BRAUN INTERTEC

#1221

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Engineers and Scientists Serving the Built and Natural Environments

September 23, 1992

Project No. CMKX-91-0319

Mr. Jay Clark
B&F Distributing, Inc.
1830 SE 3rd Avenue
Rochester, MN 55904

Dear Mr. Clark:

Re: Remedial Investigation Report, Jiffy Mart Service Station, 3010 West Oakland Avenue, Austin, Minnesota, MPCA LEAK#00001221

Braun Intertec Environmental, Inc. (Braun Intertec) has completed a remedial investigation (RI) at the Jiffy Mart service station located in Austin, Minnesota. This investigation was conducted after evidence of a petroleum release was detected during a phase II environmental investigation at the site performed by Twin Cities Testing (TCT) on June 2, 1989.

The purpose of this investigation was to characterize the extent of subsurface petroleum contamination and to evaluate possible sources. Tasks associated with this investigation included completing soil borings, installing monitoring wells, chemically analyzing soil and groundwater samples, completing an MPCA Groundwater Receptor Survey and Hydrogeologic Setting and Groundwater Characterization Contamination Worksheet, Vapor Risk Assessment and RI report.

In summary, petroleum compounds were detected in the soils and groundwater at the site. Groundwater impacted by benzene, ethyl benzene, toluene and xylenes (BETX) and total hydrocarbons (THC) as gasoline were detected in monitoring well MW-3. BETX and THC as gasoline were not detected in monitoring wells MW-2 or MW-1. Soil boring and monitoring well data indicate the release(s) most likely originated from the pump islands or from overfilling of the tanks. Tank tightness tests indicated the tanks are "tight".

Based on these results, we recommend that on site monitoring wells be sampled for one year in order to monitor the groundwater flow direction and groundwater quality. If, after one year, levels of petroleum constituents in the groundwater remain stable or decrease, we will recommend site closure.

For complete details of this investigation, along with our recommendations and conclusions, please refer to the attached report.

B.3. Surface Release Investigation

On July 22, 1991 approximately 50 gallons of diesel fuel were released on the ground surface at the site. The release occurred when one of the dispensers was struck by a vehicle. The released product was washed off the pavement and apparently infiltrated into unpaved areas located in the northwestern portion of the site. Approximately 120 cubic yards of contaminated soil was excavated from these areas by B & F Distributing, Inc. and disposed of at the Lake Mills Sanitary Landfill. Based on chemical analysis and field observations, a large portion of the soil appeared to have been impacted by a previous release of gasoline from an unknown source. These soils were excavated along with those impacted by the diesel fuel release and disposed of. Based on photoionization detector (PID) readings and chemical results of soil samples collected by B & F Distributing, Inc. from the bottom of each excavation, the majority of contaminated material appeared to have been effectively removed.

B.4. Area Geology and Hydrogeology.

The surficial geology in this area consists of unconsolidated glacial till (sands and clay) and alluvial deposits (sand and silt). Based on the hydrogeologic atlas (HA-255) for this water shed region, approximately 140 feet of unconsolidated glacial drift overly the Cedar Valley Limestone Formation. The regional groundwater flow direction in the water table aquifer is to the north.

C. Scope of Work

The following is a list in chronological order of the activities and services provided by Braun Intertec at this site. The work was performed in accordance with the standard procedures outlined in Appendix A.

January 13 through 17, 1992. Braun Intertec conducted nine soil borings (B-5 to B-14) and completed three as monitoring wells (MW-1, MW-2 and MW-3). A total of 12 soil samples were collected and returned to our laboratory under Braun Intertec chain of custody procedures and analyzed for BETX, THC as gasoline or fuel oil, methyl tertiary butyl ether (MTBE) and lead.

