SITE INVESTIGATION WORK PLAN

MALLORY IMPROVEMENTS PROPERTY
1005 PERKINS AVENUE
WAUKESHA, WISCONSIN

FID # 268091890

Prepared for:
Hein-Werner Corporation
2120 Pewaukee Road
Waukesha, Wisconsin 53188

Prepared by:
SECOR International Inc.
3695-M North 126th Street
Brookfield, Wisconsin 53005

April 4, 1996

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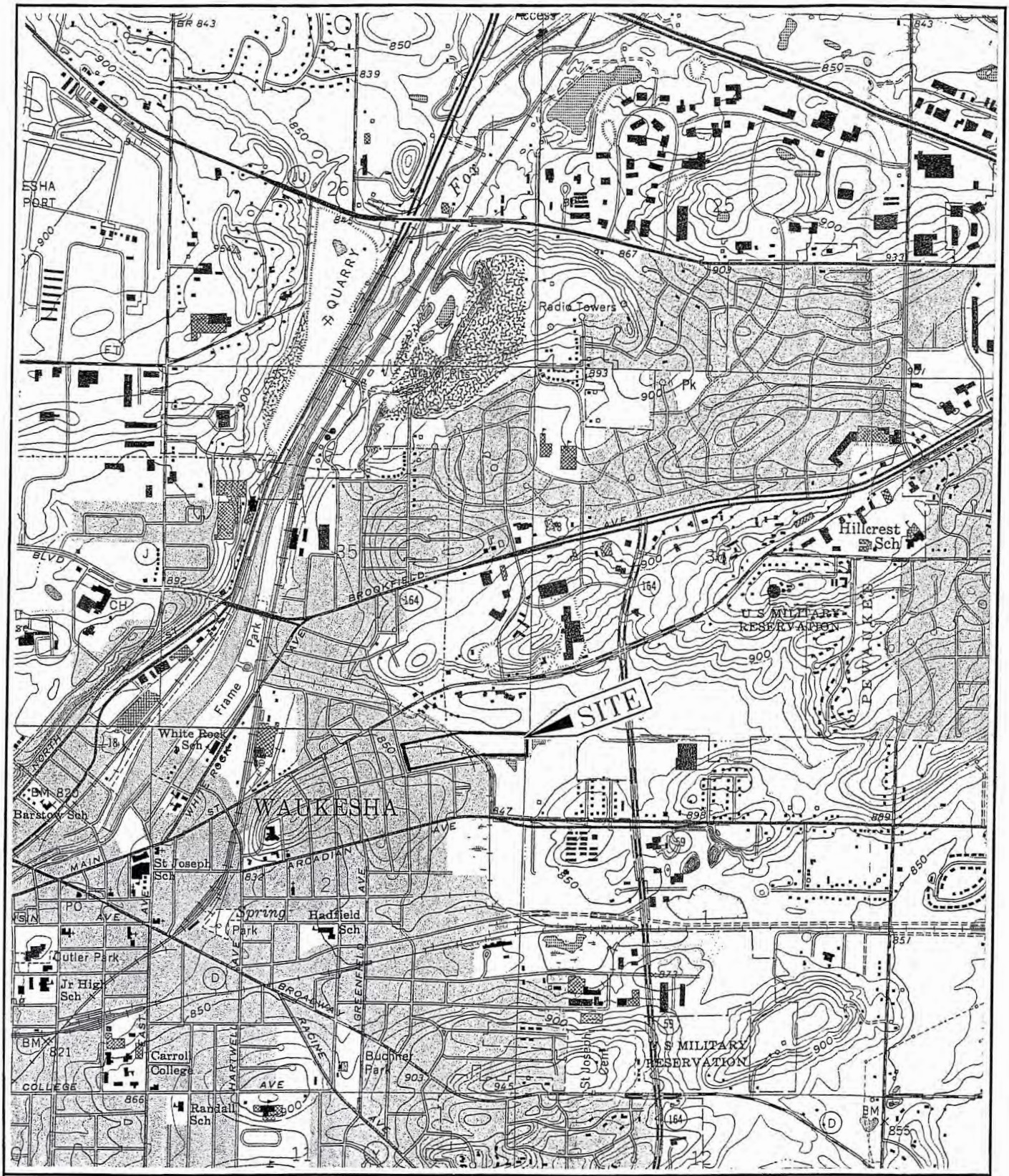
1.0 INTRODUCTION

***SECOR* International Corporation (*SECOR*)** has been retained by Hein-Werner Corporation to evaluate whether buried drums are present at property formerly owned by Hein-Werner Corporation and Akerman (Site). The Site is located on the eastern portion of the property located at 1005 Perkins Avenue, Waukesha, Wisconsin, and is physically separated from the rest of the property by a creek (Figure 1).

This document includes a brief Site background, project objectives, a scope-of-work, and a schedule for Wisconsin Department of Natural Resources' (WDNR) review. Attached are Standard Operating Procedures (SOPs) and a Health and Safety Plan.

Based upon telephone conversations with WDNR, the WDNR has requested a brief Work Plan for the proposed activities. This document is intended to meet this general goal but not all other potentially applicable WDNR documentation requirements.



SECOR
International Incorporated

DATE:	3-28-96
PROJ #:	5E-025-001-01
FILE #:	HWF1
REV:	WCL
DRAWN:	KMC

North

FIGURE 1 - SITE LOCATION
MALLORY IMPROVEMENTS PROPERTY
1005 PERKINS AVENUE
WAUKESHA, WISCONSIN

Source: USGS 7.5-Minute Series Waukesha, Wis. (1994); Scale 1:24,000.

2.0 SITE BACKGROUND

The Site history, condition, geology, and hydrogeology and the results of numerous Site investigations and remedial activities have been previously documented by Versar, Inc. (October 1992, November 1992, November 1993, June 1994, February 1994). In addition, Dakota Environmental (Dakota) conducted a geophysical survey of the eastern portion of the Site, which is documented in their February 23, 1996, correspondence. A copy of the geophysical survey report is included at Appendix A.

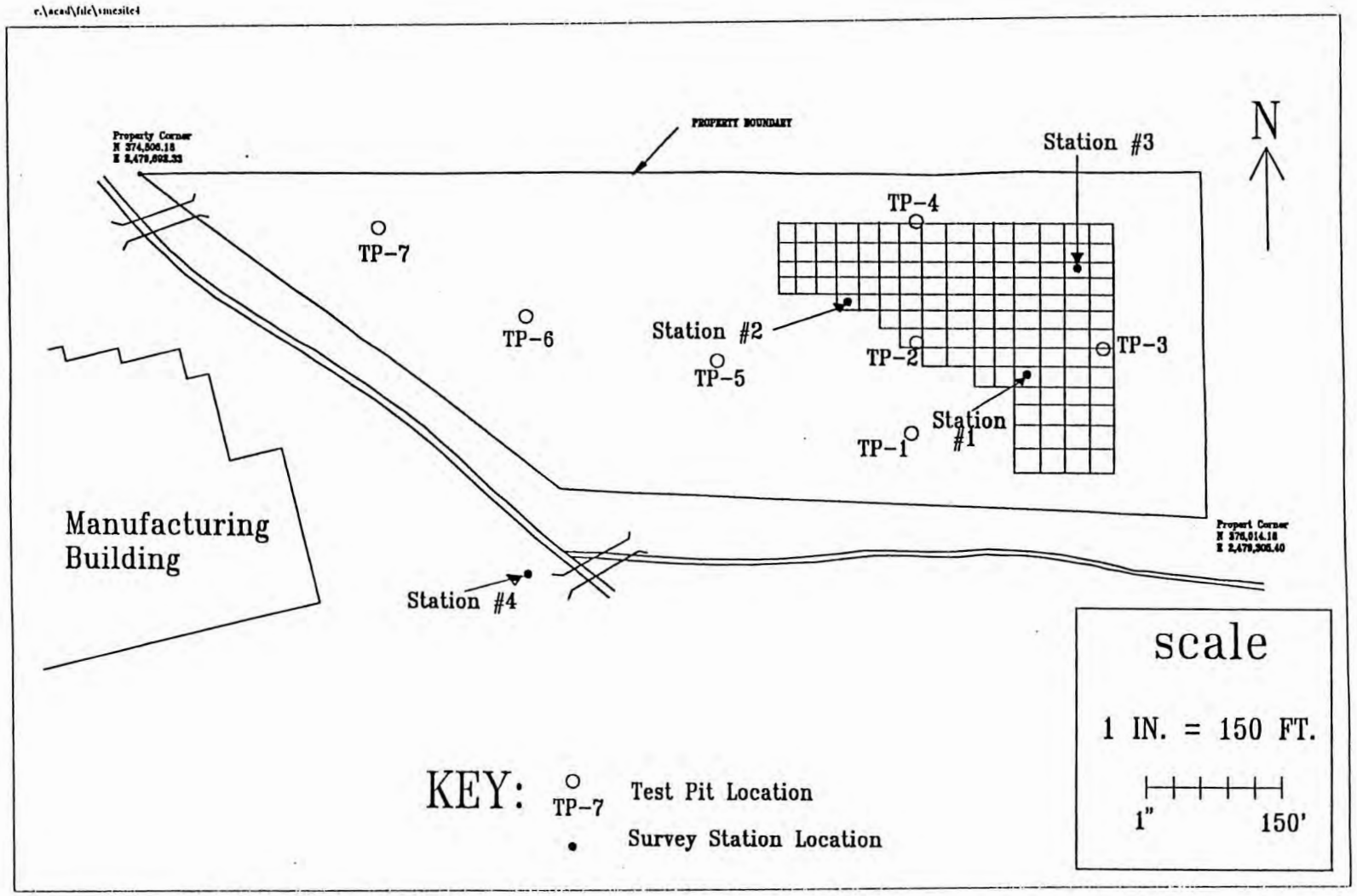
Background information pertinent to the objectives of this proposed investigation includes the following:

- The Site contains fill materials placed on the Site between 1963 and 1975. The Site has historically been utilized by Hein-Werner and Akerman for employee parking and excavation equipment demonstration. The fill material consists primarily of foundry sand, with minor amounts of brick, gravel, concrete, metal and cinder fragments. Based on previous excavation work on the Site, the depth of the fill material is reported to be 5 to 9.5 feet. The estimated volume of foundry fill is approximately 69,000 cubic yards. Approximately 90% of the Site is covered with asphalt or smoothly graded gravel (Versar, Inc. October 1992, November 1992).

- A series of trenches was excavated by Versar, Inc. in September 1992 (Figure 2). The results did not indicate the presence of buried drums or industrial waste. Additionally, no photoionization detector (PID) measurements above background were observed (Versar, Inc. October 1992). Verser Inc.'s trenching logs are included at Appendix B.

- The adjacent properties to the north, south and east also appeared to have been backfilled to elevate the ground surface above flood levels (Versar, Inc. October 1992).

- Remedial activities to address polychlorinated biphenyl (PCB) impacts to surface and shallow subsurface soils at the Site were completed in June 1994 (Versar, Inc., June 3, 1994). There was no evidence of buried or surface drums discovered during these remedial activities.



SECOR
International Incorporated

3695-M North 126th Street
Brookfield, WI

DATE:	4-4-96
PROJ #:	5E-025-001-01
FILE #:	H-WMTGF
REV:	JRS
DRAWN:	KMC

North

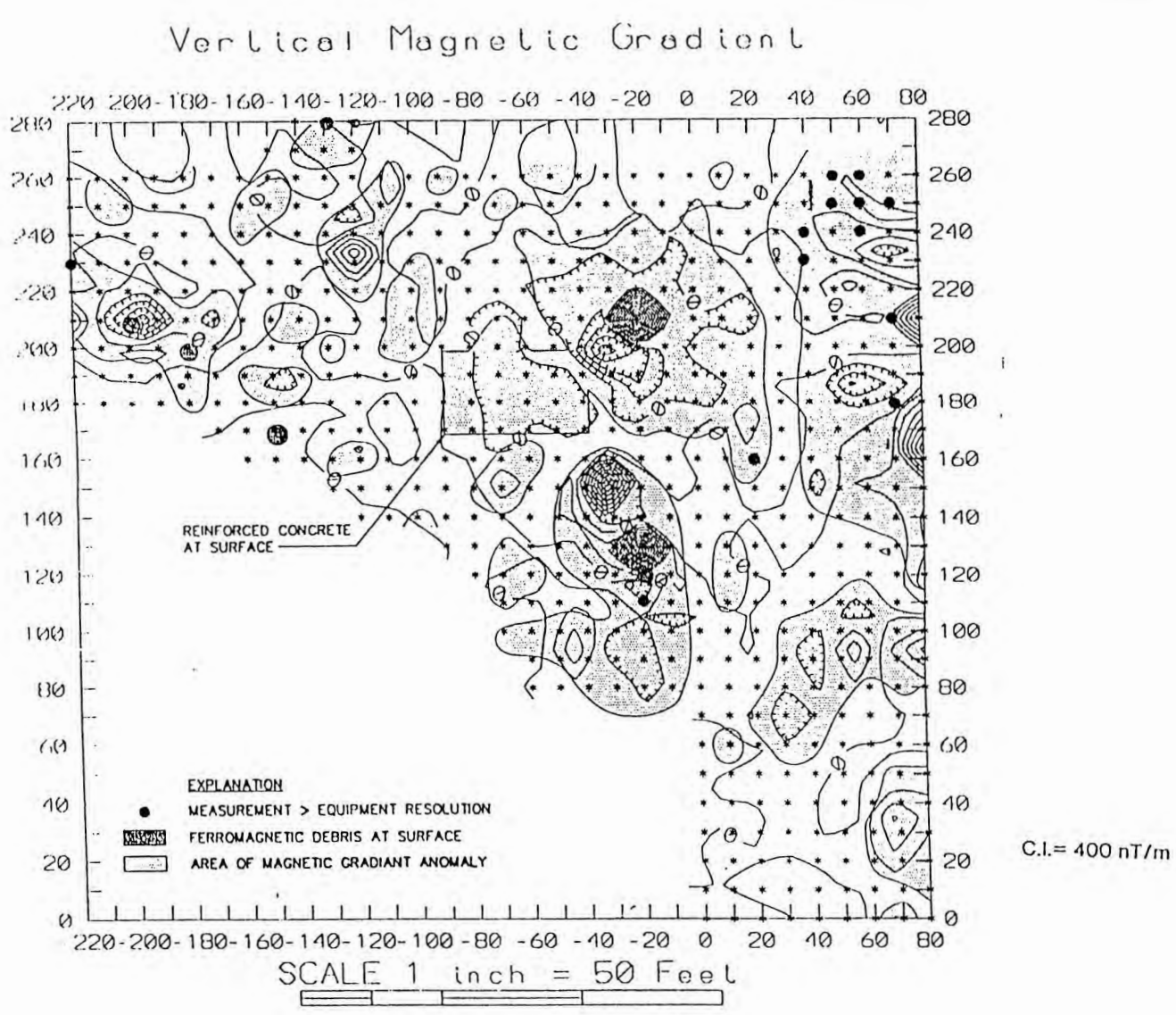
Adapted from Dakota, 2-23-96.

FIGURE 2 - VERSAR TEST PIT LOCATIONS & DAKOTA GEOPHYSICAL SURVEY AREA
MALLORY IMPROVEMENTS PROPERTY
1005 PERKINS AVENUE
WAUKESHA, WISCONSIN

- Three shallow monitoring wells were installed in August 1993. The boring logs for the three wells indicated no evidence of buried drums. Groundwater flows from east to west across the Site and appears to discharge to the stream. Compounds found in the fill material were not observed in the groundwater samples (Versar, Inc. November 1993).

- During a WDNR inspection in 1994, several drums were noted on the northeastern portion of the Site in nonpaved areas where construction-type surface debris is evident. Analysis of one sample of paint-like waste indicated the presence of lead above the regulatory limit of five mg/l for classification of the material as a characteristic hazardous waste (WDNR August 24, 1995). There are still drum remnants located on the northeastern portion of the Site.

- Magnetic anomalies, indicative of buried ferrous metal, were recorded by Dakota during their survey of the eastern portion of the property (Figures 2 and 3; Dakota, February 1996).



C.I.= 400 nT/m

SECOR
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Adapted from Dakota, 2-23-96.

FIGURE 3 - PRELIMINARY MAGNETIC SURVEY RESULTS
MALLORY IMPROVEMENTS PROPERTY
1005 PERKINS AVENUE
WAUKESHA, WISCONSIN

3.0 OBJECTIVE

The project objective is to evaluate whether there are buried drums at the Site utilizing trenching techniques to supplement previous geophysical, soil boring, trenching and excavation activities.

This document addresses site investigative activities only and does not address potential removal/remedial activities that may be required, based upon the results of the investigation.

4.0 SCOPE-OF-WORK

4.1 SITE INVESTIGATION ACTIVITIES

Based upon the background data referenced and briefly summarized in Section 2.0, the entire eastern area of the property, including the area covered by the Dakota geophysical survey and the area immediately to the east of that area, will be investigated.

A series of six trenches will be excavated on the Site. The locations were selected based upon the geophysical anomalies recorded by Dakota combined with observable Site features and restrictions, i.e., property lines, embankments, piles of rubble, etc. The trenches (approximately 20-30 feet long, 4-6 feet wide and 6-8 feet deep) will be excavated using a backhoe operated by an United States Occupational Safety and Health Administration (OSHA) 40-hour health and safety-trained operator.

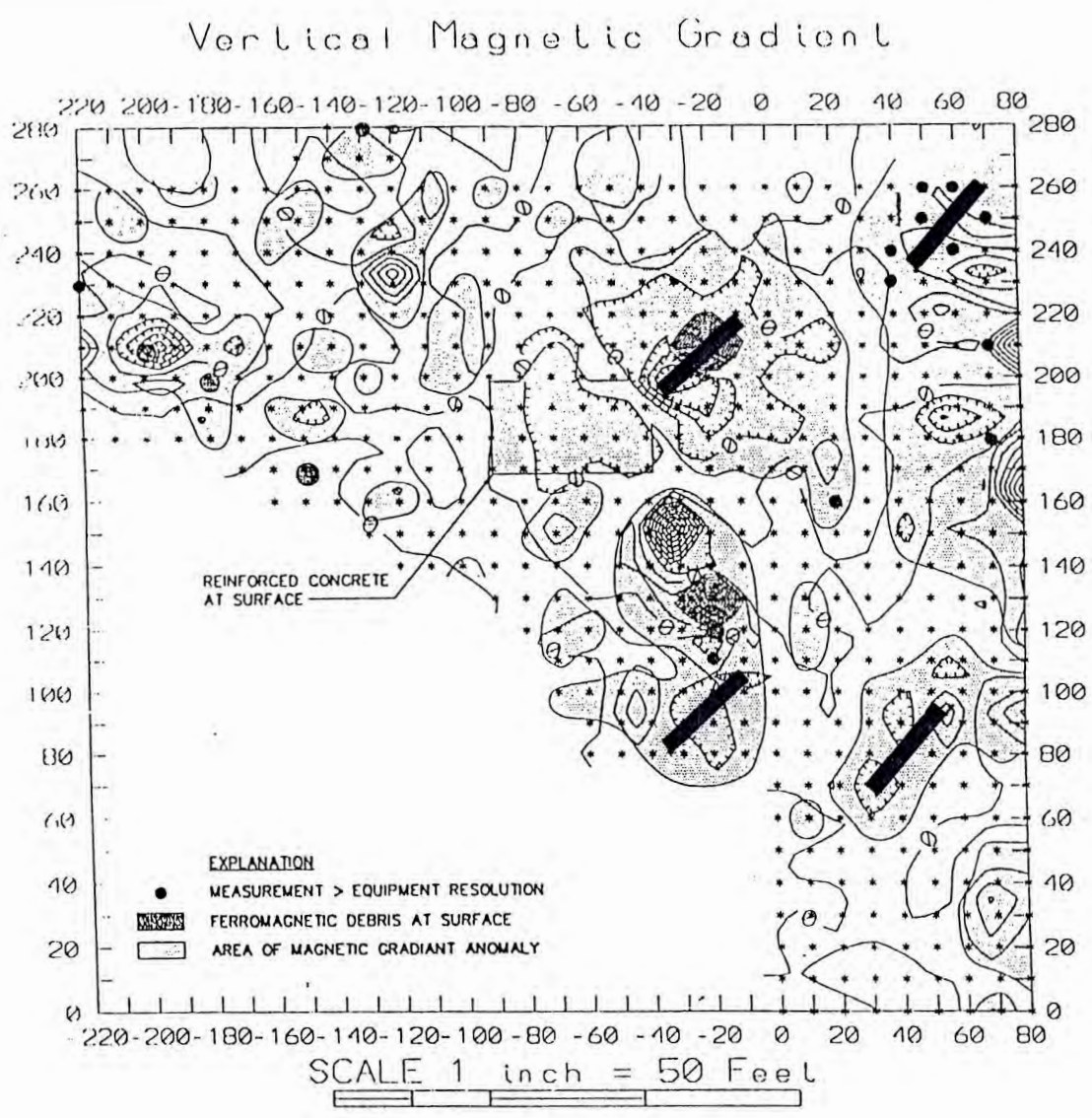
Four of the trenches will be located in areas identified in the Dakota geophysical survey as most likely to contain buried ferrous materials (Figure 4). Two trenches will be located to the east of this area, where no geophysical work has been done. The placement of these two trenches may be adjusted to account for access limitations. No trenches will be dug in the areas previously excavated by Versar since the previous trench work in that area (involving 7 test pits) identified no evidence of buried drums.

Based upon field observations, samples may be obtained from the investigative trenches for laboratory analysis. Samples will only be laboratory analyzed if industrial waste materials, such as drums, are encountered. The selection of samples will be based upon photoionization detector (PID) field measurements and observations. It should be noted that the objectives of this investigation do not include sampling and evaluation of foundry wastes, such as slag and sand, which were utilized as fill at the Site. Samples will be analyzed by a Wisconsin-certified laboratory for volatile organic compounds (VOCs) (Method 8260) and the eight Resource Conservation and Recovery Act (RCRA) metals (reference Appendix C, SOP 1, Sample Identification/Containers/Preservation) as appropriate.

Excavated materials will be temporarily stockpiled adjacent to the trenches on plastic sheeting. Where present, soil cover material will be segregated from the trench contents for reuse as cover after backfilling. The trenches will be backfilled with the excavated materials after observations and measurements have been recorded and samples obtained (reference Appendix C, SOP 3, Trenching).

Several overpack drums will be available on site to containerize free liquids if isolated intact drums are encountered. In the event multiple drums are encountered, the investigative strategy will be altered to determine the boundaries and volume of the drums (As previously stated, the objectives of this investigation do not include removal/remedial activities.)

SOPs for the trenching, sampling, and decontamination activities are included as Appendix C.



TWO ADDITIONAL TRENCHES MAY BE LOCATED EAST OF THE SURVEY AREA DEPENDENT UPON SITE CONDITIONS.

C.I.= 400 nT/m

SECOR
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Brookfield, WI

DATE:	4-4-96
PROJ #:	5E-025-001-01
FILE #:	H-WMTGF
REV:	JRS
DRAWN:	KMC

North

Adapted from Dakota, 2-23-96.

FIGURE 4 - PROPOSED TRENCH LOCATIONS
MALLORY IMPROVEMENTS PROPERTY
1005 PERKINS AVENUE
WAUKESHA, WISCONSIN

4.2 INVESTIGATIVE WASTE MANAGEMENT

Based upon the nature of the Site, i.e., a fill area containing foundry sand, the investigative waste will be incorporated with the backfilling of the trenches, unless drums/waste are encountered. An SOP for equipment decontamination is included in Appendix C, SOP 2.

4.3 REPORT PREPARATION

A Site Investigation Report will be prepared. The report will document the findings and observations of the trenching activities, and locations, categorization and estimated volume of waste materials (if any) and analytical results. Based upon the investigation results, the report will also include, if appropriate, recommendations for additional site investigative or remedial activities.

4.4 HEALTH AND SAFETY

Personal protective levels will be based on the real-time air monitoring and Site conditions observed during the work and may consist of Level D, Level C or Level B protective equipment. A Health and Safety Plan for the proposed site investigation activities is included as Appendix D.

5.0 SCHEDULE

The anticipated schedule for the proposed Scope-of-Work is as follows:

April 4, 1996:	Submittal of Work Plan to WDNR.
April 5, 1996:	Receipt of WDNR comments/approval of Work Plan.
One to two weeks after receipt of WDNR comments:	Submittal of Revised Work Plan.
Three business days after Work Plan approval:	Initiation of Site Investigation.*
Four weeks after receipt of analytical data:	Submittal of Site Investigation Report

*Scheduling of the trenching activities will be based on availability of contractors.

APPENDIX A

JANUARY 24, 1996, SITE INVESTIGATION WORK PLAN DAKOTA ENVIRONMENTAL

Site Investigation Work Plan For the 1005 Perkins Avenue Site Waukesha, WI

WDNR #: PID 268 09189 0, County of Waukesha, HW/GENCL
DEW #: 95101103

This Work Plan is Prepared for:

Mr. Frank Giuffre, Sr.
Mallory Improvements
6635 S. 13th Street
Milwaukee, WI 53221

and

Wisconsin Department
of Natural Resources

January 24, 1996

DAKOTA ENVIRONMENTAL

Environmental Engineers...Hydrogeologists...Geologists...Remedial Specialists

"Yours for a cleaner Earth"

Wisconsin Office
S15 W. 22600
Arcadian Avenue
Waukesha, WI 53186
1-800-533-6327

Illinois Office
207 E. Ohio
No. 304
Chicago, IL 60611
1-800-533-6327

S. Dakota Office
1122 21st Street SW
P.O. Box 636
Huron, SD 57350
1-800-888-0423

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1.0 INTRODUCTION

Dakota Environmental of Wisconsin, Inc. (CONSULTANT) has been retained by Mr. Frank Giuffre of Mallory Improvements (CLIENT) to prepare this site investigation work plan for the 1005 Perkins Avenue property, Waukesha, Wisconsin, owned by CLIENT. A geophysical survey was performed using a GEM GSM-19 proton precession gradiometer equipped with two sensors mounted vertically on a staff. The geophysical survey results at the site and the proposed scope of work based on our understanding of the site conditions and the letters from the Wisconsin Department of Natural Resources (WDNR) are discussed in the following sections.

