DAIMLERCHRYSLER

DaimlerChrysler Corporation

February 6, 2001

Ms. Vicky Stoball
Program Assistant
Department of Natural Resources
State of Wisconsin
Southeast Region Headquarters
2300 N. Dr. Martin Luther King, Jr. Drive
PO Box 12436
Milwaukee, Wisconsin 53212-0436

Re: Tirabassi & Sons, Inc. Property
8531 39th Avenue
Pleasant Prairie, Wisconsin
BRRTS #: 02-30-225198
Federal ID #: 230083700
ERP/LUST: ERP

RECEIVED FEB 8 2001 By

Dear Ms. Stoball:

DaimlerChrysler is submitting the Site Investigation Work Plan prepared by our consultant, Leggette, Brashears & Graham, dated January 26, 2001. Upon approval of the Work Plan, site work can commence within 30 days of obtaining site access.

If you have any questions regarding this letter, please call me at (248) 576-7360.

Sincerely,

Patricia L. Beaujon
Superfund Specialist, P.E.

RECEIVED FEB 23 01

Attachments

cc: Chris Danikolas, Howard & Howard

plb:y/data/sites/tirabassi/let7_58.doc

DaimlerChrysler Corporation
800 Chrysler Drive CIMS 482-00-51
Auburn Hills MI USA 48326-2757

LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Ground-Water and Environmental Engineering Services

6525 Grand Teton Plaza
Madison, Wisconsin
608-855-5555
Fax 608-833-5551

SITE INVESTIGATION WORK PLAN

RECEIVED
FEB 8 2001
By

TIRABASSI LANDFILL
PLEASANT PRAIRIE, WISCONSIN
BRRTS# 02-30-225198
FEDERAL ID# 230083700

Prepared for:

DaimlerChrysler Corporation
Chrysler Technology Center
Auburn Hills, Michigan

January 26, 2001

Reviewed by:

J. Kevin Powers, PG
Vice President

Prepared by:

Louis M. Racchini, PG, CHMM
Senior Hydrogeologist

Andrew B. Graham, PE, PG, CHMM
Associate

SITE INVESTIGATION
WORK PLAN

TIRABASSI LANDFILL
PLEASANT PRAIRIE, WISCONSIN

SUBMITTAL CERTIFICATION

I, Andrew B. Graham, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E4, Wis. Adm. Code and a hydrogeologist as that term is defined in s. NR 712.03(1), Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E8, Wis. Adm. 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 chs. NR 700 to 726, Wis. Adm. Code.

WISCONSIN
ANDREW B. GRAHAM
E-30086
EVANSVILLE
WI
PROFESSIONAL ENGINEER

Registration No. 30086
Expiration Date: 7/31/02

Andrew B. Graham, PE, PG, CHMM
Associate

Leggette, Brashears & Graham, Inc.

Corp. Engineering/Geology License No. 2205
Expiration Date: 1/31/02

WISCONSIN
ANDREW B. GRAHAM
PG-119
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Registration No. 119
Expiration Date: 7/31/02

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1 Site Location

2 Site Map

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Appendix

A Well Specification

B Drilling Supervision Procedure / Soil Sampling Procedure

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SITE INVESTIGATION
WORK PLAN

TIRABASSI LANDFILL
PLEASANT PRAIRIE, WISCONSIN

1.0 INTRODUCTION

Leggette, Brashears & Graham, Inc. (LBG) has been retained by DaimlerChrysler Corporation (DaimlerChrysler) to investigate the extent of recognized environmental conditions or the presence of any hazardous substances that indicate a release occurred at the Tirabassi & Sons, Inc. (Tirabassi) property (site). The site address is 8531 39th Avenue, Kenosha, Wisconsin (Figure 1). The Wisconsin Department of Natural Resources (WDNR) has requested restoration of the environment at the above-referenced site under Section 292, Wisconsin Statutes, known as the hazardous substances spill law, in notification letters sent both to DaimlerChrysler and Domenick Tirabassi, Jr., dated July 22, 1999.

The proposed work in this plan is intended to generate the data necessary to characterize the site and allow further evaluation of appropriate remedial actions. The plan includes a drilling and sampling program, aquifer testing, a site survey, and preparation of a Site Investigation Report. This work plan has been prepared in accordance with the requirements of Chapter NR 716.09 of the Wisconsin Administrative Code (WAC).

2.0 OBJECTIVES

The proposed Site Investigation (SI) will be conducted in accordance with applicable chapters of the NR 700 rule series of the WAC and other appropriate state and federal regulations, rules and guidance. The overall project goal is to characterize the extent of contamination in the ground water and soil at the site in order to determine the appropriate remedial response in accordance with NR 722 WAC.

The objectives of the work plan are to ensure that all tasks are performed adequately, safely and on schedule. To meet these objectives, this work plan includes:

1) relevant site information;
2) proposed boring and test well locations;
3) procedures for drilling, installing and testing the monitoring wells;
4) a health and safety plan; and
5) a project schedule.

3.0 SITE BACKGROUND

3.1 Site Description

The 140 acre (approx.) site is located at the southeast corner of 80th Street and 39th Avenue, partly in the SW¼ and NW¼ of Section 12 and in the NW¼ of Section 13, T1N, R22E on the Kenosha, Wisconsin Quadrangle topographic map (Figure 1). A site map is included as Figure 2.

The site is currently operated by Tirabassi & Sons, Inc., a construction company with roofing, excavating and sewer contracting operations. Ownership of the property will be determined during Site Scoping. On July 22, 1999, the WDNR sent notification letters to two potentially responsible parties: DaimlerChrysler and Tirabassi & Sons, Inc. The designated contacts for the potentially responsible parties are:

- Mr. Domenick Tirabassi, Jr.
  Tirabassi & Son's, Inc.
  8531 39th Avenue
  Kenosha, WI 53412
  Phone: (262) 694-0557/6550

- Mr. Gregory Rose
  Assessment Deactivation and Remediation
  DaimlerChrysler Corporation
  800 Chrysler Drive
  Auburn Hills, MI 48326-2757
  Phone: (248) 576-7362

According to the WDNR file, the site has been used for waste disposal by numerous other parties. Therefore, there are likely other, yet unnamed, potentially responsible parties.

3.2 Site Summary and Conditions

On September 27, 1999, LBG requested a copy of the WDNR file for the site. A copy of the file was provided by Jennifer Pelczar of the WDNR Southeast District Office. The file contained documents from 1972 to 1999. According to the file documents, the site operated as an unregulated landfill from the late 1940s to 1972. During this time, the landfill accepted cardboard cartons, building debris, scrap metal, refuse, sawdust, wood trimmings, steel drums, industrial waste and foundry sand. In 1972, the WDNR ordered the landfill operation closed because of leachate entering nearby surface water. By 1976, some of the items in the 1972 order were still noncompliant, and the WDNR issued a second order. Under that order, all wood waste and refuse was to be removed, access controls were to be provided, and the salvage yard license had to be made current. On July 13, 1976, the WDNR found that the order requirements were satisfied.

In 1972, Domenick Tirabassi, Sr. applied for a license to operate a solid waste disposal, noncombustible landfill operation and salvage yard. He requested permission to fill the on-site gravel pit excavations with demolition debris, and operate a private salvage yard on the site. In 1975, Domenick Tirabassi, Jr. was issued a license to operate a salvage yard on the property. From 1972 to 1975 he operated the landfill without a license. In 1975, the licensure requirement for operating the landfill was dropped under an agreement that he would only fill with "clean earth material containing less than 25 percent concrete, building stone and asphalt". He continued to operate the salvage yard under a license until 1982. In 1982, salvage yards were no longer regulated by the WDNR; therefore, correspondence on the matter ceased.

In 1984, the Environmental Protection Agency (EPA) performed a preliminary assessment of the site, thereby entering it into the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. In 1986, a site inspection was conducted; it was noted that salvage operations continued. Since 1986, there has been no EPA involvement with the site. In October 1998, Francis Johnston, a nearby resident, asked the WDNR to investigate the Tirabassi site. On May 19, 1999, the WDNR inspected the site and requested further investigative actions to take place.

3.3 Site Topography and Hydrology

The northwest and northeast corners of the original site have been developed for retail commercial use. The southern portion of the site (between 85th and 86th Avenues) has been developed into residential housing. Numerous soil/debris piles are evident on the western half of the site. According to the WDNR file, the western half of the site has been used for the excavation of sand and gravel and landfilling. The eastern half of the site is occupied by agricultural fields.

The site is approximately 650 feet above mean sea level (AMSL) and is fairly level. Local relief within a 2-mile radius of the site ranges from 740 feet AMSL to the west, to 580 feet AMSL at Lake Michigan to the east. Flat or gradual sloping terrain are the predominant local land features. Relative to the site, Lake Michigan lies approximately 2 miles east. A small drainage ditch lies south and southwest of the property at a distance of approximately 1,000 feet. This ditch appears to flow into Jerome Creek at a point approximately 1 mile southwest of the site. Two small bodies of water also lie southwest of the site at distances of approximately 2,000 and 3,500 feet. Additionally, there is a storm-water retention pond located in the southeast quadrant of the site.

3.4 Geology/Hydrogeology

Topography in the Kenosha area is typified by rolling hills and plains formed from Pleistocene glacial deposits. These glacial deposits consist of unsorted till deposited as ground and end moraines, sorted and stratified outwash and glacial lake deposits (Black, 1970). In the Kenosha area, these deposits range from 50 to 150 feet thick.

The underlying bedrock unit in the vicinity of the site is comprised of Silurian-age, undifferentiated, fractured dolomites and silty dolomites of the Niagra Escarpment. In the site area, this bedrock unit ranges from 150 to 250 feet thick and dips slightly to the east (Skinner and Borman, 1973). Ordovician and Cambrian sandstone bedrock lie beneath the Silurian dolomites .

The principal surface water body in the Kenosha area is Lake Michigan. Surface water in the area is discharged to Lake Michigan by Pike Creek and Barnes Creek, which are located north and south of the site, respectively, and by the Kenosha City storm sewers.

The three principle sources of ground water in the Kenosha area are the unconsolidated sand and gravel deposits (outwash), the undifferentiated Silurian dolomites (Niagra Aquifer) and the Ordovician and Cambrian sandstone bedrock beneath the Silurian dolomites (Mickelson, et al., 1984). The water table generally occurs within the glacial deposits. Ground-water flow in the shallow aquifer is ultimately controlled by topography and surface water. Based on surface topography, the regional ground-water flow direction is expected to be to the east, toward Lake Michigan. Well depths in the shallow glacial aquifers range from 30 to 480 feet, and yields range from 125 gallons per minute (gpm) in the buried sand and gravel deposits to as much as 1,200 gpm in the surface sand and gravels (Skinner and Borman, 1973). The Niagra aquifer is the most widely used source of ground water. The well yields from this aquifer are highly variable (10 gpm to 1,200 gpm), due to the non-uniform distribution of fractures in the bedrock. The Ordovician and Cambrian sandstone aquifer is the primary source of water for high-capacity wells

in the area and may yield as much as 1,500 gpm. Well depths in this aquifer range from 300 to 2,000 feet.

