TRIAD ENGINEERING INCORPORATED

325 East Chicago Street
Milwaukee, Wisconsin 53202
414/291-8840
Fax: 414/291-8841

June 4, 1996

Ms. Pamela Mylotta
% ERR/ERP
Wisconsin Department of Natural Resources
4041 North Richards Street
P.O. Box 12436
Milwaukee, WI 53212

Dear Ms. Mylotta:

RE: Proposed Building 68 and Building 54 Addition
Remedial Investigation/Remedial Action Option Evaluation and
Buildings 38 and 39 Preliminary Remedial Investigation Work Plans
Chrysler Corporation, Kenosha Engine Plant
FID #230139360 ERR/ERP

Enclosed for your review are two work plans prepared by Triad Engineering Inc. (Triad) on behalf of Chrysler Corporation (Chrysler). The work plans address the proposed Building 68 and 54 addition and Buildings 38 and 39 areas, respectively, at the Chrysler Kenosha Engine Plant property.

If you have any questions or comments, please do not hesitate to call us at (414) 291-8840 or Mr. Greg Rose of Chrysler at (810) 576-7362.

Sincerely,

TRIAD ENGINEERING INC.

Richard J. Binder, P.G., CGWP
Senior Hydrogeologist

TRIAD ENGINEERING INC.

Ross M. Creighton, P.G.
ProjectManager/Hydrogeologist

c: Curt Chapman/Chrysler
Jack Bugno/Chrysler

mao\W963873\3873EP-1.B

FID 230139 360 ERR/ERP

PROPOSED BUILDING 68
AND
BUILDING 54 ADDITION
REMEDIAL INVESTIGATION/
REMEDIAL ACTION OPTION EVALUATION
WORK PLAN
CHRYSLER CORPORATION, KENOSHA ENGINE PLANT
KENOSHA, WISCONSIN

PREPARED FOR:

CHRYSLER CORPORATION
800 CHRYSLER DRIVE
AUBURN HILLS, MICHIGAN 48326-2757

TRIAD ENGINEERING INCORPORATED
PROJECT NO. W943324-26

JUNE 1996

TRIAD ENGINEERING INCORPORATED

325 East Chicago Street
Milwaukee, Wisconsin 53202
414-291-8840 Fax 414-291-8841

4410 Executive Boulevard
Fort Wayne, Indiana 46808
219-471-3388 Fax 219-471-3565

300 North Michigan Street
South Bend, Indiana 46601
219-237-0894 Fax 219-237-0896

PROPOSED BUILDING 68
AND
BUILDING 54 ADDITION
REMEDIAL INVESTIGATION/
REMEDIAL ACTION OPTION EVALUATION
WORK PLAN
CHRYSLER CORPORATION, ENGINE PLANT
KENOSHA, WISCONSIN

PREPARED FOR:

CHRYSLER CORPORATION
800 CHRYSLER DRIVE
AUBURN HILLS, MICHIGAN 48326-2757

TRIAD ENGINEERING PROJECT NO. W943324-26

JUNE 1996

Edward T. Manning, Jr., P.E.
Vice President

Ross M. Creighton, P.G.
Project Manager/Hydrogeologist

Sarah E. Levin, P.E.
Project Engineer

Richard J. Binder, P.G., CGWP
Senior Hydrogeologist

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

WORK PLAN CERTIFICATIONS

"I, Ross M. Creighton, hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wisconsin Administrative Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in Chapters NR 716, Wisconsin Administrative Code."

Ross M. Creighton, P.G. No. 858
Project Manager/Hydrogeologist

4/6/96
Date

"I, Sarah E. Levin, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of Chapter A-E4, Wisconsin Administrative Code; that this document has been prepared in accordance with the Rules of Professional Conduct in Chapter A-E8, Wisconsin Administrative Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in Chapters NR 716, Wisconsin Administrative Code."

Sarah E. Levin, P.E. No. E-29769
Project Engineer

4/4/96
Date

LIST OF ACRONYMS

AST	aboveground storage tank
ASTM	American Society for Testing and Materials
BGS	below ground surface
BQL	below quantitative limit
cm/s	centimeters per second
cy	cubic yards
DOT	Department of Transportation
DRO	diesel range organics
EPA	United States Environmental Protection Agency
GC	gas chromatograph
GRO	gasoline range organics
HSI	Hydro-Search, Inc.
KEP	Kenosha Engine Plant
KTE	Kenosha Testing and Engineering, Inc.
mg/kg	milligrams per kilogram
msl	mean sea level
No(s).	number(s)
OSHA	Occupational Health and Safety Administration
PID	photoionization detector
Plan	Investigation Work Plan
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RAE	Remedial Action Option Evaluation
RDF	recycling and disposal facility
RI	Remedial Investigation
SPT	standard penetration testing
SVE	soil vapor extraction
SVOCs	semi-volatile organic compounds
Triad	Triad Engineering Incorporated
µg/kg	micrograms per kilogram
USGS	United States Geological Survey
UST	underground storage tank
VOCs	volatile organic compounds
WAC	Wisconsin Administrative Code
WDNR	Wisconsin Department of Natural Resources

