STATEMENT OF BASIS

For

General Motors Corporation
North American Car Group (NACG) Lordstown Assembly Plant
And
Metal Fabricating Division (MFD)
Lordstown Metal Fabricating Plant

EPA I.D. No. OHD 020 632 998

September 2006

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Statement of Basis for the Proposed Remedy at the General Motors Corporation North American Car Group (NACG) Lordstown Assembly Plant and Metal Fabricating Division (MFD) Lordstown Metal Fabricating Plant

INTRODUCTION

This Statement of Basis (SB) explains the proposed remedy for contaminated soil and groundwater at the General Motors Corporation Lordstown Metal Fabricating Plant. The United States Environmental Protection Agency (U.S. EPA) will select a final remedy for the General Motors Facility only after the public comment period has ended and the information provided by the public has been reviewed and substantive comments considered.

This SB is being issued by U.S. EPA as part of its public participation responsibilities under the Resource Conservation and Recovery Act (RCRA). The document summarizes information that can be found in greater detail in the final RCRA Facility Investigation (RFI) and Corrective Measure Study (CMS) Reports and other pertinent documents contained in the Administrative Record. U.S. EPA encourages the public to review these documents in order to gain a more comprehensive understanding of the General Motors Facility and the RCRA activities that have been conducted.

U.S. 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 corrective measure scenarios. The public can participate in the remedy selection process by reviewing the documents contained in the Administrative Record.

PROPOSED REMEDY

The U.S. EPA is proposing the following remedy to address the contaminated media at and from the GM-Lordstown Facility:

- **Engineering and Institutional Controls Restricting Exposure to Contaminated Soil and Groundwater and Limiting the Facility to Industrial Use and Financial Assurance**.

  Engineering and institutional controls will be implemented at the site, which will include a site wide plan to control particulate emissions from surface soils (i.e. dust control) and a Site plan to preclude the removal of pavement in a currently active waste drum unload area without proper health and safety controls or further assessment. In addition, the developed portion of the Site and groundwater on site will be restricted to industrial use through the implementation of an environmental covenant pursuant to the Uniform Environmental Covenants law (Ohio Revised Code 5301.80-5301.92).

  Data indicates that constituent concentrations in soil are either below or higher than screening criteria based on industrial land use. This means the contaminated soil does not present unacceptable risks for industrial use, but the property should never be converted or used for residential land use, unless soils are first remediated to screening criteria based on residential land use.

  Accordingly, GM-Lordstown must place a notation on the deed for the property that designates areas of the facility that have been impacted by previous activities. These use restrictions will be made permanent through the implementation of an environmental covenant and other enforceable use restrictions pursuant to the Uniform Environmental Covenants Law and other appropriate legal mechanisms. The use restrictions will be placed on these areas to ensure continued industrial use. For ease in administration, the

use restrictions will encompass the main operational portions of the plant buildings and yards. Measures will be taken to assure the restrictions (including the Operations and Maintenance (O&M) Plan requirements) are enforceable by U.S. EPA as well as by GM. The Environmental Covenant and other enforceable use restrictions would remain in place and enforceable if some or all of the property is transferred to different owners in the future. The land use in other areas of the plant is not restricted because the soil has not been impacted by contaminants.

GM must also demonstrate that adequate funds will be available for the operation and maintenance of the selected remedy. GM must provide this financial assurance within 90 days after U.S. EPA selects the remedy and issues its *Final Decision and Response to Comments*. Any of the following financial mechanisms may be used to make this demonstration: financial trusts, surety bonds, letters of credit, insurance, or qualification as a self-insurer by means of a financial test. GM may request that the amount of the financial assurance be reduced from time to time during the operation and maintenance phase of the remedy or EPA can request an increase if more issues arise in the future

Soil Excavation and Removal of Impacted Soil at Area of Interest (AOI)-13

Soil under the AOI-13 Hazardous Waste Drum Unload Area that exceeded the screening criteria would be excavated, containerized, characterized and treated and/or disposed of off-site if and when future maintenance of the area is performed. The area of soil to be removed is estimated to be approximately 2 feet deep and 20 feet by 30 feet for a volume of approximately 44 cubic yards. Post excavation soil samples would be collected and estimates of routine worker risk to soil concentrations remaining in the area would be determined to confirm that residual soil concentrations will not lead to unacceptable risks. This area has a number of above and below ground utilities and obstructions, which would make implementation difficult while maintaining the active status of this area.

Therefore, this portion of the proposed remedy would not be implemented until future maintenance of the area and/or slab is required.

- **Implementation of a Site Wide Groundwater Monitoring Program, and Monitoring of Area of Interest (AOI)-35 Underground Storage Tank (UST) Area#4 Shallow Groundwater Zone, with Contingency Plans.**

  GM-Lordstown must monitor groundwater (1) to ensure that human beings are not exposed to unacceptable levels of groundwater contamination, (2) to verify whether the concentrations of constituents of potential risk are decreasing at the source, and (3) to assess movement of the contaminated perched water to ensure that it does not migrate out of the containment zone where it currently exists.

  GM must monitor the wells in the Site Wide Groundwater Monitoring Program on a bi-annual basis for a minimum of two years, analyzing the samples for the compounds of interest, identifying trends through statistical analysis of the results, and submitting bi-annual reports to the U.S. EPA. Subsequently, GM must monitor wells annually for three years, if the sampling results show no significant increase of constituent concentrations, and submit annual reports to U.S.EPA. The monitoring wells in the Site Wide Groundwater Monitoring Program are located at the sites perimeter, to ensure none of the contaminants onsite is migrating off-site above the risk based screening levels (RBSLs) which are the Safe Drinking Water Standards Maximum Concentration Limits (MCLs) and the Equivalent Drinking Water Levels (EDWLs) for constituents without MCLs for the bedrock perimeter wells, and the GM-derived, U.S. EPA-approved Off-site Non-potable Groundwater Use Criteria and Off-site Indoor Air Inhalation of Vapors from Groundwater Criteria for the shallow perimeter wells. The network of wells selected in the Site Wide Groundwater Monitoring Program is:

Shallow perimeter monitoring wells:

- MW-202S, MW-203S, MW-204S, MW-314S, MW-401, and MW-501

Bedrock perimeter monitoring wells:

- MW-202D, MW-203D, MW-205D and MW-314D

The selected monitoring wells will be sampled for total Target Analyte List (TAL)metals (Silver, Arsenic, Barium, Beryllium, Cadmium, Cobalt, Chromium (total), Copper, Manganese, Nickel, Lead, Selenium, Antimony, Vanadium, and Zinc) and TCL (Target Compound List) volatile organic compounds (VOCs).

GM must monitor groundwater wells in the AOI-35 UST #4 area monitoring network on a quarterly basis for a minimum of two years, analyzing the samples mainly for Benzene, other VOCs, semi-volatile organic compound (SVOCs), and metals, identifying trends through statistical analysis of the results, and submitting quarterly reports to the U.S. EPA. Subsequently, GM must monitor wells annually for three years, if the sampling results show no significant increase of constituent concentrations above the Non-potable Groundwater use Criteria and Off-site Indoor Air Inhalation of Vapors from Groundwater Criteria, and submit annual reports to U.S.EPA.

A total of six monitoring wells located in the overburden groundwater zone have been selected to monitor conditions at AOI-35 UST Area#4. Three monitoring wells selected at the AOI -35 UST #4 area would demonstrate through sampling whether contaminant concentrations at the source are decreasing or increasing in the area where the USTs were located. Three additional wells were selected as sentinel wells. The sentinel wells, which are located downstream of AOI-35 UST #4 within the site boundary, would demonstrate whether compounds of interest have migrated, and have the potential to migrate off-site. Constituent concentrations at sentinel wells must not exceed the risk based screening level (RBSL) Criteria. If constituents increase and start to approach the Non-potable Groundwater Use Criteria and/or the Off-site Indoor Air Inhalation of Vapors from Groundwater criteria, contingency plans must be implemented.

Actual sampling data from all of the wells monitored at AOI-35 UST #4 area will be used to evaluate and verify the results from the Bioscreen model presented in the CMP, which predicted the benzene concentrations will remain consistent or reduce over time.
The network of wells selected in the AOI -35 UST #4 monitoring program are:
Source monitoring wells:

- MW-213, MW-214, MW-215

Sentinel monitoring wells:

- MW-313, MW-401, MW-402

The monitoring well sampling programs should achieve the following three objectives: 1) regularly monitor the concentrations, flow direction(s) and extent of the contaminated groundwater originating from the facility, 2) confirm whether the contaminated groundwater is relatively stable by comparing actual to modeled conditions or using other appropriate methods and 3) provide point of compliance monitoring at the source areas to determine whether the constituent concentrations are consistently below the RBSLs.

