1/20/10 draft

# STATEMENT OF BASIS
# FOR
# DETROIT DIESEL CORPORATION SITE
# 13400 WEST OUTER DRIVE
# DETROIT, MICHIGAN
# MID 005 356 803

## INTRODUCTION

This Statement of Basis (SB) for the Detroit Diesel Corporation Site (Site), is being issued by the United States Environmental Protection Agency (U.S.EPA) to fulfill part of our public participation responsibilities under the Resource Conservation and Recovery Act (RCRA). The Site is comprised of the Detroit Diesel Corporation (DDC) facility at and around 13400 West Outer Drive, Detroit, Michigan (Facility), as well as surrounding areas to which any contaminants of concern from the Facility may migrate. This SB explains the Proposed Remedy for the Facility (and surrounding areas), along with a background on the Facility, and a summary of environmental investigations and interim measures performed as part of the efforts by DDC to address its obligations under RCRA. This remedy is proposed for addressing groundwater and light non-aqueous phase liquid (LNAPL) plumes at the Facility. The U.S.EPA will select a final remedy for the Facility only after the public comment period has ended and we have reviewed and considered the information submitted to us during this time.

This document summarizes information that can be found in greater detail in the Current Conditions Report (CCR), Due Care Plan (DCP) and RCRA Facility Investigation (RFI) Report, as well as other documents contained in the administrative record for the Facility. U.S.EPA encourages the public to review these documents in order to gain a more comprehensive understanding of the Site and the 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 the proposed remedy. The public can be involved in the remedy selection process by reviewing the documents contained in the administrative record. U.S.EPA is informing the public of the location and availability of the administrative record and the schedule for the public comment period.

## PROPOSED REMEDY

Ground and groundwater contamination are the principal remaining concerns at the Site. Contaminated groundwater was extracted and treated for 14 years, and continues to be monitored as part of interim measures performed at Area of Interest (AOI)-25 of the Facility by DDC, along with monitoring and removal of LNAPL at up to eight AOIs at the Facility. The U.S.EPA proposes the following remedy to address the remaining contaminated groundwater and LNAPL at the Facility:

### **OAI – 25 Groundwater**

A long-term groundwater monitoring program will be implemented to confirm that concentrations of constituents remain below human health risk-based criteria at the property boundary monitoring wells, and at off-site (the term "off-site" is used in this SB to indicate "outside of the Facility's boundaries", but note that off-site wells etc. are still part of the "Site") monitoring wells downgradient of the Facility. Specifically, the long-term groundwater monitoring program will include semi-annual groundwater sampling at the Facility's perimeter and off-site monitoring wells downgradient of AOI 25 to confirm that concentrations in these areas remain below the applicable human health risk-based criteria. Additionally, monitoring wells at the interior of the Facility will be sampled to confirm that concentrations of constituents remain at or below levels that are protective of human health and the environment under current and reasonably expected future land use at the Site. A long-term groundwater monitoring plan will be developed and submitted to the U.S.EPA as part of the long-term operation and maintenance plan. This long-term groundwater monitoring plan will define the monitoring wells to be sampled, the analyses to be performed, and the frequency and expected duration of the long-term monitoring program. Initially, the groundwater sampling will be conducted semi-annually for a period of two years. After two years, the sampling will be conducted annually for a period of three years. Subsequently, the frequency and details of the monitoring program will be re-evaluated and modified, as necessary. A contingency plan will be in place and will be enacted if groundwater concentrations at the Facility's perimeter or off-site locations approach applicable human health risk-based criteria.

### **Site-Wide LNAPL**

A LNAPL monitoring program will be implemented to confirm that the presence of LNAPL beneath the Site remains stable and does not migrate. Specifically, the LNAPL monitoring program will include semi-annual gauging events of the recovery and monitoring wells located within and near the identified LNAPL plumes. A long-term LNAPL monitoring plan will be developed and submitted to the EPA as part of the long-term operation and maintenance plan. This long-term LNAPL monitoring plan will define the monitoring wells to be monitored and the frequency and expected duration of the long-term monitoring program. Initially, the monitoring program will be conducted semi-annually for a period of two years. After two years, the monitoring program will be conducted annually for a period of three years. Subsequently, the frequency and details

of the monitoring program will be re-evaluated and modified, as necessary. Additionally, the eight existing recovery wells will continue to be operated until LNAPL thickness measures 0.1- feet or less at each well for two consecutive years.

**Due Care Plan**

A Due Care Plan (DCP) will be prepared consistent with Michigan Public Act 451, Part 201, and implemented to account for the necessary monitoring and personal protective equipment that limits potential exposure pathways to LNAPL and impacted groundwater in AOI 25.

**Engineering and Institutional Controls**

Engineering/institutional controls will be implemented at the Site to ensure that the presence of hazardous constituents in environmental media at the Site does not pose an unacceptable risk to humans and the environment under current and reasonably expected future land use at or near the Site. Engineering/institutional controls will include the DCP to control routine construction worker contact with groundwater or LNAPL during potential excavation activities. Additionally, although not required to prevent unacceptable exposures, the existing concrete floor with epoxy coating will be maintained throughout the manufacturing area and the exterior paved areas will be maintained in the vicinity of AOI 25. In addition, the Site will be restricted to industrial/commercial use and the use of groundwater will be restricted through the implementation of a restrictive covenant for the impacted areas of the Site. The existing day care center is in a non-impacted area of the Site at the southeast corner of the Facility property and will be excluded from the restrictive covenant.

**Administrative Order**

During implementation of the corrective measures, an Administrative Order on Consent will be negotiated between U.S. EPA and DDC to provide an enforceable instrument for ensuring that financial assurance is and remains in place for completing corrective measures and any long-term requirements for Operations and Maintenance, including groundwater monitoring and institutional controls, are properly adhered to until the measures are completed or deemed unnecessary.