1.0 INTRODUCTION/BACKGROUND

1.1 Purpose and Scope.

Triad Engineering Incorporated (Triad) has been retained by Chrysler Corporation (Chrysler) to prepare a Remedial Investigation/Remedial Action Option Evaluation (RI/RAE) Work Plan (Plan) for the proposed Building 68 and Building 54 addition at the Chrysler Kenosha Engine Plant (KEP), Kenosha, Wisconsin (Figure 1). An RI/RAE will be conducted within and adjacent to, the 36,000-square-foot footprint of proposed Building 68 and in the vicinity of the Building 54 addition to assess soil and groundwater conditions, and to evaluate the approximate extent of affected soil. Results of the RI will also be used to determine whether specific handling of affected soil will be required during the proposed excavations and whether dewatering fluids (if generated) will require treatment prior to discharge to the existing wastewater treatment system or the sanitary sewer. The scope of work will be divided into several phases, including preliminary investigations (to determine if soil and/or groundwater are impacted beneath the proposed footprints of Building 68 and Building 54 addition) and additional investigations to evaluate the approximate extent of potential soil and/or groundwater impacts. During excavation of soil, soil management services will be performed, including oversight, sampling, and field screening. Necessary documentation will be submitted to the Wisconsin Department of Natural Resources (WDNR). Documentation may include a stockpile exemption request and an interim RAE addendum for soil and dewatering fluids, if appropriate. During the RAE portion of the project, soil and groundwater remedial actions will be evaluated and submitted in a report to the WDNR for approval.

In order to complete the above-described objectives, the following tasks are proposed:

- Preliminary Investigations
- Additional Soil and Groundwater Investigations
- Soil Management
- Monitoring Well Installation and Sampling, and
- RI/RAE Report Preparation

1.2 Report Organization.

This Plan is divided into seven sections. General information is presented in Section 2.0. Scoping information, which includes site history, previous investigations, and potential receptors are described in Section 3.0. Basic hydrologic and geologic information are summarized in Section 4.0. The investigation techniques, methodologies, sampling parameters, analytical methods, detection limits, and quality assurance/ quality control (QA/QC) procedures are addressed in Section 5.0. The anticipated schedule is presented in Section 6.0 and the references cited are listed in Section 7.0.

2.0 GENERAL INFORMATION

The proposed Building 68 and Building 54 addition are located within the KEP property in Kenosha, Wisconsin (Figures 1, 2, and 3). The property is bounded by 60th Street to the south, 30th Avenue to the west, 52nd Street to the north, and an infrequently used rail line to the east. Surrounding land use is industrial, commercial, and residential. The proposed Building 68 and Building 54 addition are located in the Southeast Quarter, Section 36, Township 2 North, Range 22 East, Kenosha County, Wisconsin.

FACILITY:	Chrysler Corporation, Kenosha Engine Plant
ADDRESS:	5555 30th Avenue Kenosha, Wisconsin 53144-2800
OWNER:	Chrysler Corporation 800 Chrysler Drive Auburn Hills, Michigan 48326-2757
CONTACTS:	Mr. John P. Bugno, Site Administrator, Kenosha, Wisconsin Mr. Gregory M. Rose, Supervisor, Environmental Remediation, Auburn Hills, Michigan
TELEPHONE:	(414) 658-6000 (Kenosha, Wisconsin) (810) 576-7362 (Auburn Hills, Michigan)
FACSIMILE:	(414) 658-6904 (Kenosha, Wisconsin) (810) 576-7369 (Auburn Hills, Michigan)
CONSULTANT:	Triad Engineering Incorporated
ADDRESS:	325 East Chicago Street Milwaukee, Wisconsin 53202
CONTACTS:	Mr. Ross M. Creighton, P.G., Project Manager/Hydrogeologist Ms. Sarah E. Levin, P.E., Project Engineer Mr. Richard J. Binder, P.G., CGWP, Senior Hydrogeologist
TELEPHONE:	(414) 291-8840
FACSIMILE:	(414) 291-8841
WDNR FID NUMBER:	230139360 ERR/ERP

3.0 SCOPING INFORMATION

3.1 Site History

The KEP property has been used for automobile production and assembly operations since the early 1900s. During World War II, the former plant was used to manufacture military equipment including aircraft engines. Following the war, the plant resumed automobile production.

The area immediately north of proposed Building 68 (Building 36 area) was formerly used as a vehicle refueling area. Above ground storage tanks were located inside Building 36 and dispensers were located outside the building. Types of potential compounds that may be found in the subsurface soil and groundwater in this area include diesel and gasoline range organic compounds (DRO and GRO).

A former scrap metal staging area is located approximately 100 to 150 feet southeast of proposed Building 68. This area was used to load metal shavings and scrap metal onto railroad cars. These metal shavings are generally coated with a petroleum-base cutting oil. Types of potential compounds that may be found in this area include volatile organic compounds (VOCs).

3.2 Adjacent Properties

The Main Plant property is located immediately east and north of the KEP property (Figure 1). As part of deactivation, environmental investigations were conducted at the property. The Main Plant property was divided into 16 areas (sites MP-1 through MP-16, Figure 2) to allow investigations to focus on areas of concern. VOCs, semi-volatile organic compounds (SVOCs), metals, and cyanide have been detected in subsurface soil and groundwater samples at various locations.

