

SV

STATE OF MINNESOTA

DEPARTMENT OF PUBLIC SAFETY - DIVISION OF EMERGENCY MANAGEMENT
8-5 STATE CAPITOL, SAINT PAUL, MN 55155-1049

MINNESOTA DUTY OFFICER HAZARDOUS MATERIALS INCIDENT REPORT: TANKS

REPORT DATE: Oct 20 1998 TIME: 912 DUTY OFFICER: Sailer

REPORTED BY:		RESPONSIBLE PARTY/PROPERTY OWNER:	
NAME: <u>Pam Fitzman</u>		CONTACT:	
C/O: <u>---</u>		C/O: <u>same</u>	
ADDRESS: <u>P.O Box 33</u>		ADDRESS:	
CITY: <u>Pierz</u>	STATE: <u>mn</u>	CITY:	STATE:
PHONE: <u>320-468-6478</u>	ZIP: <u>56364</u>	PHONE:	ZIP:
ALT. PHONE:		ALT. PHONE:	

DISCOVERY DATE: 9/2/98 TIME: --- PREVIOUSLY REPORTED SITE?: Y/N UNK --LEAK#

SITE NAME & ADDRESS: NW corner of Main St + 2nd Ave N

CITY: Pierz ZIP: 56364 COUNTY: Morrison

NUMBER/SIZE OF TANK(S):	TANK CONTENTS:	AGE OF TANK(S):	TYPE:
<u>@ no tanks on site</u>			U.S.T / A.S.T. - STEEL/FIBRE GLASS
<u>@</u>			U.S.T / A.S.T. - STEEL/FIBRE GLASS
<u>@</u>			U.S.T / A.S.T. - STEEL/FIBRE GLASS
<u>@</u>			U.S.T / A.S.T. - STEEL/FIBRE GLASS

NATIVE SOIL TYPE: _____ SURFACE WATER NEARBY? Y / N / UNK _____

ARE THERE ANY MONITORING WELLS ON SITE? Y / N / UNK _____

WHAT IS THE SITE WATER SOURCE: MUNICIPAL / PRIVATE WELL / UNK _____

CONTAMINATED SOIL EXCAVATED?: Y / N / UNK QUANTITY: _____

ABLE TO DIG OUT OF CONTAMINATION?: Y / N / UNK

GROUND WATER ENCOUNTERED?: Y / N / UNK DEPTH TO GROUND WATER?: _____

FREE PRODUCT FOUND?: Y / N --- STAINED SOILS?: Y / N --- PETROLEUM ODORS?: Y / N

HIGHEST VAPOR READING: _____ ANALYTICAL RESULTS: _____

NARRATIVE: Widseth, Smith + Nolting - see attachment
Used to be hydraulic lifts

DUTY OFFICER NOTIFICATIONS MADE: (AGENCY, NAME, TIME)

MPCA TANKS, ATTN: STACEY VAN PATTON - FAX	
<u>mPCA Region 2</u>	

ANY QUESTIONS? CONTACT THE MINNESOTA DUTY OFFICER AT 649-5451 OR 1-800-422-0798

This Space For MPCA Use Only:

MPCA PROJECT MANAGER: LLH LEAK NUMBER: 11937

Who Took: _____

PM: _____

Priority: _____ High
 _____ Action
 _____ No action

Action: _____ Advise
 _____ Visit by _____
 _____ State money spent
 _____ File
 _____ No File

REMARKS:

Copy To? _____

Send Packet?

- _____ Disposal Packet
- _____ Reporting Packet
- _____ Spill Bill Packet
- _____ VIC Packet
- _____ VPIC Packet
- _____ Other _____

Quickie Closure:(circle one)

Why Closed:

- 1--Referred to LEAKS
- 2--Referred to RCRA
- 3--Referred to AQ
- 4--Referred to WQ
- 5--Referred to VIC

- 6--Referred to local/county
- 7--Referred to Region
- 8--Referred to GWSW
- 9--Response Completed

- 10--No Response Necessary
- 11--Closed for other reasons (see remarks)
- 12--AG Lead

SPILL # _____



Minnesota Pollution Control Agency

FILE

November 10, 1999

Ms. Pam Fitzman
P.O. Box 33
Pierz, Minnesota 56364

RE: Petroleum Tank Release Site File Closure
Site: Northwest corner of Main Street & 2nd Avenue North
Site ID#: LEAK00011937

Dear Ms. Fitzman:

We are pleased to let you know that the Minnesota Pollution Control Agency (MPCA) Tanks and Emergency Response Section (TERS) staff has determined that your investigation and/or cleanup has adequately addressed the petroleum tank release at the site listed above. Based on the information provided, the TERS staff has closed the release site file.

Closure of the file means that the TERS staff does not require any additional investigation and/or cleanup work at this time or in the foreseeable future. Please be aware that file closure does not necessarily mean that all petroleum contamination has been removed from this site. However, the TERS staff has concluded that any remaining contamination, if present, does not appear to pose a threat to public health or the environment.

The MPCA reserves the right to reopen this file and to require additional investigation and/or cleanup work if new information or changing regulatory requirements make additional work necessary. If you or other parties discover additional contamination (either petroleum or nonpetroleum) that was not previously reported to the MPCA, Minnesota law requires that the MPCA be immediately notified.

You should understand that this letter does not release any party from liability for the petroleum contamination under Minn. Stat. ch. 115C (Supp. 1997) or any other applicable state or federal law. In addition, this letter does not release any party from liability for nonpetroleum contamination, if present, under Minn. Stat. ch. 115B (1996), the Minnesota Superfund Law.

Because you performed the requested work, the state may reimburse you for a major portion of your costs. The Petroleum Tank Release Cleanup Act establishes a fund which may provide partial reimbursement for petroleum tank release cleanup costs. This fund is administered by the Department of Commerce Petro Board. Specific eligibility rules are available from the Petro Board at (651) 297-1119 or (651) 297-4203.

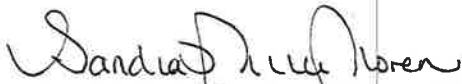
Ms. Pam Fitzman
Page 2
November 10, 1999

If future development of this property or the surrounding area is planned, it should be assumed that petroleum contamination may still be present. If petroleum contamination is encountered during future development work, the MPCA staff should be notified immediately.

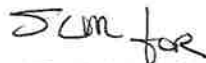
For specific information regarding petroleum contamination that may remain at this leak site, please call the TERS File Request Program at (651) 297-8499. The MPCA fact sheet #3.35 *Leak/Spill and Underground Storage Tank File Request Form* (August 1997) must be completed prior to arranging a time for file review.

Thank you for your response to this petroleum tank release and for your cooperation with the MPCA to protect public health and the environment. If you have any questions regarding this letter, please call me at (218) 828-6118.

Sincerely,



Sandra L. Miller-Moren
Project Manager
Remediation Unit
North District – Brainerd Office



Jim MacArthur
Hydrogeologist
Remediation Unit
North District – Brainerd Office

SLM:

cc: Lorae Vardas, City Clerk, Pierz
Chuck Meyer, Fire Chief, Pierz
Roger Kuklok, Morrison County Zoning Administrator, Little Falls
Bruce Johnson, Summit Envirosolutions, St. Paul
Minnesota Department of Commerce Petrofund Staff



Minnesota Pollution Control Agency

October 21, 1998

Ms. Pam Fitzman
P.O. Box 33
Pierz, Minnesota 56364

RE: Petroleum Storage Tank Release Investigation and Corrective Action
Site: Northwest corner of Main Street & 2nd Avenue North
Site ID#: LEAK00011937

Dear Ms. Fitzman:

Notice of Release

The Minnesota Pollution Control Agency (MPCA) has been informed that a release of petroleum has occurred from storage tank facilities which you own and/or operate. We appreciate your timely notification so this site can be handled in an efficient manner.

Legal Obligations

Federal and state laws require that persons legally responsible for storage tank releases notify the MPCA of the release, investigate the release and, if necessary, clean up the release. A person is considered legally responsible for a tank release if the person owned or operated the tank either during or after the release, unless specifically exempted under the law. If you believe that you are not legally responsible for this storage tank release, please contact the project manager listed below.

If you are not legally responsible for the release, but hold legal or equitable title to the property where the release occurred, you may volunteer to take corrective action. Responsible persons and volunteers who take corrective action may be eligible for reimbursement for a major portion of the costs of corrective action. The legislature has established the Petroleum Tank Release Cleanup Account to reimburse responsible persons and volunteers. The account is administered by the Petro Board which is part of the Minnesota Department of Commerce. Final decisions regarding the amount of reimbursement are made by the Petro Board. All questions about eligibility and reimbursement should be directed to the Petrofund staff at 651/297-1119 or 651/297-4203.

Request to Take Corrective Action

The MPCA staff requests that you take steps to investigate and, if necessary, clean up the release in accordance with the enclosed MPCA fact sheets. The site investigation must fully define the extent and magnitude of the soil and/or ground water contamination caused by the release. A report (excavation report and/or remedial investigation/corrective action design (RI/CAD) which details the results of the investigation or concludes that excavation was sufficient to clean up the release must be submitted to this office within 10 months of the date of this letter. Please refer to MPCA fact sheets for information pertaining to the amount of work needed at the petroleum release site(s).

520 Lafayette Rd. N.; St. Paul, MN 55155-4194; (612) 296-6300 (Voice); (612) 282-5332 (TTY)

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Ms. Pam Fitzman
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October 21, 1998



Sites with free product (free-floating petroleum), drinking water supply impacts, surface water impacts, indoor vapor impacts, fire or explosion hazards, or ground water impacts which pose a significant threat to public health or the environment, are considered high priority for staff review. If one or more of these situations apply to your site, an RI/CAD report must be submitted within 90 days. In addition, if you know or discover that there is free-product from a well, excavation, or borehole, you must notify the MPCA within 24 hours and IMMEDIATELY begin interim free product recovery.

If you have not already done so, the MPCA recommends that you hire a qualified consulting firm registered with the Petrofund staff that has experience in conducting petroleum release site investigations and in proposing and implementing appropriate corrective actions. A list of registered contractors and consultants is available from the Petrofund staff. The MPCA reserves the right to reject proposed corrective actions if the requirements of the site investigation have not been fulfilled. Please note that, under Minn. R. 2890 (Supp. 1997), you must solicit a minimum of two competitive proposals on a form prescribed by the Petro Board to ensure that the consulting costs are reasonable. Questions about bidding requirements should be directed to Petrofund staff.

Required Response

MPCA staff requests a response to this letter within 30 days. Please tell us whether you intend to proceed with the requested work. If you do not respond within this time frame, the MPCA staff will assume that you do not intend to comply, in which case the MPCA Commissioner may order you to take corrective action. Failure to cooperate with the MPCA in a timely manner may result in reduced reimbursement from the Petro Board. See Minn. R. 2890 (Supp. 1997). The enclosed fact sheets will provide you with the information necessary to complete a successful investigation and cleanup. If you have any questions concerning this letter or need additional information, please contact me at 651/297-8591. Please reference the above LEAK # in all correspondence. If you are calling long distance, you may reach the MPCA St. Paul office by calling 1-800/657-3864.

Sincerely,

A handwritten signature in black ink, appearing to read "L. Hysjulien".

Laura Hysjulien
Project Manager
North District

LLH:kh

Enclosures

cc: Lora Vardas, City Clerk, Pierz
Chuck Meyer, Fire Chief, Pierz
Steve Backowski, Morrison County Solid Waste Officer



December 14, 1998

Ms. Laura Hysjulien
Minnesota Pollution Control Agency
Petroleum Storage Tank Release Investigation and Corrective Action
North District
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

RECEIVED

DEC 17 1998

Subject: Closure Request Letter
Northwest Corner of Main Street and Second Avenue North
Pierz, Minnesota
MPCA Site ID#: LEAK00011937
Summit Project No. 1049-002

**MPCA, Metro District
Site Remediation**

Dear Ms. Hysjulien:

Summit Envirosolutions, Inc. (Summit), on behalf of our client, Ms. Pam Sitzman, is pleased to present this letter requesting site closure at the subject site. As we discussed during our telephone conversation on November 24, 1998, a Phase II Environmental Site Assessment (ESA) was performed by Widseth Smith Nolting (WSN) at the site as part of a potential property transaction. The site is located along Main Street in Pierz, Minnesota (Figure 1). The Phase II ESA results indicated that petroleum hydrocarbon impacts were observed in the vicinity of a hydraulic lift in the east carwash bay (Figure 2). This letter will include a background review of the WSN Phase II ESA report (Appendix I) and the results of our receptor survey (Appendix II). Summit will also include conclusions and recommendations for future site activities.

BACKGROUND

On July 9, 1998, WSN advanced four test borings to depths ranging from 22 to 27 feet below grade (bg) as part of Phase II ESA. The results of the test borings indicated 1 to 4.5 feet of fill or topsoil underlain by coarse alluvium to a depth of 25 feet bg. Uniformly at a depth of 25 feet bg, an unweathered, lean clay till was encountered. Groundwater was also encountered at depths varying from 20 to 21 feet bg. WSN collected soil samples at five-foot intervals to the terminus of each test boring and screened the soil for organic vapors using a photoionization detector (PID). The results were presented on the test boring logs included in the Phase II ESA and presented in Appendix I of this letter. The organic vapor screening results indicated readings that varied from 4.5 to 20 parts per million (ppm). In addition, WSN collected both soil and

groundwater samples for chemical analysis of volatile organic compounds (VOCs) using Minnesota Department of Health 465E, modified Wisconsin methods for gasoline range organics (GRO) and diesel range organics (DRO), and polychlorinated biphenyl (PCBs). The PCB analysis was limited to one soil sample collected at test boring SB-2. The analytical results for the soil and groundwater samples indicated low concentrations of VOCs at SB-2 and SB-4 (see Table 2 in Appendix I) and 12 ppm DRO in a groundwater sample collected at SB-2 (see Table 2 in Appendix I). WSN indicated that a potential source of the petroleum hydrocarbon impacts was the hydraulic lift in the East Wash Bay and recommended that additional subsurface investigation be completed to define the source and delineate the lateral extent of the petroleum hydrocarbons observed at the site. WSN also identified a waste oil pit at the site. However, the current property owner is not aware of a waste oil pit at the subject site.

RECEPTOR SURVEY

Groundwater Receptor Survey

As part of a groundwater receptor survey, Summit contacted the City of Pierz to verify that properties within 500 feet from the site are provided city water supply. In addition, Summit reviewed the County Well Index (CWI) for Morrison County to identify potential water wells within a ½ mile and a 500-foot radius of the site. The results of the CWI indicate that water wells are not present within 500 feet of the project site. One well (Unique Well No. 136962) used for domestic purposes appears to be located approximately ½ mile northeast of the site. The results of the CWI and figure illustrating the well locations are presented in Appendix II.