## FACILITY BACKGROUND

**Site Description**

The Site is located at and around the Facility at 13400 West Outer Drive, and is within Redford Township and the City of Detroit, Wayne County, Michigan, approximately 12 miles northwest of downtown Detroit, Michigan. The Facility is located at $42^0$ 23 minutes north latitude and $83^0$ 16 minutes west longitude. The Facility is located on 129.41 acres (85.61 acres in Redford Township and 43.80 acres in the City of Detroit).

The Site consists of the Facility and areas to which contaminants of concern from the Facility have migrated (or may migrate) in amounts which necessitate corrective action.

Almost the entire Facility is zoned and utilized for industrial purposes with the exception of the southwestern portion within Redford Township, which is zoned for general commercial use. A parking lot is located on the commercially-zoned portion of the Facility. According to the future land use plans, land use at the Facility is expected to remain industrial and land use immediately around the Facility is expected to remain as currently zoned (especially with the recent brownfield developments at the Facility). A Daycare Center was constructed in the southeast corner of the property in 2001. DDC applied for a building permit for construction of the Daycare Center in early 2000, however, it was denied due to the M-4 (industrial) zoning of the Site property. This decision was appealed by DDC, and the City of Detroit subsequently granted a zoning variance for construction and operation of the Daycare Center on March 21, 2000, pursuant to the conditions identified in the decision.

The Facility is bounded on the north by a railroad right-of-way that is the property of CSX Transportation. The railroad tracks within this right-of-way run in an east/west direction. The property to the north of the railroad tracks is primarily residential with limited industrial areas.

The property east of West Outer Drive is parkland consisting of the River Rouge Park and the Rouge Golf Course. The River Rouge flows from the north to the south in the area to the east of the Facility.

The property to the south is zoned primarily for single family residential use. Some of the property in this area is used by local businesses and for parking. A Detroit Charter School is also located directly south of the southwestern portion of the Facility.

The property west of Telegraph Road is currently zoned and utilized primarily for light, medium, and general industrial or commercial purposes.

The Facility is secured through the use of security fencing and a 24 hours/day – 7 days/week security patrol. Access to the Facility is restricted via several security checkpoints.

## Historical Operations

The Facility has experienced substantial change from the time of initial construction in 1937 to the present. Most of these changes occurred prior to divestiture from former General Motors Corporation (fGMC) to DDC on December 31, 1987. Although the Facility has always been used for the design, manufacturing, and testing of diesel engines, several operations and processes have changed over time. Changes in industrial operations and processes at the Facility prior to 1988 are summarized below.

Building M-19, the process waste water treatment plant (WWTP), was not constructed until 1975. Process wastewater generated before the completion of the WWTP was discharged directly to the Detroit Water and Sewage Department (DWSD) sanitary sewer system.

The Stormwater Clarifier located on the east side of the Facility was constructed in 1972. Stormwater and non-contact cooling water were historically (approximately 1940 through 1957 according to aerial photographs) discharged directly to the River Rouge through the Campbell Drain. The Campbell Drain flowed onto the Facility at its northwestern corner, and flowed off the Facility at its southeastern side. The Campbell Drain was backfilled with clean fill and buildings were constructed over top. DDC requested that the Campbell Drain be officially closed by Wayne County in 1990 given that it was no longer used or needed for stormwater drainage. Redford Township (within Wayne County) affirmed and approved the closure of the Campbell Drain at DDC in 1991.

Prior to 1986, solvent-based paint was used to paint engines at the Facility. Toluene was used as a paint thinner/reducer for production paints and for the cleaning of paint lines. In 1986, the painting process changed from a solvent-based paint to a water-based paint and the use of toluene was discontinued. A hazardous waste underground storage tank (UST) and a fresh toluene UST were removed as a result of this process change. Impacted soils were encountered in the area of both USTs and were subsequently removed and disposed of at other locations. The New Oil Storage Area building was constructed over this location in 1988. A sump continues to collect perched groundwater in this area which is directed to the Facility process WWTP for treatment.

Drawings from 1967 identified an incinerator in the location of the former Building M-18. A truck repair garage was constructed adjacent to the incinerator building in 1974. Building M-18 was used for truck repair from that time and was demolished between 1993 and 1997.

Liquid storage was historically conducted at the Former Oil Storage Area. The Former Oil Storage Area is currently used for storage of liquid-free materials.

Industrial operations at the Facility have not changed significantly since divestiture from fGMC to DDC on December 31, 1987. The Facility building configuration has changed slightly due to the removal, replacement, and/or additions of structures and product manufacturing lines. Since 1987, machining operations at the Facility have been reduced; however, assembly operations have increased. Engine production has continued as the primary operation, however, additional manufacturing processes for truck components have been added, including emissions control components and truck axles.

From 2005 to 2008, DDC completed the “Redford Renaissance” re-development project at the Facility. The project included installing 13 new production lines, removing 30 active and abandoned roof-top PCB transformers, removing approximately 25% of the asbestos in the building, removing 2 and de-listing 3 miss-classified USTs, adding over 77,000 square feet of greenspace, replacing and raising portions of the roof, and installing

new emission control devices. The U.S. EPA selected DDC Renaissance project as the 2008 Region 5 Phoenix Award winner. The redevelopment project was also selected as the 2008 National Grand Prize winner, selected at the 2009 National Brownfields Conference in New Orleans, Louisiana.

In 2006, DDC was recognized by Michigan's Clean Corporate Citizen Program for environmental stewardship which includes the environmental management system, pollution prevention policy and program, and environmental compliance.