As part of remedial activities, fourteen groundwater recovery and six treatment systems were installed. The systems were installed to provide hydraulic control, expedite the recovery of product and groundwater containing VOCs, and treat the recovered groundwater prior to discharge to the City of Kenosha Water Utility. In addition, three soil vapor extraction (SVE) systems were installed and one ex-situ/in-site bioremediation system is scheduled for start-up during 1996. Other historical remedial activities have included soil excavation and off-site disposal/treatment. Previous investigative and remedial activities are documented in previous reports submitted to the WDNR.

There are no access restrictions to the site or neighboring properties, since Chrysler owns the properties adjacent to proposed Building 68 and Building 54 addition.

3.3 Potential Receptors.

The City of Kenosha currently obtains its drinking water from Lake Michigan. There are no known public or private water wells within a 1200-foot radius of the site. According to city engineers, however, domestic wells may be in operation within the city limits. No records documenting domestic wells currently exist (HSI, 1989). Domestic wells are also found in outlying areas several miles from the site.

There are on-site underground utilities that are located near the proposed Building 68 and Building 54 area. These will be identified prior to conducting subsurface work.

There are no known state or federally listed threatened or endangered species or sensitive species habitats or ecosystems that will be impacted at the site. In addition, there are no known wetlands, outstanding water resources or areas of historical or archeological significance on-site.

4.0 HYDROLOGIC AND GEOLOGIC INFORMATION

The following sections present general and site-specific topographic, geologic, and hydrogeologic information. The majority of the information is based on the HSI investigations (1989–1991).

4.1 Topography and Surface Water.

Topography surrounding the KEP property is generally flat (Figure 1). Topographic relief within 0.5 miles of the site is less than 50 feet, with elevations ranging from approximately 650 feet above mean sea level (msl) to the west to approximately 600 feet above msl at Pike Creek, north of the KEP. Surface drainage from the site is to city storm sewers, which drain to Pike Creek and Lake Michigan. All storm water/non-impacted cooling water is currently routed through an on-site treatment system prior to discharge to Pike Creek. A secondary storm water overflow relief outfall tie-in is located on 60th Street in the event flooding/surcharging occurs. Surface water bodies in the vicinity of the facility include Pike Creek, approximately 0.5 miles north, a pond located in Lincoln Park, approximately 0.6 miles southeast , and Lake Michigan, approximately 1.25 miles to the east (HSI, 1989).

4.2 Regional Geology and Hydrogeology.

Unconsolidated sediments in the Kenosha area consist predominantly of Quaternary-age glacial and preglacial sediments deposited during the later stages of glaciation that occurred within the Lake Michigan Basin (about 15,000 years ago). The deposits are composed of glacial lake organic materials, stratified clay, silt, and sand with an approximate thickness of 20 to 100 feet (Mickelson et al., 1984).

Bedrock underlying the unconsolidated glacial deposits in the Kenosha area consists of Silurian-age sedimentary rocks. Available published information suggests that the Silurian system is predominantly composed of the Niagara Dolomite (Skinner and Borman, 1973). The Silurian system dips gently to the east towards the Lake Michigan Basin.

The Silurian system conformably overlies a sequence of Ordovician-and Cambrian-age rocks that also dip gently to the east toward the Lake Michigan Basin. The Ordovician-age rocks include the Maquoketa Formation (shales, dolomitic shales, and minor dolomite), Sinnipee Group (dolomites with minor limestones and shale), St. Peter Sandstone (well-sorted sand with a basal conglomerate and minor shale), and Prairie du Chien Group (dolomite with minor sandstone and shale). The Cambrian-age rocks are composed mainly of sandstones of the Tunnel City and Elk Mound Groups. Cambrian sandstones unconformably overlie Precambrian-age crystalline basement rock (Skinner and Borman, 1973).

Two major groundwater producing aquifers are present in the Kenosha area (Skinner and Borman, 1973). The upper unconfined aquifer system consists of Quaternary-age unconsolidated glacial and preglacial deposits and the underlying Silurian-age dolomite bedrock. The deeper confined aquifer system, which consists of Ordovician- and Cambrian-age dolomites and sandstones, is located at a depth of approximately 250 feet beneath the upper aquifer. This lower aquifer is confined between the overlying Ordovician-age

Maquoketa shale and the underlying Precambrian-age crystalline rock. Regional groundwater flow for both aquifers is eastward towards Lake Michigan (Skinner and Borman, 1973).

The City of Kenosha currently obtains its drinking water from Lake Michigan. Domestic wells in the outlying areas generally obtain potable water from the Niagara Dolomite (HSI, 1989).

4.3 Site Geology and Hydrogeology.

Based on information collected during previous investigative activities at the Main Plant, surficial materials at the site generally consist of approximately 0 to 10 feet of fill material which overlie varying thicknesses of silty sand, sandy silt, silt, clayey silt, and silty clay. the deepest boreholes installed at the Main Plant were two 51-foot boreholes, MP-2Q and MP-2R, located at site MP-2. At these locations, the subsoil generally consisted of sandy silt and silty sand to a depth of 15 to 24 feet. Underlying these sandy units was a silty clay glacial till unit identified to be the Oak Creek Formation. The Oak Creek Till is a regionally extensive unit, on the order of 130 feet thick, which underlies the entire plant site (Mickelson, et al., 1984). This unit is very dense and exhibits low hydraulic conductivity on the order of 10^{-7} cm/sec. The Oak Creek Till acts as an aquitard between a shallow water table observed at the site and deeper bedrock aquifers (HSI, 1989).