Soil borings advanced in 1972 as part of the landfill permit application indicate that the soil profile at the site is quite uniform, consisting of surface layers of fill, typically 5 feet thick; underlain by a stratum of fine to coarse sand to a depth of approximately 18 feet; which in turn is underlain by very hard clay to at least 25 feet below grade (ft bg). This clay stratum was quite impervious in the opinion of the drilling company, Milwaukee Testing Laboratory. Ground water was encountered in these borings at approximately 10 ft bg.

3.5 Remedial Actions

LBG is unaware of any remedial actions that have taken or are currently taking place at the site.

3.6 Potential Impacts from Nearby Properties

Database searches were conducted on behalf of LBG by VISTA Information Solutions, Inc. (VISTA). The search was conducted specifically for the Tirabassi & Sons, Inc. site located at a street address of 8531 39th Avenue, Kenosha, Wisconsin 53412. VISTA completed the database and records search and issued Report No. 148901901 on October 19, 1999. The search items requested by LBG were: Toxic Release Inventory System (TRIS), Corrective Action Report System (CORRACTS), and Resource Conservation and Recovery Act (RCRA) violators.

The search indicated five additional sites within 1/4 mile and 49 additional sites located within a 1 mile radius of the Site. The sites located within 1/4 mile were found in the following databases. This search is described in greater detail in Technical Memorandum 99-02.

Site	Distance from Subject Site	Database*
Tirabassi Dump (Site), Tirabassi & Sons, Inc.	-	SCL, CERCLIS/NFRAP
PDQ Food Store (No. 351), 8012 39th Ave	0.09 miles NW	LUST, UST/AST
Woodbridge Partnership, 4011-4015 80th St	0.16 miles W	UST/AST, GNRTR
Bank One Property, 3314 80th St	0.17 miles E	SCL
Don James Tirabassi Property, 8100 37th Ave	0.24 miles W	UST/AST
Pilger Jr. Property, 7900 40th Ave	0.25 miles NW	UST/AST

* The acronyms for the databases searched can be found in the Site Assessment Plus Report (Technical Memorandum 99-02).

A search of the available City of Kenosha Directories and Sanborn Fire Insurance Maps did not disclose any information pertaining to the site.

4.0 EXPOSURE PATHWAYS AND POTENTIAL RECEPTORS

4.1 Private Water Supply Wells

A well records search for the purpose of locating water supply wells near the site was conducted by LBG on October 17, 1999 (Technical Memorandum 99-01).

The Wisconsin Geological and Natural History Survey (WGNHS) was instructed to search their files for two major sets of well data: Well Constructor's Reports (WCRs) and Geologic Logs. WCRs are one- or two-page reports submitted to the WDNR by well drillers upon completion of a well (some test borings are also included in WCR files).

The WGNHS search indicated that only four wells are located within 1,200 feet of the site, one of which was the site water supply well. The area is served by a public water supply. The closest of the remaining three wells is/was owned by Frank Lesky. This well is located approximately 1/4 mile south of the site. The other two wells, also south of the site, are/were owned by Henry Slater and William Bruchan, respectively. No other well records were on file with the WGNHS in the requested search area. However, aerial photographs from 1950 to the present indicate that other private residences are and have been located in the vicinity of the site. It is not known how many, if any, of these homes have water supply wells. There were no Geologic Logs in the file.

The on-site well (Tirabassi) was reportedly constructed with 6-inch iron casing to 97 feet. The three off-site wells were constructed with 6-inch iron casing set into the bedrock layer from approximately 72-106 ft bg. Depth from surface to static water-level varied from 7 to 25 ft bg.

4.2 Public Water Supply Wells

There are no public water supply wells within 1,200 feet of the subject site.

4.3 Water Supply Lines

Numerous water supply lines exist within the study area. If contaminated source soils are discovered during the investigation, the potential for the source soils to impact water service lines will be evaluated and summarized in the Site Investigation Report.

4.4 Building Foundations and Utility Conduits

The study area includes numerous building foundations, basements and utility corridors. If contaminated source soils are discovered during the investigation, LBG will evaluate the potential for these structures to be impacted by vapors or act as preferential migration pathways.

4.5 Surface Water Bodies

The nearest surface water body is the storm water retention pond, located in the southeast quadrant of the site.

5.0 POTENTIAL IMPACTS ON THE ENVIRONMENT

LBG requested a National Environmental Policy Act (NEPA) Checklist from VISTA which reviews a site location and furnishes critical map information on natural and cultural features. The layers of data included are Wetlands, Wilderness Areas, Wildlife Preserves, Endangered Species Habitat, Floodplains, National Historic Sites and Landmark Sites and Native American Sacred Sites. Findings from the NEPA checklist review are presented in the following sections.

5.1 State or Federal-Listed Threatened or Endangered Species

An evaluation of the potential impact to state or federal-listed threatened or endangered species was conducted, and there are no known threatened or endangered species on the subject site.

5.2 Wetlands in Areas of Special Natural Resource Interest

A Wisconsin Wetlands Inventory Map produced for the Southeastern Wisconsin Regional Planning Commission by the Wisconsin Department of Transportation in 1979 was reviewed. The map showed two wetlands, smaller than 2 acres in size. These wetlands are located very close to Sunnyside and Anderson Parks, approximately 3,000 feet south-southeast of the site. Aerial photographs taken during 1992 (the most recent available) indicate that the wetlands are not present at this time. A review of NR 103.04 WAC indicates that the site or the land and waters in the vicinity of the site have not been designated as wetland environments.

5.3 Outstanding and Exceptional Resource Waters

Based on a review of Chapters NR 102.10 and 102.11 WAC, none of the surface water bodies listed in Sections 3.3 or 4.5 have been designated as outstanding or exceptional resource waters.

5.4 Historical or Archaeological Sites

There are no known sites of historical or archaeological significance in the vicinity of the site property.

5.5 Wilderness Areas

The NEPA Checklist indicated only cultural features within the search radius of one mile. Both were listed as Wilderness Areas under the State Parks and Forests headings. Sunnyside Park and Anderson Park are located approximately ½ mile east and ¾ mile southeast of the site, respectively.

6.0 SCOPE OF WORK

6.1 Soil Borings

Borings will be completed at the eight locations depicted on Figure 2. The borings will be installed with a drilling rig and hollow-stem augers in accordance with the Well Specification (Appendix A). The down-hole equipment will be decontaminated before work commences at the site and between each boring location. The decontamination procedure is included in Appendix A. The boreholes will be continuously sampled with 2-inch outer diameter splitspoon samplers. The target depth for each borehole will be the base (top of clay unit if present) of the water table aquifer, estimated to be 20 ft bg. The soil samples will be inspected in the field by an LBG field geologist in accordance with the procedure provided in Appendix B.

Discrete soil samples will be obtained at every 2-foot depth interval. The samples will be field-screened for volatile organic compounds (VOCs), with an organic vapor analyzer (OVA). A sample from each boring will be selected based upon field screening, shipped to the laboratory and analyzed for VOCs, PAHs and total and leachable RCRA metals. If chlorinated solvents or PAHs are present, the sample will also be analyzed for leachable VOCs and/or PAHs, respectively. Extraction of the leachable fraction will be performed using the Synthetic Precipitation Leaching

Procedure (SPLP). The soil sampling procedure (including the volume of sample required, type and size of sample container and preservation requirement) is included in Appendix B. All wastes will be handled in accordance with the Waste Storage and Disposal Procedure included as Appendix C. Any borings not completed as monitoring wells will be abandoned in accordance with Appendix D.

6.2 Monitoring Wells

Monitoring wells will be installed at the eight locations shown on Figure 2. The monitoring wells will consist of 15 feet of 2-inch diameter, 0.010-inch slot PVC screen, and sufficient 2-inch diameter PVC riser to extend the wells to ground surface. The monitoring wells will be installed in accordance with NR 141 WAC. The monitoring wells will be equipped with a 3-foot stick-up, protective outer casing, locking cap and two protective bollards as shown in Appendix A.

6.3 Monitoring Well Sampling

Following well construction, the monitoring wells will be developed in accordance with WDNR regulations. The monitoring wells will be sampled at least two weeks after development to allow for stabilization of the shallow water bearing unit. Ground-water samples will be collected and analyzed for VOCs, PAHs and total and dissolved metals. The Water-Level and Quality Measurement Procedure (including the volume of sample required, type and size of sample container and preservation requirement) is included as Appendix E. The well development procedure is included in Appendix A.

In addition, applicable field practices, sampling techniques, and sampling protocol will be performed in accordance with "The Groundwater Sampling Field Manual" (WDNR, 1996). All wastes will be handled in accordance with the Waste Storage and Disposal Procedure included as Appendix C.

6.4 Hydraulic Conductivity Testing

Hydraulic conductivity tests will be performed on the monitoring wells in order to obtain hydraulic conductivity values. The slug out testing method will be utilized. Hydraulic conductivity testing data along with information on ground-water flow direction will be used to further evaluate the fate and transport of potential ground-water contaminants. The slug test procedure is included as Appendix F.

6.5 Site Survey

The new wells will be surveyed for horizontal and vertical datum and referenced to mean sea level (msl) by a Wisconsin licensed land surveyor.

7.0 SITE HEALTH AND SAFETY

A Site Health and Safety Plan has been prepared by LBG. The Site Health and Safety Plan will be on-site during all site activities. This plan details health and safety issues associated with the activities to be conducted at the site. Information in the plan includes personal protective equipment, safe working practices, air quality monitoring, and emergency procedures. It is anticipated that all work will be conducted in Level D protection. The plan will be distributed and reviewed by all field personnel prior to initiation of work. Appendices G and H contain the Site Health and Safety Plan and Extreme Weather Safety procedures, respectively.

8.0 SITE INVESTIGATION REPORT

A Site Investigation Report on the findings of the investigation will be prepared following the field activities. The report will include a description of the field activities, boring logs, a site figure showing as-built locations and survey data for all monitoring wells and borings, abandonment records, a water-table surface map, isoconcentration drawings for soil and ground-water contaminants, a comparison of the contaminant levels to the Enforcement Standards and Preventative Action Limits listed under NR 140 WAC, conclusions and recommendations.