## Current Operations

The current site plan is presented on Figure 1. The Facility currently performs design, machining, assembly, and testing of diesel engines and other truck components in the approximately 3 million square foot main manufacturing building. The main manufacturing building is comprised of many smaller segments or "buildings" which are the result of years of expansion. There are also several smaller separate buildings located at the Facility. All buildings are steel-framed with concrete block and plaster construction. The roofs are supported with I-beam and steel joist infrastructures. All floors are constructed of poured concrete overlain mostly with sealed concrete. Less than 5 percent of the floor space consists of wood blocks (used for light maintenance).

## Surface Water Hydrology

No surface water bodies exist at the Facility. The River Rouge is the prominent hydrologic feature in the vicinity of the Facility located approximately 1,500 feet to the east. The River Rouge is used for flood control and recreational purposes. The northern and central portions of Wayne County are located within the River Rouge Drainage Basin and consist of an area of approximately 187 square miles. This river system includes three tributaries prior to discharging into the Detroit River: Upper River Rouge, Middle River Rouge, and Lower River Rouge. The Detroit River discharges into Lake Erie, which is located approximately 25 miles southeast of the Site.

## Site Geology

The Site geology consists of a surficial fill unit which ranges from 3 to 15 feet thick; however, this fill unit is typically 3 to 8 feet thick. The fill unit consists primarily of fine grained, brown sand with various amounts of silt and is inter-bedded with discontinuous silty clay units. Limited portions of this fill unit consist of native materials. Four geotechnical laboratory sieve analyses were conducted on this surficial fill unit. The most significant geologic unit beneath the Site is the approximately 50-foot thick clay unit directly below the fill unit. The clay unit is present throughout the region and beneath the entire Site. This clay has been described as glacial till and lacustrine clay deposits and consists primarily of stiff, low to medium plasticity, gray clay. Based on four laboratory permeability tests, the vertical hydraulic conductivity of the clay varies from 4.0 X 10-7 centimeters/second (cm/sec) to 3.1 X 10-8 cm/sec. The geometric mean

of the four tests is 7.5 x $10^{-8}$ cm/sec. These results are consistent with that expected for a clay aquitard.

Perched water exists in the fill unit and is unconfined, discontinuous, or intermittent in nature and does not yield a significant flow or volume of water. Groundwater has been encountered in approximately two thirds of the boreholes at the Site. Groundwater level data from the monitoring wells indicate the depth to water varies from approximately 1 foot bgs to approximately 7.5 feet bgs. The perched water flow direction is generally to the south and east; however, variable localized flow directions are present beneath the Site. The variable localized flow directions appear to be a function of the discontinuous nature of the fill unit and the existing manmade structures.

**Water Supply and Groundwater Use**

The DWSD provides the potable water supply to the Facility, and the local area from, the Spring Wells Plant located near Warren Road and Wyoming Avenue in Detroit, Michigan. The Spring Wells Plant is located approximately 10 miles southeast of the Site.

The MDEQ-Geological Survey Division (GSD) was contacted on two occasions to complete well inventories for groundwater wells within a one-mile and five-mile radius of the Site. MDEQ-GSD responses to these well inventory requests are presented as part of the Off-Site Groundwater Use/Review of Municipal Water Supply review presented as Appendix F of the CCR. No industrial or domestic water wells were reported within a distance of two miles from the Site.

Based on this information, groundwater is not used as a water supply (potable or non-potable) in the immediate vicinity of the Site, including the residential area south of the Facility.

## PRE-RCRA FACILITY INVESTIGATION

Extensive environmental investigations had been conducted at the Facility prior to the RFI. Historical data in addition to other existing information have been evaluated qualitatively and quantitatively to identify conditions that warrant further investigation. The qualitative review considered sample locations and depths, constituents analyzed, analytical methods, and any related field observations. The quantitative review was based on a comparison of the historical data for soil and groundwater samples with Michigan Act 451, Part 201 generic cleanup criteria that the MDEQ has developed under the authority of the Natural Resources and Environmental Protection Act.

The results of the comparisons of pre-RFI data to the Part 201 generic criteria are presented in the CCR. Those comparisons facilitated the development of the RFI scope of work since this historical data had been collected from a majority of the AOIs identified in the CCR.

## RCRA FACILITY INVESTIGATION

Based on the investigation conducted during the RFI and RFI Addendum No. 1, no further action was found to be warranted at the eastern and southern Facility boundaries and the following 18 AOIs:

AOI 1 – Former Hazardous Waste UST
AOI 2 – Hazardous Waste CSA
AOI 3 – Scrap Metal Pits
AOI 4 – Non Hazardous Paint and Grinding SSA
AOI 5 – Wastewater Treatment Plant
AOI 6 – Former Waste Paint Sludge CSA
AOI 8 – Former Waste Chemical Storage Area
AOI 9 – Battery Accumulation Storage Area
AOI 14 – Building M-5
AOI 16 – Building M-8
AOI 19 – Building M-14
AOI 20 – Building M-17
AOI 21 – E-4 Lab
AOI 22 – Powerhouse
AOI 23 – Tank Farm
AOI 24 – Former Building M-18
AOI 26 – Miscellaneous Releases
AOI 27 – Former Automotive Junkyard

The RFI and RFI Addendum No. 1 data indicate that concentrations at these AOIs are lower than screening levels based on industrial land use. The basis and rationale for development of the pertinent screening levels are discussed in the Final Draft RFI Report. In addition, the risk estimates for soil and groundwater are within U.S. EPA's acceptable risk limits and require no further action.

The following AOIs at the Facility were recommended for further investigation/action:

AOI 7 – Stormwater Clarifier
AOI 10.3 & 10.7 – Former USTs
AOI 11 – Department 109
AOI 12 – Column K-5 Sump Area
AOI 13 – Department 169
AOI 15 – Building M-7
AOI 17 – Building M-11
AOI 18 – Building M-12
AOI 25 – Former Oil Storage Area

Locations of the AOIs are presented on Figure 2, and a summary of AOIs is presented in Table 1.

