

MINNESOTA POLLUTION CONTROL AGENCY
 TANKS AND SPILLS SECTION
 PETROLEUM TANK RELEASE REPORT

Report Taken By: MDN Date/Time Occurred:
 Date/Time Reported: 6/08/94 Date/Time Discovered: 6/07/94

LEAK# 7452 PROJECT MANAGER: DDD USTIS #

CALLER
 Name: Brian Kamnikar
 Phone: 779-5091
 Relationship to site:
 MnDOT

SITE
 Name: Fort Snelling Truck Station
 Street: 5837 Minnehaha
 City: Fort Snelling Zip: 55111
 County: Ramsey Region:

TANK OPERATOR
 Name:
 Street:
 City: Zip:
 Contact Person:
 Phone:

TANK OWNER
 Name: MNDOT
 Street: 3485 Hadley Ave
 City: Oakdale St.: MN Zip: 55128
 Contact Person: Brian Kamnikar
 Phone: (612) 779-5091

Own tanks/product/property?
 Share in profits?
 Control over inventory, maintenance
 and tank decisions?

SITUATION Material Released/Amount: GASAHOL	Source of Release: PIPING	Release Discovery: PUMP FAILURE on dispenser
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TANK INFORMATION					
Contents	Size	Age	Removed	Condition	Registered
Gasahol	unknown	1989	no		

State or Federal Excavation Contractor: _____ Notification prior to removal: _____
 Consultant: _____

SOIL
 Contaminated soil excavated: no
 Was it a total excavation: -
 Vapor readings: 500 ppm - near pump dispenser
 Soil samples:
 Borings:
 Native soil type: sandy
 Stockpiled properly/disposal arranged:
 Other:

Fiberglass piping
suction
 Brian will be on site today
with vapor meter to
confirm release

WATER

Groundwater in excavation: —

Free product present:

Depth to groundwater: *unknown*

City water/wells private/municipal:

Surface water: *no*

VAPORS.

Sewers/buildings:

SITE INFORMATION

Description of area:

Previous release(s):

INSTRUCTION GIVEN

Hire consultant
Submit report
Staff will call
Contact staff

CONTACTS

Local Fire/Police
Local Officials
Regional Staff
Other

CONCLUSIONS AND OTHER RELATED INFORMATION



Minnesota Pollution Control Agency

March 3, 1997

Mr. Brian Kamnikar
Minnesota Department of Transportation
3485 Hadley Avenue
Oakdale, Minnesota 55128

RE: Petroleum Tank Release Site File Closure
Site: Fort Snelling Truck Station, 5837 Minnehaha, Fort Snelling
Site ID#: LEAK 00007452

Dear Mr. Kamnikar:

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 1995) 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 (1994), the Minnesota Superfund Law.

Mr. Brian Kamnikar

March 3, 1997

Page 2

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 612/297-1119 or 612/297-4203.

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 612/297-8499. The MPCA fact sheet #3.35 *Leak/Spill and Underground Storage Tank File Request Form* (April 1996) 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 612/297-8598 or the site hydrogeologist, Steve Geyen, at 612/297-8581.

Sincerely,

Sue Morrison

for Gary Zarling
Project Manager
Cleanup Unit II
Tanks and Emergency Response Section

for V.R. Ahnedecker
Stephen Geyen
Hydrogeologist
Cleanup Unit II
Tanks and Emergency Response Section


GZ:SG:smm

cc: Fred Owusu, St. Paul City Clerk
Steve Zaccard, St. Paul Fire Marshal
Larry Carlson, Ramsey County Solid Waste Officer
Camilla Pederson, Bay West
Minnesota Department of Commerce Petrofund Staff

Office Memorandum

DATE: February 26, 1997

TO: Gary Zarling, Project Manager
MPCA Tanks and Emergency Response Section

FROM: Brian Kamnikar, Senior Environmental Engineer
Environmental Compliance and Investigation Unit 

PHONE: 779-5091

SUBJECT: Mn/DOT Fort Snelling Truck Station: SITE CLOSURE REQUEST
MPCA Leak #7452

Mn/DOT received your request dated 20 February 1997 to install a monitoring well at the Fort Snelling Truck Station. According to the request, the purpose of installing the groundwater monitoring well is to "document that free product does not exist despite high levels of contamination remaining in the soil above the water table".

As you are aware, Mn/DOT complied with an earlier request from the MPCA, dated 15 July 1996, to complete a soil boring near the dispensing island in order to "obtain a water sample for analysis and make sure there isn't free product pooled on the water table". Free product was not encountered during completion of the soil boring. Soil headspace readings collected from the boring detected organic vapor concentrations ranging from 17 to 311 ppm. Soil samples collected from soil boring SB-5, located adjacent to the dispensing island, detected maximum petroleum concentrations as gasoline range organics (GRO) and diesel range organics (DRO) of 130 ppm and 97 ppm, respectively. The total concentration of benzene, ethylbenzene, toluene and xylene compounds was 10.5 ppm. Analysis of the groundwater sample detected GRO and DRO at concentrations of 1,800 ppb and 630 ppb, respectively. Benzene and toluene were detected at concentrations exceeding the Health Risk Limits.

The uppermost bedrock unit beneath the site is the Platteville formation which consists of fine-grained dolostone and limestone. Underlying the Platteville formation is the Glenwood shale. Both formations are generally considered non-aquifers and confining layers. The groundwater receptor survey identified one water supply well within 1/2 mile of the site. The well is located approximately 1/3 mile northwest of the site and is cased to 246 feet below grade. Based on the regional groundwater flow, this well is situated up-gradient of the site.