During a telephone conversation on December 2, 1998, a representative of the City of Pierz indicated that a recent city-wide program to provide city water to all properties within the city limits was just concluding and that everyone would be on city water within 500 feet of the subject site. Based on the available information, potential adverse impacts to water wells from the concentrations of petroleum hydrocarbons identified at this site appear relatively low.

Vapor Risk Assessment

Summit contacted the City of Pierz to acquire a utility location map for the vicinity of the site. The City indicated that the same project that has provided city water to local properties was also currently mapping the location of all city utilities. A utility location map is not available at this time. However, WSN provided the location of the sanitary sewer service and water service line locations which have been duplicated on Figure 2. Mr. Gary Brausen, an employee of the City of Pierz for 20 years, indicated that the sanitary and storm sewers are located along the center line of Second Street at an approximate depth of 12 feet bg. In addition, the City representative indicated that the water line is at a depth of 8 feet bg along the center line of Second Street. The approximate location of the sewer and water mains are also presented on Figure 2. The test

boring logs indicate a depth to groundwater of approximately 20 feet bg in a coarse-grained soil. Based on the separation distance between the impacted groundwater (20 feet bg) and the utility trenches (8 to 12 feet bg), soil type, and the low concentration of petroleum hydrocarbons in the soil and groundwater, the potential for impacts to the local utilities appears to be relatively low.

Surface Water Risk Assessment

The Skunk River is located approximately ½ mile to the southeast of the site (Figure 1). Test borings SB-4 and SB-1 are located south and southeast of highest petroleum hydrocarbon concentrations observed at test boring SB-2 which is in the direction of the Skunk River. Concentrations of VOCs observed in the groundwater samples collected at test borings SB-1 and SB-4 do not exceed the Minnesota Department of Health (MDH) Health Risk Limits (HRLs). Based on the distance to the Skunk River and the groundwater concentrations of petroleum hydrocarbons observed at the site, the potential for petroleum hydrocarbon impacts associated with this release to the Skunk River appears to be relatively low.

CONCLUSIONS/RECOMMENDATIONS

Petroleum hydrocarbon impacts to soil and shallow groundwater were observed at this site. The maximum PID reading at this site do not exceed the 40 ppm action limit established for granular soil by the Minnesota Pollution Control Agency (MPCA). The concentrations of VOCs observed at test borings SB-2 and SB-4 do not exceed the MDH HRLs. The maximum concentrations of petroleum hydrocarbons were observed in the vicinity of the hydraulic lift in the East Wash Bay at 12 ppm DRO. Based on the subsurface data collected by WSN and the receptor information collected by Summit, we recommend that this site be reviewed by the MPCA for closure status.

LIMITATIONS OF ENVIRONMENTAL ASSESSMENTS

Site Data and Related Records Review

Summit's opinions, conclusions and recommendations are based, in part, on information Summit obtained and evaluated from current sources including the client, property owner, former reports, and private, municipal, state and federal agencies. Verification of the authenticity or accuracy of this information is not warranted by Summit or included in Summit's scope of services.

Final Letter and Interpretation of Results

Summit's letter is based upon information provided to Summit and the results of analytical sampling performed by others. Given the inherent limitations of environmental assessment


Ms Laura Hysjulien
Minnesota Pollution Control Agency
December 3, 1998
Page 4

work, Summit will not guarantee that the site is free of hazardous or potentially hazardous materials or conditions or that latent or undiscovered conditions will not become evident in the future. Summit's letter was prepared in accordance with the proposal, scope of work, and Summit's General Conditions and terms, and no other warranties, representations, or certifications will be made. In addition, the recommendations, in part, are based on telephone conversations with the MPCA and City representatives.

If you have questions or comments on the content of this letter, please contact me at (651) 644-8080, extension 204.


Sincerely,

Summit Envirosolutions, Inc.



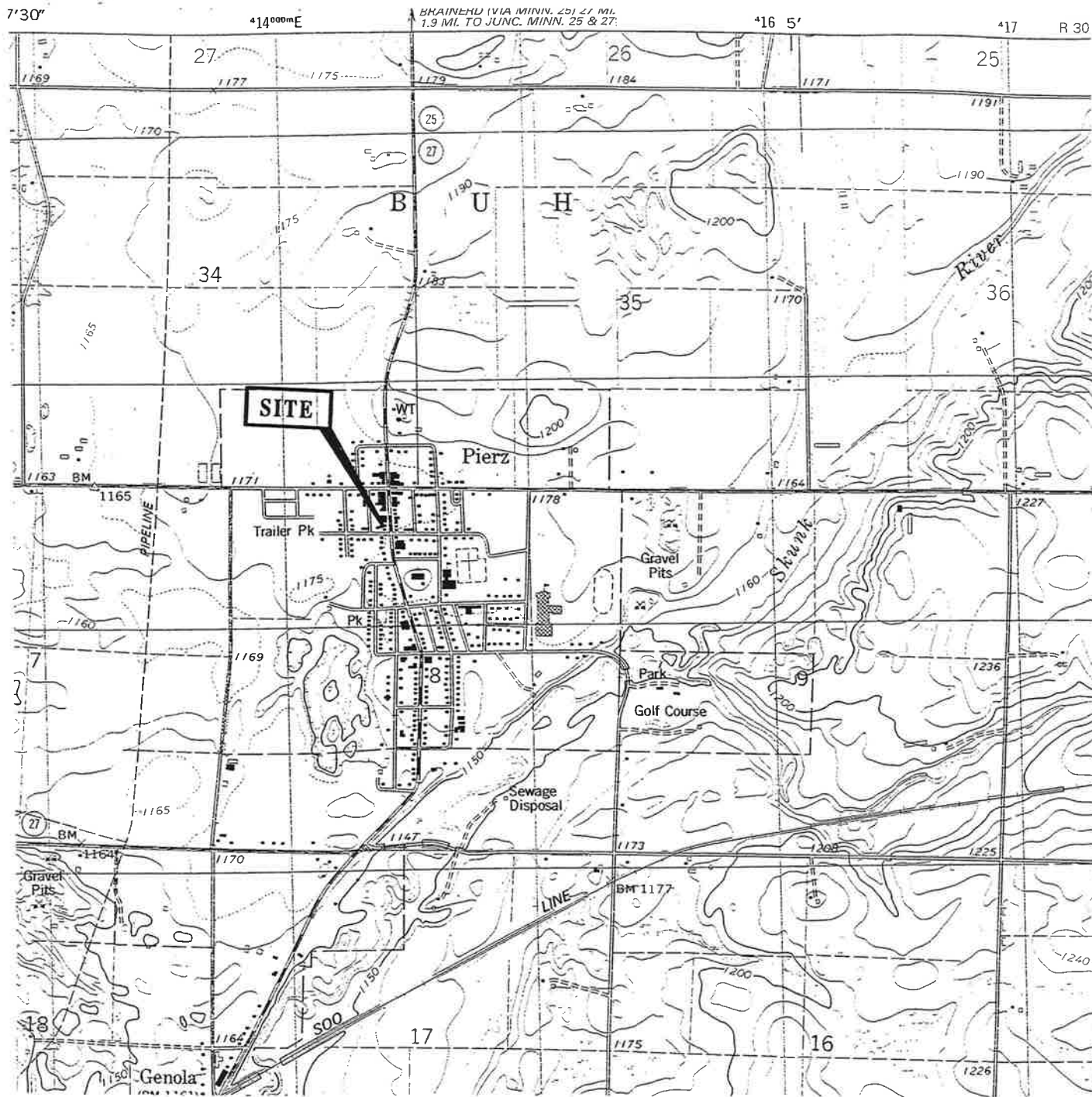
Bruce D. Johnson, PG
Senior Geologist

Reviewed by:



Elizabeth M Metzger, PG
Senior Project Manager

/bdj



APPROXIMATE SCALE:



1 inch = 2,000 feet

REMARKS:

Map taken from USGS 7.5 minute Pierz, MN Quadrangle.

**DRAWN BY: ASW
REVIEWED BY: BDJ**

NORTH



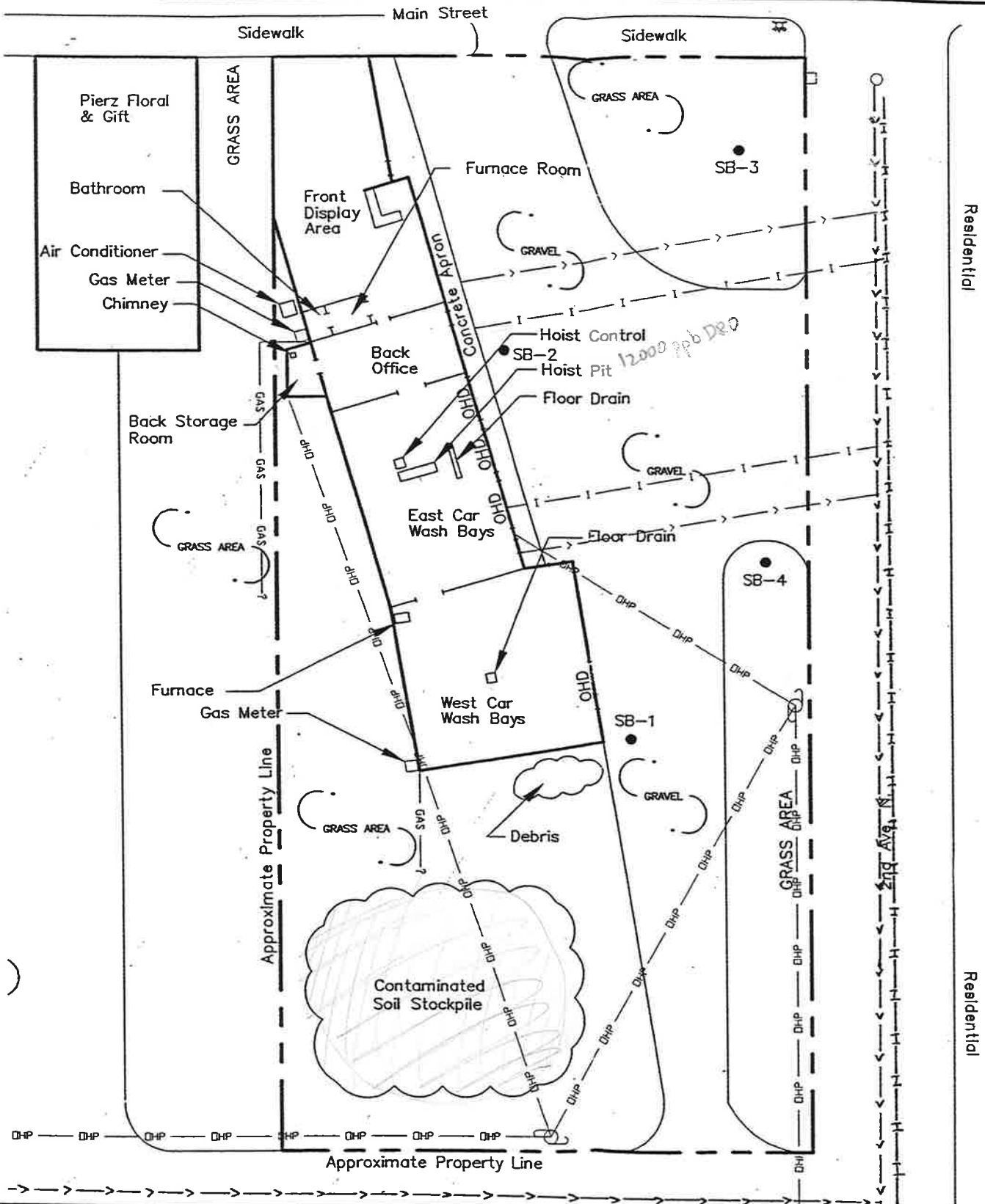
**DATE:
DECEMBER
1998**

FIGURE 1

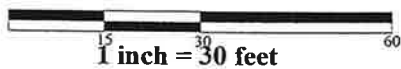
SITE LOCATION MAP

**PROPERTY: MAIN STREET and 2nd AVENUE
PIERZ, MINNESOTA
SUMMIT PROJECT NO.1049-002**

SUMMIT ENVIROSOLUTIONS



APPROXIMATE SCALE:



NORTH



FIGURE 2

SITE MAP

PROPERTY: MAIN STREET and 2nd AVENUE
PIERZ, MINNESOTA
SUMMIT PROJECT NO.1049-002

REMARKS: Map from WSN Phase II ESA
Dated September, 1998 and conversations
with the City of Pierz.

DRAWN BY: ASW
REVIEWED BY: BDJ

DATE:
DECEMBER
1998

PHASE II ENVIRONMENTAL SITE ASSESSMENT

of

**PROPERTY ON THE NW CORNER OF MAIN STREET
AND SECOND AVENUE NORTH
PIERZ, MINNESOTA**

Prepared for:

**Horizon Health, Inc.
93 Edwards Street South
Pierz, Minnesota 56364**

September 1998

WSN No. 260B531

WIDSETH SMITH NOLTING

ENGINEERS • ARCHITECTS • LAND SURVEYORS • ENVIRONMENTAL SERVICES

216 South Main
P.O. Box 458
Crookston, MN 56716
218-281-6522
FAX: 218-281-6545

2000 Industrial Park Rd. S.
P.O. Box 2720
Baxter, MN 56425
218-829-5117
Fax: 218-829-2517

2504 Aga Drive
Alexandria, MN 56308
320-762-8149
FAX: 320-762-0263

WIDSETH SMITH NOLTING

ENGINEERS
ARCHITECTS
LAND SURVEYORS
ENVIRONMENTAL SERVICES

September 2, 1998

Mr. Jim Birchem
Horizon Health, Inc.
93 Edward Street South
Pierz, MN 56364

**Re: Phase II Environmental Site Assessment
Sitzman Property, Pierz, Minnesota**

Dear Mr. Birchem:

Enclosed are two copies of the Phase II Environmental Site Assessment (ESA) for the above-referenced site.

As we discussed, four soil borings were completed downgradient from the soil stockpile, the West Car Wash Bays, and the East Car Wash Bays at the subject site. Soil samples collected from each boring were screened for volatile organics. Volatile organics were detected in SB-1 and SB-2. One soil sample and four groundwater samples were sent to the laboratory to be analyzed for diesel range organics (DRO), gasoline range organics (GRO), and volatile organics (VOCs). The Phase II ESA found that groundwater downgradient from the East Car Wash Bays is contaminated with a moderate level of DRO. Groundwater downgradient from the West Car Wash Bays is contaminated with very low levels of petroleum compounds.

The concentrations of petroleum contaminants detected at the site were relatively low and the vertical extent of the contamination is limited to five feet of perched water on top of clay. Based on the field results, WSN recommends an additional site investigation in order to determine the source of the contamination and define the lateral extent of contamination. WSN also recommends a risk assessment to evaluate the potential risks associated with the contamination.

