

**STATEMENT OF BASIS  
FOR  
GENERAL MOTORS CORPORATION  
2900 SOUTH SCATTERFIELD ROAD FACILITY  
ANDERSON, INDIANA**

**IND 980 503 825**

**INTRODUCTION**

This Statement of Basis (SB) for the General Motors Corporation (GMC), 2900 South Scatterfield Road facility in Anderson, Indiana, is being issued by the United States Environmental Protection Agency (U.S. EPA) to fulfill part of its public participation responsibilities under the Resource Conservation and Recovery Act (RCRA). The SB explains the proposed remedy at the facility. This remedy is proposed for addressing soil and ground water at the facility. In addition, the SB includes summaries of other remedies analyzed for this facility. The U.S. EPA will select a final remedy for the facility only after the public comment period has ended and the information submitted during this time has been reviewed and considered.

This document summarizes information that can be found in greater detail in the Phase 1 Environmental Monitoring Report, the RCRA Facility Investigation (RFI) Final report, quarterly technical progress reports, Final Corrective Measures Proposal (CMP), and other documents contained in the administrative record for the GMC facility. U.S. EPA encourages the public to review these other documents in order to gain a more comprehensive understanding of the facility and RCRA activities that have been conducted there.

The 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 alternatives. The public can be involved in the remedy selection process by reviewing the documents contained in the administrative record. U.S. EPA in this document informs the public of the location and availability of the administrative record.

**LOCATIONS ADDRESSED BY THE CORRECTIVE ACTION**

The 2900 South Scatterfield Road facility includes numerous locations where materials which meet the definition of solid waste at Title 40 Code of Federal Regulations (40 C.F.R.) Part 260.10 have been managed. These locations are termed solid waste management units (SWMUs). Other locations which do not necessarily meet the definition of SWMUs, but which were evaluated for possible releases of contaminants, are termed areas of concern (AOCs) or areas of interest (AOIs). Descriptions of the SWMUs, AOCs and AOIs can be found in the RFI Final Report and Final CMP.

## **PROPOSED REMEDY**

**Plant 19, Parking Lot 3, Monroe Street Parking Lots** – U.S. EPA has determined that no SWMUs are present and that releases of hazardous constituents have not occurred from these portions of the GMC property. These properties, some of which have been sold by GMC, are no longer part of the facility.

**Assessment of Site Conditions** – The RFI Final Report presented an evaluation of human health risks from all anticipated organic and metallic contaminants at the GMC facility, based on either the use of conservative risk-based screening criteria or through a site-specific Baseline Risk Assessment. The RFI Final Report and the Baseline Risk Assessment contained therein were approved by U.S. EPA on May 1, 2002.

Areas of soil contamination at the facility have been addressed by treatment or removal, as interim corrective measures. Ground water at the facility property line which had the potential to migrate off-site at concentrations that exceed site-specific risk-based criteria has been treated *in situ* as an interim corrective measure. The U.S. EPA proposes the following remedy to address the remaining contaminated soils and ground water at the GMC facility:

### **Soils**

**Former Plant 3, SWMU 72** – Soil removal was conducted during the Plant 3 demolition and concrete slab removal from the former chrome plating area. GMC conducted a human health risk assessment for the residual contamination, which was reviewed by U.S. EPA, and demonstrated concentrations of contaminants are below the U.S. EPA-established risk levels. This area has been determined to require no further action.

**Former Plant 3, SWMU 79** – Soil contaminated by low concentrations of organic compounds was identified during investigation activities. GMC conducted a human health risk assessment for the residual contamination, which was reviewed by U.S. EPA, and demonstrated that concentrations of contaminants are below the U.S. EPA-established risk levels. This area has been determined to require no further action.

**Former Plant 3, AOC 16** – Soil contaminated by organic compounds was identified during investigation activities. GMC conducted a human health risk assessment for the residual contamination, which was reviewed by U.S. EPA, and demonstrated that concentrations of contaminants are below the U.S. EPA-established risk levels. This area has been determined to require no further action.

**Former Plant 3, AOC 18** – Soil contaminated by metals and cyanide was identified during investigation activities. GMC conducted a human health risk assessment for the residual contamination, which was reviewed by U.S. EPA, and demonstrated that concentrations of contaminants are below the U.S. EPA-established risk levels. This area has been determined to require no further action.

**Former Plant 3, Area 4** – Soil contaminated by volatile organic compounds (VOCs) was identified during investigation activities. GMC conducted a human health risk assessment for the residual contamination, which was reviewed by U.S. EPA, and demonstrated that concentrations of contaminants are below the U.S. EPA-established risk levels. This area has been determined to require no further action.