## COMPLETED INTERIM MEASURES

Interim Measures (IM) have been completed at the Former Oil Storage Area (AOI 25) and initiated for the remaining locations where LNAPL exists (AOIs 7, 10.3, 10.7, 11, 12, 13, 15, 17, and 18). A Due Care Plan has been implemented at the Facility to ensure that any planned construction activity, specifically at AOIs 11 and 25, would follow proper health and safety procedures to minimize risk. These AOIs did not pose an immediate threat to human health, but early action was taken to expedite corrective action.

The Interim Measures are further discussed in the following sections.

### AOI 25 Groundwater

The Former Oil Storage Area was built in 1967 and is a 6,400 square foot building located on the southwest side of the Facility. Liquid storage occurred in drums within and in the vicinity of the building and in twelve USTs adjacent to the building. The twelve USTs were removed in October 1989.

There were several investigations in the late 1980s, which detected the presence of chlorinated solvents in the shallow perched groundwater at the Former Oil Storage Area building, as well as south of the Facility. On September 26, 2002, the Former Oil Storage Area was designated for IM.

The following IMs were completed for AOI 25:

In October 1989, a groundwater collection system was installed to intercept the impacted shallow perched groundwater and mitigate its off-site migration. The collection system was approximately 350 feet in length and was installed to a depth approximately 6 to 8 feet bgs, which was reportedly deeper than the surface of the native lacustrine clay unit underlying the shallower silty sands. A gravity drainage system was incorporated into the design to collect the intercepted groundwater in a sump southeast of the Former Oil Storage Area building. This design intercepts the groundwater which may potentially migrate off the Facility and directs it to the Facility WWTP and/or holds it until the trench is pumped out manually.

Annual groundwater monitoring was performed from 1990 to 2000 to evaluate the effectiveness of the groundwater recovery system in meeting cleanup-up objectives.
In July 2003, the groundwater collection system was extended 75 feet to prevent any potential migration of chlorinated solvents from the Facility. The groundwater collection system was extended approximately 60 feet eastward parallel to, and approximately 25 feet north of, the southern property line with a northern leg extending approximately 15 feet north. Operation of the groundwater collection system was discontinued in 2004 based on revised City of Detroit Water and Sewerage Department permit requirements.
In August 2003, chemical oxidation injections were conducted at 45 off-site locations south of the Facility in a grid pattern spaced approximately 15-feet apart. Where

possible, 100-gallons of two percent potassium permanganate ($KMnO_4$) solution were injected through the downhole drilling equipment.

Additional chemical oxidation activities were completed in November 2005 at 20 on-site injection well locations for the additional treatment of on-site groundwater.

Three groundwater sampling events were conducted in November 2003, June 2004, and May 2008, respectively. Groundwater sampling was conducted to: (1) monitor the effectiveness of the chemical oxidation activities, (2) evaluate the current concentrations and extent of dissolved chlorinated solvents in on-site and off-site groundwater, and (3) to determine if additional on-site injections are warranted to facilitate the degradation of chlorinated solvents in this area.

A Due Care Plan and update memorandums have been provided to the Facility and include procedures to ensure that the proper health and safety controls are used during any subsurface construction/maintenance activities.

The location of AOI 25 and the groundwater recovery trench are presented on Figure 3.

**Site-Wide LNAPL**

During the RFI implementation at the Facility, LNAPL was identified, characterized, and delineated beneath the following AOIs as presented on Figure 4:

AOI 7 – Stormwater Clarifier
AOIs 10.3 & 10.7 – Underground Storage Tanks (USTs)
AOI 11 – Department 109
AOI 12 – Column K-5 Sump Area
AOI 13 – Department 169
AOI 15 – Building M-7
AOI 17 – Building M-11
AOI 18 – Building M-12

Details of the previous studies to identify, characterize, and delineate the LNAPL are included in the CCR and other documents. The LNAPL is not known to have migrated to any adjacent properties. The LNAPL is present above a perched groundwater zone located within the uppermost shallow silty sand layer above the clay aquitard.

The following IMs were completed to address the LNAPL at the Facility:

An LNAPL recovery system was installed in the early 1990s and consists of eight active recovery wells operating in three LNAPL plumes. Three recovery wells (RW-109A, RW109B, and RW-109C) are located in a small plume near AOI 11. Two recovery wells (RW-K5A and RW-K5B) are located in a plume near AOI 12. Three recovery wells (RW-169B, RW-169C, and RW-356) are located in and around a small plume near AOI 13. The recovery wells continue to operate today.

In 2003, a 4-week evaluation of the recovery system was conducted and during that time period only 0.2-gallons of LNAPL was recovered by the eight recovery wells. Results of the evaluation concluded that the existing systems were only marginally effective. Quarterly system checks and monitoring of the eight recovery wells and monitoring wells that were inside or adjacent to the LNAPL plumes had been conducted to evaluate free product thickness, plume size and volume. Monitoring results have shown that the LNAPL plume is stable and has not migrated from beneath the Facility.

A 3-month remedial pilot study was conducted from June to September 2006 to evaluate remedial technologies utilizing multi-phase vapor extraction (MPVE) and pneumatic fracturing for enhanced LNAPL recovery. During the pilot study, a total of 2,035 gallons of LNAPL was successfully removed from AOIs 7 and 12. A full-scale MPVE system was never implemented due to cost prohibitiveness, large footprint for a treatment system, and limited space availability within the plant.

## SUMMARY OF FACILITY RISKS

The RFI and RFI Addendum No. 1 were implemented to determine whether a significant release of hazardous waste and/or hazardous constituents occurred at relevant Facility AOIs and, if so, to characterize the exposure point concentration so that risk-based decisions on the need for interim measures and/or final corrective measures could be formulated. Conservatively biased or systematic random sampling schemes were generally employed to provide data for assessing potential exposures via various scenarios.