Based on contaminant concentrations discovered in soil and groundwater samples collected from the site and the separation distance to the nearest possible receptor, it is unlikely that petroleum contaminants remaining at the Mn/DOT Fort Snelling Truck Station pose a threat to public health or the environment. Therefore, Mn/DOT requests closure of this site. Please call me if you require any further information regarding this project.

cc:

J. Pirkel
C. Lucas

C. Hoffstedt
B. Johnson/File



Minnesota Pollution Control Agency

February 20, 1997

Mr. Brian Kamnikar
Minnesota Department of Transportation
3485 Hadley Avenue
Oakdale, Minnesota 55128

RE: Corrective Action Design Approval/Monitoring Only
Site: Fort Snelling Truck Station, 5837 Minnehaha, Fort Snelling
Site ID#: LEAK 00007452

Dear Mr. Kamnikar:

The Minnesota Pollution Control Agency (MPCA) staff has reviewed your remedial investigation report dated May 20, 1996, and addendum dated December 27, 1996. MPCA staff do not approve site closure at this time.

MPCA staff request that one monitoring well be completed near soil boring SB-10 to monitor whether free product is present. The purpose of the ground water monitoring is to document that free product does not exist despite the high levels of contamination remaining in the soil above the water table. The MPCA staff hereby approves ground water monitoring as the corrective action design for this site. Please proceed according to the following stipulations:

- General Conditions:

If subsequently obtained information indicates that the approved corrective actions are inappropriate or inadequate, the MPCA may require additional work or modifications in the approved work. The MPCA should be notified if any of the following conditions occur at the site:

- a) Free product is found to be present in the well.
- b) New risk information is gained or risk factors change about ground water receptors, vapor receptors or impacts to surface waters.

- Monitoring requirements:

Monitoring should be conducted quarterly for the first six monitoring events. Thereafter monitoring should be conducted semi-annually until closure criteria are met (See "Closure criteria below). Monitoring should include:

- a) measurement of water level and product thickness in the monitoring well;
- b) analysis of water samples from all monitoring wells not containing free product for benzene, ethyl benzene, toluene, xylene, MTBE and TPH using gasoline range organics and diesel range organics.

- Reporting:

An annual progress report should be prepared and submitted in accordance with the MPCA Annual Progress Reports, Fact Sheet 3.26 dated April 1996. Results of the quarterly (or semi-annual) monitoring should be included in the annual report.

- Closure criteria:

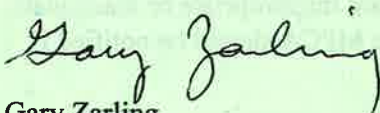
Closure may be considered when free product has not been detected in any monitoring point for at least four consecutive monitoring events.

Approval of this Corrective Action Design is based on its environmental merits for addressing the petroleum contamination only. This letter does not apply to other types of contamination that may be present on the subject property.

This approval qualifies you under Minn. Stat. § 115C.09, subd. 2(a)(3) (1994) to be eligible for Petrofund reimbursement of eligible cleanup costs. Applications for reimbursement must be made directly to the Petrofund. Decisions regarding Petrofund reimbursement are made by the Petro Board. Reimbursement decisions are based on factors such as the adequacy of cleanup, reasonableness of cost, compliance with notification laws, and cooperation with the MPCA.

If you have questions regarding the investigation of ground water at this site, please contact MPCA staff hydrogeologist Stephen Geyen at 612/297-8581. If you have any other questions, please call me at 612/297-8598.

Sincerely,



Gary Zarling
Project Manager
Cleanup Unit II
Tanks and Emergency Response Section



Stephen Geyen
Hydrogeologist
Cleanup Unit II
Tanks and Emergency Response Section


cc: Camilla Pederson, Bay West, St. Paul
Minnesota Department of Commerce Petrofund Staff

DATE: January 7, 1997

TO: Gary Zarling, Project Manager
MPCA Tanks and Emergency Response Section

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JAN 09 1997

FROM: Brian Kamnikar, P.E. 
Senior Environmental Engineer
Environmental Compliance and Investigation Unit

**MPCA, HAZARDOUS
WASTE DIVISION**

PHONE: 779-5091

SUBJECT: Mn/DOT Ft. Snelling Truck Station: SITE CLOSURE REQUEST
MPCA Leak #7452

In a letter dated 15 July 1996, the MPCA requested collection of a groundwater sample at the Mn/DOT Ft. Snelling Truck Station. Mn/DOT advanced one boring to the groundwater table on 12 November 1996 to collect a groundwater sample for laboratory analysis and to determine whether free petroleum product was present. The boring was located approximately 10 feet from the dispensing island which was the source of the petroleum release. Results of the groundwater sample collection are included in the enclosed addendum report, dated 27 December 1996.

Groundwater was encountered approximately 36 feet below grade. No evidence of free product was observed on the water table. Laboratory analysis of a groundwater sample collected from the boring detected the following: gasoline range organics (1,800 ppb), diesel range organics (630 ppb), benzene (280 ppb), ethylbenzene (160 ppb), toluene (1,300) and xylenes (960 ppb). Dissolved lead was not detected above method detection limits. Benzene and toluene were detected at concentrations exceeding health risk limits.

A groundwater receptor survey was completed during the limited site investigation. The nearest water supply well identified during the survey is located approximately 1/3 mile up-gradient of the site.

