TECHNICAL REPORT

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LNAPL Recovery System Operation and Maintenance Plan

Saginaw Malleable Iron Plant and
Delphi Saginaw Steering Systems
Plant 2 Properties

General Motors Corporation
Saginaw, Michigan

October 2000

BBL
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1. Introduction

1.1 General

This document presents an Operation and Maintenance (O&M) Plan for the light, non-aqueous phase liquid (LNAPL) recovery system at the General Motors Corporation (GM) Saginaw Malleable Iron (SMI) Plant and Delphi Saginaw Steering Systems Plant 2 properties located in Saginaw, Michigan. The LNAPL recovery system was constructed as part of the commitment to the Michigan Department of Environmental Quality (MDEQ) to install an LNAPL Recovery System Interim Response Action (IRA) pursuant to Part 201 of the Natural Resources and Environmental Protection Act (NREPA), as amended.

1.2 LNAPL Recovery System Description/Construction

The LNAPL recovery system was constructed in accordance with the LNAPL recovery system contract drawings prepared by Blasland, Bouck & Lee, Inc. (BBL) dated June 1996. Construction of the LNAPL recovery system consisted of the following major elements:

- Installation of four new recovery wells;
- Installation of LNAPL recovery and groundwater depression pumps and associated controls for the recovery wells;
- Installation of underground LNAPL and groundwater transfer piping within containment piping from each recovery well to the treatment system enclosure;
- Installation of a 20-foot by 25-foot treatment system enclosure; and
- Installation of treatment system equipment including:
  - One oil/water separator (OWS);
  - One OWS LNAPL transfer pump and associated controls;
  - One OWS water transfer pump and associated controls;
  - Two bag filters in parallel and associated controls;
  - Two granular activated carbon (GAC) units in series;
  - One treatment system enclosure sump pump and associated controls;
  - One in-line mixer (installed in August 1998);
  - One hydrogen peroxide metering pump (installed in August 1998);
  - Three LNAPL collection totes (two totes as part of the system and a third as a spare);
  - One rain gauge; and
  - One autodialer.

Construction of the LNAPL recovery system began in January 1997 and was completed in September 1997. Changes were made to the original construction in August 1998. Record drawings are provided in Appendix A.

The LNAPL recovery system consists of the following four recovery wells:

- PW-1 located 100 feet northeast of the treatment building on the GM SMI Plant Property;
- PW-2 located 700 feet southeast of the treatment building on the GM SMI Plant Property;
- PW-3 located 100 feet south of the treatment building on the GM SMI Plant Property; and
- PW-4 located 250 feet northwest of the treatment building on the Delphi Saginaw Steering System Plant 2 Property.

Each recovery well has one scavenger LNAPL pump with an LNAPL/water level control and one groundwater pump. The scavenger pumps discharge directly to one of two LNAPL totes that are located in the Treatment Building. The groundwater is pumped to a common line for all four wells in the Treatment Building. After the groundwater enters the common line, it is sent to an oil/water separator. The oil that is captured in the oil/water separator is pumped via an oil transfer pump to one of the two LNAPL totes in the Treatment Building. The water from the oil/water separator is then pumped through an additional treatment system that includes hydrogen peroxide addition, a 10 micron bag filter, and a two-unit GAC system that is used in series. The treated water is discharged to an on-site sanitary sewer .

1.3 Purpose and Organization of Plan

The purpose of this document is to establish O&M procedures that will ensure the continued effectiveness of the LNAPL recovery system. This LNAPL Recovery System O&M Plan is organized into the following five sections:

- *Section 1 – Introduction.* Presents general information about this document.
- *Section 2 – Operations and Maintenance Personnel.* Identifies the GM personnel associated with the LNAPL recovery system and outlines the training requirements for the O&M contractor.
- *Section 3 – Inspections.* Discusses inspections of the LNAPL recovery system including sampling and analysis activities.
- *Section 4 – Maintenance.* Discusses the maintenance activities that will likely be necessary to maintain the LNAPL recovery system in proper operating condition.
- *Section 5 – Transport and Disposal of LNAPL and Spent Carbon.* Discusses the requirements for the off-site transport and disposal of waste generated during O&M activities.