2.0 BACKGROUND REVIEW

2.1 Site Condition Description

The site is located in an industrial and residential area northeast of Waukesha, WI (see Figure 1). It encompasses 16 acres of land and is separated into two portions by a railroad together with a small unnamed creek, see Figure 2. The west portion is occupied by approximately 245,000 square feet of facility buildings together with parking lots. The building is now divided into rental warehouse spaces and office spaces. The east portion of the property is basically a vacant lot with a storage shed on the northern boundary. A metal fence further divides the eastern parcel into two portions as shown in Figure 2.

A fill area is located on the eastern portion of the property which covers approximately 150' x 150' as shown in Figure 2. The fill consists of bricks, gravel, cement blocks, scrap metal, and other debris. Polychlorinated biphenols (PCBs) were detected in surface and test pit sampling during a three phase investigations conducted by Versar, Inc. (Versar) in November 1993. A series of seven test pits were advanced at the fill area and soil samples were taken from each test pit. Analytical results indicate the presence of PCBs in only two of the test pits. Three soil borings were advanced and converted into monitoring wells at the site. The analytical results of the groundwater sampling indicate the absence of any of those parameters commonly associated with foundry sand. Versar concluded in the Phase III report that the source of PCBs is unknown and it appears the contamination is localized. Initial site remedial activities, mainly soil excavation and removal of 175.49 tons of hazardous and 292.55 tons of non-hazardous soil, were performed by E & K Hazardous Waste in December 1993.

On November 11, 1993, Wisconsin Department of Natural Resources (WDNR) began to investigate the site to determine the validity of an anonymous complaint

alleging the disposal of hundreds of 55-gallon drums containing waste paints and solvents in the property. The WDNR personnel did find partially exposed 30-gallon drums in the northeast corner of the site. One soil sample and two waste samples were taken from the site, and all samples showed high levels of heavy metals, including chromium and lead.

Upon the review of the site conditions and negotiation between responsible parties and the WDNR personnel in a meeting held on September 27, 1995, the WDNR required that a site investigation plan and a site remediation be performed (WDNR letter of October 2, 1995). This work plan is to address the WDNR requirements for the site investigation.

From December 11th through 24th, 1995, DEW and Northern Environmental, Inc. conducted a geophysical survey on a targeted area of 260' x 300' where some drums were exposed and other drums were suspected. The geophysical survey result revealed areas of magnetic gradient anomalies over 1/2 of the survey covered areas. It also revealed a 40' x 50' old building foundation with re-bars. The investigation area is focused in the eastern portion from the fence that divides the eatern parcel as shown in Figure 2.

2.2 Site History

The current site owners are Dominick J. Giuffre and Frank P. Giuffre, Mallory Improvements, 6635 S. 13th Street, Milwaukee, WI 53221. (414)764-9200. Mallory Improvements purchased this property from VME Americas, Inc. (VME) in February, 1993. VME's current address is 1 West Pack Square, Asheville, North Carolina 28801, (704)257-2528. VME used the property from 1981 to 1993. Prior to VME, the property was owned and operated by Hein-Werner from 1955 to 1981.

The facility was used for manufacturing and assembling heavy construction equipment from 1955 to 1992. The western portion of the property was basically used for manufacturing activities, while the eastern portion was used for demonstrating and testing the construction equipment manufactured by the previous owners/operators of the facility.

The complete inventory of waste generated during the past manufacturing operations is not known at this time. No party has claimed responsibility for the disposal of hazardous waste at this property.

An underground storage tank (UST) Closure Checklist report dated November 21, 1993, was prepared for the VME Americas Inc. by Versar Inc. Five petroleum and hydraulic oil USTs were removed from the eastern portion of the property and

a UST removal assessment was performed by Versar, Inc. Contaminated soil excavation was conducted to remove the impacted soil from the tank locations.

During the Phase I property assessment, fill material was identified at the ground surface in the eastern parcel of the property (Versar, Inc., July 1992). The eastern parcel of the property was further investigated and remediated through Phase IIA and IIB (Versar, October 1992), Phase III (Versar, November 1993), Summary of groundwater investigation results (Versar, December 1993) and a June 1994 supplemental report (Versar, June 1994) stages.

2.3 Site Geology and Hydrology

According to Versar's report, varying thickness of borrow fill was placed across the site. The fill consists of a conglomeration of clay, silt, sand, gravel, spent casting or foundry sand, brick, wood, metal, and concrete. Glacial till underlies several feet below the fill and extends to a depth on average 9 ft. below the ground surface. Poorly sorted outwash sand and sandy gravel underlie the till. The sandy material is saturated and contains trace amount of fines. The outwash base is located approximately 22 ft. below ground surface. Lacustrine silt and clayey silt are located under the outwash. The silty deposits grades to fine sand at approximately 40 ft. below the ground surface. The fine sand layer represents the erosion deposit over the bedrock. Silurian dolomite bedrock was encountered at the depth around 40 to 45 ft. below ground surface according to the boring logs.

The poorly sorted sandy outwash located at the depth between 9 and 22 ft. is considered a shallow aquifer. It is confined or partially confined by the upper till. The Lacustrine silt and clayey silt located under the outwash is considered a confining layer with low conductivity. The erosion sand together with the jointed dolomite functioned as an aquifer.

The surface water drains to a small unnamed creek which flows across the middle of the property (see Figure 2). It divides the property into two portions together with the railroad tracks. The groundwater which flows from east to west under the site and is likely discharging into the unnamed stream west of the site (Versar, November 1993).

Local residents are furnished with potable water obtained from deep wells (~2,000 ft. deep, Versar Inc., 1993). The nearest potable water supply well is approximately one mile southwest of the site.

2.4 Geophysical Survey Results

Based on the meeting of September 25, 1995, DEW and Northern Environmental, Inc. conducted a geophysical survey to investigate the east parcel of the property in an attempt to delineate the potential extent of the buried drum areas. The investigation started on December 11, 1995 and finished on December 14, 1995. A grid density of 10' x 10' was used for over an area of 280' x 300' (approximately 2 acres) as shown in Figure 3. The stakes were planted with a grid of 20' x 20' and later surveyed by DEW's crew based on the area that showed exposed drums.

The magnetic data were collected on north-south profiles at ten-foot centers to ensure the capability of detecting a single buried drum. The survey grid and area was established by DEW. The survey was performed using a GEM GSM-19 proton precession gradiometer equipped with two sensors mounted vertically on a staff. The gradiometer has a sensitivity of 0.1 nanotesla per meter (nT/m) and a gradient tolerance over 7000 nT/m. A vertical magnetic gradient survey was selected, as opposed to a total vertical magnetic field survey, because the gradiometer provides greater detail by resolving complex or composite anomalies and effectively removes diurnal variations, including magnetic storms. The vertical magnetic gradient is the difference in intensity of the two sensors divided by the distance between the sensors measured at the midpoint of the sensor spacing.

Anomalies are shown over 50% of the surveyed area. The highest anomalies are shown in the northeast, central and west areas of the survey coverage. The anomalies can be a result of scrap metals or buried drums. The area which was covered with re-bar enforced concrete foundation was shown in the north central area. The vertical magnetic gradient map is shown in Figure 4.

As shown in Figure 4, the extent of the magnetic anomolies does not terminate on the boundaries of the survey covered area. This result indicates that an entire site survey on the eastern portion of the property east of the fence may be needed to define the extent of the magnetic anomalies which should reflect the buried scrap metals and drums. The vertical extent of the potential drums and scrap metals can not be calculated from the current geophysical survey results.

3.0 OBJECTIVE OF WORK

The Work Plan is prepared for the Client to define the scope of work, sequence of work, and the estimated cost of the work. The scope of work and procedures for this project are prepared in accordance with the WDNR's requirements (i.e. Michael Ellenbecker, March 7, 1995, Debby Roszak, October 2, 1995) and the guideline of Closure of Unlicensed Hazardous Waste Treatment, Storage, and Disposal Facilities (WDNR, 1994).

During the time the geophysical survey in December 1995 was conducted, DEW received a written response from Mr. Scott Ferguson, WDNR hydrogeologist, on December 12,

1995, indicating that WDNR requests all areas of the property not covered by manmade structures be included in the geophysical survey. The letter also indicated the workplan should provide recommendations for any needed future actions (additional investigations, hazardous waste determinations, excavations or clean-up activities) that are required.

The objective of this workplan is to define the extent and degree of contamination caused by the previous facility operation at the referred site. Since hazardous waste has been confirmed by the WDNR sampling, surveying for additional drums/waste disposal areas, if any, and determining the waste characteristics are also part of the project. A site remedial action plan can be developed based on the results of the proposed site investigation.

4.0 SCOPE OF WORK

The scope of work of the site investigation will include:

1. *Perform an additional geophysical site survey to cover the entire eastern parcel area (approximately 7 acres) to locate any buried drums or scrap metal areas.* A magnetometer survey will be employed. The magnetic data will be collected on north-south profiles at ten-foot centers to ensure the capability of detecting a single buried drum as directed by WDNR. The proposed survey grid is shown in Figure 5. The grid stakes will be surveyed to ensure the accuracy. An optional approach is to survey the northwestern portion of the parcel due to the fact that the soil borings installed at the site by Versar, Inc. (Versar, Inc. 1992) showed PCB contamination only in TP-1 and TP-2 and the reported location of drums is in the northwest corner.

   The survey will be performed using a GEM GSM-19 proton precession gradiometer equipped with two sensors mounted vertically on a staff. The gradiometer will have a sensitivity of 0.1 nT/m and a gradient tolerance over 7000 nT/m. A vertical magnetic gradient survey was selected because the gradiometer provides greater detail by resolving complex or composite anomalies and can effectively remove diurnal variations, including magnetic storms.

   A comprehensive geophysical survey report will be provided. This technology will be able to identify the possible extent of buried drums, scrap metals or other indicative metals. Because there is little risk of generating dust during the geophysical survey, a modified level D protection for personnel health and safety will be used.

2. *Expose each identified potential drum/waste area and retrieve waste samples from the waste drums or waste burial pits by backhoe digging.* This phase of work is designed to confirm the survey results and to characterize the contaminants in the waste by sampling and analyzing soil samples to be retrieved by backhoe digging.

Send 20 to 60 representative waste samples from the drums or pits identified by the geophysical survey for analysis of VOCs and selected heavy metals. The actual number of samples will depend on the number of drums and extent of the contamination. A level C protection for health and safety is expected. The work is preferably conducted before summer to avoid dust problem. The actual efforts and extents of exploratory digging will depend upon the results of additional geophysical survey.

3. *Analyze the data generated through the site investigation and provide a report based on the project results.* A comprehensive site investigation report will be prepared based on the existing data.

4. *Develop remedial action recommendations for the site.* A brief description of the future remedial plan will be included in the report, which will evaluate various options and rationales for the selection of the remedial technologies. A site remedial plan can be developed based on the data and recommendations.

Based on the fact that the known or suspected contaminants are solvents and paint related heavy metals, DEW plans to analyze VOCs for all of the samples using the EPA 8260/SW846 methodologies for the testing. Eight major toxic metals, namely Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver, will be analyzed by a certified lab for each soil sample.

5.0 SCHEDULE OF WORK IMPLEMENTATION

Upon the review and approval of your company and the WDNR, DEW proposes to use the following schedule for the site investigation:

February - 1996	Work Plan Review, Modification, and Approval by WDNR and RPs
March - 1996	Additional Grid Survey and Geophysical Survey and Survey Report Preparation
April - 1996	Survey report review by clients and WDNR
May - 1996	Exploration Digging, Sampling, and Testing
June - 1996	Site Investigation Report (draft)
July - 1996	Review and modification, Supplemental Data Gathering (if required)
August - 1996	Final Report and Remedial Action Plan Development

Above are the projected schedules for the project. The schedule may be revised when circumstance dictates. Hopefully, a remedial design can be completed and the remedial action can be initiated within 1996. DEW plans to include the drum removal and waste

excavation, if needed, in the remedial phase of the project. This will allow sufficient time to characterize the contaminants and evaluate the most economic and effective remedial options for the site.

6.0 SITE SAFETY AND INVESTIGATION GENERATED WASTE MANAGEMENT

According to the site's known history, only containers (cans and drums) with paints or paint-related wastes together with industrial solvents are identified or suspected at this site. The major potential hazardous concerns are from the solvents and heavy metals. DEW believes that a modified OSHA Level D protection for the geophysical survey work crew with precautions in avoiding inhaling, congestion, and fire will be sufficient for the operation of the geophysical survey investigation. The intrusive backhoe digging and sampling stage can be an OSHA level C protection with a filtered breathing apparatus. A site safety and health plan will be developed prior to the site investigation and administered during the investigation.

Since the concentration of contaminants can only be identified after the sampling, the soil or waste excavated from the exploration digging will be backfilled with the initial excavated materials after the sampling. This procedure will avoid surface water run-off or run-on problems. Upon the characterization of the contamination, further decision of the site clean-up will be made to handle the wastes.

A decontamination station will be established during the site investigation. The decontamination water will be contained in drums for further disposal decisions.

7.0 ACCEPTANCE AND AGREEMENT

CLIENT acknowledges and approves the above work plan and the attached Appendices 1, 2 and 3. CLIENT hereby authorizes, by signing below, the CONSULTANT to proceed with the proposed scope of work. Client agrees to pay for all the services rendered through this project in the proposed scope of work within 30 days after the reception of the progressive project cost invoices. The Magnetic Gradiometer Survey Data is in Appendix 1, a General Terms and Conditions is attached in Appendix 2, while a cost estimation is in the Appendix 3. The recommendations and proposed scope of work in this report is subject to the limitations attached in Appendix 4.

CLIENT:

Signature:_____ Date:_____
Name(Print): Frank P. Giuffre, Sr. Title: President
Company Name: Giuffre Brothers Cranes, Inc.
Address: 6635 S. 13th Street, Milwaukee, WI 53221

CONSULTANT:

Signature:_____ Date:_____
Name(Print): Wenbin Yuan Title: General Manager

This Work Plan is prepared by:

_____(Signature) _____(Date)
Minghua Wan, Professional Geologist (#92)

This Work Plan is reviewed by:

_____(Signature) _____(Date)
Wenbin Yuan, Professional Geologist (#95)

Attachments:
1. Magnetic Gradiometer Survey Data (Appendix 1)
2. DEW's Terms & Conditions of Engagement (Appendix 2)
3. Cost Estimation (Appendix 3)

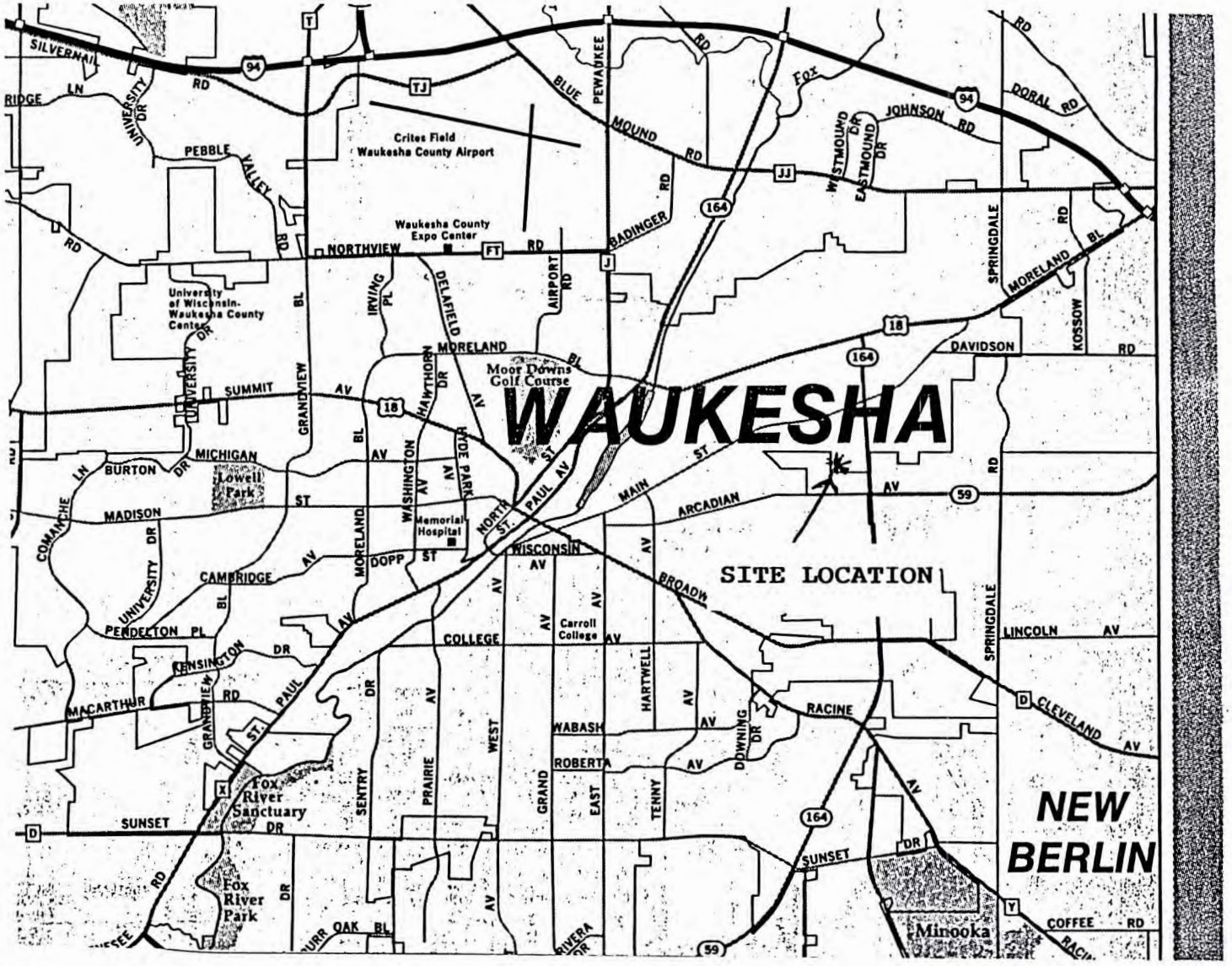

FIG NO.: 1 DATE: 12/29/95	SCALE AS SHOWN	DESIGNED BY: Dakota Environmental
FIG NAME: Site Location Map		DRAWN BY: J.A.M.
SITE NAME: VME		DAKOTA ENVIRONMENTAL OF WI, INC. S15 W22600 ARCADIAN AVE. WAUKESHA, WISCONSIN 414-548-8884 or 1-800-533-6327

c:\acad\file\vme1

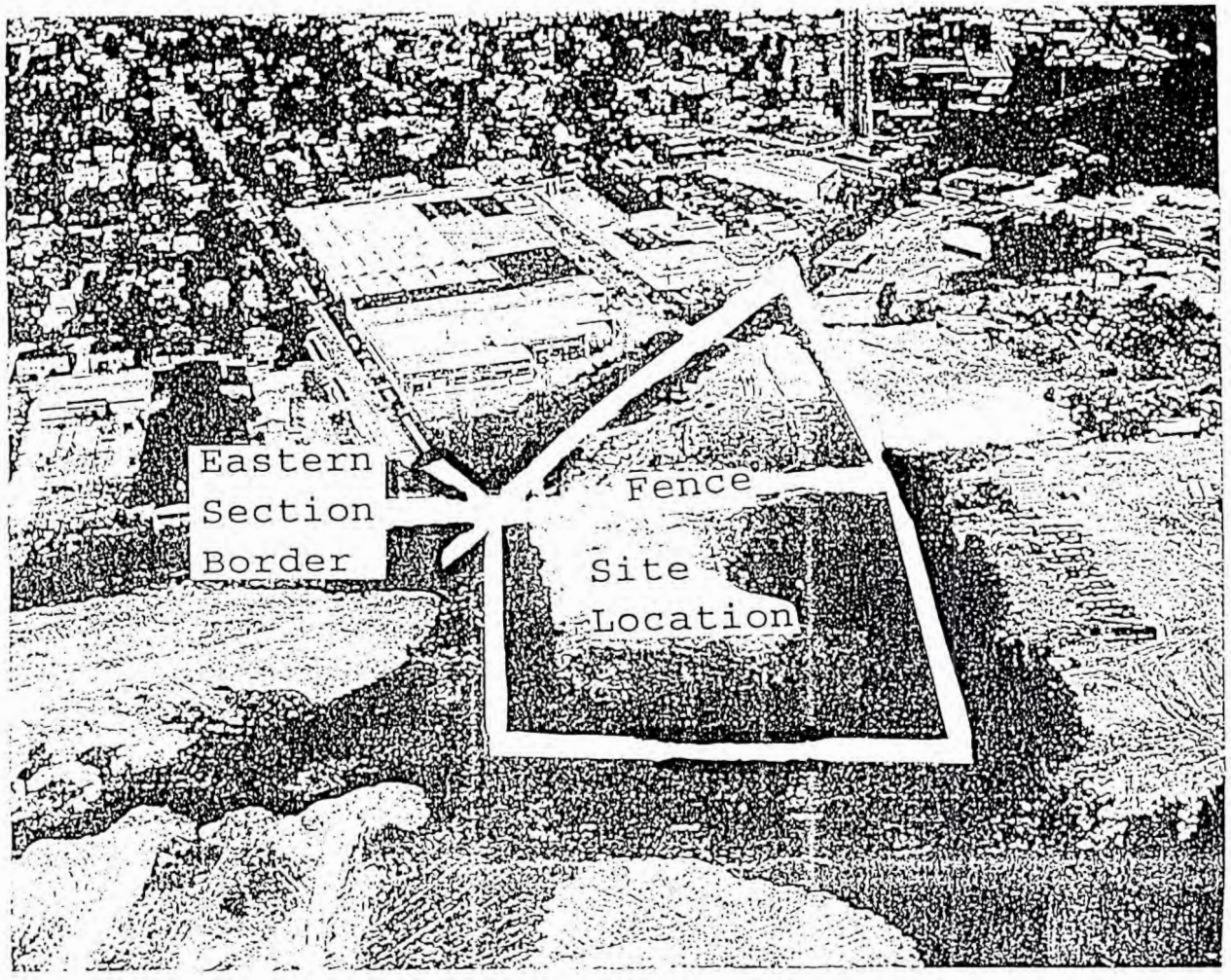

FIG NO.: 2 DATE: 12/29/95 FIG NAME: Property Features Map SITE NAME: VME	SCALE AS SHOWN	DESIGNED BY: Dakota Environmental DRAWN BY: J.A.M. DAKOTA ENVIRONMENTAL OF WI, INC. S15 W22600 ARCADIAN AVE. WAUKESHA, WISCONSIN 414-548-8884 or 1-800-533-6327

DAKOTA ENVIRONMENTAL OF WI, INC.