**Former Plant 3, Area 3** – An area of soil which is contaminated with trichloroethene (TCE) and its degradation compounds was addressed by soil vapor extraction as an interim corrective measure from 1999 to 2001. 95% of the contamination was removed, and the risk estimates based on the residual concentrations are below the U.S. EPA-established limits. This area has been determined to require no further action.

**Former Plant 17, Area 2** – Risk estimates are below the U.S. EPA-established limits. However, oil was present in limited portions of Area 2. Oil contaminated soil has been excavated and removed off-site. This area has been determined to require no further action.

**Former Plant 17, AOC 24** – The soil in this area is contaminated with TCE and its degradation compounds. As an interim corrective measure, soil vapor extraction was performed from 1999 to 2000, but was discontinued when the system reached its practical limits. GMC conducted a human health risk assessment for this area, which was reviewed by U.S. EPA, and demonstrated that risk estimated based on the residual concentrations of TCE are below U.S. EPA-established limits. This area has been determined to require no further action.

**Plant 11, SWMU 36** – The concrete floor and underlying soil in the former chrome plating area, which were contaminated with chromium, were excavated and removed off-site. In another location, TCE and metals were detected in the soil. Investigation has shown the soil contamination to be localized; however, TCE has impacted ground water in this area. Although the TCE impacted ground water extends beyond the immediate area of SWMU 36, ground water monitoring has confirmed that the area of ground water impact is not expanding. GMC conducted a human health risk assessment for this SWMU, which was reviewed by U.S. EPA, and demonstrated that concentrations of contaminants are below levels that require corrective measures. This area has been determined to require no further action.

**Former Plant 10, SWMU 76** – Soil contaminated by metals and cyanide was identified during investigation activities. GMC conducted a human health risk assessment for the residual contamination, which was reviewed by U.S. EPA, and demonstrated that concentrations of contaminants are below the U.S. EPA-established risk levels. This area has been determined to require no further action.

**Area 5 (Pittsford Ditch)** – Contaminants detected in the Pittsford Ditch sediments were benzo(a)pyrene in a segment of the ditch within the GMC facility, and lead in sediment at the off-site outlet of the ditch. The average concentration of lead was below the U.S. EPA residential threshold level of 400 mg/kg, and the human health risk assessment demonstrated that concentrations of contaminants are below the U.S. EPA-established risk levels, and that no further action is required for the on-site portion of the ditch.

**Former Plant 7, Area 1** – The soil in this area has been thoroughly investigated. Oil and lead are the contaminants of concern. Polychlorinated biphenyls (PCB) was detected in one soil sample at a low concentration (12 mg/kg). GMC performed a human health risk assessment, which was reviewed by U.S. EPA, and determined that concentrations of contaminants are below the U.S. EPA-established risk levels. This area has been determined to require no further action, under continued industrial use.

**Former Plant 7, Area 7** – Significant concentrations of TCE are present in the soil in the former location of a degreaser. Corrective measures are required for this area. The remedy proposed for this contamination is physical containment, which is described below in this SB.

## **Ground Water**

### Ground Water Monitoring Program

GMC submitted a Ground Water Monitoring Plan (GMP) to U.S. EPA on June 12, 2001, to address monitoring activities recommended in the RFI Final Report. The GMP provides the details of two ground water monitoring programs. The areas of interest that are involved in this ground water monitoring are Area 3, Plant 3; Areas 1 and 7 at Former Plant 7; SWMU 36 and AOC 24. The first, Baseline Ground Water Monitoring Program, intended as a one-time event to collect ground water chemistry data from all ground water sampling locations within the areas of interest determined to require further monitoring that have had levels of contaminants exceeding Federal maximum concentration levels in the past, was conducted between June 27, 2001 and July 10, 2001.

The second, Ongoing Ground Water Monitoring Program, includes ground water monitoring of a smaller set of wells on an ongoing basis for five years or 10 sampling events, primarily to compile a set of ground water chemistry data which will form a basis for future use in identifying trends at the different areas of interest during the implementation of the GMP.

The Ongoing Ground Water Monitoring Program has continued with semi-annual sampling in March and September of each year since September 2001. Detailed reports of these sampling events were submitted to U.S. EPA in Annual Ground Water Monitoring Reports from 2001 to 2005.