Minnesota Statute 115.061 requires that property owners who discover contamination have the duty to notify the Minnesota Pollution Control Agency.

RE:308260ENV1R1531VB090298.LTR

BRAINERD

2000 Industrial Park Rd. S.
P.O. Box 2720
Baxter, MN 56425
218-829-5117
Fax: 218-829-2517

Mr. Birchem
September 2, 1998
Page 2

Thank you for the opportunity to assist you on this project. If you have any questions, please contact me.

Sincerely,

WIDSETH SMITH NOLTING



Brian A. Ross, P.G.
Senior Geologist

Enc.

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FIGURES

Figure 1	Site Location Map
Figure 2	Soil Boring Location Map

TABLES

Table 1	Soil Boring Summary
Table 2	Summary of Groundwater Analytical Results
Table 3	Summary of Soil Analytical Results

APPENDICES

Appendix A	Laboratory Reports and Chain-of-Custody Forms
Appendix B	Soil Boring Logs
Appendix C	Sampling Methods and Procedures

I. SUMMARY

A Phase II Environmental Site Assessment (ESA) has been completed of the property on the northwest corner of Main Street and Second Avenue North, in Pierz, Minnesota. During a Phase I ESA, four areas of recognized environmental conditions were identified. The areas identified in the Phase I were the hoist, floor drains, waste oil pit, and soil pile.

The Phase II ESA consisted of a subsurface investigation to learn whether there was contamination from prior activities on the site. The subsurface investigation included one soil boring downgradient from the petroleum impacted stockpiled soil; one soil boring downgradient from the floor drain in the West Car Wash Bays; and two soil borings downgradient from the hoist pit and floor drain in the East Car Wash Bays. Three soil borings were advanced to twenty-seven feet and one soil boring was advanced to twenty-two feet using a hollow stem auger. Groundwater samples were collected from each boring.

The first soil boring was south of the southwest corner of the West Car Wash Bays. The second soil boring was completed near the south property boundary approximately forty-five feet south of the southeast corner of the West Car Wash Bays. The third soil boring was completed approximately ten feet southeast of the East Car Wash Bays. The fourth soil boring was drilled near the southeast corner of the subject property. Widseth Smith Nolting (WSN) screened the soils during advancement with a Photovac® photoionization detector equipped with a 10.6 eV lamp and groundwater samples collected from the borings. The results of the soil screening showed detectable concentrations of organic vapors present in three of the soil borings. All four groundwater samples were submitted to the laboratory for chemical analysis. Two soil samples were submitted to the laboratory for analysis.

Based on the limited site investigation completed for the Phase II ESA, groundwater at the subject site is impacted with petroleum compounds. Groundwater is not impacted with solvents. The contaminant plume is relatively small and confined to a perched aquifer. Soil analytical results indicate that soil is not impacted with petroleum compounds or solvents at the locations sampled.

II. INTRODUCTION

A. Purpose

Widseth Smith Nolting (WSN) has completed a Phase II Environmental Site Assessment (ESA) for the property located on the northwest (NW) corner of Main Street and Second Avenue North, Pierz, Minnesota. The Phase II ESA was requested after a Phase I ESA found four areas of recognized environmental conditions at the subject site. In accordance with the written authorization on July 3, 1998, WSN conducted the Phase II ESA to disclose any factual environmental information and render an opinion regarding the environmental data collected.

B. Scope of Work

1. Near the southwest corner of the West Car Wash Bays, advance one soil boring to a depth of approximately twenty-five feet below ground surface (BGS) and collect one groundwater sample from the boring to be submitted for laboratory analysis for diesel range organics (DRO), gasoline range organics (GRO) and volatile organics (VOCs). Because of the presence of significant organic vapors in the soil, one split-spoon soil sample was collected from the area of maximum contamination for laboratory analysis for DRO, GRO, and VOCs.
2. Downgradient from the hoist pit and floor drain in the East Car Wash Bays, advance one soil boring to a depth of approximately twenty-five feet BGS and collect one groundwater sample from the boring to be submitted for laboratory analysis for DRO, GRO, and VOCs. Because of the presence of petroleum odors and staining near the bottom of the soil boring, one split-spoon soil sample was collected from the area of maximum contamination for laboratory analysis for DRO, GRO, and VOCs.
3. Near the southeast corner of the property beneath the former location of the Langer building and downgradient from the hoist pit and floor drains, advance one soil boring to a depth of approximately twenty-five feet BGS and collect one groundwater sample from the boring to be submitted for laboratory analysis for DRO, GRO, and VOCs.
4. Downgradient from the floor drain in the West Car Wash Bays, advance one soil boring to a depth of approximately twenty-five feet BGS and collect one groundwater sample from the boring for laboratory analysis for DRO, GRO, and VOCs.
5. Prepare a report summarizing observations relating to the environmental conditions of the site and an analysis of collected data.

C. Methodology

1. Soil Sampling

Soil samples were obtained from soil borings advanced by a hollow stem auger (HSA). Soil samples were collected with a stainless steel split-spoon sampler. Appendix C lists the procedures for sampling, classification of soils, and other related activities.

2. Decontamination of Drilling Equipment

The downhole drilling equipment and associated tools were cleaned before the start of any project work. In addition, the drilling equipment was cleaned with a pressure washer between each boring. The sampling equipment was cleaned with a decontamination solution and rinsed with distilled water between each sampling event.

3. Soil Classification

As samples were obtained in the field, they were visually and manually classified by a WSN representative in accordance with American Society of Testing and Materials (ASTM) Standard D 2488-93 (ASTM: D 2488-93). The classification of soil boring samples, soil boring depths, identification of various strata, the soil consistency, water level information, and pertinent information regarding the method of maintaining and advancing the drill holes are presented on boring logs.

4. Soil Organic Vapor Monitoring

Soil samples were screened for organic vapors with a Photovac® photoionization detector (PID) equipped with a 10.6 eV lamp and calibrated for a direct equivalent reading of parts per million isobutylene. Organic vapor concentrations were recorded using the bag headspace method as described in the Minnesota Pollution Control Agency (MPCA) *Soil Sample Collection and Analysis Procedures* Fact Sheet #3.22.

5. Soil and Groundwater Sampling for Chemical Analysis

Soil and groundwater samples submitted for chemical analyses were collected using decontaminated sampling equipment and latex gloves. Soil and groundwater samples were placed in clean jars with Teflon-lined lids and stored in coolers containing ice packs. The cooler was then shipped to Serco Laboratories using standard chain-of-custody forms and procedures.

6. Groundwater Level Measurements

Groundwater level measurements were obtained using an electronic instrument. The instrument is equipped with a probe which emits an electric signal when in contact with water. Measurements were obtained by lowering the probe into the soil boring and recording the depth of the probe when an electric signal indicated contact with water. The manufacturer's reported accuracy for the instrument is 0.04 feet.

III. SAMPLING RESULTS

1. Soil Borings

On July 9, 1998, four soil borings, SB-1 through SB-4, were completed to depths of 22-27 feet BGS. All borings were completed using a hollow stem auger with a three and one quarter-inch inside diameter. Soil samples were obtained by advancing a split-spoon sampler into the boring.

The lithologic profile, as defined by the soil borings, consists of at least 25 feet of coarse alluvium overlying an unweathered till. The coarse alluvium consists of reddish-brown gravel and coarse-grained sand. The unweathered till consists of dark brown clay with a small amount of gravel. The near-surface saturated zone extends from approximately 20 feet BGS to 25 feet BGS where it is confined by the unweathered till. The boring logs are included as Appendix B. Soil boring locations for the subject site are shown on Figure 2.

2. Field Screening for Contamination

Soil samples were obtained from 5-7 feet, 10-12 feet, 15-17 feet, 20-22 feet, and 25-27 feet in SB-1, SB-2, and SB-3, and from 5-7 feet, 10-12 feet, 15-17 feet, and 20-22 feet in SB-4. Each soil sample was screened for organic vapors using a Photovac® photoionization detector (PID) equipped with 10.6 eV lamp and calibrated for a direct equivalent reading of parts per million isobutylene. Organic vapor readings from the soil borings are included on boring logs in Appendix B and are summarized in Table 1.

The background organic vapor readings for the site ranged from 4.5 ppm to 11.0 ppm. Field screening of soil boring samples indicated detectable levels of organic vapors and petroleum odors in soil samples from SB-1 and SB-2. Organic vapor readings in SB-1 ranged from 4.5 ppm to 20 ppm. Organic vapor readings in SB-2 ranged from 5.9 ppm to 12.2 ppm.

3. Groundwater Results

Groundwater samples were collected from SB-1, SB-2, SB-3, and SB-4 on July 9, 1998. All of the groundwater samples were submitted to Serco Laboratories for quantification of DRO, GRO, and VOCs on July 9, 1998. Groundwater analytical results indicated detectable concentrations of analytes present in SB-2 and SB-4. Groundwater analytical results are summarized in Table 2. The laboratory analytical reports and chain-of-custody forms are included as Appendix A.

4. Soil Results

Two soil samples, SB-1 (5-7') and SB-2 (25-27'), were sent to the laboratory for analysis. SB-1 was analyzed for DRO, GRO, and VOCs. SB-2 was analyzed for PCBs. Petroleum compounds were not detected in SB-1, and PCBs were not detected in SB-2. Soil analytical results for SB-1 and SB-2 are summarized in Table 3. The laboratory analytical reports and chain-of-custody forms are included in Appendix A.

IV. FINDINGS AND CONCLUSIONS

WSN advanced four soil borings on the subject site. Soils samples collected from the soil borings were screened for organic vapors. Elevated levels of organic vapors were detected in SB-1 and SB-2, and petroleum odors were detected in SB-2. The organic vapor readings recorded from SB-1 were highest near the ground surface. The organic vapor readings recorded from SB-2 were highest near the water table.

Two soil samples were submitted to the laboratory for analysis. Laboratory results from SB-1 indicated that the soil near the southwest corner of the West Car Wash Bays is not impacted with petroleum products. PCBs were not detected in SB-2.

Groundwater samples were collected from each of the soil borings. Groundwater analytical results indicated that groundwater collected from SB-2 is impacted with low levels of petroleum constituents including ethylbenzene, tert-butylbenzene, 1,3,5-trimethylbenzene, n-propylbenzene, naphthalene, and GRO. SB-2 is also impacted with moderate levels of DRO. Low levels of benzene, toluene, and ethylbenzene were detected in the groundwater from SB-4.

Several compounds including methylene chloride, 1,1-dichloroethene, and 1,1,1-trichloroethane were detected in the groundwater sample for SB-4, and 1,1-dichloroethene was detected in groundwater from SB-1, SB-2, and SB-3. 1,1-dichloroethene was also detected in the soil sample from SB-1. As noted on the analytical reports, those three compounds were also detected in the lab blank which indicates that site samples were impacted with those compounds in the laboratory processes. Dichlorodifluoromethane was detected in SB-4. As noted on the analytical report, the calibration for this compound was above the quality control acceptance limit, again

indicating a laboratory problem..

The Phase II ESA found that groundwater downgradient from the East Car Wash Bays and south of the West Car Wash Bays is impacted with petroleum compounds. Releases related to the hydraulic hoists are the probable source of the contamination since the highest level of DRO detected was downgradient from the hoists. The vertical extent of impacted groundwater is limited to five feet of groundwater above a confining till. The confining till layer will impede the contaminants from migrating to the regional aquifer. The horizontal extent of impacted groundwater appears to be limited to a relatively small portion of the subject site based on sampling results from the four soil borings.

V. RECOMMENDATIONS

Based on the analytical results, WSN recommends an additional site investigation in order to determine the source of the contamination and define the lateral extent of contamination. As part of an additional site investigation, WSN also recommends a risk assessment to evaluate the potential risks associated with the contamination.

Minnesota Statute 115.061 requires that property owners who discover contamination have the duty to notify the Minnesota Pollution Control Agency.

10/20/98 9:15 Doug - Duty officer
1-800-422-0798

PCA - Stacy Van Patton
1-800 657 3864
tanks division

Don Mellis

Filed 12 pages of report

VI. SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

The conclusions and recommendations in this report represent our opinions, which are reasonable based on the information found by this limited assessment. These opinions were arrived at in accordance with currently accepted engineering, hydrologic, and geologic practices and are subject to the inherent limitations of environmental site assessments. No environmental site assessment can wholly eliminate uncertainty regarding the potential for "recognized environmental conditions" in connection with this property. This Phase II ESA was designed to identify potential contamination from petroleum products. WSN cannot guarantee that no other environmental problems, other than those identified, exist at the site.

This report was prepared by:



9-2-98

Molly C. Hayenga, E.I.T.
Field Engineer

Date

This report was reviewed by:



9/2/98

Brian A. Ross, P.G.
Senior Geologist

Date

VII. STAFF QUALIFICATIONS

WSN has been doing environmental work and conducting ESAs for more than five years. To date, the company has completed more than 50 Phase I and II ESAs on a wide variety of businesses and industries. Descriptions of the qualifications of the principal ESAs staff are provided below.

Molly C. Hayenga, E.I.T.
Field Engineer

Molly graduated from Michigan Technological University in 1997 with a Bachelor of Science Degree in Geological Engineering.

Prior to joining WSN, Molly worked for one year at an environmental consulting company in Michigan. Her experience has included a variety of environmental investigation, remediation, and design projects. Specific projects include remedial investigation and corrective action activities at numerous underground storage tank facilities; Phase I and Phase II environmental site assessments; contaminant transport evaluation for several petroleum release sites; and hydrogeologic investigations and evaluation. Molly has assisted with monitoring well design and installation; and remediation system design and maintenance.

As part of hydrogeologic investigations, Molly has conducted air, groundwater, and soil sampling at several facilities. In addition, she has performed aquifer tests and geophysical surveys.