D.3. Soil Conditions

Split-spoon soil samples collected from the borings were scanned with a PID using MPCA procedures for headspace analysis. Elevated PID readings were observed in five of the ten borings conducted during this investigation. The highest PID readings (up to 222 ppm) were measured in borings B-5, B-6, B-8 and B-14. PID soil screening results are summarized in Table 3 below and Organic Vapor Data Sheets, included as Appendix F.

Table 3

Summary of Headspace Soil Boring PID Readings (ppm)

Boring No.	Depth	Split-Spoon	Headspace
B-5	2.5	0	11
	5.0	0	2
	7.5	0	5
	10.0	0	2
	12.5	26	183
	15.0	214	107
B-6	2.5	0	03
	5.0	0	10
	7.5	1	16
	10.0	2	27
	12.5	26	190
	15.0	4	110
	17.5	0	135
	20.0	31	147
	22.5	61	101
	25.0	2	93
	27.5	0	54
	30.0	0	69
B-7	2.5	0	2
	5.0	0	12
	7.5	4	18
	10.0	1	40
	12.5	0	4
	15.0	0	4
	17.5	0	3
	20.0	0	1

Boring No.	Depth	Split-Spoon	Headspace
B-8	2.5	0	0
	5.0	0	2
	7.5	6	99
	10.0	13	165
	12.5	0	31
	15.0	0	145
	17.5	76	222
	20.0	40	185
	22.5	10	86
B-9	5	0	0
	10	0	0
	15	0	0
	20	0	0
	25	0	0
B-10	2.5	0	0
	5.0	0	0
	7.5	0	0
	10.0	0	0
	12.5	0	0
	15.0	0	0
	17.5	0	0
	20.0	0	0
	22.5	0	0
	25.0	0	0
B-11	2.5	0	1
	5.0	0	4
	7.5	0	3
	10.0	0	0
	12.5	0	2
	15.0	0	1
	17.5	0	0
	20.0	0	0
	22.5	0	0
	25.0	0	0

Boring No.	Depth	Split-Spoon	Headspace
B-12	2.5	0	0
	5.0	0	0
	7.5	0	0
	10.0	0	0
	12.5	0	0
	15.0	0	0
	17.5	0	0
	20.0	0	0
	22.5	0	0
B-13	5.0	0	0
	10.0	0	0
	15.0	0	0
	20.0	0	0
	25.0	0	0
B-14	5.0	0	15
	10.0	46	82
	15.0	42	123
	20.0	132	159
	25.0	110	130
	30.0	0	17

Twelve soil samples collected from on-site borings were analyzed for the presence of BETX, THC as gasoline or fuel oil, methyl tertiary butyl ether (MTBE) and total lead. The analytical results were generally consistent with the results of the PID field screening for organic vapors. THC as gasoline was detected in sampled collected in borings B-5, B-6, B-8 and B-14 in concentrations ranging from 2-68 ppm. The highest concentrations were detected in B-14, which also had relatively high corresponding PID readings. MTBE was not detected in any of the samples. Total lead was present in all samples in concentrations ranging from 1.8 ug/l to 7.0 ug/l. Benzene, toluene and total xylenes were present in the soil sample collected from boring B-14. Results of the soil sample analyses are shown in Table 4. A copy of the complete laboratory report and accompanying chain-of-custody are included in Appendix E.

Table 4

Soil Boring Analytical Results (mg/kg)

Boring Depth	Benzene	Ethyl Benzene	Toluene	Xylenes	THC*	MTBE	Lead
B-5 (12.5)	ND	ND	ND	ND	2.0	ND	4.8
B-6 (14.5)	ND	ND	ND	0.3	9.2	ND	4.3
B-6 (30.0)	ND	ND	ND	ND	ND	ND	1.8
B-7 (20.0)	ND	ND	ND	ND	ND	ND	3.5
B-8 (17.5)	ND	ND	ND	ND	1.4	ND	2.7
B-9 (25.0)	ND	ND	ND	ND	ND	ND	4.8
B-10 (25.0)	ND	ND	ND	ND	ND	ND	3.9
B-11 (25.0)	ND	ND	ND	ND	ND	ND	2.9
B-12 (25.0)	ND	ND	ND	ND	ND	ND	5.8
B-13 (15.0)	ND	ND	ND	ND	ND	ND	7.0
B-14 (10.0)	ND	ND	ND	ND	46	ND	7.0
B-14 (15.0)	0.3	ND	0.4	2.9	68	ND	6.2

* THC = total hydrocarbons calculated as gasoline.

