WORKPLAN FOR A GROUNDWATER INVESTIGATION AT THE NAVISTAR INTERNATIONAL CASTING FACILITY WAUKESHA, WISCONSIN

PREPARED BY
RMT, INC.

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Section 1

INTRODUCTION

1.1 Background

The Navistar International Transportation Corporation (NITC) has received a request from the Wisconsin Department of Natural Resources (WDNR), dated June 8, 1992, to investigate potential groundwater contamination by trichloroethene (TCE) and 1,1,1-trichloroethane (TCA) at their manufacturing facility located at 1401 Perkins Avenue, Waukesha, Wisconsin. The request is based on the discovery of TCA and TCE in groundwater near the northern portion of the NITC property during a subsurface investigation related to petroleum underground storage tank closures conducted at the neighboring facility to the north, which is occupied by Wisconsin Coach Lines, Inc. (WCL). RMT, Inc. (RMT), has been retained to prepare and implement a workplan to address whether NITC may have released these constituents to groundwater. This workplan has been prepared based on background information contained in a July 1992 report prepared by Graef, Anhalt, Schloemer, and Associates (G.A.S.) regarding tank closure and on a soil and groundwater investigation on the WCL site. Comments made by WDNR staff during a July 2, 1992, meeting have also been considered.

1.1.1 Wisconsin Coach Lines Facility

A summary of WCL investigation activities and relevant findings contained in the report " Initial Site Assessment, Extent of Contamination and Remediation Progress Report" (G.A.S., July 1992) is included as background. A general sequence of WCL investigation activities follows:

- October 24-25, 1990 - A 12,000-gallon diesel tank and a 1,000-gallon waste oil tank are removed from an area about 70 feet north of the Navistar property line, because results from preliminary borings conducted in August 1990 indicated a release of petroleum products. No visible leaks were observed in the diesel tank; however, the waste oil tank was pitted and had a 1-inch hole along a seam. There was evidence of soil staining near the waste oil tank and laboratory results of a soil sample indicated 8,120 ppm of total petroleum hydrocarbons (TPH) referenced as waste oil.

- March to July 1991 - Soil borings and monitoring wells are installed as part of a site investigation conducted to determine the extent of contamination from the removed waste oil and diesel tanks.

- April 10, 1991 - Groundwater is sampled and analyzed from MW-5 near the former waste oil tank. Analytical results indicate that TCE was present at 610 ppb. A mixture of diesel fuel and oil was detected floating on the water table.

- June 7, 1991 - Groundwater is sampled and analyzed at MW-6, about 60 feet northwest of the former waste oil tank. Results indicate that chlorinated solvents are present. A maximum concentration of 48,000 ppb cis-1,2-dichloroethene was detected.

- October 28 to November 7, 1991 - A total of 2,660 cubic yards of contaminated soil are removed from around the waste oil and diesel tanks. The soil is disposed at Parkview landfill. Although WDNR Solid Waste Program requirements for soils to be landfilled include VOC analyses, no documentation in this regard has been found.

- December 1991 and March 1992 - Additional monitoring wells (MW-11 through MW-20) are installed on the WCL site. Analytical results from monitoring well MW-17, which is close to the facility boundary shared with NITC, indicate the highest TCE, TCA, and GRO concentrations detected in groundwater during the sampling round.

The G.A.S. report describes a rather extensive effort expended to delineate the nature and extent of soil and groundwater contamination at the WCL site. The leaking waste oil tank was 28 years old at the time of its removal. Specific records of the contents of the waste oil tank are apparently not available, but in addition to waste motor oil, the report states that some waste gasoline and diesel were also placed in the tank on occasion. The report also states that parts cleaning solvents used at WCL have been collected by a hazardous waste recycling company since the current owners have operated the business. The report does not specify how waste solvents were handled under prior ownership or how long the current recycling program has been in effect.

The G.A.S. report concludes that the primary soil contaminants are diesel fuel and waste oil, which leaked from the WCL tanks. It also concludes that the gasoline-range organic (GRO) compounds and benzene detected during the investigation probably came from the former waste oil tank. It states that the solvents TCA and TCE present beneath the WCL site could possibly originate from upgradient (to the southeast) because the monitoring well in which these compounds are present at the highest concentrations (MW-17) is close to the southern property line, and the concentrations generally decrease to the north and northwest.