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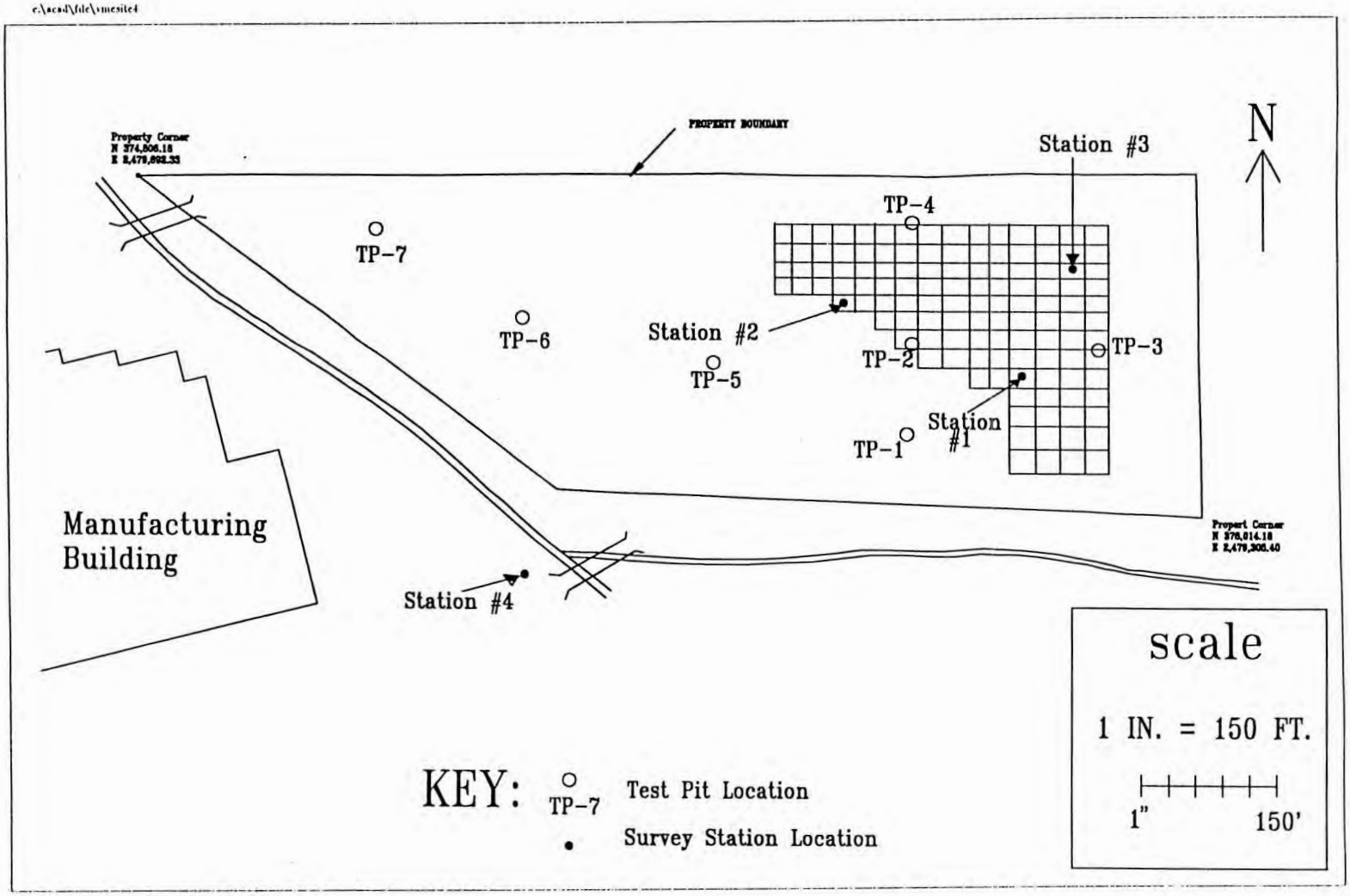


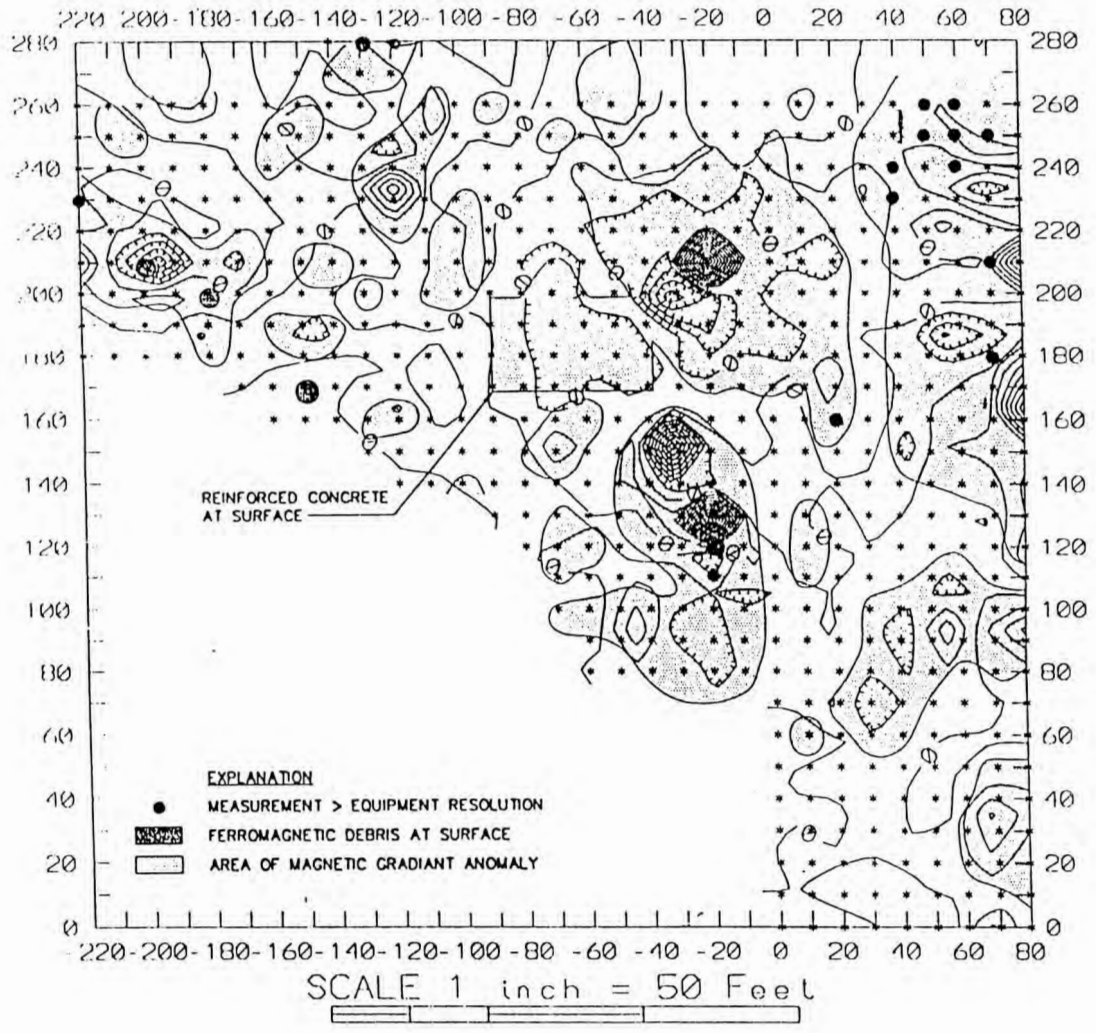
FIG NO.: 3	DATE: 12/29/95	SCALE AS SHOWN	DESIGNED BY: Dakota Environmental DRAWN BY: J.A.M.
FIG NAME: Preliminary Survey Area & Grid			
SITE NAME: VME			DAKOTA ENVIRONMENTAL OF WI, INC. S15 W22600 ARCADIAN AVE. WAUKESHA, WISCONSIN 414-548-8884 or 1-800-533-6327

DAKOTA ENVIRONMENTAL OF WI, INC.

a:\vme3

[redacted] [redacted]

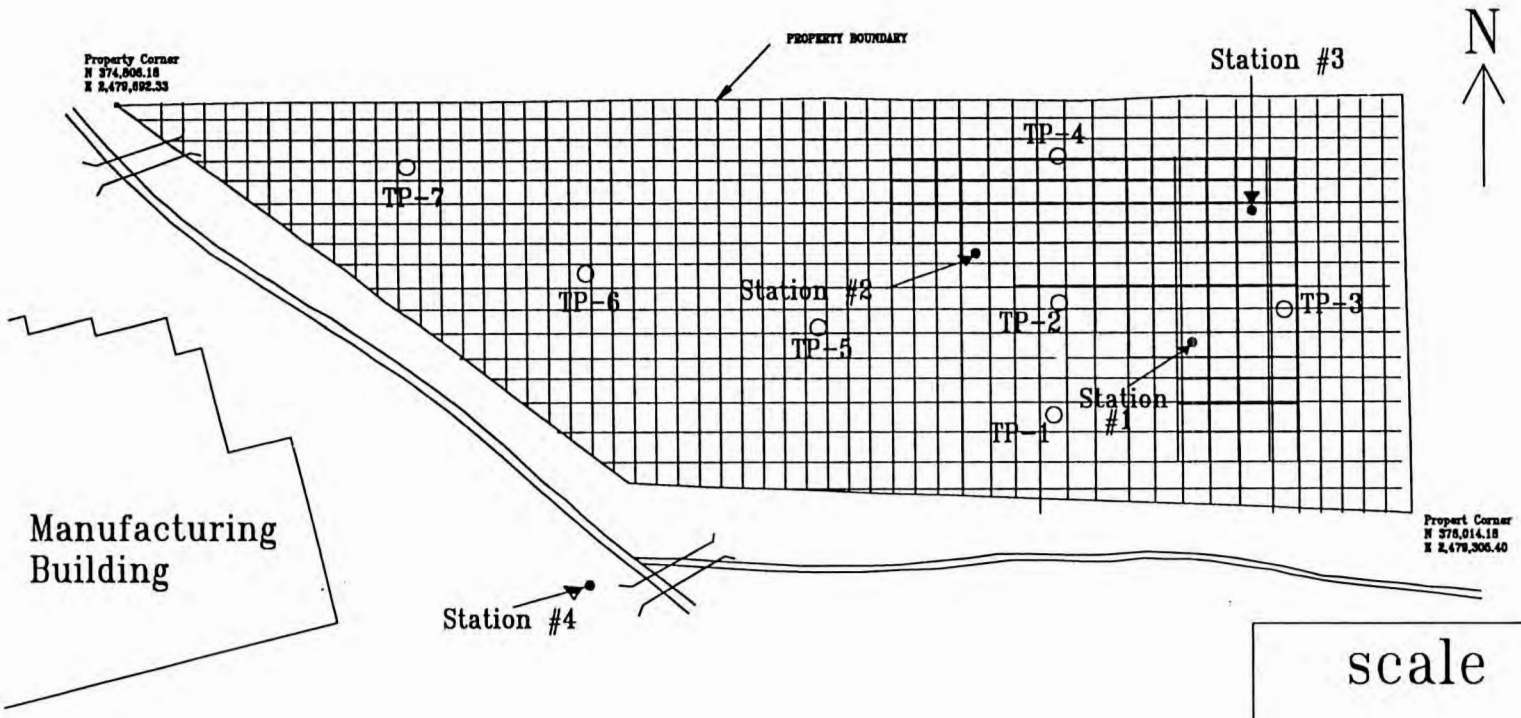
Vertical Magnetic Gradient



C.I.= 400 nT/m

FIG NO.: 4 DATE: 12/29/95	SCALE AS SHOWN	DESIGNED BY: Dakota Environmental DRAWN BY: J.A.M.
FIG NAME: Preliminary Magnetic Results		
SITE NAME: VME		DAKOTA ENVIRONMENTAL OF WI, INC. S15 W22600 ARCADIAN AVE. WAUKESHA, WISCONSIN 414-548-8884 or 1-800-533-6327

a:\vme4



scale

1 IN. = 150 FT.

1" 150'

KEY:

TP-7 Test Pit Location

Survey Station Location

FIG NO.: 5 DATE: 12/29/95	SCALE AS SHOWN	DESIGNED BY: Dakota Environmental DRAWN BY: J.A.M.
FIG NAME: PROPOSED MAGNETIC SURVEY GRID		
SITE NAME: VME		DAKOTA ENVIRONMENTAL OF WI, INC. S15 W22600 ARCADIAN AVE. WAUKESHA, WISCONSIN 414-548-8884 or 1-800-533-6327

DAKOTA ENVIRONMENTAL OF WI, INC.

a:\vme5

APPENDIX 1

Magnetic Gradiometer Survey Data (12/12/95)

LETTER OF TRANSMITTAL

Northern Environmental℠
Hydrologists • Engineers • Geologists

1214 West Venture Court
Mequon Wisconsin 53092

1-414-241-3133
Toll Free 1-800-776-7140
Fax 1-414-241-8222

DATE 12-15-95	PROJECT NO. DEWITT-1
ATTENTION Wenbin Yuan	
RE Mine Survey	

TO: Dakota Environmental
515 N 122nd Arcadian Ave.
Waukesha, WI 53186

WE ARE SENDING YOU

- [x] Attached
- [ ] Under separate cover
- [ ] Shop Drawings
- [ ] Specifications
- [ ] Plans
- [ ] Copy of letter
- [ ] Samples
- [ ] Change order
- [ ] _____

COPIES	DESCRIPTION
1	Mag Map Grid Numbers — Preliminary

THESE ARE TRANSMITTED (see code)

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SIGNED: J. D. Hall

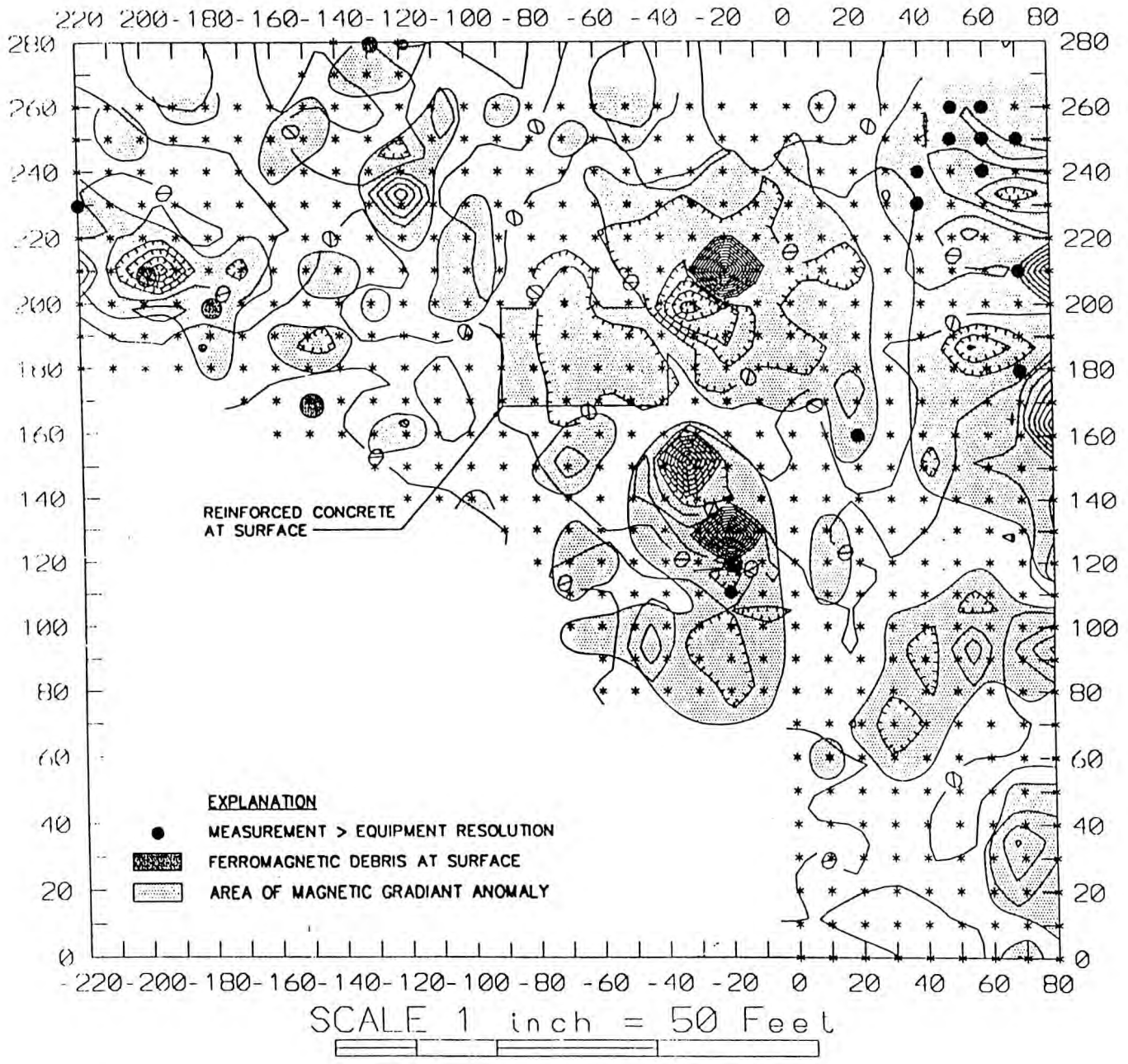
Investigation Results

The vertical magnetic gradient survey results are shown in Figure 1. The data were contoured using a contour interval of 400 nanotesla per meter (nT/m). The profiles are numbered sequentially from the zero profile 80 feet west of the east side of the survey area. Profile stations are numbered sequentially from south to north.

Areas where isolated ferromagnetic (metallic) debris was observed on the surface (e.g. Station -180, 200) are indicated by darkly shaded circles. Stations where the vertical magnetic gradient was greater than the resolution of the equipment (>7000 nT/m) and no measurements were recorded are indicated by black circles. It is likely that ferromagnetic material, such as one or more drums, are buried near the surface at these stations. An area of concrete debris containing iron reinforcement bar, indicated by a lightly shaded rectangular area, was observed near the center of the survey. This area may contain additional ferromagnetic material beneath the concrete debris.

The remaining lightly shaded areas contain composite and single station positive and negative anomalies. The magnitude of the composite anomalies ranged between 5732 nT/m at Station -20, 130 to -5978 nT/m at Station -30, 150. The magnitude of the isolated single station anomalies ranged from several hundred positive to several hundred negative nT/m. The source of the composite and single station anomalies is buried ferromagnetic material. The composite anomalies may consist of one large group or several smaller groups of ferromagnetic material, such as drums or other metallic objects. The single station anomalies may consist of a single ferromagnetic object, such as an isolated drum or other metallic object. Depths of burial were not estimated as part of this survey. The survey results indicate that buried ferromagnetic material extends beyond the limits of the survey area.

Vertical Magnetic Gradient



C.I.= 400 nT/m

Magnetic Gradiometer Survey Data 12/12/95

Dakota Environmental Perkins Ave. Site

Timer	Dist. East (Ft)	Dist. North (Ft)	Magnetic Intensity (nT)	Gradient (nT/m)
145	0	0	57277.06	145.42
212	0	10	56968.77	-67.58
227	0	20	57004.44	84.07
245	0	30	56477.54	-152.51
300	0	40	56389.87	-209.01
318	0	50	56625.54	-62.46
333	0	60	56753.38	-10.53
354	0	70	56920.52	59.5
415	0	80	57190.84	319.58
430	0	90	57223.21	211.23
442	0	100	56861.95	-82.82
506	0	110	57266.08	228.41
518	0	120	57354.57	343.73
539	0	130	56360.58	-361.75
554	0	140	56676.6	-63.14
612	0	150	56792.84	-7.51
627	0	160	56621.74	-71.64
727	0	170	56555.72	-81.6
739	0	180	56680.64	49.21
754	0	190	56176.72	-287.76
812	0	200	57098.44	263
830	0	210	56852.45	-40.92
854	0	220	56933.47	72.8
915	0	230	57027.31	159.12
939	0	240	56644.8	-113.71
1136	0	250	56388.16	-215.44
1200	0	260	56789.52	28.96
1506	10	260	56997.42	635.46
1603	10	250	56643.52	-23.96
1642	10	240	56620.64	-26.87
1715	10	230	56704.26	25.26
1757	10	220	56574.67	217.75
1845	10	210	56648.11	-109.94
1921	10	200	56935.47	103.39
1948	10	190	56883.93	43.16
2009	10	180	56974.15	102.28
2042	10	170	56848.79	45.3
2106	10	160	56702.84	-278.12
2145	10	150	56762.36	-88.05
2206	10	140	56885.26	35.48
2248	10	130	57015.42	188.87
2312	10	120	55777.15	-766
2327	10	110	56863.4	186.33
2345	10	100	56732.26	-90.16
2412	10	90	56801.3	-24.39
2530	10	80	56822.3	4.67
2600	10	70	56897.66	54.82
2630	10	60	56466.23	-337.82
2703	10	50	57015.72	141.92
2718	10	40	57043.18	151.62
2736	10	30	56938.67	70.6
2757	10	20	57098.9	159.44
2818	10	10	56927.52	-15.53
2842	10	0	57075.01	65.37

3036	20	0	56912.56	6.17
3057	20	10	56771.32	-41.8
3242	20	20	56812.39	1.75
3306	20	30	56665.01	-120.85
3318	20	40	56765.31	-111.64
3336	20	50	57157.96	167.69
3348	20	60	56922.94	-26
3406	20	70	57410.75	632.32
3527	20	80	56871.96	75.58
3539	20	90	56839.95	41.42
3551	20	100	56702.79	-44.76
3603	20	110	56652.25	-34.91
3621	20	120	56700.52	74.26
3633	20	130	56457.04	270.71
3648	20	140	56854.89	-62.66
3706	20	150	57310.68	137.35
3736	20	160	0	0
3812	20	170	59481.56	1588.55
3930	20	170	57115.84	112.16
3954	20	180	56716.86	-95.46
4033	20	190	57480.21	232.12
4051	20	200	57177.75	152.87
4212	20	210	56598.6	-180.73
4257	20	220	56727.77	25.28
4315	20	230	56783.81	15.76
4333	20	240	56639.09	-47.17
4357	20	250	56681.05	-42.44
4448	20	260	56828.18	114.39
4648	30	260	56567.95	-28.58
4724	30	250	56661.71	140.08
4745	30	240	56200.96	-431.67
4812	30	230	57153.82	958.57
4833	30	220	56938.8	81.53
4915	30	210	56980.29	155.92
4939	30	200	57401.89	199.57
5057	30	190	57135.73	81.76
5124	30	180	56538.86	-188.91
5218	30	170	56955.02	156.76
5257	30	160	56799.89	142.32
5400	30	150	56455.79	238.55
5439	30	140	56793.21	-105.26
5530	30	130	56861.58	-118.6
5554	30	120	56961.78	-57.28
5639	30	110	57389.86	336.1
5700	30	100	56948.12	514.57
5727	30	90	56624.4	-93.91
5748	30	80	56933.67	171.17
5815	30	70	56513.62	-333.98
5833	30	60	57082.55	92.51
5900	30	50	57154.76	151.25
5927	30	40	56856.99	5.08
5945	30	30	56500.55	349.94
10006	30	20	56544.17	-134.58
10027	30	10	56638.64	-99.32
10057	30	0	56888.56	7.37

10227	40	0	56684.41	-38.21
10242	40	10	56731.85	-1.66
10309	40	20	56864.94	65.16
10354	40	30	56753.69	-60.42
10436	40	40	56821.42	15.16
10927	40	50	56843.11	-16.28
11203	40	40	56835.41	-16.64
11215	40	50	56982.64	27.42
11230	40	60	56903.33	-3.91
11242	40	70	56985.78	133
11254	40	80	56746.7	-26.08
11315	40	90	56600.04	-144.28
11327	40	100	56977.44	47.6
11415	40	110	57226.43	157.62
11427	40	120	57101.92	91.05
11451	40	130	57338.02	77.14
11509	40	140	57643.34	-30.12
11527	40	150	55421.31	-729.75
11542	40	160	55970.04	-334.71
11618	40	170	56965.55	200.73
11645	40	180	56593.27	-75.98
11739	40	190	56614.44	-117.55
11824	40	200	57348	450.1
11845	40	210	56280.74	-310.1
11903	40	220	56494.11	-104.82
11939	40	230	0	0
12039	40	230	0	0
12242	40	240	0	0
12309	40	250	56109.04	-375.83
12351	40	260	55100.61	-657.89
12733	50	260	0	0
12921	50	250	0	0
13006	50	240	57693.98	-1779.98
13127	50	230	56879.71	-190.58
13209	50	220	56813.39	20.17
13327	50	210	56854.48	72.82
13345	50	200	56694.88	-248.82
13424	50	190	57001.6	-18.57
13512	50	180	56178.68	-412.64
13545	50	170	56359.5	-199.1
13606	50	160	56746.93	61.1
13630	50	150	56251.25	-287.96
13642	50	140	56913.68	-48.1
13712	50	130	57028.32	-61.73
13730	50	120	56881.77	-124.03
13748	50	110	57091.37	99.01
13803	50	100	56878.81	-71.44
13815	50	90	56952.55	15.03
13827	50	80	56899.55	-10.05
13857	50	70	56877.69	21.71
13912	50	60	56847.88	27.82
13933	50	50	56846.44	6.73
13948	50	40	56927.69	98.17
14030	50	30	56768.37	-49.28
14054	50	20	57033.76	113.58
14106	50	10	56584.02	-134.75
14121	50	0	56463.42	-164.57

14309	60	0	56898.15	52.48
14324	60	10	57043.02	69.21
14339	60	20	57510.23	440.76
14400	60	30	56803.87	-61.58
14424	60	40	56818.25	10.03
14439	60	50	56715.23	-55.71
14451	60	60	56789.79	-22.94
14503	60	70	56871.38	17.35
14518	60	80	57045.69	60.42
14536	60	90	56910.72	2880.78
14554	60	100	56945.23	-7.96
14615	60	110	57138.13	64.94
14630	60	120	57289.79	198.23
14657	60	130	57103.14	70.91
14712	60	140	56896.3	555.85
14748	60	150	56818.57	1120.73
14806	60	160	57379.59	198.21
14833	60	170	57335.17	121.3
14927	60	180	56838.61	-273.41
15003	60	190	57829.45	-3122.67
15021	60	200	58481.72	1557.3
15118	60	210	56416.19	-391.01
15154	60	220	56647.53	1346.51
15533	60	230	57358.06	-690.42
15548	60	240	0	0
15612	60	250	0	0
15624	60	260	0	0
15833	70	260	55768.62	-451.17
15906	70	250	0	0
15930	70	240	57669.09	157.26
20006	70	230	56795.89	-2670.55
20018	70	220	57393.47	407.07
20057	70	210	0	0
20118	70	200	57389.65	123.64
20145	70	190	57124.85	-301.39
20209	70	180	0	0
20351	70	170	57795.52	-90.91
20418	70	160	57419.14	29.71
20500	70	150	56900.9	624.71
20527	70	140	56801.35	-74.08
20609	70	130	57082.2	17.07
20627	70	120	56890.55	-83.14
20706	70	110	57148.94	176.55
20730	70	100	56905.5	-34.16
20800	70	90	56894.29	-1821.69
20824	70	80	56776.49	-144.25
20839	70	70	56969.39	89.05
20851	70	60	56788.32	-20.6
20906	70	50	56770.93	-18.17
20918	70	40	56730.47	1010.73
20933	70	30	56862.55	2238.96
20948	70	20	57459.27	372.17
21000	70	10	57184.5	112.71
21030	70	0	57324.68	562.76

21236	80	0	56925.69	77.33
21254	80	10	56632.63	434.16
21306	80	20	57035.8	106.6
21321	80	30	56789.62	-30.62
21336	80	40	57491.95	949.76
21418	80	50	56805.99	-31.25
21506	80	60	56816.2	-7.37
21539	80	70	57059.06	-88.6
21551	80	80	56929.68	40.8
21612	80	90	56632.63	-1804.83
21627	80	100	56958.51	-17.07
21642	80	110	57044.8	100.26
21718	80	120	57224.78	1520.37
21821	80	130	57208.05	667.69
21851	80	140	57009.53	876.1
21930	80	150	57077.4	-14.82
21954	80	160	57408.2	3239.75
22057	80	170	59148.88	3465.55
22127	80	180	56529.17	-279.67
22154	80	190	56741.62	-101.94
22209	80	200	57055.75	43.35
22412	80	210	57158.38	2709.53
22436	80	220	56694.56	-229.05
22503	80	230	57341.36	-1512.05
22524	80	240	57096.64	58.87
22536	80	250	56615.55	-129.91
22554	80	260	55981.22	-300.21
25103	-10	80	56900.29	50.23
25115	-10	90	57204.85	264.82
25130	-10	100	56741.69	-88.26
25148	-10	110	56871	-43.1
25203	-10	120	57141.96	847.03
25218	-10	130	56543.3	-105.01
25233	-10	140	56615.91	-31.19
25245	-10	150	56989.67	189.46
25300	-10	160	56819.98	55.8
25315	-10	170	56681.71	143.33
25336	-10	180	56811.36	265.96
25354	-10	190	55863.16	-389.8
25415	-10	200	56854.73	-4.32
25433	-10	210	56970.73	4.05
25451	-10	220	56934.5	82.14
25521	-10	230	56575.58	-171.33
25551	-10	240	57023.43	169.01
25718	-10	250	56859.03	70.57
25818	-10	260	56741.17	47.25