#### Interim Measures at Former Plant 7, Area 7

In an effort to address TCE contamination in the ground water which is migrating beyond the northern boundary of the GMC facility, GMC proposed to install a series of injection wells near the property line. Through these wells, GMC proposed to inject a solution of molasses into the plume of contamination. The sulfur and organic composition of the molasses would stimulate the growth of existing bacteria, which would degrade the TCE. This process is known as Enhanced Reductive Dechlorination (ERD). U.S. EPA approved GMC's plan on June 7, 2001. Twenty-two injection wells were installed in a row near the property line on 10-foot centers. The ERD system began operation in August 2001, but was shut down in November 2003. Although the system effectively degraded the TCE, the concentrations of the degradation product vinyl chloride were not effectively treated by the ERD system. U.S. EPA and GMC have decided to address ground water contamination from Area 7 through the proposed final remedy. GMC currently monitors ground water in this area to ensure that no unacceptable exposures to vinyl chloride occur.

#### Contaminated Ground Water at the Property Boundary

Ground water investigations at the facility determined that ground water, contaminated with TCE and its degradation compounds, is present at the facility and in off-site locations downgradient of the facility at concentrations above conservative risk-based screening criteria. Therefore, as part of its Baseline Risk Assessment, GMC calculated the maximum allowable concentrations for chlorinated organic contaminants which are present in the ground water passing the property boundary. These have been termed Property Boundary Goals (PBGs), which were presented in the RFI Final Report. Factors such as the near lack of human receptors (i.e., predominance of residences receiving drinking water from City water lines, and the scarcity of private wells) and the City of Anderson prohibition on the installation on new private wells, described below, were taken into account in the PBG calculations. The PBGs are 520 ug/L (parts per billion) for TCE, 483 ug/L for cis-1,2 dichloroethene and 35 ug/L for vinyl chloride.

## **Institutional Controls**

Institutional controls will be imposed on selected areas of the facility, where contaminant concentrations in soil are above levels that allow unrestricted access, to restrict land use for industrial or commercial purposes. Ground water contamination has migrated beyond GMC's property boundary. GMC replaced existing residential drinking water wells with connections to the public drinking water supply. An ordinance enacted by the City of Anderson, on November 21, 2000, prohibits the installation of private potable water wells in the future.

## **Consent Agreement and Final Order**

On May 9, 2002, U.S. EPA and GMC entered into a Consent Agreement and Final Order (CAFO), for the completion of RCRA corrective action at the South Scatterfield Road facility. This CAFO is an enforceable instrument for ensuring that financial assurance remains in place for completing corrective measures and any long-term requirements for operation and maintenance (O&M), including ground water monitoring and institutional controls, are properly adhered to until the measures are completed or deemed unnecessary.

## **FACILITY BACKGROUND**

### **Site Description**

The GMC facility is located at 2900 South Scatterfield Road, on the southeast side of the City of Anderson in Madison County, Indiana. This 220 acre facility consists of three manufacturing plants (Plants 11, 18 and 20) and four former manufacturing plants that have been demolished (former Plants 3, 7, 10 and 17). GMC owns the facility property but Plant 20 is currently leased and operated by Delphi Automotive Systems, LLC. Operations at Plant 11 previously included manufacturing and assembly of automotive engine components. Automotive ignition systems are manufactured in Plant 20. Delphi administrative offices were previously housed in Plant 18. Plants 11 and 18 are currently idle and Plant 11 is scheduled for demolition in 2006.

Former Plant 3 was built in 1937 and expanded several times. Horns and light-duty motors were manufactured in this building. Plant 3 was idled in 1999 and was demolished in 2004. The concrete foundation and floor slab were also removed.

Former Plant 7 was a manufacturing building that was built in 1940 and was expanded several times. The building was demolished in 1996, with the concrete foundation and floor slab remaining in place. Automotive electronic components were manufactured at Plant 7.

Former Plant 10 was built in 1941 and expanded several times. Automotive electronic components were manufactured. Plant 10 was demolished in 1992, with the concrete foundation and floor slab remaining in place.

Former Plant 17 was a manufacturing building that was built in 1963 and expanded several times. The automotive parts that were built in the plant included heavy-duty starter motors and alternators, and other electronic components. Plant 17 was idled in 2001 and demolished in 2003-2004. The concrete foundation and floor slab were also removed.

The GMC facility is bounded on the north by Conrail railroad tracks, a scrap yard, and other industrial property. To the west is residential land, and to the south and east is residential and undeveloped land. The facility is divided by South Scatterfield Road, a major transportation corridor which runs north-south.