For both groundwater monitoring of the site wide fill and AOI-35, the network of monitoring wells will define the containment area for groundwater. That is, within this network, groundwater must meet the RBSLs. The planning of this remedy would include action that will be taken if groundwater contaminant concentrations increase and start to approach the RBSLs or significant migration is noted. The specific contingency plans would be outlined in the Corrective Measures Implementation report that GM-Lordstown will prepare after the Agency has chosen the final remedy. The specific measures to be developed must assure protection of human health and the environment from adverse effects. Possible contingent remedies could include active groundwater remediation or containment.

After the initial five year period of monitoring, GM may propose a more limited groundwater monitoring program depending on the results of the monitoring by

submitting a written request to U.S. EPA and receiving U.S. EPA's approval. GM may also propose to possibly discontinue the monitoring programs by submitting an "Attainment of Ground Water Performance Standards Report" and certification, and obtaining U.S. EPA approval if the results from 5 years of consecutive rounds of monitoring demonstrate that concentrations below appropriate RBSLs have been achieved. In the report, GM must demonstrate whether the ground water performance standards have been attained in satisfaction of the requirements of the Order by showing contaminant concentrations are steady and have a downward trend to ensure that the concentrations will remain below the RBSL in the future once the monitoring has commenced. If U.S. EPA approves the report and agrees with its findings, GM would then receive the "Corrective Action Complete with Controls" status from U.S. EPA. The "with controls" status means that all that remains is performance of the required operation and maintenance, and compliance with and maintenance of any institutional controls.

A more detailed discussion of the RFI/CMS, and U.S. EPA's proposed remedy is provided in the following sections.

FACILITY BACKGROUND

The Site is located at the intersection of Interstate 80, Hallock-Young Road, and Ellsworth Bailey Road in Trumbull County, Ohio and covers approximately 925 acres of land. The Site is composed of the following (See attachment 1):

- The North American Car Group (NACG) Assembly Plant, including the active Passenger Car Assembly Plant and the demolished Van Assembly Plant, occupies the south-central portion of the Site and is located at 2300 Hallock-Young Road. The Passenger Car Assembly Plant covers approximately 2 million square feet and employs 4500 people. The former Van Assembly Plant covered approximately 0.7 million square feet. The slab

of this plant remains. The major operations at assembly plants are body shop welding, body painting, and vehicle assembly;

- The Metal Fabricating Division (MFD) Metal Fabricating Plant occupies the western portion of the Site and is located at 2369 Ellsworth Bailey Road. The plant covers approximately 2.38 million square feet and employs 2590 people. The major operations are metal stamping, welding, metal assembly, and scrap metal handling;

- PPG Industries, Inc leases the northwest corner of the Site from GM. The activities at the facility include automotive coatings applications research and automotive paint mixing;

- Leaseway Trucking, Inc. leases the eastern portion of the Site from GM. The operations include car transport loading, truck maintenance, and fuel filling station; and

- A fenced wildlife preserve is located on the south-east corner of the Site. The remainder of the property is comprised of asphalt or concrete surfaces, and fields and wooded areas to the northeast of the Assembly Plant.

SITE SPECIFIC CHARACTERISTICS AND SETTING

Hydrogeologic Setting

- Overburden Groundwater

The overburden groundwater is generally comprised of an unconfined water-bearing unit consisting of fill material and glacial tills overlying low permeability weathered clay-shale and shale bedrock. Rising head hydraulic conductivity tests from monitoring wells completed in the overburden generally indicate a range in permeability from 10^{-3} to 10^{-6} cm/sec, with a typical permeability on the order of 10^{-4} cm/sec.

Based on groundwater elevation measurements in overburden wells, overburden groundwater

flow appears to be controlled by Site surface water drainage (groundwater flow data are provided in Appendix B) as well as underground appurtenances, such as storm lines, sanitary lines and foundation drains. Overburden groundwater is not used as a potable water source.

- Bedrock Groundwater

The upper bedrock groundwater flow zone generally consists of a confined water bearing unit consisting of the interbedded layers of Berea Sandstone, overlain by low permeability (10^{-6} cm/sec or less) Orangeville Shale (confining unit) and weathered clay-shale. Based on water level measurements bedrock groundwater generally flows towards the north to northwest (groundwater flow data are provided in Appendix B).

Ecological Setting

The Site comprises two types of areas: 1) heavily industrialized areas occupied by buildings, parking areas, storage areas, and other plant structures; and 2) natural and semi-natural areas where, historically, plant activities were minimal (e.g., the undeveloped area north of the Assembly Plant) or completely absent (e.g., the Wildlife Preserve area). The areas around the Site buildings are typically paved or gravel, and sometimes have small patches of grassy or weedy vegetation growing at various locations near buildings or parking areas.

In addition to the physical features described above, there are three man-made surface-water features present at the Site:

· The single stormwater detention basin northeast of the Metal Fabricating Plant

· The two Assembly Plant stormwater detention basins east of Leaseway Trucking

· The GM Ditch

The nearest natural surface-water body is Mud Creek. Mud Creek originates in the area of the facility where it receives flow from drainage ditches adjacent to the Ohio Turnpike (Interstate 80) and from the Site stormwater detention basins. Mud Creek and its floodplain in the area of the Site downstream to Warren-Salem Road are highly altered by human activity, which is exemplified by its use as a stormwater detention basin by Trumbull County. The surface-water hydrology of the site was described above.

The only wildlife observed in the industrial parts of the Site during visits by ecologists were groundhogs (or woodchucks), although common urban bird species, such as robins, pigeons, gulls, and European starlings would be expected. Tracks of raccoon and deer were observed in the wooded area near the Construction Debris Area (Area of Interest - AOI 1).

Great blue herons were observed flying in the vicinity of the wildlife preserve, and Canada geese and ducks were seen loafing in the two Assembly Plant stormwater detention basins. Great blue herons were also sighted foraging in the Assembly Plant stormwater basins. Green herons, tree swallows, and a few terns were observed foraging in the Metal Fabricating Plant stormwater detention basin, and Canada geese were observed loafing there. A great blue heron colony with numerous nest structures and young was observed in the Wildlife Preserve during a May 2003 site visit.

- Storm Water Retention Basins

The three onsite stormwater detention basins are man-made structures that are integral components to the operation of the plant, where they perform a water management function. However, these basins do provide some suitable habitat for wildlife species, including loafing habitat for waterfowl and foraging habitat for piscivorous and omnivorous wildlife. Common warm water fish species such as carp, sunfish, minnows, and shiners, as well as crayfish and frogs also occur in the stormwater detention basins. Operational activities at the Site may result in significant alteration or disappearance of these communities at any time.

- GM Ditch

The GM Ditch conveys overflow water from the Metal Fabricating Plant stormwater detention basin, and from paved areas and roof drains of the facility, to the two Assembly Plant stormwater detention basins. Water in the GM Ditch flows through a culvert along approximately 50 percent of its length, in areas where it passes under buildings, paving, and other structures. Elsewhere, the bottom of the ditch is composed of sand and gravel with some silt and concrete-asphalt rubble. The banks of the ditch are vegetated with grasses and shrubs in some areas. In the

vicinity of Leaseway Trucking, the ditch is located in a steeply banked channel approximately 8 to 10 ft. below ground level. The GM Ditch does not provide aquatic habitat, because it is subject to periodic drying. The ditch is vegetated with upland grasses and shrubs in some areas and is periodically maintained by grubbing and clearing.

RCRA REGULATORY HISTORY

On October 13, 1987, GM submitted a RCRA Part A permit application for the Assembly Plant. A RCRA Part B permit application was submitted for the Assembly Plants by GM on August 10, 1990. GM withdrew the Part B Application for the Assembly Plants on September 4, 1991. The Metal Fabricating Plant submitted a Part A Application on December 22, 1980 and withdrew the Application on June 20, 1983. Applications for RCRA permits for the Assembly Plant and Metal Fabricating Plant were withdrawn when it was determined a permit was not needed.