2. Operations and Maintenance Personnel

2.1 Site and Environmental Affairs Personnel

The table below lists the personnel associated with LNAPL recovery system O&M activities.

Company and Title	Contact	Phone Number
GM Project Coordinator	Cheryl Hiatt	(315) 556-9032
GM SMI Contact	Megan Shaffner	(517) 757-0920
GM SMI Security	Richard Saenz	(517) 757-0545
GM SMI Confined Space Entry	Rich Main	(517) 757-1038
Delphi Plant 2 Plant Control	John Krause	(517) 757-5245
Delphi Plant 2 Environmental Contact	David Seamans	(517) 757-4258

2.2 O&M Contractor Training Requirements

Routine O&M activities at the LNAPL recovery system will be conducted by an O&M contractor to be selected by GM. The O&M contractor will be responsible for implementing the O&M activities described in this plan. These activities include managing water, LNAPL, spent carbon, and other waste that could potentially contain volatile and semi-volatile organic compounds, inorganic compounds, and polychlorinated biphenyls (PCBs).

To ensure that the O&M work is completed in a safe manner, the O&M contractor will be required to prepare, submit, and implement a site-specific Health and Safety Plan (HASP). The HASP must, at a minimum, address the following items:

- For work described in this plan, the O&M contractor must comply with all federal, state, and local regulations including (but not limited to) 29 CFR Part 1910, 40 CFR 260-267 and related regulations that call for developing and implementing a safety and health program for employees involved in hazardous waste operations. The O&M contractor will be required to comply with all requirements under these regulations for this project.

- Prior to commencing field activities, the O&M contractor's manager will have had site manager training and will certify that personnel assigned to perform O&M activities at the LNAPL recovery system, including direct employees as well as subcontractors, have completed a 40-hour health and safety training course (and annual refresher training) in accordance with 29 CFR 1910. The O&M contractor will also certify that any individuals who later become employed by the O&M contractor to conduct O&M activities also attend such training prior to performing work at the LNAPL recovery system. Employees and subcontractors of the O&M contractor who are unable to demonstrate compliance with such training requirements will be limited to support roles at the LNAPL recovery system.

- The O&M contractor will certify that all personnel who will be employed by the O&M contractor to perform O&M activities at the LNAPL recovery system, including direct employees as well as subcontractors, have received the initial and annual (if applicable) medical examinations as required by 29 CFR 1910.

- The O&M contractor will comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54).

- The O&M contractor must understand and follow plant safety and environmental guidelines as presented by plant environmental personnel.

- The O&M contractor will be responsible for the safety of his employees, subcontractors, suppliers, and other parties at the work area as a result of the O&M contractor's direction.

- The HASP will also include, but not be limited to, the following components:

  - Identification of Key Personnel – Identify, by name and title, the on-site and off-site health and safety personnel responsible for implementing health and safety procedures.

  - Site Hazards – Identify and provide a means to mitigate all foreseeable chemical and physical hazards associated with the work, including, but not limited to, hazards associated with exposure to constituents of concern.

  - Work Zones – If required, the following work zones will be designated: Exclusion Zones, Decontamination Zones, and Support Zones. If personal protection is required, the level for each zone will be specified.

  - Personal Protective Equipment (PPE) and Protective Clothing – Identify PPE and protective clothing to be used and available on-site.

  - Personal and Area Air Monitoring – Identify protocols and criteria associated with personal and area air monitoring of on-site personnel. The air monitoring will address both airborne volatile constituents and fugitive particulate emissions, if required.

  - Equipment Cleaning – Describe methods and procedures to decontaminate personnel, vehicles, and equipment.

  - Contingency Plan – Develop an alternative plan for all activities associated with the O&M of the LNAPL recovery system to prevent the likelihood and to mitigate the impact of a spill of any materials brought on site by the O&M contractor. This plan should address any materials or waste related to the LNAPL recovery system, such as LNAPL-impacted water, spent carbon, and LNAPL, removed and handled by the O&M contractor.

  - Material Safety Data Sheets – Provide Material Safety Data Sheets (MSDSs) for all materials to be brought on site, as well as constituents that are expected to be encountered during O&M activities.

  - All materials brought onsite must receive prior written approval from the GM SMI contact. A notice of request to bring approved materials onsite must be submitted to GM one week prior to their use.