### **Site Geology**

Geology at the facility has been investigated through the installation of approximately 414 soil borings and 113 monitoring wells. Generally, the facility is developed upon complexly interbedded glacial and stream deposited sediments which range from silty sand to dense, clay-rich till. The facility extends over three surficial geologic units. These units include a sandy, silty, clay unit of low permeability, a coarse sand and gravel unit which forms an upper aquifer, and a dense gravelly clay unit, known as a basal till, which underlies the entire facility, separating the upper interbedded sediments from the bedrock. Depths to the basal till range from 25 to 53 feet below the ground surface.

### **Surface Water Hydrology**

The predominant surface water feature in the vicinity of the facility is the White River, which is located approximately 3,000 feet to the north, flowing east to west. A tributary stream, the Pittsford Ditch, flows south to north through the facility property. Within the GMC property, the Pittsford Ditch is either lined with concrete or flows underground through culverts.

### **Ground Water Hydrogeology**

The basal till forms an effective barrier between the saturated upper aquifer sediments described above and the deeper bedrock aquifer. Ground water flows in the upper aquifer in a primarily north-northwesterly direction, toward the White River.

## **Water Supply and Ground Water Use**

Residences and places of business to the north (downgradient) of the facility obtain their drinking water from City municipal lines, with the exception of a private well at one currently vacant property. In the past, several residences relied on private water supplies to obtain their drinking water. GMC sampled and analyzed well water for contaminants on a semi-annual basis at these well until these residences were connected to the public drinking water system. GMC was sampling and analyzing the well water from the one remaining property that has a private well until it recently became vacant. GMC will resume monitoring the well water at this residence if it becomes reoccupied and if it remains on a private well supply.

## **PRE-RCRA FACILITY INVESTIGATION**

Prior to initiating the RFI in September 1998, GMC searched its facility records and performed preliminary investigations, which were summarized in the April 1992 RFI Phase I Environmental Monitoring Report (EMR). GMC also conducted extensive field investigations at areas of former Plant 3, former Plant 7 and former Plant 17 where potentially significant levels of contaminants in soil and ground water were identified during investigations conducted in 1994. The principal contaminants identified during these investigations included TCE and its degradation products. The pre-RFI characterization of soil and ground water enabled initiation of the previously described interim measures at Area 3, AOC 24 and Area 7.

## **RCRA FACILITY INVESTIGATION**

The first phase of the RFI field investigations was initiated in September 1998 with U.S. EPA's approval of the RFI Work Plan. Based on the results of the initial phase of field investigations, GMC recommended further characterization of SWMU 36, Area 1 (at SWMU 5 only), Area 2 and Area 5. These additional investigations were conducted from July 1999 to January 2000, and the results were summarized in the Supplemental RFI Report and Stage III RFI Work Plan.

The Stage III field investigations were conducted from March to August 2000. GMC determined the need for further investigation of Area 2, which was discussed in the Plant 17 Chip Handling Area Interim Measures Work Plan, and performed from January to March 2001.

Results of the field investigations and GMC's recommendations were summarized in the October 2001 RFI Final Report and Baseline Risk Assessment. U.S. EPA approved this document on May 1, 2002.

## **SUMMARY OF FACILITY RISKS**

### **Human Health Risk Evaluation**

During the implementation of the RFI, the sampling results from each area were compared with conservative generic and/or site specific risk-based screening criteria to identify whether a potentially significant release of hazardous constituents to the environment had occurred and to assess the adequacy of characterization of potentially significant releases. It was determined that adequate data had been collected from each SWMU, AOC and AOI to support a risk evaluation. The Baseline Risk Assessment was presented as Section 5.0 of the RFI Final Report. The conclusions of the Baseline Risk Assessment were summarized in the Final Corrective Measures Proposal (CMP) submitted to U.S. EPA on April 29, 2004, and revised on January 13, 2005, and September 16, 2005. Two addenda to the CMP providing additional risk screening evaluations were submitted; the first on March 20, 2005, and the second on September 19, 2005.

The significance of potential exposure to soil at the site was evaluated based on current and reasonably expected future land use. Potential receptors considered included on-site routine workers, on-site construction workers, site redevelopment workers, trespassers and off-site residents. A conservative estimate of the cumulative cancer and noncancer risks was calculated for each of the areas investigated during the RFI. These estimates were calculated based on the maximum concentrations of constituents detected in soil or sediment at each area, and the conservative exposure factors that were used to derive the U.S. EPA Region 9 risk-based Preliminary Remediation Goals (PRGs). Under U.S. EPA policy, corrective measures are not warranted when the site-related cumulative cancer risk does not exceed  $10^{-4}$  and the noncancer hazard index (HI) does not exceed 1. The principal contaminants, termed hazardous constituents, present are heavy metals and TCE and its degradation products.