The Current Conditions Report (CCR) (Haley & Aldrich, 2000) and Current Conditions Report Addendum (Haley & Aldrich, 2001a) summarized the individual areas at the Site which may have a potential for a release to the environment. These areas were identified during the file review, interview process, and Site visits. These areas have been cataloged as Areas of Interest. Areas of Interest include Hazardous Waste Management Units (HWMU), Solid Waste Management Units (SWMUs) or Areas of Concern (AOCs) identified in the RCRA Facility Assessment (RFA) (PRC Environmental Management, 1993) and Preliminary Assessment/Visual Site Inspection (PA/VSI), and additional areas identified during the development of the CCR and implementation of the RFI. Based on information gathered during development of the CCR, certain AOIs were determined not to require further investigation due to the absence of a release to the environment or because of previous work conducted. The basis for eliminating these AOIs from further investigation is documented in the CCR. For AOIs that warranted further investigation based on the documentation in the CCR, GM conducted a RFI to determine whether the AOIs had released hazardous waste or hazardous constituents that pose an unacceptable risk to human health or the environment (See attachment 2)

The RFI was conducted at the Site to fulfill one of the requirements of the U.S.EPA Administrative Order on Consent #R8H-5-00-005 effective June 26, 2000 for the NACG Lordstown Assembly Plant and Lordstown MFD Metal Fabricating Plant. The RFI was conducted at the Site in a phased approach, with six phases of investigation being implemented during the period of April 2001 through July 2003. Field investigations focused on the 30 AOIs designated for investigation in the RFI Work Plan, and three additional areas identified during the implementation of the RFI. The findings of the investigations were communicated to U.S. EPA through data reports, meetings and conference calls.

The RFI was designed to evaluate Site conditions, to determine if a release of hazardous waste or hazardous constituents has occurred, and where a potentially significant release is identified, to characterize the nature and extent of hazardous constituents in the environmental media. After each phase, adequacy of the data was evaluated to determine whether additional data collection was warranted. As indicated above, six field events were conducted to collect soil, surface water, groundwater, and sediment and biota data necessary to achieve RFI objectives.

When data of sufficient quality and quantity had been collected, the data were used to support decisions regarding the need for interim or corrective measures. Human health and ecological risk assessments are included in the RFI Final Report to provide a basis for determining whether the presence of these hazardous constituents poses an unacceptable risk to human health and the environment that would warrant corrective measures.

INVESTIGATION RESULTS

The following paragraphs discuss the human health risk and ecological risk evaluation performed at the GM-Lordstown facility, based on the data collected during the RFI.

Human Health Risk Evaluation

The significance of current and reasonably likely future human exposures to hazardous constituents detected in soil, groundwater, surface water and sediment at and adjacent to the Site was evaluated during the RFI. Risks were calculated based on the potential receptor, or person, who is assumed to be exposed to the contamination. The results are presented for carcinogens and non-carcinogenic chemicals. Health risks due to exposure to carcinogens are described as the probability of excess incidences of cancer. The U.S. EPA guidelines established a range of one in ten thousand to one in one million excess cancer incidences as acceptable (10^{-4}-10^{-6}.) Risk due to chemicals that are not carcinogens are presented as a Hazard Index (HI) which compares concentrations of chemicals at the site to a value that is known to be safe. A HI greater than one means that the chemical concentrations at the site are higher than safe concentrations, and further evaluation is necessary. The risk evaluation for each media sampled during the RFI is summarized below.

Soil

Upper-bound estimates of the cumulative cancer risk and noncancer HI for routine worker exposures to on-site soil are calculated based on the maximum concentrations of constituents detected in soil at any depth in each AOI investigated, and the conservative risk-based screening criteria that are derived from U.S. EPA Region 9 risk-based Preliminary Remediation Goals (PRGs) for soil exposures in generic commercial/industrial settings (USEPA, 2002a). These risk estimates are considered upper-bound estimates because actual cumulative cancer and noncancer HIs for an area would be lower if concentrations representative of the AOI were used instead of maximum concentrations, and if site-specific exposure factors were used to account for the magnitude, frequency, and duration of exposures appropriate for the particular AOI.

The following areas were determined to have no significant exposures to hazardous constituents in the soil based on a conservative approach in which the highest site-related concentrations of constituents detected during RFI field investigations at an AOI were used to estimate upper-bound cumulative cancer risks and noncancer HIs in the risk evaluation. The carcinogenic and non-carcinogenic risks calculated for these areas did not exceed 10^{-5} and had HIs of less than one

- AOI-1 Construction Debris Area
- AOI-2 UST Area #7
- AOI-9b Area Outside Tank #1
- AOI-11 Hydraulic Lift – Maintenance Pit
- AOI-12 Diesel Pump House (Tank Farm)
- AOI-14 Process Pump Sump
- AOI-16 Accumulation Drum Storage Area - WWTP
- AOI-17 Accumulation Drum Storage Area - CMB
- AOI-25a Sweeper Sump
- AOI-25b Battery Charging Area Sump
- AOI-28 Drum Staging Area
- AOI-30 Benzene and Ethylbenzene in GW – Tank Farm
- AOI-31 Passenger Car Assembly Plant – Fluid Fill Area
- AOI-42 Used Oil Above Ground Storage Tank
- AOI-43 Former Container Storage Area (CSA)
- AOI-46 Scrap Metal Conveyor System
- AOI-50 Solvent Storage Area
- AOI-51 UST Area #1
- AOI-52 Temporary Lined Spoil Area from UST Areas
- AOI-53 UST Area #2
- AOI-55 Sump Located Outside of Tank Farm Pump House
- Bureau of Underground Storage Tank Regulation (BUSTR) Area
- GM Ditch Wells
- MW-202 Area
- MW-203 Area
- Perimeter Wells Overburden and Bedrock Monitoring Wells other than the MW-202 and MW-203 Areas

The following areas have upper-bound cumulative noncancer HIs that are higher than one, based on using the maximum concentrations of constituents detected at each area:

- AOI-7 Fire Training Area
- AOI-13 Hazardous Waste Drum Unload Area
- AOI-35 UST Area #4
- AOI-39 Container Storage Area (CSA)

The significance of potential exposure at these AOIs is further evaluated below using 95% upper confidence limits (UCLs) on the mean concentration for those constituents whose maximum concentrations contribute the most significantly to the upper-bound estimate of cumulative noncancer HIs. This approach is efficient in that it avoids calculation of 95% UCLs that would not materially affect cumulative risk estimates, and is consistent with U.S. EPA guidance (1989).

With the exception of AOI-13, the estimated cumulative noncancer HI for these areas using the refined Exposure Point Concentrations (EPCs) based on 95% UCLs for the constituents contributing most significantly to the initial risk estimates had an HI of less than 1, respectively.

Specifically, the noncancer HI for an onsite routine worker exposed to soil in AOI-13 was estimated to be 4. This risk is primarily associated with the inhalation pathway and reflects the assumption that the area is unpaved. Because this area is currently paved, the risks to routine workers associated with constituent concentrations in this area are not expected to be significant under current conditions. However if this pavement were to be removed in the future, potential risks to routine workers could be significant, as indicated by this risk evaluation

- Groundwater

The significance of potential exposure to groundwater at and adjacent to the site was evaluated based on current and reasonably likely future use of shallow overburden groundwater and deep bedrock groundwater at and adjacent to the site. Potential receptors considered in this evaluation included on-site and off-site routine workers, on-site and off-site construction workers, on-site trespassers and off-site residents.

Potential direct exposures to constituents in groundwater by on-site and off-site routine workers were not evaluated, as this is not a likely route of exposure for routine workers. Exposure to constituents volatilizing from the shallow groundwater into indoor air through cracks in building foundations is a potential exposure pathway and was evaluated using conservative screening criteria based on exposure factors for indoor air inhalation in industrial buildings. No constituent concentrations exceeded these criteria, thus indicating that this does not represent a significant exposure pathway to site-related constituents detected in shallow groundwater.

To evaluate potential exposure of on-site construction workers to constituents in groundwater, maximum concentrations in shallow groundwater in each AOI were compared with risk-based criteria protective of dermal contact and inhalation exposures that may occur during excavation activities. Only one detected constituent concentration exceeded the criteria. The maximum detected groundwater concentration of benzo(a)pyrene in AOI-53 observed during the RFI investigations exceeded the risk-based criterion, although benzo(a)pyrene was not detected in groundwater in AOI-53 during the most recent sampling round. Further, the cumulative cancer risk and noncancer HI for a construction worker exposed to groundwater during excavation activities in AOI-53 based on exposure to an on-site construction did not exceed 10^{-5}, and had an HI of less than one. Based on these results, on-site groundwater concentrations do not pose an unacceptable risk to construction workers.