The O&M contractor will determine the appropriate level of worker safety equipment and procedures based on site visit(s) and review of available information as deemed necessary. Should any unforeseen or site-specific safety-related factor, hazard, or condition become evident during the performance of work at the

LNAPL recovery system, it will be the O&M contractor's responsibility to bring such to the attention of the GM on-site representative both verbally and in writing as quickly as possible for resolution. In the interim, the O&M contractor will take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment.

2.3 Reporting Requirements

The O&M contractor must immediately notify GM verbally of any issues or problems with the operation of the LNAPL recovery system and document the issue or problem and the resolution to the issue or problem within two weeks.

The O&M contractor will be responsible for preparing a monthly LNAPL recovery system O&M Report for GM with the following contents:

- Written narrative that summarizes the prior month's O&M activities and the current status of the LNAPL recovery system;
- LNAPL Recovery System Inspection Log;
- LNAPL Recovery System Maintenance Log;
- Records of equipment, manpower, and materials used during O&M activities;
- Records of the quantity of water treated and discharged;
- Records of the quantity of LNAPL recovered;
- Records of sample analytical results, as generated;
- Disposal records for spent carbon and LNAPL, as generated; and
- Records of the quantity of hydrogen peroxide used.

The O&M contractor will also be responsible for preparing an annual LNAPL Recovery System O&M Summary Report for GM's submittal to the MDEQ. This report will provide a summary of key information from the monthly reports such as quantity of water treated, quantity of LNAPL recovered, sample analytical results, etc.

3. Inspections

3.1 General

The O&M contractor will conduct weekly inspections of the LNAPL recovery system to obtain operating data and to identify any required maintenance activities. The inspections and associated maintenance will be conducted to ensure the continued effectiveness of the LNAPL recovery system. The inspections will include assessing the LNAPL recovery system components; collecting operating data; collecting water, LNAPL, and spent carbon samples, as required; performing maintenance procedures; and routine housekeeping (e.g., trash removal, general cleaning, etc.). Results of the inspections will be recorded on an LNAPL Recovery System Inspection Log, included in this plan as Table 1, and retained at the facility. The LNAPL recovery system layout and components are shown on the record drawings included in this plan as Appendix A.

3.2 LNAPL Recovery Well Inspections

Each of the four recovery wells are located within 48-inch-diameter by 48-inch-deep concrete manholes. Access to each manhole is provided by a heavy-duty, 24-inch by 24-inch iron cover. Access into the manhole shall be performed using an appropriate harness and tripod-lifting device to lower the individual into the structure and follow all confined space entry rules and regulations. This includes having a trained individual outside the manhole during entry. A permit must be obtained from the plant prior to entry. During manhole entry, the area around the manhole shall be temporarily barricaded to reroute traffic around the manhole. At the end of the inspection, the manhole cover is to be closed and the temporary barricade is to be removed. Within each manhole is an 18-inch-diameter well riser pipe that contains an LNAPL recovery pump and a groundwater depression pump. Also within each manhole is a ½-inch-diameter nylon LNAPL transfer hose, one-inch-diameter rubber groundwater transfer hose, associated valves, and electrical power and control wiring. The LNAPL and groundwater transfer hoses enter a 3-inch-diameter containment pipe at the exit point of each manhole and continue through the 3-inch-diameter containment pipe until entry into the treatment enclosure.

Each recovery well will be inspected to determine the structural integrity of the concrete manhole and cover, the well riser pipe/concrete grout seal, and the LNAPL and groundwater pumps, transfer hoses, electrical wires, and valves. The hoses and valves within the manhole will be inspected for any sign of leakage, and the containment pipe will be inspected to determine if either the LNAPL or groundwater transfer hoses are leaking between the manhole and the treatment enclosure.

At a minimum, the LNAPL thickness will be measured once per month at well locations RW-1, RW-2, RW-3, RW-4, MW-147WT, MW-148WT, MW-157WT, MW-158WT, MW-160WT, MW-168WT, MW-172WT, MW-175WT, MW-178WT, and TP-2. Based on thickness and distribution found at the above well locations, more wells may be added to the LNAPL measuring program.