Based upon the RFI field investigations and the risk evaluations for each SWMU, AOC and AOI, these areas have been divided into three subsections as follows: (1) areas where no corrective measures are warranted (including the need for site-specific institutional controls); (2) areas where corrective measures are not warranted, with the exception of institutional controls to maintain commercial/industrial land use; and (3) areas where corrective measures are warranted, with institutional controls to maintain commercial/industrial land use.

Areas which were determined not to warrant corrective measures or site-specific institutional controls (that is, areas qualifying for unrestricted land use) are: SWMU 72, SWMU 79, AOC 16, AOC 18, former Plant 3 - Area 3, former Plant 3 - Area 4, SWMU 76, SWMU 36, former Plant 17 - Area 2, former Plant 17 - AOC 24 and SWMU 28.

Areas which were determined not to warrant corrective measures under commercial/industrial land use are as follows: Former Plant 7 – Area 1 (SWMUs 4,5 and 6) and Area 5 (Pittsford Ditch).

Former Plant 7 – Area 7 will require corrective measures which are discussed below.

### **Ecological Risk Evaluation**

The GMC facility is located in a highly developed area consisting of a mixture of industrial, commercial, and residential properties. The site itself is a formerly active industrial property with little natural soil or vegetation at ground surface. Currently, the facility is predominantly covered by buildings, pavement, crushed rock, the slabs of demolished buildings, or areas where vegetation has been established following the removal of former plant slabs. The only surface water body, the Pittsford Ditch, flows either through concrete-lined channels or underground culverts. Based on these observations, no environmentally sensitive habitats exist at the facility, and no endangered and/or threatened species are expected to be present. Further, because the facility will be redeveloped for commercial/industrial reuse, the creation of habitats at the site is unlikely.

### **SUMMARY OF CORRECTIVE MEASURES OPTIONS FOR AREA 7**

The concentrations of contaminants in ground water downgradient of the facility at Area 7 do not present an immediate threat to human health; however GMC has attempted to prevent further off-site migration of the contaminant plume from Area 7 by conducting the previously described ERD interim measures. U.S. EPA and GMC have determined that the ground water contamination at Area 7 must be addressed by final corrective measures, either at its source at Area 7 or at the property boundary. Alternatives which have been considered for the final corrective measures for Area 7 are summarized as follows:

#### **Alternative 1 – Modification and Continued Operation of the ERD System**

In order to reactivate the system to become effective, redesign and modifications to the array of injection wells would be required. The former Area 7 degreaser source area of TCE would not be addressed under this alternative, and operation of a property boundary control system would need to be conducted indefinitely. Institutional controls associated with this alternative would consist of deed restrictions to ensure continued industrial use of the former Plant 7 property and restrict development in the former degreaser area, and periodically verify the existence of the City ordinance which prohibits the installation of private wells. Engineering controls would consist of maintaining the concrete cover in the former degreaser area to prevent direct contact exposure with impacted soil. The continued operation alternative would require upgrades to the existing system totaling

\$100,000. Operation of the system would be required for an indefinite period at an estimated cost of \$89,600 per year.

#### Alternative 2 – No Active Remediation

This alternative would require no activity as the selected corrective measure. Concentrations of contaminants in soil and ground water would remain in excess of screening criteria. Selection of this alternative may create a potential for exposure to unacceptable levels of chlorinated compounds in ground water off-site under expected future conditions, and to indoor air or direct contact with soil, if the degreaser area were developed. Institutional controls associated with this alternative would include deed restrictions to ensure continued industrial use of the former Plant 7 property, restrict development in the former degreaser area, and periodically verify the existence of the City of Anderson ordinance which prohibits the installation of private wells. Engineering controls would be the maintenance of the concrete cover in the former degreaser area, to prevent direct contact exposure with impacted soil. No capital costs are associated with this alternative, and annual O&M costs are estimated at \$24,600.