To evaluate potential exposure of off-site construction workers to constituents in groundwater downgradient of the Site, maximum concentrations in the perimeter overburden wells were compared with risk-based criteria protective of dermal contact and inhalation exposures that may occur during excavation activities. None of the constituent concentrations exceeded these criteria, thus indicating that exposure to groundwater during off-site excavation activities do not pose an unacceptable risk to construction workers.

To evaluate potential off-site resident exposure to inhalation of vapors migrating into indoor air from contamination in shallow groundwater via vapor intrusion, exposure concentrations in perimeter overburden wells were compared with risk-based criteria based on exposure factors for

indoor air inhalation in residential buildings. None of the constituent concentrations exceed these criteria, thus indicating that exposure to any contamination in shallow groundwater via vapor intrusion into off-site residences does not pose an unacceptable risk.

To evaluate potential off-site resident exposure due to non-potable uses of shallow groundwater, exposure concentrations in perimeter overburden wells were compared with risk-based criteria calculated based on an assumption that shallow groundwater could be used to fill a residential kiddie pool. None of the constituent concentrations exceed these criteria, thus indicating that exposure to any contamination in shallow groundwater via this pathway does not pose an unacceptable risk to off-site residents.

However, as evaluated in the "Uncertainty Analysis" section of the Human Health Risk Evaluation of the RFI, hydrogeologic information collected indicate that with the exception of AOI-35, AOI-43 and the BUSTR Area, all areas at which overburden groundwater was identified as a potential concern during the RFI investigation process, discharge to the GM Ditch. For AOI-35, AOI-43 and the BUSTR Area maximum concentrations of constituents detected in overburden groundwater at these areas were compared against the risk-based criteria developed for off-site construction worker exposures, off-site non-potable shallow groundwater use (kiddie pool), and vapor migration to indoor air to assess the potential worst-case risks to offsite receptors in the unlikely event that these on-site groundwater concentrations migrate un-attenuated to off-site areas. The results of this uncertainty analysis are presented on Tables 5.16 through 5.20 of the RFI.

As indicated by the comparison of maximum on-site concentrations to relevant off-site groundwater criteria, the maximum concentration of benzene at AOI-35 is the only concentration exceeding one of these off-site non-potable groundwater criteria. The concentration of 2.2 mg/L exceeds the non-potable criteria of 0.55 mg/L derived for the kiddie pool scenario. This result was observed in MW-214 in January 2002.

Subsequent sampling in December 2002 indicated that benzene concentrations dropped to 0.58 mg/L in MW-214, however this concentration is still slightly above the non-potable criteria.

To evaluate potential off-site resident exposure due to potable use of deep bedrock groundwater, exposure concentrations in perimeter bedrock wells were compared with drinking water criteria based on maximum contaminant levels (MCLs) established under the Safe Drinking Water Act and EDWLs for constituents without MCLs.

None of the constituent concentrations exceed these criteria, thus indicating that exposure to bedrock groundwater via off-site potable use does not pose an unacceptable risk.
However, one monitoring well interior to the site, Test Well #4, had historical concentrations of manganese, and one round of sampling of thallium above the MCLs for both of those constituents. More recent rounds of sampling in that same well showed thallium was not detected, and manganese was below the MCL. Monitoring MW-314D had one round of sampling where methylene chloride was above its MCL. A subsequent round of sampling showed the constituent was not detected. Bis(2-Ethylhexyl)phthalate was detected above its MCL at one round of sampling in MW-314D, however, its detection was most likely contributed to the constituent being a common lab contaminant.

Although none of the recent sampling data has any constituents in the deep aquifer above MCLs, due to these historical instances where constituents were above their respective MCLs, potable use of on-site bedrock groundwater will be restricted.

- Sediment

Sediment data was collected in AOI-33, the Assembly Plant North Detention Basin, the Assembly Plant South Detention Basin, an offsite storm water management area downstream of the Site, and the Metal Fabricating Plant Detention Basin during the RFI investigations. Maintenance workers may be potentially exposed to constituents in on-site and off-site sediments. The potential human health significance of these exposures is evaluated by conservatively using the routine worker as a conservative surrogate based on the fact that routine

workers would have more exposure to impacted areas than maintenance workers, even though maintenance workers would be the actual receptors. Potential maintenance worker exposures to sediments would be lower than those characterized by a routine worker receptor.

To assess the potential risks associated with exposure of maintenance workers to constituents in on-site sediment, the maximum concentrations of chemicals detected in each area were conservatively assumed to represent the exposure point concentration in each area.

As summarized in Table 1, the cumulative cancer risk and noncancer HI for each of these on-site areas were estimated to be within the U. S. EPA's acceptable risk range of 10^{-4}-10^{-6}, and the HI is less than one. These estimates likely overstate the risks to on-site maintenance workers based on the higher exposure estimates for routine workers.

To assess the potential risks associated with exposure of maintenance workers to constituents in off-site sediment, the maximum concentrations of chemicals detected in off-site sediment samples were used to represent exposure point concentrations.

Table 1: Cumulative Cancer Risks and His Based on Exposure Point Concentrations (Sediment)
GMC - Lordstown Site, 2300 Hallock-Young Road, Lordstown, Ohio

Area	**Matrix**	**Cumulative Risk**	**Risk**
AOI-08	Sediment	See note 1	0.000001
AOI-33	Sediment	1.E-04	0.3
AOI-43	Sediment	2.E-07	0.4
Metal Fab Basin	Sediment	4.E-05	0.3
Area	**Matrix**	**Cumulative Risk**	**Risk**
Off-Site Sediment	Sediment	7.E-05	0.3
North Assembly	Sediment	9.E-06	0.3

Basin			
South Assembly Basin	Sediment	9.E-06	0.3
Notes: 1. No carcinogenic compounds were detected.			

As summarized on Table 1, cumulative cancer risk and noncancer HIs for the offsite area were estimated to be 7 x 10^{-5} and 0.3, which are within U.S. EPA's acceptable risk range of 10^{-4}-10^{-6}, and the HI of less than one.

- Surface Water

To evaluate potential exposure of on-site maintenance workers and trespassers to constituents in surface water, exposure concentrations in on-site surface water bodies were compared with drinking water screening levels based on MCLs established under the Safe Drinking Water Act and Equivalent Drinking Water Levels EDWLs for constituents without MCLs. The EDWLs are generic risk based drinking water limits using conservative standard default exposure factors for estimating high end exposures via daily drinking water consumption and target cancer risk of 10^{-5} for carcinogenic constituents and HI of 1 for non-carcinogenic constituents.

These screening criteria are conservative for evaluating potential exposure to constituents in surface water as the most likely human exposure to surface water at the Site would be via direct contact by occasional maintenance work or incidental contact by trespassers. Surface water concentrations did not exceed these criteria in any of the areas evaluated, thus indicating that on-site surface water concentrations would not pose unacceptable risk to maintenance workers or trespassers. No surface water samples have been collected in off-site areas, however, site-related concentrations would be expected to be lower than observed in on-site surface water bodies, and therefore, risks due to exposure to surface water would also be expected to be lower off-site as compared to on-site.

Ecological Risk Evaluation

On completion of the field sampling activities, an ecological risk assessment was prepared to develop information necessary to determine whether there is the potential for unacceptable risk of adverse ecological effects resulting from Site-related hazardous constituent concentrations in environmental media. This risk assessment included identification of AOIs with hazardous constituents, habitat and potentially complete exposure pathways; habitat characterization; field studies to measure concentrations of hazardous constituents in biota; and quantitative risk analysis.

Based on the results of a habitat characterization and a review of existing Site information, potential ecological concerns at the Site were found to be limited to the stormwater detention basins at the Assembly Plant and the Metal Fabricating Plant, and the off-site sediment in Mud Creek. The remaining AOIs and other areas of investigation are unlikely to pose risks of adverse effects to ecological receptors because there are incomplete exposure pathways to potential receptors. Pathways are incomplete in these areas, either because there is no habitat (and therefore, no receptors), or because there was no release and, therefore, there are no hazardous constituents present that receptors could be exposed to.