30048	-20	260	56994.66	272.71
30124	-20	250	56443.02	-210.5
30309	-20	240	57114.68	190.92
30330	-20	230	56715.41	407.46
30342	-20	220	56559.92	-163.14
30400	-20	210	58119.45	4621.75
30436	-20	200	58102.31	-988.42
30557	-20	190	54846.16	-1486.82
30618	-20	180	56558.87	100
30633	-20	170	56076.44	-376.55
30645	-20	160	56976.56	381.07
30657	-20	150	56602.55	0.42
30715	-20	140	56084.56	-445.64
30730	-20	130	56663.21	5732.14
30751	-20	120	56180.48	-1186.73
30800	-20	110	0	0
30906	-20	100	56877.83	-3.76
30936	-20	90	56757.97	-6.71
30951	-20	80	56434.57	-263.35
31057	-30	80	56866.18	638
31109	-30	90	56795.89	-1302.92
31121	-30	100	56654.32	-147.03
31136	-30	110	56951.57	69.89
31157	-30	120	56817.71	-85.87
31212	-30	130	57059.06	1080.23
31227	-30	140	56486.5	-698.87
31248	-30	150	56421.8	-5978.78
31306	-30	160	56519.89	56.87
31330	-30	170	56470.64	50.05
31351	-30	180	56521.06	31.1
31415	-30	190	56945.58	160.67
31430	-30	200	57358.06	-2818.75
31527	-30	210	56578.6	-156.76
31606	-30	220	56470.76	-195.83
31703	-30	230	56644.76	-44.37
31742	-30	240	56757.47	22.01
31848	-30	250	56450.07	-136.98
31918	-30	260	56634.48	-82.41

32239	-40	80	56928.27	56.71
32251	-40	90	56665.21	1968.96
32303	-40	100	57258.04	1579.76
32315	-40	110	57108.85	142.3
32330	-40	120	56610.91	-201.32
32342	-40	130	57161.29	221.62
32400	-40	140	56502.7	202.14
32412	-40	150	56714.14	1521.85
32439	-40	160	56666.15	53.23
32500	-40	170	56472.58	-98.51
32518	-40	180	56683.43	67.44
32618	-40	190	56981.91	151.87
32703	-40	200	56854.72	-68.16
32733	-40	210	56052.61	-717
32821	-40	220	56811.01	26.48
32839	-40	230	57158.38	177.35
32918	-40	240	56484.61	-90.12
32939	-40	250	56540.04	-86.33
33012	-40	260	56130.98	-250.62
33133	-50	260	57141.8	-895.6
33221	-50	250	57424.93	-390.01
33321	-50	240	56718.14	-108.08
33354	-50	230	56864.04	110.44
33415	-50	220	56584.73	-152.41
33445	-50	210	56894.38	129.89
33554	-50	200	56949.19	170.07
33621	-50	190	56203.82	-259.25
33633	-50	180	56194.62	-198.3
33648	-50	170	56614.04	-51.96
33709	-50	160	56974.2	161.64
33727	-50	150	55739.65	-768.03
33745	-50	140	57597.23	517.8
33800	-50	130	56204.55	-516.51
33821	-50	120	56490.24	-165.66
33833	-50	110	57057.26	75.05
33854	-50	100	57469.11	449.17
33909	-50	90	56945.6	17.5
33927	-50	80	57013.01	167.44

34048	-60	80	56903.13	77.96
34100	-60	90	56778.05	-27.21
34112	-60	100	56360.4	-471.46
34124	-60	110	56642.07	-141
34136	-60	120	57394.3	415.32
34151	-60	130	56915.33	35.75
34203	-60	140	57576.91	333.53
34242	-60	150	57730.33	416.69
34330	-60	160	57236.53	248.28
34357	-60	170	56759.4	27.48
34427	-60	180	56457.97	-19.82
34442	-60	190	56358.89	-62.67
34454	-60	200	56674.03	61.94
34512	-60	210	56975.61	97.26
34530	-60	220	56874.43	-56.53
34551	-60	230	57136.76	100.1
34603	-60	240	58286.79	1041.07
34618	-60	250	56746.08	94.19
34639	-60	260	55965.54	-424.23
34748	-70	260	56193.08	-184.67
34803	-70	250	55686.86	-588.39
34818	-70	240	56840.52	48.25
34848	-70	230	56913.29	41.1
34915	-70	220	57332.09	305.21
34942	-70	210	56198.25	-300.87
35003	-70	200	56257.32	-124.1
35036	-70	190	56249.47	-125.05
35054	-70	180	56266.08	-227.53
35136	-70	170	56403.61	-270.67
35224	-70	160	56867.25	-46.78
35306	-70	150	57880.41	902.94
35336	-70	140	56908.02	-13.6
35351	-70	130	56039.85	-461.19
35403	-70	120	56903.66	287.6
35436	-70	110	56591.58	-71.58
35451	-70	100	56316.26	-380.3

35603	-80	120	56267.02	-164.33
35615	-80	130	56259.85	-162.94
35627	-80	140	56555.48	-8.07
35642	-80	150	56202.12	-426.62
35721	-80	160	57151.4	234.75
35757	-80	170	56963.34	84.85
35830	-80	180	57113.4	507.55
35842	-80	190	56372.07	-131.53
35854	-80	200	56492.2	-18.83
35909	-80	210	56843.1	112.92
35918	-80	220	56856.53	53.1
35936	-80	230	56517.5	-190.32
40000	-80	240	56816.69	185.98
40015	-80	250	56202.05	-208.69
40030	-80	260	57136.38	395.66
40130	-90	260	56387.35	754.01
40145	-90	250	56526.45	49.25
40200	-90	240	56389.76	-127.21
40221	-90	230	57003.41	147.87
40236	-90	220	56677.91	28.83
40254	-90	210	56519.54	-35.08
40306	-90	200	56484.51	356.8
40324	-90	190	56429.28	-43.37
40336	-90	180	56532.84	-58.14
40354	-90	170	56430.36	-161.23
40409	-90	160	56644.34	-63.55
40424	-90	150	56685.71	-4.67
40439	-90	140	56685.36	106.75
40457	-90	130	56732.45	159.3

40915	-100	140	56226.38	-330.75
40927	-100	150	56538.01	-79.58
40939	-100	160	56781.79	74.87
40951	-100	170	56597.52	-68.82
41003	-100	180	56556.78	-38.39
41015	-100	190	56566.71	10.28
41030	-100	200	56041.65	-257.17
41045	-100	210	55937.07	-219.42
41100	-100	220	56376.77	-52.57
41124	-100	230	56290.45	-288.17
41136	-100	240	56400.45	-66.3
41151	-100	250	56235.79	-159.89
41215	-100	260	56618.13	-52.32
41318	-110	260	57880.41	723.62
41342	-110	250	57692.04	736.71
41403	-110	240	56876.7	135.96
41433	-110	230	56900.83	-37.83
41454	-110	220	57285.91	340.71
41539	-110	210	57406.55	460.75
41603	-110	200	56386.86	544.98
41739	-110	190	56625.03	64.82
41757	-110	180	56395.9	-134.14
41818	-110	170	57018.68	413.1
41857	-110	160	56560.81	9.12
41918	-110	150	56283.13	-170.89
41930	-110	140	56768.02	169.44
42039	-120	140	56567.72	66.37
42054	-120	150	56515.57	14.96
42109	-120	160	55862.51	-659.19
42127	-120	170	56280.82	-67.17
42142	-120	180	56402.14	-56.51
42206	-120	190	56508.11	2.44
42227	-120	200	56576.47	21.75
42251	-120	210	56661.55	-53.67
42430	-120	220	56778.99	-363.39
42454	-120	230	58274.16	3423.05
42509	-120	240	55632.32	-648.44
42527	-120	250	55787.1	-614.57
42545	-120	260	56324.66	-47.53
42600	-120	270	55922.5	-338.41
42630	-120	280	56941.48	484.32

42921	-130	280	56076.63	-319.62
42942	-130	270	56102.57	-194.17
43003	-130	260	56649.61	156.75
43021	-130	250	56735.85	167.89
43051	-130	240	55712.06	-621.23
43106	-130	230	58954.2	314.07
43118	-130	220	57039.53	-170.37
43142	-130	210	56211.38	-136.78
43154	-130	200	56504.42	685.35
43206	-130	190	56654.17	45.66
43224	-130	180	56660.44	36.73
43239	-130	170	56438.26	-63.25
43254	-130	160	55913.82	-583.62
43309	-130	150	57008.87	152.14
43421	-140	160	57577.54	472.33
43433	-140	170	57045.62	117.07
43445	-140	180	56832.87	105.12
43457	-140	190	55951.77	-620.32
43512	-140	200	56505.3	-37.44
43527	-140	210	53949.87	-717.55
43648	-140	220	56773.75	-64.12
43703	-140	230	57839.54	424.3
43715	-140	240	56915.16	12.03
43727	-140	250	56356	-162.39
43748	-140	260	56667.33	153.3
43809	-140	270	56775.14	284.26
43851	-140	280	56411.88	65.41
44009	-150	270	56246.85	-255.17
44024	-150	260	56625.9	258.53
44051	-150	250	55435.4	-741.82
44118	-150	240	57009.72	93
44139	-150	230	57158.43	139.75
44209	-150	220	56917.86	31.83
44233	-150	210	57996.97	614.96
44309	-150	200	56737.4	-35.48
44418	-150	190	57158.38	-1289.33
44445	-150	180	57491.95	654.85
44503	-150	170	56908.42	-89.44
44518	-150	160	56963.99	-33.91

44730	-160	160	57510.67	282.05
44742	-160	170	56801.66	-89.98
44754	-160	180	56779.26	-82.6
44806	-160	190	56532.44	-286.55
44818	-160	200	56871.22	134.3
44836	-160	210	57095.74	293.67
44921	-160	220	56544.18	-54.25
44939	-160	230	56466.43	-77.55
45027	-160	240	57015.65	205.69
45054	-160	250	56951.57	383
45118	-160	260	56408.03	-84.35
45221	-170	260	56657.72	68.19
45236	-170	250	56269.61	-162.03
45257	-170	240	56818.82	134.19
45315	-170	230	56484.49	-81.8
45333	-170	220	56376.44	-58.42
45357	-170	210	55846.17	-562.78
45430	-170	200	56832.8	130.98
45445	-170	190	56677.53	68.75
45457	-170	180	56544.33	-90.64
45515	-170	170	56740.23	-18.75
45621	-180	180	56114.47	-307.96
45633	-180	190	55661.29	-721.89
45651	-180	200	57264.51	590.5
45836	-180	210	56335.08	-128.12
45854	-180	220	56559.8	120.25
45915	-180	230	56295.05	-266.46
45939	-180	240	56198.26	-180.58
50021	-180	250	56470.96	4.91
50042	-180	260	57033.97	292.3

50212	-190	260	57092.13	1110.39
50227	-190	250	56539.35	-50.5
50300	-190	240	56307.24	-60.66
50433	-190	230	56376.38	-16.23
50457	-190	220	56609.94	255.16
50536	-190	210	55175.58	-983.21
50630	-190	200	57008.12	131.39
50706	-190	190	56834.02	89.35
50733	-190	180	56679.06	23.05
50848	-200	180	56546.09	-102.64
50900	-200	190	56775.21	-67.44
50915	-200	200	58170.93	1451.55
50939	-200	210	56373.37	-3548.37
51139	-200	220	55981.66	-396.58
51206	-200	230	56673.89	151.66
51233	-200	240	56576.47	-36.33
51303	-200	250	56092.39	-318.25
51321	-200	260	56226.57	-90.01
51445	-210	260	56488.69	269.23
51506	-210	250	56861.45	-559.83
51603	-210	240	56934.03	151.05
51803	-210	230	57277.03	401.21
51827	-210	220	57010.04	220.94
51839	-210	210	56838.08	101.96
51854	-210	200	56847.09	72.55
51909	-210	190	56659.75	49.3
51918	-210	180	56308.8	-175.67
52015	-220	180	56325.38	-169.37
52027	-220	190	56471.45	-64.57
52039	-220	200	56765.7	50.42
52106	-220	210	57195.32	1264.64
52203	-220	220	56475.05	-257.78
52227	-220	230	0	0
52439	-220	240	56029.25	-154.8
52454	-220	250	56099.85	-229
52506	-220	260	56284.23	-216.39

APPENDIX 2

Terms & Conditions of Engagement

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TERMS & CONDITIONS OF ENGAGEMENT
Dakota Environmental of Wisconsin, Inc.

The Terms and Conditions and the "Proposal" dated November 28, 1995, submitted by Dakota Environmental of Wisconsin, Inc. ("DEW" or "us") to Mallory Improvements/Giuffre Bros. Cranes, Inc./Asset Acquisitions, Inc. ("you"), make up the "Agreement" between you and us. THESE TERMS CONTAIN LIMITATIONS IN DEW LIABILITY TO YOU, AND OTHERS, FOR ANY CLAIMS ARISING OUT OF DEW SERVICES:

1. Services: The "Services" for the "Project", "Site" and any other consulting services we may perform referred to in DEW proposal will be performed for your exclusive use. DEW services address current conditions. Any delayed use of the results of our services will require updates. You acknowledge, by entering into this agreement, the inherent risks and uncertainties associated with the work plan development, investigation of subsurface conditions for construction purposes, and assessment or remediation of hazardous substances. You have been advised, and acknowledged, that DEW decisions are judgments based upon limited data and time frame rather than upon scientific fact.

2. Right of Entry: You have given us the right to collect data, access the related reports, enter upon the site so that we and DEW consultants and subcontractors can perform data analyses, borings, explorations and, if specified, report preparation and remediation work. If any services are to be carried out on property or facilities not owned or occupied by you, you represent to us that the owner and occupant have given you permission for us to enter and perform the services under the conditions stated in section 3. You will give us reasonable evidence confirming such permission, if requested. The permission to enter into properties not owned by you will be a separate service if consulted by DEW.

3. Subsurface Explorations:

Equipment used in performing DEW services will, to some degree, affect, alter or damage the site surfaces, buildings, structures, vegetation, facilities and subsurface installations (collectively "improvements"). You accept such risks. We will exercise reasonable care to limit such damage. However, we do not undertake the restoration of such damage. Any costs of restoration of improvements will be borne by you. They have not been included in DEW fees or prices.

We will contact the local public agencies or private firms, if any, which coordinate subsurface utility information and will review plans and data which they provide in response to DEW inquiries. You undertake to give us any plans and other information in your possession concerning the site. On unknown sites, you will request utility locations and other plans from site owner and provide them to us. If, despite all such available plans and information, all underground improvements cannot be located, there is some risk to you of damage to these improvements. You agree to accept the risks of damage and expense associated with repair or restoration of any improvements not disclosed by plans and information provided to us by those sources.

4. Payment:

Invoices will be submitted to you monthly, or at the completion of a scope of work, at DEW's discretion. Payment is due within thirty (30) days from invoice date. An invoice remaining unpaid after thirty (30) days will bear interest at the lesser of the maximum lawful annual interest rate or 1-1/2% per month. If you do not pay an invoice within thirty (30) days, we may, thereafter, on ten (10) days prior written notice, elect to terminate all further services, without incurring any liability to you. On termination of services for non-payment, we retain all DEW rights and claims. If any state imposes a service, sales or similar tax on DEW services, you will pay that tax as an additional item on DEW invoices.

If we terminate services because of non-payment, you will pay us for all services and expenses, according to the agreement, through the termination date, plus expenses of termination, interest and costs of collection, including reasonable attorney's fees. Any objection to an invoice must be made by you, in writing, within ten (10) days, or the objection will be waived.

5. Insurance: We maintain the following insurance: workers compensation with statutory required limits; comprehensive general liability; automobile (various coverage); professional liability and environmental impairment liability. We furnish you certificates of insurance upon your request.

6. Samples/Manifests: Unless you give us written instructions prior to our beginning field work, we will dispose of all soil, rock, water and any other samples thirty (30) days after we submit our initial report.

If any samples contain hazardous substances, we will dispose of those (1) through a qualified waste disposal contractor or (2), upon your timely written instruction, we will ship them by a licensed transporter to a licensed disposal facility. If you give us timely written instructions to retain samples beyond such thirty (30) days, we will arrange to store them for you. You will pay us our additional standard laboratory fees for our storage and transport of samples in accordance with your instructions. We do not undertake any responsibility or liability for transport or disposal of hazardous or toxic substances. We will not, under any circumstances, sign manifests for such substances. You agree that we are not a handler, generator, operator, treater or storer, transporter or disposer of hazardous or toxic substances found or identified at a site. Any required arrangements for transport, treatment, storage and disposal of such substances
(including samples not so removed) will be made by others in their name.

Definition of "Hazardous Substances": Materials, pollutants or asbestos, which are a danger to public health, safety or the environment, including substances defined in the Federal Water Pollution Control Act; Federal Comprehensive Environmental Response Compensation and Liability Act (CERCLA); Resource Conservation and Recovery Act (RCRA) and in state and local laws, codes and regulations.

7. Construction Observation Services: If DEW services include observation of construction on a site, we will carry out our observation in accordance with generally accepted professional practices of similar engineers and consultants. DEW services will not include any supervision of any contractor or subcontractor other than our own. Your contractor will remain solely and completely responsible for enforcement and compliance by it, and its subcontractors, and contract plans, specifications and safety requirements for all site working conditions, and safety requirements, day and night, for both persons and property. These include all OSHA, NIOSH, U.S. EPA and any other applicable governmental regulations. DEW observations and monitoring services do not include review of the sufficiency of the contractor's health and safety measures at or near the construction site.

8. Ownership of Documents: Everything we prepare, as instruments of service, whether reports, boring logs, field data and notes, laboratory tests and data, calculations, estimates or other documents or memoranda, will remain our property.

9. Disclosure of Hazards: Taking into account the information you provide us, we will take reasonable precautions for the health and safety of DEW personnel while at the site. Before you direct us to proceed with our services, you will give us any information in your possession regarding the existence of any hazardous substances under or adjacent to the site. This includes all permits, manifests and any records of compliance, or non-compliance, with law. If you, your counsel or any other of your representatives fail to furnish us with such information, to the extent it is in your possession, and the possible presence of such hazardous substances is not disclosed in the information you provide to us, you will be responsible to us, and to any claimants, for property damages and consequential damages, as spelled out in section 14 and for any claims, demands, suits and liabilities for personal injury, disease, medical expenses (including health monitoring and death claims).

10. Unanticipated Hazardous Materials: If hazardous substances, not anticipated in the scope of work, which are a threat to health, safety or the environment are encountered in the course of DEW services, we can suspend DEW services. We will cooperate with you in order to work out mutually satisfactory revisions to the scope of work, estimated cost and time now in our agreement to fit the conditions. If we do not reach mutual agreement on such revisions, we can terminate DEW services on giving you ten (10) days written notice. You will pay us for all services and expenses through termination date in accordance with this agreement, in the case of such termination.

11. Confidentiality: We will not disclose information about the agreement, our services or our reports to anyone except on your written instructions. If you provide us with confidential information about your business, we will keep that information confidential except to the extent necessary for (1) us to perform our services (2) to comply with professional standards to protect public health, safety and the environment and (3) to comply with governmental regulations and court orders. Information which is known to the public, technical information which we may have developed independently or acquired without breach of any duty, will not be considered confidential.

12. Disclosure: If by order of court, or governmental law or regulations, ("orders"), we are required to disclose information in our possession, we shall give your prompt notice of such facts. Thereafter, we may, without liability to you or others, comply with such orders. If any claims are asserted against us because of our compliance, you will hold us harmless from such claims and reasonable expense incurred, provided that our disclosure is made under a reasonable bona fide belief, or on advice of counsel, that disclosure is required by law.

13. Standard of Care: We shall, in performing our services, exercise the same degree of care and skill ordinarily exercised under similar circumstances by qualified professionals and consultants undertaking similar work in the same locality at that time. Subsequently evolved standards will not be applied in judging our work. We make only this and no other warranty or representation, express or implied. We will not be liable for the interpretation, by others, of data or information we develop.

14. Indemnification: To the fullest extent permitted by law, you shall indemnify, defend and hold harmless DEW and its subcontractors, consultants, agents, officers, directors, and employees from and against all claims, damages. losses and expenses, where direct or indirect. To the fullest

extent permitted by law, such indemnification shall apply regardless of the fault, negligence, breach of warranty or contract, or strict liability of the engineer or consultant.

15. Third Party Claims: By authorizing us to proceed with the services, you confirm that we have not created nor contributed to the presence of any hazardous substances or conditions at or near the site. In seeking our services to assist you in dealing with the conditions existing at the site, you acknowledge that, during the course of our services, we may not have professional liability, or other liability insurance, or may not be able to obtain such insurance at reasonable cost covering claims involving the actual or potential presence of hazardous substances. The compensation to be paid to us for our services, and our potential profit, is disproportionally small in relation to the potential risk of injury, loss or damage from a release of or exposure to such substances or conditions.

In acknowledgment of the imbalance between our benefits and risks, you agree to hold us, and each of our contractors, subcontractors, consultants, agents, officers, directors and employees, harmless against all claims for damages, direct or consequential; all expenses, costs of every kind, direct or indirect, legal or otherwise in connection with a release of hazardous substances; bodily injury, disability, death, medical expenses, property damage and other expenses and economic loss, alleged to have been caused by the release, removal, remedial action or investigation of hazardous substances; and any assessment of fines or penalties related to hazardous substances or their remediation.

Your obligation to indemnify us does not apply to claims, damages, losses or releases and exposure to pollutants which are adjudicated to have resulted from our gross negligence or willful misconduct in our performance of the services.

16. Limitation of Professional Liability: You agree that your aggregate maximum recovery against us for any claims based on the performance of our professional services, whether in contract, tort or otherwise, is limited to the greater of $50,000 or the amount of fees paid to us with respect to this agreement.

We shall not be liable on any basis for your loss of profits, delay, damages or any special or consequential damages of any type.

You may elect to increase the limit of liability for damages, up to $100,000, if you do the following: indicate below that you elect to increase the limit to one of the levels designated below and pay the additional fee shown opposite the increased level, payment to be made simultaneously with the execution of this agreement.

The additional charge serves as consideration for our undertaking the greater risk involved in performing services for you under an increased limit of liability for damages above $50,000.

Increased Limit of Liability for Damages	Additional Fee	Client Must Initial
$ 75,000	$1,000	
$100,000	$2,000	

You agree that your payment of the additional fee does not constitute a charge for placement of additional professional liability insurance.

17. Governing Law; Survivability Modifications; Assignment: This agreement shall be governed and enforceable in accordance with the laws of Massachusetts, the state in which our principal office is located, which shall be deemed the place of contracting.

The provisions of this agreement are survivable. The invalidity of any provision shall not affect the validity and enforceability of any other provisions. This agreement, made up of our proposal and these terms and conditions, cannot be modified orally, or by any course of conduct, and shall control over any inconsistent or contrary provisions in any proposal, contract form, purchase order or other document issued by you. These terms and conditions shall survive the completion, or termination, of our services for the project. Any assignment of your rights under this agreement requires our prior written consent.

APPENDIX 3

Cost Estimate to Implement the Work Plan

APPENDIX 4

WORK PLAN DEVELOPMENT LIMITATIONS

1. The observations described in this Report were made under the conditions stated therein. The conclusions presented in the Report were based solely upon the services described therein, and not on scientific tasks or procedures beyond the scope of described services or the time and budgetary constraints imposed by Client. The work described in this Report was carried out in accordance with the attached Statement of Terms and Conditions.

2. In preparing this Report, DEW has relied on certain information provided by state and local officials and other parties referenced therein, and on information contained in the files of state and/or local agencies available to DEW at the time of the Site assessment. Although there may have been some degree of overlap in the information provided by these various sources, DEW did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this Site assessment.

3. In the event that bank counsel or title examiner for Client obtains information on environmental or hazardous waste issues at the Site not contained in this Report, such information shall be brought to DEW's attention forthwith. DEW will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this Report.

4. Observations were made of the Site and of structures on the Site as indicated within the Report. Where access to portions of the Site or to structures on the Site was unavailable or limited, DEW renders no opinion as to the presence of hazardous material or oil, or to the presence of indirect evidence relating to hazardous material or oil, in that portion of the Site or structure. In addition, DEW renders no opinion as to the presence of hazardous material, drums, scrap metals or oil, or to the presence of indirect evidence relating to hazardous material or oil, where direct observation on a Site was obstructed by objects or coverings on or over these surfaces.

5. The purpose of this Report was to assess the physical characteristics of the subject Site with respect to the presence in the environment of hazardous material and develop a work plan for further actions. No specific attempt was made to check on the compliance of present or past owners or operators of the Site with federal, state, or local laws and regulations, environmental or otherwise.

6. The conclusions and recommendations contained in this Report are based upon observations, previous reports and the 2-acre geophysical survey report only. No subsurface explorations were performed as part of the study.