#### Alternative 3 – Physical Containment of the Source Area

The physical containment alternative would include the installation of a 360-degree slurry wall around the source area to contain soils contaminated above the calculated cleanup objective of 15 mg/kg TCE and to contain ground water that contains greater than 2.0 mg/L (parts per million) TCE. These numbers were determined based on ground water modeling to meet the PBGs for the facility. The slurry wall would be keyed into the underlying basal clay geologic unit at approximately 40 feet below ground surface, to provide complete containment. The overlying concrete cover would be repaired and maintained, or an alternate cover would be installed, such as a low-permeability cover, to minimize the infiltration of water and to provide a physical barrier to prevent direct contact with contaminated soils. A minimal amount of ground water extraction from within the containment area would be required to maintain an inward gradient of flow.

Institutional controls associated with this alternative would include deed restrictions to limit future use to industrial use of the former Plant 7 property, prohibit all excavation within the containment area, protect the integrity of the slurry wall and cover, and restrict development in the former degreaser area, and periodically verify the existence of the City of Anderson ordinance which prohibits the installation of private wells. Engineered controls would include maintaining the integrity of the cover .

The capital construction cost for the slurry wall containment system is estimated at \$636,600, which include the installation of O&M monitoring wells downgradient of Area 7. The net present value of the O&M costs is estimated at \$961,000, which includes operation of the ground water extraction system, annual ground water monitoring, and maintenance of the final cover. The O&M costs have been calculated over a 100-year period, to reflect the indefinite maintenance of this alternative, compared to the U.S. EPA standard of a 30-year period to evaluate O&M costs associated with some of the other alternatives evaluated.

Alternative 4 – Excavation and Off-Site Disposal of Contaminated Soil with *in situ* Chemical Oxidation of Contaminated Ground Water

This alternative would consist of the removal down to the water table of soils impacted with TCE above 15 mg/kg. The excavated material would be transported off-site as hazardous waste for disposal. Following excavation and removal, a series of injection wells would be installed in the former degreaser area to conduct *in situ* chemical oxidation, to degrade the TCE in the local ground water. The likely oxidant would be potassium permanganate (KMnO<sub>4</sub>); however, the exact spacing of the injection wells, the oxidant, and the number of injections of the oxidant would be determined through a treatability study.

Institutional controls would include deed restrictions to limit future use to industrial use of the former Plant 7 property, restrict development in the former degreaser area and periodically verify the existence of the City of Anderson ordinance which prohibits the installation of private wells.

The capital costs for excavation and off-site disposal followed by *in situ* chemical oxidation are estimated at \$5,201,214. O&M costs are estimated at \$430,000 which includes ground water monitoring to evaluate the effectiveness of the corrective measures. O&M costs were calculated over a 30-year period.

Alternative 5 – *In Situ* Thermal Treatment of Soil and Ground Water

The *in situ* thermal treatment of the contaminated zones above and below the water table would involve the installation of a system to heat the soil and ground water to remove the TCE to the calculated cleanup objectives of 15 mg/kg in soil and 2.0 mg/L in the ground water. GMC obtained proposals for this option from four vendors to determine the cost and feasibility of this option.

Institutional controls associated with this alternative would include deed restrictions to limit future use to industrial use of the former Plant 7 property, restrict development of the former degreaser area, and periodically verify the existence of the City of Anderson ordinance which prohibits the installation of private wells.

The capital construction cost for this alternative is estimated at \$2,693,363, which includes the installation of O&M monitoring wells. O&M costs are estimated at \$430,000, which includes ground water monitoring to evaluate the effectiveness of the corrective measures, over a 30-year period.

Alternative 6 – Excavation and *Ex Situ* Thermal Desorption of Soil with *In Situ* Chemical Oxidation of Ground Water

This alternative would consist of the removal of soils impacted with TCE above 15 mg/kg, to the water table. The contaminated soil would be treated on-site using thermal desorption technologies to a 15 mg/kg, after which the treated soil would be placed back into the excavation. Following completion of the excavation and treatment, a series of injection wells would be installed in the former degreaser area to conduct *in situ* chemical oxidation of ground water. The likely oxidant would be potassium permanganate; however, the exact spacing of the injection wells, the oxidant and the number of injections of the oxidant would be determined through a treatability study.

Institutional controls associated with this alternative would consist of deed restrictions to limit future use to industrial use of the former Plant 7 property, restrict development of the former degreaser area and periodically verify the existence of the City of Anderson ordinance which prohibits the installation of private wells.

The capital construction cost for this alternative is estimated at \$2,359,664, which includes the installation of O&M monitoring wells. O&M costs are estimated at \$430,000 which includes ground water monitoring over a 30-year period, to evaluate the effectiveness of the corrective measures.