9.0 PROJECT TIME LINE

LBG anticipates that the activities outlined in this work plan can be completed within 120 days of receiving permission to drill on the property.

10.0 REFERENCES

Black, R. F., et al., *Pleistocene Geology of Southern Wisconsin*, University of Wisconsin-Extension, Geological and Natural History Survey, Madison, Wisconsin, 1970.

Leggette, Brashears & Graham, Inc., *Technical Memorandum 99-01, Well Records Search*, October 17, 1999.

Leggette, Brashears & Graham, Inc., *Technical Memorandum 99-02, Comprehensive Database and Records Search*, November 4, 1999.

Leggette, Brashears & Graham, Inc., *Technical Memorandum 99-03, Aerial Photograph Search*, December 3, 1999.

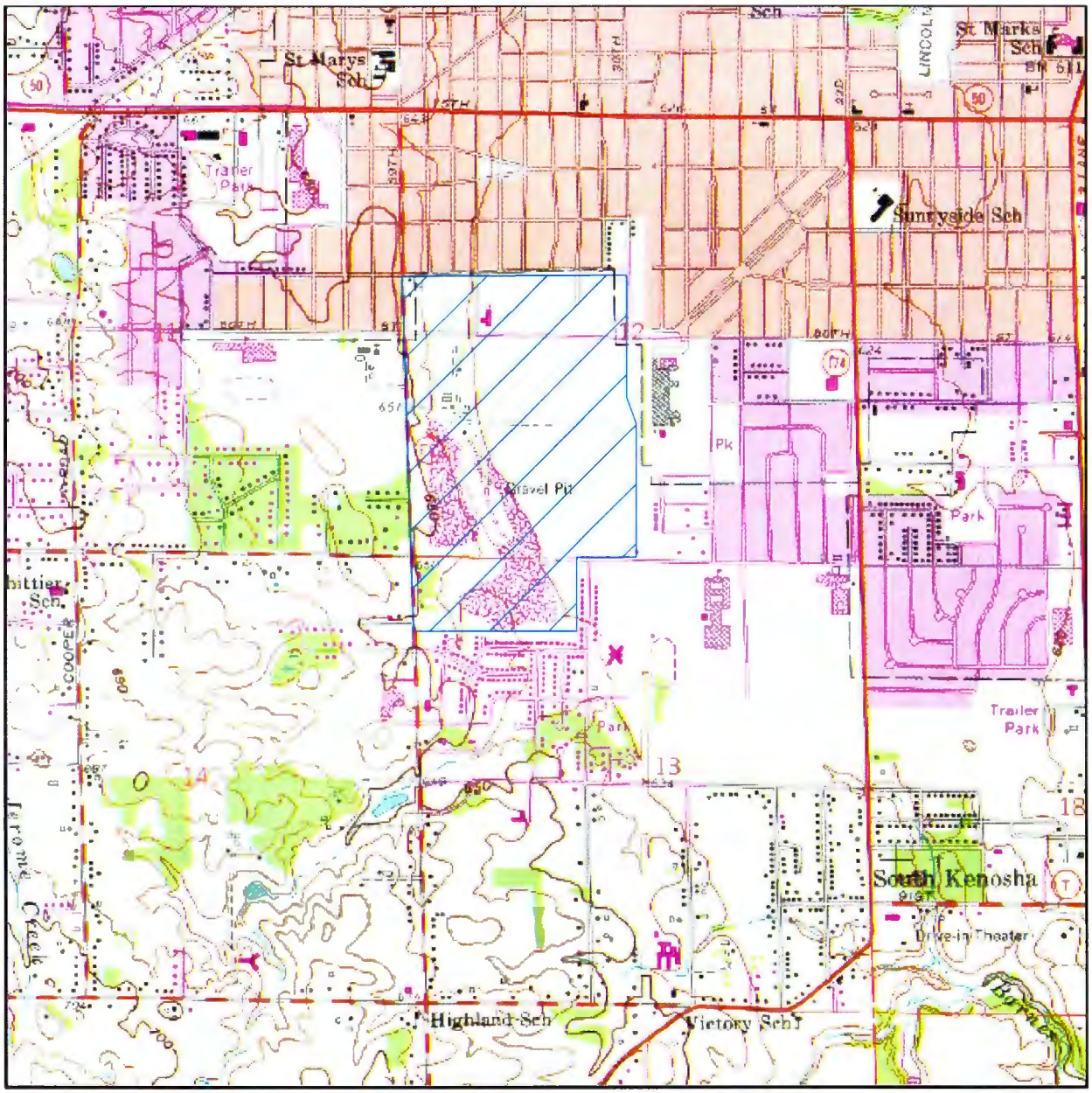
Mickelson, David M. and Lee Clayton, eds., "Late Pleistocene History of Southeastern Wisconsin", *Geoscience Wisconsin*, Volume 7, *Pleistocene Stratigraphic Units of Wisconsin*, Miscellaneous Paper 84-1, University of Wisconsin-Extension, Geological and Natural History Survey, Madison, Wisconsin, 1984.

Skinner, E. L. and Borman, R. G., *Water Resources of Wisconsin - Lake Michigan Basin*, Hydrologic Investigations Atlas HA-432, U. S. Geological Survey, Washington, D. C., 1973.

Wisconsin Department of Natural Resources, Groundwater Sampling Field Manual, 1996.

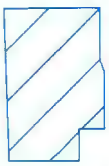
Wisconsin Department of Natural Resources, Wisconsin Wetlands Inventory Map, Kenosha County, Wisconsin, 1981.

Wisconsin Geological and Natural History Survey, Well Construction Report Search, October 1999.



QUADRANGLE LOCATION

U.S.G.S. TOPOGRAPHIC
KENOSHA, WIS
7.5 MINUTE QUADRANGLE
1976



APPROXIMATE SITE BOUNDARY

DATE: 1/26/2001	PREPARED BY:		FIGURE:
REVISION: 0	LEGGETTE, BRASHEARS & GRAHAM, INC. Professional Ground-Water and Environmental Engineering Services 6525 Grand Teton Plaza Madison, WI 53719 (608) 833-5555	TIRABASSI LANDFILL PLEASANT PRAIRIE, WISCONSIN SITE LOCATION	
DISK: J:\3CHR17\TIRABA\			
FILE: AREALOC1.DWG			
DRAWN: SR / CHECKED: WRG			

APPENDIX A
WELL SPECIFICATION

APPENDIX A

WELL SPECIFICATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Soil borings.

B. Ground-water monitoring wells.

C. Well development.

1.2 REFERENCES

A. ASTM D1586 - Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.

B. ASTM F480 - Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR, SCH 40 and SCH 80).

C. Appendix C - Waste Storage and Disposal Procedure.

D. Appendix D - Well Abandonment Specification.

E. Appendix G - Site Health and Safety Plan.

1.3 REGULATORY REQUIREMENTS

A. Conform to NR 141 Wis. Adm. Code for Work of this section.

B. Drilling Firm: Company specializing in performing the work of this section with supervising personnel licensed in the State of Wisconsin to install wells.

1.4 SUBMITTALS FOR REVIEW

A. Certification that field personnel have been trained in the proper use of protective equipment and clothing in accordance with 29 CFR Part 1910.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

A. Accurately record actual locations of well, depth, subsoil strata and drilling difficulties encountered.

B. Submit signed copy of driller's log book statements.

C. Copies of each completed WDNR Form.

1.6 JOB CONDITIONS

A. Conduct Work in accordance with the Site Health and Safety Plan.

B. Clear utilities under by contacting Diggers Hotline (1-800-242-8511) a minimum of 3 work days before drilling.

C. Provide and maintain necessary lighting, barriers, warning signs and devices, and temporary walkways to assure public safety.

D. Provide adequate safeguards to protect surrounding properties and improvements from damage resulting from the Work.

PART 2 PRODUCTS

2.1 WELL MATERIALS

A. Casing: ASTM F480, Schedule 40 PVC.
   1. Manufacturer: Big Foot Manufacturing, (Cadillac, MI) Riser Pipe or equivalent.
   2. Joints: ASTM F480
      a) Flush joint thread.
      b) One Buna "O" Ring for each connection.

B. Screen: ASTM F480, Schedule 40 PVC.
   1. Manufacturer: Big Foot Manufacturing, (Cadillac, MI) Well Screen or equivalent.
   2. Joints: ASTM F480
      a) Flush joint thread.
      b) One Buna "O" Ring for each connection.
   3. Slot Size: 0.010 in. (10-slot).

C. Filter Pack
   1. Manufacturer: American Materials Corp., (Eau Claire, WI) Red Flint Sand (0.45 mm to 0.55 mm) or equivalent.

D. Fine Sand
   1. Manufacturer: American Materials Corp., (Eau Claire, WI) Red Flint Sand (0.10 mm to 0.20 mm) or equivalent.

E. Annular sealants used to seal the annulus may be prepared in slurry or used, un-mixed in a dry pellet, granular, or chip form. Sealants selected must meet all applicable Wisconsin state code and achieve a permeability of 1×10^{-7} centimeters per second or less.
   1. Manufacturer: CETCO, (Arlington Heights, IL) PureGold Medium Chips and Grout or equivalent.

2. Description: A blend of pure, dried bentonite clay without polymers or organic additives used for sealing of the annular space of monitoring and product recovery wells to control contaminant infiltration and preserve ambient water quality.

2.2 WELL HEADS

A. Curb Box
1. Manufacturer: Morrison Bros. Co. (Dubuque, IA), Model TC-240P Limited Access Manhole or equivalent.
2. Description: Flush mount 8 inch diameter manhole with cast iron, watertight, boltable cover and rim and 8 inch galvanized steel skirt. Cover clearly labeled "Test Well".
3. Stick-up Protectors: 7 foot long, 4 inch diameter steel pipe filled with concrete.

B. Well Cap
1. Manufacturer: Boart Longyear Company (Stone Mountain, GA), Model TC292 or equivalent.
2. Description: 2 piece brass and aluminum locking and leak resistant well cap. Cover clearly marked with triangular monitoring well warning symbol and "Test Well".

C. Protective Ballards: 7 foot long, 4 inch diameter steel pipe filled with concrete.

PART 3 EXECUTION

3.1 WELL LOCATION

A. Advance borings at locations indicated on Figure 2. Advance borings at additional or other locations if directed by the LBG Hydrogeologist.

3.2 BOREHOLE ADVANCEMENT

A. Utilize the hollow-stem auger method: 4.25 inch ID minimum.

B. Collect continuous samples utilizing the STP method in accordance with ASTM D1586 with a 2 inch OD, 24 inch long sampler.