Groundwater level measurements from the Main Plant monitoring wells indicate that groundwater generally occurs at approximately 2 to 15 feet below ground surface (bgs). Based on groundwater levels obtained from the northern and eastern portions of the site, the horizontal hydraulic gradient for the water table surface varies from approximately 0.01 to 0.003 foot per foot. The local groundwater flow direction at the property is influenced by the on-site groundwater recovery systems.

Hydraulic conductivity testing was performed at 36 monitoring well locations. Calculated site hydraulic conductivities ranged from approximately 3×10^{-7} centimeters per second (cm/s) to approximately 5×10^{-4} cm/s (HSI, 1989).

The linear groundwater flow velocity for the site can be estimated using the horizontal hydraulic gradient, hydraulic conductivity and an assumed effective porosity for site aquifer materials. Porosity values for silty clay are on the order of 35 to 70 percent (Freeze and Cherry, 1979). Due to poor sorting and relatively high silt and clay content in the soils, a porosity of 35 percent was used. Based on the calculated hydraulic conductivities, horizontal groundwater flow velocities at the site are anticipated to range from less than 1 to 13 feet per year. Hydraulic testing and water elevation data and estimated groundwater flow velocity calculations are contained in a previous report (HSI, 1989). Recent construction and investigations at the KEP property indicate that geologic and hydrogeologic conditions are similar to those at the Main Plant.

5.0 SCOPE OF WORK

This Plan describes the proposed investigation of subsurface soil and/or groundwater characteristics in the vicinity of the proposed Building 68 and Building 54 area (Figure 3). Elements of the planned field activities are discussed in this section. Field activities will be conducted under the observation of qualified on-site personnel. They will be under the supervision of a hydrogeologist meeting the definition contained in s. NR 712.03(1), WAC.

Utility clearance will be confirmed by Digger's Hotline and with Chrysler representatives prior to initiating site activities. A site-specific Health and Safety Plan will also be prepared, in accordance with Occupational Health and Safety Administration (OSHA) requirements.

5.1 Preliminary Investigations.

Preliminary investigations will be completed within the footprint of the proposed Buildings 68 and 54 foundations to evaluate whether affected soil is present and whether unique handling practices will be required to facilitate construction. Initial preliminary investigation for the proposed Building 68 area was conducted on June 22, 1995, and the results were submitted to the WDNR on August 22, 1995. Investigative activities included the installation of five soil borings (SB68-1 through SB68-5). Each boring was advanced to a depth of 9 feet. The borings were placed at locations within the footprint of the proposed Building 68 area. Figure 3 shows the approximate locations of the five borings.

The soil borings were installed using a Diedrich D-25, trailer-mounted drill rig. Soil samples were obtained by advancing a 2-foot long, 1-inch diameter, stainless steel split-spoon. Soil samples were collected continuously (two foot intervals) at each boring location. The split-spoon samples were also screened in the field for the presence of VOCs by using head space methods and a photoionization detector (PID) equipped with a 10.2 eV probe. Soil descriptions and apparent odors and /or staining were also noted. Soil samples collected for analysis were placed in laboratory-supplied containers, preserved as appropriate, placed in an ice filled cooler, and maintained at a temperature of approximately 4 degrees Celsius. One soil sample was collected from above the apparent water table in each boring. The soil samples were submitted for analysis of DRO (Wisconsin Modified DRO Method with 5-minute extended retention time window), GRO (Wisconsin Modified Method), VOCs (EPA Method 8260), and polychlorinated biphenyls (PCBs; EPA Method 8080). The soil samples were submitted under chain-of-custody to Midwest Analytical Services, Inc. (MAS), a state certified laboratory. The locations of the soil borings were measured in the field.

A summary of soil samples and detected constituents are presented in Table 1. An apparent odor and/or elevated PID readings (greater than 10 instrument units [iu]) were observed for soil samples collected above the apparent water table depth at locations SB68-1, SB68-2, and SB68-3. An apparent odor and elevated PID readings were observed for soil samples collected at or below the apparent water table at locations SB68-1 and SB68-2.

The data indicate that VOCs were detected at concentrations above the laboratory detection limit in soil samples collected from soil borings SB68-1 and SB68-2. The detected VOC concentrations in soil samples collected from SB68-1 ranged from 7.5 μg/kg trichloroethene

(TCE) to 390 µg/kg 1,2,4-trimethylbenzene (1,2,4 TMB). The detected VOC concentrations in soil samples collected from SB68-2 ranged from 470 µg/kg o-xylene to 8,400 µg/kg 1,2,4 TMB. VOCs were not detected above the laboratory detection limit in the remaining soil samples. GRO was detected in soil samples collected from SB68-1 and SB68-2 at concentrations of 220 mg/kg and 2,400 mg/kg, respectively. DRO was detected in soil samples collected from SB68-1 and SB68-2 at concentrations of 12 mg/kg and 360 mg/kg, respectively. PCBs were not detected in any of the soil samples.