Alternative 7 – *In Situ* Thermal Treatment of Soil with *In Situ* Chemical Oxidation of Ground Water

This combination of *in situ* treatment of contaminated soil and ground water would include the installation of a system to heat the contaminated soil above the water table to remove TCE contamination to 15 mg/kg. Following completion of the soil treatment, a series of injection wells would be installed in the former degreaser area, to conduct *in situ* chemical oxidation of ground water. The likely oxidant would be potassium permanganate; however, the exact spacing of the injection wells, the oxidant and the number of injections of the oxidant would be determined through a treatability study.

Institutional controls associated with this alternative would include deed restrictions to limit future use to industrial use of the former Plant 7 property, restrict development in the former degreaser area and periodically verify the existence of the City of Anderson ordinance which prohibits the installation of private wells.

The capital construction cost for this alternative is estimated at \$2,012,512, which includes the installation of O&M monitoring wells. O&M costs are estimated at \$430,000 which includes ground water monitoring over a 30-year period, to evaluate the effectiveness of the corrective measures.

## **EVALUATION OF PROPOSED CORRECTIVE MEASURES**

The corrective measures alternatives discussed above were evaluated using the General Remedy Standards and Decision Factors criteria discussed below.

### **General Remedy Standards**

Overall Protection of Human Health and the Environment – With the exception of Alternative 2, all of the alternatives will provide protection of human health and the environment. Alternatives 3, 4, 5, 6 and 7 address the source of the ground water contamination and require monitoring of the contaminant plume. Also, Alternatives 1, 4, 5, 6 and 7 include treatment of contaminated ground water. Alternative 4 would eliminate all risks presented by contaminated soil by excavation and removal off-site; although Alternatives 3, 5, 6 and 7 would directly address soil contamination by containment or treatment.

Attainment of Media Cleanup Standards – If Alternative 1 were selected, the ground water at the downgradient property boundary would have to be monitored indefinitely, to ascertain that the calculated PBGs are not exceeded. If the PBGs are exceeded, then corrective measures for source control would have to be implemented. Alternative 2 would be less protective because no treatment would occur, with the assumption that PBGs would not be exceeded. However, Alternatives 3, 4, 5, 6 and 7 require either containment, excavation, or treatment of the source area soil to attain the calculated cleanup goal of 15 mg/kg for TCE. These alternatives also require confirmatory monitoring of the ground water to ensure that the PBGs are not exceeded.

Controlling the Source(s) of Releases – Alternatives 3, 4, 5, 6 and 7 require that the source area of TCE contamination at Area 7 be addressed, either through containment, excavation, or treatment. This is not the case with Alternatives 1 and 2.

Compliance with Applicable Standards for Waste Management – No wastes would be generated by implementing Alternatives 1, 2, 5 and 7. Excavation and off-site removal under Alternative 4 would require that the excavated soil be managed as hazardous waste, in accordance with all applicable regulations. During the construction of Alternative 3, some contaminated soil may have to be removed and managed as hazardous waste. For Alternatives 3, 6 and 7, the treatment and reburial of the treated soil could take place within the area of contamination during the corrective measures implementation, such that the cleanup standard is achieved.

### **Remedy Decision Factors**

Long-Term Reliability and Effectiveness – The containment, removal, or treatment of soil will result in acceptable risk through corrective measures that are both reliable and effective because the contamination is either removed or minimized, and thus unable to contaminate ground water or present a hazard by direct contact. This objective can be accomplished by Alternatives 3, 4, 5, 6, and 7. Follow-up monitoring of the downgradient ground water over a 30-year period will track the performance of the selected corrective measures. Alternatives 1 and 2 would not provide long-term reliability and effectiveness.

Reduction of Toxicity, Mobility or Volume of Wastes – Alternative 2 would depend upon the passive and natural degradation of the TCE contamination, which would require monitoring of the ground water for an indefinite time, and would be minimally effective in achieving this objective. Alternative 1 would be an improvement, because the ground water contamination would be treated; although the source would not be addressed. Alternative 4 offers the most protection through removal of the soil contamination to the cleanup goal, combined with treatment of ground water contamination. Alternatives 3, 5, 6 and 7 would also effectively reduce the toxicity, mobility and volume of TCE and its degradation products in soil and ground water through their implementation.

Short-Term Effectiveness – The contamination at Area 7 has been shown to have a minimal impact upon downgradient businesses and residences. Implementation of Alternative 3 would have the most rapid effect upon soil and ground water contamination; although the benefits of Alternatives 4, 5, 6 and 7 would be expected to appear before long.