D.4. Groundwater Conditions

Groundwater samples were collected from on-site monitoring wells MW-1, MW-2 and MW-3 on February 6, 1992 in accordance with MPCA guidelines. Prior to sample collection, stabilization tests were performed. Stabilization test data is included as Appendix D. The samples were analyzed in the Braun Intertec laboratory for VOCs, THC as gasoline or fuel oil, MTBE and dissolved lead. Analytical results are summarized in Table 5 below.

Table 5

Groundwater Analytical Results

Parameter	Units	MW-1	MW-2	MW-3
1,2-Dichloroethane	ug/L	ND	ND	11
1,2-Dibromoethane	ug/L	ND	ND	6.6
1,1,1,2-Tetrachloroethane	ug/L	ND	ND	0.5
Ethyl Ether	ug/L	ND	ND	590
Acetone	ug/L	ND	ND	270
Methyl Ethyl Ketone	ug/L	ND	ND	890
Tetrahydrofuran	ug/L	ND	ND	5600
Benzene	ug/L	ND	ND	1700
Methyl Isobutyl Ketone	ug/L	ND	ND	140
Toluene	ug/L	ND	ND	7300
Ethyl Benzene	ug/L	ND	ND	670
Xylenes, Total	ug/L	ND	ND	8000
Cumene	ug/L	ND	ND	60
THC	ug/L	ND	ND	94000

* THC = Total Hydrocarbons calculated as Gasoline.

Elevated concentrations of petroleum constituents were detected in the groundwater sample collected from monitoring well MW-3. Dissolved lead was detected in the sample at a concentration of 9 ug/l. In addition, several VOCs were also detected. MTBE was not detected in any of the samples. These compounds are commonly detected in samples containing elevated concentrations of petroleum contaminants due to similarities in their chromatographic signatures. It has not been determined whether these VOCs were actually present, or merely the result of laboratory interference. No VOCs or THC as gasoline were

E. Discussion and Conclusions

E.1. Soil Contamination Conditions

Based on the results of the field investigation, subsurface soils at the site appear to have been impacted by one or more releases of petroleum product. Based on boring results, the extent of soil contamination has been determined. Soil contamination appears to extend from near the surface below the apparent water table into the alluvial deposits at depth. The lateral limits of soil contamination appear to be limited to the western half of the site. The inferred limits of petroleum impacted soil are shown on Figure 6. The highest levels of contamination were detected in the vicinity of the underground storage tank basin, west of the pump islands and in the area where the surface release occurred in July 1991. Based on headspace PID readings, soil contamination did not appear to decrease significantly at depths below the water table. Relatively high PID readings were recorded within the alluvial deposits present below the till unit and the water table.

The exact source of the release has not been determined. According to B & F Distributing, Inc. the existing USTs passed tank tightness tests in January 1990. In addition, results of inventory control measurements since the tanks were tested indicted that no product has been unaccounted for. Based on the presence of near surface soil contamination in areas where the highest levels of petroleum impacts were detected, it appears that surface spills such as the one that occurred during July 1991, and overfilling of the tanks are the most likely source of the identified contamination.

Headspace High → lab samples from correct location?

Although contaminated soil remains on-site, chemical sampling results indicate that soil contaminant concentrations are relatively low. Soil contaminated during the surface release in July 1991 appeared to be effectively remediated. In addition, soil which appeared to have been impacted from a previous release(s) was also excavated and removed during remediation of the surface spill.