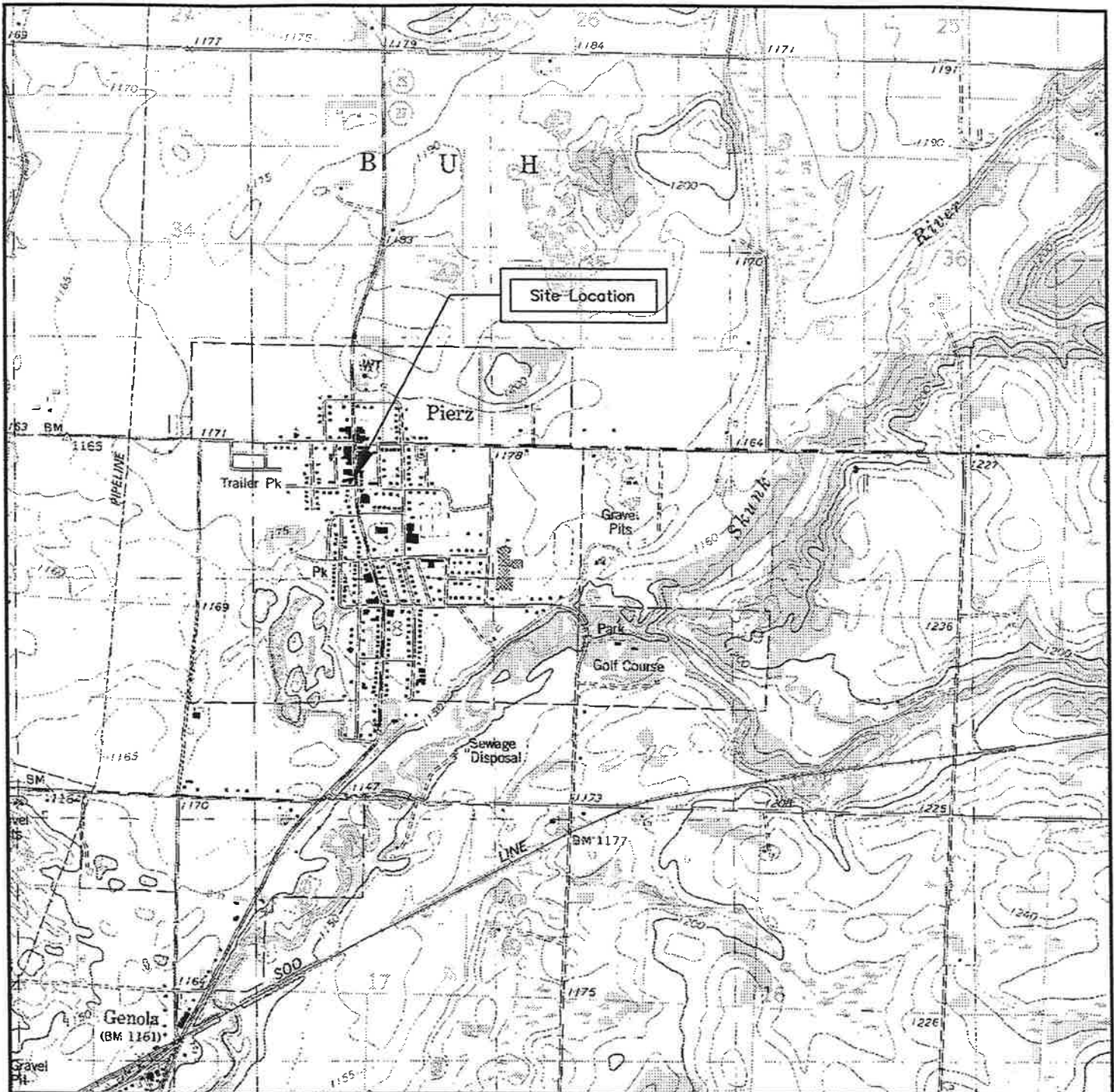
Brian A. Ross, P.G.
Senior Geologist

Mr. Ross has a B.A. in Earth Science and an M.S. in Geology from the University of Minnesota. He is a Registered Professional Geologist and a licensed monitoring well contractor. He has a strong computer background with experience in modeling groundwater flow.

Mr. Ross joined WSN in 1991, after six years with a Twin Cities environmental consulting firm. He has extensive experience in site investigation activities including sludge, sediment, soil, surface water and groundwater sampling as well as soil boring logging, monitoring well installation and aquifer testing.

Mr. Ross has experience as Project Manager for conducting hydrogeologic assessments at several landfills and wastewater ponds. One of these involved completing quarterly monitoring of groundwater as part of the closure of an industrial waste landfill. This project included development of a quality assurance plan and quarterly reports showing changes in groundwater flow and chemical concentrations. Another project involved assessing a county demolition landfill to determine if it impacted groundwater.

Mr. Ross has conducted more than 50 hydrogeologic investigations of underground storage tank (UST) releases for several major petroleum distributors. In addition, he has completed assessments, inspections, or investigations for the U.S. Environmental Protection Agency at more than three dozen hazardous waste sites all around the United States. He has also been involved in pesticide release studies, more than three dozen environmental property assessments and provided input into Environmental Impact Statements (EISs).



AREA LOCATION

TN
MN 6°

UNT Grid & Magnetic
North Declination at
Center of Sheet.

U.S.G.S. QUADRANGLE MAPS: Pierz, Minnesota
 PUBLISHED: 1978
 PHOTOREMISED: N/A

GRAPHIC SCALE



(IN FEET)



WIDSETH SMITH NOLTING
 ENGINEERS, ARCHITECTS, LAND SURVEYORS
 AND PROJECT MANAGERS

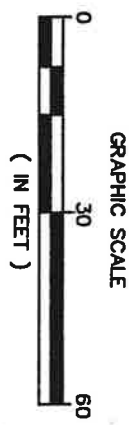
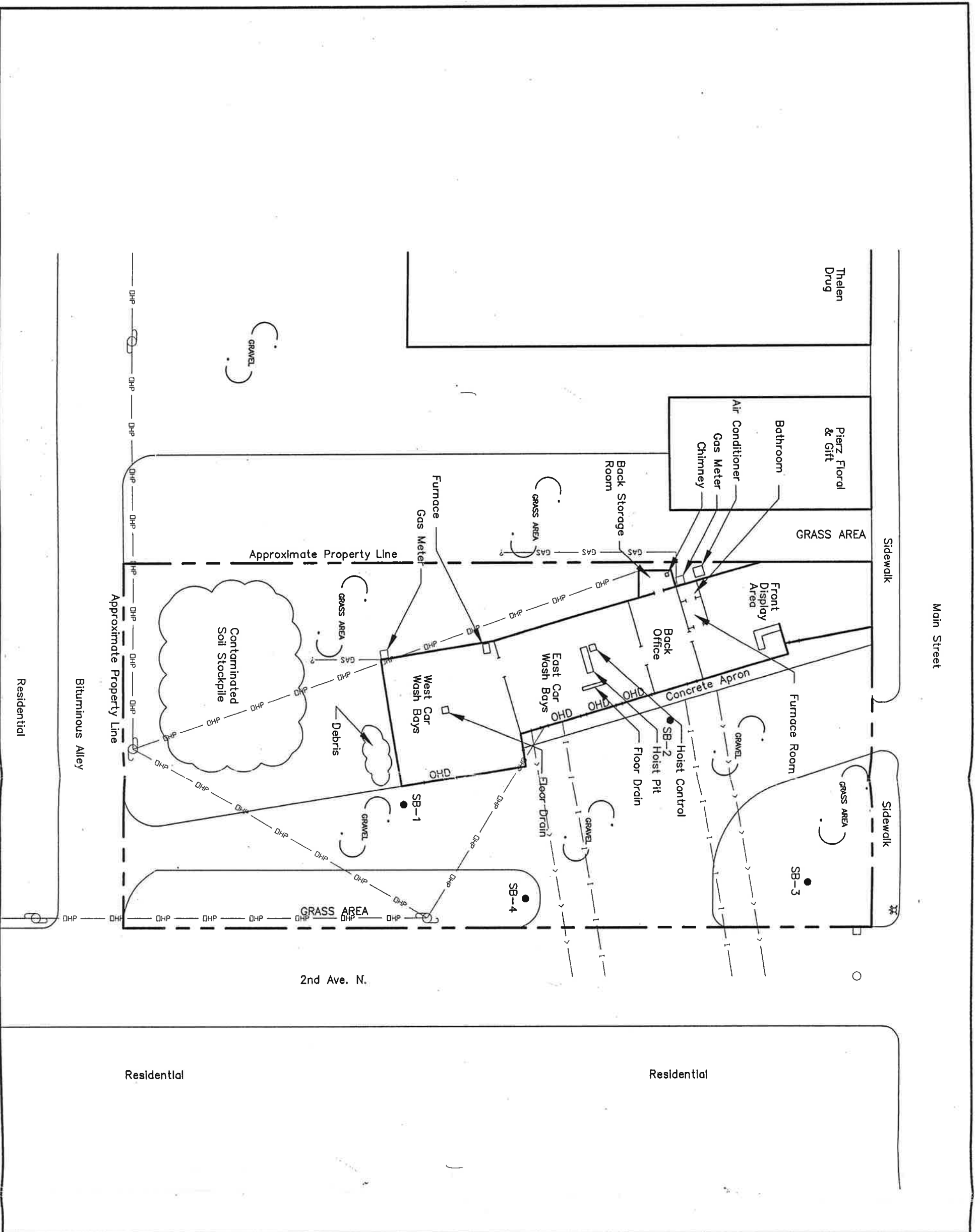
CROOKSTON BRAINERD ALEXANDRIA
 218-281-6522 218-829-5117 612-762-8149

Site Location Map

Figure 1

Horizon Health Phase II ESA
 Pierz, Minnesota

Aug. 1998



LEGEND:

—	GAS LINE
- - -	SANITARY SEWER
—	WATER LINE
—	OVERHEAD POWER
○	POWER POLE
○	MANHOLE
○	CATCH BASIN
○	OVERHEAD DOOR
●	SOIL BORING
⊗	HYDRANT

Note: Location of structures and utilities are approximate. Verify utilities before starting any subsurface work.

Figure 2

Soil Boring Location Map

Horizon Health Phase II ESA
Pierz, Minnesota

260Envr/531/Figure/Site Aug. 1998

WIDSETH SMITH NOLTING
ENGINEERS, ARCHITECTS, LAND SURVEYORS
AND PROJECT MANAGERS
ALEXANDRIA BRANEO CROOKSTON
612-762-8149 218-823-5117 218-881-6522

TABLE 1

SOIL BORING SUMMARY

**Horizon Health, Inc.
Pierz, MN**

Soil Boring ID	Boring Interval (ft.)	Headspace Results (ppm)	Soil Classification	Soil Type
SB-1	5-7	20	GP	Alluvium
	10-12	4.5	GP	Alluvium
	15-17	6.8	GP	Alluvium
	20-22	7.0	GP	Alluvium
	25-27	10.0	CL	Till
SB-2	5-7	7.4	GP	Alluvium
	10-12	5.9	GP	Alluvium
	15-17	8.3	GP	Alluvium
	20-22	6.3	GP	Alluvium
	25-27	12.2	CL	Till
SB-3	5-7	7.9	GP	Alluvium
	10-12	8.5	GP	Alluvium
	15-17	8.4	GP	Alluvium
	20-22	7.8	GP	Alluvium
	25-27	17	CL	Till
SB-4	5-7	10.9	GP	Alluvium
	10-12	10.2	GP	Alluvium
	15-17	8.1	GP	Alluvium
	20-22	7.2	GP	Alluvium

Soils were visually and manually classified using ASTM D2488-93
ppm = parts per million

TABLE 2

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

**Horizon Health, Inc.
Pierz, Minnesota**

Sample Designation	SB-1 ppb	SB-2 ppb	SB-3 ppb	SB-4 ppb
DATE	7-9-98	7-9-98	7-9-98	7-9-98
Benzene	ND	ND	ND	0.4
Toluene	ND	ND	ND	0.8
Ethylbenzene	ND	0.6	ND	0.6
Total Xylene	ND	ND	ND	ND
tert-Butylbenzene	ND	1.1	ND	ND
1,3,5-Trimethylbenzene	ND	0.5	ND	ND
n-Propylbenzene	ND	1.1	ND	ND
Naphthalene	ND	12	ND	ND
GRO	ND	180	ND	ND
DRO	ND	12000	ND	ND

ND = Not detected at or above method detection limits.
- = Not Analyzed.
GRO = Gasoline Range Organics
DRO = Diesel Range Organics
ppb = Parts per billion

TABLE 3

SUMMARY OF SOIL ANALYTICAL RESULTS

**Horizon Health, Inc.
Pierz, Minnesota**

Sample Designation	SB-1 (5-7) ppb	SB-2 (25-27) ppb
DATE	7-9-98	7-9-98
Benzene	ND	-
Toluene	ND	-
Ethylbenzene	ND	-
Total Xylene	ND	-
tert-Butylbenzene	ND	-
1,3,5-Trimethylbenzene	ND	-
n-Propylbenzene	ND	-
Naphthalene	ND	-
GRO	ND	-
DRO	ND	-
Polychlorinated Biphenyls	-	ND

ND = Not detected at or above method detection limits.
- = Not Analyzed.
GRO = Gasoline Range Organics
DRO = Diesel Range Organics
ppb = Parts per billion

APPENDIX - A

Laboratory Reports and Chain-of-Custody Forms



SERCO Laboratories

1931 West County Road C2
St. Paul, Minnesota 55113

Phone (651) 636-7173
Fax (651) 636-7178

LABORATORY ANALYSIS REPORT NO: 82263
08/11/98

Page 1 of 9

Widseth Smith Nolting
2000 Industrial Park Rd. South
P.O. Box 2720
Baxter, MN 56716

Attn: Molly Hayenga

DATE COLLECTED: 07/09/98
DATE RECEIVED: 07/10/98
COLLECTED BY : CLIENT
DELIVERED BY : CLIENT
SAMPLE TYPE : WATER
SOIL

CLIENT'S ID: 260B531 Horizon Heath, Pierz

SERCO SAMPLE NO:	71778	71788	71798	71808
SAMPLE DESCRIPTION:	SB-1	SB-2 water	SB-2 soil 25-27'	SB-3

ANALYSIS:

Gasoline Range Organics, C6-C10, ug/L	<100	180	-	<100
Analytical Method for MOD GRO	MOD GRO	MOD GRO	-	MOD GRO
Date of Analysis for MOD GRO	07/20/98	07/20/98	-	07/20/98
Diesel Range Organics, C10-C28, ug/L	<100	12000	-	<100
Analytical Method for MOD DRO	MOD DRO	MOD DRO	-	MOD DRO
Date of Extraction for MOD DRO	07/13/98	07/13/98	-	07/13/98
Date of Analysis for MOD DRO	07/15/98	07/15/98	-	07/15/98
Acetone, ug/L	<50	<50	-	<50
Allyl chloride, ug/L	<0.3	<0.3	-	<0.3
Benzene, ug/L	<0.2	<0.2	-	<0.2
Bromobenzene, ug/L	<0.2	<0.2	-	<0.2
Bromochloromethane, ug/L	<0.3	<0.3	-	<0.3
Bromodichloromethane, ug/L	<0.2	<0.2	-	<0.2
Bromoform, ug/L	<2.0	<2.0	-	<2.0
Bromomethane, ug/L (Methyl bromide)	<1.7	<1.7	-	<1.7
n-Butylbenzene, ug/L	<0.4	<0.4	-	<0.4
sec-Butylbenzene, ug/L	<0.4	<0.4	-	<0.4
tert-Butylbenzene, ug/L	<0.5	1.1	-	<0.5
Carbon tetrachloride, ug/L	<0.2	<0.2	-	<0.2
Chlorobenzene, ug/L	<0.2	<0.2	-	<0.2
Chloroethane, ug/L (Ethyl chloride)	<0.6	<0.6	-	<0.6
Chloroform, ug/L	<0.5	<0.5	-	<0.5
Chloromethane, ug/L (Methyl chloride)	<3.5	<3.5	-	<3.5
2-Chlorotoluene, ug/L (o-Chlorotoluene)	<0.2	<0.2	-	<0.2
4-Chlorotoluene, ug/L (p-Chlorotoluene)	<0.2	<0.2	-	<0.2

< means "not detected at this level". 1 mg = 1000 ug.