Implementation – Alternative 2 would require no effort other than ground water monitoring. The implementation of Alternative 1 would require some mobilization, for the redevelopment and improvement of the existing ERD injection well array. Similarly, Alternatives 5 and 7 would be conducted below ground level; although care would have to be taken with *in situ* thermal treatment so as not to disperse the existing contamination over a larger area. Alternative 3 would require some excavation and construction activities, with applicable safety and waste management issues to be kept in mind. Alternative 4 and 6 would be the most large-scale undertakings, and would require a large area for excavation, staging and equipment decontamination. Safety and transportation issues would have to be addressed for the off-site shipment of an estimated 10,000 cubic yards of hazardous waste in Alternative 4. Safety and potential air emissions issues would have to be addressed for the on-site thermal treatment of an estimated 10,000 cubic yards of TCE impacted soil in Alternative 6. Because TCE is a volatile compound, the open excavation could expose a large surface area of contaminated soil, potentially releasing a significant volume of vapors. Alternatives 4 and 6 would be the most complex undertakings.

Cost – Alternative 2 would be the least expensive remedy, at an estimated \$24,600 per year for O&M. The most expensive alternative would be Alternative 4, which would cost an estimated \$5,201,214 for construction, and \$430,000 over a 30-year O&M period.

### **Proposed Final Corrective Measures for Area 7**

U.S. EPA proposes Alternative 3, physical containment of the source area, as the final corrective measures for Area 7. Encapsulation of all soil containing greater than 15 mg/kg of TCE with a slurry wall and final cover will be protective of human health and the environment by isolating the contamination from ground water and exposure to humans. GMC has taken measures to minimize and eliminate the potential exposure of human receptors to contaminated ground water at downgradient residences by assisting those potentially affected with carbon filter installation, private well abandonment, and connection to City drinking water lines. GMC will monitor the ground water downgradient of Area 7 in order to track the expected decrease of contaminant levels. Also, the Consent Agreement and Final Order will be modified accordingly, to provide financial assurance for the remedy, quality assurance for the construction of the slurry wall and cover, ground water extraction within the containment area to maintain an inward hydraulic gradient, periodic evaluation of the slurry wall's integrity, ground water monitoring and other O&M requirements.

## **SUMMARY**

Various locations where materials which meet the definition of a solid waste have been managed were investigated and evaluated by GMC and presented in the RFI Final Report. Areas where a potentially significant release was identified were evaluated in a site-specific baseline risk assessment to determine the significance of human health risks. The risk assessment results were presented in the RFI Final Report and Final CMP (and Addenda).

Former Plant 7, Area 7 was the only area where corrective measures in addition to institutional controls were required. Significant concentrations of TCE are present in the soil in the former location of a degreaser. Physical containment of the source area is proposed as the final corrective measures for Area 7. Encapsulation of all soil with a slurry wall and final cover will be protective of human health and the environment by isolating the contamination from ground water and exposure to humans. GMC will monitor the ground water downgradient of Area 7 in order to track the expected decrease of contaminant levels.

Institutional controls will be established for certain areas of the facility to restrict land use for industrial or commercial purposes. An ordinance enacted by the City of Anderson in November 2000 prohibits the installation of private potable water wells in the future and thereby provides sufficient protections against ground water consumption downgradient of the facility.

## **PUBLIC PARTICIPATION**

The U.S. EPA is soliciting comments from the public on corrective measures alternatives presented in this document for the GMC Scatterfield Road facility. The U.S. EPA has scheduled a public comment period of 45 days from April 28, 2006 to June 12, 2006 in order to encourage public participation in the decision process. During the public comment period, the U.S. EPA will accept written comments on the proposed action. The public may submit written comments, questions and requests for a public meeting to the following address:

U.S. Environmental Protection Agency, Region 5  
Waste Management Branch (DW-8J)  
77 West Jackson Boulevard  
Chicago, IL 60604  
(312) 353-1248  
ATTN: Don Heller or Martha Y. Robinson

The administrative record is available for review at the following two locations:

Anderson Public Library  
111 East 12<sup>th</sup> Street  
Anderson, Indiana 46016

and

U.S. Environmental Protection Agency, Region 5  
77 West Jackson Boulevard  
Chicago, Illinois 60604  
Attention: Don Heller

You may also obtain more information on the internet at:

<http://www.epa.gov/reg5rcra/wptdiv/permits/index/htm>.

After U.S. EPA's consideration of the public comments that are received, they will be summarized and responses will be provided in a Response to Comments document. The Response to Comments document will be drafted after the conclusion of the public comment period and will be incorporated into the administrative record.