The subsurface site investigation that followed as a result of discovering the release from the WCL tanks reportedly defined the extent of soil contamination. It also claims that all soil contamination related to these two tanks has been subsequently excavated. The G.A.S. report did not document the characterization of the removed soils with respect to the chlorinated solvents previously detected on the site. Although 20 monitoring wells have been installed at the site, the extent of groundwater contamination at the site has not been entirely defined.

A potentiometric map included in the G.A.S. report indicates that groundwater flows generally to the northwest in the vicinity of MW-17 and the former tank area. A pattern indicating the extent of TCE contamination in groundwater was included in the G.A.S. report and is repeated on Figure 1. The shape and size of the area impacted by TCE is similar to the areas impacted by TCA and GRO.

1.1.2 Navistar Facility

The NITC casting facility has used approximately 7,000-31,000 pounds of TCA annually in recent years. Less than 0.1 percent TCE is present in the TCA as an impurity. NITC has indicated that TCA has been and still is being used as a reducing agent (thinner) for a core coating process at NITC. The coating is applied to the core and then allowed to air dry. TCA is used as the reducing agent because of its boiling point, 165° F. This allows the core to be coated and the product to be air dried since TCA will evaporate at room temperature. TCA is purchased in 55-gallon drums, in 4-6 drums lots. The material is stored on pallets under a shed in the west yard of the plant. The material is stored in the west yard for convenience as well as safety. The core room, where the material is used, is just east of the storage shed. The west yard is asphalted and there are no storm drains located in it. The TCA is transported by truck into the core room where it is opened and drained into the coating tank. At no time are the TCA drums opened in the west yard.

Parts washing is conducted at four self contained stations located in the eastern portion of the facility. These stations use mineral spirits which may contain up to 0.5 percent TCA as an impurity. The spent liquids are removed and replaced by Safety Kleen directly at each station.

1.2 Purpose and Scope

The purpose of this document is to describe the activities to be performed during a subsurface investigation, the goal of which is to determine whether TCA and TCE contamination detected at the WCL site originates on the NITC site. The scope of this workplan includes the following:

- A description of the rationale used to select monitoring well locations
- A description of methods that will be used to install soil borings and monitoring wells and to collect soil and groundwater samples
- An analytical program that will be followed to quantify the contaminants of concern in soil and groundwater samples
- A description of the report to be prepared documenting results and providing recommendations for further action, as appropriate

Section 2

SCOPE OF WORK FOR SUBSURFACE INVESTIGATION

2.1 Approach

This investigation has been designed to test the theory that the source of TCA and TCE contamination discovered in groundwater beneath the WCL site originates on or upgradient from the NITC facility. This will be attempted by quantifying appropriate solvent and petroleum constituents in soil and groundwater at locations expected to be upgradient of the plume as described by the WCL investigation. Better definition of groundwater flow direction beneath the NITC facility will also be essential to evaluating the source of contaminants.

The groundwater flow direction at the WCL site is reported to be relatively uniform toward the northwest based on groundwater potentials measured at the site. If the saturated deposits through which groundwater moves are generally homogeneous, a contaminant plume of dissolved constituents would also migrate to the northwest. For the most part, this may be true at the WCL site; however, conditions are present suggesting that contaminant migration is more complex. The occurrence of the typically highly fractured Niagara dolomite as the upper-most saturated unit beneath part of the site causes the prediction of contaminant migration pathways to be more difficult. The area where this occurs includes the former waste oil and diesel tank locations and many of the monitoring wells where petroleum and solvent compounds were detected. (The July 1992 G.A.S. report lacks the information to determine whether monitoring wells in the eastern part of the site are also screened in bedrock.)

Contaminants can be spread out in directions lateral to the primary groundwater flow direction if preferential pathways, such as large fractures, occur near the source. Evidence from the northeast part of the WCL site (see Figure 1), near MW-7, MW-9 and MW-14, suggests that a separate TCE plume exists and has spread in a northerly direction. This direction is lateral by almost 90 degrees from the reported primary direction of groundwater flow. This discrepancy between flow direction as implied from the groundwater potentiometric map and the contaminant migration patterns could be caused by fracture permeability. The discrepancy also emphasizes the need to better define groundwater flow direction beneath the NITC facility prior to evaluating the contaminant source.