The RFI field investigation was designed to determine if a release of hazardous waste or hazardous constituents had 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, the adequacy of the data was evaluated to determine whether additional data collection was warranted. As indicated above, several field events were conducted to collect soil, groundwater, and borehole water data necessary to achieve the 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 were conducted to provide a basis for determining whether the presence of hazardous constituents in environmental media at the Site poses a significant risk to human health and the environment that would warrant Corrective Measures. Details of the risk assessments and their findings are presented in the Final Draft RFI Report and the Supplemental Information to Support the RFI Human Health Risk Evaluation. The risk assessment findings are summarized below.

## Summary of Human Health Risk Evaluation

During the implementation of the RFI, the sampling results for 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 concluded that adequate data had been collected from each AOI and the three additional areas to support a risk evaluation.

The RFI was conducted in a phased approach, with phases of field investigation being implemented during the period of July 2001 through June 2002. The data from the field investigation are presented in the Final Draft RFI Report.

The significance of potential exposure to soil, groundwater, and/or LNAPL at and adjacent to the Facility was evaluated based on current and reasonably expected future land use. Potential receptors considered in the evaluation included on-site routine workers, on-site construction workers, trespassers, and daycare center occupants. The evaluations for all of the receptors were conducted on an area specific basis.

The results of the RFI, for each AOI that was investigated, compared the characterization data with MDEQ generic risk-based industrial screening levels to identify whether a potentially significant release of hazardous constituents to the environment had occurred. The results of the evaluation indicate that all detected concentrations of hazardous constituents were below pertinent MDEQ risk-based industrial screening levels with the exception of chromium and manganese in soil and phenanthrene and total PCBs in groundwater (at limited locations).

Of the areas evaluated, only one AOI was identified as posing a potentially significant risk. Specifically, the upper bound estimates of cancer risk and hazard index for potential exposure of construction workers at AOI 11 exceeded U.S. EPA's acceptable risk limits. As a result, a Due Care Plan was prepared for implementation at the Site by DDC to ensure that any planned intrusive construction activity in this area would follow proper health and safety procedures to prevent unacceptable exposure to LNAPL.

Additional borehole water samples were collected from AOI 25 locations during 2005, identifying vinyl chloride at a concentration greater than generic groundwater contact criteria. The DCP was subsequently updated to be protective of routine construction worker exposure to site groundwater at AOI 25.

## Summary of Ecological Risks

A quantitative evaluation of ecological risk assessment is not warranted at the Site for the following reasons: 1) the Site is an active industrial manufacturing area, 2) the Site is devoid of habitat since it consists almost entirely of buildings or parking lots, and 3) the Site is located in an urbanized and developed portion of the City of Detroit and Redford Township and has been industrially developed for more than 60 years. A screening-level

problem formulation conducted for this Site in July 2006 by a Certified Ecologist indicated that the Site lacks ecological habitat and lacks complete ecological exposure pathways.

## SUMMARY OF CORRECTIVE MEASURES OPTIONS

### **AOI 25 Groundwater**

The human health risk assessment determined that the current groundwater conditions do not pose an unacceptable risk under current and reasonably expected future land use at and around the Site, with the exception of the construction worker exposure scenario. Institutional controls are proposed that will protect workers at the Facility from exposure to groundwater in AOI 25. Interim Measures have been implemented at AOI 25 to control the migration of impacted groundwater. Although concentrations of volatile organic compounds (VOCs) in groundwater at AOI 25 do not pose a significant risk on-Site or off-site, under current and reasonably expected future land use, TCE, cis-1,2-dichloroethene, and vinyl chloride were identified in groundwater samples collected from off-site monitoring wells at concentrations greater than screening criteria. The Interim Measure for AOI 25 groundwater was implemented to control the migration of VOC-impacted groundwater.

The corrective measures objectives for Site groundwater are to:

1. Confirm off-site groundwater concentrations remain below applicable human health risk-based criteria;

2. Have a contingency plan in place if groundwater concentrations at the Facility's perimeter or off-site locations approach applicable human health risk-based criteria; and

3. Prevent on-site groundwater use/exposure.

We also propose to continue monitoring groundwater conditions at the Site for a period of time to confirm the RFI findings and institute controls that will protect site-workers from exposure to groundwater in AOI 25.

### **Summary of Alternatives**

The following Interim Measures were performed as part of the proposed final Corrective Measures for AOI 25 Groundwater:

1. Interim Measure for AOI 25 Groundwater Off-Site – chemical oxidation of TCE-impacted groundwater was conducted at AOI 25 during 2003 to control the migration of TCE-impacted groundwater.

2. Interim Measure for AOI 25 Groundwater On-Site – chemical oxidation of TCE-impacted groundwater was conducted at AOI 25 during 2005 to control the migration of TCE-impacted groundwater.

3. Interim Measure for AOI 25 Groundwater On-Site – a groundwater recovery trench was installed in 1989 and extended in 2003. The groundwater recovery trench was installed to intercept potential off-site migration of groundwater impacted with chlorinated solvents. The groundwater recovery trench ceased operating in 2004.

4. Due Care Plan - a Due Care Plan was implemented at the Facility to ensure that any planned construction activity would follow proper health and safety procedures to minimize risk.

The following alternatives were evaluated as part of the final Corrective Measures for the AOI 25 Groundwater:

**Alternative 1: no Further Action – The no action alternative would require any** activity as the selected Corrective Measure. This alternative would result in no unacceptable risks to human health, but would not confirm the conclusions of the Final Draft RFI Report.