Because no free product was observed at the groundwater interface at the site and no water supply wells are located near the site in the down-gradient direction, Mn/DOT requests closure of this site. Please call me if you require any additional information concerning this project.

cc (with enclosure):
C. Lucas

cc (without enclosure):
J. Pirkl
C. Hoffstedt
B. Johnson/File

RECEIVED

JAN 09 1981

WASTE DIVISION
MEDICAL HAZARDOUS

December 27, 1996

Mr. Brian Kamnikar
Minnesota Department of Transportation
Office of Environmental Services
3485 Hadley Avenue North
Oakdale, Minnesota 55128

RE: Addendum to the Limited Site Investigation Report - Minnesota Department of Transportation (Mn/DOT) Fort Snelling Truck Station - 5837 Minnehaha Avenue, Minneapolis, Minnesota - Minnesota Pollution Control Agency (MPCA) Leak # 8881

Dear Mr. Kamnikar:

At the request of the Minnesota Department of Transportation (Mn/DOT), Bay West, Inc. (Bay West) has completed additional investigation work at the Fort Snelling Truck Station located at 5837 Minnehaha Avenue in Minneapolis, Minnesota (Figure 1). This work is described below. Please refer to Bay West's Limited Site Investigation Report dated May 20, 1996 for details regarding site background.

Site Location

The site is located in Hennepin County near the southeast corner of Highway 62 and Minnehaha Avenue. The site corresponds to the NW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 20, Township 28 North, Range 23 West (Figures 1 and 2). The site latitude is 44° 53' 51"; the longitude is 93° 11' 56." The Mississippi River is located approximately $\frac{1}{4}$ -mile east of the site. The Minnesota River is located approximately 1 mile southeast of the site.

Scope of Work

Field work for the investigation was completed on November 12, 1996, and included the following:

- completion of one soil boring to 40 feet below grade (bg)
- collection of soil samples for headspace analyses
- collection of a ground water sample for laboratory analyses

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JAN 09 1997

**MPCA, HAZARDOUS
WASTE DIVISION**

METHODOLOGY

Soil Borings

One soil boring was completed by Thein Well Co. (Shakopee, Minnesota) using a truck-mounted auger drill rig and was advanced using 8.25-inch inside diameter (I.D.) hollow stem augers in accordance with ASTM D 1452 "Soil Investigation and Sampling by Auger Borings." Air rotary drilling techniques were used from 23 to 30 feet bg when boulders were encountered.

All soil samples were logged by a Bay West geologist in the field. Information collected during the completion of the soil borings included: approximate depth, location, and visual characterization of contamination encountered.

The soil boring was abandoned by placing a bentonite grout slurry seal from the bottom of the borehole to the ground surface.

Field Analysis/Instrument Operation

Soil samples were collected at selected intervals and were screened for organic vapors using an organic vapor analyzer and ambient temperature headspace analysis. Headspace analysis was performed in general accordance with the MPCA's "Field Screening Procedure." Headspace readings were collected using an HNU equipped with a 10.2 eV lamp. The HNU was calibrated daily using an isobutylene standard.

Ground Water Chemical Analyses

A ground water sample was collected from the soil boring for laboratory chemical analysis. The sample was submitted under chain-of-custody to American Science, Inc. The ground water sample was analyzed for volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH) as gasoline range organics (GRO), TPH as diesel range organics (DRO), and lead.

SAMPLING RESULTS

The sediments encountered beneath the site consisted primarily of a sand and sand with boulders. Ground water was encountered in the boring at approximately 36 feet bg. According to the Surficial Hydrogeology Map from the Geologic Atlas of Hennepin County, Minnesota, ground water flows to the east at approximately 35 feet bg.

Headspace readings were collected at selected intervals during the completion of the boring. The results of the headspace analyses are contained on the boring log contained in Appendix 1 and summarized on Table 1. The headspace concentrations in soil boring SB-10 ranged from 0 parts per million (ppm) (0 to 14 feet bg) to 17 ppm (14 to 16 feet bg) and from 245 ppm (32 to 34 feet bg) to 311 ppm (16 to 18 feet bg).

Mr. Brian Kamnikar
December 27, 1996
Page 3

A ground water sample collected from the soil boring was submitted for laboratory analyses. The laboratory results are contained in Appendix 2 and summarized in Table 2. Lead was not detected in the water sample at concentrations above the analytical detection limits. Benzene, ethyl benzene, toluene, and xylenes (BTEX) were encountered at concentrations of 280 $\mu\text{g/L}$, 160 $\mu\text{g/L}$, 1300 $\mu\text{g/L}$, and 960 $\mu\text{g/L}$, respectively. Other VOCs were encountered in the water samples at the following concentrations: acetone (12 $\mu\text{g/L}$); n-butylbenzene (13 $\mu\text{g/L}$); sec-butylbenzene (200 $\mu\text{g/L}$); tert-butylbenzene (47 $\mu\text{g/L}$); ethyl ether (1.2 $\mu\text{g/L}$); isopropylbenzene (7.9 $\mu\text{g/L}$); methyl ethyl ketone (7.9 $\mu\text{g/L}$); naphthalene (28 $\mu\text{g/L}$); n-propylbenzene (12 $\mu\text{g/L}$); styrene (1.7 $\mu\text{g/L}$); tetrahydrofuran (1.5 $\mu\text{g/L}$); and 1,3,5-trimethylbenzene (88 $\mu\text{g/L}$). TPH as GRO and TPH as DRO were encountered at concentrations of 1800 $\mu\text{g/L}$ and 630, respectively. The analytical results are attached to this letter. Benzene and toluene were detected above the Minnesota Department of Health (MDH) Recommended Allowable Limits (RALs)/Health Risk Limits (HRLs). The RAL/HRL for benzene is 10 $\mu\text{g/L}$ and the RAL/HRL for toluene is 1000 $\mu\text{g/L}$.

