of soil and shipping it off-site, is small.

In summary, Alternative 1 (EPA's preferred alternative) would achieve substantial risk reduction by maintaining and improving the direct barrier between the lead-contaminated soil and industrial worker contact. Considering that the reasonably anticipated future land use in this area will be industrial and that lead adheres to soil particles thus making it stable in the environment, the proposed remedy provides the best balance among the alternatives with respect to the evaluation criteria. In the event the barriers are removed, the use restrictions would require either replacement of the barrier or excavation and disposal of contaminated soil above industrial cleanup standards.

Off-site Soil Remedy

Selected Remedy-Alternative 2: Excavation and Off-site Disposal of Contaminated Soil on Off-site Property

1. Overall Protection: Both alternatives would provide adequate protection of human health and the environment by eliminating, reducing, or controlling the risk through removal and treatment, engineering controls and/or implementing institutional controls. Alternative 2 will protect human health by removing lead contaminated soil on the railroad's property and thereby eliminating potential future exposure to off-site workers conducting activities in the area. Alternative 1 will prevent direct exposure by using an engineered barrier to directly prevent worker exposure to the contamination and an institutional control to prevent excavation in the contaminated areas.
2. Attainment of Media Cleanup Standards: Both alternatives would address their respective media cleanup standards of Federal and State environmental laws by eliminating the exposure pathway for workers in those areas. Alternative 2 would remove soils exceeding the 400 mg/kg standard allowing for unrestricted use of the property. Alternative 1 will prevent worker exposure to the contaminated soil in the short term and long term as long as the engineered barriers are maintained.
3. Controlling the Sources of Releases: Both alternatives would be effective at reducing, to the extent practicable, further releases of contaminants. By choosing an engineering control such as leaving the concrete slab in place (as in Alternative 1), further groundwater infiltration will be mitigated and it will provide a barrier to worker exposure to the contaminated soil and by excavating the contaminated

soil on off-site property. Alternative 2, would directly control the source of release by removing the contaminated soil.

4. Compliance with Waste Management Standards: Alternative 2 involves excavation and off-site disposal of the lead-contaminated soil. Therefore, waste management standards need to be met when disposing of the contaminated soil. Alternative 1 does not require waste disposal for the remedy to be complete.
5. Long-term Reliability and Effectiveness: Both alternatives would reduce the inherent hazards posed by the lead-contaminated soil. Alternative 2 would not require long term maintenance to remain effective. Alternative 1 would reduce the inherent hazards posed by the lead-contaminated soil by capping it in place, and as long as the cap remains intact, this remedy would be very effective at preventing worker exposure to lead and benzo(a)pyrene.
6. Reduction of Toxicity, Mobility, or Volume of Wastes: Alternative 1 would reduce the mobility of the lead in the soil by providing a barrier to groundwater to infiltrate the area where soil is contaminated with lead. Alternative 2 would reduce the volume of the lead-contaminated soil by removing all soil with lead and/or benzo(a)pyrene above unrestricted use criteria thereby eliminating the need for additional deed restrictions on CSX's property.
7. Short-term Effectiveness: Alternative 1 would provide the most short-term effectiveness. Alternative 2 (excavation off-site) could create short-term exposure risks since the contaminated soil would be disturbed with excavation. However, proper health and safety procedures will be adhered to during excavation, such as dust control.
8. Implementability: Excavation of off-site soil (alternative 2) poses more of an issue to implementability since access agreements need to be made with the off-site property owner in order to allow MLC to do excavation on their property. However, placing an institutional and/or engineering control on the off-site property (alternative 2) would pose the same issue, where agreements would be needed and the property would require further long-term restrictions placed on it due to the presence of elevated lead and benzo(a)pyrene. By excavating the contaminated soil to unrestricted use limits, additional land use restrictions will not have to be placed on CSX's property.
9. Cost: The cost of Alternative 2 (excavation of contaminated soil on the off-site property) is $408,000.00 versus $15,000.00 for Alternative 1 (establishing institutional and/or engineering controls) on the off-site property.

Alternative 2, excavating contaminated soil at the off-site property to unrestricted use standards is the most effective remedy. No additional institutional controls will be required for the property since the lead and benzo(a)pyrene contamination will be removed. In addition, no additional operation or maintenance would be required with an engineering control. This avoids the difficulty of imposing and maintaining long-term engineering controls and use restrictions on a third party's property.