Mud Creek received discharges from the Site via the stormwater detention basins, and sampling of sediment in Mud Creek indicated that some site-related chemicals may be present. Because there is a complete exposure pathway in Mud Creek, this area was the focus of a screening-level evaluation. The analytical data for sediment in the Mud Creek drainage were compared to sediment and soil screening benchmarks known as Ecological Screening Levels (ESLs) and Ecological Soil Screening Levels (EcoSSLs). Mud Creek sediment concentrations exceeded sediment screening levels for arsenic, lead, nickel, zinc, cyanide, polyaromatic hydrocarbons (PAHs), and phthalates. Stations within Mud Creek that were dredged in 2001 were also screened against soil screening levels because the dredge spoils provide a potential exposure pathway for terrestrial organisms in the Mud Creek floodplain. Mud Creek dredged sediment concentrations exceeded soil screening levels for antimony, arsenic, cadmium, chromium,

copper, lead, mercury, nickel, selenium, vanadium, zinc, and phthalates. The presence of phthalates is believed to be due to lab contamination.

A comparison of the results for Site-influenced stations in Mud Creek to upgradient stations showed that Station SOS3, an upgradient area, had the highest concentrations of PAHs. This indicates that at least some of the PAHs found in Mud Creek sediments are from non-site related sources. Because Mud Creek functions as a stormwater basin for Trumbull County and collects runoff from Interstate 80, it is not surprising that typical constituents of road runoff such as PAHs and heavy metals would occur in the creek sediment. This was further confirmed by comparing Mud Creek sediment to Site-specific background (for metals) and urban background (for PAHs), which showed that the range of PAH concentrations in Mud Creek is within that found in urban areas for many PAH compounds, and is similar to the range of background concentrations found at the Site for metals. Therefore, incremental risks to aquatic receptors and terrestrial receptors from exposure to Mud Creek sediment do not suggest any incremental increase over risk at upgradient stations.

Because the onsite detention basins have hazardous constituents present, providing foraging and loafing habitat for ecological receptors, and thus have complete exposure pathways, a quantitative analysis of these chemical concentrations in the basins was conducted. Specifically, the presence of Site-related constituents in the basins sediment, surface water, fish and benthos indicated complete exposure pathways to wildlife through incidental ingestion of sediment and surface water, and through fish/invertebrate consumption. These pathways were assessed using food-web exposure models for representative receptors (i.e., herons, raccoons, and mink).
The results of the exposure assessment, the total ingestion of chemicals from all dietary components, were compared to No Observed Adverse Effect Level (NOAEL)-based Toxicity Reference Values (TRVs) for birds and mammals to assess risk using an HQ (Hazard Quotient) approach. Using this approach, it was determined that all of the HQs for herons were less than 1, indicating negligible risk to avian receptors from exposure to chemicals in surface water, sediment, and biota in the Assembly Plant and Metal Fabricating Plant basins. HQs exceeded 1

(HQs ranged from approximately >1 to 3) for mammalian receptors (raccoon and mink) for arsenic, cobalt, selenium, and vanadium.

However, the likelihood that a raccoon or mink would use the onsite stormwater detention basins as its only foraging habitat, and would consume only aquatic prey throughout the year, is very low. Further, for all metals with HQs greater than 1, with the exception of selenium, the average onsite sediment concentrations fell within the range of Site-specific surface soil background concentrations. Because risk is indicated (HQs>1) at exposures within normal background ranges, this suggests the mammalian TRVs for arsenic, cobalt, and vanadium are very conservative and likely overestimate risk. Therefore, the potential for adverse effects to mammalian receptors from these exposures is considered negligible.

In summary, the ecological risk evaluation determined that the risk of adverse ecological effects at the Site resulting from wildlife exposure to Site-related hazardous constituents is negligible.

SCOPE OF CORRECTIVE ACTION

The studies contained in the RFI and CMS showed that surface soils, subsurface soils, sediments, and air do not pose a significant risk to people who are likely to be exposed to those media under current conditions at the site. Some areas of the site have not been impacted by industrial operations, and were not investigated nor evaluated for corrective measures. These areas are southeast and northeast of the operational part of the site, and consist of fields and wooded areas. The southeast corner of the Site consists of a fenced wildlife preserve.

However, constituents present in soil and groundwater at parts of the site where industrial activities took place and industrial slag fill material were deposited may potentially pose a significant risk without proper controls limiting exposure to these constituents and preventing them from migrating from their current source areas.

Soil at AOI-13 and the site wide industrial slag fill may pose a significant risk if appropriate institutional and engineering controls are not in place to abate the potential risk from these areas through direct contact or inhalation of soil particles.

Groundwater at the site, specifically at AOI-35, may pose a significant risk if current concentrations of contaminants were allowed to migrate beyond the Site boundaries
A detailed description of these media and their potential risk are described below in detail.

Soil

- AOI-13

The AOI-13 area is located directly east of the main tank farm behind the Assembly building and is used to store drums of paint thinner, paints, and/or other types of solvents. The drums contents are pumped into Hazardous Waste Tank #1 (AOI-9) through overhead piping. Site personnel were unsure of how long this area has been active, but thought it has been active for the life of the plant (1966 to present). The RFI scope of work for AOI-13 included the installation of six soil borings and one shallow monitoring well. Two analytical soil samples were collected from each boring. RFI Report sections describing AOI 13 and field investigations conducted in this area are included in Appendix B of the RFI.

Cumulative cancer risk estimates for AOI-13 are within U.S. EPA's acceptable risk range of 10^{-4}-10^{-6}; however, the noncancer HI associated with exposure to constituents in soil at AOI-13 was higher than U.S. EPA's HI limit of 1. Specifically, the noncancer HI for an on-site routine worker exposed to soil in AOI-13 was estimated to be 4. This risk is primarily associated with the inhalation pathway and is based on the assumption that the area is unpaved. Because this area is currently paved, the risks to routine workers associated with constituent concentrations in this area are not significant under current conditions. However if this pavement were to be removed, potential risks to routine workers could be significant. Therefore corrective measures are warranted.

- Site Wide Industrial Slag Fill

The fill material consists of various components including reworked silt, sandy silt material; reworked organic materials; and industrial slag, foundry sand, and cinders. A review of historic topographic maps, grading plans, aerial photographs, and construction photographs, indicated that the Site was stripped of the soft organic materials associated with the marshy conditions that preexisted Site development. Natural sandy-silt soils were mixed with industrial slag to serve as the structural fill to bring the grade to present levels across much of the Site. The natural soils and slag were also mixed and compacted to serve as a paving base, know as "Water-bound Macadam" in the Site parking areas. In addition, slag material was used as concrete base course under much of the building slab construction. Historic construction photographs for the Metal Fabricating Facility indicated that black cinders were used as fill for underground piping. During the preliminary review of RFI Field Event #1 data, detections of certain metals above the preliminary screening criteria were identified. Specifically, manganese was detected above risk-based screening levels in soil across the site. These detections did not appear to be related to a release of hazardous constituents at individual AOIs. Potential sources of these metals at the Site were reviewed and the following was identified:

• Interviews with facility personnel indicate that slag from a local steel manufacturer (Youngstown area) was utilized as part of engineered site construction fill.

• Review of original site topographic maps in comparison to current topography, indicate up to approximately 16 ft of fill was used to level the site. An isopach map of the site was created from the original and current topographic maps to define the filling areas and indicated both cut areas (near highway) and fill areas (towards center of the site).

• Review of original grading plans indicated that "Water-bound Macadam" was used extensively in the original parking areas. Macadam is defined as pavement created through compaction of small stones and binder material (often stone dust and water).

• Review of aerial photographs taken during the construction of the Assembly Plant indicated:

• A mixing plant with three stockpiles was located immediately north of AOI-7. This area coincides with the largest fill area.

• An earth-like material was being spread and compacted in the parking area south of the Assembly Plant.

• Inspection of soil samples collected from the Metal Fabricating Plant indicate slag materials (sand and gravel size particles) are mixed with natural soil material (silt and clay). A review of boring logs for the site indicated the potential for wide-spread presence of this type of fill material.

Due to the potential presence of hazardous constituents and elevated manganese concentrations in the fill material, constituent concentrations detected in the fill were further evaluated
The risk evaluation showed that the non-cancer HI and cumulative cancer risk were within the acceptable risk range for routine worker, construction worker, and the trespasser exposure pathway.