C. Provide LBG Hydrogeologist with unopened sampler for sampling and logging.

D. Complete boring logs which document:
1. Well location.
2. Geotechnical data (penetration, blow counts).
3. Descriptive information for each material identified in the borehole either by symbol or word description, or both.
4. Dimensions and materials of the completed borehole and well.

E. Store soil cuttings in accordance with the Waste Storage and Disposal Procedure.

F. Abandon all boreholes not completed as wells in accordance with the Well Abandonment Specification.

3.3 DECONTAMINATION

A. Decontaminate all down-hole equipment between borings with a steam cleaner or pressure washer.

B. Decontaminate all sampling equipment before each use with a brush and detergent solution followed by a distilled water rinse.

3.4 WELL COMPLETION

A. Install wells as indicated on Figure A1.

3.5 WELL DEVELOPMENT

A. Wait a minimum of 12 hours between well construction and development if the well is sealed with grout or slurry.

B. Develop wells by alternately surging and purging for a minimum of 30 minutes by using either a bailer or surge block or by pumping the well sufficiently to cause a drawdown and then allowing the well to recover and repeat the process.

C. After the final surge and purge cycle, pump or bail 10 well volumes or until the well produces sediment free water.

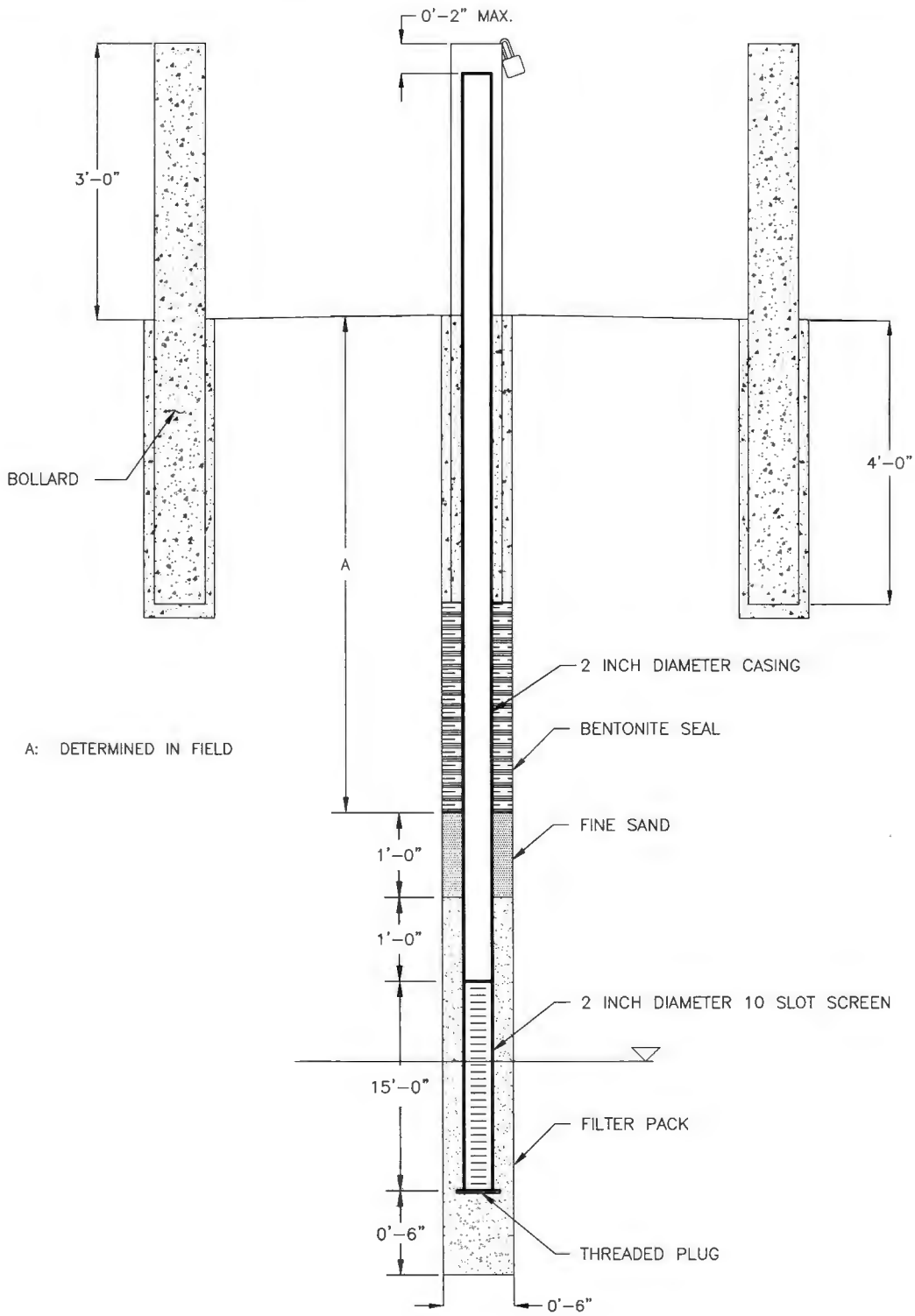
D. If the well bails dry, develop by purging only in a manner which limits agitation.

E. Dispose of accumulated water in accordance with the Waste Storage and Disposal Procedure.

3.6 DOCUMENTATION

A. Complete and submit WDNR Form 4400-113A, Form 4400-113B and Form 4400-122 to the WDNR within 60 days of well completion.

END OF SECTION



DATE: 1/26/2001	PREPARED BY:		DRAWING:
REVISION: 0	LEGGETTE, BRASHEARS & GRAHAM, INC. Professional Ground-Water and Environmental Services 6525 Grand Teton Plaza Madison, WI 53719 (608) 833-5555	TIRABASSI LANDFILL PLEASANT PRAIRIE, WISCONSIN MONITORING WELL PROFILE	A1
DISK: J:\\TIRABA\WORKPLAN2000\DATA\			
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APPENDIX B
DRILLING SUPERVISION PROCEDURE/SOIL SAMPLING PROCEDURE

APPENDIX B

DRILLING SUPERVISION / SOIL SAMPLING PROCEDURE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drilling supervision.

B. Hand augering.

1.2 REFERENCES

A. Appendix A - Well Specification.

B. Appendix C - Waste Storage and Disposal Procedure.

C. Appendix D - Well Abandonment Specification.

D. Appendix G - Site Health and Safety Plan.

E. LBG Standard Operating Procedures.
   1. Section 1-3: Subcontractor Observation.
   2. Section 2-9: OVA.
   3. Section 3-3: Geological Logging.

1.3 JOB CONDITIONS

A. Conduct Work in accordance with Site Health and Safety Plan.

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

A. Water-Level Indicator
   1. Manufacturer: Solonist Canada, Ltd. (Georgetown, Ontario, Canada) Model 101 or equivalent.

B. Organic Vapor Analyzer (OVA): Photoionization Detector
   1. Manufacturer: HNU Systems, Inc. (Newton, Massachusetts) Model HW 101 with 11.7 eV lamp.
   2. Other acceptable manufacturers offering equivalent products:
      a) Thermo Environmental Instruments, Inc. (Franklin, Massachusetts) Model 580B OVM with 11.7 eV lamp.

2.2 FIELD SUPPLIES

A. Sample Equipment: Trowel or sampling spoon, Chain of Custody, cooler, foil wrap, soil screening jars, sample bottles, Ziploc bags, decontamination solutions with buckets and brushes.

PART 3 EXECUTION

3.1 PREPARATION

A. Mark well locations with white spray paint, white stakes or flags at least 4 days prior to drilling activities.

B. Confirm with drilling contractor that utility clearance has been requested 3 work days prior to drilling activities.

C. Calibrate the OVA each day, prior to head space screening.

3.2 CONTRACTOR SUPERVISION

A. Confirm that drilling contractor completes work according to the Drawings and Specifications for the project.

B. Record general site activities on Form 01050F1.

3.3 BOREHOLE LOGGING

A. Log boreholes on Form 02670F1A in accordance with LBG SOP 3-3.

3.4 SUBSURFACE SOIL SAMPLING

A. Procedure
   1. Open split-spoon sampler.
   2. Place the soil sample in two jars; one for head space analysis, one for laboratory analysis.
   3. Label both jars.

B. Screening Frequency: Screen a minimum of one soil sample from each 2 feet of boring.

C. Analyze head space in accordance with LBG SOP 2-9.

D. Select samples for laboratory analysis and submit to laboratory according to Schedule 1.

E. Empty head space jars into appropriate waste drum in accordance with the Waste Storage and Disposal Procedure and dispose of sample jars in garbage.

3.5 WELL COMPLETION

A. Record all measurements for billing.

3.6 PROJECT CLOSEOUT

A. Confirm that well completion report has been submitted to WDNR.

Schedule 1 - Soil Sampling				
Analyte	**Sample Points**	**Field (F) or Lab (L)**	**Analysis Method**	**Container Information**
VOCs	Each split spoon	F	OVA	G, 1L CWM
VOCs	Split spoon with highest OVA reading from each boring or at water table if OVA readings are 0.	L	EPA SW846 8260	G, 125 ml CWM
PAHs		L	EPA SW846 8270	G, 1L AMW
SPLP VOCs	Split spoon with highest OVA reading from each boring or at water table if OVA readings are 0. Extraction will only take place if VOCs or PAHs are present.	L	EPA SW846 1312 w/ EPA SW846 524.1	G, 250 g
SPLP PAHs		L	EPA SW846 1312 w/ EPA SW846 8270	G, 250 g
8 RCRA Metals (Total)	One sample of obvious fill materials or at the bottom of each boring or at water table interface if ground water encountered	L	EPA SW846 7000/6010	4 oz. CWM
8 RCRA SPLP Metals		L	EPA SW846 1312 w/ EPA-1 200.7	4 oz. CWM

Notes: P - Plastic, G - Glass, CWM - Clear Wide Mouth, AMW - Amber Wide Mouth, g - Grams, L - liters, ml - Milliliters, oz. - Ounces, NA - Not Applicable, SPLP - Synthetic Precipitation Leaching Procedure Container type, sample size (where noted), sample bottle, preservative (where noted). Samples should be cooled to 4°C.

END OF SECTION

APPENDIX C
WASTE STORAGE AND DISPOSAL PROCEDURE

APPENDIX C

WASTE STORAGE AND DISPOSAL PROCEDURE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Soil disposal.