3.3 Treatment Enclosure and Associated Equipment Inspections

The LNAPL recovery system equipment (other than the LNAPL and groundwater well pumps) is located within an insulated, ventilated, and heated 20-foot by 25-foot enclosure. The LNAPL recovery system equipment includes the following major components:

Equipment Description	Equipment Purpose
OWS	Separates LNAPL from groundwater pumped from recovery wells.
OWSLNAPL Transfer Pump	Transfers LNAPL collected in the OWS to LNAPL collection totes.
OWS Water Transfer Pump	Transfers groundwater collected in OWS to other groundwater treatment equipment.
Hydrogen Peroxide Metering Pump	Introduces a metered amount of hydrogen peroxide to the in-line mixer.
In-Line Mixer	Mixes a metered amount of hydrogen peroxide into groundwater stream.
Bag Filter Units	Removes particulates and emulsified LNAPL from water to minimize fouling of GAC units.
GAC Units	Removes PCBs, other organics, and metals from groundwater prior to discharge to on-site sanitary sewer.
Treatment Enclosure Sump Pump	Transfers any LNAPL or water collected in the treatment building sump to the OWS.
LNAPL Collection Totes	Provides temporary storage for LNAPL pending sampling, analysis, and disposal.

Other ancilliatory equipment includes manual and automatic valves; pressure gauges; pressure switches; treated groundwater discharge flow meter; pump on and off switches for the OWS and treatment building sump; and high level alarm switches for the OWS, the treatment building sump, LNAPL collection totes, and HVAC system.

The following inspections will be performed on each component of the LNAPL recovery system:

- OWS – To verify structural integrity and proper operation per manufacturer's literature.
- OWS LNAPL transfer pump – To verify proper operation per manufacturer's literature.
- In-line mixer – To verify proper operation per manufacturer's literature.
- Hydrogen peroxide metering pump – To verify proper operation per manufacturer's literature.
- OWS water transfer pump – To verify proper operation per manufacturer's literature.
- Bag filter units – For accumulation of solids or fouling that could effect filter performance. Pressure drop through the bag filter unit(s) will be determined using the pressure gauges located upstream and downstream of the bag filter unit(s).
- GAC filter units – For structural integrity and proper operation per manufacturer's literature. Pressure drop through the GAC filter units will be determined using the pressure gauges located upstream and downstream of the GAC filter units.
- LNAPL collection totes – For structural integrity and volume of collected LNAPL. Volume of collected LNAPL must be tracked on an Access® database or Excel® spreadsheet for reporting to the state.

- LNAPL process piping – For structural integrity. Pressure gauges on the process piping will be checked and pressure differentials along the process piping will be calculated to estimate scaling and fowling of the process piping.

- Treatment enclosure – For structural integrity and proper operation of floor, roof, siding, doors, and protective bollards.

- Treatment enclosure sump and sump pump – For structural integrity and proper operations using manufacturer's literature.

- Treatment enclosure HVAC and lighting systems – To verify proper operation per manufacturer's literature.

- Check calibration of LEL meter.

- General check for leaks in piping and tanks.

- General housekeeping and cleaning of treatment building.

3.4 Sampling and Analysis

The O&M contractor will be responsible for the sampling and analysis of treated groundwater, collected LNAPL, and spent carbon.

Treated groundwater collected after the secondary GAC unit will be sampled and analyzed twice monthly for the following constituents:

- Volatile organic compounds (VOCs) using USEPA Method 8260;
- Semi-Volatile Organic Compounds (SVOCs) using USEPA Method 8270;
- Polychlorinated biphenyls (PCBs) using USEPA Method 608;
- Inorganics using USEPA 6010 and 7000 Series; and
- Flash point USEPA Method 1010.

Treated groundwater collected after the primary GAC unit will also be sampled and analyzed for the following constituents:

- PCBs using USEPA Method 608.

The collected LNAPL and spent carbon will be sampled and analyzed, as needed, for disposal characterization as required by the GM national disposal contractor. For the purposes of this plan, the following parameters are assumed:

- VOCs using USEPA Method 8260;
- SVOCs using USEPA Method 8270;
- PCBs using USEPA Method 8080;
- Total petroleum hydrocarbons (TPHs) using USEPA Method 418.1;
- TCLP, VOCs, SVOCs, and 10 Michigan metals;
- Flash point EPA Method 1010;

- pH;
- Reactivity; and
- Total sulfide.