A preliminary soil probe investigation will also be completed in the area of the proposed Building 54 addition. The Building 54 investigation will extend into areas of the oil-recycling slab and the overhead crane scrap- and chip-loading area (Figure 3). This phase of the investigation will follow the same procedures described for proposed Building 68. Approximately ten additional GeoProbe™ borings will be installed, and ten soil samples and five groundwater samples will be collected and submitted for laboratory analysis of VOCs, GRO and DRO + 5. A soil sample may also be submitted for Waste Management of Wisconsin (WMWI) Protocol B analysis.

5.2 Additional Investigations.

Based on the information gathered in the preliminary investigations, additional soil borings will be completed using GeoProbe™ sampling techniques to further evaluate the extent of affected soil and to obtain additional geotechnical data. Additional activities may be conducted during several phases. An estimated total of 30 additional borings will be advanced at locations determined from data collected during the previous investigation phase. The actual boring locations and designations will be determined in the field. The borings will be advanced to at least 2 feet past the field observed water table (approximately 10 feet). The number of borings will be expanded in appropriate directions until unaffected soil and/or groundwater are identified.

The soil borings will be completed using GeoProbe™ drilling methods. Soil samples will be collected continuously in 2-foot sample intervals using GeoProbe™ samplers and clean dedicated plastic sleeves. Upon retrieving the GeoProbe™ samples, the plastic sleeve will be cut open using a clean knife. Soil sampling and PID screening will be completed as described for the Building 68 Preliminary Investigation. Selected, unsaturated soil samples from above the field observed water table (one from each boring collected from the interval exhibiting the highest PID reading or having the greatest potential to be affected, based on visual and/or olfactory observations) will be field tested using an on-site GC for VOC and DRO analyses. The efficiency of the field GC will be evaluated during the first phase of additional investigation at Building 68. The GC may or may not be used in successive investigation phases. Approximately ten soil samples will be submitted to the project laboratory for VOC (EPA Method 8260), GRO (WDNR Modified GRO Method), and DRO (WDNR Modified DRO Method + 5) confirmatory analyses. If sample volume is limited, VOC and GRO samples will be collected first: DRO + 5 samples will be obtained from a different interval. When negative results are obtained with the field-screening equipment (indicating the affected area is approximately defined), no additional borings in that direction will be completed. Anticipated sampling parameters, laboratory analytical methods and laboratory detection limits are presented in Table 2.

At four to seven select locations, groundwater samples will be collected using a GeoProbe™ sampler and field-screened with the on-site GC (DRO and GRO). At least one water sample will be collected from a GeoProbe™ boring within the apparently affected area. The remaining groundwater samples will be collected from GeoProbe™ borings at the apparent edges of impacts.

One additional soil boring, located near the center of the Building 68 footprint, will be advanced to a depth of approximately 30 feet to collect geotechnical information and samples. The geotechnical samples will be submitted to Chrysler's geotechnical consultant for construction purposes. Due to the depth of the boring, it will be advanced using a truck mounted drill rig and 3.25 inch inside-diameter, hollow-stem augers (HSAs). A 2-foot long by 2-inch diameter, stainless steel split-spoon will be used to collect the deep boring samples. Soil samples will be collected every 5 feet until the top of the clay unit (approximately 20 feet) is reached, then 2-foot continuous sampling will be completed thereafter to a depth of 30 feet.

5.3 Soil Management.

Chrysler's geotechnical subcontractor (Kenosha Testing and Engineering, Inc. [KTE]) estimates that up to 6 feet of soil for foundation construction (beneath the frost line) and an unknown number of 3-foot diameter by 30-foot deep caisson borings must be excavated from within the proposed Building 68 footprint. Additional soil will be excavated from the Building 54 addition.

Triad will oversee excavation over an estimated 4- to 6-week period. Oversight will include field screening excavated soil, and segregating potentially clean soil from affected soil based on PID screening, visual observations, and soil sampling results from preliminary investigation locations. Soil samples will be collected and submitted for VOC (EPA 8260), GRO (WDNR Modified Method), and DRO (WDNR Modified Method + 5) laboratory analyses. Sampling parameters, analytical methods and detection limits are presented in Table 3. Four to six samples will be collected and submitted for Waste Management of Wisconsin (WMWI) Protocol B analysis to evaluate disposal as an interim RA. It is estimated that approximately 13,000 cy (cubic yards; 18,200 tons) of soil may be excavated from the proposed Building 68 footprint location, and approximately 1000 cy (1,400 tons) of soil will be excavated from the Building 54 addition.

In addition to excavation oversight, Triad will submit a soil stockpile exemption request to the WDNR and complete an interim RAE addendum for soil and treatment of dewatering fluids, if appropriate (as required under NR 708) for submittal to WDNR. After soil disposal and/or treatment is complete, Triad will submit a brief report to the WDNR documenting interim RA activities.

5.4 Well Installation and Sampling.

It is assumed that seven 2-inch diameter monitoring wells will be installed in the proposed Building 68 and Building 54 addition investigation area. The monitoring wells will be used as points to assess the extent of affected groundwater observed during the GeoProbe™ investigation. The locations will be determined following review of the GeoProbe™ field

screening data. Recovery wells may also be installed, based on review of monitoring well data. The monitoring wells will be installed using standard HSA well installation techniques. The wells will be constructed of Schedule 40, polyvinyl chloride (PVC) casing, and factory-slotted screen. Monitoring wells will be installed to a depth of approximately 7 feet below the field-observed water table so the well screens intersect the water table surface. The monitoring wells will be installed in accordance with Chapter 141, Wisconsin Administrative Code Groundwater Monitoring Well Requirements, and will be completed with flushmount protective covers and locking caps.