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SERCO SAMPLE NO:	71778	71788	71798	71808
SAMPLE DESCRIPTION:	SB-1	SB-2 water	SB-2 soil 25-27'	SB-3

ANALYSIS:

Dibromochloromethane, ug/L (Chlorodibromomethane)	<0.3	<0.3	-	<0.3
1,2-Dibromo-3-chloropropane, ug/L	<0.5	<0.5	-	<0.5
1,2-Dibromoethane, ug/L (Ethylene dibromide)	<0.4	<0.4	-	<0.4
1,2-Dichlorobenzene, ug/L (o-Dichlorobenzene)	<0.2	<0.2	-	<0.2
1,3-Dichlorobenzene, ug/L (m-Dichlorobenzene)	<0.2	<0.2	-	<0.2
1,4-Dichlorobenzene, ug/L (p-Dichlorobenzene)	<0.5	<0.5	-	<0.5
Dichlorodifluoromethane, ug/L (Freon 12)	<2.0	<2.0	-	<2.0
1,1-Dichloroethane, ug/L	<0.3	<0.3	-	<0.3
1,2-Dichloroethane, ug/L (Ethylene dichloride)	<0.1	<0.1	-	<0.1
1,1-Dichloroethene, ug/L	0.3 F	0.6 E	-	0.3 B
cis-1,2-Dichloroethene, ug/L	<0.2	<0.2	-	<0.2
trans-1,2-Dichloroethene, ug/L	<0.2	<0.2	-	<0.2
1,2-Dichloropropane, ug/L	<0.1	<0.1	-	<0.1
1,3-Dichloropropane, ug/L	<0.5	<0.5	-	<0.5
2,2-Dichloropropane, ug/L	<0.5	<0.5	-	<0.5
1,1-Dichloropropene, ug/L	<0.2	<0.2	-	<0.2
cis-1,3-Dichloropropene, ug/L	<0.1	<0.1	-	<0.1
trans-1,3-Dichloropropene, ug/L	<0.2	<0.2	-	<0.2
Dichlorofluoromethane, ug/L (Freon 21)	<0.7	<0.7	-	<0.7
Ethylbenzene, ug/L	<0.5	0.6	-	<0.5
Ethyl ether, ug/L	<2.0	<2.0	-	<2.0
Hexachlorobutadiene, ug/L	<0.3	<0.3	-	<0.3
Isopropylbenzene, ug/L, (Cumene)	<0.2	<0.2	-	<0.2
4-Isopropyltoluene, ug/L (p-Isopropyltoluene)	<0.4	<0.4	-	<0.4
Methyl ethyl ketone, ug/L (2-Butanone)	<10	<10	-	<10

< means "not detected at this level". 1 mg = 1000 ug.



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LABORATORY ANALYSIS REPORT NO: 82263
08/11/98

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SERCO SAMPLE NO:	71778	71788	71798	71808
SAMPLE DESCRIPTION:	SB-1	SB-2 water	SB-2 soil 25-27'	SB-3

ANALYSIS:

Methyl isobutyl ketone, ug/L (4-Methyl-2-pentanone)	<1.0	<1.0	-	<1.0
Methyl tertiary butyl ether, ug/L	<0.4	<0.4	-	<0.4
Methylene chloride, ug/L (Dichloromethane)	<3.0	<3.0	-	<3.0
Naphthalene, ug/L, (volatile method)	<0.5	12	-	<0.5
n-Propylbenzene, ug/L	<0.2	1.1	-	<0.2
Styrene, ug/L	<0.5	<0.5	-	<0.5
1,1,1,2-Tetrachloroethane, ug/L	<0.1	<0.1	-	<0.1
1,1,2,2-Tetrachloroethane, ug/L	<0.3	<0.3	-	<0.3
Tetrachloroethene, ug/L	<0.3	<0.3	-	<0.3
Tetrahydrofuran, ug/L	<25	<25	-	<25
Toluene, ug/L	<0.5	<0.5	-	<0.5
1,2,3-Trichlorobenzene, ug/L	<0.2	<0.2	-	<0.2
1,2,4-Trichlorobenzene, ug/L	<0.2	<0.2	-	<0.2
1,1,1-Trichloroethane, ug/L	<0.3	<0.3	-	<0.3
1,1,2-Trichloroethane, ug/L	<0.2	<0.2	-	<0.2
Trichloroethene, ug/L	<0.4	<0.4	-	<0.4
Trichlorofluoromethane, ug/L (Freon 11)	<1.0	<1.0	-	<1.0
1,2,3-Trichloropropane, ug/L	<0.5	<0.5	-	<0.5
1,1,2-Trichlorotrifluoroethane, ug/L (Freon 113)	<0.9	<0.9	-	<0.9
1,2,4-Trimethylbenzene, ug/L	<0.4	<0.4	-	<0.4
1,3,5-Trimethylbenzene, ug/L (Mesitylene)	<0.2	0.5	-	<0.2
Vinyl chloride, ug/L	<0.5	<0.5	-	<0.5
Total Xylene, ug/L	<0.5	<0.5	-	<0.5
Dibromomethane, ug/L	<0.3	<0.3	-	<0.3
Polychlorinated biphenyl, (PCB), ug/kg	-	-	<7.0	-

< means "not detected at this level". 1 mg = 1000 ug.



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LABORATORY ANALYSIS REPORT NO: 82263
08/11/98

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SERCO SAMPLE NO:	71818	71828
SAMPLE DESCRIPTION:	SB-4	SB-1 soil 5-7'

ANALYSIS:

Gasoline Range Organics, C6-C10, ug/L	<100	-
Analytical Method for MOD GRO	MOD GRO	MOD GRO
Date of Analysis for MOD GRO	07/20/98	07/21/98
Diesel Range Organics, C10-C28, ug/L	<150 A	-
Analytical Method for MOD DRO	MOD DRO	MOD DRO
Date of Extraction for MOD DRO	07/13/98	07/15/98
Date of Analysis for MOD DRO	07/15/98	07/20/98
Acetone, ug/L	<50	-
Allyl chloride, ug/L	<0.3	-
Benzene, ug/L	0.4	-
Bromobenzene, ug/L	<0.2	-
Bromochloromethane, ug/L	<0.3	-
Bromodichloromethane, ug/L	<0.2	-
Bromoform, ug/L	<2.0	-
Bromomethane, ug/L (Methyl bromide)	<1.7	-
n-Butylbenzene, ug/L	<0.4	-
sec-Butylbenzene, ug/L	<0.4	-
tert-Butylbenzene, ug/L	<0.5	-
Carbon tetrachloride, ug/L	<0.2	-
Chlorobenzene, ug/L	<0.2	-
Chloroethane, ug/L (Ethyl chloride)	<0.6	-
Chloroform, ug/L	<0.5	-
Chloromethane, ug/L (Methyl chloride)	<3.5	-
2-Chlorotoluene, ug/L (o-Chlorotoluene)	<0.2	-
4-Chlorotoluene, ug/L (p-Chlorotoluene)	<0.2	-
Dibromochloromethane, ug/L	<0.3	-
(Chlorodibromomethane)		
1,2-Dibromo-3-chloropropane, ug/L	<0.5	-
1,2-Dibromoethane, ug/L	<0.4	-
(Ethylene dibromide)		
1,2-Dichlorobenzene, ug/L	<0.2	-
(o-Dichlorobenzene)		

< means "not detected at this level". 1 mg = 1000 ug.



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08/11/98

Page 5 of 9

SERCO SAMPLE NO:	71818	71828
SAMPLE DESCRIPTION:	SB-4	SB-1 soil 5-7'

ANALYSIS:

1,3-Dichlorobenzene, ug/L (m-Dichlorobenzene)	<0.2	-
1,4-Dichlorobenzene, ug/L (p-Dichlorobenzene)	<0.5	-
Dichlorodifluoromethane, ug/L (Freon 12)	3.7 I	-
1,1-Dichloroethane, ug/L	<0.3	-
1,2-Dichloroethane, ug/L (Ethylene dichloride)	<0.1	-
1,1-Dichloroethene, ug/L	0.3 B	-
cis-1,2-Dichloroethene, ug/L	<0.2	-
trans-1,2-Dichloroethene, ug/L	<0.2	-
1,2-Dichloropropane, ug/L	<0.1	-
1,3-Dichloropropane, ug/L	<0.5	-
2,2-Dichloropropane, ug/L	<0.5	-
1,1-Dichloropropene, ug/L	<0.2	-
cis-1,3-Dichloropropene, ug/L	<0.1	-
trans-1,3-Dichloropropene, ug/L	<0.2	-
Dichlorofluoromethane, ug/L (Freon 21)	<0.7	-
Ethylbenzene, ug/L	0.6	-
Ethyl ether, ug/L	<2.0	-
Hexachlorobutadiene, ug/L	<0.3	-
Isopropylbenzene, ug/L, (Cumene)	<0.2	-
4-Isopropyltoluene, ug/L (p-Isopropyltoluene)	<0.4	-
Methyl ethyl ketone, ug/L (2-Butanone)	<10	-
Methyl isobutyl ketone, ug/L (4-Methyl-2-pentanone)	<1.0	-
Methyl tertiary butyl ether, ug/L	<0.4	-
Methylene chloride, ug/L (Dichloromethane)	3.3 D,I	-
Naphthalene, ug/L, (volatile method)	<0.5	-
n-Propylbenzene, ug/L	<0.2	-
Styrene, ug/L	<0.5	-
1,1,1,2-Tetrachloroethane, ug/L	<0.1	-

< means "not detected at this level". 1 mg = 1000 ug.



SERCO Laboratories

1931 West County Road C2
St. Paul, Minnesota 55113

Phone (651) 636-7173
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LABORATORY ANALYSIS REPORT NO: 82263
08/11/98

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SERCO SAMPLE NO:	71818	71828
SAMPLE DESCRIPTION:	SB-4	SB-1 soil 5-7'

ANALYSIS:

1,1,2,2-Tetrachloroethane, ug/L	<0.3	-
Tetrachloroethene, ug/L	<0.3	-
Tetrahydrofuran, ug/L	<25	-
Toluene, ug/L	0.8	-
1,2,3-Trichlorobenzene, ug/L	<0.2	-
1,2,4-Trichlorobenzene, ug/L	<0.2	-
1,1,1-Trichloroethane, ug/L	1.0 C	-
1,1,2-Trichloroethane, ug/L	<0.2	-
Trichloroethene, ug/L	<0.4	-
Trichlorofluoromethane, ug/L (Freon 11)	<1.0	-
1,2,3-Trichloropropane, ug/L	<0.5	-
1,1,2-Trichlorotrifluoroethane, ug/L (Freon 113)	<0.9	-
1,2,4-Trimethylbenzene, ug/L	<0.4	-
1,3,5-Trimethylbenzene, ug/L (Mesitylene)	<0.2	-
Vinyl chloride, ug/L	<0.5	-
Total Xylene, ug/L	<0.5	-
Dibromomethane, ug/L	<0.3	-
Gasoline Range Organics, C6-C10, dry weight, mg/kg	-	<10
Diesel Range Organics C10-C28, dry weight, mg/kg	-	<10
Acetone, ug/kg	-	<2500
Allyl chloride, ug/kg	-	<15
Benzene, ug/kg	-	<10
Bromobenzene, ug/kg	-	<10
Bromochloromethane, ug/kg	-	<15
Bromodichloromethane, ug/kg	-	<10
Bromoform, ug/kg	-	<100
Bromomethane, ug/kg (Methyl bromide)	-	<85
n-Butylbenzene, ug/kg	-	<20
sec-Butylbenzene, ug/kg	-	<20
tert-Butylbenzene, ug/kg	-	<25

< means "not detected at this level". 1 mg = 1000 ug.



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SERC0 SAMPLE NO:	71818	71828
SAMPLE DESCRIPTION:	SB-4	SB-1 soil 5-7'

ANALYSIS:

Carbon tetrachloride, ug/kg	-	<10
Chlorobenzene, ug/kg	-	<10
Chloroethane, ug/kg (Ethyl chloride)	-	<30
Chloroform, ug/kg	-	<25
Chloromethane, ug/kg (Methyl chloride)	-	<180
2-Chlorotoluene, ug/kg (o-Chlorotoluene)	-	<10
4-Chlorotoluene, ug/kg (p-Chlorotoluene)	-	<10
Dibromochloromethane, ug/kg	-	<15
1,2-Dibromo-3-chloropropane, ug/kg	-	<25
1,2-Dibromoethane, ug/kg (Ethylene dibromide)	-	<20
1,2-Dichlorobenzene, ug/kg (o-Dichlorobenzene)	-	<10
1,3-Dichlorobenzene, ug/kg (m-Dichlorobenzene)	-	<10
1,4-Dichlorobenzene, ug/kg (p-Dichlorobenzene)	-	<25
Dichlorodifluoromethane, ug/kg (Freon 12)	-	<100
1,1-Dichloroethane, ug/kg	-	<15
1,2-Dichloroethane, ug/kg (Ethylene dichloride)	-	<5.0
1,1-Dichloroethene, ug/kg	-	10 H
cis-1,2-Dichloroethene, ug/kg	-	<10
trans-1,2-Dichloroethene, ug/kg	-	<10
Dichlorofluoromethane, ug/kg (Freon 21)	-	<35
1,2-Dichloropropane, ug/kg	-	<5.0
1,3-Dichloropropane, ug/kg	-	<25
2,2-Dichloropropane, ug/kg	-	<25
1,1-Dichloropropene, ug/kg	-	<10
cis-1,3-Dichloropropene, ug/kg	-	<5.0
trans-1,3-Dichloropropene, ug/kg	-	<10
Dibromomethane, ug/kg	-	<15
Ethylbenzene, ug/kg	-	<25

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SERCOC SAMPLE NO:	71818	71828
SAMPLE DESCRIPTION:	SB-4	SB-1 soil 5-7'

ANALYSIS:

Ethyl ether, ug/kg	-	<2.0
Hexachlorobutadiene, ug/kg	-	<15
Isopropylbenzene, ug/kg, (Cumene)	-	<10
4-Isopropyltoluene, ug/kg (p-Isopropyltoluene)	-	<20
Methyl ethyl ketone, ug/kg (2-Butanone)	-	<500
Methyl isobutyl ketone, ug/kg (4-Methyl-2-pentanone)	-	<50
Methyl tertiary butyl ether, ug/kg	-	<20
Methylene chloride, ug/kg (Dichloromethane)	-	490 G
n-Propylbenzene, ug/kg	-	<10
Naphthalene, ug/kg, (volatile method)	-	<25
Styrene, ug/kg	-	<25
1,1,1,2-Tetrachloroethane, ug/kg	-	<5.0
1,1,2,2-Tetrachloroethane, ug/kg	-	<15
Tetrachloroethene, ug/kg	-	<15
Tetrahydrofuran, ug/kg	-	<1200
Toluene, ug/kg	-	<25
1,2,3-Trichlorobenzene, ug/kg	-	<10
1,2,4-Trichlorobenzene, ug/kg	-	<10
1,1,1-Trichloroethane, ug/kg	-	<15
1,1,2-Trichloroethane, ug/kg	-	<10
Trichloroethene, ug/kg	-	<20
Trichlorofluoromethane, ug/kg (Freon 11)	-	<50
1,2,3-Trichloropropane, ug/kg	-	<25
1,1,2-Trichlorotrifluoroethane, ug/kg	-	<45
1,2,4-Trimethylbenzene, ug/kg	-	<20
1,3,5-Trimethylbenzene, ug/kg (Mesitylene)	-	<10
Vinyl chloride, ug/kg	-	<25
Total Xylene, ug/kg	-	<25
Total Solids, percent	-	96.3

See addendum for additional information

< means "not detected at this level". 1 mg = 1000 ug.