Prior to sampling and analysis, GM must provide approval of the analytical laboratory selected by the O&M contractor.

3.5 Recordkeeping and Reporting

The information collected by the O&M contractor during the LNAPL recovery system inspections will be recorded on the LNAPL Recovery System Inspection Log, included as Table 1 in this plan, and transferred to an electronic media such as Access® or Excel®. This database or spreadsheet shall be maintained and updated as needed. The inspection log and records of samples taken and analytical results will be included in the O&M contractor's annual report to the GM site contact.

4. Maintenance

4.1 General

The O&M contractor will perform various routine maintenance tasks to ensure the ongoing effectiveness of the LNAPL recovery system, and will also perform any maintenance needed to correct problems identified during the LNAPL recovery system inspections. All maintenance activities will be recorded on an LNAPL Recovery System Maintenance Log, included with this plan as Table 2. All maintenance will be conducted according to applicable equipment warranties and per the Operation and Maintenance Manuals provided by equipment vendors for the LNAPL recovery system. Appendix C to this plan contains the Operation and Maintenance Manuals and warranties provided from vendors. PPE will be worn in accordance with the LNAPL Recovery System HASP.

4.2 Frequency

The O&M contractor will perform routine maintenance during the weekly inspection of the LNAPL recovery system. Non-routine maintenance will be performed as soon as is feasible when a problem has been identified. Problems that threaten worker health and safety or the environment must be dealt with as soon as possible, and within two hours of notification. The O&M contractor shall notify GM of any non-routine required repairs prior to completing the repairs, although notification will not hold up any urgent repairs. All non-routine system repairs will be addressed in a timely manner. All alarms will be acknowledged within 24 to 48 hours of the alarm.

4.3 LNAPL Recovery Well Maintenance

The O&M contractor will clean debris off of the LNAPL recovery well concrete manholes and hinged cast iron covers so that the hinged covers operate properly. Any cracks or leaks in the concrete manhole, broken hinges, or leaks at conduit and pipe penetration seals will be repaired. Recovery wells with covers open or removed will be temporarily barricaded at all times to prevent traffic accidents. At a minimum, the O&M contractor will perform the following routine maintenance procedures on the LNAPL recovery well pumps, hoses, valves, hand cranks, steel cables, electrical cables, and connectors and appurtenances.

Equipment Description	Routine Maintenance Procedures
LNAPL Pump	• Check pump discharge flow rate; • Measure thickness of LNAPL layer in well; • Maintain pump per manufacturer's recommendations; and • Clean pump and remove any accumulated dirt.
Water Pump	• Check pump discharge flow rate; • Check pump motor current draw and compare to appropriate motor current draw found in pump manufacturer's literature; • Maintain pump per manufacturer's recommendations; and • Clean pump and remove any accumulated dirt.
Metering Pump	• Check pump performance against manufacturer's literature; • Maintain pump per manufacturer's recommendations; and • Clean pump and remove any accumulated dirt.

Equipment Description	Routine Maintenance Procedures
Hand Crank and Steel Cable	• Check for proper crank operation and condition of steel cable.
LNAPL and Water Discharge Hoses and Valves	• Check condition of hoses and valves.
Electrical Power and Control Cables	• Check condition of electrical power and control cables.

The O&M contractor will also perform any other non-routine maintenance activities necessary to keep the LNAPL recovery pumps in good working condition.

4.4 Treatment Enclosure and Associated Equipment Maintenance

The O&M contractor will, at a minimum, perform the following routine maintenance procedures:

Equipment Description	Routine Maintenance Procedures
Treatment Enclosure	• Maintain heated pre-engineered building per manufacturer's recommendations. • Maintain heated pre-engineered building in a clean, neat, and organized condition.
Treatment Enclosure Sump Pump	• Maintain per manufacturer's recommendations.
OWS	• Clean coalescing screen as needed and maintain unit per manufacturer's recommendations.
OWS LNAPL Transfer Pump	• Maintain per manufacturer's recommendations.
OWS Water Transfer Pump	• Maintain per manufacturer's recommendations.
Hydrogen Peroxide Pump	• Maintain per manufacturer's recommendations.
Bag Filter Units	• Provide replacement filters and replace bag filter elements as needed when the differential pressure increases and maintain filter housings per manufacturer's recommendations.
GAC Filter Units	• Replace carbon in primary GAC unit if analytical results of monthly water testing indicate breakthrough of PCBs in the primary unit. During carbon replacement, the primary GAC unit will be replaced with the secondary GAC unit and the newly rebedded carbon unit will be positioned as the secondary GAC unit. • Allow carbon to sit in water 8 to 12 hours after filling to allow air to leave system.
LNAPL Collection Totes	• Clean high level float and switches as needed to maintain proper operation; • Drain off any water that accumulates in the collection tote to the enclosure sump using drain valve and hose at bottom of collection tote; and • Transfer LNAPL into GM-provided containers, as needed, to maintain sufficient LNAPL storage capacity.
Process Control Panel	• Maintain per manufacturer's recommendations.
Autodialer	• Maintain per manufacturer's recommendations.
Rain Gauge	• Maintain per manufacturer's recommendations.
LEL Meter	• Calibrate per manufacturer's recommendations.

The O&M contractor will also perform other non-routine maintenance activities such as cleaning or replacing well pumps, replacing cut or cracked hoses and electrical cables, making repairs to treatment enclosure and floor, or other measures necessary to keep the LNAPL recovery system equipment in good working condition.

4.5 LNAPL Recovery System Settings

The LNAPL recovery system is designed to run in automatic operation. The following settings are needed to run the system in automatic operation:

- RW-1 through RW-4 – Must be set up in automatic operation. This allows for on-site operation of pump functions using panel controls and indicators;
- Water transfer pumps – Automatic operation;
- Oil transfer pumps – Automatic operation;
- Treatment Building sump pump – Automatic operation; and
- Hydrogen peroxide metering pump – 1.0 to 2.0 parts per million at effluent to the bag filters.

The hydrogen peroxide solution concentration is to be 25 percent solution.

4.6 Trouble Shooting

The LNAPL recovery system is made up of the following five subsystems:

- Recovery wells;
- OWS, transfer pumps, and sump pump;
- Hydrogen peroxide metering pump;
- Bag filters and GAC vessels;
- LNAPL totes; and
- Treatment system enclosure.

A troubleshooting table for these subsystems can be found in Appendix B.

4.7 Recordkeeping and Reporting

The maintenance performed by the O&M contractor will be recorded on the LNAPL Recovery System Maintenance Log included with this plan as Table 2. The maintenance log will be included in the O&M contractor's annual report to the GM site contact.

5. Transport and Disposal of LNAPL and Spent Carbon

5.1 General

The O&M contractor will be responsible for the on-site transport of waste materials generated during operation of the LNAPL recovery system to the GM/SMI Plant designated storage area (the PCB cage or the hazardous materials cage), including providing all labor, equipment, and materials needed for the on-site transport of recovered LNAPL, spent carbon, and other waste generated during O&M activities. The O&M contractor must arrange to change out the spent carbon. The O&M contractor will be responsible for labeling all waste containers in accordance with DOT regulations at 49 CFR 107 and 171-189, as well as applicable RCRA and TSCA regulations.

5.2 Off-Site Transport and Disposal

The O&M contractor will be responsible for on-site handling and coordinating with GM environmental personnel for the off-site transport and disposal of the recovered LNAPL, spent carbon, and other waste generated during O&M activities. The O&M contractor will be responsible for the proper storage, labeling, and manifesting; obtaining shipping documents for GM; and arranging for disposal and supervision of disposal in the proper timeframe. GM has the final responsibility for off-site transport and disposal of LNAPL recovery system wastes. The O&M contractor will arrange for disposal and incineration of LNAPL, PPE, spent carbon, sediment from wells, and any other waste. A responsible representative from the O&M contractor must be there during removal of LNAPL, PPE, spent carbon, sediment from wells, and any other waste.

5.3 PPE Disposal

The O&M contractor will dispose of all PPE by bagging the PPE and placing it in a drum. Every drum will be labeled with its contents and an accumulation date.

5.4 Sampling and Analysis

The O&M contractor will be responsible for treated groundwater and waste characterization sampling as described in Section 3.4 of this plan.