However, the supplemental evaluation of potential risks associated with a change in Site operations (i.e., large uncovered areas subject to vehicle traffic) indicates that site controls should be considered to prevent areas over 5 acres from being subject to vehicle traffic greater than that assumed in developing the allowable concentration curve presented on Figure I-4 of the RFI, or that dust controls should be employed to mitigate particulate emissions from larger unpaved areas subject to vehicle traffic. As a result of the findings of potential risk from particulate emissions, corrective measures are warranted to prevent or control potential particulate emissions from uncovered areas.

Groundwater

- Site Wide Groundwater

Due to the size of the Site, the limited groundwater information available prior to the RFI field work and the potential need to evaluate downgradient groundwater quality at AOIs where a

groundwater impact potential was indicated, investigation of groundwater conditions during the RFI was initially conducted on a Site-wide basis. This included installation of well clusters along the perimeter of the Site. The data gathered during, and subsequent to, well installation was used to develop an understanding of groundwater flow conditions to verify historic groundwater information, to confirm appropriate locations for additional well installations at individual AOIs, and to determine vertical hydraulic gradients. The wells were sampled several times during the RFI field investigations, as discussed in the RFI Report.

Although the human health risk assessment determined that the current groundwater conditions do not pose a significant risk under current and reasonably expected future land use and groundwater use at and around the Site, the groundwater should still be monitored as a precautionary measure, to ensure that no contaminants are migrating beyond the Site boundaries above appropriate risk based screening levels. Corrective measures should be implemented if constituent concentrations approach the risk based screening levels which are the Safe Drinking Water Standards MCLs and the EDWLs for constituents without MCLs for the bedrock perimeter wells and GM derived, U.S. EPA approved Off-site Non-potable Groundwater Use Criteria and Off-site Indoor Air Inhalation of Vapors from Groundwater Criteria for the shallow perimeter wells.

AOI-35

AOI-35 includes the location of a former UST (underground storage tank) located north of the Metal Fabricating Plant. The system consisted of a 1,000-gallon, gasoline, UST, associated piping, and dispensing equipment. The tank, piping, and dispensing equipment were removed in 1990.

Contaminated soil and free product was observed during removal and GM notified BUSTR. Seven soil samples were collected after approximately 200 cubic yards were removed. Thirteen soil borings and seven groundwater monitoring wells were installed around the excavation to determine the extent of the free product. It was determined that groundwater in the vicinity had been impacted. In 1992, GM installed a treatment system to remove free product from the area

and submitted a Corrective Action Plan to BUSTR. The treatment system was shut down in 1994 and BUSTR issued a no further action letter to General Motors in 1998.

Based on review of the previous investigation data, the extent of residual contamination was not adequately determined. Therefore, the RFI scope of work for AOI-35 included the installation of twelve soil borings and 10 monitoring wells. Each boring had a shallow and deep soil sample collected from it and the wells were sampled throughout the RFI investigation. For more detail please refer to the RFI Report Section IV.

As indicated by the comparison of maximum on-site concentrations to relevant off-site groundwater criteria (described in the RFI Report (H&A 2005)), the maximum concentration of benzene at AOI-35 is the only concentration exceeding off-site non-potable groundwater criteria. The concentration of 2.2 mg/L exceeds the non-potable criteria of 0.55 mg/L.

Groundwater at AOI-35 should be monitored to ensure that (1) constituent concentrations at the source continue to decrease, and, (2) to detect if constituent concentrations are migrating off-site at down gradient locations above appropriate risk based screening levels, and (3) to support the findings of the BIOSCREEN plume modeling. The results of the BIOSCREEN model presented in appendix C of the Corrective Measures Proposal indicate that the sentinel wells are located further downgradient of the modeled maximum extent of plume migration with no decay; meaning the only attenuation mechanisms with this model include dispersion and adsorption of contaminants to the soil matrix, or beyond the solute transport with first order decay; meaning the solute degradation rate is proportional to the solute concentration. This means, the higher the concentration solute, the higher the degradation rate. This model predicts that benzene concentrations could possibly remain consistent or reduce over time. The model will be supplemented with any new findings from the actual sampling data at AOI-35. Further corrective measures should be implemented if constituent concentrations approach the appropriate risk-based criteria for shallow overburden groundwater at sentinel wells.

SUMMARY OF CORRECTIVE MEASURE SCENARIOS

The corrective measure scenarios analyzed to address soil and groundwater contamination at and from the GM-Lordstown Facility are presented below.

Alternative 1: No Further Action

Alternative No. 1 results in no additional risk reduction at the site. The no further action alternative could provide hazardous constituent reduction through ongoing natural attenuation processes in the groundwater and soil or further migration of contaminants could occur and could create new and unacceptable exposures to potential receptors. Furthermore, neither of these actions would be monitored or documented (i.e., no evaluation of effectiveness or ineffectiveness). No institutional or engineering controls are associated with this action. This alternative is technically and administratively implementable, as no engineering or administrative procedures are required.

Alternative 2: Engineering and Institutional Controls Restricting Exposure to the Contaminated Soil and Groundwater and Limiting the Facility to Industrial Use.

Alternative No. 2 restricts the contaminated portions of the facility to industrial use**.** A notation in the property deeds of the developed portion of the Site would restrict these areas to industrial use. The developed portion of the Site and groundwater on site will be restricted to industrial use through the implementation of an environmental covenant and other enforceable use restrictions pursuant to the Uniform Environmental Covenants Law and other appropriate legal mechanisms. Measures will be taken to assure the restrictions (including the O&M Plan requirements) are enforceable by U.S. EPA as well as by GM. The Environmental Covenant and use restrictions would remain in place and enforceable if some or all of the property is transferred to different owners in the future.

Furthermore under this alternative, a plan to maintain pavement and control any construction activities that requires removal of pavement would be implemented and would be part of the O&M plan. The plan would include an annual inspection to identify and repair any cracks in the

containment pavement, and procedures to ensure that proper health and safety controls are used during any subsurface construction/maintenance activities. In addition, a notation in the property deed for this area of the Site would restrict any intrusive activities in this area without further evaluation and approval. This information would be incorporated into the deed notice and use restrictions.

Additionally, a plan would be developed and implemented at the Site to control particulate emissions (i.e., dust control) during any large construction or other site activities that create dust in large areas of exposed fill.

Institutional controls have the potential to reduce the risk of exposure with minimal impact on industrial operations.

Alternative 3: In-situ Treatment of Impacted Soil.

Alternative No. 3 consists of treatment of impacted soils in-situ as a potential alternative corrective measure for AOI-13 soils. One in-situ treatment option is soil vacuum extraction (SVE) to directly remove contaminants. SVE would require installation of piping beneath the slab to extract volatile organics via soil vapor. Implementation of an SVE system in this area is problematic due to above and below ground piping in this area, in addition to the active status of the area. Further, for SVE to be successful, vapor entry points/areas (e.g. slab cracks, utility penetrations, etc.) would need to be sealed to control sub-slab vapor flow. Given the above and below ground utility restrictions, and the requirement that the vapor leakage from the surface be tightly controlled to ensure success, SVE would not likely be effective at addressing the impacted soils.

Another method of in-situ treatment would be the introduction of bio-enhancing compound (e.g. oxygen release compounds (ORC)) to accelerate the rate of naturally occurring aerobic contaminant biodegradation in the soils. Since the impacted soils are primarily in the shallow, zero to two foot depth interval, they are above the water table and the soils are not saturated.

This limits the ability to deliver the bioenhancing compound to the impacted soils and typically ORC is not effective in unsaturated soils.

Alternative 4: Soil Excavation and Removal of Impacted Soil at AOI-13.

Under Alternative No. 4, soil under this AOI-13 that exceeded the screening criteria could be excavated, containerized, characterized and treated and/or disposed of off-site, as a potential alternative to addressing the impacted media for the future. The area of soil to be removed is estimated to be approximately 2 feet deep and 20 feet by 30 feet for a volume of approximately 44 cubic yards. Under this alternative, post excavation soil samples would be collected and estimates of routine worker risk to soil concentrations remaining in the area would be determined to confirm that residual soil concentrations will not lead to unacceptable risks. This area has a number of above and below ground utilities and obstructions, which would make implementation difficult, while maintaining the active status of this area. However, should future maintenance of the area and/or slab be required, removal of the impacted soils may be more practicable.