Soil sampling will be performed continuously using hollow-stem augers and split-spoon sampling methods in accordance with ASTM Method D1586-84. Soil samples will be logged, described, and screened for the possible presence of VOCs by using a PID, or equivalent, according to WDNR-approved, headspace-screening techniques. Visual and olfactory observations will also be made.

Soil samples collected from above the apparent water table depth will be placed in laboratory-supplied sample containers, preserved with laboratory-supplied preservative (as appropriate), and placed on ice pending possible shipment to the laboratory. Soil samples selected for laboratory analysis will be submitted under chain-of-custody to a state-certified laboratory. The soil samples will be submitted for analysis of DRO (WDNR Modified Method+5), GRO (WDNR Modified Method), and VOCs (EPA Method 8260). Anticipated sampling parameters, analytical methods and detection limits are presented in Table 2.

5.5 Monitoring Well Development.

The monitoring wells will be developed by surging/bailing with a clean, disposable or dedicated bailer and/or pumping with a decontaminated, submersible, electric pump until either ten well volumes are removed or the well is purged dry twice and indicator parameters (pH, specific conductance and temperature) have stabilized in accordance with NR 141 requirements. Non-reusable bailers will be disposed of properly, and the reusable electric pump will be decontaminated if more than one well is to be developed using this method.

Following well development, hydraulic conductivity testing (slug or bail-down tests) will be completed in select monitoring wells. Water produced during well development will be placed in labeled DOT-approved, 55-gallon drums and treated in one of the on-site air strippers.

5.6 Groundwater-Sampling Procedures.

Following development, the wells will be purged and sampled per WDNR Guidance (WDNR, 1987). A minimum of three well volumes of water will be removed prior to sampling. Groundwater sampling will be accomplished by using a clean, disposable bailer. The required number of clean, laboratory-supplied, sample containers will be filled directly from the bailer. The sampling containers will be preserved with laboratory-supplied preservative. The groundwater samples will be analyzed for DRO (WDNR Modified Method+5), GRO (WDNR Modified Method), VOCs (EPA 8260), and treatability parameters such as total and dissolved alkalinity, hardness, calcium, iron, lead, magnesium, and manganese. Sampling parameters, analytical methods and detection limits are presented in Table 2. Each sample will then be placed in a cooler on ice and chilled to approximately 4 degrees Celsius for transportation to

a Wisconsin-certified laboratory. Sample handling and transportation will follow chain-of-custody procedures.

5.7 Site Survey.

A survey of the new soil-boring/well locations will be conducted following well installation to determine elevation and geographical coordinates, per NR 141 specifications. The soil-boring/well locations will also be measured by triangulation methods using a steel/fiberglass tape.

5.8 Water Level Measurements.

Water level measurements in the newly installed monitoring wells will be collected following well development. The water level elevation in each well will be used to assess the current surface elevation of the water table at the site and the predominant groundwater flow direction within the water table aquifer.

5.9 Documentation.

Soil-boring information, soil boring and well abandonment, well construction and well development will be documented by completing the appropriate WDNR forms. Completed forms will be provided in either the quarterly reports or the final RI/RAE report.

5.10 Quality Assurance/Quality Control Procedures

One equipment blank will be collected for each day of sampling from down-hole sampling equipment (e.g., split-spoon sampler or electric submersible pump) following decontamination of the equipment (unless disposable or dedicated sampling devices are used). One trip blank will be submitted with each groundwater sample shipment for VOC analysis. In addition, one duplicate groundwater sample and one field blank sample will be collected per ten groundwater samples.

All QA/QC samples will be processed through the sampling equipment in a manner identical to actual samples. Results of the analyses of QA/QC samples will be included in the RI/RAE report, and will be taken into account in the data assessment portion of the report. Chain-of-custody documents will be completed for all samples collected and submitted for laboratory analysis.

5.11 Decontamination Procedures and Cross-Contamination Prevention Procedures.

Drilling equipment will be steam-cleaned prior to arrival on-site and between soil-boring locations at an area identified by Chrysler representatives. Sampling equipment will be washed with trisodium phosphate substitute (Alconox) solution, followed by triple-distilled water rinses prior to arrival on site and between successive sample intervals in an area identified by Chrysler representatives.

Decontamination wash water will be contained in labeled, DOT-approved, 55-gallon drums and treated in one of the on-site air strippers.

5.12 Waste Generation.

Cuttings generated during soil-boring activities will be placed in Department of Transportation (DOT)–approved, 55-gallon drums or stockpiled on-site, if appropriate. The method for disposing of the cuttings will be determined upon receipt of analytical results from the soil-sampling program.

6.0 SCHEDULE

A description of the major mileposts and their anticipated completion dates are provided below.

TASK DESCRIPTION	ANTICIPATED DATE
Preliminary Investigation	June 1995 – February 1996
Additional Investigation	October 1995 – August 1996
Soil Management	December 1995 – July 1996
Well Installation and Sampling	August 1996 – October 1996
RI/RAE Report	March 1997

Note: This schedule is tentative. The actual schedule for this project will be dependent upon subcontractor availability and Chrysler construction priorities.