**SERCO Laboratories**1931 West County Road C2
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Fax (651) 636-7178**LABORATORY ANALYSIS REPORT NO: 82263**
08/11/98

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All analyses were performed using EPA or other accepted methodologies. Samples that may be of an environmentally hazardous nature may be returned to you. Other samples will be stored for 30 days from the date of this report, then disposed of by SERCO Laboratories. Please contact me if other arrangements are needed. This report may not be reproduced, except in its entirety, without prior written approval from SERCO Laboratories.

Report submitted by,

Diane J. Anderson
Project Manager

< means "not detected at this level". 1 mg = 1000 ug.



SERCO Laboratories

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**Addendum to SERCO Laboratories Report #82263
Widseth, Smith & Nolting
August, 1998**

- A: Increased detection limit due to limited sample volume.
- B: Detected in lab blank at a concentration of 0.5ug/L.
- C: Detected in lab blank at a concentration of 1.0ug/L.
- D: Detected in lab blank at a concentration of 4.1ug/L.
- E: Detected in lab blank at a concentration of 0.4ug/L.
- F: Detected in lab blank at a concentration of 0.3ug/L.
- G: Detected in lab blank at a concentration of 14ug/L.
An equivalent concentration for this sample would be 700ug/Kg.
- H: Detected in lab blank at a concentration of 0.5ug/L.
An equivalent concentration for this sample would be 25ug/Kg.
- I: Overall calibration was acceptable, but % recovery for this calibration standard was above the QC acceptance limit.

APPENDIX - B

Soil Boring Logs

Log Of Test Borings



WIDSETH SMITH NOLTING
 ENGINEERS, ARCHITECTS, LAND SURVEYORS
 AND PROJECT MANAGERS
 ALEXANDRIA BRAINERS CROOKSTON
 612-762-8149 218-823-3117 218-261-6322

Project Number : 280B531

Project Name : Horizon Health ESA

Location : Pierz, MN

Boring Number : SB-1

Surface Elevation : 96.10

Start Date: 7/9/98 Time: 0945

Completion Date: 7/9/98 Time: 1135

Description

FILL, Dark Brown, Medium to Coarse-Grained Sand with gravel

COARSE ALLUVIUM, Reddish Brown, Soft, GRAVEL WITH SAND, Sand is coarse-grained

UNWEATHERED TILL, Dark Brown, Soft, LEAN CLAY WITH TRACE GRAVEL

End of boring at 27.0'

Sample # and Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	U.S.C.S. Symbol	Depth (feet)
						5
1020	SS	16	DR	20	GP	
						10
1030	SS	6	Da	4.5	GP	
						15
1040	SS	8	Da	6.8	GP	
						20
1055	SS	6	M	7.0	GP	▼
						25
1120	SS	18	Da	10.0	CL	
						30

Water Level Measurements (feet)

Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level
7/9/98	1125	25'-27'	25'	25'	21.2'

Drilling Method : HSA

Backfill Method : Bentonite and Cuttings

Field Representative : Molly Hayenga

Log Of Test Borings



WIDSETH SMITH NOLTING
 ENGINEERS, ARCHITECTS, LAND SURVEYORS
 AND PROJECT MANAGERS
 ALEXANDRIA BRABERS CRICKSTON
 612-762-8149 219-829-3117 219-281-6322

Project Number : 280B531

Project Name : Horizon Health ESA

Location : Pierz, MN

Boring Number : SB-2

Surface Elevation : 96.16

Sample # and Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	U.S.C.S. Symbol	Depth (feet)	Description
							Start Date: <u>7/9/98</u> Time: <u>1145</u> Completion Date: <u>7/9/98</u> Time: <u>1300</u>
							Description
							FILL, Dark Brown, Medium to Coarse-Grained Sand with gravel
							COARSE ALLUVIUM, Reddish Brown, Soft, GRAVEL WITH SAND, Sand is coarse-grained
1155	SS	16	Slight Da	7.4	GP	5	
1205	SS	10	Slight Da	5.9	GP	10	
1210	SS	10	Da	8.3	GP	15	
1220	SS	6	Da	6.3	GP	20	
						25	Petroleum Odor
1230	SS	6	Da	12.2	CL	25	UNWEATHERED TILL, Dark Brownish Gray, Soft, LEAN CLAY WITH ROCK FRAGMENTS
						30	End of boring at 27.0'

Water Level Measurements (feet)							
Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level		
7/9/98	1232	25'-27'	25'	25'	19.9'	Drilling Method : HSA	
						Backfill Method : Bentonite and Cuttings	
						Field Representative : Molly Hayenga	

Log Of Test Borings



WIDSETH SMITH NOLTING
 ENGINEERS, ARCHITECTS, LAND SURVEYORS
 AND PROJECT MANAGERS
 ALEXANDRIA BRANES CROOKSTON
 612-762-8149 218-823-5117 218-281-6322

Project Number : 260B531
 Project Name : Horizon Health ESA
 Location : Pierz, MN
 Boring Number : SB-3 Surface Elevation : 96.08

Sample # and Time	Sample Type	Recovery (inches)	Moisture	PID Readings (ppm)	U.S.C.S. Symbol	Depth (feet)	Description
						Start Date: <u>7/9/98</u> Time: <u>1320</u> Completion Date: <u>7/9/98</u> Time: <u>1420</u>	
						5	Fill, dark brown, medium-grained sand
1335	SS	8	DR	7.9	GP	5	COARSE ALLUVIUM, Reddish Brown, Soft, GRAVEL WITH SAND, Sand is coarse-grained
						10	
1345	SS	6	Slight Da	8.5	GP	10	
						15	
1352	SS	8	Da	8.4	GP	15	
						20	
1400	SS	3	W	7.8	GP	20	
						25	
1410	SS	18	Da	17	CL	25	UNWEATHERED TILL, Dark Brown, Soft, LEAN CLAY WITH TRACE GRAVEL
						30	End of boring at 27.0'

Water Level Measurements (feet)						Drilling Method : HSA
Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level	
7/9/98	1415	25'-27'	25'	25'	20.0'	Backfill Method : Bentonite and Cuttings
						Field Representative : Molly Hayenga

Log Of Test Borings



WIDSETH SMITH NOLTING
 ENGINEERS, ARCHITECTS, LAND SURVEYORS
 AND PROJECT MANAGERS
 ALEXANDRIA BRAINERD CROCKSTON
 612-762-8149 219-829-3117 219-281-6322

Project Number : 260B531

Project Name : Horizon Health ESA

Location : Pierz, MN

Boring Number : SB-4

Surface Elevation : 95.83

Start Date: 7/9/98 Time: 1435

Completion Date: 7/9/98 Time: 1530

Description

Topsil with some clay
 COARSE ALLUVIUM, Reddish Brown, Soft, GRAVEL WITH SAND
 Sand is coarse-grained

5

1450 SS 10 DR 10.9 GP

10

1500 SS 8 Slight Da 10.2 GP

15

1510 SS 12 Da 8.1 GP

20

1516 SS 12 W 7.2 GP

Augers rejected by rock at 22.0'

25

30

Water Level Measurements (feet)

Date	Time	Sample Depth	Casing Depth	Cave-in Depth	Water Level
7/9/98	1517	20'-22'	20'	20'	20.0'

Drilling Method : HSA

Backfill Method : Bentonite and Cuttings

Field Representative : Molly Hayenga

Widseth Smith Nolting

SOIL BORING LOG DESCRIPTIVE TERMINOLOGY

GRAIN SIZE

Soil Fraction	Particle Size	U.S. Standard Sieve
Boulders	Larger than 300mm	Larger than 12"
Cobbles	75mm to 33mm	3" to 12"
Gravel: Coarse	19mm to 75mm	3/4" to 3"
Fine	4.75mm to 19mm	#4 to 3/4"
Sand: Coarse	2.00mm to 4.75mm	#10 to #4
Medium	0.425mm to 2.00 mm	#40 to #10
Fine	0.075mm to 0.425mm	#200 to #40
Silt	0.005mm to 0.075mm	Smaller than #200
Clay	Smaller than 0.005mm	Smaller than #200

Plasticity characteristics differentiate between silt and clay.

RELATIVE PROPORTIONS

Term	Range	Term	Range
Trace	0-5%	Little	10-30%
Few	5-10%	Some	30-50%

DENSITY

CONSISTENCY

Term	"N" Value	Term
Very Loose	0-4	Very Soft
Loose	5-8	Soft
Medium Dense	9-15	Firm
Dense	16-30	Hard
Very Dense	Over 30	Very Hard

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split Barrel Sampler

SOIL MOISTURE

Dry	DR	Powdery, absence of moisture
Damp	Da	Residual moisture on soil grains
Moist	M	Below saturation
Wet	W	Saturated, visible free water

SOIL STRUCTURE

Fracture	Cracks or fissures
Seam	Up to 1/8" thick
Lamination	1/8" to 1/2" thick
Lense	1/2" to 6" thick stratum
Layer	Over 6" thick stratum
Varved	Alternating colored laminations of clay, silt, and/or fine-grained sand

DRILLING AND SAMPLING

CS	Continuous Sampling
RC	Rock Coring; Size AQ,BQ,NQ,PQ,PQ
RB	Rock Bit
CW	Clear Water
DM	Drilling Mud
MR	Mud Rotary
AR	Air Rotary
CT	Cable Tool
HSA	Hollow Stem Auger
FA	Flight Auger
HA	Hand Auger
SS	2" Diameter Split-Barrel Sample
2ST	2" Diameter Thin-Walled Tube Sample
3ST	3" Diameter Thin-Walled Tube Sample
AS	Auger Sample
CTC	Cable Tool Cuttings
WS	Washed Sample
NR	No Recovery
NMR	No Measurement Recorded
JW	Jetting Water
ND	Not Detected Above Background
NS	Not Sampled

GEOLOGIC TERMS

Coarse Alluvium	Sand and/or gravel sediments deposited by water action
Fine Alluvium	Silt and/or clay sediment deposited by water action
Mixed Alluvium	Mixture of Coarse and Fine Alluvium
Till	Unsorted sediments deposited directly by glacial ice
Colluvium	Talus and slope deposits
Eolian or Loess	Sediments deposited by wind action
Lacustrine	Sediments deposited at the bottom of a lake or pond
Peat	Organic material deposited in swamp or marsh
Fill	Sediments placed by man

WATER LEVEL MEASUREMENT

▽	Perched Water Level
▼	Water level

Note: Water level measurements shown on the boring logs represent conditions at the time indicated and may not reflect static levels, especially in cohesive soils.

Widseth Smith Nolting

CLASSIFICATION OF SOIL FOR ENGINEERING PURPOSES

ASTM Designation: D 2487-93

(Based on Unified Soil Classification System)

COARSE-GRAINED SOILS (50% or more larger than No. 200 sieve size)

GRAVELS 50% or more of coarse fraction larger than No. 4 sieve	Clean Gravels (Less than 5% fines)
	GW Well-graded gravels, gravel-sand mixtures, little or no fines
	Clean Gravels (Less than 5% fines)
	GP Poorly graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (Greater than 12% fines)
SANDS 50% or more of coarse fraction smaller than No. 4 sieve	Clean sands (Less than 5% fines)
	SW Well-graded sands, gravelly sands, little or no fines
	Clean sands (Less than 5% fines)
	SP Poorly graded sands, gravelly sands, little or no fines
	Sand with Fines (Greater than 12% fines)
SANDS 50% or more of coarse fraction smaller than No. 4 sieve	Sand with Fines (Greater than 12% fines)
	SM Silty sands, sand-silt mixtures
	Sand with Fines (Greater than 12% fines)
	SC Clayey sands, sand-clay mixtures

FINE-GRAINED SOILS (50% or more smaller than No. 200 Sieve)

SILTS AND CLAYS Liquid limit less than 50%	ML Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity
	CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL Organic silts & organic silty clays of low plasticity
SILTS AND CLAYS Liquid Limit 50% or More	MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH Inorganic clays of high plasticity, fat clays
	OH Organic clays of medium to high plasticity, organic silts

HIGHLY ORGANIC SOILS

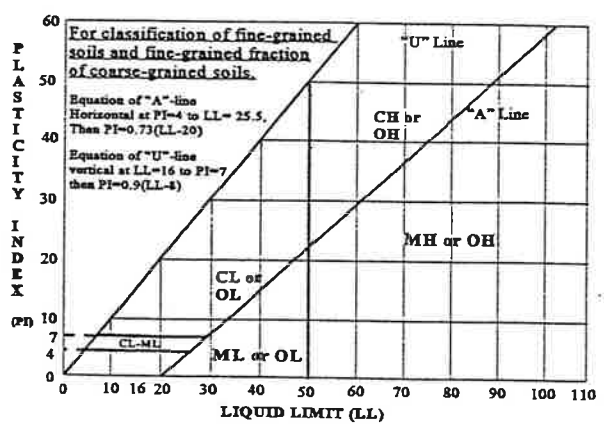
PEAT Primarily Organic Matter	Fibric Peat > 67% fibers PT Hemic Peat 33%-67% fibers Sapric Peat < 33% fibers
---	--

LABORATORY CLASSIFICATION CRITERIA

GW D_{60} greater than or equal to 4; $(\frac{D_{30}}{D_{10}})^2$ between 1 and 3 $\frac{D_{30}}{D_{10} \times D_{60}}$ Where D_{60}, D_{30}, D_{10} are the particle diameters corresponding to 60%, 30%, 10% passing on the cumulative particle-size distribution curve.	
GP Not meeting all gradation requirements for GW	
GM *Atterberg limits below "A" line or P.I. less than 4	*Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols GC-GM
GC *Atterberg limits above "A" line with P.I. greater than 7	*For fine-grained fraction
SW D_{60} greater than or equal to 6; $(\frac{D_{30}}{D_{10}})^2$ between 1 and 3 $\frac{D_{30}}{D_{10} \times D_{60}}$ Where D_{60}, D_{30}, D_{10} are the particle diameters corresponding to 60%, 30%, 10% passing on the cumulative particle-size distribution curve.	
SP Not meeting all gradation requirements for SW	
SM *Atterberg limits below "A" line or P.I. less than 4	*Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols SC-SM
SC *Atterberg limits above "A" line with P.I. greater than 7	*For fine-grained fraction

Gravels with 5 to 12% fines require dual symbols:
 GW-GM well-graded gravel with silt
 GW-GC well-graded gravel with clay
 GP-GM poorly graded gravel with silt
 GP-GC poorly graded gravel with clay

Sands with 5 to 12% fines require dual symbols:
 SW-SM well-graded sand with silt
 SW-SC well-graded sand with clay
 SP-SM poorly graded sand with silt
 SP-SC poorly graded sand with clay



APPENDIX - C

Sampling Methods and Procedures

FIELD METHODS AND PROCEDURES

1.0 SOIL SAMPLING

Soil samples were obtained from soil borings advanced by either hollow stem auger (HSA) or mud-rotary methods. Soil sampling was done by driving or pushing a 2-inch O.D. split-spoon sampler 1.5 to 2.0 feet into the soil. The relative density of cohesionless soils and the consistency of cohesive soils are recorded based on the resistance to the sampler.