B. Water disposal.

1.2 REFERENCES

A. Wisconsin Administrative Code, NR 605, Identification and Listing of Hazardous Waste.

B. Wisconsin Administrative Code, NR 610, Small Quantity Generator Standards.

C. Wisconsin Administrative Code, NR 615, Large Quantity Generator Standards.

D. Code of Federal Regulations, 40 CFR 261.3(a)(2).

E. Code of Federal Regulations, 49 CFR 172.101 - Hazardous Materials Table.

F. Appendix G - Site Health and Safety Plan.

G. LBG Standard Operating Procedures.
   1. Section 1-4: General Water Sampling Protocol.
   2. Section 2-9: OVA.
   3. Section 4-8: Screening Soil Samples for VOCs.

1.3 REGULATORY REQUIREMENTS

A. Conform to applicable federal and State of Wisconsin regulations for Work of this section.

1.4 JOB CONDITIONS

A. Conduct work in accordance with Site Health and Safety Plan.

B. Provide spill kit containing shovels, spare drum and absorbent material.

PART 2 PRODUCTS

2.1 DRUMS

A. 55-gallon steel drums: DOT 17E, UN Marking 1A1, closed head, unlined, new.

B. 55-gallon steel drums: DOT 17H, UN Marking 1A2, open head, unlined, new.

2.2 LABELS

A. Non-Hazardous Waste.
   1. Manufacturer: Lab Safety Supply (Janesville, WI), Non-Hazardous Waste Label No. 478.
   2. Description: Vinyl with adhesive back, 6 inches by 6 inches.

B. Hazardous Waste.
   1. Manufacturer: Lab Safety Supply (Janesville, WI), Hazardous Waste Label No. 433.
   2. Description: Vinyl with adhesive back, 6 inches by 6 inches.

2.3 PLASTIC SHEETING

A. Plastic Sheeting: 6 mil HDPE.

PART 3 EXECUTION

3.1 SOIL DISPOSAL

A. Waste Segregation
   1. Segregate and store grossly contaminated drill cuttings (OVA reading >1,000) and drill cuttings containing free product from each boring in separate steel drums.
   2. Mark drum as Uncharacterized Waste and identify source of drum contents for sampling purposes.
   3. Place other drill cuttings in steel roll-off box provided by Waste Management.
   4. Cover roll-off box with tarpaulin daily.

B. Drum Filling
   1. Place plastic sheeting under drums during filling.
   2. Fill drums with a shovel.
   3. Secure bungs and lids with spark-proof equipment.

C. Drum Labeling
   1. Complete labels with indelible ink.
   2. Label drums containing soil characterized as non-hazardous with an EPA Non-Hazardous Waste Label.
   3. Label drums containing soil characterized as hazardous with an EPA Hazardous Waste Label.

D. Drum Storage
   1. Move drums to the designated drum storage area within 72 hours of generating waste.
   2. Provide secondary containment in drum storage area by covering area with plastic and constructing berms around the storage area.
   3. Inspect containers periodically for evidence of leakage, corrosion or deterioration.

E. Waste Disposal
   1. Non-hazardous: Authorize transport of roll-box containing solvent-impacted soil to Kestrel Hawk Landfill (Racine, WI).
   2. Hazardous: Hazardous waste will be disposed of by the Department under a separate contract.

3.2 WASTE CHARACTERIZATION FOR DISPOSAL

A. Procedure
   1. Use hand auger or trowel to obtain a sample.
   2. Collect sample at a minimum of 18 inches below the soil surface.
   3. Jar soil sample for laboratory analysis.

B. Submit sample for laboratory analysis of waste characteristics as required by Waste Management of Wisconsin Protocol B (attached).

3.3 WATER DISPOSAL

A. Pump purge water from wells into polyethylene storage tank.

B. Waste Characterization: Collect sample of waste from tank in accordance with LBG SOP 1-4. Submit sample of waste for laboratory analysis by EPA Method 5030/8021 to Test America.

C. Contact Environmental Support Services at (608) 834-9634 to load, haul and dispose of purge water at Kenosha Area Sewerage District.

Schedule 1 - Drum Labeling		
Information	**Non-Hazardous Waste**	**Hazardous Waste**
Shipper	DaimlerChrysler Corporation	DaimlerChrysler Corporation
Address	800 Chrysler Drive CIMS 482-00-51	800 Chrysler Drive CIMS 482-00-51
City, State, Zip	Auburn Hills, MI 48326-2757	Auburn Hills, MI 48326-2757
Phone	(248) 576-7360	(248) 576-7360
Contents	Solvent impacted soil/water	Solvent impacted soil/water
Proper U.S. DOT Description		*Example:* *Hazardous Waste, Solid/Liquid, n.o.s. (Vinyl Chloride, 1,2-Dichloroethylene) 9, NA3077, III*
EPA ID No.		To be filled out when known.
EPA Manifest Document No.		To be filled out upon drum filling.
EPA Waste No.		To be filled out when known
Accumulation Start Date		To be filled out upon drum filling.
State Manifest Document No.		To be filled out upon drum filling.

END OF SECTION

APPENDIX D
WELL ABANDONMENT SPECIFICATION

APPENDIX D

WELL ABANDONMENT SPECIFICATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Borehole abandonment.

1.2 REFERENCES

A. Wisconsin Administrative Code, NR 141.25, Abandonment Requirements.

B. Appendix G - Site Health and Safety Plan.

1.3 REGULATORY REQUIREMENTS

A. Conform to NR 141.25 for Work of this section.

1.4 JOB CONDITIONS

A. Conduct Work in accordance with Site Health and Safety Plan.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

A. Copy of each completed WDNR Borehole Abandonment Form (Form 3300-5B).

PART 2 PRODUCTS

2.1 SEALING MATERIAL

A. Grout: Neat cement containing bentonite or Aquajel from 2% to 6% by dry weight or combination thereof avoiding segregation or dilution of the material.

B. Pure bentonite in any form
   1. Manufacturer: CETCO, (Arlington Heights, IL) PureGold Medium Chips and Grout or equivalent.
   2. Description: A blend of pure, dried bentonite clay without polymers or organic additives used for sealing of the annular space of monitoring and product recovery wells to control contaminate infiltration and preserve ambient water quality.

PART 3 EXECUTION

3.1 BOREHOLE ABANDONMENT

A. Seal borehole by grouting from the bottom up by using specified sealing material. Apply material the full depth of the borehole and terminate material within three feet of the ground surface.

B. Backfill to base of existing surface.

C. Patch surface with like material.

3.2 NOTIFICATION

A. Submit a WDNR Borehole Abandonment Form (Form 3300-5B) to the WDNR or approved local health department not more than 60 days after the borehole is sealed.

END OF SECTION

APPENDIX E
WATER LEVEL AND QUALITY MEASUREMENT PROCEDURE

APPENDIX E

WATER-LEVEL AND QUALITY MEASUREMENT PROCEDURE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fluid level measurement.

B. Well purging.

C. Sample collection.

D. Calculations.

1.2 REFERENCES

A. "Groundwater Sampling Field Manual," WDNR Publication PUBL-DG-038 96.

B. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, Vol. One, Ch. One (Quality Control) and Vol. Two (Field Manual).

C. DaimlerChrysler Corporation, "Environmental Contract Laboratory Program Analytical Services and Quality Assurance Guidance Manual."

D. Appendix C - Waste Storage and Disposal Procedure.

E. Appendix C - Waste Storage and Disposal Procedure.

F. Appendix G - Site Health and Safety Plan.

G. LBG Standard Operating Procedures.
   1. Section 1-7: Equipment Decontamination.
   2. Section 2-2: pH Analysis.
   3. Section 3-2: Ground-Water Well Sampling.
   4. Section 3-4: Ground-Water Level Measurement.

1.3 JOB CONDITIONS

A. Conduct Work in accordance with Site Health and Safety Plan.

1.4 QUALITY CONTROL

A. Conduct Work in accordance with:
   1. State of Wisconsin Regulations.

2. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, Vol. One, Ch. One (Quality Control) and Vol. Two (Field Manual).
3. "Groundwater Sampling Field Manual," WDNR Publication PUBL-DG-038 96.
4. DaimlerChrysler Corporation, "Environmental Contract Laboratory Program Analytical Services and Quality Assurance Guidance Manual."
5. LBG's Standard Operating Procedures.

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

A. pH/Conductivity Meter
   1. Manufacturer: Micron L Company (Carlsbad, California) Model EP11/pH or M6/pH or equivalent.

2.2 FIELD SUPPLIES

A. Sample Equipment
   1. Field Filters and Hand Pump
   2. pH Paper
   3. Thermometer
   4. Ziploc Bags
   5. Ice
   6. Sample Bottles
   7. Packing Tape
   8. Cooler
   9. Labels/Seals
   10. Bailers
   11. Rope
   12. Scissors/Knife
   13. Graduated Bucket
   14. Chain of Custody
   15. Air Bill Label

B. Decontamination Solutions
   1. Alconox Solution
   2. Isopropyl Solution
   3. Distilled Water
   4. Paper Towels

PART 3 EXECUTION

3.1 OFFICE PREPARATION

A. Order sample bottles, field blanks, trip blanks and distilled water through laboratory.

3.2 FIELD PREPARATION

A. Uncap all wells ½ hour before measuring water levels to allow water levels to stabilize.

B. Record general site activities on Form 01050F1.

3.3 FLUID-LEVEL MEASUREMENT

A. Begin measurements at the cleanest well as indicated on the fluid-level measurement schedule.

B. Measure the water level, record the data on the Fluid-Level Measurement Form (02670F3A) and the Well Sampling Form (02670F3C).

C. Sound the bottom of the well and record the measurement on the Well Sampling Form.

D. Decontaminate the water level indicator as follows.
   1. Swab with absorbent pad.
   2. Spray rinse with detergent.
   3. Spray rinse with isopropyl solution.
   4. Spray rinse with distilled water.

E. Proceed to the next well indicated on the fluid-level measurement schedule and repeat steps A, B and C. Finish with the most contaminated well.

3.4 WELL PURGING

A. Calculate the required well purge volume for each well as indicated on the Well Sampling Form 02670F3C.

B. Bail purge water to a graduated bucket to measure purge volume.

C. If well bails dry, record total volume purged and allow the well to recharge and repeat purging until pH, specific conductance and temperature stabilize. Wait one hour before sampling.

D. Dispose of water in accordance with the Waste Storage and Disposal Procedure.

3.5 WELL SAMPLING

A. Collect a well water sample with a new bailer, rope and gloves at each sampling point.

B. Fill appropriate number and type of sample bottles according to the sampling schedule with bailed sample water.
   1. Store sample bottles on ice immediately after sample collection procedures.

C. Proceed to next well and repeat steps A and B.

D. Field Blanks
   1. Collect one field blank each day of sampling.
   2. Fill sample bottles with distilled water.
   3. Label each field blank according to the day it was collected (e.g. FB060198).