**Alternative 2: Due Care Plan and Implementation of Groundwater Monitoring Program with Contingency Plan** – This alternative would include sampling of select on-Site and off-site monitoring wells to confirm that constituents are not migrating off-site at concentrations above the applicable human health risk-based criteria concentrations, with contingencies for additional Corrective Measures if constituent concentrations approach the risk-based criteria that are pertinent to current and reasonable expected future groundwater use immediately downgradient of the Facility. During the monitoring period, DDC will continue to evaluate groundwater conditions, the required timeframe for monitoring, and/or the need for any additional Corrective Measures.

A long-term groundwater monitoring plan will be developed that identifies the monitoring wells to be sampled, the parameters to be analyzed, and the frequency and expected duration of the long-term monitoring program.

The long-term groundwater monitoring program will provide rationale for monitoring well and analyte selection, including monitoring wells based on locations at the center of a plume, upgradient of a plume, or defining a plume boundary.

In addition, groundwater elevation measurements will be collected prior to sampling activities in selected wells to confirm groundwater flow directions. Unused monitoring wells at the Site will be abandoned.

The groundwater analytical results from the sampling would be compared to the applicable criteria presented in Table 2. Annual reports with a summary of the year's

sampling data and a comparison to the risk-based criteria would be submitted to the U.S. EPA. In the event that a constituent's concentration approaches a risk-based criterion or increases significantly, the results would be confirmed by re-sampling for that constituent. If the re-sampling confirms the trend, DDC would notify the U.S. EPA and would present potential actions to address the situation, including implementation of the contingency plan. Upon completion of the long-term groundwater monitoring program, a close-out report would be submitted to the U.S. EPA. In the event that construction activities occur at the Site and any of the monitoring wells identified in the long-term monitoring plan require abandonment, the U.S. EPA would be notified to discuss replacement or elimination of the monitoring well from the groundwater monitoring plan. The long-term groundwater monitoring plan will be discontinued, following U.S. EPA approval, if the conditions presented in Tables 2 and 3 are achieved, including continued stability/reduction of groundwater concentrations at on and off-site locations. Initially, the groundwater sampling will be conducted semi-annually for a period of two years. After two years the sampling will be conducted annually for a period of three years. Subsequently the frequency and details of the monitoring program will be re-evaluated and modified, as necessary. A contingency plan will be enacted if groundwater concentrations at the Facility's perimeter or off-site locations approach applicable human health risk-based criteria.

In addition, a notation in the property deed(s) of the Facility would limit the use of groundwater from affected portions of the Facility.

Furthermore, the Due Care Plan will continue to be updated as necessary to ensure proper health and safety controls are used during any subsurface construction/maintenance activities.

**Alternative 3: Operation of the existing groundwater recovery trench system -** This alternative would include operating the existing groundwater recovery trench located in the immediate area south of the Former Oil Storage Building. The groundwater recovery system consists of approximately 425 feet of perforated collection pipe (6-inch diameter) bedded in fine gravel (i.e., pea stone), draining toward a sump at the northeast end of the trench. Water collected by the recovery trench can either be pumped to the DDC WWTP, or pumped manually for disposal. The Detroit Water and Sewerage Department's approval would be required prior to discharge to the on-site DDC WWTP. In addition, sampling of select on-site and off-site monitoring wells would be necessary to confirm that constituents are not migrating off-site at concentrations above the applicable human health risk-based criteria concentrations, with contingencies for additional Corrective Measures if constituent concentrations approach the risk-based criteria that are pertinent to current and reasonable expected future groundwater use immediately downgradient of the Facility.

**Alternative 4: Chemical Oxidation** – This alternative uses injection of a chemical (oxidizing agent) such as $KMnO_4$ or soy lactate to degrade, immobilize, or flush out a contaminant. In the oxidation reaction, the oxidizing agent breaks the carbon double bonds in chlorinated compounds and converts them into non-hazardous or less toxic

compounds; primarily carbon dioxide, water, and chloride. The oxidants will also react with organic carbon and soluble metals that are present in the groundwater, which reduces the amount of oxidant available for destruction of the organic compounds. Thus, the oxidant must be replenished periodically to continue the destruction of the target chlorinated compounds. The chemical oxidant would be applied by repeated injection into existing monitoring wells and/or new injection wells installed within the area of known contamination in the subsurface soil and groundwater.

**Alternative 5: Enhanced MNA -** Site conditions can be manipulated to enhance monitoring natural attenuation (MNA) and speed up the degradation rates of the contaminants in question. There are several techniques that can be applied to enhance the biological degradation of VOCs and the restoration of groundwater to pertinent criteria:

i. Supplementation with suitable sources of nitrogen and phosphorus to enhance biodegradation of Site contaminants by indigenous microbial population.

ii. Manipulation of Redox Potential by the injection of slow oxygen release compounds (ORCs) to enhance aerobic biodegradation or slow hydrogen release compounds (HRCs) into groundwater to enhance anaerobic conditions.

iii. Site microbial inoculation.

The supplementation of existing microbes with one of these reagents would be made via injection into existing monitoring wells and/or new injection wells (or using temporary push-points) installed within the area of known contamination in the subsurface soil and groundwater. Further monitoring and groundwater data assessment at the Site may be required to confirm the feasibility of enhanced natural attenuation (bioremediation) as a viable alternative.

**Alternative 6: Soil Vapor Extraction/Air Sparging -** This alternative would include a soil vapor extraction (SVE) system which utilizes an induced vacuum in an extraction well or trench to draw air through the soil matrix. The airflow enhances volatilization of the VOCs and acts as the transport mechanism as the soil vapors are extracted. The extracted vapors may require treatment after they are brought to the surface. However, the solvent contamination has been found to be present within the groundwater (i.e., saturated zone), so installation of an SVE system would not address the issue by itself. In order to assist any SVE system, the volatile chemicals must be driven from the groundwater and into the overlying vadose zone. Air sparging is a technology that involves injecting pressurized air into the groundwater to volatilize VOCs as the air passes through the saturated soils. The SVE system would then be used to remove the sparged air from the vadose zone. Construction of both an air sparging injection system (well network) and SVE system (wells or trench) would be required.