CONCLUSIONS

Additional site investigation was conducted at the Fort Snelling Truck station at the request of Mn/DOT. One soil boring was completed to 40 feet bg in the vicinity of the pump island. Headspace soil samples were collected at selected intervals during completion of the soil boring and field screening using a photoionization detector (PID). Field screening indicated that petroleum hydrocarbons are present in soils at the site. The highest impacts were observed below 17 feet bg.

Ground water was encountered at approximately 36 feet bg which agrees with the regional geologic information. A ground water sample was collected and submitted for laboratory analysis. Petroleum compounds were found in the ground water with benzene and toluene detected above the MDH HRLs/RALs. However, no water supply wells are located on site and the nearest water supply well is located approximately 1/3-mile upgradient of the site and is cased to a depth of 246 feet. In addition, there are no sub-grade structures located at the site.

Based on this information, Bay West recommends that no further investigation be conducted at the site. This recommendation is based on the limited potential for impacts to well receptors in the area, as indicated by the limited extent of soil contamination encountered during investigative activities, the presence of a confining layer above the uppermost potable aquifer in the area, and the absence of down-gradient water supply wells within 1/2-mile of the site.

Mr. Brian Kamnikar
December 27, 1996
Page 4

Therefore, based on the apparent lack of impact to public health and the environment (Minnesota Statute Chapter 115C.03), Bay West recommends that the remaining impacted soil and ground water be allowed to naturally biodegrade, and the site be considered for closure.

If you have any questions, please call us at 291-0456.

Yours truly,



Camilla Pederson, P.E.
Geological Engineer, Engineering Services



Edward J. Bacig P.G.
Hydrogeologist, Engineering Services

BW960428

TABLE 1
Summary of Headspace Analysis

Sample Location	Date	Depth (feet bg)	Results (ppm)
SB-10	11/12/96	0-2	0
		2-4	0
		4-6	0
		6-8	0
		8-10	0
		10-12	0
		12-14	0
		14-16	17
		16-18	311
		18-20	262
		20-22	277
		22-24	265
		24-26	267
		26-28	268
		28-30	228
30-32	229		
32-34	245		
34-36	278		

NOTES:

SB = Soil Boring

bg = below grade

ppm = parts per million

TABLE 2
Summary of Ground Water Analytical Results

Sample Location	Parameters																				
	A	Benzene	n-BB	sec-BB	tert-BB	Ethyl Ether	Ethyl Benzene	IPB	p-IPT	MEK	N	n-PB	S	THF	Toluene	1,3,5-TMB	Xylenes	GRO	DRO	TPH as DRO	Lead
SB-10 (36')	12	280	13	200	47	1.2	160	7.9	1.2	7.9	28	12	1.7	1.5	1300	88	960	1800	630		<30
Field Blank	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<100	<100	<30
Trip Blank	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	--	--	--
HRLs/RALS	700	10	NR	NR	NR	NR	1000	NR	NR	4000	300	NR	NR	NR	1000	NR	10000	NR	NR	NR	NR

NOTES:

A = acetone

BB = butylbenzene

IPB = isopropylbenzene

IPT = isopropyltoluene

MEK = methyl ethyl ketone

-- = sample was not analyzed for this parameter

N = naphthalene

PB = propylbenzene

S = styrene

THF = tetrahydrofuran

TMB = trimethylbenzene

TPH = total petroleum hydrocarbons

GRO = gasoline range organics

DRO = diesel range organics

HRLs = Minnesota Department of Health Health Risk Limits

RALS = Minnesota Department of Health Recommended Allowable Limits

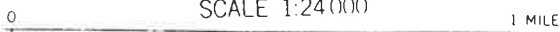
NR = No HRL/RAL for this parameter

Bold Values have concentrations greater than the HRLs/RALS



APPROXIMATE WELL LOCATION ●

SCALE 1:24,000



CONTOUR INTERVAL 10 FEET

SOURCE:
USGS 7.5 MINUTE
TOPOGRAPHIC
ST. PAUL WEST, MN
QUADRANGLE

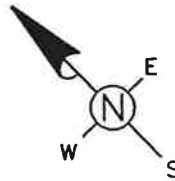
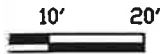



ENGR'G P.A.	DATE		BAY WEST Inc. ENVIRONMENTAL SERVICES ST. PAUL, MN
DRAWN K.T.M.	5/14/96		
REV.		PROJECT NAME MN-DOT - FORT SNELLING	
TITLE		WELL LOCATION MAP	
DWG. NO.	960046A1	SCALE	FIGURE # 1

BUILDING

- DERGROUND STORAGE TANK LOCATION
 - 10,000 GALLON GASOHOL
 - 10,000 GALLON DIESEL
- DERGROUND ELECTRICAL LINE
- DERGROUND WATER LINE
- DERGROUND PIPING
- WEST SOIL BORING LOCATION
- EAST SOIL BORING LOCATION

W SB-6 ●



E.B.	DATE		BAY WEST Inc. ENVIRONMENTAL SERVICES ST. PAUL, MN
K.M.	4/12/96		
	11/20/96		
PROJECT NAME MN-DOT - FT. SNELLING			
SITE MAP			
NO.	960046B1	SCALE 1"=20'	FIGURE # 2