Alternative 5: Excavation and Removal of Fill or Capping

Alternative No. 5 considers whether on-site slag fill that is not currently covered under buildings or pavement (e.g. vegetated areas) could be excavated, containerized, characterized and disposed of off-site. The area of fill to be removed is estimated to be approximately 121 acres with various depths ranging from 2 to 16 ft. for a volume of approximately 730,000 cubic yards of fill. The estimated costs to remove fill from these areas is approximately $10.6 million. Alternatively, to cover the potentially exposed areas with asphalt pavement would cost on the order of $2.4 million. With dust control issues, and access issues associated with utility lines, plant operations, excavation and removal of the fill material would be very difficult, however capping may be a viable, if costly, option.

Alternative 6: Implementation of a Groundwater Monitoring Program with Contingency Plans

Alternative No. 6 includes monitoring of the shallow overburden and the bedrock groundwater, to verify that concentrations of contaminants are not migrating off-site above appropriate risk based screening levels.

GM must monitor the wells in the Site Wide Groundwater Monitoring Program on a bi-annual basis for a minimum of two years, analyzing the samples for the compounds of interest, identifying trends through statistical analysis of the results, and submitting bi-annual reports to the U.S. EPA. Subsequently, GM must monitor wells annually for three years, if the sampling results show no significant increase of constituent concentrations, and submit annual reports to U.S.EPA. The monitoring wells in the Site Wide Groundwater Monitoring Program are located at the site's perimeter, to ensure none of the contaminants onsite is migrating off-site above the risk based screening levels which are the Safe Drinking Water MCLs and the EDWLs for constituents without MCLs for the bedrock perimeter wells and GM derived, U.S. EPA approved Off-site Non-potable Groundwater use Criteria and Off-site Indoor Air Inhalation of Vapors from Groundwater Criteria for the shallow perimeter wells. The network of wells selected in the Site Wide Groundwater Monitoring Program is (See attachment 3):

Shallow perimeter monitoring wells:

- MW-202S, MW-203S, MW-204S, MW-314S, MW-401, and MW-501

Bedrock perimeter monitoring wells:

- MW-202D, MW-203D, MW-205D and MW-314D

The selected monitoring wells will be sampled for total TAL metals (Silver, Arsenic, Barium, Beryllium, Cadmium, Cobalt, Chromium (total), Copper, Manganese, Nickel, Lead, Selenium, Antimony, Vanadium, and Zinc) and TCL VOCs.

GM must monitor groundwater wells in the AOI-35 UST #4 area monitoring network on a quarterly basis for a minimum of two years, analyzing the samples mainly for Benzene, other VOCs, SVOCs, and metals, identifying trends through statistical analysis of the results, and submitting quarterly reports to the U.S. EPA. Subsequently, GM must monitor wells annually for three years, if the sampling results show no significant increase of constituent concentrations

above the Non-potable Groundwater use Criteria and Off-site Indoor Air Inhalation of Vapors from Groundwater Criteria, and submit annual reports to U.S.EPA.

A total of six monitoring wells located in the overburden groundwater zone have been selected to monitor conditions at AOI-35 UST Area#4. Three monitoring wells selected at the AOI -35 UST #4 area would demonstrate through sampling whether contaminant concentrations at the source are decreasing or increasing in the area where the USTs were located. Three additional wells were selected as sentinel wells. The sentinel well which are located downstream of AOI-35 UST #4 within the site boundary, would demonstrate whether compounds of interest have migrated, and have the potential to migrate off-site. Constituent concentrations at sentinel wells must not exceed the RBSL Criteria. If constituents increase and start to approach the Non-potable Groundwater use Criteria and Off-site Indoor Air Inhalation of Vapors from Groundwater criteria, contingency plans must be implemented.

Actual sampling data from all of the wells monitored at AOI-35 UST #4 area will be used to support the results from the Bioscreen model presented in the CMP, which predicted the benzene concentrations will remain consistent or reduce over time.
The network of wells selected in the AOI -35 UST #4 monitoring program are (See attachment 3):

Source monitoring wells:

- MW-213, MW-214, MW-215

Sentinel monitoring wells:

- MW-313, MW-401, MW-402

The monitoring well sampling programs should achieve the following three objectives: 1) regularly monitor the concentrations, flow direction(s) and extent of the contaminated groundwater originating from the facility, 2) confirm whether the contaminated groundwater is relatively stable by comparing actual to modeled conditions or other reasonably appropriate methods and 3) provide point of compliance monitoring at the source areas to demonstrate whether the constituent concentrations consistently achieve groundwater cleanup objectives.

For both groundwater monitoring of the site wide fill and AOI-35, the network of monitoring wells will define the containment area for groundwater. That is, within this network, groundwater must meet the risk-based screening levels. The planning of this remedy would include action that will be taken if groundwater contaminant concentrations increase and start to approach the RBSLs or significant migration is noted. The specific contingency plans would be outlined in the Corrective Measures Implementation report that GM-Lordstown will prepare after the Agency has chosen the final remedy. The specific measures to be developed must assure protection of human health and the environment from adverse effects. Possible contingent remedies could include active groundwater remediation or containment.

After the initial five year period of monitoring, GM may propose a more limited groundwater monitoring program depending on the results of the monitoring by submitting a written request to U.S. EPA and receiving U.S. EPA's approval, GM may also propose to possibly discontinue the monitoring programs by submitting an "Attainment of Ground Water Performance Standards Report," and certification, and obtaining U.S. EPA approval if the results from 5 years of consecutive rounds of monitoring demonstrate that concentrations below appropriate RBSLs have been achieved. In the report, GM must demonstrate whether the ground water performance standards have been attained in satisfaction of the requirements of the Order by showing contaminant concentrations are steady and have a downward trend to ensure that the concentrations will remain below the RBSL in the future once the monitoring has commenced. If U.S. EPA approves the report and agrees with its findings, GM would then receive the "Corrective Action Complete with Controls" status from U.S. EPA. The "with controls" status means that all that remains is performance of the required operation and maintenance, and/or compliance with and maintenance of any institutional controls.

EVALUATION OF PROPOSED REMEDY

The proposed remedy to address contaminated media at the GM-Lordstown Facility is:

Alternative 2: Engineering and Institutional Controls Restricting Exposure to the Contaminated Soil and Groundwater and Limiting the Facility to Industrial Use and Financial Assurance.

Alternative 4: Soil Excavation and Removal of Impacted Soil at AOI-13.

and,

Alternative 6: Implementation of a Site Wide Groundwater Monitoring Program, and Monitoring of Area of Interest (AOI)-35 Underground Storage Tank (UST) Area#4 Shallow Groundwater Zone, with Contingency Plans

The following discussion profiles the performance of the proposed remedy against four general remedy standards and the five remedy decision factors, noting how it compares to the other options under consideration.

General Standards

Overall protection

The above selected alternatives would provide adequate protection of human health and the environment. The overburden and bedrock groundwater at the perimeter of the Site and the overburden groundwater downgradient of AOI-35 does not pose a current unacceptable risk. Alternative No. 6 for the perimeter groundwater and at AOI-35 ensures that no unacceptable exposure will occur. The engineering and institutional Controls identified in Alternative No. 2 for both site wide fill and AOI-13 soils are implemented as a means of preventing and /or controlling potential exposures to identified potential risks. The potential risk will be mitigated through the implementation and maintenance of engineering and institutional controls. Alternative No. 4 provides additional protection by the removal of impacted soil at AOI 13 if the pavement over the impacted soil is ever removed.

Attainment of media cleanup standards

The chosen remedy to monitor site perimeter groundwater quality and downgradient ground quality at AOI-35 will ensure that the concentrations will continue to be below the appropriate risk based groundwater criteria. Appropriate actions will be taken if contamination is identified that poses an unacceptable risk to potential receptors. The points of compliance are defined by the proposed monitoring wells. The proposed monitoring wells chosen were pre-existing wells from the RCRA Facility Investigation. New wells may need to be installed as points of compliance, if conditions change, or plume migration needs to be assessed in another area due to migration.