7. No quantitative laboratory testing was performed as part of the Work Plan development.

LIMIT.WPL

APPENDIX B

TEST PIT LOGS
REFERENCE VERSAR, INC. OCTOBER 1992

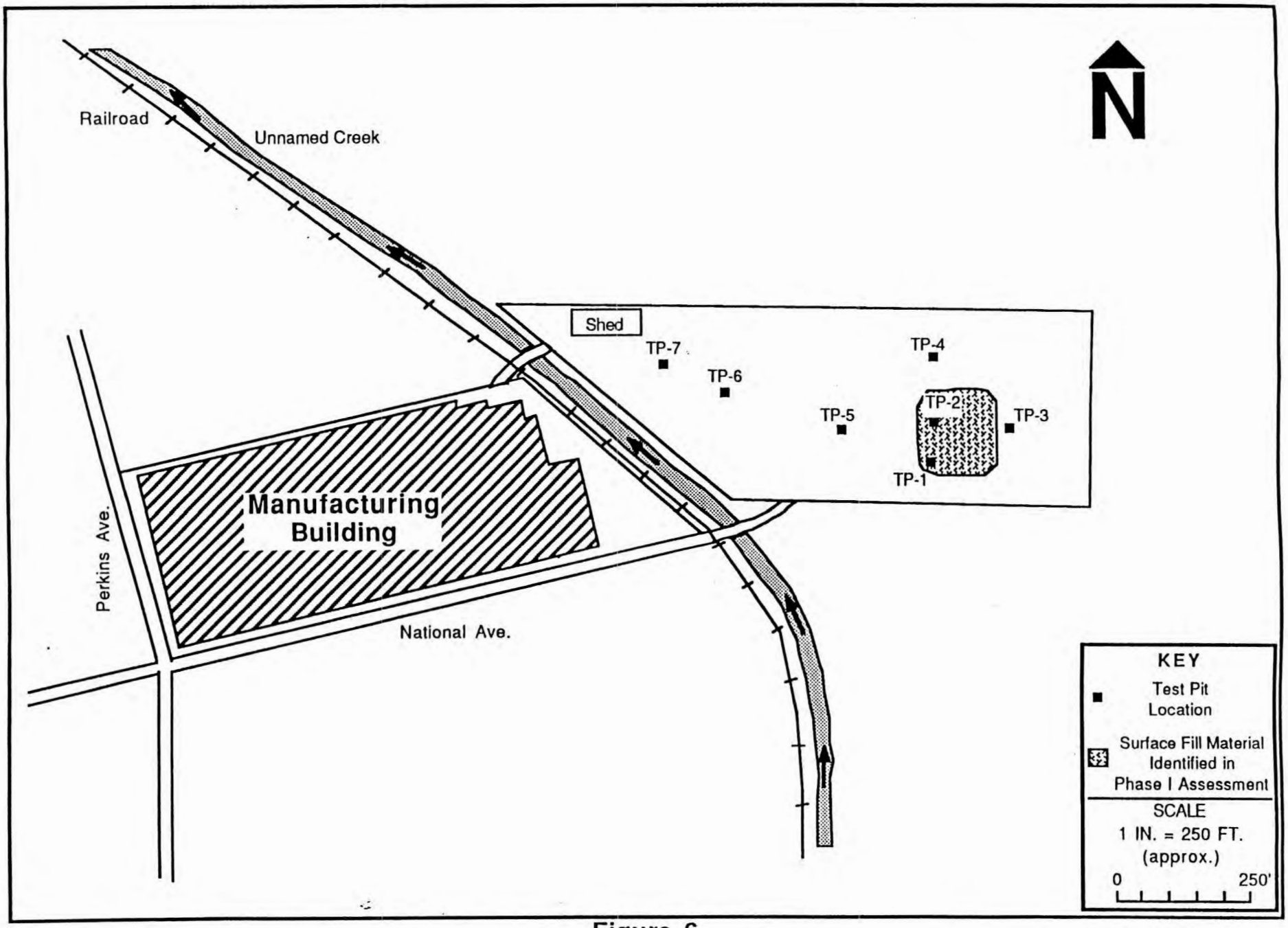


Figure 6.
Test Pit Locations
VME/Akerman Excavators, Waukesha, Wisconsin

Depth (feet)	TP-1
0 to ¾:	Top soil over gravel fill.
¾ to 6½:	Foundry fill consisting of black (N2/0) foundry sand, casting molds of founry sand, some slag, minor amounts of lumber, wire, plastic.
6½ to 7½:	Brown silty clay.
7½ to 9:	Gray (N6/0) silty clay.

TP-2

0 to ¾:	Gravel fill over sand base.
¾ to 6½:	Foundry fill consisting of black (N2/0) foundry sand, casting molds of founry sand, some slag, minor amounts of lumber, wire, plastic.
6½ to 10:	Brown silty clay.
10 to 11:	Gray (N6/0) silty clay.

TP-3

0 to 4½:	Fill consisting of subrounded gravel.
4½ to 9½:	Foundry fill consisting of black (N2/0) foundry sand, casting molds of founry sand, minor amounts of lumber and wire.
9½ to 13:	Brown silty clay.
13 to 14:	Gray (N6/0) silty clay.

TP-4

0 to 7:	Foundry fill consisting of black (N2/0) foundry sand, little wire, casting molds of foundry sand, some white silica foundry sand, some slag, moist to wet.
7 to 11:	Gray (N6/0) silty clay, trace subrounded gravel, moist.

TP-5

0 to 1:	White gravel fill.
1 to 6½:	Foundary fill consisting of black (N2/0) foundery sand, little wire and lumber scraps, trace yellow (5Y7/8) foundery sand castings, trace oil filters, moist grading downward to wet.
6½ to 8½:	Very dark gray (5Y3/1) organic clay, moist.
8½ to 9:	Light gray (N7/0) silt, moist.

Depth (feet)	TP-6
0 to 8:	Foundery fill consisting of black (N2/0) foundery sand, some pockets of yellowish brown (10YR5/6) foundary sand, trace pockets of white (10YR8/2) foundery sand, little wire and lumber scraps, moist grading downward to wet.
8 to 10:	Grayish brown (2.5Y5/2) organic clay with gastropods and plant matter, moist.

TP-7

0 to 1:	Light gray (10YR6/1) limestone gravel, angular, gravel up to 4 inches in diameter, wet.
1 to 5:	Light brownish gray (10YR6/2) sand and gravel with some clay, subrounded, gravel up to 4 inches in diameter, some broken cement blocks, wet.
5 to 6:	Black (N2/0) organic clay, moist.
6 to 6½:	Dark grayish brown (2.5Y4/2) organic clay with gastropods and plant matter, moist.

APPENDIX C

STANDARD OPERATING PROCEDURES

APPENDIX C

STANDARD OPERATING PROCEDURES

TABLE OF CONTENTS

SOP NO. 1
SAMPLE IDENTIFICATION/CONTAINERS/PRESERVATION

SOP NO. 1
SAMPLE IDENTIFICATION/CONTAINERS/PRESERVATION

1.0 GENERAL

Sample collection quality control procedures are presented in this SOP. Sections are also included regarding the methodology for documenting sample locations, identifying samples and types of sample containers and requirements for sample preservation.

1.1 SAMPLING LOCATIONS AND NUMBERS

Sample locations will be predetermined for some tasks based on available data and/or the project data objectives. However, the exact location of all samples will be determined in the field based upon field conditions. The locations will be determined by either the On-Site Coordinator or designated Task Leader.

The exact locations of each sampling point will be described in the project log book along with a sketch that includes a minimum of two (2), and, if possible, three (3) distance measurements.

The measurements will be referenced to marked grid stakes and/or from permanent ground features and landmarks which are included on the site map.

There will be two (2) identification numbers used for each sample. One will be the serial identification number assigned by the laboratory. The other identification will be an in-house number designed to incorporate site-specific field data into an alphanumeric code. The in-house numbering will consist of the following five (5) components:

- Project Identification.
- Date.
- Sample Type.
- Sample Location.
- Sample Number.

The project identification is a three (3) letter designation unique to the site sampled. For this project, the identification will be designated as follows:

- HWW - Hein-Werner Waukesha

The second designation will consist of a four-digit code identifying the month and year of sampling, e.g., 0496 = April 1996.

Each sample type collected during the sampling program will be identified by one of the following 2-3 digit alpha codes:

- TR - Trench Sample
- WS--Waste Sample.
- CS--Container Sample.
- MW--Monitor Well Sample.
- XXB (Matrix Type) Blank.
- XXD (Matrix Type) Duplicate.

A two (2) place numeric code will be used to indicate the sampling location. Thus, the identification system will require that all sampling locations be given a separate number. The field ties to these sampling locations as well as other pertinent data will be kept in the field sampling notebook.

A two (2) digit number will be used to consecutively number replicate samples taken at a sampling point. Examples of a complete sample identification number are:

- HWW-0496-TR-01-01 — Hein-Werner Waukesha, April 1996, Trench Sample, Location 001, First Sample.
- HWW-0496-TRD-02-01 — Hein-Werner Waukesha, April 1996, Trench Sample Duplicate, Location 002, First Sample.

1.2 SAMPLE CONTAINERS AND SAMPLE PRESERVATION

Sample containers will be prepared and cleaned by the respective laboratories and shipped to *SECOR* in the field.

The required sample containers, filling instructions, sample preservation methods, and shipping instructions are summarized in Table 1-1 for each of the sample types. Note: Sample analysis parameters will be determined based on site conditions, e.g., waste characterization samples (TCLP analysis) may not be required if no waste materials are located during the field work.

TABLE 1-1
SAMPLE CONTAINERS, PRESERVATIVES AND HOLDING TIMES FOR LOW CONCENTRATION TEST PARAMETERS

PARAMETER	CONTAINER	PRESERVATION	HOLDING TIME	PROCEDURE
WATER AND LIQUIDS				
Volatile Organic Compounds (EPA 8260)	2, 40-ml glass vials with Teflon-lined caps	Iced to 4°C Methanol*	14 days for analysis *	Fill completely to exclude air bubbles *
Semivolatile Extractable organic (EPA 8270)	2, one-liter glass bottles (amber) with Teflon-lined caps	Iced to 4°C	7 days for extraction; 40 days for analysis	Fill bottle to neck
Metals (EPA 3010/6010 or 7000 series)	1, one-liter high density polyethylene bottle	Adjust pH to less than 2.0 with nitric acid	Analysis within 6 months of collection (28 days for mercury)	Fill bottle to neck
Cyanide (EPA 9012)	1, one-liter high density polyethylene bottle	NaOH to pH > 12 Iced to 4°C Add 0.6 g ascorbic acid in the presence of residual chloride	14 days for analysis	Fill completely
Ignitability (EPA 1010)	1, 8 oz. wide-mouth glass jar with Teflon-lined cap	Iced to 4°C	As soon as possible	Fill completely
Reactive Sulfide (EPA Chapter 7)	1, 8oz wide-mouth glass jar with Teflon-lined cap	Iced to 4°C	As soon as possible	Fill completely
pH (EPA 9041 and/or 9040)	1, 8 oz wide-mouth glass jar with Teflon-lined cap	Iced to 4°C	As soon as possible	Fill completely
Paint Filter (EPA 9095)	1, 8 oz. wide-mouth glass jar with Teflon-lined cap	Iced to 4°C	As soon as possible	Fill completely
SOILS and SOLIDS				
Purgeable Organic Compounds (Volatiles) (EPA 8260)	2, 4 oz. wide-mouth glass jar with Teflon-lined cap	Iced to 4°C Methanol*	14 days for analysis *	Fill completely *
Extractable Organic Compounds (EPA 8270 Semivolatiles)	1, 4-8 oz. wide-mouth glass jar with Teflon-lined cap	Iced to 4°C	14 days for extraction; 40 days for analysis	Fill completely
Metals (EPA 3010, 3020 or 3050/6010 or 7000 series)	1, 6-8 oz. wide-mouth glass jar with Teflon-lined cap	Iced to 4°C	Analysis within 6 months of collection (28 days for mercury	Fill completely

PARAMETER	CONTAINER	PRESERVATION	HOLDING TIME	PROCEDURE
Cyanide (EPA 9012)	1, 6-8 oz. wide-mouth glass jars with Teflon-lined caps	Iced to 4°C	14 days for analysis	Fill completely
TCLP Volatiles (EPA 1311/8240)	1, 6-8 oz. wide-mouth glass jar with Teflon-lined cap	Iced to 4°C	14 days for TCLP extraction; 14 days for analysis	Fill completely
TCLP Semivolatiles (EPA 1311/8270)	1, 6-8 oz. wide-mouth glass jar with Teflon-lined cap	Iced to 4°C	7 days for TCLP extraction; 7 days for prep. extraction; 40 days for analysis	Fill completely
TCLP Metals (EPA 1311/3010, 6010 or 7000 series)	1, 6-8 oz. wide-mouth glass jar with Teflon-lined cap	Iced to 4°C	180 days for extraction; 180 days for analysis (28 days for mercury)	Fill completely
Ignitability (EPA 1010)	1, 8 oz. wide-mouth glass jar with Teflon-lined cap	Iced to 4°C	As soon as possible	Fill completely
Reactive Sulfide (EPA Chapter 7)	1, 8 oz. wide-mouth glass jar with Teflon-lined cap	Iced to 4°C	As soon as possible	Fill completely
pH (EPA 9041 and/or 9040)	1, 8 oz. wide-mouth glass jar with Teflon-lined cap	Iced to 4°C	As soon as possible	Fill completely
Paint Filter (EPA 9095)	1, 8 oz. wide-mouth glass jar with Teflon-lined cap	Iced to 4°C	As soon as possible	Fill completely

NS = Not stated.
All methods are from U.S. EPA SW846.
Note: Some samples may be able to be combined in the same sample container.
* = Wisconsin projects - reference NR 700.13 for methanol preservation procedures.

All sample containers will be labeled/tagged with the sample's unique identification number (see 1.1 above).

The collected sample containers will be kept out of direct sunlight and, after decontamination and labeling, will be placed in coolers and stored at approximately 4°C until they are packaged for shipping to the proper laboratory. Samples designated for chemical analysis will be packaged and shipped within 24 hours of collection.

1.3 CHAIN-OF-CUSTODY AND SHIPMENT PROCEDURES

Samples will be accompanied by a properly completed chain-of-custody form which will include a listing of sample numbers and locations. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage area.

Samples designated for shipment will be properly packaged per DOT regulations in coolers, on ice, and dispatched to the appropriate laboratory for analysis, with a separate, signed Chain-0f-Custody Record enclosed in each sample box or cooler. Shipping containers will be locked and/or secured with strapping tape and custody seals for shipment to the laboratory. The preferred procedure includes use of a custody seal attached to the front right and back left of the cooler. The custody seals are covered with clear plastic tape. The cooler will be strapped shut with strapping tape in at least two locations.

All shipments will be accompanied by the Chain-of-Custody Record identifying the contents. The original record will accompany the shipment, and one copy will be retained by the sampler for returning to the project files.

If the samples will be sent by common carriers, a bill of lading should be used. Receipts of bills of lading will be retained as part of the permanent documentation. If sent by mail, the package will be registered with return receipt requested. Commercial carriers are not required to sign off on the custody form as long as the custody forms are sealed inside the sample cooler and the custody seals remain intact.

SOP NO. 2
SAMPLING EQUIPMENT DECONTAMINATION

SOP NO. 2
SAMPLING EQUIPMENT DECONTAMINATION

1.0 GENERAL

Proper decontamination of field sampling equipment is critical to obtaining samples free from interference due to cross contamination.

2.0 FIELD DECONTAMINATION OF DRILL RIGS/HEAVY EQUIPMENT

Areas of equipment which will come in close proximity to materials being sampled should be thoroughly steam cleaned/pressure washed or manually scrubbed and then rinsed upon initial arrival on site and between drilling or excavation locations. This equipment will include:

- Backhoe buckets and extension arm.
- Drilling items such as auger flights, drill rods and drill bits.

When Shelby tubes or split-spoons are used to collect samples that will not undergo chemical analysis, they should also be steam cleaned or hand scrubbed between each sample point.

3.0 FIELD DECONTAMINATION OF HAND SAMPLING EQUIPMENT SHELBY TUBES AND SPLIT-SPOON SAMPLERS

Hand sampling equipment (bailers, sampling spoons, shovels, picks, hand augers, etc.) and Shelby tubes or split-spoons used to collect samples for chemical analysis will be decontaminated prior to use. The following procedure will be used:

- Detergent/tap water wash/scrub.
- Tap water rinse.
- Distilled water rinse.
- Acetone (pesticide grade) rinse.*
- Distilled water rinse.

*Only if tool is contaminated with non-detergent/water dispersible materials.

4.0 DECONTAMINATION OF SUBMERSIBLE PUMPS

Submersible pumps used to purge and/or sample groundwater casing should be cleaned and flushed between uses. This cleaning process consists of the following:

- An external detergent wash and tap water rinse of the pump, hose, and cables.
- A 10-gallon flush of potable water through the pump.
- A distilled water rinse of the exterior.
- A 2-gallon flush of distilled water through the pump.

Flushing can be accomplished by the use of a clean plastic overpack drum or plastic garbage can filled with potable water. The pump should run long enough to flush the water through the pump housing and hose.

A new length of tubing must be used for each well and discarded after use. The pump and hose should always be placed on clean polyethylene sheetings to avoid contact with the ground surface.

Note: To avoid electric shock, caution should be exercised to avoid contact with the pump casing and water in the drum while the pump is running. Always disconnect the pump from power source before handling.

5.0 GENERAL

Decontamination of drilling rigs and heavy equipment will be accomplished at a designated equipment decontamination area.

Decontamination of hand sampling equipment and split-spoons will be accomplished at or near the actual sample location.

Dependant upon site conditions, expended decontamination solutions and rinsates (with the exception of acetone) may be discharged at the site surface with agency and client approval. Otherwise, the decon solutions and rinsates will be drummed for disposal at an authorized facility. Acetone rinses will be drummed for disposal.

SOP NO. 3
TRENCHING

SOP NO. 3
TRENCHING

1.0 GENERAL

A backhoe will be utilized to excavate trenches in areas identified as potentially containing buried waste material.

2.0 RIG-UP FOR TRENCHING OPERATIONS

The following activities will be accomplished during rig-up:

- The location of the trench will be marked.
- The location of the Exclusion Zone, Contamination Reduction Zone, and Support Zone will be designated and marked and the appropriate personnel and equipment decontamination equipment and health and safety equipment positioned and made operational.
- The backhoe will be positioned and the bucket decontaminated.
- Polyethylene sheeting/tarps will be positioned alongside the area to be trenched.
- Sampling equipment will be prepared and positioned for use.
- Equipment required for overpacking and spill containment will be positioned and prepared for use.
- Monitoring instruments will be calibrated and background measurements obtained.
- Personnel not directly involved in the operations will move to the Support Zone.

3.0 TRENCHING OPERATIONS

3.1 EXCAVATION/SAMPLING

The backhoe operator will be directed to excavate until the sampler indicates that the desired depth has been reached. All excavated material will be placed on the polyethylene sheeting/tarp.

3.4 BACKFILLING

After all required samples have been obtained from a specific trench, the trench will be backfilled with the excavated material stockpiled on the polyethylene sheeting/tarp. The excavated material will be replaced in reverse order, i.e., last material excavated will be the first replaced in the trench.

3.5 RIG-DOWN/DEMOBILIZATION

On completion of backfilling, the equipment will be decontaminated in accordance with SOP #2. If further trenching is required, the appropriate equipment will be repositioned and operations continued in accordance with Section 3.1-3.4 of this SOP. If no further trenching is required, the equipment will be loaded and removed from the site and the site secured.

If the trench is shallow (less than 3 feet deep) and clearance by the Site Health and Safety Officer is obtained, the sampler may enter the trench and collect the soil/waste sample. For deeper trenches, the sampler will collect the sample from the backhoe bucket in an area where the sample material is not in contact with the bucket.

The sampled material will be immediately transferred to the appropriate laboratory precleaned sample container utilizing decontaminated sample equipment (spoons, trowel, etc.). To reduce chance of cross-contamination, the sampler will change gloves between each sample location. Samples will be labeled/stored/shipped utilizing procedures outlined in SOP #1.

3.2 AIR MONITORING

During trenching operations continuous air monitoring will be performed in accordance with procedures outlined in the site Health and Safety Plan. This will include immediate response monitoring at the excavation utilizing an organic vapor analyzer and a combination combustible gas indicator/hydrogen sulfide monitor.

In addition, measurements will be taken at least each half-hour at predetermined locations in the Support Zone or at the property line. All readings will be recorded in a permanently bound logbook along with the date/time of the measurement, location, activity being performed in the work area, wind direction and speed and other pertinent information.

If the level at a downwind location in the vicinity of the Support Zone/property line is more than 1 part per million (ppm) of total volatile organic compounds (VOC) above background, corrective actions will be taken to reduce emissions from the site. These corrective actions may include, but are not limited to temporary cessation of operations, excavation of a smaller working surface, utilizing of foam, poly sheeting or tarps to cover excavation working surfaces and loaded materials, utilization of water spray, erection of a wind screen, etc.

If the level at a downwind location in the vicinity of the Support Zone/property line is more than 10 ppm (total VOC) above background, excavation/removal activities will immediately be halted, the Site Health and Safety Officer representative will be immediately notified of conditions and measures necessary to control the emissions will be implemented. Corrective actions may include, but are not limited to those listed above.

3.3 OVERPACKING

In the event intact containers are removed during trenching activities, an evaluation will be made by the Site Health and Safety Officer regarding the handling/recovery/overpacking of the containers.

If the containers can be safely recovered, they will be removed with the backhoe and immediately placed in an overpack container and the overpack container marked as to the contents. An evaluation will be made regarding the container condition and the appropriate procedure to be utilized to obtain any required samples.

APPENDIX D

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

MALLORY IMPROVEMENTS PROPERTY
1005 PERKINS AVENUE
WAUKESHA, WISCONSIN

Prepared for:
Hein Werner Corporation
2120 Pewaukee Road
Waukesha, Wisconsin 53188

Submitted by:
***SECOR* International Incorporated**
3695-M North 126th Street
Brookfield, Wisconsin 53005
414/790-1974

April 4, 1996

TABLE OF CONTENTS

LIST OF ATTACHMENTS

1.0 INTRODUCTION

This site-specific Health and Safety Plan (HASP) describes procedures to be implemented to protect ***SECOR* International Incorporated** *SECOR* and authorized subcontractors personnel during the performance of the field activities described below. All personnel involved with this work are required to become familiar with, and conform to the provisions of this HASP.

2.0 BACKGROUND

2.1 SITE: Mallory Improvements Property

2.2 LOCATION: 1005 Perkins Avenue
Waukesha, Wisconsin

2.3 OBJECTIVE: Evaluate whether of buried drums are located at the property, utilizing trenching techniques to supplement previous geophysicl trenching and excavation activities.

2.4 SITE INFORMATION

2.4.1 Site Location, History and Previous Investigations

2.4.1.1 Site Location and Description

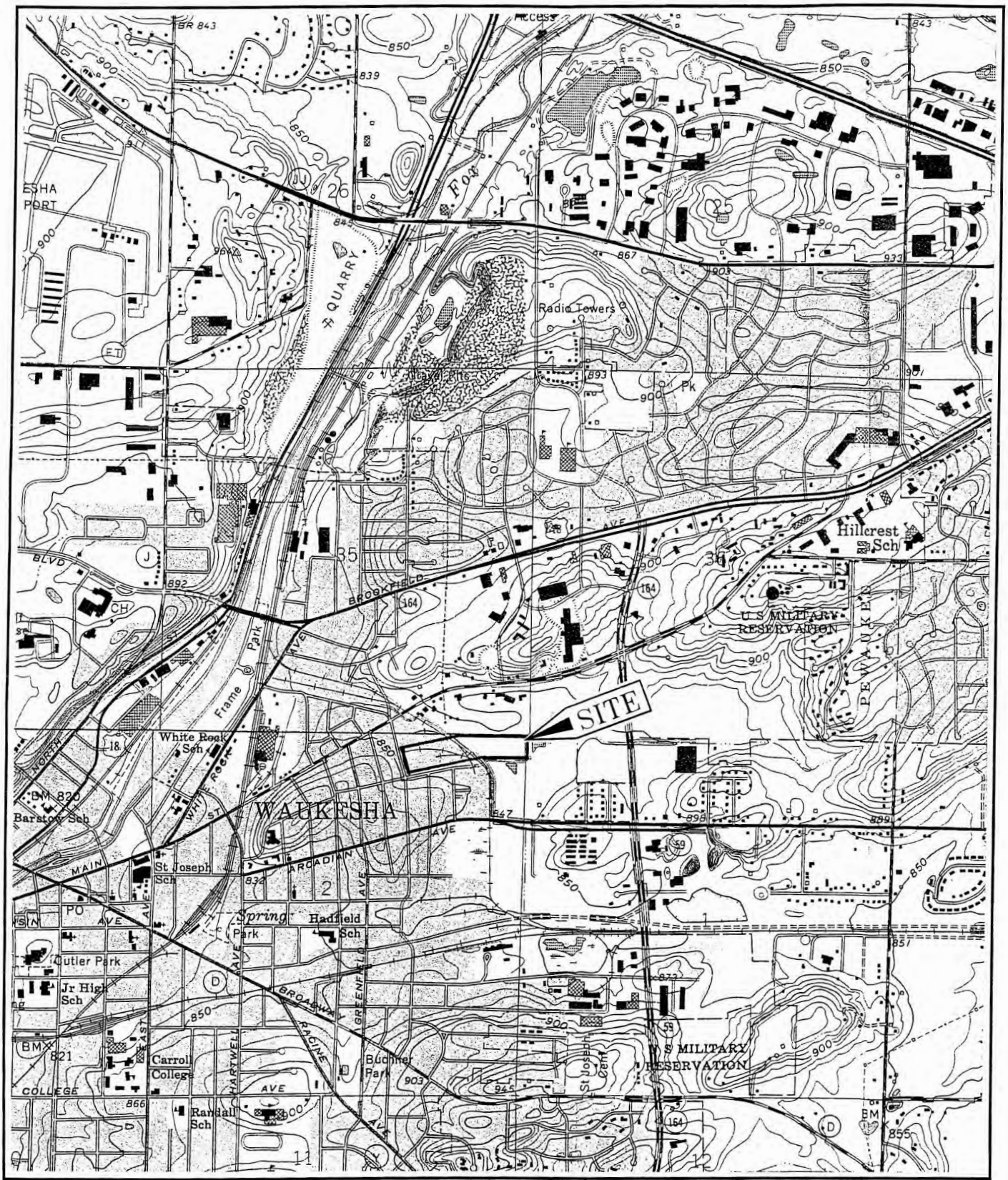
The property is situated in an industrial/commercial area of Waukesha, Wisconsin. The property is composed of approximately 16 acres which are bisected by an unnamed creek and a railroad easement (Figure 1, Site Location and Vicinity Map). The manufacturing facility is located on the western portion of the property. The eastern portion of the property was used for employee parking and demonstration of excavation equipment by both Hein-Werner and Akerman. A metal storage shed is also located on the eastern portion of the property. The eastern section of the property has been backfilled to allow its use as additional parking. Debris noted on the ground surface consisted of bricks, gravel, concrete, metal, and foundry slag. The remaining portion (90%) of the eastern half of the property is covered with asphalt or smoothly-graded gravel.

2.4.1.2 Site History

The property was formerly owned by Hein-Werner and Akerman. Both companies manufactured hydraulic components and excavation equipment at the facility.

2.4.1.3 Previous Investigations

The site history, condition, and site geology and hydrogeology and the results of numerous site investigations and remedial activities has been previously documented by Versar, Inc. (October 1992, November 1992, November 1993, June 1994, February 1994. In addition, Dakota Environmental (Dakota) conducted a geophysical survey of the eastern portion of the site, which is documented in their February 23, 1996, correspondence.



DATE:	3-28-96
PROJ #:	5E-025-001-01
FILE #:	HWF1
REV:	WCL
DRAWN:	KMC

SECOR
International Incorporated

North

FIGURE 1 - SITE LOCATION
FORMER HEIN WARNER PROPERTY
1005 PERKINS AVENUE
WAUKESHA, WISCONSIN

Source: USGS 7.5-Minute Series Waukesha, Wis. (1994); Scale 1:24,000.