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MAY 30 1996

MPCA, HAZARDOUS
WASTE DIVISION

**LIMITED SITE INVESTIGATION REPORT
MNDOT - FORT SNELLING TRUCK
STATION**

prepared for

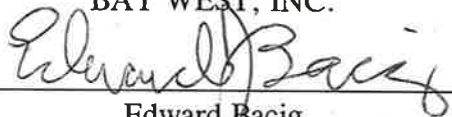
**Minnesota Department of Transportation
Transportation Building
Saint Paul, Minnesota
Leak # 7452**

Submitted to:

**MINNESOTA DEPARTMENT of
TRANSPORTATION**

Submitted by:

BAY WEST, INC.



**Edward Bacig
Hydrogeologist
Engineering Services**



**Philip Anderson
Chemical Engineer
Engineering Services**

May 20, 1996

BW960046

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MAY 30 1996

MPCA, HAZARDOUS
WASTE DIVISION

1.0 INTRODUCTION AND BACKGROUND

At the request of the Minnesota Department of Transportation (MnDOT), Bay West, Inc. (Bay West) has completed Limited Site Investigation (LSI) work at the MnDOT Fort Snelling Truck Station located at 5837 Minnehaha Avenue, Minneapolis, Minnesota. The LSI was conducted in response to a leak discovered in an underground storage tank (UST) system dispenser fitting.

1.1 Site Background

The site is located in the NW¼ of the NE¼ of the NE¼ of Section 20, Range 23W, Township 28N, Hennepin County (Figure 1). The site latitude is 44° 53' 51"; the longitude is 93° 11' 56".

In the fall of 1989, Bay West supervised the removal of four underground storage tanks and their associated piping from the site. Approximately 320 cubic yards of contaminated soil were also removed at that time. A subsurface investigation which was subsequently conducted revealed that low levels of petroleum contamination remained in soils located in a limited area adjacent to the south end of the area where soil was removed. It was recommended that no further investigation be conducted at the site.

In the winter of 1990, two UST systems were installed at the site to replace the removed UST systems. The systems consist of double-walled underground fiberglass tanks and double-walled fiberglass piping which supply one gasohol and two diesel dispensing pumps.

On June 8, 1994, it was discovered that a pipe fitting located on the gasohol dispenser was leaking. The Minnesota Pollution Control Agency (MPCA) was notified of the probable release and the leaking fitting was repaired. Bay West was subsequently contracted to perform the LSI.

1.2 Scope of Work

Bay West was contracted to perform an LSI at the site to determine whether the leaking fitting resulted in petroleum contamination and, if so, to preliminarily assess the vertical and horizontal extents of the petroleum contamination. Bay West supervised the completion of five soil borings to bedrock in the area of the suspected leak. Soil samples were collected from the borings for jar headspace and laboratory analyses.

2.0 SUBSURFACE INVESTIGATION METHODOLOGY

2.1 Soil Borings

Five soil borings (SB-5, SB-6, SB-7, SB-8, SB-9) were completed using a truck-mounted hollow stem auger drill rig and were advanced using 4.25-inch inside diameter (I.D.) hollow stem augers in accordance with ASTM D 1452 "Soil Investigation and Sampling by Auger Borings." Soil sampling was conducted using a 2-inch outside diameter (O.D.), 2-foot-long split-barrel sampler in general accordance with ASTM D 1586 "Penetration Tests and Split-Barrel Sampling of Soils."

All soil samples were logged by a Bay West geologist in the field. Information collected during the completion of the soil borings included:

- soil classification
- structural features
- depth, location, and olfactory characterization of contamination encountered
- blow counts, color, and grain-size distribution
- headspace analysis results

Flight augers, drilling rods, and tools were decontaminated prior to their use at each boring location. To minimize the potential for cross-contamination, split-barrel samplers were decontaminated between sampling events using a tap water and detergent (alconox) wash followed by a tap water rinse. The soil borings were abandoned by placing a bentonite-cement slurry seal from the bottom of the borehole to the ground surface.

Soil boring locations are shown on Figure 2. Soil boring logs are presented in Appendix 1.

2.2 Field Analysis

Soil samples were collected at two-foot intervals and were screened for organic vapors using an organic vapor analyzer and ambient temperature headspace analysis. Headspace analysis was performed in general accordance with the Minnesota Pollution Control Agency's (MPCA's) "Field Screening Procedure." Headspace readings were collected using an HNU photoionization detector (PID) equipped with a 10.2 eV lamp. The PID was calibrated using an isobutylene standard prior to use at the site.

2.3 Soil Chemical Analyses

Soil samples were collected for chemical analysis from the bottom of each boring and from the interval of each boring which exhibited the highest headspace reading (if applicable). Soil samples were analyzed by American Science Corporation. Soil samples were analyzed for benzene, toluene, ethyl benzene, and xylenes (BTEX) by EPA Method 8020, total petroleum hydrocarbons (TPH) as gasoline range organics (GRO), and TPH as diesel range organics (DRO) by Wisconsin Department of Natural Resources (WDNR) methodology adopted by the MPCA, and total lead by EPA Method 3050/6010.

All samples were placed in clean glass jars with teflon-lined lids. All samples were stored in insulated coolers at 4°C using ice. To minimize sample volatilization, soil samples collected for BTEX and TPH as GRO analyses were field preserved. Field preservation was performed in accordance with WDNR GRO methodology in which approximately 25 grams of soil are placed in a tared 60-ml jar to which 25 ml of methanol are added.