**Alternative 7: Extend Groundwater Extraction Trench-** A groundwater extraction trench already exists and is operational at AOI-25, however, this groundwater recovery system has been operational for over 10 years but the chlorinated solvents area of impact

exists off-site. This alternative would include an extension to the existing groundwater recovery system to extend the area of hydraulic influence further into the currently defined area of impact.

**Site-Wide LNAPL**

Previous studies have sufficiently characterized the nature and extent of the LNAPL present beneath the following AOIs at the Facility:

AOI 7 – Stormwater Clarifier
AOI 10.3 & 10.7 – Former USTs
AOI 11 - Department 109
AOI 12 - Column K-5 Sump Area
AOI 13 - Department 169
AOI 15 – Building M-7
AOI 17 - Building M-11
AOI 18 - Building M-12

The human health risk assessment determined that the current LNAPL conditions do not pose a significant risk under current and reasonably expected future land use at the Site with the exception of AOI 11. Exposure to LNAPL at AOI 11 by construction workers is controlled by a Due Care Plan.

The corrective measures objectives for the Site-wide LNAPL are to:

1. Minimize risk.

2. Confirm the continued stability of the LNAPL plume(s).

**Summary of Alternatives**

The following Interim Measures are proposed as part of the final Corrective Measures for the LNAPL at the Facility:

1. Due Care Plan – A Due Care Plan has been implemented at the Site to ensure that any planned construction activity, specifically in the vicinity of LNAPL at AOI 11, would follow proper health and safety procedures to minimize risk.

2. LNAPL Recovery System – the eight LNAPL recovery wells currently operating in/near AOI 11, AOI 12, and AOI 13 would continue to be used in an effort to recover some of the LNAPL existing beneath the Facility.

The following alternatives were evaluated as part of the final corrective measures for the LNAPL AOIs:

**Alternative 1: No Further Action (Removal of current Recovery System) -** This alternative would only be applicable to those areas where LNAPL recovery systems currently exist and the current system would be abandoned/removed based on its low LNAPL recovery rates. This alternative would result in no current unacceptable risks to human health, but would not involve any active recovery of the remaining LNAPL at the Facility.

**Alternative 2: Implementation of LNAPL Monitoring Program** – This alternative would include gauging select recovery and monitoring wells located within and around the LNAPL plumes to confirm that LNAPL is stable and not migrating, with contingencies for additional Corrective Measures. Initially, the monitoring program would be conducted semi-annually for a period of two years. After two years the monitoring program will be conducted annually for a period of three years. Subsequently, the frequency and details of the monitoring program will be re-evaluated and modified, as necessary. The program could be modified based on the conditions presented in Table 3.

**Alternative 3: Due Care Plan and Continued Operation of Existing LNAPL Recovery Wells** – This alternative would include updating the current Due Care Plan, as necessary, and continued operation of the existing LNAPL recovery wells. Recovery wells would be operated until LNAPL thicknesses measure 0.1-feet or less for two consecutive years as identified in Table 3. This alternative would result in no current unacceptable risks to human health, but would not confirm results of the RFI and quarterly monitoring.

**Alternative 4: Free Product Recovery without Groundwater Depression (Manual Bailing)** – This alternative would require additional recovery wells to be installed within the LNAPL area and manually operated recovery equipment (canisters, absorbent filters, bailers) would be utilized to collect LNAPL. Manual recovery activities would be conducted monthly or more frequently if necessary.

**Alternative 5: Free Product Recovery without Groundwater Depression (Spill Buddy/Magnum Spill Buster) –** This alternative would require additional recovery wells to be installed within the LNAPL area and equipped with automated recovery equipment (spill buddy/magnum spill buster) to collect LNAPL.

**Alternative 6: Free Product Recovery with Groundwater Depression –** This alternative would require additional recovery wells to be installed within the LNAPL area and equipped with single or dual pump recovery systems to collect both groundwater and LNAPL. The system acts to draw down the water table to promote LNAPL flow to the recovery wells. Discharge lines from the recovery systems would be hard piped to on-Site waste water treatment. Additional discharges to the WWTP would require evaluation compared to the existing DWSD permit.

**Alternative 7: Slurry Wall Capping and Containment –** An impermeable slurry cutoff wall would be installed around the perimeter of the LNAPL area to prevent further LNAPL migration beneath the Facility and/or off-site.

A**lternative 8: Drain Tile Collection System –** Granular trenches (equipped with perforated pipes) would be installed perpendicular to and/or across the LNAPL area to collect and convey liquids by means of gravity toward a sump or wet well.

**Alternative 9: Excavation of LNAPL Impacted Soils –** LNAPL impacted soils would be excavated from the subsurface and disposed of. Removal and replacement of large areas of concrete floor would be required.

**Alternative 10: Dual Phase Recovery (Bioslurping) –** Dual phase recovery wells would be installed throughout the LNAPL area and using a liquid ring pump, a vacuum would be applied to each recovery well. The vacuum would act to draw air and liquid up from the subsurface. The airflow promotes biodegradation and volatilization, and the negative pressure at the well point promotes the flow of LNAPL to the well.

**Alternative 11: Thermally Enhanced Recovery –** In order to enhance the LNAPL recovery rate of an LNAPL recovery system, steam would be piped to the subsurface and injected around the periphery of the LNAPL area to increase LNAPL mobility by reducing LNAPL viscosity and promoting flow toward recovery wells.