5.5 Controls and Contingencies

The O&M contractor will be responsible for preparing, submitting, and implementing a Contingency Plan as part of the HASP. This plan must be prepared in coordination with plant personnel and must incorporate the following plant guidelines:

- A spill prevention control and countermeasure plan for all materials brought to the site and waste material generated during LNAPL and spent carbon removal activities. All hazardous materials must have received authorization to be brought onsite by plant environmental personnel.

- Emergency vehicular access/egress.

- Evacuation procedures for personnel from the site.

- A list of all contact personnel with phone numbers, including the plant security personnel, O&M contractor; GM personnel; fire officials; ambulance service; local, county, and state police; and local hospitals, including routes to local hospitals and procedures for notifying each.

- Method to contain gasoline/diesel fuel spills if these fuels are to be brought into the limits of the work area. No additional compensation will be provided to the O&M contractor for work related to cleaning up spills or leaks caused by the O&M contractor's personnel or equipment.

5.6 Recordkeeping and Reporting

The O&M contractor will keep records of all transport and disposal activities. The records will contain, at a minimum, all the analytical data, and the quantity and type of containers used for each waste stream transported and disposed of off-site. The records will also include copies of all hazardous waste manifests and shipping papers. Original copies of waste manifests and shipping papers must be sent to the GM Worldwide Facilities Group with copies to the GM SMI-Environmental Engineering Group. This information will be included in the O&M contractor's annual report to the GM site contact.

Tables

Table 1 – LNAPL Recovery System Inspection Log

Table 1

General Motors Corporation
Saginaw, Michigan

LNAPL Recovery System Inspection Log

A. Visual Inspections

Recovery Wells	RW-1 Yes/No	RW-2 Yes/No	RW-3 Yes/No	RW-4 Yes/No	If No/Items to Check[1]	Description of Condition/Unusual Circumstances
Concrete manhole and cover in good condition?					Replace as needed	
Does interior of concrete manhole require cleaning to remove water, oil, and dirt?					Clean as needed	
Well riser pipe and concrete grout seal to bottom of manhole in good condition?					Replace grout	
LNAPL and groundwater transfer hoses and valves in good condition?					1-4	
Electrical power and control cables in good condition?					1-4	
LNAPL and groundwater pumps operating properly?					1-4	
Hand crank and steel cable in good condition?					1-4	
Any water on floor of manhole interior?					1-4	
Any LNAPL on floor of manhole interior?					1-4	
Any LNAPL in well? (If yes, record LNAPL layer thickness in yes/no column)						
Autodialer operating properly?					See vendor-supplied O&M manual	
Rain gauge operating properly?					Check level indicator	
OWS in good condition and operating properly?					5	
OWS LNAPL transfer pump in good condition and operating properly?					6-11	
Hydrogen Peroxide System in good condition and operating properly?					15-17	
OWS water transfer pump in good conditon and operating properly?					12-13	
Bag filter unit(s) in good condition and operating properly?					18	

Notes:
1 Refer to Appendix B for items to check.

LNAPL Recovery System Inspection Log

A. Visual Inspections

Recovery Wells	RW-1 Yes/No	RW-2 Yes/No	RW-3 Yes/No	RW-4 Yes/No	If No/Items to Check[1]	Description of Condition/Unusual Circumstances
Differential pressure across the bag filter ok?					18	
GAC filter unit(s) in good condition and operating properly?					19	
Differential pressure across the GAC filter ok?					19	
LNAPL collection totes in good condition?					20, and replace as needed	
Treatment enclosure interior in neat and well-organized condition and floor is clean?					Cleanup treatment area	
Treatment enclosure sump and sump pump in good condition and operating properly?					14	
Treatment enclosure, including HVAC and lighting systems, in good condition and operating properly?					21-28	
Treatment enclosure doors and door locks in good working order?					Replace as needed	
LEL monitor working properly?					Refer to vendor-supplied O&M manual	
Exterior alarm lights working properly?					22	
Electrical cords, conduit, panels, and other electrical equipment in good condition and operating properly?					Replace as needed	

Notes:

1 Refer to Appendix B for items to check.

Table 1
(Cont'd)
General Motors Corporation
Saginaw, Michigan

LNAPL Recovery System Inspection Log

B. Pressure Readings

Bag Filter Unit(s)	In Run (Yes/No)	Inlet Pressure	Discharge Pressure	Pressure Drop (Inlet-Discharge Pressure)
Bag Filter No. 1		psig	psig	psig
Bag Filter No. 2		psig	psig	psig

GAC Filter Unit(s)	In Run (Yes/No)	Inlet Pressure	Discharge Pressure	Pressure Drop (Inlet-Discharge Pressure)
Primary GAC Unit		psig	psig	psig
Secondary GAC Unit		psig	psig	psig

C. Recovery Well LNAPL Pump Run Times

Equipment	Hours of Operation		
	Current Reading (Hours)	Previous Reading (Hours)	Operating Time Since Previous Reading (Hours)
RW-1 LNAPL Pump			
RW-2 LNAPL Pump			
RW-3 LNAPL Pump			
RW-4 LNAPL Pump			

LNAPL Recovery System Inspection Log

D. LNAPL Recovered from Each Recovery Well

- RW-1 total operating time ____Hr x RW-1 LNAPL pumping rate 40 gphr = ____ total gallons LNAPL recovered from RW-1.

  RW-1 operating time since previous reading ____Hr x RW-1 LNAPL pumping rate 40 gphr = ____ gallons LNAPL recovered from RW-1 since previous reading.

- RW-2 total operating time ____Hr x RW-2 LNAPL pumping rate 40 gphr = ____ total gallons LNAPL recovered from RW-2.

  RW-2 operating time since previous reading ____Hr x RW-2 LNAPL pumping rate 40 gphr = ____ gallons LNAPL recovered from RW-2 since previous reading.

- RW-3 total operating time ____Hr x RW-3 LNAPL pumping rate 40 gphr = ____ total gallons LNAPL recovered from RW-3.

  RW-3 operating time since previous reading ____Hr x RW-3 LNAPL pumping rate 40 gphr = ____ gallons LNAPL recovered from RW-3 since previous reading.

- RW-4 total operating time ____Hr x RW-4 LNAPL pumping rate 40 gphr = ____ total gallons LNAPL recovered from RW-4.

  RW-4 operating time since previous reading ____Hr x RW-4 LNAPL pumping rate 40 gphr = ____ gallons LNAPL recovered from RW-4 since previous reading.

Note: Actual LNAPL pumping rate for each recovery well will vary and needs to be physically measured during start-up activities. The 40 gallon-per-hour rate (gphr) shown is indicative of maximum pumping conditions.

E. Current Volume of Collected LNAPL

LNAPL Collection Tote No. 1 _____gallons
LNAPL Collection Tote No. 2 _____gallons
LNAPL Collection Tote No. 3 (spare) _____gallons

Table 1
(Cont'd)
General Motors Corporation
Saginaw, Michigan

LNAPL Recovery System Inspection Log

F. Treated Water Flow Readings

	Current Instaneous Flow (Gallons Per Minute)	Current Total Meter Reading (Gallons)	Previous Total Meter Reading (Gallons)	Volume Since Previous Reading (Gallons)
Treated water discharge				

G. Comments

_____

_____

_____

Date: _____ Time: _____

Inspector: _____ (print)

_____ (sign)

Table 2 – LNAPL Recovery System Maintenance Log

Table 2

General Motors Corporation
Saginaw, Michigan

LNAPL Recovery System Maintenance Log

LNAPL Recovery System Recovery Wells and Equipment	Description of Maintenance Performed
Recovery Well RW-1	
Recovery Well RW-2	
Recovery Well RW-3	
Recovery Well RW-4	
Treatment Enclosure	
Treatment Enclosure Sump Pump	
OWS	
OWS LNAPL Transfer Pump	
OWS Water Transfer Pump	
Hydrogen Peroxide System	
Bag Filter Units	

Table 2

General Motors Corporation
Saginaw, Michigan

LNAPL Recovery System Maintenance Log

LNAPL Recovery System Recovery Wells and Equipment	Description of Maintenance Performed
GAC Filter Units	
LNAPL Collection Totes	
Other	

Date: _____ Time: _____

Inspector: _____ (print)

_____ (sign)

Appendix A – LNAPL Recovery System Record Drawings

BLASLAND, BOUCK & LEE, INC.

engineers & scientists