3.0 SUBSURFACE INVESTIGATION RESULTS AND DISCUSSION

3.1 Site Stratigraphy and Hydrogeology

According to geological data compiled by the Minnesota Geological Survey, the MnDOT Fort Snelling Truck Station sits upon Mississippi River Terrace Deposits, which are composed primarily of sand, gravelly sand, and silty sand. The Terrace Deposits overlie the Platteville Formation bedrock unit, which is present beneath the site at approximately 18 to 26 feet below ground surface (bgs).

The Platteville Formation consists of fine-grained dolostone and limestone and is generally regarded as a non-aquifer and a confining layer. In some areas, however, the Platteville Formation can be highly fractured resulting in medium to high secondary permeabilities along the fractured zones. Regional geological data indicate that the Platteville Formation is approximately 10- to 15-feet-thick beneath the site. Underlying the Platteville Formation is the Glenwood Formation, which consists of a sandy shale. The Glenwood Formation is approximately 2- to 5-feet-thick beneath the site and is also regarded as a non-aquifer and a confining layer.

The Glenwood Formation overlies the St. Peter Formation which is approximately 160-feet-thick. The upper half of the St. Peter Formation is composed of fine-to-medium grained friable quartz sandstone; the lower half, of mudstone, siltstone, and shale, with interbedded, very coarse sandstone.

The Prairie du Chien Formation and Jordan Sandstone underlie the St. Peter Formation. Together, the Prairie du Chien and Jordan form the most heavily used aquifer in the county.

Regional hydrogeological maps indicate that the water table elevation is approximately 35 feet below the site surface elevation. Regional ground water flow direction is east to the Mississippi River.

The Mississippi River is located approximately ¼-mile east of the site.

3.2 Site Geology

Soils encountered during LSI soil boring activities were composed predominantly of well graded very fine- to medium-grained sand, though soils directly above the bedrock were generally composed of clayey sand, sand, and gravel. Bedrock was encountered between 18 and 26 feet below grade.

Wet soils were encountered in a one-foot-thick silty-sand/clayey-sand lense present at between 15 and 17 feet bgs, with dry soils encountered beneath, indicating limited perched conditions may exist at the site.

3.3 Field Analyses

Headspace analyses indicated that elevated concentrations of petroleum compounds were present in soils collected from SB-5 and SB-6. Headspace analyses indicated that no or minimal concentrations of petroleum compounds were present at SB-7, SB-8, and SB-9.

Headspace levels of soils collected from the three intervals between 10 feet and 18 feet bgs at SB-5 exceeded the PID's measuring range of 1000 parts per million (ppm). The headspace level at 21 feet bgs (the bottom of the boring) at SB-5 was 199 ppm. The headspace level of soils collected from the 16 to 18 feet bgs interval at SB-6 was 650 ppm. The headspace level at 26 feet bgs (the bottom of the boring) at SB-6 was 40 ppm.

The results of the headspace analyses are included in Appendix 1 and presented in Table 1.

3.4 Soil Analytical Results

Soil samples collected from 10-12 and 18-20 feet bgs at SB-5, from 16-18 feet bgs at SB-6, and from 14-16 feet bgs at SB-7, along with samples from the bottom of each boring, were submitted for laboratory analyses.

The soil samples collected from borings SB-7, SB-8, SB-9, and 18-20 feet bgs at SB-5 contained no detectable concentrations of BTEX, TPH as GRO, TPH as DRO, or lead.

TPH as GRO were detected at a concentration of 130 mg/kg in samples collected from 10-12 feet bgs at SB-5, at a concentration of 65 mg/kg in samples collected from the bottom of SB-5, and at a concentration of 59 mg/kg in samples collected from 16-18 feet bgs at SB-6.

TPH as DRO were detected at a concentration of 97 mg/kg in samples collected from 10-12 feet bgs at SB-5, at a concentration of 37 mg/kg in samples collected from 16-18 feet bgs at SB-6, and at a concentration of 23 mg/kg in samples collected from the bottom of SB-6.

BTEX were detected in the samples collected from 10-12 feet bgs and from the bottom of SB-5, and from 16-18 feet bgs at SB-6. The benzene concentrations ranged from 0.086 mg/kg to 1.5 mg/kg, toluene from 1.3 mg/kg to 4 mg/kg, ethyl benzene from 1.1 mg/kg to 1.3 mg/kg, and xylenes from 5.6 mg/kg to 7.8 mg/kg.

Soil analytical results are included in Appendix 2 and presented in Table 2.

The soil contamination appears to be confined to an area directly beneath of and to the northwest of the formerly leaking dispenser fitting. The highest hydrocarbon concentrations were detected between 10 and 12 feet below grade at soil boring SB-5, which was completed approximately 5 feet northwest of the fitting. The concentration of TPH as GRO at the bottom of SB-5 was above the MPCA action level for sandy soils.

Hydrocarbon concentrations in soils from between 16 and 18 feet below grade at soil boring SB-6, located approximately 10 feet northwest of SB-5, were also above the MPCA action level for sandy soils.

3.5 Receptor Survey

Water wells are not located on the property and the site is connected to city water.