The plan to monitor groundwater quality is in keeping with U.S. EPA policy that outlined three components for groundwater cleanup: achieving groundwater cleanup levels, establishing the points of compliance, and establishing a remediation time frame. Monitoring of the shallow overburden and bedrock groundwater zones will provide data that will be screened against risk based screening criteria. The continued monitoring will confirm whether levels will continue to be below the criteria. Analytical data collected will be used to verify and /or refine the BIOSCREEN model. Appropriate actions will be taken to ensure no contamination is migrating off-site above the pertinent risk based criteria. Secondly, the points of compliance are defined by the monitoring wells currently in place. These points of compliance can be changed in the future if deemed necessary. Thirdly, GM-Lordstown can petition to reduce monitoring if they can demonstrate that concentrations at perimeter are decreasing or remaining stable at acceptable levels over time.

If the slab or pavement over AOI-13 is removed, the soil in that area must be remediated to a level that is safe for routine workers in that area. The current non-cancer HI for potential exposures to an onsite routine worker at AOI-13 is estimated to be 4. However, the area is currently paved, so that exposure is controlled.

Controlling the sources of releases

Alternatives No.2 and 6 do not add additional source controls, although they require continued implementation and maintenance of the existing barriers to infiltration and direct contact. In addition, the implementation of a Dust Control Plan during construction projects in areas of fill larger than 5 acres would mitigate releases and significant risks due to particulate emissions. Previous excavations and a groundwater treatment system had been in place at AOI-35 to remove free product in the area. Continued monitoring at the source of contamination at AOI-35 will show whether natural attenuation of constituents will occur through natural process. . Contingent measures under Alternative No. 6 will add further controls and treatment if necessary. Alternative No. 4 would provide more source control through removal, of the contaminated soil. The area of soil to be removed is estimated to be approximately 2 feet deep and 20 feet by 30 feet for a volume of approximately 44 cubic yards. Post excavation samples would be collected and estimates of routine worker risk to soil concentrations remaining in the area would be determined to confirm that residual soil concentrations will not lead to unacceptable risks.

Compliance with applicable standards for waste management

Except for minimal amounts of purge water obtained from monitoring wells during sampling events, no wastes will be generated as part of Alternatives No. 2 and 6. Any contingencies under Alternative No. 6 would comply with all applicable standards. Any waste generated from Alternative No. 4 would also comply with all applicable standards for waste handling and disposal.

Remedy Decision Factors

Long-term reliability and effectiveness

Alternative No. 2 will provide long term maintenance and implementation of the identified engineering and institutional controls which will be protective of human health and the environment. The existing Administrative Order on Consent or an implementation order will be amended/established to implement the necessary environmental covenant(s) and use restrictions pursuant to the Uniform Environmental Covenants law (Ohio Revised Code 5301.80 - 5301.92)

and other appropriate legal mechanisms. Further, these restrictions will be documented with the local municipality.

Specifically, an informational notice will be recorded in the property deed ("deed notice") so that any future owner/operators will be aware that residual contamination exists at the Site and that use restrictions are necessary to prevent unacceptable exposures. Measures will be taken to assure the restrictions (including the O&M Plan requirements) are enforceable by U.S.EPA as well as by GM. The Environmental Covenant and use restrictions would remain in place and enforceable if some or all of the property is transferred to different owners in the future.

Alternative No. 6 involves observation of the groundwater. Information gathered in previous investigations indicates that monitoring will likely be sufficient to keep track of groundwater contamination and attenuation. In the event groundwater conditions change, contingency plans will be implemented by methods that will be outlined in the Corrective Measures Implementation Report.

Alternative No. 4 would provide long-term effectiveness through the removal and disposal of contaminated soil.

Reduction of toxicity, mobility, or volume of wastes

Alternative No. 6 would demonstrate if any physical, biological or chemical processes that reduce toxicity, mobility, or volume of contaminants at and downgradient of AOI-35, and at the perimeter wells will occur. The results of the groundwater monitoring at AOI-35 will be used to verify conclusions that natural attenuation including biodegradation, dispersion, dilution, sorption, volatilization and chemical or biological stabilization, transformation or destruction of contaminants are occurring at the Site. As part of Alternative No. 2, maintaining and improving the cover at AOI-13 will help reduce mobility of contaminated soil. Furthermore, when implemented, Alternative No. 4 will reduce mobility and volume by excavation of contaminated soil. The contingencies on the selected corrective measures will act to reduce mobility and volume further if it is determined that exposure controls and natural attenuation aren't sufficient.

Short-term effectiveness

The surrounding community will not be affected by the remedial efforts of Alternatives No. 2 and 6. However, there may be short term impacts on workers from Alternative No. 4, and the Dust Control Plan that would be part of Alternative No. 2. Control Measures that would be taken if there were changes in site operations; these impacts would be controlled through good management practices and compliance with legal requirements (including the approved O&M Plan). There would be no such impacts from other alternatives.

Implementability

Alternatives No. 2 and 6 can be implemented with minimal engineering and administrative procedures, however, care must be taken to ensure the restrictions are properly prepared and filed. The field work required in the monitoring program is routine. The analysis required after sampling events is routine and the reports should not be cumbersome to prepare. Contingency measures such as containment or active remediation of groundwater are also implementable.

Alternative No.4 is currently difficult to implement because AOI-13 has a number of above and below ground utilities and obstructions associated with the area, while maintaining the active status of this area. However, if the slab over contaminated soil at AOI-13 is ever removed, this alternative would be practical with planning and coordination of plant activities.

Cost

Alternatives No. 2 will have minimal cost. Alternative No.6 will have minimal cost, unless contingent measures are later required.

The RFI/CMS indicates that these low cost engineered barriers and monitoring programs, supplementing the active interim measures that have already been taken, will provide sufficient control of and protection from, potential exposures to residual contamination at the facility under

an industrial use scenario. The contingencies included in the O&M plan and in the groundwater monitoring program assure protectiveness if use of open portions of the facility changes and/or if modeling and assumptions about attenuation and control of groundwater contamination prove to be inaccurate. Implementing Alternative No. 4 when it becomes administratively feasible provides further long-term protectiveness at AOI-13, the area where residual soil contamination remains highest.

The cost of treatment or excavation of contaminated soil under Alternative Nos. 3 and 5 would be substantial, so that the proposed remedy is significantly more cost effective. Moreover, if groundwater monitoring indicates that additional source control measures are necessary to assure protectiveness, elements of these costlier alternatives could still be implemented if appropriate. Alternatively, to cover the potentially exposed areas with asphalt pavement would cost on the order of $2.4 million. Although this cost is reasonable, the increase of effectiveness is minimal compared to the less costly options of Alternatives No. 2 and No. 6.

Based on information currently available, the proposed remedy provides the best balance of corrective measure scenarios with respect to the evaluation criteria. U.S. EPA believes that the proposed remedy is protective of human health and the environment and will effectively control the exposure to contaminants in groundwater, and soil. All applicable standards regarding surface water protection would be addressed and complied with during the corrective measures implementation process.

PUBLIC PARTICIPATION

U.S. EPA solicits input from the community on the corrective measures proposed for contaminated groundwater, soil, and sediment. The public is also invited to provide comment on corrective measure scenarios not addressed in this Statement of Basis. U.S. EPA has set a public comment period from October 13th, 2006 through Novermber 30th 2006, to encourage public participation in the selection process.

The Administrative Record for the GM-Lordstown Facility is available at the following locations:

Warren-Trumbull County Public Library
1471 Salt Springs Rd,
Warren, OH 44481
Ph # (330) 824-2094

U.S. EPA, Region 5
Waste, Pesticides and Toxics Division Records Center
77 West Jackson Boulevard, 7th Floor
Chicago, Illinois 60604-3590
(312) 886-0902
Hours: Mon-Fri, 8:00 a.m. - 4:00 p.m.

After consideration of the comments received, U.S. EPA will select the remedy and document the selection in the Final Decision and Response to Comments. In addition, public comments will be summarized and responses provided. The Final Decision and Response to Comments will be drafted at the conclusion of the public comment period and incorporated into the Administrative Record.

To send written comments or request technical information on the General Motors Lordstown Facility, please contact:

Tammy Moore
EPA Project Coordinator
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Corrective Action Section, DE-9J
Chicago, Illinois 60604-3590
(312) 886-6181
E-mail: Moore.Tammy@epa.gov

To request information on the public comment period process, please contact:

Martha Yolisma Robinson
Environmental Specialist
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Information Management Section, DM-7J
Chicago, Illinois 60604-3590
(312) 886-6141
E-mail: robinson.martha@epa.gov