Background information pertinent to the objectives of this proposed investigation are summarized below:

- The eastern section of the property has historically been utilized for employee parking and the demonstration of excavation equipment. Fill material was placed on the property between 1963 and 1975 to allow use of the area. Depth of fill material is 5 to 9.5 feet. Estimated volume of foundry fill is 69,000 cubic yards.

- Fill material consists primarily of foundry sand, with minor amounts of brick, gravel, concrete, and metal. Approximately 90% of the property is covered with asphalt or smoothly graded gravel (Versar, Inc. October 1992, November 1992).

- A series of trenches was excavated by Versar, Inc, in September 1992. The results did not indicate the presence of buried drums or industrial waste. Additionally, no photoionization detector (PID) measurements above background were observed (reference Versar, Inc. October 1992).

- Remedial activities to address polychlorinated biphenyl (PCB) impacts to surface and shallow subsurface soils were completed in June 1994 (Versar, Inc., June 3, 1994). There was no evidence of buried or surface drums observed during these remedial activities.

- Three shallow monitoring wells were installed in August 1993. The boring logs for the 3 wells indicated no evidence of buried drums. Groundwater flows from east to west cross the site and appear to be connected to the stream. Compounds found in the fill material were not observed in the groundwater samples (Versar, Inc. November 1993).

- During a WDNR inspection in 1994, several drums were noted on the northeastern portion of the site. Analysis of one sample of paint-like waste indicated the presence of lead above the regulatory limit of 5 mg/l for classification of the material as a characteristic hazardous waste (WDNR August 24, 1995). There are still drum remnants located on the northeastern portion of the site.

- Magnetic anomalies, indicative of buried ferrous metal, were recorded by Dakota during their survey of the eastern portion of the property.

- The adjacent properties to the north, south and east also appeared to have been backfilled to elevate the ground surface above flood levels (Versar, Inc. October 1992).

- Table 2-1 lists the applicable OSHA standards, ACGIH recommended TWAs and STELs, IDLH levels and odor thresholds for compounds which may be suspected to be present at the site. Toxicological properties of these compounds can be found in Attachment A.

2.5 PROPOSED DATE OF WORK: April-May 1996.

TABLE 2-1
APPLICABLE EXPOSURE LIMITS OF COMPOUNDS PRESENT
OR EXPECTED TO BE PRESENT

COMPOUND	OSHA TWA[1]	OSHA CEILING[1]	ACGIH TWA[2]	ACGIH STEL[3]	IDLH[4]	ODOR THRESHOLD[4]
Tetrachloroethylene	100 ppm	200 ppm	25 ppm	100 ppm	150 ppm	4.68 ppm
Trichloroethylene	100 ppm	200 ppm	50 ppm	100 ppm	1,000 ppm	21.4 ppm
Phenol	5 ppm	9 ppm	5 PPM	---	250 ppm	0.047 PPM
Barium	0.5 mg/m^3	---	0.5 mg/m^3	---	1,100 mg/m^3	---
Nickel	1 mg/m^3	---	1 mg/m^3	---	---	---
Zinc (as ZnO)	---	5 mg/m^3	5 mg/m^3	---	500 mg/m^3	---
Lead	0.05 mg/m^3	---	0.15 mg/m^3	---	100 mg/m^3	---

1. Occupational Safety and Health Administration (OSHA) Time Weighted Average (TWA) Values and Ceiling Values from Table Z-1, Table Z-2 and Table Z-3, CFR 1910.1000 and specific chemical regulations.
2. American Conference of Governmental Industries Hygienists (ACGIH) Time Weighted Average (TWA) Values from ACGIH Threshold Limit Values and Biological Exposure Indices for 1995-1996.
3. ACGIH Short Term Exposure Limit (STEL) Values from ACGIH Threshold Limit Values and Biological Exposure Indices for 1995-1996.
4. Immediately Dangerous to Life and Health. Values from NIOSH Pocket Guide to Chemical Hazards, June 1994.
5. Ruth "Odor Thresholds and Irritation Levels of Several Chemical Substances, A Review," Am. Indust. Hygiene Assoc. Journal, March 1986 and Billings "Odor Thresholds in Air as Compared to Threshold Limit Values," Am. Indust. Hygiene Assoc. Journal, June 1991.

3.0 HAZARD EVALUATION

3.1 POTENTIAL CHEMICAL HAZARDS

The following hazardous substances may be encountered during this project. (Mixtures of substances are possible [see Attachment A].)

POTENTIAL SUBSTANCE	FORM	PRIMARY HAZARDS
See Table 2-1	Potentially impacted soils, waste, vapors	See Attachment A.

3.2 PHYSICAL HAZARDS

The primary physical hazards posed by field activities are from working near heavy equipment (e.g., backhoes, drill rigs). Hard hats, safety glasses or goggles, ear protection, and steel toe boots are required for personnel working around such equipment. Other physical hazards include:

- Slippery/uneven footing.
- Possible heat stress due to protective equipment burden.
- Possible cold stress if work occurs during winter months.
- Possible high noise area.
- Overhead electric lines.
- Underground utilities.
- Possible high pressure lines/hoses.
- Moving parts (e.g., backhoe).

3.3 FIRE OR EXPLOSION

During operations in which exposure/release of flammable materials may occur, continuous monitoring with a combustible gas meter will be performed.

4.0 HAZARD CONTROL

4.1 EXPOSURE TO PERSONNEL

Exposure to personnel will be reduced by the following:

4.1.1 Personnel will be required to follow the General Site Safety Rules (see Attachment B).

4.1.2 Specific training will be conducted for all operational personnel on site hazards, and safety and operational procedures to be used at the job site.

4.1.3 An exclusion zone will be established and entry strictly controlled.

4.1.4 Personnel will be required to wear appropriate protective equipment.

4.1.5 Proper decontamination procedures will be followed.

4.1.6 Appropriate monitoring will be performed.

4.1.7 Underground utilities will be identified and avoided during operations.

4.1.8 Equipment shall not be operated within 10 feet of over-head powerlines, or within a distance according to CFR 1926.550(a)15, unless the powerlines are deenergized.

4.1.9 High pressure lines will be inspected daily and during operations.

4.1.10 All chains, lines, cables, etc. will be inspected daily and during operation.

4.2 PERSONNEL PROTECTIVE EQUIPMENT

Based on an evaluation of potential hazards, the following levels of personal protection have been designated for applicable work areas or tasks:

LOCATION	LEVEL OF PROTECTION
Exclusion Zone	A B [C] D
Contamination Reduction Zone	A B [C] D
Support Zone	A B C [D]

This HASP also provides on-site personnel with an optional upgrade to Level B based on atmosphere monitoring and/or function (see Section 5.0). In the event additional upgrading is determined necessary, re-evaluation of this HASP will be necessary.

4.2.1 Level D Personal Protection.

- Coveralls and protective gloves.
- Boots or shoes, steel toe.
- Hard hat.
- Safety eye wear.
- Hearing protection.

4.2.2 Level D Personal Protection (Modified).

- Disposable coveralls or PVC splash suit.
- Outer gloves, Nitrile.
- Rubber boots, steel toe.
- Hard hat.
- Safety eye wear.
- Hearing protection.

4.2.3 Level C Personal Protection.

- Full facepiece respirator or powered air purifying respirator equipped with combination organic vapor and HEPA filters (NIOSH approved).
- Disposable chemical-resistant coveralls or PVC chemical splash suit.*
- Inner gloves, PVC.
- Outer gloves, nitrile.
- Rubber boots, steel toe.

- Two-way radio communication (intrinsically safe).**
- Hard hat.
- Hearing protection.
- Safety eye wear.

* Openings taped
** Optional

4.2.4 Level B Protection

Personal Protective Equipment:

- Full facepiece supplied-air respirator (NIOSH approved). Respirators may be:
  - Full facepiece pressure-demand, self-contained breathing apparatus

    or

  - Full facepiece pressure-demand, airline respirator (with escape bottle for IDLH or potential for IDLH atmosphere).
- Chemical-resistant clothing (hooded, one or two-piece chemical-splash suit or disposable, chemical-resistant, one-piece suits).
- Long underwear.*
- Coveralls.*
- Gloves (outer), chemical-resistant.
- Gloves (inner), chemical-resistant.
- Boots (outer), chemical-resistant, steel toe and shank.
- Boot covers (outer), chemical-resistant (disposable).*
- Hard hat (face shield*) (as required).
- Hearing protection (as required).
- Radio.*

*Optional equipment.

Personnel required to utilize Level C or Level B protection must have obtained the appropriate health and safety training, and have completed fit testing protocol for Level C or Level B respiratory protection.

Note: No changes to specified levels of protection shall be made without the approval of the Health and Safety Officer.

4.3 OTHER SAFETY EQUIPMENT REQUIRED ON SITE

4.3.1 Fire Extinguisher, CO_2 or Dry Chemical.

4.3.2 Eye/Face Wash or On-Site Safety Shower.

4.3.3 First Aid Kit.

4.3.4 Warning Horn.

4.3.5 Monitoring Equipment - See Section 5.0.

4.3.6 Spill Containment Equipment.

5.0 ATMOSPHERIC MONITORING AND ACTION LEVELS

The Site Health and Safety Officer shall be responsible for enforcing Air Monitoring Action Levels.

Prior to initiation of field work, a general air quality survey will be made to determine ambient air quality at the site. Results of this survey will be used to designate locations of decontamination and support zones and determine initial personnel protective equipment requirements and monitoring frequencies.

During field activities at the Site, an air quality survey shall be performed utilizing equipment described below. If additional chemical hazards are encountered during the course of the project, other types of instruments may be required.

Prior to each days's use, all instruments will be field calibrated in accordance with manufacturer's recommended procedures utilizing the recommended calibration/span gas. Instrument calibration will be recorded in the project logbook. Malfunctioning instruments (including those which cannot be calibrated ± 5% of the span gas concentration) will be reported to the Health and Safety Officer.

Note: Based on his evaluation of air monitoring data, type of work in progress, likelihood of exposure, etc., the Site Health and Safety Officer, after consultation with the Office Health and Safety Officer may modify the levels of personal protection and frequency of sampling.

5.1 AREA MONITORING

5.1.1 Combustible Gas/Hydrogen Sulfide Monitoring

In the event of possible exposure/release of flammable materials and/or hydrogen sulfide (H_2S), a combustible gas/H_2S meter shall be used to continuously monitor for hazardous conditions. The following action levels shall be observed:

INSTRUMENT READING, LOWER EXPLOSIVE UNIT LIMIT (LEL)	ACTION
1% - 10%	Investigate and control source of combustible gas. Continue operations.
>10% - 25%	All ignition sources shall be shut-off. Continue operations.
>25%	All ignition sources shall be shut off and the site evacuated.

INSTRUMENT READING, H_2S	ACTION
> 0 ppm - 10 ppm	Normal Operations, Investigate and Control H_2S source
>10 ppm - 50 ppm	Level B, Investigate and Control Source
> 50 ppm	Level B, Cease Operations, Investigate and Control Source

5.1.2 Organic Vapor Monitoring

Atmosphere monitoring for organic vapors will be conducted using a flame ionization detector (FID) or photoionization detector (PID). This instrumentation will determine the need to upgrade the level of personnel protection. The atmosphere in the immediate work area and in the workers' breathing zone will be continuously monitored during trenching operations.

During on-site activities the following action levels shall be observed:

INSTRUMENT READING (ppm)	ACTION LEVEL
Background - 5	Level D
> 5 - 50	Level C*
> 50 - 1,000	Level B
> 1,000	Evacuate

*If a continuous (5 minute) concentration of 5 units above background is recorded, *SECOR* will halt work activities and immediately notify the contractor and client. At this point, further upgrade in protective level will be required prior to initiating further work activities.

5.2 PERSONNEL MONITORING

Personnel will be monitored for any physiological changes indicative of exposure to hazardous chemicals (see Attachment A) or heat or cold stress (see Attachment C).

6.0 ORGANIZATION/FUNCTIONS

A work party consisting of the following persons will assume the responsibilities indicated below:

6.1 PROJECT MANAGER: William C. Looney, Jr.

Function: Prepares Proposal: Ensures work plan is completed on schedule. Serves as customer liaison. Coordinates facilities, materials and personnel required to accomplish job. Implements financial controls.

6.2 PROJECT SUPERVISOR: William C. Looney, Jr.

Function: Oversees and directs operations as representative of *SECOR* and client ensures project Health and Safety Plan implementation.

6.3 PROJECT SUBCONTRACTOR: To be determined.

Function: Advises on use and operates equipment. Performs on-site tasks under direction of Project Supervisor. Complies with site safety plan. Notifies Project Supervisor of unsafe conditions.

6.4 SITE HEALTH AND SAFETY OFFICER: Duane A. Stillings

Function: Designates safety procedures and equipment. Prepares health and safety plan. Ensures health and safety procedures are implemented.

6.5 PROJECT GEOLOGIST: Duane A. Stillings.

Function: Maintains log of trenching activities, obtains and evaluates samples. Sample custodian.

6.6 PROJECT TECHNICIAN: Gregory S. Vogel.

Performs on-site tasks at direction of Project Supervisor; perform perimeter air monitoring.

6.7 WORK PARTY BRIEFING

The work party was briefed on the contents of this plan at:

_____

_____

7.0 MEDICAL MONITORING PROGRAM

All *SECOR* site workers and assigned subcontractor personnel engaged in hazardous waste field activities as specified in 29 CFR 1910.120 shall be required to enter a comprehensive medical monitoring program established by their respective employers. This program will consist of the following:

7.1 PREWORK ASSIGNMENT PHYSICAL EXAMINATION

All employees shall be required to pass a comprehensive pre-employment medical examination prior to working at hazardous waste sites. The examination includes:

- Complete medical and occupation history.
- Full physical examination.
- Vital systems check.
- Screening audiometry.
- Pulmonary function test.
- Electrocardiogram.
- Chest X-ray.
- Blood test including CBC and SMA24.
- Urinalysis including microscopic.
- Drug screen.
- Back motion tests.
- Other special tests as deemed necessary by the Company Physician.

Following the results of the hand-on physical and the laboratory tests, the physician determines whether the employees is:

- Qualified to work in areas where exposure to chemicals or physical stress is possible.
- Physically able to use protective equipment, including respirator.

7.2 ANNUAL AND EXIT EXAMINATION

An identical program will be conducted on an annual basis and at employee termination. Additional testing may be conducted when special or unusual conditions exist.

7.3 MEDICAL SUPPORT SERVICES

The Company Physician will provide medical consultation services (to advise on medical and health questions as they arise) and evaluate the care of individuals with work related exposures, injuries or illness.

If exposure to infectious and/or medical wastes can be reasonably expected, applicable provisions of the United States Department of Labor, Occupational Safety and Health Administration (OSHA) Occupational Exposure to Bloodborne Pathogens Standard (29 CFR 1910.1030), including the preexposure hepatitis B vaccination requirement, shall be followed.

8.0 HEALTH AND SAFETY TRAINING PROGRAM

8.1 INITIAL TRAINING

All personnel involved in job site operations will receive training commensurate to their specific job function and exposure possibility prior to initiation of operations.

For jobs involving hazardous waste-related field activities, *SECOR* field personnel and assigned project subcontractor personnel will receive training to meet requirements for hazardous waste operations training as outlined in 29 CFR 1912.120 prior to initiation of operations.

8.2 SITE SPECIFIC TRAINING

Employees assigned to the Site will be given site specific training to include the following subject matter:

8.2.1 General site safety rules and regulations.

8.2.2 Acute and chronic effects of toxic materials found at the Site.

8.2.3 Routes of potential exposure and field activities which could result in such exposure.

8.2.4 Need for personal protection, types of protection, its effectiveness and limitations.

8.2.5 Proper use and fitting of respiratory protective equipment.

8.2.6 Medical surveillance program review.

8.2.7 Work zones established at the Site.

8.2.8 Prohibited activities in the Exclusion and Contamination Reduction Zone. The prohibited activities include:

- Wearing glasses or having facial hair, such as beards and long sideburns, which interfere with respirator fit.
- Wearing Contact lenses.
- Eating, drinking, smoking, chewing gum and use of smokeless tobacco products in nondesignated areas.
- Wearing of personal articles such as watches, rings, etc.
- Working when ill.

8.2.9 Engineering controls and safe work practices associated with each employee's work assignment including dust control measures and use of "buddy system."

8.2.10 Personal and equipment decontamination procedures.

8.2.11 Emergency response procedures.

8.2.12 Basic operational safety, emphasizing hazards expected on-site.

8.2.13 If exposure to infectious or medical wastes can be reasonably expected, applicable provisions of the OSHA Occupational Exposure to Bloodborne Pathogens Standard (29 CFR 1910.1030), including the hepatitis B vaccination, shall be followed.

8.3 VISITOR AND SUBCONTRACTOR TRAINING.

Subcontractors and visitors to the site will be made aware of the hazards associated with the Site, emergency procedures and will be trained in the use, limitations and fit of any personal protective equipment required during the visit.

8.4 SAFETY MEETING

An informal "tailgate" type safety meeting will be held each morning. This meeting will be conducted by the Site Health and Safety Officer or his designated representative and include field operations personnel. Safety/accident prevention information pertinent to job performance will be discussed at these meetings.

8.5 LABORATORY CONSIDERATIONS

Analysis of air, soil, sediment and water samples for detailed chemical or geophysical content analysis will be conducted by the subcontract analytical laboratory. The laboratory director must be informed of any possible contaminants in the samples that would require special handling procedures to prevent risks to the health and safety of laboratory personnel.

9.0 COMMUNICATION PROCEDURE

9.1 Personnel in the Exclusion Zone should remain within sight of the supervisor. The Buddy System will be utilized.

9.2 Rapid horn blasts will be the emergency signal to indicate that all personnel should leave the Exclusion Zone.

9.3 The following hand signals may be used:

9.3.1 Hand Gripping Throat: Out of air, can't breathe, respirator problem.

9.3.2 Grip Partner's Wrist or Both Hands Around Waist: Leave area immediately.

9.3.3 Hands on Top of Head: Need assistance.

9.3.4 Thumbs Up: O.K.; I am all right; I understand.

9.3.5 Thumbs Down: No; negative.

10.0 DECONTAMINATION PROCEDURES

10.1 LEVEL D PERSONAL PROTECTION

If contamination is suspected or observed during field activities, personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated. For personnel involved in Level D work, decontamination, other than normal washing, is not anticipated.

10.2 LEVEL C AND B PERSONAL PROTECTION

Decontamination procedures shall be utilized in the event contamination is encountered, and upgraded levels of personnel protection (Levels C, B or A) used. Personnel involved in Level C or B work will decontaminate themselves and their equipment by physically removing the contaminated clothing or by changing the chemical nature of contaminants to innocuous substances. Specific decontamination procedures are given in Attachment D.

10.3 EQUIPMENT LEAVING EXCLUSION AREA

Equipment leaving the exclusion area will be decontaminated by washing with a decontamination solution or steam cleaning. Personnel performing equipment decontamination will wear appropriate protective clothing (Section 4.0).

10.4 DECONTAMINATION EQUIPMENT

The following decontamination equipment is required:

- Five-gallon pails and/or wash tubs.
- Plastic Sheeting.
- Plastic Bags.
- Sponges and brushes.
- Personnel decontamination solution (soap and water).

11.0 DISPOSAL

Contaminated clothing and equipment will be packaged and stored on site, as appropriate, pending determination of disposal method.

12.0 EMERGENCY INFORMATION AND PROCEDURES

12.1 EMERGENCY MEDICAL CARE AND TREATMENT

Prior to starting work at the Site, local emergency organizations (i.e., hospital, ambulance, fire department, police, etc.) will be contacted to coordinate adequate response to potential emergencies.

Emergency telephone numbers and a map with directions to the nearest medical treatment facility will be conspicuously posted at the Site (see Attachment E).

Emergency decontamination equipment and first aid equipment will be readily available on-site.

In the event of an injury or chemical exposure, the affected employee(s) will be transported to the Medical Center. If possible, employee(s) suffering from chemical exposure will be accompanied by a Material Safety Data Sheet giving specific information about the chemicals.

12.2 EMERGENCY MEDICAL INFORMATION

12.2.1 Effects of Exposure

See Attachment A.

12.2.2 First Aid

Eyes:	Flush with water for 15 minutes. Get medical attention.
Skin:	Wash immediately with soap and water. Medical attention required if irritation persists/skin damage evident.
Inhalation:	Be prepared to administer artificial respiration if breathing stops. Medical attention required

12.3 EMERGENCY FIRE FIGHTING PROCEDURES

12.3.1 Wear full face SCBA and impervious over-clothing.

12.3.2 Control discharge and runoff.

12.4 EMERGENCY RESPONSE CONTACTS

Dial 911 for Immediate Emergency.

12.4.1 Hospital: Waukesha Memorial Hospital
725 American Avenue
Waukesha, Wisconsin
414/544-2267

12.4.2 Ambulance: 911

12.4.3 Fire: 911

12.4.4 Police: 911

12.4.5 Emergency Spill: 414/263-8491

12.4.6 Health and Safety: Duane A. Stillings
414/790-1974

12.5 EMERGENCY PROCEDURE (should be modified as required for incident):

The following standard emergency procedures will be used by on-site personnel. The Project Supervisor shall be notified of any on-site emergencies and is responsible for ensuring that the appropriate procedures are followed:

12.5.1 Personnel Injury in the Exclusion Zone: Upon the notification of an injury in the Exclusion Zone, the designated emergency signal (rapid short horn blasts) shall be sounded. All site personnel shall assemble at the decontamination line. The rescue team will enter the Exclusion Zone (if required) to move the injured person to the hotline. The Project Supervisor and Site Health and Safety Officer should evaluate the nature of the injury, and the affected person should be decontaminated to the extent possible prior to movement to the Support Zone. The appropriate first aid shall be administered and contact should be made for an ambulance and with the designated medical facility (if required). No persons shall re-enter the Exclusion Zone until the cause of the injury or symptoms is determined.

12.5.2 Personnel Injury in the Support Zone: Upon notification of an injury in the Support Zone, the Project Supervisor and Site Health and Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others, the designated emergency signal (rapid horn blasts) shall be sounded and all site personnel shall move to the decontamination line for further instructions. Activities on site will stop until the added risk is removed or minimized.

12.5.3 Fire/Explosion: Upon notification of a fire or explosion on site, the designated emergency signal (rapid horn blasts) shall be sounded and all site personnel assembled at the decontamination line. The fire department shall be alerted and all personnel moved to a safe distance from the involved area.

12.5.4 Personal Protective Equipment Failure: If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his/her buddy shall immediately leave the Exclusion Zone. Re-entry shall not be permitted until the equipment has been repaired or replaced.

12.5.5 Other Equipment Failure: If any other equipment on site fails to operate properly, the Project Supervisor shall be notified and determine the effects of this failure on continuing operations on site. If failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

12.5.6 The following emergency escape routes are designed for use in those situations where egress from the Exclusion Zone cannot occur through the decontamination line:

(to be determined prior to initiation of operations)

12.5.7 In all situations, when an on-site emergency results in evacuation of the Exclusion Zone, personnel shall not re-enter until:

- The conditions resulting in the emergency have been corrected.
- The hazards have been reassessed.
- The Site Safety Plan has been reviewed.
- The Project Manager/Safety Officer states that re-entry is allowed.

13.0 REFERENCES

13.1 NIOSH/OSHA/USCG/EPA. 1985. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities.

13.2 U.S. EPA. 1985. Characterization of Hazardous Waste Site - A Methods Manual: Volume I Site Investigations; EPA 600/4-84-075.

13.3 ACGIH. 1995. Threshold Limit Values and Biological Exposure Indices for 1995-1996, American Conference of Governmental Industrial Hygienists, Cincinnati, OH.

13.4 NIOSH. 1994. Pocket Guide to Chemical Hazards. National Institute for Occupational Safety and Health, Cincinnati, OH.

13.5 ANSI, 1980. Practices for Respiratory Protection. ANSI Z88.2-1980. American National Standards Institute, 1430 Broadway, New York, NY 10018.

13.6 NIOSH. 1987. Guide to Industrial Respiratory Protection.

13.7 NIOSH. 1986. Criteria for a Recommended Standard . . . Occupational Exposure to Hot Environments.

13.8 Schwope, A.D.: Costas, P.P.; Jackson, J.E.; and D.J. Weitzman. 1985. Guidelines for the Selection of Chemical-Protective Clothing, Second Edition. American Conference of Governmental Industrial Hygienists, Inc. 6500 Lynnway Avenue, Building D-7, Cincinnati, OH 45211.

13.9 USEPA. 1992. Standard Operating Safety Guides Publication, 92285.1-03.

14.0 CERTIFICATION

All personnel have read the above plan and are familiar with its provisions.

_____	_____
Project Manager	Signature
_____	_____
Project Supervisor	Signature
_____	_____
_____	_____
_____	_____
_____	_____
Other Site Personnel	Signatures

ATTACHMENT A

HAZARDOUS SUBSTANCES INFORMATION

MSDS for TETRACHLOROETHYLENE Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: TETRACHLOROETHYLENE
FORMULA: CL2C:CCL2
FORMULA WT: 165.83
CAS NO.: 00127-18-4
NIOSH/RTECS NO.: KX3850000
COMMON SYNONYMS: PERCHLOROETHYLENE; ETHYLENE TETRACHLORIDE; CARBON BICHLORIDE; CARBON DICHLORIDE
PRODUCT CODES: 9218,9453,5380,9465
EFFECTIVE: 02/12/87
REVISION #03

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	3	SEVERE (CANCER CAUSING)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	3	SEVERE (LIFE)

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

DANGER
HARMFUL IF SWALLOWED OR INHALED
EXCEPTIONAL HEALTH AND CONTACT HAZARDS - READ MATERIAL SAFETY DATA SHEET
NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE.
NOTE: THIS MATERIAL OR ITS VAPORS IN CONTACT WITH FLAMES OR HOT GLOWING SURFACES MAY FORM CORROSIVE ACID FUMES.
KEEP AWAY FROM HEAT, SPARKS, FLAME. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
TETRACHLOROETHYLENE	90-100	127-18-4

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3 - PHYSICAL DATA

BOILING POINT: 121 C (250 F) VAPOR PRESSURE(MM HG): 13

MELTING POINT: -22 C (-8 F) VAPOR DENSITY(AIR=1): 5.8

SPECIFIC GRAVITY: 1.62 (H2O=1) EVAPORATION RATE: 2.80 (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: COLORLESS LIQUID WITH ETHER OR CHLOROFORM ODOR.