E. Matrix Spike/ Matrix Spike Duplicates
   1. Select a sample location to collect a matrix spike and matrix spike duplicate sample.
   2. Matrix Spike/ Matrix Spike Duplicates must be collected for the following, whichever is most frequent.
      a) Each 20 field samples in an SDG (not including trip and field blanks), OR
      b) Each 5-calendar-day period during which field samples in an SDG were received (said period beginning with the receipt of the first sample in that SDG)
   3. Label each matrix spike/ matrix spike duplicate with the sample location followed by MS/MSD (e.g. MW-01 MS/MSD).

F. Trip Blanks: Include one trip blank per cooler. Keep all bottles in the same cooler with the trip blank.

G. Complete chain-of-custody forms.
   1. Include the project name and job number on each chain-of-custody.
   2. Verify that the number of samples on the chain-of-custody match the number of samples to be sent to the laboratory.
   3. Indicate on the final chain-of-custody form that the sampling event is complete.

H. Packaging.
   1. Package each sample bottle in foam provided by laboratory.
   2. Bag chain-of-custody and tape to underside of cooler lid.
   3. Use packing tape to seal cooler.

Schedule 1 - Well Sampling					
Analyte	**Sample Points**	**Field (F) or Lab (L)**	**Analysis Method**	**Field Filtered**	**Container Information**
VOCs	All wells if VOCs detected in soil boring(s)	L	EPA SW846 8260	No	G, (3) 40mL#, HCl
PAHs	All wells if PAHs detected in soil boring(s)	L	EPA SW846 8270	No	G, 1L AMW,
Metals (Total)	All wells	L	EPA SW846 7000/6010	No	P, 250mL HDPE, HNO_3
Metals (Diss.)	All wells	L	EPA-1 200.7	Yes	P, 250mL HDPE, HNO_3
pH	All wells	F	pH/Cond. Meter	No	-
Specific Conductance	All wells	F	pH/Cond. Meter	No	-
Temperature	All wells	F	Thermometer	No	-

Notes: All samples should be cooled (iced) to 4°C.

Container type, sample size (where noted), sample bottle, preservative (where noted).

P - Plastic, G - Glass, mL - Milliliters, L - Liter, HCl - Hydrochloric acid (pH<2)
H_2SO_4 - Sulfuric Acid (pH<2), HNO_3 - Nitric Acid (pH<2), # - No headspace,
HDPE - High Density Polyethylene Bottle, AMW - Amber Wide Mouth Bottle

END OF SECTION

APPENDIX F
SLUG TEST PROCEDURE

APPENDIX F

SLUG TEST PROCEDURE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Slug test.

1.2 REFERENCES

A. ASTM D 4044-96 - Standard Test Method (Field Procedure) for Instantaneous Change in Head (Slug Tests) for Determining Hydraulic Properties of Aquifers.

B. Appendix C - Waste Storage and Disposal Procedure.

C. Appendix G - Site Health and Safety Plan.

D. LBG Standard Operating Procedures:
   1.. Section 3-4: Ground-Water Level Measurement.

1.3 JOB CONDITIONS

A. Conduct Work in accordance with Site Health and Safety Plan.

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

A. Water Level Indicator:
   1. Manufacturer: Solinst (Ontario, Canada).
   2. Other manufacturers offering equivalent products.

B. Data Logger:
   1. Manufacturer: Campbell Scientific Model PST8.
   2. Other manufacturers offering equivalent products.

C. Pressure Transducer:
   1. Pressure Range: 0 to 11 psi.

D. Computer: Portable PC with Microsoft Excel installed.

2.2 FIELD SUPPLIES

A. Bailer:
   1. Length: 6 feet.
   2. Diameter: 1.66 inch.

B. Bucket: 5 gallon.

PART 3 EXECUTION

3.1 PREPARATION

A. Install the pressure transducer in the test well.
   1. Secure the transducer 1 foot above the bottom of the test well.
   2. Connect the transducer cables to the data logger.
   3. Set the data logger to record data in the delta mode at 0.01 feet change in head.
   4. Calibrate the data logger head reading against water-levels measured with the water level indicator.

B. Completely submerge a bailer in the test well.

C. Monitor the water level for at least 5 minutes and until there is no fluctuation in fluid level.

D. Record data on Slug Test Field Sheet (Form 02670F7).

3.2 TEST PROCEDURE

A. Start data logger and record time.

B. Withdraw the bailer (slug) and discard the contents in a plastic bucket.

C. Monitor the fluid level response to the change in water level until the water level has recovered to at least 90 percent of the static level.

D. Record data on Slug Test Field Sheet (Form 02670F7).

3.3 POST-TEST PROCEDURE

A. Analyze the test data to confirm adequate test results.

B. Repeat the test if necessary.

C. Remove and decontaminate the pressure transducer.
   1. Swab probe and cable with absorbent pad.
   2. Spray rinse with Alconox solution.
   3. Spray rinse with isopropyl solution.
   4. Spray rinse with deionized water.

D. Dispose of purge water in accordance with the Waste Storage and Disposal Procedure.

3.4 DATA ANALYSIS

A. Download the test data to the computer.
   1. Access data logger downloading file.
   2. Retrieve data and save as a new file.
   3. Import new file into spreadsheet application.
   4. Save file in new format.
   5. Manipulate data for insertion into slug test evaluation sheet.

B. Calculate the hydraulic conductivity.
   1. Complete the "Calculation of Hydraulic Conductivity".
   2. Print, check and sign the calculation sheet.

END OF SECTION

APPENDIX G
SITE HEALTH AND SAFETY PLAN

APPENDIX G

SITE HEALTH AND SAFETY PLAN

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Personal protective equipment.

B. Safe working practices.

C. Air quality monitoring.

D. Emergency procedures.

1.2 REFERENCES

A. 40 CFR 1910.120 - Hazardous Waste Operations and Emergency Response.

B. Appendix H - Extreme Weather Safety.

1.3 PURPOSE

A. To provide a framework for the safe conduct of Work on site.

B. To safely manage the exposure to hazardous chemicals.

C. To comply with the written health and safety plan requirement of 40 CFR 1910.120 (b)(4).

1.4 APPLICABILITY

A. Leggette, Brashears & Graham, Inc. and subcontractor employees working on site.

B. Level D Work.

1.5 REGULATORY REQUIREMENTS

A. Conduct work in accordance with OSHA Interim Final Standard 29 CFR 1910 or as may be amended.

1.6 WORKER REQUIREMENTS

A. Hazardous Materials Training: All site workers, including site managers, must have completed 40 hour health and safety training including annual 8 hour refreshers in accordance with 29 CFR Part 1910.120(e).

B. Medical Surveillance: In compliance with 29 CFR Part 1910.120(f).

1.7 SUBMITTALS

A. Certification that each site worker involved in environmental sampling participates in an ongoing medical surveillance program, which includes baseline and annual follow-up exams stating that worker is able to perform required duties.

B. Certification that each site worker, including site managers, has been trained in the proper use of protective clothing and equipment in accordance with 29 CFR Part 1910.120(e)(1) through (e)(4) or demonstration of equivalent training in accordance with 29 CFR Part 1910.120(e)(9).

C. Certification that each site worker received, read and understands the Site Health and Safety Plan (this and related sections).

1.8 RESPONSIBILITIES

A. Project Manager
   1. Overall implementation and monitoring of the health and safety program.
   2. Hazard communication with Owner.

B. On-Site Health and Safety Officer (HSO)
   1. Enforcement of the Health and Safety Plan.
   2. Preparation.
   3. Hazard communication.
   4. Safety equipment inventory and access.
   5. Air monitoring and data recording.
   6. Communication with Project Manager.
   7. Supervision and direction in emergency situation.
   8. Incident reporting.

C. Field Personnel.
   1. All remaining requirements of the Site Health and Safety Plan.

1.9 PREPARATION

A. Drive the route to the hospital to verify correct directions on Schedule 3.

B. Hold a meeting to review the Site Health and Safety Plan including a discussion of the potential hazards at the site, a review of the required protective clothing and procedures and the location of emergency equipment. As necessary, hold additional meetings to discuss changes in the hazard potential.

C. Confirm that all field personnel have appropriate personal protective equipment.

D. Confirm that safety equipment is present and in working order. Place equipment in appropriate accessible location.

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

A. Organic Vapor Analyzer (OVA): Photoionization Detector
   1. Manufacturer: HNU Systems, Inc. (Newton, Massachusetts) Model HW 101 with 11.7 eV lamp.
   2. Other acceptable manufacturers offering equivalent products:
      a) Thermo Environmental Instruments, Inc. (Franklin, Massachusetts) Model 580B OVM with 11.7 eV lamp.

B. Gas Sampling System: Air Pump and Chemical Detector Tubes
   1. Manufacturer: Sensidyne, Inc. Model 800.
   2. Other acceptable manufacturers offering equivalent products:
      a) Drager: Accuro Hand Pump and Detector Tubes

2.2 SAFETY EQUIPMENT

1. Potable Water Supply: A minimum of two liters per person per day, maintained at a temperature below 60 degrees F.
2. Fire Extinguisher: For fire classifications A, B and C and 5 pound minimum capacity.
3. First Aid Kit: LBG field kit or equivalent.
   a) Small industrial first aid kit.
   b) Small industrial site burn kit.
   c) Eye wash, 6 oz. min.
   d) CPR shield.
   e) 4 instant cold packs.
4. Cellular Phone.

2.3 PERSONAL PROTECTIVE EQUIPMENT

A. Personal Protective Equipment: Level D
   1. All activities (minimum protection): Work clothing and foot protection.
   2. Drilling and Excavating: Head protection, eye protection, hearing protection and hand protection.
   3. Chemical Handling: Head protection, eye protection, hand protection and chemical protective clothing.
   4. Other Activities: Use appropriate personal protective equipment as conditions warrant.

B. Work Clothing: Sturdy, long pants and shirt with additional thermal layering as appropriate for weather conditions.

C. Chemical Protective Clothing (required only where dermal exposure exists)
   1. Suit: Tyvek®/SARENEX® 23-P coveralls with hood and booties.
   2. Overboots: Designed for medium or heavyweight use and constructed of neoprene, rubber or butyl.

D. Head Protection: Protective helmet conforming to ANSI Z89.1-1986
   1. Type: Type 1 (brim fully encircles the dome of the hat) or Type 2 (no encircling brim).
   2. Class: Class A (proof tested shell to 2,200 volts), Class B (proof tested shell to 22,000 volts) or Class C (no electrical protection).
   3. Physical Condition:
      a) Shell: Free of dents, cracks, penetration and any damage.
      b) Liner: Must be intact and free of modification and damage.