7.0 REFERENCES CITED

American Society for Testing and Materials, 1984, Standard Method for Penetration Test and Split-Barrel Sampling of Soils D1586-84, p. 298-303.

Freeze, R.A., and Cherry, J.A., 1979 Groundwater, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 07632, 604 p.

Mickelson, D.M., Clayton, L., Baker, R.W., Mode, W.N., and Schneider, A.F., 1984; Pleistocene Stratigraphic Units of Wisconsin: Wisconsin Geographic and Natural History Survey, Miscellaneous Paper 84-1, 15 p.

Skinner, E.L. and Borman, 1973: Water Resources of Wisconsin (Lake Michigan Basin); Hydrologic Investigation Atlas HA-432, United States Geological Survey.

Wisconsin Department of Natural Resources, 1991, Groundwater Monitoring Well Requirements: Wisconsin Administrative Code, Chapter NR 141, p. 690-7-690-30.

Wisconsin Department of Natural Resources, 1994, Investigation and Remediation of Environmental Contamination: Wisconsin Administrative Code, Chapters NR 700 - 736.

Wisconsin Department of Natural Resources, September 1987, Groundwater Sampling Procedures Field Manual, PUBL-WR-168.

HSI, 1989 and 1991, Subsurface Site Environmental Assessment Report, Chrysler Corporation, Main Plant and Support Sites, Kenosha, Wisconsin (Phases I, II, and III).

TABLE 1
BUILDING 68 PRELIMINARY RI
SUMMARY OF DETECTED CONSTITUENTS
CHRYSLER CORPORATION

SAMPLE I.D.	DATE COLLECTED	LAB IDENTIFICATION[1]	Results (micrograms per kilograms)																(milligrams per kilogram)	
			BENZENE	n-BUTYLBENZENE	sec-BUTYLBENZENE	ETHYL BENZENE	ISOPROPYLBENZENE	p-ISOPROPYLTOLUENE	NAPHTHALENE	n-PROPYL BENZENE	TOLUENE	1,1,2-TRICHLOROETHANE	TRICHLOROETHENE	1,2,4-TRIMETHYLBENZENE	1,3,5-TRIMETHYLBENZENE	m & p-XYLENE	o-XYLENE	PCBs	GRO	DRO
B-1 (2-3')	6/22/95	50623028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA
B-1(3-5')	6/22/95	50623027	<5	140	<5	100	62	86	<5	110	<5	37	7.5	390*	110	120	31	NA	220	12
B-2(1-3')	6/22/95	50623022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA
B-2(3-5')	6/22/95	50623021	4700*	2800	1100	3900*	1700	1500	1300	2700	2100	<50	<50	8400*	3200	5800	470	NA	2400	360
B-3(3-5')	6/22/95	50623029	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<330	<10	<10
B-4(1-3')	6/22/95	50623024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA
B-4(3-5')	6/22/95	50623023	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	NA	<10	<10
B-5(1-3')	6/22/95	50623026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA
B-5(3-5')	6/22/95	50623025	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	NA	<10	<10

* The analyte concentration was found to be outside of the established linear range of quantitation for this compound. The reported value is an approximation only.
(1) Analysis Performed by Midwest Analytical Services, Inc.
NA - Not Analyzed

TABLE 2
SAMPLING RATIONALE/ANALYTICAL PROTOCOL
PROPOSED BUILDING 68 AND BUILDING 54 ADDITION
CHRYSLER CORPORATION

TASK	MEDIUM	NUMBER OF BORINGS/WELLS	NUMBER OF SAMPLES	ANALYTICAL PARAMETERS (METHOD)	METHOD DETECTION LIMIT (ug/kg or ug/l)
Preliminary Investigation	Soil	15	5	PCBs (8080)	330
			5	VOCs (8260)	5
			15	DRO (WI mod. ext. window)	10000
			15	GRO (WI modified)	10000
			1	Protocol B (various)	various
	Groundwater	5	5	VOCs (8260)	1
			5	DRO (WI mod. ext. window)	100
			5	GRO (WI modified)	100
Additional Investigation	Soil	30	10	VOCs (8260)	5
			10	DRO (WI mod. ext. window)	10000
			10	GRO (WI modified)	10000
	Groundwater	5	5	VOCs (8260)	1
			5	DRO (WI mod. ext. window)	100
			5	GRO (WI modified)	100
Soil Management	Soil	NA	16	VOCs (8260)	5
			16	DRO (WI mod. ext. window)	10000
			16	GRO (WI modified)	10000
			6	Protocol B (various)	various
Monitoring Well Installation	Soil	7	7	VOCs (8260)	5
			7	DRO (WI mod. ext. window)	10000
			7	GRO (WI modified)	10000
	Groundwater	7	7	VOCs (8260)	1
			7	DRO (WI mod. ext. window)	100
			7	GRO (WI modified)	100
			7	Treatability parameters	various

VOC - Volatile organic compound.
DRO - Diesel range organics.
GRO - Gasoline range organics.
ug/kg - Micrograms per kilogram.
ug/l - Micrograms per liter.