E.2. Groundwater Contamination

During the field investigation, clay till of apparent low permeability was encountered in the uppermost portion of the bore holes. At depths ranging from 14 to 20.5 feet, alluvial sands

and silts were encountered. As the boring intersected the alluvium, groundwater entered the bore hole. Water levels in the bore holes stabilized overnight at 8 to 10 feet below grade.

Based on these results, it appeared that, although the water table was apparently present in the till unit, the clay-rich composition of the till prevented significant groundwater movement through the formation. The underlying alluvial deposit appeared to have a much higher permeability and produced significantly more groundwater. It is likely that dissolved petroleum constituents would tend to migrate within a medium of preferential groundwater flow (such as the alluvial deposit) than one of relatively low transmissivity (such as the clay till unit). Therefore, in order to evaluate the extent of dissolved petroleum migration the monitoring wells were constructed so that the screens intersected the higher permeability alluvium.

The groundwater flow direction at the site appeared to change from west (as measured on February 6, 1992) to southwest on May 4, 1992. It is unknown whether the apparent disparity in flow direction is the result of seasonal fluctuations in the water table aquifer or the result of other causes. However, flow within the alluvium appears to have a westerly component. Water levels will be measured quarterly to determine the principal flow direction, if possible.

One round of sampling has been completed on the three on-site groundwater monitoring wells at this site. Groundwater samples were analyzed for VOCs, BETX, MTBE, THC as gasoline or fuel oil and lead. VOCs and BETX were detected in MW-3 in concentrations exceeding the Minnesota Department of Health Recommended Allowable Limits (RALs). THC as gasoline was also detected. There is no RAL for THC. Dissolved lead was detected at a concentration of 9 ug/l. MTBE was not present in the sample above method detection limits. No targeted parameters were detected in monitoring wells MW-1 and MW-2.

Based on PID reading and analyses of soil samples collected from borings B-9, B-12 and B-13 at the apparent water table and within the water bearing alluvial deposit, it appears that groundwater contamination is likely restricted in lateral extent.

F. Recommendations

Results of this investigation conclude that soil and groundwater has been impacted by a release of petroleum products at this site. Based on boring and chemical analyses of soil samples, soil contamination is limited in lateral extent and remaining petroleum concentrations are relatively low. Therefore, Braun Intertec recommends no further action regarding on-site soil contamination.

Based on the results of the chemical sampling of the groundwater in MW-3, we recommend that groundwater at the site be monitored quarterly for a period of one year. Groundwater samples will be collected from all three on-site wells (MW-1, MW-2 and MW-3) and analyzed for BETX, MTBE, THC and dissolved lead. Because VOCs were detected during the first round of sampling, Braun Intertec recommends that the wells be resampled for VOCs during the summer quarter of 1992. A duplicate sample will be collected from MW-3 (where VOCs were detected) and analyzed for VOCs by gas chromatograph/mass spectrometer to determine whether the compounds detected during the first round were the result of interference created by petroleum compounds in the sample or are actually present. If results of this analysis reveal that no non-petroleum compounds are present in groundwater at the site, then VOCs will not be analyzed during subsequent sampling events.

As previously discussed, water levels will also be measured during each subsequent sampling event to determine the dominant direction of flow within the alluvium.

If, after one year of monitoring, groundwater contaminant levels appear to be stable or decreasing, we recommend that the wells be abandoned in accordance with the Minnesota Department of Health Water Well Code and the site closed.