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A NFPA 704M RATING: 2-0-0

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS
CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE.

TOXIC GASES PRODUCED
HYDROGEN CHLORIDE, PHOSGENE, CARBON MONOXIDE, CARBON DIOXIDE

5 - HEALTH HAZARD DATA

ACCEPTABLE MAXIMUM PEAK ABOVE THE ACCEPTANCE CEILING CONCENTRATION FOR AN EIGHT-HOUR SHIFT = 300 PPM FOR 5 MINUTES IN ANY 3 HOURS. (PEL) CEILING = 200 PPM

THRESHOLD LIMIT VALUE (TLV/TWA): 335 MG/M3 (50 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 1340 MG/M3 (200 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): MG/M3 (100 PPM)

TOXICITY: LD50 (ORAL-RAT)(MG/KG) - 8850
LD50 (IPR-MOUSE)(MG/KG) - 4700

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
INHALATION OF VAPORS MAY CAUSE HEADACHE, NAUSEA, VOMITING, DIZZINESS, DROWSINESS, IRRITATION OF RESPIRATORY TRACT, AND LOSS OF CONSCIOUSNESS. LIQUID MAY BE IRRITATING TO SKIN AND EYES. PROLONGED SKIN CONTACT MAY RESULT IN DERMATITIS. EYE CONTACT MAY RESULT IN TEMPORARY CORNEAL DAMAGE.

INGESTION MAY CAUSE NAUSEA, VOMITING, HEADACHES, DIZZINESS, GASTROINTESTINAL IRRITATION.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE DAMAGE TO KIDNEYS, LIVER, LUNGS, BLOOD, OR CENTRAL NERVOUS SYSTEM.

TARGET ORGANS
LIVER, KIDNEYS, EYES, UPPER RESPIRATORY SYSTEM, CENTRAL NERVOUS SYSTEM

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

SOME EXPERIMENTS WITH TEST ANIMALS INDICATED THAT THIS SUBSTANCE MAY BE ANTICIPATED TO BE A CARCINOGEN.

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS, ALKALI METALS, ALUMINUM

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, PHOSGENE, CARBON MONOXIDE, CARBON DIOXIDE

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS.
TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U210 (TOXIC WASTE)

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8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.
RESPIRATORY PROTECTION:	RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 50 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.
EYE/SKIN PROTECTION:	SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, POLYVINYL ALCOHOL GLOVES ARE RECOMMENDED.

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9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

SPECIAL PRECAUTIONS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA.
STORE IN A COOL, WELL-VENTILATED AREA AWAY FROM SOURCES OF HEAT, FLAME, OR IGNITION.

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10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	TETRACHLOROETHYLENE (AIR ONLY)
HAZARD CLASS	ORM-A
UN/NA	UN1897
LABELS	NONE
REPORTABLE QUANTITY	1 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	TETRACHLOROETHYLENE
HAZARD CLASS	6.1
UN/NA	UN1897
LABELS	HARMFUL - STOW AWAY FROM FOOD STUFFS

MSDS for TRICHLOROETHYLENE Page 1

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: TRICHLOROETHYLENE
FORMULA: C2HCL3
FORMULA WT: 131.40
CAS NO.: 79-01-6
NIOSH/RTECS NO.: KX4550000
COMMON SYNONYMS: TRICHLOROETHENE; ETHINYL TRICHLORIDE; ACETYLENE TRICHLORIDE; TCE
PRODUCT CODES: 5376,9458,9454,9455,9464,9473
EFFECTIVE: 01/22/87
REVISION #03

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	3	SEVERE (CANCER CAUSING)
FLAMMABILITY	-	1	SLIGHT
REACTIVITY	-	1	SLIGHT
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

WARNING
HARMFUL IF SWALLOWED OR INHALED
CAUSES IRRITATION
NOTE: THIS MATERIAL OR ITS VAPORS IN CONTACT WITH FLAMES OR HOT GLOWING SURFACES MAY FORM CORROSIVE ACID FUMES.
NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE.
AVOID CONTACT WITH EYES, SKIN, CLOTHING.
DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
TRICHLOROETHYLENE	90-100	79-01-6

3 - PHYSICAL DATA

BOILING POINT: 87 C (189 F) VAPOR PRESSURE(MM HG): 58

MSDS for TRICHLOROETHYLENE Page 2

MELTING POINT: -73 C (-99 F) VAPOR DENSITY(AIR=1): 4.53

SPECIFIC GRAVITY: 1.47 (H2O=1) EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): SLIGHT (0.1 TO 1 %) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: COLORLESS LIQUID WITH CHLOROFORM ODOR.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A NFPA 704M RATING: 2-1-0

FLAMMABLE LIMITS: UPPER - 10.5 % LOWER - 8.0 %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS
GIVES OFF FLAMMABLE VAPORS. VAPORS MAY FORM EXPLOSIVE MIXTURE WITH AIR. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.

TOXIC GASES PRODUCED
HYDROGEN CHLORIDE, PHOSGENE, CHLORINE, CARBON MONOXIDE, CARBON DIOXIDE

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5 - HEALTH HAZARD DATA

SOME EXPERIMENTS WITH TEST ANIMALS INDICATED THAT THIS SUBSTANCE MAY BE ANTICIPATED TO BE A CARCINOGEN.

THRESHOLD LIMIT VALUE (TLV/TWA): 270 MG/M3 (50 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 1080 MG/M3 (200 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): MG/M3 (100 PPM)

TOXICITY:
LD50 (ORAL-RAT)(MG/KG) - 7193
LD50 (IPR-MOUSE)(MG/KG) - 3000
LD50 (IV-MOUSE) (MG/KG) - 34

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
INHALATION OF VAPORS MAY CAUSE HEADACHE, NAUSEA, VOMITING, DIZZINESS,

http://physchem.ox.ac.uk/MSDS/T/TRICHLOROETHYLENE

MSDS for TRICHLOROETHYLENE Page 3

DROWSINESS, IRRITATION OF RESPIRATORY TRACT, AND LOSS OF CONSCIOUSNESS.
INHALATION OF VAPORS MAY CAUSE PULMONARY EDEMA.
CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION.
PROLONGED EXPOSURE MAY CAUSE DERMATITIS.
INGESTION MAY CAUSE NAUSEA, VOMITING, HEADACHES,DIZZINESS,
GASTROINTESTINAL IRRITATION, CENTRAL NERVOUS SYSTEM DEPRESSION AND
HEARING LOSS.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE DAMAGE TO KIDNEYS, LIVER,
LUNGS, BLOOD, OR CENTRAL NERVOUS SYSTEM.

TARGET ORGANS
RESPIRATORY SYSTEM, HEART, LIVER, KIDNEYS, CENTRAL NERVOUS SYSTEM

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT
LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

ACCEPTABLE MAXIMUM PEAK ABOVE THE ACCEPTANCE CEILING CONCENTRATION FOR AN
EIGHT-HOUR SHIFT = 300 PPM FOR 5 MINUTES IN ANY 2 HOURS. (PEL)
CEILING = 200 PPM.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION, LIGHT

INCOMPATIBLES: CHEMICALLY ACTIVE METALS, STRONG BASES,
STRONG OXIDIZING AGENTS

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, PHOSGENE, CHLORINE,
CARBON MONOXIDE, CARBON DIOXIDE

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7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS.
TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE

http://physchem.ox.ac.uk/MSDS/T/TRICHLOROETHYLENE

INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U228 (TOXIC WASTE)

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8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.
RESPIRATORY PROTECTION:	RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 1000 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.
EYE/SKIN PROTECTION:	SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, NEOPRENE GLOVES ARE RECOMMENDED.

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9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA.

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10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	TRICHLOROETHYLENE (AIR ONLY)
HAZARD CLASS	ORM-A
UN/NA	UN1710
LABELS	NONE
REPORTABLE QUANTITY	1000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	TRICHLOROETHYLENE
HAZARD CLASS	6.1
UN/NA	UN1710
LABELS	HARMFUL - STOW AWAY FROM FOOD STUFFS

MSDS for PHENOL Page 1

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: PHENOL
FORMULA: C6H5OH
FORMULA WT: 94.11
CAS NO.: 00108-95-2
NIOSH/RTECS NO.: SJ3325000
COMMON SYNONYMS: CARBOLIC ACID; HYDROXYBENZENE; MONOHYDROXYBENZENE; PHENIC ACID; PHENYLIC ACID
PRODUCT CODES: 2858,2862
EFFECTIVE: 01/22/87
REVISION #04

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	3	SEVERE (LIFE)
FLAMMABILITY	-	2	MODERATE
REACTIVITY	-	1	SLIGHT
CONTACT	-	4	EXTREME (CORROSIVE)

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

** CODE NOT ON FILE **

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
COMBUSTIBLE
CAUSES SEVERE BURNS - RAPIDLY ABSORBED THROUGH SKIN
MAY BE FATAL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN
EXCEPTIONAL HEALTH AND CONTACT HAZARDS - READ MATERIAL SAFETY DATA SHEET
KEEP AWAY FROM HEAT, SPARKS, FLAME. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE DUST. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, SOAK WITH WATER. IN CASE OF SPILL, SWEEP UP AND REMOVE. FLUSH SPILL AREA WITH WATER.

SAF-T-DATA(TM) STORAGE COLOR CODE: RED STRIPE (STORE SEPARATELY)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
PHENOL	90-100	108-95-2

3 - PHYSICAL DATA

BOILING POINT: 182 C (360 F) VAPOR PRESSURE(MM HG): 0.35

MSDS for PHENOL Page 2

MELTING POINT: 40 C (104 F) VAPOR DENSITY(AIR=1): 3.24

SPECIFIC GRAVITY: 1.07 (H2O=1) EVAPORATION RATE: <1 (BUTYL ACETATE=1)

SOLUBILITY(H2O): MODERATE (1 TO 10 %) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: COLORLESS CRYSTALS; CHARACTERISTIC ODOR.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP 79 C (175 F) NFPA 704M RATING: 3-2-0

FLAMMABLE LIMITS: UPPER - 8.6 % LOWER - 1.5 %

FIRE EXTINGUISHING MEDIA
USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS
GIVES OFF HEAVY SMOKE.
GIVES OFF FLAMMABLE VAPORS. VAPORS MAY FORM EXPLOSIVE MIXTURE WITH AIR. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.

TOXIC GASES PRODUCED
CARBON MONOXIDE, CARBON DIOXIDE

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5 - HEALTH HAZARD DATA

TLV AND PEL LISTED DENOTE (SKIN).

THRESHOLD LIMIT VALUE (TLV/TWA): 19 MG/M3 (5 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 38 MG/M3 (10 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 19 MG/M3 (5 PPM)

TOXICITY:
LD50 (ORAL-RAT)(MG/KG) - 384
LD50 (SKN-RAT) (MG/KG) - 669
LD50 (IPR-RAT)(MG/KG) - 250
LC50 (INHL-RAT) (MG/KG) - 316

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE

ACUTE POISONING VIA ALL ROUTES OF EXPOSURE MAY BE SEVERE ENOUGH TO BE FATAL.
INHALATION OF DUST MAY CAUSE HEADACHE, COUGHING, DIFFICULTY IN BREATHING, CHEST PAIN, SEVERE LUNG IRRITATION, OR PULMONARY EDEMA.
CONTACT WITH SKIN OR EYES MAY CAUSE SEVERE IRRITATION OR BURNS.
SUBSTANCE IS READILY ABSORBED THROUGH THE SKIN.
INGESTION MAY CAUSE NAUSEA, VOMITING, GASTROINTESTINAL IRRITATION, AND BURNS TO MOUTH AND THROAT.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER DAMAGE.

TARGET ORGANS

LIVER, KIDNEYS, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

KIDNEY DISORDERS

ROUTES OF ENTRY

INHALATION, ABSORPTION, INHALATION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING; IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION, LIGHT, AIR

INCOMPATIBLES: STRONG OXIDIZING AGENTS, STRONG BASES, ALKALIES, CALCIUM HYPOCHLORITE

DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING, OR FLAMES IN AREA. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U188 (TOXIC WASTE)

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 50 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIV E SUIT, VITON GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: RED STRIPE (STORE SEPARATELY)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA OR CABINET.
STORE IN LIGHT-RESISTANT CONTAINERS.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	PHENOL
HAZARD CLASS	POISON B
UN/NA	UN1671
LABELS	POISON
REPORTABLE QUANTITY	1000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	PHENOLS
HAZARD CLASS	6.1
UN/NA	UN1671
LABELS	POISON

Common Name: Barium
CAS Number: 7440-39-3
DOT Number: UN 1400 Non-Powder/UN 1854 Powder
Date: January, 1986

HAZARD SUMMARY

* Barium can affect you when breathed in.
* Exposure can irritate the eyes, nose, and throat.
* Repeated high exposures can irritate the lungs, causing cough and phlegm, and may cause an abnormal chest x-ray.
* Very high exposures (such as swallowing or extremely high dust exposure) can cause Barium poisoning with symptoms of vomiting, and diarrhea, irregular heart beat, paralysis, and death.

IDENTIFICATION

Barium is a silver white or yellowish metal powder. It is used in spark plugs, engine rod bearings and to remove gas from vacuum tubes.

REASON FOR CITATION

* Barium is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT and EPA.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is 0.5 mg/m3 averaged over an 8-hour work-shift.
ACGIH: The recommended airborne exposure limit is 0.5 mg/m3 averaged over an 8-hour workshift.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly at the end of the work-shift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Barium to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible. Good WORK PRACTICES can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by Barium powder should change into clean clothing promptly.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to Barium powder.
* Wash any areas of the body that may have contacted Barium at the end of each work day, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where Barium is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating or smoking.
* Do not dry sweep for clean-up. Use a vacuum or a wet method to reduce dust during clean-up.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

The following recommendations are only guidelines and may not apply to every situation.

Clothing
* Avoid skin contact with Barium. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection
* Wear dust-proof goggles when working with powders or dust, unless full face-piece respiratory protection is worn.

Respiratory Protection
* IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Where the potential exists for exposures to Barium Dust, use a MSHA/NIOSH approved respirator equipped with particulate (dust/fume/mist) filters. Particulate filters must be checked every day before work for physical damage, such as rips or tears, and replaced as needed.
* If while wearing a filter, cartridge or canister respirator, you can smell, taste, or otherwise detect Barium, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter, cartridge, or canister. If the seal is no longer good, you may need a new respirator.
* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters, cartridges, or canisters, to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
* Where the potential for high exposures exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in the positive pressure mode or with a full facepiece, hood, or helmet in the continuous flow mode, or use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
* Exposure to 250 mg/m3 is immediately dangerous to life and health. If the possibility of exposures above 250 mg/m3 exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in continuous flow or other positive pressure mode.

HANDLING AND STORAGE

* Prior to working with Barium you should be trained on its proper handling and storage.
* Explosion risk varies with type of Barium compound.
* Barium must be stored to avoid contact with STRONG ACIDS (such as HYDROCHLORIC, SULFURIC, and NITRIC) and HALOGENATED HYDROCARBONS since violent reactions occur.
* Store Barium powder in sealed containers under an inert gas or oxygen-free petroleum liquid away from water, oxidizers, acids or ammonia.
* Sources of ignition such as smoking and open flames are prohibited where Barium powder is handled, used, or stored.
* Use only non-sparking tools and equipment, especially when opening and closing containers of Barium powder.

Common Name: Barium
DOT Number: UN 1400 Non Powder/UN 1854 Powder
DOT Emergency Guide code: 40/37
CAS Number: 7440-39-3

Hazard rating	NJ DOH	NFPA
FLAMMABILITY	3	Not Rated
REACTIVITY	2	Not Rated

DO NOT USE WATER
POWDER MAY IGNITE SPONTANEOUSLY IN AIR
POISONOUS GASES ARE PRODUCED IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

HEALTH HAZARD INFORMATION

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to Barium:

* Exposure can irritate the eyes, nose, throat, and lungs, and may cause coughing.
* Contact may damage the eyes.
* Very high exposures could cause Barium poisoning with symptoms of vomiting, diarrhea, irregular heartbeat, paralysis, and death.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to Barium and can last for months or years:

Cancer Hazard
* According to the information presently available to the New Jersey Department of Health, Barium has not been tested for its ability to cause cancer in animals.

Reproductive Hazard
* According to the information presently available to the New Jersey Department of Health, Barium has not been tested for its ability to affect reproduction.

Other Long-Term Effects
* Repeated exposure can cause an abnormal chest x-ray. This usually takes years to develop. An abnormal chest x-ray from Barium does not mean the lung has been damaged but very irritating substances may affect the lungs. It is not known whether Barium causes lung damage.

MEDICAL

Medical Testing
For those with frequent or potentially high exposure (half the TLV or greater), the following are recommended before beginning work and at regular times after that:

* Lung function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

Mixed Exposures
Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

WORKPLACE CONTROLS AND PRACTICES

http://physchem.ox.ac.uk/MSDS/B/barium

FIRE HAZARDS

* Barium POWDER is a flammable solid.
* POISONOUS GASES ARE PRODUCED IN FIRE.
* CONTAINERS MAY EXPLODE IN FIRE.
* FIRE MAY RESTART AFTER IT HAS BEEN EXTINGUISHED.
* Powder may ignite spontaneously in air.
* Use dry chemicals appropriate for extinguishing metal fires.
* Do not use water.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If Barium is spilled, take the following steps:

* Restrict persons not wearing protective equipment from area of spill until cleanup is complete.
* Remove all ignition sources.
* Collect powdered material in the most convenient and safe manner and deposit in sealed containers. Do not use water.
* Keep Barium out of a confined space, such as a sewer, because of the possibility of an explosion, unless the sewer is designed to prevent the build-up of explosive concentrations.
* It may be necessary to contain and dispose of Barium as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

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FOR LARGE SPILLS AND FIRES immediately call your fire department.
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FIRST AID

Eye Contact
* Immediately flush with large amounts of water. Continue without stopping for at least 30 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

Skin Contact
* Remove contaminated clothing. Wash contaminated skin with soap and water.

Breathing
* Remove the person from exposure.
* Begin rescue breathing if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Vapor Pressure:	10 mm Hg at 1922oF (1050oC)
Flash Point:	Barium powder may ignite at room temperature
Water Solubility:	Insoluble (decomposes)

CHEMICAL NAME

Barium

NEW JERSEY DEPARTMENT OF HEALTH
Right to Know Program
CN 368, Trenton, NJ 08625-0368
(609) 984-2202

ECOLOGICAL INFORMATION

Barium is a yellowish-white solid which exists in a variety of salt forms. Barium and its salts have a wide variety of applications, including uses in nuclear reactors, electronic tubes, as additives in lubricating oils, in the manufacture of pyrotechnics and explosives, in tanning and finishing leathers, as a mordant for fabrics and dyes, in electroplating, aluminum refining, and rubber manufacture; and in the production of paints and enamels. Barium may enter the environment from industrial and municipal waste treatment plant discharges, or spills.

ACUTE (SHORT-TERM) ECOLOGICAL EFFECTS

Acute toxic effects may include the death of animals, birds, or fish, and death or low growth rate in plants. Acute effects are seen two to four days after animals or plants come in contact with a toxic chemical substance.

Barium and its salts have moderate acute toxicity to aquatic life. Insufficient data are available to evaluate or predict the short-term effects of barium or its salts to plants, birds, or land animals.

CHRONIC (LONG-TERM) ECOLOGICAL EFFECTS

Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behavior. Chronic effects can be seen long after first exposure(s) to a toxic chemical.

Barium and its salts have moderate chronic toxicity to aquatic life. Insufficient data are available to evaluate or predict the long-term effects of barium or its salts to plants, birds, or land animals.

WATER SOLUBILITY

Most of the barium salts are either highly or moderately soluble in water. Concentrations of 1 to 1,000 milligrams and more will mix with a liter of water.

DISTRIBUTION AND PERSISTENCE IN THE ENVIRONMENT
Barium is highly persistent in water, with a half-life greater than 200 days. The half-life of a pollutant is the amount of time it takes for one-half of the chemical to be degraded.

BIOACCUMULATION IN AQUATIC ORGANISMS

Some substances increase in concentration, or bioaccumulate, in living organisms as they breathe contaminated air, drink contaminated water, or eat contaminated food. These chemicals can become concentrated in the tissues and internal organs of animals and humans.

The concentration of barium found in fish tissues is expected to be about the same as the average concentration of in the water from which the fish was taken.

SUPPORT DOCUMENT: AQUIRE Database, ERL-Duluth, U.S. EPA.

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http://physchem.ox.ac.uk/MSDS/N/NICKEL

Common Name: Nickel
CAS Number: 7440-02-0
DOT Number: UN 2881 (Nickel catalyst, dry)
Date: April, 1989

HAZARD SUMMARY

* Nickel dusts and fumes can affect you when breathed in.
* Nickel is a CARCINOGEN and may damage the developing fetus. HANDLE WITH EXTREME CAUTION. Cancers in humans are associated with Nickel refining.
* Skin contact may cause skin allergy, with itching, redness and later rash.
* Lung allergy occasionally occurs with asthma-type effects.
* High exposure can cause cough, shortness of breath and fluid in the lungs, which is sometimes delayed for 1 to 2 days after exposure.
* It is a HIGHLY FLAMMABLE SOLID and is a DANGEROUS FIRE and EXPLOSION HAZARD.

IDENTIFICATION

Nickel is a silvery-white metal. It is used in electroplating and in making coins, batteries, catalysts and metal alloys such as stainless steel.

REASON FOR CITATION

* Nickel is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, IARC, NTP, DEP, NFPA and EPA.
* It is on the Special Health Hazard Substance List because it is a CARCINOGEN.

HOW TO DETERMINE IF YOU ARE BEING exposed

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is 1 mg/m3 averaged over an 8-hour workshift. (Final Rule January 1989).

NIOSH: The recommended airborne exposure limit is 0.015 mg/m3 averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is 1 mg/m3 averaged over an 8-hour workshift.

* Nickel may form metal fumes which present different hazards than the substance itself.
* Nickel is a PROBABLE CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust

ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* A regulated, marked area should be established where Nickel is handled, used, or stored.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to Nickel.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Nickel to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Metal, metal compounds and alloys are often used in "hot" operations in the work-place. These may include, but are not limited to, welding, brazing, soldering, plating, cutting, and metallizing. At the high temperatures reached in these operations, metals often form metal fumes which have different health effects and exposure standards than the original metal or metal compound and require specialized controls. Your workplace can be evaluated for the presence of particular fumes which may be generated.

HEALTH HAZARD INFORMATION

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to Nickel:

* Eye or skin contact may cause irritation.
* Fumes from heated Nickel can cause a pneumonia-like illness, with cough and shortness of breath. Higher exposures can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to Nickel and can last for months or years:

Cancer Hazard
* Nickel is a PROBABLE CARCINOGEN in humans. There is some evidence that it causes lung and nasal sinus cancer in humans and it has been shown to cause lung cancer in animals.
* There is a clear association between Nickel refining and an increase in lung, nasal and throat cancers in humans.
* Many scientists believe there is no safe level of exposure to a carcinogen. Such substances may also have the potential for causing reproductive damage in humans.

Reproductive Hazard
* Nickel may damage the developing fetus.

Other Long-Term Effects
* Skin contact can cause allergy. Symptoms include burning, itching, redness and bumps or other rash. Rash may spread to

other areas and last for weeks after exposure stops, but usually improves in about a week.
* Lung allergy (asthma) occasionally occurs, with wheezing and/or tightness in the chest.
* Exposure to Nickel can cause a sore or hole in the "bone" dividing the inner nose (septum).
* Single high or repeated lower exposures may damage the lungs, with scarring of lung tissues, and may cause damage to heart muscle, liver and/or kidney.

MEDICAL

Medical Testing
Before beginning employment and at regular times after that, the following are recommended:

* Lung function tests. These may be normal if the person is not having an attack at the time of the test.
* Urine or plasma test for Nickel (unexposed persons have urine levels less than 10 micrograms per liter).

If symptoms develop or overexposure is suspected, the following may be useful:

* Daily urine Nickel for several days (persons with urine Nickel over 100 micrograms per liter need medical attention).
* Consider chest x-ray after acute over-exposure.
* Evaluation by a qualified allergist, including careful exposure history and special testing, may help diagnose skin allergy.
* Liver and kidney function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

Mixed Exposures
Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

Conditions Made Worse By Exposure
Persons who are allergic to Nickel may also react to Nickel-coated jewelry, watchbands and, sometimes, to prolonged contact with keys, coins, etc.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

* Specific engineering controls are recommended for this chemical by NIOSH. Refer to the NIOSH criteria document: Occupational Exposure to Inorganic Nickel #77-164.

Good WORK PRACTICES can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by Nickel should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to Nickel.
* Wash any areas of the body that may have contacted Mercuric Sulfate at the end of each workday, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where Nickel is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating or smoking.
* Use a vacuum or a wet method to reduce dust during clean-up. Do not dry sweep.
* When vacuuming, a high efficiency particulate absolute (HEPA) filter should be used, not a standard shop vacuum.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with Nickel. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* Eye protection is included in the recommended respiratory protection.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training,

respirator fit testing and medical exams, as described in OSHA 1910.134.

* At any exposure level, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in the positive pressure mode or with a full facepiece, hood, or helmet in the continuous flow mode, or use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.

HANDLING AND STORAGE

* Prior to working with Nickel you should be trained on its proper handling and storage.
* A regulated, marked area should be established where Nickel is handled, used, or stored.
* Nickel must be stored to avoid contact with STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) since violent reactions occur.
* Store in tightly closed containers in a cool, well-ventilated area away from ACIDS, FLUORINE, AMMONIA, PHOSPHORUS, SULFUR, SELENIUM, HYDRAZINE and PERFORMIC ACID.
* Sources of ignition, such as smoking and open flames, are prohibited where Nickel is used, handled, or stored in a manner that could create a potential fire or explosion hazard.
* Wherever Nickel is used, handled, manufactured, or stored, use explosion-proof electrical equipment.