2.0 DECONTAMINATION OF DRILLING EQUIPMENT

The downhole drilling equipment and associated tools were steam cleaned prior to the start of any project work. In addition, the downhole drilling equipment was cleaned with a soap solution using a high pressure spray after completion of each soil boring. The split barrel sampler was also cleaned between samples to minimize cross-contamination. The cleaning procedure consisted of scrubbing the sampler with a brush in a soap and water solution followed by a tap water rinse. The soap and water were changed regularly during the sampling. Fluids used in on-site cleaning of the split barrel sampler and drilling equipment were disposed on the site.

3.0 SOIL CLASSIFICATION

As the samples were obtained in the field, they were visually and manually classified by a WSN representative in accordance with ASTM: D 2488-93. Representative portions of the samples were then returned to WSN's office in the event there is need for further examination and verification of the field classification. The classification of soil boring samples, soil boring depths, identification of the various strata, the soil consistency, water level information, and pertinent information regarding the method of maintaining and advancing the drill holes are presented on boring logs. Charts describing the soil classification procedure, the descriptive terminology, and symbols used on the boring logs are included with the logs.

4.0 SOIL ORGANIC VAPOR MONITORING

Soil samples were screened for organic vapors with an HNU Model 101 photoionization detector (PID) equipped with a 10.2 eV lamp and calibrated for a direct equivalent reading of parts per million benzene. Organic vapor concentrations were recorded using the jar headspace method. Under favorable conditions, organic vapor concentrations were also recorded by placing the PID probe within 1 to 2 inches of a fresh soil surface. During cold weather, PID headspace readings were taken in a heated space.

5.0 SOIL SAMPLING FOR CHEMICAL ANALYSIS

Soil samples submitted for chemical analysis were collected using decontaminated sampling equipment and new latex gloves. Soil samples were placed in clean jars with teflon-lined lids and stored in coolers containing ice packs. The cooler was then shipped or delivered to the analytical laboratory using standard chain-of-custody forms and procedures.

6.0 GROUNDWATER LEVEL MEASUREMENTS

Groundwater level measurements were obtained using an electronic measuring instrument. The instrument is equipped with a probe which emits an electric signal when in contact with water. Measurements were obtained by lowering the probe into the well and recording the depth of the probe when the electric signal indicated contact with water. Measurements were referenced to the top of the monitoring well casing and recorded to the nearest 0.01 feet. The manufacturer's reported accuracy for the instrument is 0.04 feet.

7.0 GROUNDWATER SAMPLING FOR CHEMICAL ANALYSIS

Groundwater samples from monitoring wells were obtained using a stainless steel bailer equipped with a bottom-closing ball-check valve. Samples were collected with bailers cleaned in a soapy water wash, and then rinsed with deionized or distilled water. Bailer blanks of distilled water were collected at the site.

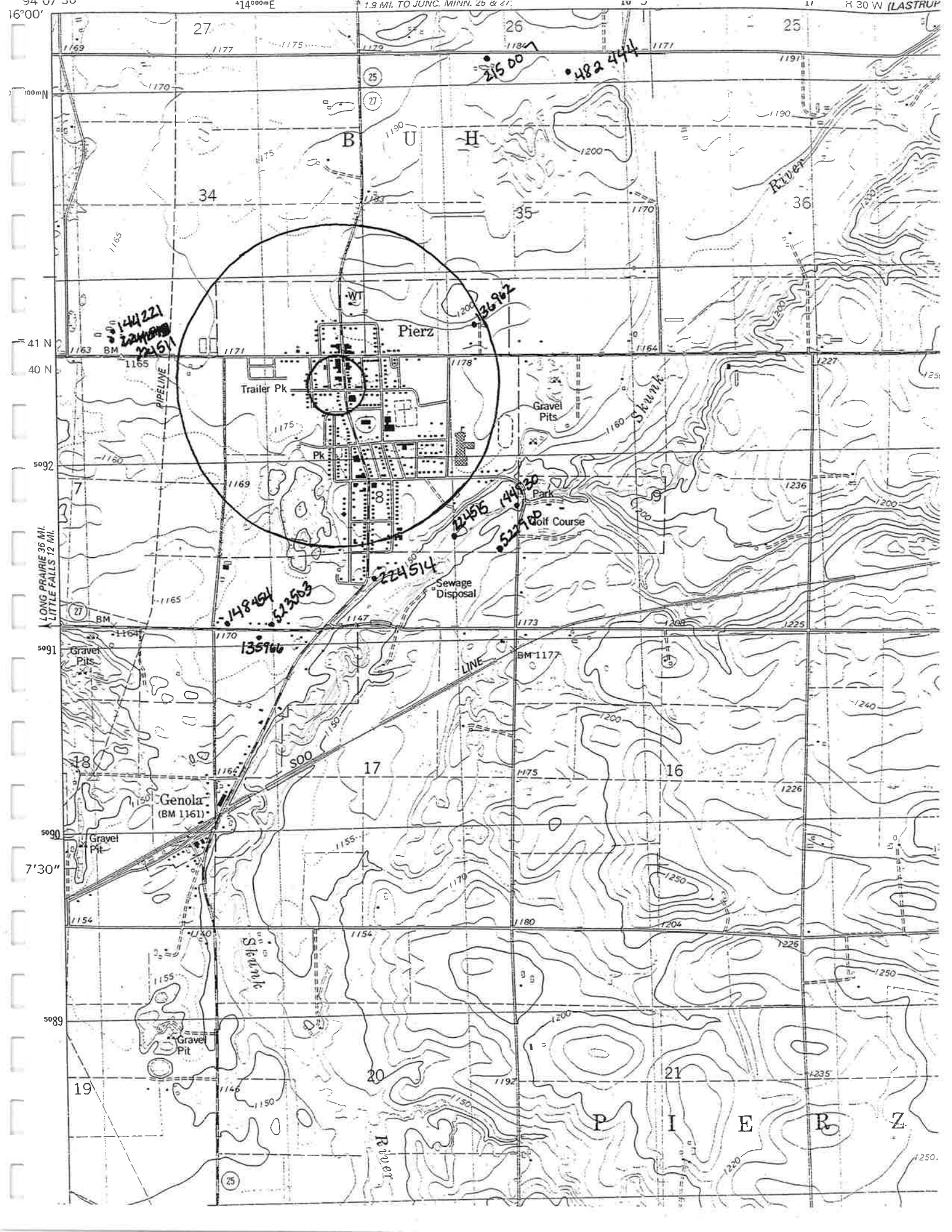
Prior to sampling, the monitoring wells were purged to introduce fresh formation water into the wells. The monitoring wells were purged by removing water from the wells with the stainless steel bailer. A minimum of three monitoring well water volumes were evacuated prior to sample collection where suitable groundwater recharge occurred. In some cases, the evacuated groundwater was monitored for pH, specific conductance and temperature during the purging process. Water level measurements were recorded prior to purging.

Groundwater samples were collected in clean glass containers affixed with labels listing the type of analysis and sample identification. Appropriate preservation techniques were used for those samples as required. The sample bottles were appropriately labeled with the work order number, location number, date sampled, and initials of the individual sampler. A chain-of-custody form was completed and was shipped with the samples to the laboratory. Upon arrival at the laboratory, the samples were checked in and signed over to the appropriate laboratory personnel. At that time, a copy of the chain-of-custody form was retained and returned to the project manager.

Field filtration was performed on groundwater samples collected for analysis of dissolved metals. A groundwater sample was collected in a temporary transfer container from which the sample was passed through a filter into a labelled collection container. The transfer and collection containers consist of laboratory cleaned bottles. Following filtering the samples were preserved.

8.0 SURVEYING

Surface elevations of the soil borings were surveyed and elevations were recorded to the nearest 0.1 feet.



MINNESOTA COUNTY WELL INDEX/WELL LOG.

UN.NO./CO. : 135966/49

NAME : LEROY GULDEN

WELL CONSTRUCTION.

	DIAM (IN)	FROM (FT)	TO (FT)	[GROUT-----] MATERIAL	AMNT	UNITS
CASING 1 :	6	0	73			

SCREEN: DATA UNAVAILABLE.

PUMP : DATA UNAVAILABLE.

PUMPAGE TEST(S).

STATIC WATER LEVEL: LEVEL (FT)	25 FT. HOURS	GPM	DATE: 1977/06/ DRAWDOWN (FT)
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TEST 1:	45	1	25	20.0
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DRILLER S/GEOLOGIC LOG

DEPTH INTERVAL	DRILLER S DESCRIPTION [EL.TOP] [INTERPRETED LITHOLOGY	COLOR [CODE]	HARDNESS [STRATIGRAPHIC UNIT(S)	[AGE]
0 5	GRAVEL + BOULDERS	BROWN	HARD	
[1169]	[GRAVEL, COBBLE, BOULDER	[QFUB]	[SAND, BROWN	] [QUA]
5 45	SAND	BROWN	HARD	
[1164]	[SAND	[QFUB]	[SAND, BROWN	] [QUA]
45 67	CLAY	YELLOW	HARD	
[1124]	[CLAY	[QTUB]	[TILL, BROWN	] [QUA]
67 73	GRAVEL + WATER			
[1102]	[GRAVEL	[QFUU]	[SAND	] [QUA]

MINNESOTA COUNTY WELL INDEX.

UN.NO./CO. : 136962/49

ENTERED: 1988/04/13

NAME : DENNIS ROTHSTEIN

UPDATED: 1991/08/14

COUNTY : MORRISON	USE : DOMESTIC	DRILLED: 1977/06/12
T/R/SEC. : 41/30/35CDCA	DEPTH : 70 FT.	DEPTH D: 70 FT.
ELEVATION: 1195 FT. (TOPO)	CASED : 62 FT.	GROUT : YES
DIAM. : 4 IN.	DRL/DS :	
STATUS : ACTIVE	WHPA :	DNR PA#:

AQUIFER : QUAT. BURIED ARTES. AQUIFER

QUAD (7.5): PIERZ	CONTACT:
POTENTIAL POLLUTION SOURCE: 0200 FT.	DIR.:
CWI/WL: NO	CWI/WC: NO
CORE/CTINGS/GP.:	TYPE:

DATE	NITRATE	BACTERIA	SOURCE	SWL	ELEV	SOURCE
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MINNESOTA COUNTY WELL INDEX/WELL LOG.

UN.NO./CO. : 144930/49

NAME : JOHN BRAUN

WELL CONSTRUCTION.

	DIAM(IN)	FROM(FT)	TO(FT)	[GROUT-----] MATERIAL	AMNT	UNITS
CASING 1 :	6	0	25			

SCREEN.

PRESENT?: YES

MAKE : SMITH

TYPE: STAINLESS

DIAM: 6 IN.

SCREEN : SLT/GZE LENGTH(FT) SETTING

SCREEN 1: 20 4 TOP: 25 FT. BOTTOM: 29 FT.

PUMP : DATA UNAVAILABLE.

PUMPAGE TEST(S).

STATIC WATER LEVEL: LEVEL(FT)	25 FT. HOURS	GPM	DATE: 1976/05/ DRAWDOWN(FT)
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TEST 1:	25	1	10	.0
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DRILLER S/GEOLOGIC LOG

DEPTH INTERVAL	DRILLER S DESCRIPTION [EL.TOP] [INTERPRETED LITHOLOGY	COLOR [CODE] [STRATIGRAPHIC UNIT(S)	HARDNESS [AGE]
0 1	TOPSOIL	BLACK	SOFT
[1171]	[SOIL, ORGANIC DEPOSITS	] [RUUG] [GRAY	] [REC]
1 10	SAND, GRAVEL, + ROCKS	BROWN	MEDIUM
[1170]	[SAND, GRAVEL, COBBLE	] [QFUB] [SAND, BROWN	] [QUA]
10 24	SAND, GRAVEL, + CLAY	BROWN	MEDIUM
[1161]	[SAND, GRAVEL, CLAY	] [QTUB] [TILL, BROWN	] [QUA]
24 29	SAND, GRAVEL	BROWN	SOFT
[1147]	[SAND, GRAVEL	] [QFUB] [SAND, BROWN	] [QUA]
29 37	CLAY + GRAVEL	BROWN	HARD
[1142]	[CLAY, GRAVEL	] [QTUB] [TILL, BROWN	] [QUA]

MINNESOTA COUNTY WELL INDEX.

UN.NO./CO. : 148454/49

ENTERED: 1988/04/13

NAME : GARY BRAUSEN

UPDATED: 1991/08/14

COUNTY : MORRISON	USE : DOMESTIC	DRILLED: 1978/04/11
T/R/SEC. : 40/30/08CCCCDC	DEPTH : 87 FT.	DEPTH D: 87 FT.
ELEVATION: 1168 FT. (TOPO)	CASED : 79 FT.	GROUT :
DIAM. : 4 IN.	DRL/DS : 48038	:NORTH STAR DRILLING
LOC.METH.: SEE REMRKS	LOC.BY : MGS	COORDS.:
STATUS : ACTIVE	WHPA :	DNR PA#:

MINNESOTA COUNTY WELL INDEX/WELL LOG.