G. General

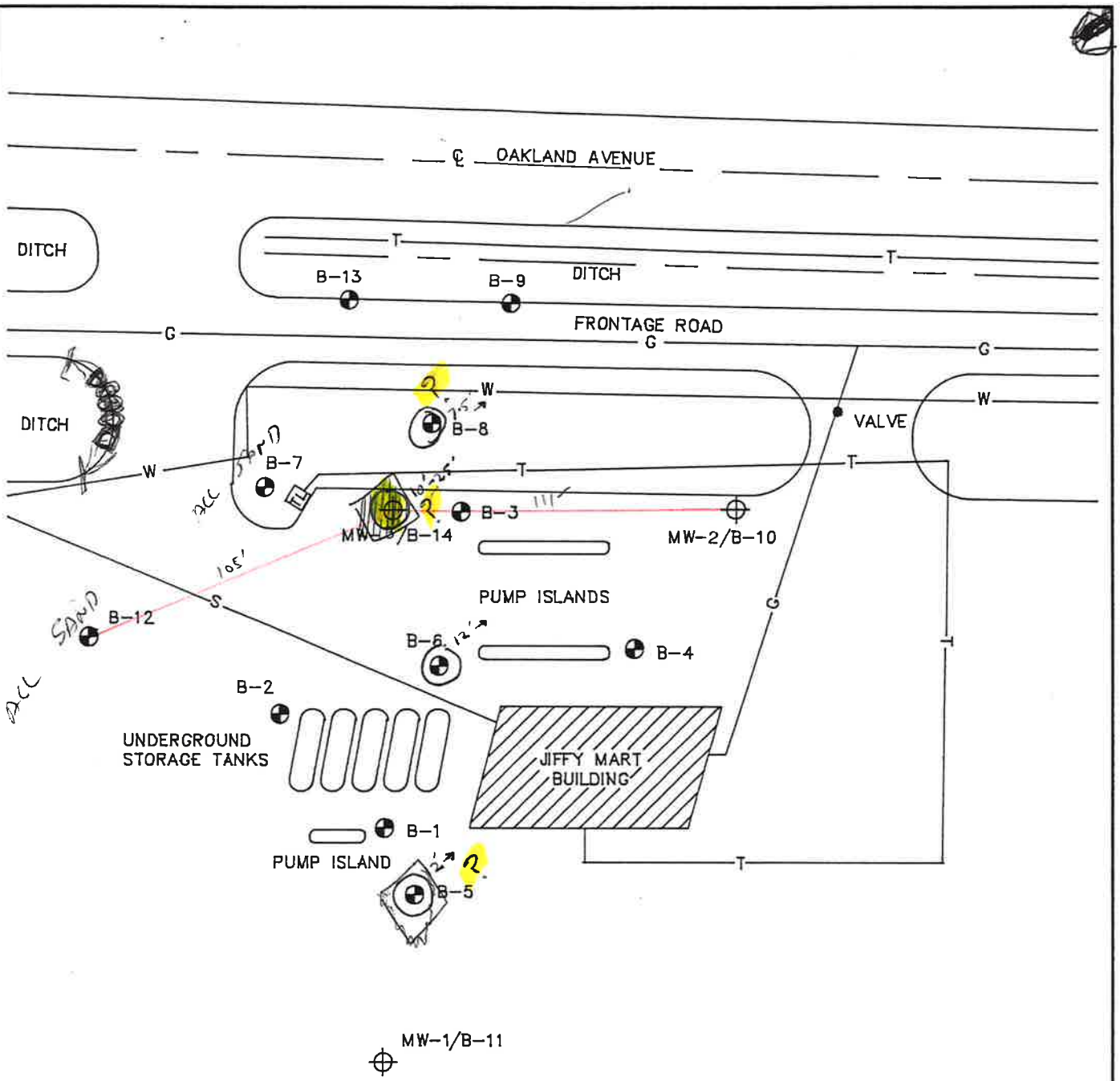
In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession practicing in the same locality. No other warranty is made or intended.

Figures

BRAUN INTERTEC

SITE LOCATION MAP
REMEDIAL INVESTIGATION
JIFFY MART
AUSTIN, MN.