**Alternative 12: Pressure Pulse Technology (PPT) –** In order to enhance the LNAPL recovery rate of an LNAPL recovery system, seismic pulse vibrations would be utilized to promote the flow of LNAPL and small solid particles. New wells would be installed within and surrounding the LNAPL area to accommodate the PPT system.

## EVALUATION OF PROPOSED CORRECTIVE MEASURES

Based on the findings from the RFI and completed IMs along with the risk assessment results, the final Corrective Measures at the Site that U.S. EPA proposes are:

**AOI 25 Groundwater**

Completed Interim Measure – On and Off-Site In-Situ Chemical Oxidation
Completed Interim Measure – Operation of Groundwater Recovery Trench
Completed Interim Measure – Due Care Plan
Alternative 2: Due Care Plan and Implementation of Groundwater Monitoring Program

**Facility-Wide LNAPL**

Completed Interim Measure –Due Care Plan
Alternative 2: Implementation of LNAPL Monitoring Program
Alternative 3: Due Care Plan and Continued Operation of Recovery Wells

**Institutional Controls**

Institutional controls (ICs) would be imposed in all site areas where risk based levels do not allow for unrestricted land use and groundwater does not meet drinking water standards. An Administrative Order on Consent would be used as the enforceable instrument to ensure the ICs and O&MM requirements are met.

**General Remedy Standards**

1. Overall Protection – The above selected alternatives would provide adequate protection of human health and the environment. The overburden groundwater at the interior of the Facility, at the Facility perimeter, and downgradient of the Facility, does not present unacceptable risk. Alternative 2 for the AOI 25 Groundwater ensures that no unacceptable exposure will occur. The engineering and institutional controls identified in the Due Care Plan would be implemented as a means of preventing and/or controlling potential exposures to identified potential risks. The potential risks would be mitigated through the implementation of engineering and institutional controls.

2. Attainment of media cleanup standards – The chosen remedy to monitor Facility groundwater quality and downgradient groundwater quality would ensure that the concentrations will continue to be below the appropriate risk-based groundwater criteria. Appropriate actions would be taken if contamination is identified that poses an unacceptable risk to potential receptors. The points of compliance would be defined by the proposed monitoring wells in the long-term monitoring plan. The monitoring timeframe identified in the long-term monitoring plan would be long enough to confirm the previous RFI field investigations and the quarterly monitoring results.

3. Controlling the sources of releases – The chosen alternatives supplement the Interim Measures performed at AOI 25 and the LNAPL areas to control the migration of impacted groundwater and LNAPL.

4. Compliance with applicable standards for waste management – No wastes would be generated as part of the chosen alternatives with the exception of minimal amounts of purge water generated during implementation of the groundwater sampling program for the AOI 25 Groundwater. All waste generated from the chosen alternatives and any contingencies of the groundwater monitoring program would comply with applicable standards.

**Remedy Decision factors**

1. Long term reliability and effectiveness – Information collected during the RFI indicates that the information collected as part of the groundwater monitoring program will be sufficient to be protective of human health and the environment. In the event that groundwater conditions are identified to be above screening

criteria, contingency plans would be implemented. The long term maintenance and implementation of the identified engineering and institutional controls will be protective of human health and the environment. Deed restrictions will be implemented in such a way that they continue with the land when the property, or a portion there of, is sold.

2. Reduction of toxicity, mobility, or volume of wastes – The results from the RFI indicate that the information collected as part of the groundwater monitoring program will capture the results of any physical, biological, or chemical processes that reduce toxicity, mobility, or volume of contaminants downgradient of AOI 25. The results of the groundwater monitoring program will be used to verify RFI and supplemental monitoring conclusions that natural processes are ongoing at the Site, and that in conjunction with the results of the Interim Measures in AOI 25, will continue to reduce the toxicity and/or mobility of the constituents of concern.

3. Short-term effectiveness – The surrounding community will not be affected by the remedial efforts described herein with the exception of off-site groundwater sampling. In addition, workers at the Facility are not at risk of exposure to the impacted soil and groundwater under the current scenario, with the exception of activities identified in the Due Care Plan.

4. Implementation – The selected remedy alternatives can be implemented with minimal engineering and administrative procedures and with no impact to the surrounding community with the exception of continued off-site groundwater sampling. The field work and reporting associated with the groundwater and LNAPL monitoring program are routine type activities and can easily be implemented. Potential contingency measures associated with the groundwater and LNAPL monitoring program would also be easily implemented if necessary.

5. Costs – Costs associated with the groundwater and LNAPL monitoring program are not prohibitive. The implementation of engineering and institutional controls at the Site will involve nominal costs.

Based on information currently available, the proposed remedy for the Site provides the best balance of Corrective Measures scenarios with respect to the evaluation criteria.

## PUBLIC PARTICIPATION

The U.S.EPA is soliciting comments from the public on corrective measures alternatives presented in this document for the DCC Facility. The U.S.EPA has scheduled a public comment period of 30 days **from February 8, 2010 to March 11, 2010**, 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 and questions and request a public meeting to the following address:

Mr. Greg Rudloff
Environmental Protection Agency
77 West Jackson Boulevard, LU-9J
Chicago, Illinois 60604
Telephone No.: (312) 886-0656
rudloff.gregory@epa.gov

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

Redford Township District Library
25320 West 6 Mile Road
Redford Township, Michigan

and

Detroit Public Library
5201 Woodward Avenue
Detroit, Michigan

The administrative record is also available for review at the U.S.EPA Region 5 office at:

United States Environmental Protection Agency
77 West Jackson Boulevard, LU-9J
Chicago, Illinois 60604
Attention: Greg Rudloff

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 and Final Decision (RCFD) document. The RCFD document will be drafted after the conclusion of the public comment period and will be incorporated into the administrative record.