The general pattern of the gasoline-range organics(GRO) in the plume, the source of which the G.A.S. report states is likely the former waste oil tank, is very similar to that of TCA and TCE. Monitoring well MW-17, which has the highest TCE/TCA concentrations (during the most recent round), also had the highest GRO concentration reported on-site. No apparent reason is shown why dissolved TCA/TCE and the GRO compounds should migrate in a distinctly different manner in groundwater. Therefore, it does not directly follow that the solvent and petroleum compounds would have different sources, particularly when waste solvents possibly could have been disposed in the waste oil tank in the past. For this reason, in addition to quantifying the volatile organic compounds (VOCs) of interest, the analyses for quantifying the petroleum compounds formerly stored in the WCL tanks will also be conducted on samples from the proposed monitoring wells.

The most recent groundwater analytical data available for MW-17 are from March 1992. Since concentrations can be expected to change over time, it will be important to resample and analyze at MW-17 at the same time the proposed NITC wells will be sampled so that a valid comparison can be made.

The following soil boring/monitoring well locations are proposed (see Figure 1):

> **NMW-1:** To investigate the existence of a TCA/TCE source at Navistar, this monitoring well will be placed upgradient (southeast) of the plume near the northern boundary of the Navistar property. If the assumptions of the G.A.S. report are accurate, higher concentrations of the solvents should be present at this location. To avoid drilling inside buildings, this monitoring well will have to be placed in the alley between the two properties.
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> **NMW-2:** This monitoring well is proposed in the assumed downgradient direction from the NITC core room where TCA is used, a location which is also between the area where NITC stores TCA and MW-17.
>
> **NMW-3 and NMW-4:** These monitoring wells are proposed to determine whether sources of solvent contamination exist further upgradient than the NITC property. If information regarding specific potential upgradient sources becomes available prior to installation, the location of these wells should be adjusted accordingly.

Groundwater elevations will be determined at each of these wells to help define groundwater flow direction beneath the NITC facility.

Borings for monitoring well installations are expected to encounter bedrock. If possible, the monitoring wells will be screened to intercept saturated bedrock since its fractured nature probably represents the preferred path of contaminant movement.

2.2 Field Investigation

The subsurface investigation will consist of the following tasks:

- Prepare a site-specific Health and Safety Plan as required by OSHA.

- Observe and document the installation of four Standard Penetration Test (SPT) borings at locations shown on Figure 1 and for the reasons described in the previous subsection. Borings will be advanced through the unconsolidated deposits using 4 1/4-inch I.D. hollow-stemmed augers. Soil samples will be obtained at 2.5-foot intervals using a split-spoon sampler to the top of bedrock, which is expected to be about 15 feet deep. The air rotary method will be used to advance the borehole in bedrock to a total depth of about 25 feet. Soils will be described according to the Unified Soil Classification System.

- Screen soil samples for VOCs using a photoionization detector (PID). Based on screening results, select one sample from each of the borings based on the highest PID reading from the unsaturated zone. The samples will be analyzed in the laboratory for volatile organic compounds (VOCs) by Method 8021, gasoline- and diesel-range organics (GRO and DRO), and total recoverable petroleum hydrocarbons (TRPH).

- Convert each of the soil borings to water table monitoring wells at the locations shown on Figure 1. Monitoring well installation will conform to NR 141 Wisconsin Administrative Code, which regulates monitoring well construction.

- Develop the monitoring wells by surging and bailing in accordance with NR 141 regulations.

- Perform slug or baildown tests on the newly installed monitoring wells to determine hydraulic conductivity.

- Sample the newly installed monitoring wells and MW-17 on the WCL site, and analyze the groundwater samples for VOCs, GRO, DRO, and TRPH.

- Collect a field blank during the groundwater sampling event, and analyze it for the sample parameters.

- Survey the elevations and locations of all newly installed wells.

- Measure static water levels at the new wells, and select WCL wells (if access can be obtained).

- Soil cuttings from drilling will be stockpiled on-site; water produced from equipment decontamination, well development, and purging will be collected and placed in labeled drums. These materials will be stored until analytical results are available, at which time a proper disposal method will be selected. If pre-approval from the city of Waukesha can be obtained, wastewaters would preferably be discharged to the sanitary sewer.

Field methods related to the above tasks are described in more detail in Appendix A.