UN.NO./CO. : 148454/49

NAME : GARY BRAUSEN

WELL CONSTRUCTION.

	DIAM (IN)	FROM (FT)	TO (FT)	[GROUT-----] MATERIAL	AMNT	UNITS
CASING 1 :	4	0	79			

SCREEN.

PRESENT?: YES

MAKE : JOHNSON

TYPE: STAINLESS

DIAM: 2 IN.

SCREEN : SLT/GZE LENGTH (FT) SETTING

SCREEN 1: 012 8 TOP: 79 FT. BOTTOM: 87 FT.

PUMP : DATA UNAVAILABLE.

PUMPAGE TEST(S).

STATIC WATER LEVEL:	29 FT.	DATE: 1978/04/
LEVEL (FT)	HOURS	GPM
		DRAWDOWN (FT)
TEST 1:	49	1
		15
		20.0

DRILLER S/GEOLOGIC LOG

DEPTH INTERVAL	DRILLER S DESCRIPTION [EL.TOP] [INTERPRETED LITHOLOGY	COLOR] [CODE]	HARDNESS [STRATIGRAPHIC UNIT(S)	[AGE]
0 20	GRAVEL	BROWN		
[1168]	[GRAVEL	] [QFUB] [SAND, BROWN		] [QUA]
20 71	CLAY + ROCKS	BROWN	VARIED	
[1148]	[CLAY, COBBLE	] [QTUB] [TILL, BROWN		] [QUA]
71 79	DIRTY SAND	BROWN	SOFT	
[1097]	[SAND, SILT	] [QFUB] [SAND, BROWN		] [QUA]
79 87	SAND, FINE	GRAY	SOFT	
[1089]	[SAND	] [QFUG] [SAND, GRAY		] [QUA]

MINNESOTA COUNTY WELL INDEX.

UN.NO./CO. : 152116/49

ENTERED: 1989/02/27

NAME : FLICKER, MARK

UPDATED: 1991/08/14

COUNTY : MORRISON

USE : IRRIGATION DRILLED: 1985/04/19

T/R/SEC. : 41/30/35

DEPTH : 100 FT. DEPTH D: 100 FT.

ELEVATION: FT. ()

CASED : 70 FT. GROUT : YES

DIAM. : 12 IN.

DRL/DS :

STATUS : ACTIVE

WHPA : DNR PA#:

CWI/WL: NO CWI/WC: NO CORE/CTTNGS/GP.:

DATE NITRATE BACTERIA SOURCE SWL ELEV SOURCE

1985/04/19

21

48038

COMMENTS: PIERZ. P.A.85-3291.

MINNESOTA COUNTY WELL INDEX.

UN.NO./CO. : 189862/49
NAME : BOB POEPPING

ENTERED: 1989/02/28
UPDATED: 1991/08/14

COUNTY : MORRISON
T/R/SEC. : 41/30/34
ELEVATION: FT. ()
DIAM. : 4 IN.

USE : DOMESTIC
DEPTH : 70 FT.
CASED : 62 FT.
DRL/DS :

DRILLED: 1981/08/20
DEPTH D: 70 FT.
GROUT :

MINNESOTA COUNTY WELL INDEX.
UNIQUE NO.: 189862 (CONTINUED)

STATUS : ACTIVE WHPA : DNR PA#:

POTENTIAL POLLUTION SOURCE: 0100 FT. DIR.: TYPE:
CWI/WL: NO CWI/WC: NO CORE/CTTNGS/GP.:

DATE	NITRATE	BACTERIA	SOURCE	SWL	ELEV	SOURCE
1981/08/20				00012		0048038

MINNESOTA COUNTY WELL INDEX.

UN.NO./CO. : 215007/49 ENTERED: 1988/04/13
NAME : G FLICKER UPDATED: 1991/08/14

COUNTY : MORRISON USE : DRILLED: 1970/01/30
T/R/SEC. : 41/30/35BAAB DEPTH : 44 FT. DEPTH D: 44 FT.
ELEVATION: 1185 FT. (TOPO) CASED : 40 FT. GROUT :
DIAM. : 6 IN. DRL/DS :
STATUS : ACTIVE WHPA : DNR PA#:

AQUIFER : QUAT. BURIED ARTES. AQUIFER

QUAD (7.5) : PIERZ CONTACT:

MINNESOTA COUNTY WELL INDEX.
UNIQUE NO.: 215007 (CONTINUED)

CWI/WL: NO CWI/WC: NO CORE/CTTNGS/GP.:

DATE	NITRATE	BACTERIA	SOURCE	SWL	ELEV	SOURCE
1970/01/30				00021	1164	

MINNESOTA COUNTY WELL INDEX.

UN.NO./CO. : 224511/49 ENTERED: 1988/04/13
NAME : WERNER VIRNING UPDATED: 1991/08/14

COUNTY : MORRISON USE : DRILLED: 1970/01/26
T/R/SEC. : 41/30/34CCDB DEPTH : 75 FT. DEPTH D: 75 FT.
ELEVATION: 1164 FT. (TOPO) CASED : 70 FT. GROUT :
DIAM. : 6 IN. DRL/DS :
STATUS : ACTIVE WHPA : DNR PA#:

AQUIFER : QUAT. BURIED ARTES. AQUIFER

MINNESOTA COUNTY WELL INDEX.
 UNIQUE NO.: 224511 (CONTINUED)

QUAD(7.5): PIERZ CONTACT:
 CWI/WL: NO CWI/WC: NO CORE/CTTNGS/GP.:

DATE	NITRATE	BACTERIA	SOURCE	SWL	ELEV	SOURCE
1970/01/26				00022	1142	

 MINNESOTA COUNTY WELL INDEX.

UN.NO./CO. : 224514/49 ENTERED: 1988/04/13
 NAME : LEO VERNIG UPDATED: 1991/08/14

COUNTY : MORRISON USE : DOMESTIC DRILLED: 1969/ /
 T/R/SEC. : 40/30/08DCBBDD DEPTH : 66 FT. DEPTH D: 66 FT.
 ELEVATION: 1170 FT.(TOPO) CASD : 66 FT. GROUT :
 DIAM. : 4 IN. DRL/DS :
 LOC.METH.: INFO.NGHBR LOC.BY : MGS COORDS.:
 STATUS : ACTIVE WHPA : DNR PA#:

MINNESOTA COUNTY WELL INDEX.
UNIQUE NO.: 224514 (CONTINUED)

OPEN HOLE: QUAT. BURIED ARTES. AQUIFER
AQUIFER : QUAT. BURIED ARTES. AQUIFER

QUAD(7.5): PIERZ CONTACT:
CWI/WL: YES CWI/WC: NO CORE/CTNGS/GP.:

MINNESOTA COUNTY WELL INDEX/WELL LOG.

UN.NO./CO. : 224514/49

NAME : LEO VERNIG

WELL CONSTRUCTION.

	DIAM(IN)	FROM(FT)	TO(FT)	[GROUT-----] MATERIAL	AMNT	UNITS
CASING 1 :	4	0	66			

SCREEN: DATA UNAVAILABLE.

PUMP : DATA UNAVAILABLE.

PUMPAGE TEST: DATA UNAVAILABLE.

DRILLER S/GEOLOGIC LOG

DEPTH INTERVAL [EL.TOP]	DRILLER S DESCRIPTION [INTERPRETED LITHOLOGY	COLOR [CODE]	HARDNESS [STRATIGRAPHIC UNIT(S)	[AGE]
0 3	TOPSOIL			
[1170]	[SOIL, ORGANIC DEPOSITS	] [RUUU]	[RECENT DEPOSIT	] [REC]
3 47	GRAVEL			
[1167]	[GRAVEL	] [QFUU]	[SAND	] [QUA]
47 66	BROWNISH-GRAY CLAY			
[1123]	[CLAY	] [QTUG]	[TILL, GRAY	] [QUA]
66 66	SAND			
[1104]	[SAND	] [QFUU]	[SAND	] [QUA]

MINNESOTA COUNTY WELL INDEX.

UN.NO./CO. : 224515/49

ENTERED: 1988/04/13

NAME : MEYERS DAIRY

UPDATED: 1991/08/14

COUNTY : MORRISON USE : COMMERCIAL DRILLED: 1965/06/
T/R/SEC. : 40/30/08DABCCC DEPTH : 101 FT. DEPTH D: 101 FT.
ELEVATION: 1173 FT. (TOPO) CASED : FT. GROUT :
DIAM. : 6 IN. DRL/DS : 73061 :DONABAUER WELL CO.
LOC.METH.: SEE REMRKS LOC.BY : MGS COORDS.:
STATUS : ACTIVE WHPA : DNR PA#: 49-0004

DPTH BDRK: -999 FT. BEDROCK: NOT APPLICABLE
OPEN HOLE: QUAT. BURIED ARTES. AQUIFER
AQUIFER : QUAT. BURIED ARTES. AQUIFER

QUAD(7.5): PIERZ CONTACT:
CWI/WL: YES CWI/WC: NO CORE/CTINGS/GP.:

DATE	NITRATE	BACTERIA	SOURCE	SWL	ELEV	SOURCE
1965/06/				27	1146	

MINNESOTA COUNTY WELL INDEX/WELL LOG.

UN.NO./CO. : 224515/49

NAME : MEYERS DAIRY

WELL CONSTRUCTION.

	DIAM(IN)	FROM(FT)	TO(FT)	[GROUT-----] MATERIAL	AMNT	UNITS
CASING 1 :	6					

SCREEN: DATA UNAVAILABLE.

PUMP.

INSTLLD?: YES

DATE : / /

SIZE : H.P.

VOLTS:

CAPACITY: 50 GPM

PUMPAGE TEST(S).

	STATIC WATER LEVEL: LEVEL (FT)	27 FT. HOURS	GPM	DATE: 1965/06/ DRAWDOWN (FT)
TEST 1:	44	6	199	17.0

DRILLER S/GEOLOGIC LOG

DEPTH INTERVAL [EL.TOP]	DRILLER S DESCRIPTION [INTERPRETED LITHOLOGY	COLOR [CODE]	HARDNESS [STRATIGRAPHIC UNIT(S)	[AGE]
0 28	SAND + GRAVEL			
[1173]	[SAND, GRAVEL	] [QFUU]	[SAND	] [QUA]
28 36	CLAY + GRAVEL	BROWN		
[1145]	[CLAY, GRAVEL	] [QTUB]	[TILL, BROWN	] [QUA]
36 58	HARDPAN	GRAY		
[1137]	[HARDPAN	] [QTUG]	[TILL, GRAY	] [QUA]
58 82	CLAY	GRAY		
[1115]	[CLAY	] [QTUG]	[TILL, GRAY	] [QUA]
82 88	QUICKSAND	GRAY		
[1091]	[SAND, SILT	] [QFUG]	[SAND, GRAY	] [QUA]
88 101	SAND, GRAVEL, WATER			
[1085]	[SAND, GRAVEL	] [QFUU]	[SAND	] [QUA]

MINNESOTA COUNTY WELL INDEX.

UN.NO./CO. : 421328/49

ENTERED: 1991/04/25

NAME : KARST, RAY

UPDATED: 1991/08/14

COUNTY : MORRISON

USE : DOMESTIC

DRILLED: 1987/05/12

T/R/SEC. : 41/30/35

DEPTH : 65 FT.

DEPTH D: 65 FT.

ELEVATION: FT. ()

CASED : 57 FT.

GROUT : YES

DIAM. : 4 IN.

DRL/DS : 49397 :NORTHLAND WELL CO.

STATUS : ACTIVE

WHPA :

DNR PA#:

ADDRESS : BOX 284 X , PIERZ , MN 56364

CWI/WL: NO CWI/WC: NO CORE/CTINGS/GP.:

MINNESOTA COUNTY WELL INDEX.
 UNIQUE NO.: 482444 (CONTINUED)

ABANDONED: / / UNUSED?: NO SEALED?:
 STATUS : ACTIVE WHPA : DNR PA#:

ADDRESS : RR 4 BOX 25 , PIERZ , MN 56364
 POTENTIAL POLLUTION SOURCE: 100 FT. DIR.: TYPE: SEPTIC/DFL
 CWI/WL: NO CWI/WC: NO CORE/CTTNGS/GP.:

DATE	NITRATE	BACTERIA	SOURCE	SWL	ELEV	SOURCE
1992/05/18				18		49588

 MINNESOTA COUNTY WELL INDEX.

UN.NO./CO. : 522900/49 ENTERED: 1993/07/31
 NAME : GRITZMACHER, JOE UPDATED: 1993/07/31

COUNTY : MORRISON USE : DOMESTIC DRILLED: 1993/06/08
 T/R/SEC. : 40/30/ 8DAD DEPTH : 75 FT. DEPTH D: 75 FT.
 ELEVATION: FT. () CASD : 71 FT. GROUT : YES
 DIAM. : 4 IN. DRL/DS : 49397 :NORTHLAND WELL CO.

MINNESOTA COUNTY WELL INDEX.
 UNIQUE NO.: 522900 (CONTINUED)

ABANDONED: / / UNUSED?: NO SEALED?:
 STATUS : ACTIVE WHPA : DNR PA#:

ADDRESS : RR 3 , PIERZ , MN 56364
 CWI/WL: NO CWI/WC: NO CORE/CTINGS/GP.:

DATE	NITRATE	BACTERIA	SOURCE	SWL	ELEV	SOURCE
1993/06/08				40		49397

 MINNESOTA COUNTY WELL INDEX.

UN.NO./CO. : 523503/49 ENTERED: 1993/07/31
 NAME : REDWOOD INDUSTRIES UPDATED: 1993/07/31

COUNTY : MORRISON USE : DOMESTIC DRILLED: 1993/01/22
 T/R/SEC. : 40/30/ 8CCD DEPTH : 120 FT. DEPTH D: 120 FT.
 ELEVATION: FT. () CASD : 107 FT. GROUT : YES
 DIAM. : 6 IN. DRL/DS : 49588 :NORTH STAR DRILLING
 ABANDONED: / / UNUSED?: NO SEALED?:

MINNESOTA COUNTY WELL INDEX.
UNIQUE NO.: 523503 (CONTINUED)

STATUS : ACTIVE WHPA : DNR PA#:

ADDRESS : RR 5, BOX 29 , LITTLE FALLS , MN 56345
POTENTIAL POLLUTION SOURCE: 100 FT. DIR.: TYPE: SEPTIC/DFL
CWI/WL: NO CWI/WC: NO CORE/CTTNGS/GP.:

DATE	NITRATE	BACTERIA	SOURCE	SWL	ELEV	SOURCE
/ /				26		49588