Common Name: Nickel
DOT Number: UN 2881 Nickel catalyst, dry
DOT Emergency Guide code: 53
CAS Number: 7440-02-0

Hazard rating	NFPA
FLAMMABILITY	4
REACTIVITY	0

FLAMMABLE WHEN IN DUST FORM
CARCINOGEN
POISONOUS GASES ARE PRODUCED IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* Nickel dust is FLAMMABLE.
* Use dry chemical, soda ash, or lime extinguishers.
* POISONOUS GASES ARE PRODUCED IN FIRE, including Nickel Carbonyl.
* Dry Nickel catalyst may spontaneously ignite and the fire may restart after it has been extinguished.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If Nickel is spilled, take the following steps:

* Restrict persons not wearing protective equipment from area of

spill until clean-up is complete.
* Remove all ignition sources.
* Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
* Keep Mercuric Sulfate out of a confined space, such as a sewer, because of the possibility of an explosion, unless the sewer is designed to prevent the build-up of explosive concentrations.
* It may be necessary to contain and dispose of Nickel as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

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FOR LARGE SPILLS AND FIRES immediately call your fire department.
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FIRST AID
Eye Contact
* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact
* Remove contaminated clothing. Wash contaminated skin with water.

Breathing
* Remove the person from exposure.
* Transfer promptly to a medical facility.
* Begin rescue breathing if breathing has stopped and CPR if heart action has stopped.
* Medical observation and tests for urine Nickel are recommended for 24 to 48 hours after breathing overexposure, as pulmonary edema may be delayed.

PHYSICAL DATA

Vapor Pressure: Essentially zero mm Hg at 68oF (20oC)
Water Solubility: Insoluble

OTHER COMMONLY USED NAMES

Chemical Name:
Nickel

Other Names and Formulations:
Raney Alloy, C.I. 77775.

NEW JERSEY DEPARTMENT OF HEALTH
Right to Know Program
CN 368, Trenton, NJ 08625-0368

ECOLOGICAL INFORMATION

Nickel is one of the most common metals occurring in surface

waters. It occurs naturally in surface waters from the weathering of rocks. Other sources of nickel and compounds to the environment include the burning of coal and other fossil fuels and discharges from such industries as electroplating and smelting.

ACUTE (SHORT-TERM) ECOLOGICAL EFFECTS

Acute toxic effects may include the death of animals, birds, or fish, and death or low growth rate in plants. Acute effects are seen two to four days after animals or plants come in contact with a toxic chemical substance.

Water hardness affects nickel toxicity to aquatic organisms -the softer the water, the higher the toxicity.

Nickel and its compounds have high acute toxicity to aquatic life. Insufficient data are available to evaluate or predict the short-term effects of nickel and its compounds to plants, birds, or land animals.

CHRONIC (LONG-TERM) ECOLOGICAL EFFECTS

Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behavior. Chronic effects can be seen long after first exposure(s) to a toxic chemical.

Nickel and its compounds have high chronic toxicity to aquatic life. Insufficient data are available to evaluate or predict the long-term effects of nickel and its compounds to plants, birds, or land animals.

WATER SOLUBILITY

Nickel and its compounds have water solubilities ranging from low to high.

DISTRIBUTION AND PERSISTENCE IN THE ENVIRONMENT

Nickel and its compounds are highly persistent in water, with half-lives greater than 200 days.

BIOACCUMULATION IN AQUATIC ORGANISMS

Some substances increase in concentration, or bioaccumulate, in living organisms as they breathe contaminated air, drink contaminated water, or eat contaminated food. These chemicals can become concentrated in the tissues and internal organs of animals and humans.
The concentration of nickel and its compounds found in fish tissues is expected to be somewhat higher than the average concentration of nickel and its compounds in the water from which the fish was taken.

SUPPORT DOCUMENT: AQUIRE Database, ERL-Duluth, U.S. EPA.

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MSDS for ZINC Page 1

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: ZINC
FORMULA: ZN
FORMULA WT: 65.37
CAS NO.: 7440-66-6
NIOSH/RTECS NO.: ZG8600000
COMMON SYNONYMS: BLUE POWDER
PRODUCT CODES: 4244,4290,4240,4252,4260,4248,4274,5828,4264,4270
EFFECTIVE: 06/25/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	0	NONE
FLAMMABILITY	-	1	SLIGHT
REACTIVITY	-	2	MODERATE
CONTACT	-	0	NONE

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

WARNING
CAUSES IRRITATION
DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
ZINC	90-100	7440-66-6

3 - PHYSICAL DATA

BOILING POINT: 908 C (1666 F)
MELTING POINT: 420 C (788 F)
SPECIFIC GRAVITY: 7.14 (H2O=1)
VAPOR PRESSURE(MM HG): 1
VAPOR DENSITY(AIR=1): N/A
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

MSDS for ZINC Page 2

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: BLUISH-WHITE ODORLESS SOLID.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

UNUSUAL FIRE & EXPLOSION HAZARDS
REACTS VIOLENTLY WITH WATER LIBERATING AND IGNITING HYDROGEN.

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5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 10 MG/M3 (PPM)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
CONTACT WITH SKIN OR EYES MAY CAUSE SEVERE IRRITATION OR BURNS.
INHALATION OF DUST MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT.
PROLONGED EXPOSURE MAY CAUSE DERMATITIS.
NOTE: PRODUCT IS A SOLID MASS; HOWEVER, WARNINGS ARE BASED ON INHALATION DUST, MIST OR FUME EMISSIONS THAT ARE POSSIBLE DURING MANUFACTURING OR CHEMICAL REACTIONS.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

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6 - REACTIVITY DATA

STABILITY: UNSTABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: MOISTURE

INCOMPATIBLES: STRONG ACIDS, STRONG BASES, STRONG OXIDIZING AGENTS, ALKALI METALS, HALOGENATED HYDROCARBONS

DECOMPOSITION PRODUCTS: OXIDES OF ZINC

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7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

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8 - PROTECTIVE EQUIPMENT

VENTILATION: USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

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9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

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10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	ZINC
HAZARD CLASS	ORM-E
LABELS	NONE
REPORTABLE QUANTITY	1000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

Common Name: Lead
CAS Number: 7439-92-1
DOT Number: None
Date: October 1986

HAZARD SUMMARY

* Lead can affect you when breathed in and if swallowed from food, drinks, or cigarettes.
* Lead is a TERATOGEN--HANDLE WITH EXTREME CAUTION.
* Repeated exposure causes Lead build-up in the body. Low levels may cause tiredness, mood changes, headaches, stomach problems and trouble sleeping.
* Higher levels may cause aching, weakness, and concentration or memory problems.
* Lead can also cause serious permanent kidney or brain damage at high levels.
* Lead exposure increases risk of high blood pressure.

IDENTIFICATION

Lead is a heavy, soft gray metal. It has wide industrial use due to its properties of high density, softness, low melting point, resistance to corrosion and ability to stop gamma and x-rays.

REASON FOR CITATION

* Lead is on the RTK Hazardous Substance List because it is regulated by OSHA and cited by ACGIH and NIOSH.
* This chemical is on the Special Health Hazard Substance List because it is a TERATOGEN.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

* These exposure limits are recommended for inorganic Lead dusts and fumes measured as Lead.

OSHA: The legal airborne permissible exposure limit (PEL) is 0.05 mg/m3 averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is less than 0.10 mg/m3 averaged over an 10-hour workshift.

ACGIH: The recommended airborne exposure limit is 0.15 mg/m3 averaged over an 8-hour workshift.

* Lead is a TERATOGEN. All contact with this chemical should be reduced to the lowest possible level.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.

* Wear protective work clothing.
* Wash thoroughly at the end of the work-shift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Lead to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to Lead:

* Extremely high exposures could cause seizures, but usually symptoms from Lead occur after weeks to months of exposure.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to Lead and can last for months or years:

Cancer Hazard
* According to the information presently available to the New Jersey Department of Health, Lead has not been tested for its ability to cause cancer in animals.

Reproductive Hazard
* Lead is a PROBABLE TERATOGEN in humans.
* Lead may decrease fertility in males and females.

Other Long-Term Effects
* Repeated exposure to Lead causes Lead to build up in the body. The earliest symptoms may be tiredness, trouble sleeping, stomach problems, constipation, headaches and moodiness (mostly irritability and depression).
* Higher levels may cause aching and weakness in your arms and legs, trouble concentrating and remembering things, and may cause a low blood count (anemia).
* Lead can cause serious, permanent kidney and brain damage at high enough levels.
* Lead exposure increases risk of high blood pressure.

MEDICAL

Medical Testing
Before first exposure and every six months thereafter, OSHA (1910.1025) requires your employer to provide:

* Blood Lead test.
* ZPP test (a special test for the effect of Lead on blood cells).

Before first exposure, and yearly for exposed person with blood Lead over 40 micrograms per 100 g of whole blood, OSHA also

requires a complete medical history and exam with the above tests, and:

* Complete blood count.
* Kidney function tests.

OSHA defines "exposure" for these tests as air levels averages 30 micrograms of Lead or more in a cubic meter of air. OSHA requires your employer to send the doctor a copy of the Lead standard and provide one for you.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

Mixed Exposures
Body exposures to Lead from hobbies using Lead solder or pigments; target practice; and drinking moonshine made in Leaded containers will increase Lead levels. Repeated breathing or handling Leaded gasoline may also add somewhat to body Lead levels.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.
In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

* Avoid heating above 900oF.
* Specific engineering controls are required for this chemical by OSHA. Refer to the OSHA standard 1910.1025 available from OSHA or your employer.

Good WORK PRACTICES can help to reduce hazardous exposures. The following work practices are recommended:

* When vacuuming, a high efficiency particulate absolute (HEPA) filter should be used, not a standard shop vacuum.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to Lead.
* Work clothing should be HEPA vacuumed before removal.
* Do not take contaminated work clothes home. Family members could be exposed.
* Wash any areas of the body that may have contacted Lead at the end of each workday, whether or not known skin contact has occurred.

* Do not eat, smoke, or drink where Lead is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating or smoking.
* Use a HEPA vacuum or a wet method to reduce dust during clean-up. Do not dry sweep.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

The following recommendations are only guidelines and may not apply to every situation.

Clothing
* Avoid skin contact with Lead dust and fume. Wear protective gloves, full body and hat clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.
* Work clothing should be HEPA vacuumed before removal.

Eye Protection
* Wear dust-proof goggles when working with powders or dust, unless full face-piece respiratory protection is worn.

Respiratory Protection
IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Where the potential exists for exposures not higher than 0.5 mg/m3, use a half-mask, air purifying respirator equipped with high efficiency filters.
* Where the potential exists for exposures not higher than 2.5 mg/m3, use a full facepiece, air purifying respirator with high efficiency filters.
* OSHA requires the employer to provide a powered-air purifying respirator, instead of one of the above, whenever the employee asks to use this type of respirator.
* OSHA prohibits the employer from requiring an employee to wear one of the above negative pressure respirators longer than 4.4 hours per day in battery manufacturing and primary and secondary Lead production.
* Where the potential exists for exposures not higher than 50 mg/m3, use any powered-air purifying respirator with high efficiency filters or half-mask supplied-air respirator operated in positive pressure mode.
* If while wearing a filter, cartridge or canister respirator, you can smell, taste or otherwise detect Lead, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter, cartridge or canister. If the seal is no longer good,

http://physchem.ox.ac.uk/MSDS/L/LEAD

you may need a new respirator.
* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters, cartridges, or canisters to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
* Where the potential exists, for exposures not higher than 100 mg/m3, use supplied-air respirators with full facepiece, hood, helmet or suit, operated in positive pressure mode.
* Where the potential exists for exposures greater than 100 mg/m3, use full facepiece, self-contained breathing apparatus operated in positive pressure mode.

Common Name: Lead
DOT Number: None
DOT Emergency Guide code: No Citation
CAS Number: 7439-92-1

Hazard rating	NFPA
FLAMMABILITY	Not Found
REACTIVITY	Not Found

DO NOT USE WATER
POISONOUS GAS IS PRODUCED IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* Lead Powder is FLAMMABLE when exposed to heat or flame.
* POISONOUS GAS IS PRODUCED IN FIRE.
* Use dry chemicals appropriate for extinguishing metal fires. Do not use water.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If Lead is spilled, take the following steps:

* Restrict persons not wearing protective equipment from area of spill until clean-up is complete.
* Ventilate the area of spill.
* Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
* It may be necessary to contain and dispose of Lead as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

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FOR LARGE SPILLS AND FIRES immediately call your fire department.
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HANDLING AND STORAGE

* Prior to working with Lead you should be trained on its proper handling and storage.
* Lead must be stored to avoid contact with OXIDIZERS (such as

PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES and NITRATES) and CHEMICALLY ACTIVE METALS (such as POTASSIUM, SODIUM, MAGNESIUM and ZINC) since violent reactions occur.
* Lead is regulated by an OSHA Standard 1910.1025. All requirements of the standard must be followed.

FIRST AID
Eye Contact
* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact
* Remove contaminated clothing. Wash contaminated skin with soap and water.

Antidotes and Special Procedures
* Persons with significant Lead poisoning are sometimes treated with EDTA while hospitalized. Since this drug causes a rush of Lead from body organs into the blood and kidneys and thus has its own hazards, it must be done only by experienced medical per sons under careful observation. It or other "chelating" drugs should never be used to prevent poisoning while exposures continues or without strict exposure control as severe kidney damage can result.

PHYSICAL DATA

Vapor Pressure: -1.77 mm Hg at 1832oF
Water Solubility: Slightly soluble

CHEMICAL NAME

Lead

NEW JERSEY DEPARTMENT OF HEALTH
Right to Know Program
CN 368, Trenton, NJ 08625-0368

ECOLOGICAL INFORMATION

Lead and its compounds is one of the metals known since ancient times. It occurs widely in the earth's crust and can be dissolved from rocks and minerals into surface waters. Lead and its compounds have a variety of commercial and industrial uses, such as lead pipe, lead-lined containers for corrosive gases and liquids, tetraethyl lead, paint pigments, alloys in metallurgy, storage batteries, ceramics, electronic devices, and plastics.

ACUTE (SHORT-TERM) ECOLOGICAL EFFECTS

Acute toxic effects may include the death of animals, birds, or fish, and death or low growth rate in plants. Acute effects are seen two to four days after animals or plants come in contact with a toxic chemical substance.

http://physchem.ox.ac.uk/MSDS/L/LEAD

Toxicity to aquatic life is affected by water hardness - the softer the water, the greater the toxicity. Lead and its compounds have high acute toxicity to aquatic life. Insufficient data are available to evaluate or predict the short-term effects of lead and its compounds to plants, birds, or land animals.

CHRONIC (LONG-TERM) ECOLOGICAL EFFECTS

Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behavior. Chronic effects can be seen long after first exposure(s) to a toxic chemical.

Lead and its compounds have high chronic toxicity to aquatic life. Lead causes nerve and behavioral effects in humans and could cause similar long-term effects in birds and land animals exposed to lead and its compounds.

WATER SOLUBILITY

Lead and its compounds range in their respective water solubilities from highly soluble to practically insoluble.

DISTRIBUTION AND PERSISTENCE IN THE ENVIRONMENT

Lead and its compounds are highly persistent in water, with a half-life greater than 200 days. The half-life of a pollutant is the amount of time it takes for one-half of the chemical to be degraded.

BIOACCUMULATION IN AQUATIC ORGANISMS

Some substances increase in concentration, or bioaccumulate, in living organisms as they breathe contaminated air, drink contaminated water, or eat contaminated food. These chemicals can become concentrated in the tissues and internal organs of animals and humans.

The concentration of lead and its compounds found in fish tissues is expected to be much higher than the average concentration of lead in the water from which the fish was taken.

SUPPORT DOCUMENT: AQUIRE Database, ERL-Duluth, U.S. EPA.

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ATTACHMENT B

GENERAL SITE SAFETY RULES

GENERAL SITE SAFETY RULES

1. There will be an informal safety meeting each morning prior to commencing operations.

2. The project site is divided into an EXCLUSION ZONE (i.e. WORK AREA) and a SUPPORT ZONE (i.e. Administrative Area) separated by a CONTAMINATION REDUCTION ZONE (i.e. Personnel & Equipment Decontamination Facilities). Entrance to and exit from the EXCLUSION ZONE will be via the CONTAMINATION REDUCTION ZONE. Only authorized, properly protected personnel will be allowed to enter the work area.

3. All personnel and equipment must be decontaminated when passing from the EXCLUSION ZONE to the SUPPORT ZONE. Prior to departing from the site, or at the end of the work day, all personnel will processed through the Decontamination Station where disposable clothing and equipment will be removed.

4. All personnel in the EXCLUSION ZONE and CONTAMINATION REDUCTION ZONE will be required to wear at minimum the gear specified in the TETC's Health and Safety Plan.

5. No eating, drinking, smoking or chewing will be permitted in the EXCLUSION and CONTAMINATION REDUCTION ZONES.

6. Prior to eating, drinking, or smoking, all personnel must wash their hands and faces.

7. All questions should be referred to the Growth Environmental Services, Inc. supervisor.

8. All personnel will be required to clean their respirator at the end of the work day.

9. Violation of these rules will result in immediate dismissal from the site.

ATTACHMENT C

ENVIRONMENTAL STRESS

ATTACHMENT C
ENVIRONMENTAL STRESS

Climatic conditions are important considerations in planning and conducting work at the Site. The effects of ambient temperature can cause physical discomfort, loss of efficiency, personal injury and increased accident probability. In particular, heat stress, due to protective clothing decreasing body ventilation is an important factor.

The following plans serve to outline procedures to mitigate environmental stress factors.

ENVIRONMENTAL STRESS
HEAT STRESS CASUALTY PREVENTION PLAN

Due to the decrease in body ventilation caused by wearing personal protective equipment, there exists an increase in the potential for heat casualties. Site personnel will be instructed in the identification of heat stress symptoms, first-aid procedures for heat stress casualties and methods for prevention of heat stress.

IDENTIFICATION AND TREATMENT

1. Heal Cramps

   a. Symptoms: Heat cramps are caused by heavy sweating with inadequate electrolyte replacement and may be manifested by muscle spasms and pain in the limbs and abdomen.

   b. First Aid: Have the victim move to the Personal Decontamination Station and rest. Firm pressure and warm, wet towels placed over the cramped area give relief. Give electrolyte solution to drink.

2. Heat Exhaustion

   a. Symptoms: Usually begins with muscular weakness, dizziness, nausea, and a staggering gait. Vomiting is frequent. The bowels may move involuntarily. The victim is very pale, his skin is clammy, and he may perspire profusely. The pulse is weak and fast, his breathing is shallow. He may faint unless he lies down.

   b. First Aid: Immediately remove the victim to a shady and cool area in the Personnel Decontamination Station. Remove all protective outer wear. Call a physician. Treat the victim for shock. (Make him lie down, raise his feet 6-12 inches, and loosen his clothing, but keep him warm.) If victim is conscious, it may be helpful to give him sips of a salt water solution (1 teaspoon of salt to 1 glass of water) or commercial electrolyte drink. Transport victim to medial facility as soon as possible.

3. Heat Stroke

   a. Symptoms: This is the most serious of heat casualties due to the fact that the body loses its heat regulating ability. Body temperatures often are between 107-110°F. There is often severe headache, dizziness, nausea, oppression, and the skin is dry, red, and hot. Unconsciousness follows quickly, and death is imminent if exposure continues. The attack will usually occur suddenly.

b. First Aid: THIS IS A LIFE THREATENING SITUATION! Immediately evacuate the victim to a cool and shady area in the Personnel Decontamination Station. Remove all protective outer wear and all personal clothing. Lay him on his back with the head and shoulders slightly elevated. It is imperative that the body temperature be lowered immediately. This can be accomplished by applying cold, wet towels, ice bags, etc., to the head. Sponge off the bare skin with cool water or rubbing alcohol, if available, etc. The main objective is to cool him without chilling him. Give no stimulants. Contact a physician and transport to a medial facility as soon as possible.

4. Prevention of Heat Stress

a. One of the major causes of heat casualties is the depletion of body fluids. There must be plenty of fluids available on the site. Personnel should replace water and salts lost from sweating. Salts can be replaced by either a 0.1% salt solution, more heavily salted foods, or commercial mixes such as Gatorade. The commercial mixes are advised for personnel on low sodium diets.

b. All work schedules should be established so that the majority of the work day will be during the morning hours of the day before ambient air temperature levels reach their highs.

c. Work/rest guidelines will be implemented for personnel required to wear level B or C protection. This guideline is as follows:

Ambient Temperatures	Maximum Wearing Time
Above 90°F	½ hour
80-90°F	1 hour
70-80°F	2 hours
60-70°F	3 hours
50-60°F	4 hours

A sufficient period will be allowed for personnel to "cool down." This may require shifts of workers during operations.

d. Good hygienic standards must be maintained by frequent change of clothing and daily showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

5. Heat Stress Monitoring

For monitoring the body's excess heat recuperative ability, one or more of the following techniques should be used as a screening mechanism. Monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. Frequency of monitoring should increase as the ambient temperature increases or if slow recovery rates are indicated. When temperatures exceed 80 degrees Fahrenheit, workers must be monitored for heat stress after every work period.

Heart rate (HR) should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by one-third, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by one-third.

Body temperature should be measured orally with a clinical thermometer as early as possible in the resting period (before drinking). Oral temperature (OT) at the beginning of the rest period should not exceed 99.6 degrees Fahrenheit. If it does, the next work period should be shortened by one-third, while the length of the rest period stays the same. However, if the OT still exceeds 99.6 degrees Fahrenheit at the beginning of the next rest period, the following work cycle should be further shortened by one-third. Oral temperature should be measured again at the end of the rest period to make sure that it has dropped below 99.7 degrees Fahrenheit.

Body Water Loss (BWL) due to seating should be measured by weighing the worker in the morning and in the evening. The clothing work should be similar at both weighings; preferably the workers should be nude. The scale should be accurate to plus or minus 1/4 pound. BWL should not exceed 1.5 percent of the total body weight. If it does, workers should be instructed to increase their daily intake of fluids by the weight lost. Ideally, body fluids should be maintained at a constant level during the work day.

ENVIRONMENTAL STRESS
COLD STRESS CASUALTY PREVENTION PLAN

A decrease in ambient air temperature and the effects of wind velocity, increase the potential for injury due to cold stress. Site personnel will be instructed in the identification, prevention and first-aid for cold stress.

IDENTIFICATION AND TREATMENT

1. Frostbite

   a. Symptoms: Frostbite usually begins with numbness and/or pain in the extremities or exposed skin surfaces and a decrease in manual dexterity (known as frostnip). If exposure continues, the skin may take on a white waxy appearance. As further cooling occurs the tissue will freeze completely, and progressive symptoms will be indicated by skin color turning to a mottled or blotchy white then grayish yellow and finally grayish blue. Severe tissue damage has occurred.

   b. First Aid: If initial symptoms (frostnip) are present, remove the victim from the cold and have him gently warm the affected area. If advanced symptoms are present or if the condition does not respond to this simple care, transport to a medical facility at once.

2. Cold Stress (Hypothermia)

   a. Symptoms In hypothermia, the body core temperature is reduced. Hypothermia will very likely result in reduced mental alertness, reduction in rational decision making, fatigue, drowsiness, and loss of consciousness with a threat of fatal consequences. During exposure to cold, severe uncontrollable shivering develops as a first symptom of cold stress.

   b. First Aid The onset of heavy shivering, excessive fatigue, reduced manual dexterity or other symptoms of hypothermia are indications for immediate return to a heated shelter. The outer layer of clothing should be removed and the remainder of the clothing loosened to permit sweat evaporation. Warm sweet drinks and soups should be consumed to provide caloric intake and fluid volume. Oral temperature will be determined and the individual will be transported to a medical facility if the core body temperature is below 95 degrees F.

PREVENTION OF COLD STRESS

Exposed skin surfaces may be protected by the use of appropriate cold weather protective clothing. These protective items can include facemasks, gloves, and insulated footware. Windbreaks can shield the work area from the cooling effects of wind. The workers shall wear

cold protective clothing appropriate for the level of cold and physical activity with an objective to protect all parts of the body with emphasis on hands and feet. Provisions for keeping the workers' hands warm in addition to use of insulated gloves include use of warm air jets and radiant heaters. Adequate insulating clothing to maintain body core temperatures above 36degrees (97°F) will be used. The use of extra insulating clothing and/or a reduction in the duration of exposure period are special precautions. During periods of extreme cold (10 degrees F or less) workers should use the buddy system for constant protective observation. Eye protection against glare and ultraviolet light will be worn in snow and/or ice terrain.

ATTACHMENT D

DECONTAMINATION PROCEDURES

ATTACHMENT D

DECONTAMINATION PROCEDURES

If personnel decontamination is required, the following decontamination procedures, as a minimum, will be utilized:

Station 1:	Equipment Drop	Deposit equipment used on-site on plastic drop cloths. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, a cool down/rest station may be operated in this area. During cold weather operations a warmup/rest station may be operated.
Station 2:	Outer Garment, overboot, over glove, and respirator Wash and Rinse	Wash respirator, overboots, outer gloves and outer garments with decontamination solution. Rinse with water.
Station 3:	Overboot and Glove Removal	Remove overboots and outer gloves. Deposit in the designated container which is equipped with a plastic liner.
Station 4:	Respirator or Air Bottle Change	If the worker leaves Exclusion Zone to change air bottles or respirator, this is the last step in the decontamination procedure. Worker's respirator or air bottles are exchanged, new outer gloves and boot covers are donned and taped, and the worker returns to job.
Station 5:	Boot and Outer Garment Removal	Boots, coveralls and inner gloves are removed and placed in separate designated containers lined with plastic bags.
Station 6:	Respirator Removal	Respirators are removed and placed on a plastic sheet or in plastic bags.
Station 7:	Wash	Workers will wash thoroughly before departing site.
Station 8:	Redress	

ATTACHMENT E

SITE LOCATION AND EMERGENCY HOSPITAL ROUTE

EMERGENCY TELEPHONE NUMBERS
HEIN-WERNER PROJECT

DIAL 911 FOR IMMEDIATE EMERGENCY

Hospital	Waukesha Memorial Hospital 725 American Avenue Waukesha, WI	414/544-2267
Police	Waukesha Police Department	414/524-3820
Fire	Waukesha Fire Department	414/524-3830
Regional Poison Control Center		800/815-8855
SECOR Health and Safety Officer		Work: 414/790-1974 Home: 414/353-0354
WDNR Project Manager	Scott Fergerson	414/229-0800

EMERGENCY EVALUATION MAP WILL BE POSTED AT SITE PRIOR TO INITIATION OF OPERATIONS.