The Minnesota Geologic Survey (MGS) files were reviewed to determine if any water wells are located within a ½-mile radius of the site. The review indicates that only one water supply well is located within this area. The well is located at the Veterans Administration Hospital, approximately 1/3-mile northwest of the site. The well is completed into the Prairie Du-Chien/Jordan aquifer and is cased to a depth of 246 feet bgs, with open borehole extending from 246 feet bgs to 449 feet bgs. The well was drilled in 1986.

Based on the regional ground water flow direction, the VA water supply well is upgradient of the subject site and is unlikely to be impacted by the Fort Snelling Truck Station release. The depth of the supply well further minimizes any potential for impacts from the site to the VA water supply well.

The well search area illustration and log of the VA well are contained in Appendix 3.

3.6 Vapor Risk Assessment

A vapor survey was not conducted at the site because there are no sub-grade structures at the site.

4.0 CONCLUSIONS AND RECOMMENDATIONS

A limited site investigation was conducted at the Fort Snelling Truck station in response to the discovery of a leaking fitting associated with the gasohol dispenser. Five soils borings were completed to bedrock in the vicinity of the dispenser. Soil samples were collected at two-foot intervals during completion of each soil boring and field screened using a photo-ionization detector on jar headspace. Selected soil samples were submitted for laboratory analyses.

Soils encountered during soil boring activities consisted predominantly of sand. Bedrock was encountered at 18 to 26 feet below grade. Geological data indicates that the bedrock unit encountered is the Platteville Formation, which is approximately 10- to 15-feet-thick beneath the site. A 2- to 5-foot-thick layer of Glenwood Formation (bedrock) underlies the Platteville Formation. Neither formation is regarded as a resource aquifer bearing unit. The Glenwood Formation is considered a confining layer.

A ground water unit was not encountered during investigative activities. A one foot thick perched water layer was encountered approximately 15 feet below grade. Regional hydrogeologic data suggests that the water table is approximately 35 feet below grade at the site.

No water supply wells are located on site. The nearest water supply well is located approximately 1/3-mile upgradient of the site and is cased to a depth of 246 feet.

There are no sub-grade structures located at the site.

Field screening and laboratory analytical results indicate that petroleum hydrocarbons are present in soils at the site. The hydrocarbon contamination appears to be confined to an area directly beneath of and to the northwest of the formerly leaking fitting. The highest impacts were observed between 10 and 18 feet below grade in the boring completed nearest the fitting (SB-5). Additionally, contaminant concentrations exceeding the MPCA action level of 50 mg/kg were detected at the bottom of SB-5. Contaminant concentrations exceeding the MPCA action level were also detected in soils collected from between 16 and 18 feet below grade at soil boring SB-6, located approximately 10 feet northwest of SB-5.

Bay West recommends that no further investigation be conducted at the site and that the project be closed. This recommendation is based on the limited potential for impacts to well receptors in the area, as indicated by the limited extent of soil contamination encountered during investigative activities, the presence of a confining layer above the uppermost potable aquifer in the area, and the absence of down-gradient water supply wells within 1/2-mile of the site.

5.0 DISCLAIMER

The conclusions contained in this report represent our professional opinions. These opinions are based on currently available information and are arrived at in accordance with currently accepted hydrogeologic and engineering practices at this time and location. Other than this, no warranty is implied or intended.

TABLE 1

**SOIL BORING HEADSPACE RESULTS - APRIL 10, 1996
MNDOT - FORT SNELLING TRUCK STATION
MINNEAPOLIS, MINNESOTA**

DEPTH	HEADSPACE READING				
	Boring SB-5	Boring SB-6	Boring SB-7	Boring SB-8	Boring SB-9
0'-2'	99	0	0	0	0
2'-4'	0	0	1	0	0
4'-6'	0	3	2	0	0
6'-8'	0	0	1	0	0
8'-10'	2	2	0.5	0	0
10'-12'	1000+	3	1.5	0	0
12'-14'	1000+	1	1.5	0	0
14'-16'	1000+	10	2.5	0	0
16'-18'	1000+	650	0	0	0
18'-20'	102	2	1	0	Bedrock
20'-22'	199	60	no yield - rock	Bedrock	
22'-24'	Bedrock	10	3		
24'-26'		40	Bedrock		
26'-28'		Bedrock			

Headspace values listed in ppm.

TABLE 2

ANALYTICAL RESULTS - APRIL 1996
MNDOT - FORT SNELLING TRUCK STATION
MINNEAPOLIS, MINNESOTA

Parameter	SAMPLE LOCATION AND INTERVAL									QL
	SB-5			SB-6		SB-7		SB-8	SB-9	
	10'-12'	18'-20'	20'-21'	16'-18'	24'-26'	14'-16'	22'-24'	16'-18'	16'-18'	
Benzene	0.086	ND	0.32	1.5	ND	ND	ND	ND	ND	0.05
Toluene	1.3	ND	2.4	4	ND	ND	ND	ND	ND	0.05
Ethylbenzene	1.3	ND	1.1	1.1	ND	ND	ND	ND	ND	0.05
Xylenes	7.8	ND	6.1	5.6	ND	ND	ND	ND	ND	0.05
TPH as GRO	130	ND	65	59	ND	ND	ND	ND	ND	10
TPH as DRO	97	ND	ND	37	23	ND	ND	ND	ND	10
Lead	ND	NA	6.1	NA	5.7	NA	NA	NA	NA	5