E. Foot Protection: Steel toed work boots conforming to ANSI Z41-1991
   1. Toe Protection: PT 91 (protective toe) rating.
   2. Impact Resistance: I/75 (75 foot pounds), I/50 (50 foot pounds) or I/30 (30 foot pounds).
   3. Compression Resistance: C/75 (2500 pounds), C/50 (1750 pounds) or C/30 (1000 pounds).
   4. Metatarsal Protection: None required.
   5. Electrical Protection: None required.
   6. Puncture Resistance: None required.

F. Eye Protection: Protective glasses, goggles or face shield conforming to ANSI Z87.1-1989.

G. Hearing Protection: Protective ear plugs or muffs with a 22 dB minimum noise reduction ratio (NRR) conforming to ANSI S3.19-1974.

H. Hand Protection
   1. Outer Glove: Designed for medium or heavyweight use and constructed of Viton, butyl, neoprene, PVC or nitrile.
   2. Inner Glove: SilverShield® 0.004 inch gauge thickness (required only where possible product contact exists).
   3. Thermal Liner: Woven material appropriate to temperature conditions: cotton or polyester in summer, wool in winter.

PART 3 EXECUTION

3.1 AIR QUALITY MONITORING

A. Definitions: See Schedule 1 for relevant values.
   1. Permissible Exposure Limit (PEL): Exposure limits established and enforced by OSHA. Values can be given as a 8-hour TWA, a 15-minute STEL or a ceiling

concentration which cannot be exceeded at any time.

2. Recommended Exposure Limit (REL): Exposure limits established by National Institute for Occupational Safety and Health (NIOSH). Values can be given as a 10-hour TWA, a 15-minute STEL or a ceiling concentration which cannot be exceeded at any time.
3. Threshold Limit Value (TLV): Exposure limits established by American Conference of Governmental Industrial Hygienists (ACGIH). Values can be given as a 10-hour TWA, a 15-minute STEL or a ceiling concentration which cannot be exceeded at any time.
4. Time Weighted Average (TWA): Time weighted average for up to a 10-hour day over a 40-hour work week.
5. Short-Term Exposure Limit (STEL): A 15-minute TWA that should not be exceeded at any time during a work day.
6. Immediately Dangerous to Life or Health (IDLH) Limit: The maximum concentration at which a worker can be exposed for 30 minutes without loss of life or irreversible health effects (for escape contingency). Only a highly reliable breathing apparatus providing maximum worker protection is permitted in IDLH environments.
7. Lower Explosive Limit (LEL): Lower explosive (flammable) limit in air, percent by volume at room temperature.
8. Upper Explosive Limit (UEL): Upper explosive (flammable) limit in air, percent by volume at room temperature.

B. Monitor the ambient air quality every 15 minutes in the work zone with the OVA during all drilling or excavation activities. Monitor the ambient air quality as necessary in the work zone with the OVA during all other field activities where vapor exposure is possible.

C. If an OVA level exceeds the lower limit of the site's air monitoring action range (bottom line of Schedule 1) but is less than the upper limit (the lowest IDLH for the compounds of concern):

1. Stop work and instruct all personnel to leave the work area.
2. Analyze air in work zone using a chemical-specific sorbent tube(s) to determine if the compound(s) with the most stringent PEL is present above the PEL. Refer to Schedule 1 for the PEL.
3. Reenter work zone only if sorbent tube levels are below the lower limit of the monitoring action range and OVA levels are below the lowest action range for which no sorbent tube sample was collected.
4. If re-entry to the site is allowed by (3) above, continue work with continuous monitoring for a minimum of 30 minutes, after which, periodic monitoring can resume.
5. If an OVA level again exceeds the lower limit of the compound-specific action range(s) but is less than the upper limit of the action range(s), stop work and instruct all personnel to leave the work area. After OVA levels return to below the lower limit, stabilize the work area and move to new work area or discontinue work at the site until personnel are prepared to continue at a higher level of protection. Work at a higher level of detection is beyond the scope of this HASP.

D. If an OVA level exceeds the upper limit of the site's air monitoring range:
   1. Stop work and instruct all personnel to leave the work area.
   2. Reenter work zone only if OVA levels return to below the lower action limit.
   3. Stabilize or isolate the work area and move to a new work area or discontinue work at the site until personnel are prepared to continue at a higher level of protection. Work at a higher level of protection is beyond the scope of this HASP.

E. Record air quality monitoring data in field log (Form 01510F1).

3.2 SAFE WORKING PRACTICES

A. Do not eat, drink, smoke, chew gum or use smokeless tobacco or partake in other consumptive activities in the work zone.

B. Designate an area within the work zone for decontamination. Decontaminate by brushing heavily soiled boots to remove soils, rinsing gloves and safety glasses (and over boots, if worn) with water, and removing and storing coveralls in plastic bags before leaving the work zone, if heavily soiled or suspected of having been in contact with site contaminants.

C. To prevent unauthorized personnel from entering areas where active operations are being performed, designate the area within 25 feet of the drilling equipment as the work zone.

D. Take extra precautions around areas subject to ice buildup, such as standing on slippery surfaces.

E. Head protection conforming to ANSI Z89.1-1986 is required only during activities in which construction or overhead work is being conducted such as drilling or construction related tasks. Activities such as pilot testing and ground-water sampling do not require head protection.

F. Steel-toed boots conforming to ANSI Z41-1991 are required only during drilling or construction activities. Activities such as pilot testing and ground-water sampling do not require use of steel-toed boots.

G. Eye protection is required during all drilling, ground-water sampling, and construction activities. Eye protection is suggested during all other on-site activities as well.

H. Hearing protection is required during all drilling activities. It may also be required at other times as deemed appropriate by the on-site HSO.

I. Conduct Work in accordance with Extreme Weather Safety the heat index exceeds 90 degrees F, symptoms of heat-related illness are observed on any on-site worker, the wind chill index is below 0 degrees F or symptoms of cold-related illness are observed on any on-site worker.

3.3 EMERGENCY CONTINGENCY PLAN

A. In the event of a safety or health emergency, take appropriate corrective measures to assist those who have been injured or exposed and to protect others from hazard. Notify the on-site HSO of the incident immediately. If necessary, administer first aid. Symptoms of overexposure, possible chronic effects and first aid treatment for the potential hazards are provided in Schedule 4.

B. Document emergency in writing.

C. Contact the LBG Project Manager and the Owner as indicated on Schedule 2. Contact appropriate regulatory contacts if necessary.

SCHEDULE 1									
Compound	**IP**	**LEL (%)**	**UEL (%)**	**PEL**	**REL**	**TLV**	**Odor Threshold**	**IDLH**	**Air Monitoring Action Range**
1,2-Dichloroethene	11.06	5.4	11.4	100 TWA	100 TWA	200 TWA	No Data	3000	100-3000
Ethylbenzene	8.76	0.8	6.7	100 TWA	100 TWA 125 STEL	100 TWA 125 STEL	0.1	800	100-800
n-Propylbenzene	8.82	1.1	7.1	200 TWA 300 CEIL.	100 TWA 150 STEL	50 TWA	0.15-52	500	50-500
Trichloroethene (TCE)	9.45	8	10.5	100 TWA 200 CEIL.	25 TWA	50 TWA 100 STEL	72	1000	25-1000
Tetrachloroethene	9.32	NA	NA	25 TWA	200 CEIL. 300 STEL (5 MIN.)	25 TWA 100 STEL	0.5	150	25-150
o-Xylene	8.56	0.9	6.7	100 TWA	100 TWA 150 STEL	100 TWA 150 STEL	0.1-4.6	900	100-900
m-Xylene	8.56	1.1	7.0	100 TWA	100 TWA 150 STEL	100 TWA 150 STEL	0.1-16	900	100-900
p-Xylene	8.44	1.1	7.0	100 TWA	100 TWA 150 STEL	100 TWA 150 STEL	0.1-2	900	100-900
Vinyl Chloride	9.99	3.6	33.0	1 TWA	5 CEIL. 5 STEL	5 TWA	No Data	No Data	1-No Data
Site Air Monitoring Range for Compounds of Concern									1 - 150

Sources: NIOSH Pocket Guide to Chemical Hazards
Documentation for Immediately Dangerous to Life or Health Concentrations (IDLHs)
International Chemical Safety Cards.

Note: Safety information was not found on the following compound: n-Butylbenzene

SCHEDULE 2 - EMERGENCY CONTACT INFORMATION		
Contact	**Address**	**Phone Number**
DaimlerChrysler Corporation Ms. Patricia Beaujon	Chrysler Technology Center 800 Chrysler Drive CIMS 482-00-51 Auburn Hills, MI 48326-2757	(248) 576-7360
Emergency Services Police Fire Emergency Medical	(Not Applicable)	911
Hospital Kenosha Hospital & Medical Center	5000 68th Avenue Kenosha, WI 53144	(262) 656-8282
Leggette, Brashears & Graham, Inc. Project Manager: Andrew Graham On-Site HSO: Ranking LBG Personnel	Leggette, Brashears & Graham, Inc. 6525 Grand Teton Plaza Madison, WI 53719	(608) 833-5555
Regulatory Contacts Ms. Brenda Brown, WDNR	Wisconsin Department of Natural Resources Remediation and Redevelopment Division 2300 North Dr. Martin Luther King Jr. Drive P.O. Box 12436 Milwaukee, WI 53212	(414) 263-8680

SCHEDULE 3 - ROUTE TO HOSPITAL

Directions to Kenosha Hospital and Medical Center:

- **go north on 39th Avenue approximately 1.1 miles to WI Hwy 50 ;**
- **turn left (west) onto WI Hwy 50 and travel 1.6 miles to WI Hwy 31N;**
- **turn right (north) onto WI Hwy 31N and travel 1.5 miles to WI-158;**
- **turn left (west) on WI-158, travel 0.3 miles to 68th Avenue;**
- **turn right (north) onto 68th Avenue you are at hospital.**
- **the address is: 5000 68th Ave, Kenosha, Wisconsin.**

SCHEDULE 4 - CHEMICAL HEALTH INFORMATION					
Compound	**Description of Substance**	**Exposure Route**	**Symptoms**	**Target Organs**	**First Aid**
1,2-DCE (Dichloroethene)	Colorless, oily liquid with chloroform-like odor.	Inhalation Ingestion Contact	Skin irritation; nervous system depression; liver, kidney, lung damage	Eyes, respiratory system nervous system	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Medical attention immediately
n-Propylbenzene	Colorless liquid (unless dyed blue) with chloroform-like odor.	Inhalation Absorption Ingestion Contact	Skin.,eye, resp tract, mucous membrane irritation	Eyes, skin, respiratory system	Eye: Irrigate immediately Skin: Soap wash promptly Medical attention immediately
Trichloroethylene (TCE)	Colorless liquid (unless dyed blue) with chloroform-like odor.	Inhalation Absorption Ingestion Contact	Skin/eye irritation, headache, vertigo, visual disturbance, fatigue, giddiness, tremor, sleepiness, nausea, vomit, dermatitis, cardiac arrhythmia, paresthesia, liver injury, carcinogen	Eyes, skin, respiratory system, heart, liver, nervous system	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Medical attention immediately
Tetrachloroethene (PCE)	Colorless liquid with a mild chloroform-like odor.	Inhalation Absorption Ingestion Contact	Eye/nose/throat irritation, nausea, flush face and neck, vertigo, dizziness, incoherent, headache, insomnia fatigue, liver damage	Eyes, skin, respiratory system, nervous system, liver	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Medical attention immediately
Vinyl Chloride	Colorless gas or liquid with a pleasant odor at high concentrations.	Inhalation Contact	Weakness, abdominal pain, GI bleeding, enlarged liver, pallor or cyan of extremities, carcinogen, frostbite (if liquid)	Liver, central nervous system, respiratory system, lymphatic system.	Respiratory support Frostbite

Note: Safety information was not found on the following compounds: Di-n-butylphthalate, bis(2-Ethylhexyl)phthalate, butylbenzylphtalate, benzo(b&k)flouranthene, flouranthene, 2-methylnaphthalene,4-chloro-3-methylphenol.