3-22-96

SCALE

0 ½ 1 MILE

0 1000 2000 3000 4000 FEET

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL

QUADRANGLE LOCATION
MODIFIED FROM U.S.G.S. 7.5'
KENOSHA, WI
QUADRANGLE MAP
PHOTOREVISED 1971
MINOR REVISION 1994

TRIAD ENGINEERING INCORPORATED

FIGURE 1
CHRYSLER CORPORATION
KENOSHA PLANT
SITE LOCATION AND LOCAL TOPOGRAPHY

3-24-26-1
3-22-96

ENGINE PLANT PROPERTY

MAIN PLANT PROPERTY

SOUTH AREA

NORTH AREA

NORTH

APPROX. SCALE IN FEET

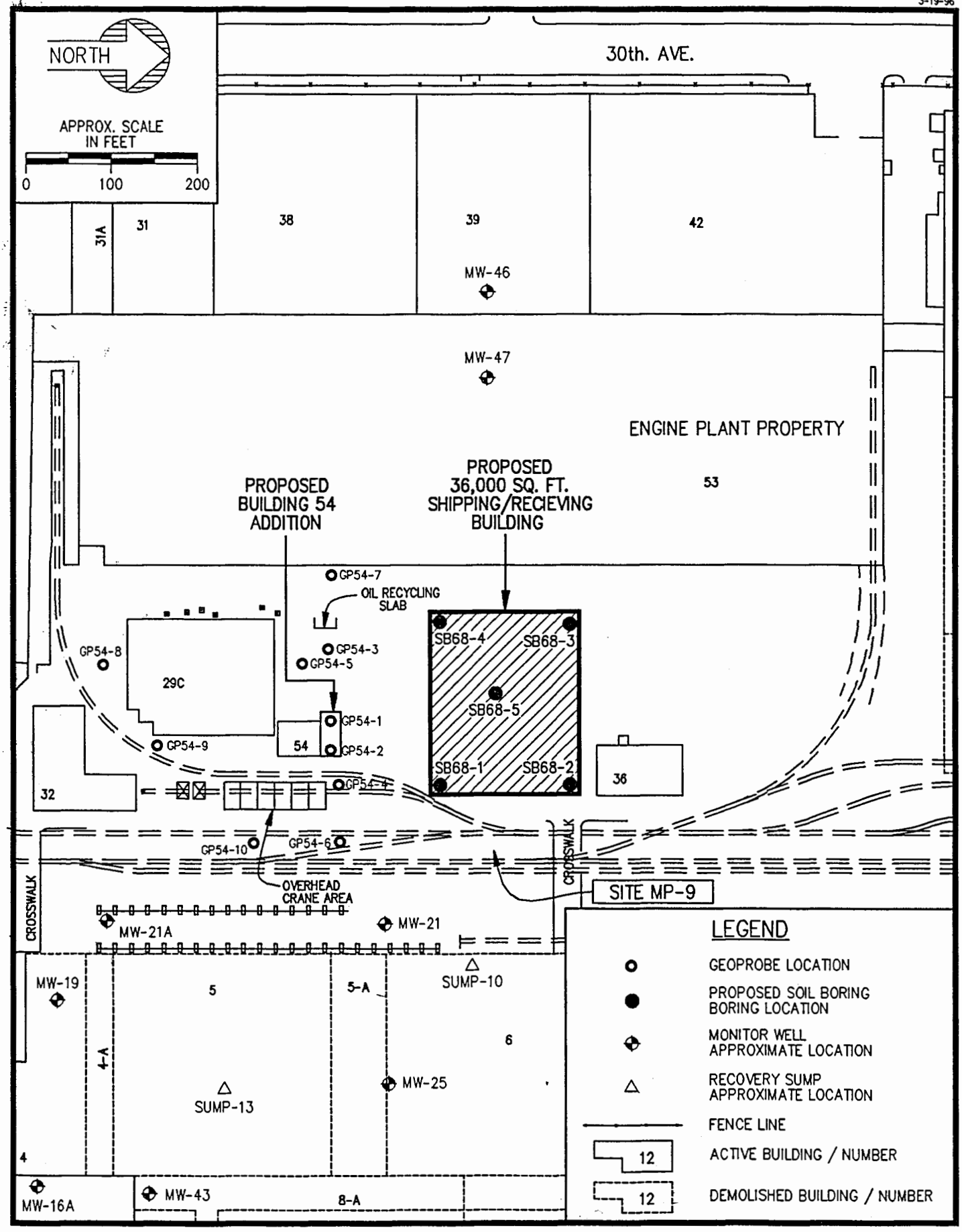
0 300 600

LEGEND

- MONITOR WELL APPROXIMATE LOCATION
- RECOVERY SUMP APPROXIMATE LOCATION
- OBSERVATION WELL APPROXIMATE LOCATION
- RECOVERY SYSTEM TRENCH
- FENCE LINE
- 12 ACTIVE BUILDING/NUMBER
- 12 DEMOLISHED BUILDING/NUMBER

TRIAD ENGINEERING INCORPORATED

FIGURE 2
CHRYSLER KENOSHA ENGINE AND MAIN PLANT FACILITIES LAYOUT



TRIAD ENGINEERING INCORPORATED

FIGURE 3
CHRYSLER KENOSHA ENGINE PLANT
PROPOSED BUILDING 68/BUILDING 54 ADDITION
PRELIMINARY REMEDIAL INVESTIGATION