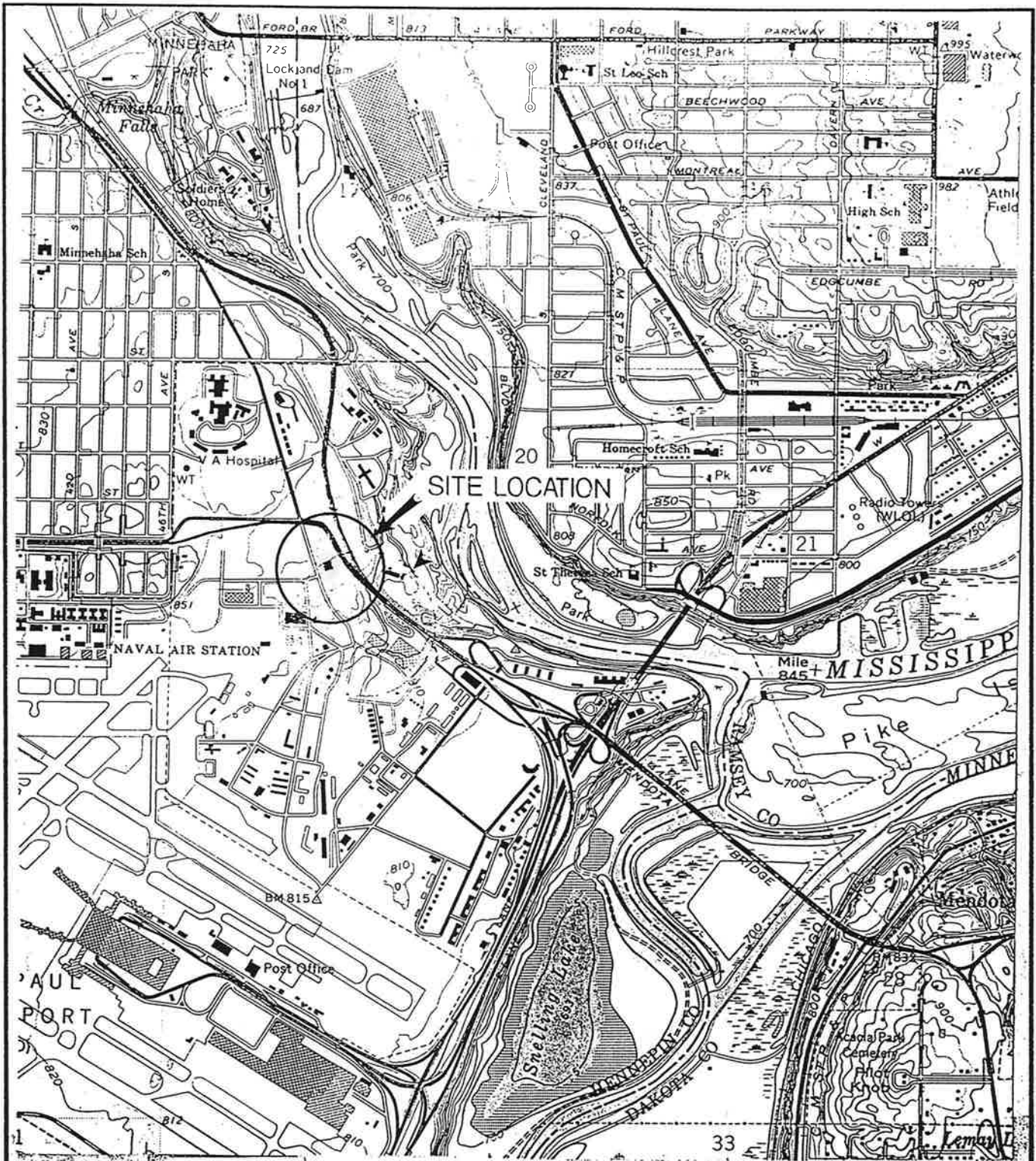
Results given as mg/kg (ppm)

QL = Quantitation Limit of analytical method

ND = Not Detected, concentration less than QL

NA = Sample not analyzed for this parameter

FIGURES




SCALE 1:24 000

1 MILE

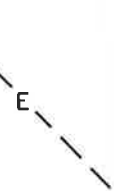
CONTOUR INTERVAL 10 FEET

SOURCE:
USGS 7.5 MINUTE
TOPOGRAPHIC
ST. PAUL WEST, MN.
QUADRANGLE



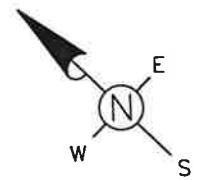
ENGR'G B.R.	DATE	 BAY WEST Inc. ENVIRONMENTAL SERVICES ST. PAUL MN
DRAWN K.M.	12/22/89	
REV.		
PROJECT NAME		MN-DOT- FT. SNELLING
TITLE		SITE LOCATION MAP
DWG. NO.	960046A1	SCALE
		FIGURE # 1


BUILDING



SB-6

- UNDERGROUND STORAGE TANK LOCATION
- T5- 10,000 GALLON GASOHOL
- T6- 10,000 GALLON DIESEL
- UNDERGROUND ELECTRICAL LINE
- UNDERGROUND WATER LINE
- UNDERGROUND PIPING
- SOIL BORING LOCATION



ENGR' G	E.B.	DATE		BAY WEST Inc. ENVIRONMENTAL SERVICES ST. PAUL, MN
DRAWN	K.M.	4/12/96		
REV.		4/16/96		
PROJECT NAME MN-DOT - FT. SNELLING				
TITLE SITE MAP				
DWG. NO.	960046B1	SCALE	1"=20'	FIGURE # 2

APPENDIX 1
SOIL BORING LOGS