2.3 Data Analysis and Report Preparation

The objectives of this task are to reduce and evaluate field and laboratory data and to prepare a report based on information gathered during the subsurface investigation.

Data analysis will consist of the following tasks:

- Finalize all boring logs and well construction diagrams. These will be provided on WDNR forms in compliance with NR 141.
- Tabulate the results of in-field and laboratory chemical analyses performed on soil samples.
- Tabulate the results of chemical analyses of groundwater samples obtained from the monitoring well sampling.
- Prepare a water table map of the site.
- Develop a geologic cross section using newly acquired data and WCL data.
- Analyze in-field hydraulic conductivity test data.
- Calculate horizontal groundwater hydraulic gradients, and estimate horizontal groundwater flow rates, based on updated hydraulic conductivity estimates.

2.4 Report Preparation

RMT will compile the existing information and data generated above; prepare a brief report containing findings, conclusions, and recommendations concerning the existence of soil and groundwater contamination at the site.

Section 3

SCHEDULE

The anticipated schedule for conducting the work is as follows:

- Upon approval of the workplan by the WDNR, RMT will take 1 to 2 weeks to contract for drilling services and prepare for fieldwork.
- The SPT soil boring and monitoring well installations, groundwater sampling, and well surveys are anticipated to take approximately 2 to 3 weeks.
- Laboratory analysis of soil, groundwater, and off-gas samples will require 3 to 4 weeks.
- Data analysis and report preparation can be completed in 3 to 4 weeks, following receipt of laboratory results.

If a condition is encountered during this investigation which could raise the priority level of the site, a status report to the WDNR will be submitted in a timely manner following discovery.

APPENDIX A

FIELD METHODS

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Soil Borings

The soil borings will be drilled using hollow-stemmed augers and air rotary methods in bedrock to minimize introducing drilling fluids into the formation and to minimize downhole contamination. Logs of each borehole will be prepared at the time of drilling, and field soil classification will be verified later during examination of the soil samples in the soils laboratory. Upon completion, soil boring logs will be amended as necessary. The finalized boring logs and documentation required under NR 141 will be included in an appendix to the report.

Precautions will be taken to minimize potential contamination between samples. The split-spoon soil sampler will be cleaned prior to its initial use on-site and between samples. Cleaning procedures will involve the following:

- Scrubbing away soil material with a stiff brush in a trisodium phosphate soap solution
- Double-rinsing in clean potable water

Soil samples will be collected using a split-spoon sampler at 2.5-foot intervals, according to ASTM D-1586. A 3-inch split-spoon or continuous type sampler may be needed to obtain sufficient sample volume. The soil samples will be examined to classify the subsurface materials.

To minimize potential contamination between boreholes, drilling equipment will be cleaned using a steam-cleaner. Drill cuttings will be covered with visquene and stockpiled on-site and will be disposed at a later date.

Soil Sampling

Soil samples collected with a split-spoon sampler will be split out for laboratory chemical analysis. Samples collected will be stored in appropriate bottles and put on ice immediately after collection. The samples will be transported to the RMT Laboratory in Madison with chain-of-custody documentation.

Well Installation and Development

The wells will be installed in accordance with NR 141. The annular space seal will consist of bentonite. The sealant material will be pumped through a tremie pipe or poured down the borehole. Well development and well construction forms will be included in an appendix to the report. After completion of the well installation, each well will be developed following the procedures in NR 141, Wisconsin Administrative Code, which governs monitoring well construction. First, the water level in each well will be measured, and the volume of standing water in each will be estimated. Surging and purging with a dedicated bailer will be performed for at least 30 minutes until 10 well volumes of water are removed, or until the well is bailed dry. Volumes will be measured using 5-gallon buckets. Well development forms will be included in an appendix to the report. Well casing elevations will later be surveyed to the nearest 0.01 foot by RMT and related to the Wisconsin State Plane Coordinate System.

Groundwater Sampling

Groundwater samples will be collected from each well by RMT after well development is completed. The groundwater sampling procedures are summarized as follows:

- The samples will be collected using PVC bailers, washed and rinsed with distilled water, and dedicated for use in only one well.
- Each sample for chemical analysis will be placed in appropriate bottles and properly preserved where necessary.
- The samples will be immediately placed on ice.
- The samples will be delivered to the laboratory under chain-of-custody procedures.

- The samples will be analyzed according to USEPA-approved procedures and QA/QC protocols.