Source: NIOSH Pocket Guide to Chemical Hazards
** All data from U.S. Environmental Protection Agency, Chemical Fact Sheet File, 1995.

END OF SECTION

APPENDIX H
EXTREME WEATHER SAFETY

APPENDIX H

EXTREME WEATHER SAFETY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hot Weather Working Practices.

B. Cold Weather Working Practices.

C. Emergency Procedures.

1.2 RELATED SECTIONS

A. Appendix G - Site Health and Safety Plan.

1.3 APPLICABILITY

A. Leggette, Brashears & Graham, Inc. and subcontractor employees working on site.

B. Follow hot weather working practices when the heat index exceeds 90 degrees F or symptoms of heat-related illness are observed on any on-site worker. (See Figure 1 for heat index.)

C. Follow cold weather working practices when the wind chill index is below 0 degrees F or symptoms of cold-related illness are observed on any on-site worker. (See Figure 2 for wind chill index.)

1.4 PREPARATION

A. Monitor weather conditions with test equipment or current local weather forecast. Evaluate ability to conduct work.

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

A. Thermometer: -40 to 120 degrees F.

B. Thermo-hygrometer
   1. Temperature Range: 32 to 120 degrees F.
   2. Relative Humidity Range: 25 to 95 percent (±5 percent).

C. Wind Speed Indicator: 1 to 100 miles per hour (±5 percent).

2.2 SAFETY EQUIPMENT

A. Hot Weather
   1. Potable Water Supply: Two liters per person per day (minimum), maintained at a temperature below 60 degrees F.
   2. Chilling Mechanism: Bagged ice or chemical cold compresses (4 minimum).

B. Cold Weather
   1. Heating Mechanism:
      a) Ready access to warm water (5 gallons minimum, 50 to 105 degrees F).
      b) Chemical heat compresses (4 minimum).
   2. Ready access to heated shelter or vehicle.

PART 3 EXECUTION

3.1 HOT WEATHER WORKING PRACTICES

A. Definitions
   1. Heat Cramps: Painful muscle spasms which usually occur in the legs and abdomen. Heat cramps are an early warning sign of possible heat-related emergency.
   2. Heat Exhaustion: Low blood pressure caused by an inability to regulate body temperature. The effects of heat exhaustion can be reversed with prompt attention. The symptoms include cool, moist, pale or flushed skin, headache, nausea, dizziness, weakness and exhaustion.
   3. Heat Stroke: Interruption of body systems overwhelmed by heat. Heat stroke is a serious medical emergency. The symptoms include red, hot dry skin; changes in consciousness; rapid weak pulse and rapid shallow breathing.

B. Special Work Procedures
   1. Drink a 16-ounce glass of water prior to work (in the morning and after lunch). Drink additional water approximately every 20 minutes.
   2. When necessary to wear heat-retaining protective clothing, wear long cotton underwear to adsorb perspiration.
   3. Rest in cool or shaded areas as needed to prevent over exertion.
   4. Monitor the personnel in the work zone for signs of heat-related illness.
   5. Initiate appropriate emergency procedure if heat-related illness is observed.

C. Work Suspension: Suspend work if heat index exceeds 105 degrees F or heat stress or heat stroke is observed on any on-site worker following initiation of hot weather working practices. (See Figure 1 for heat index.)

3.2 COLD WEATHER WORKING PRACTICES

A. Definitions

1. Frostbite: The freezing of body parts exposed to the cold. Symptoms include lack of feeling in the affected area, and skin that appears waxy, is cold to the touch or is discolored (flush white, yellow or blue). Frostbite can result in loss of affected area if not given care.
2. Hypothermia: The lowering of body temperature. Symptoms include shivering, numbness, glassy stare, apathy and loss of consciousness. Victim will die if not given care.

B. Special Work Procedures

1. Wear adequate clothing in layers, to adapt to changing conditions and various levels of physical stress.
2. Replace inner clothing if excessive perspiration builds up.
3. Rest until warm in a heated vehicle or building if cold. Remove outer clothing during the break.
4. Monitor the personnel in the work zone for signs of cold-related injury.
5. Initiate appropriate emergency procedure if cold-related illness is observed.

C. Work Suspension: Suspend work if wind chill index is below -20 degrees F or cold-related illness is observed on any on-site worker following initiation of cold weather working practices. (See Figure 2 for wind chill index.)

3.3 EMERGENCY PROCEDURES

A. In the event of a safety or health emergency, notify the on-site HSO and take appropriate corrective measures immediately to assist injured workers and to protect others from hazard.

B. Heat Cramps

1. Rest victim in a cool place.
2. Require victim to drink water or a commercial sports drink. Do ***not*** administer salt tablets.
3. Assist victim to stretch and gently massage the affected muscles.
4. Allow victim to return to work after cramps stop and if there is no other sign of illness.

C. Heat Exhaustion

1. Remove the victim from the heat.
2. Loosen tight clothing and apply cool, wet cloths.
3. Assist victim in drinking 4 ounces of water every 15 minutes.
4. Allow victim to rest comfortably and carefully monitor for changes in condition.
5. Do not allow victim to return to work until the next work day.
6. If victim refuses water, vomits or loses consciousness, the condition is getting worse. In this case, initiate Heat Stroke emergency procedure.

D. Heat Stroke

1. Immediately call for emergency medical assistance.
2. Cool victim any way possible. Place ice packs or cold packs on wrists, ankles, groin, each armpit and on the neck to cool large blood vessels. Do ***not*** apply rubbing alcohol.
3. Keep victim in lying position on side in case of vomiting.

E. Frostbite

1. Remove the victim from the cold.
2. Call for medical assistance.
3. Handle the affected area gently. Do not rub.
4. Warm affected limbs gently by soaking in warm water not exceeding 105 degrees F. Keep the frostbitten part in the water until it looks red and feels warm.
5. Warm affected facial areas by applying a heat compress. Keep the frostbitten part heated until it looks red and feels warm.
6. Loosely bandage the area with a dry, sterile dressing. If toes or fingers are frostbitten, place cotton or gauze between them. Do not break any blisters.
7. Do not allow victim to return to work until cleared by a physician.

F. Hypothermia

1. Remove the victim from the cold.
2. Remove wet clothing and dry the victim.
3. Warm the body gradually by wrapping the victim in blankets or putting on dry clothing.
4. If alert, give the victim warm fluids to drink.
5. Do not allow victim to return to work until the next work day.
6. In severe cases (altered consciousness, unconsciousness or stopped breathing), immediately call for emergency medical assistance. Administer first aid and CPR as necessary.

G. Record accident details in accordance with the Site Health and Safety Plan.

Heat Index Chart (Temperature & Relative Humidity)

RH (%)	Temperature (° F)															
	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
90	119	123	128	132	137	141	146	152	157	163	168	174	180	186	193	199
85	115	119	123	127	132	136	141	145	150	155	161	166	172	178	184	190
80	112	115	119	123	127	131	135	140	144	149	154	159	164	169	175	180
75	109	112	115	119	122	126	130	134	138	143	147	152	156	161	166	171
70	106	109	112	115	118	122	125	129	133	137	141	145	149	154	158	163
65	103	106	108	111	114	117	121	124	127	131	135	139	143	147	151	155
60	100	103	105	108	111	114	116	120	123	126	129	133	136	140	144	148
55	98	100	103	105	107	110	113	115	118	121	124	127	131	134	137	141
50	96	98	100	102	104	107	109	112	114	117	119	122	125	128	131	135
45	94	96	98	100	102	104	106	108	110	113	115	118	120	123	126	129
40	92	94	96	97	99	101	103	105	107	109	111	113	116	118	121	123
35	91	92	94	95	97	98	100	102	104	106	107	109	112	114	116	118
30	89	90	92	93	95	96	98	99	101	102	104	106	108	110	112	114

Note: Exposure to full sunshine can increase HI values by up to 15° F

Any value less than 80 is considered comfortable.
Any value greater than 90 is considered extreme.
Any value greater than 100 is considered hazardous.
Any value greater than 110 is considered dangerous.

Figure 1: **Heat Index Chart.** To us the chart, find the appropriate temperature at the top until opposite the humidity. The number at the intersection is the heat index.

WIND CHILL CHART

Wind Speed:	CALM	5 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph
Degrees Farenheight	45	43	34	29	26	23	21	20
	40	37	28	23	19	16	13	12
	35	32	22	16	12	8	6	4
	30	27	16	9	4	1	-2	-4
	25	22	10	2	-3	-7	-10	-12
	20	16	3	-5	-10	-15	-18	-20
	15	11	-3	-11	-17	-22	-25	-27
	10	6	-9	-18	-24	-29	-33	-35
	5	0	-15	-25	-31	-36	-41	-43
	0	-5	-22	-31	-39	-44	-49	-52
	-5	-10	-27	-38	-46	-51	-56	-58
	-10	-15	-34	-45	-51	-59	-64	-67
	-15	-21	-40	-51	-60	-66	-71	-74
	-20	-26	-46	-58	-67	-74	-79	-82
	-25	-31	-52	-65	-74	-81	-86	-89

Figure 2: **Wind Chill Chart.** To use the chart, locate the temperature along the left-hand column and the wind speed across the top row. The wind chill index is found at the intersection of the two.

END OF SECTION