Southend LNAPL

Selected Remedy-Alternative 3 Steam-Enhanced LNAPL Extraction

1. Overall Protection: All of the alternatives would provide adequate protection of human health and the environment by eliminating, reducing, or controlling the risk through treatment, engineering controls and/or implementing institutional controls. The proposed remedy will reduce the mass of free product in the groundwater at the fastest rate of any of the alternatives and thereby provide a greater amount of protection for the environment. Furthermore, this remedy will allow the groundwater to be restored more quickly.
2. Attainment of Media Cleanup Standards: It is anticipated that Alternatives 2 and 3 would meet their respective media cleanup standards of Federal and State environmental laws. However, Alternative 2 is limited by the amount of LNAPL that the recovery systems are able to pump from the ground. Alternative 3 is designed to remove the largest amount of LNAPL, promoting the achievement of media cleanup standards and eliminating the source of dissolved contaminants in the groundwater to the greatest extent feasible.
3. Controlling the Sources of Releases: Alternatives 2 and 3 will control the sources of releases by physically removing the LNAPL that exists at the site. Alternative 1 will not.
4. Compliance with Waste Management Standards: In Alternatives 2 and 3, after free product is pumped out of the ground, it will need to be disposed of according to waste management standards. Alternative 1 does not require compliance with waste management standards since it will only limit use of the land.
5. Long-term Reliability and Effectiveness: All alternatives will be reliable long-term. However, removing product from the ground as in Alternatives 2 or 3 would be the most effective and reliable long-term.
6. Reduction of Toxicity, Mobility, or Volume of Wastes: Alternative 1 (Additional institutional controls above baseline) will not reduce the mass of the LNAPL. This alternative will only limit worker exposure to the contamination and reduce mobility by mitigating groundwater infiltration. Alternatives 2 and 3 will produce much more significant reductions in contaminant mobility and will also reduce the volume and levels of waste products by physically removing LNAPL from the groundwater to the greatest extent achievable.
7. Short-term Effectiveness: Alternative 1 would be the most effective in the short term by directly protecting workers in the area. Alternative 2 is effective in the short-term since it is currently an operational system, but to make it more effective, new wells will need to be installed. Alternative 3 will not be effective from the start since a whole new system will need to be put in place, but once the system is operational, it will immediately begin removing LNAPL. Good construction management practices will be used in upgrading and installing the extraction systems to minimize short-term exposures from construction activity.
8. Implementability: All alternatives can be implemented easily. The easiest to implement would be Alternative 1 since no construction is required. Alternative 2 will require installation of new recovery wells in those areas with LNAPL.

Alternative 3 will require installation of a whole new system for the injection of steam and extraction of LNAPL.

9. Cost: Alternative 1 (institutional controls) would cost $15,000.00. Alternative 2, LNAPL-only extraction and additional institutional controls above baseline would cost $4,000,000.00 versus $2,580,000.00 for Alternative 3, steam-enhanced LNAPL recovery. Alternative 3 is more cost effective because it produces greater recovery of LNAPL in a shorter period of time.

Taking into account all of these factors, Alternative 3 was chosen as the remedy because it will reduce the greatest amount of LNAPL mass in the shortest amount of time. By removing more LNAPL, which acts as a source for groundwater contamination, the potential for migration of contaminants to the Flint River will be reduced. Alternative 3 also increases the likelihood that the groundwater will be cleaned up to levels allowing for maximum beneficial use of that groundwater.

Southend Groundwater Monitoring and Contingency Plan

A groundwater monitoring plan will be developed in the Corrective Measures Implementation (CMI) Workplan. The purpose of groundwater monitoring will be 1) to measure the effectiveness of the LNAPL remedy; 2) monitor the long-term stability of contaminants in the groundwater; 3) insure continued compliance with the MDEQ groundwater/surface water interface (GSI) criteria for the long-term protection of the Flint River. Contingencies and performance standards will also be developed in the CMI workplan that will be subject to EPA review and approval. The contingency plan will be developed so that in the event that selected remedies are later found to not achieve cleanup goals (such as the GSI criteria) or the contaminated groundwater plume does not remain stable, an alternative remedy can easily be identified and implemented.

PUBLIC PARTICIPATION

EPA is soliciting input from the community on the selected cleanup methods proposed in this document. The public is also invited to provide comments on remedial alternatives not addressed in this Statement of Basis. EPA has set a public comment period from January 28-February 28, 2010 to encourage public participation in the selection process. The comment period includes a public meeting at which EPA will present the SB, answer questions, and accept both oral and written comments.

The Administrative Record is available at the following locations:

Flint Public Library (Main Branch)
1026 E. Kearsley Street
Flint, Michigan
Hours
Monday-Thursday: 9:00 AM-9:00 PM
Friday-Saturday: 9:00 AM-6:00 PM

U. S. EPA Region 5 Records Center
77 W. Jackson Blvd.
Chicago, Illinois
Hours
Monday-Friday: 8:00 AM to 4:00 PM