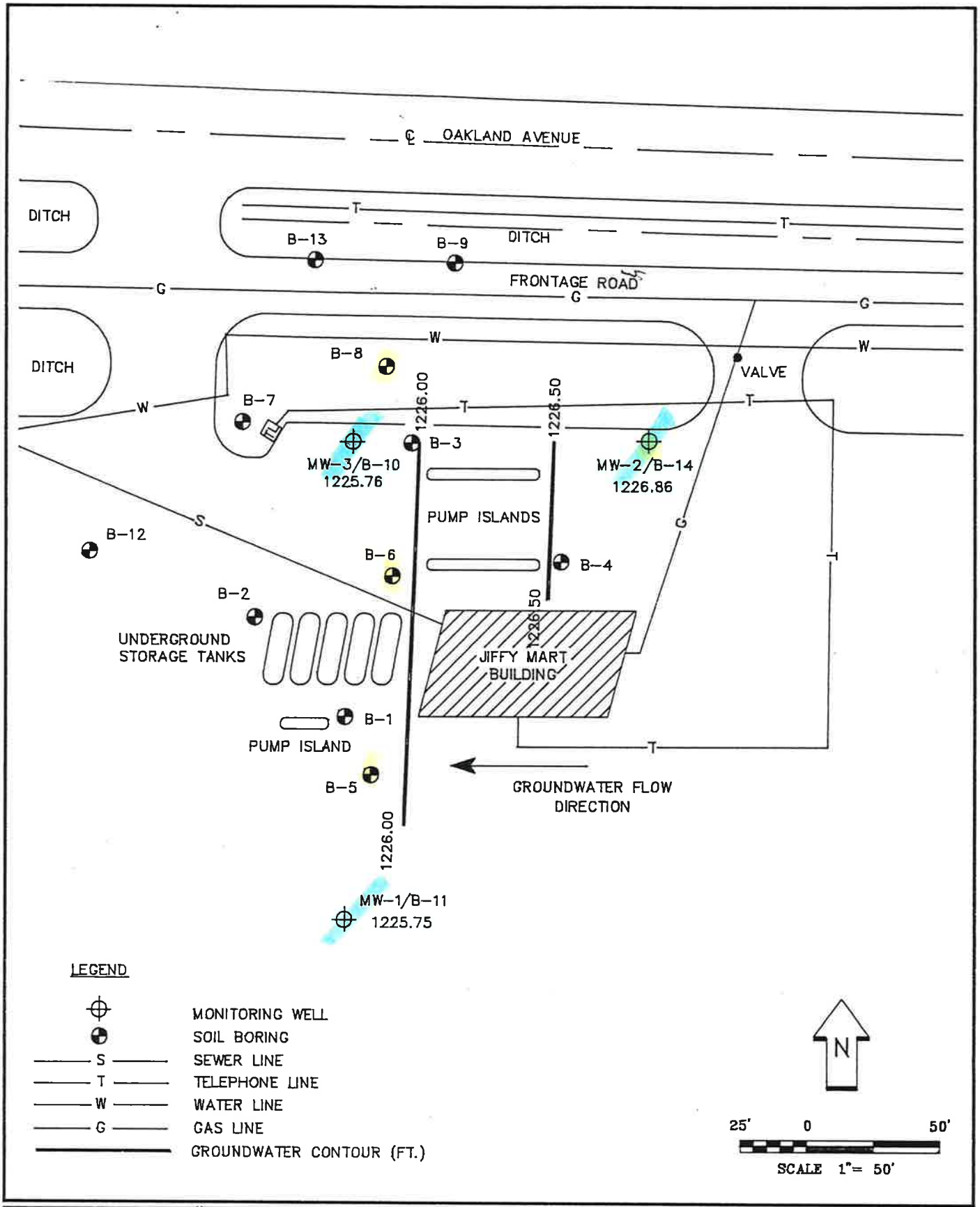
	INT	DATE	SHEET
DRAWN BY:	KNZ	11/22/91	1
APP'D BY:			OF 2
JOB No.	CMKX-91-0319		
DWG.No.		FIGURE#	1
SCALE	1"=2000'		



BRAUN INTERTEC

SITE PLAN
Remedial Investigation
Jiffy Mart
Austin, Minnesota

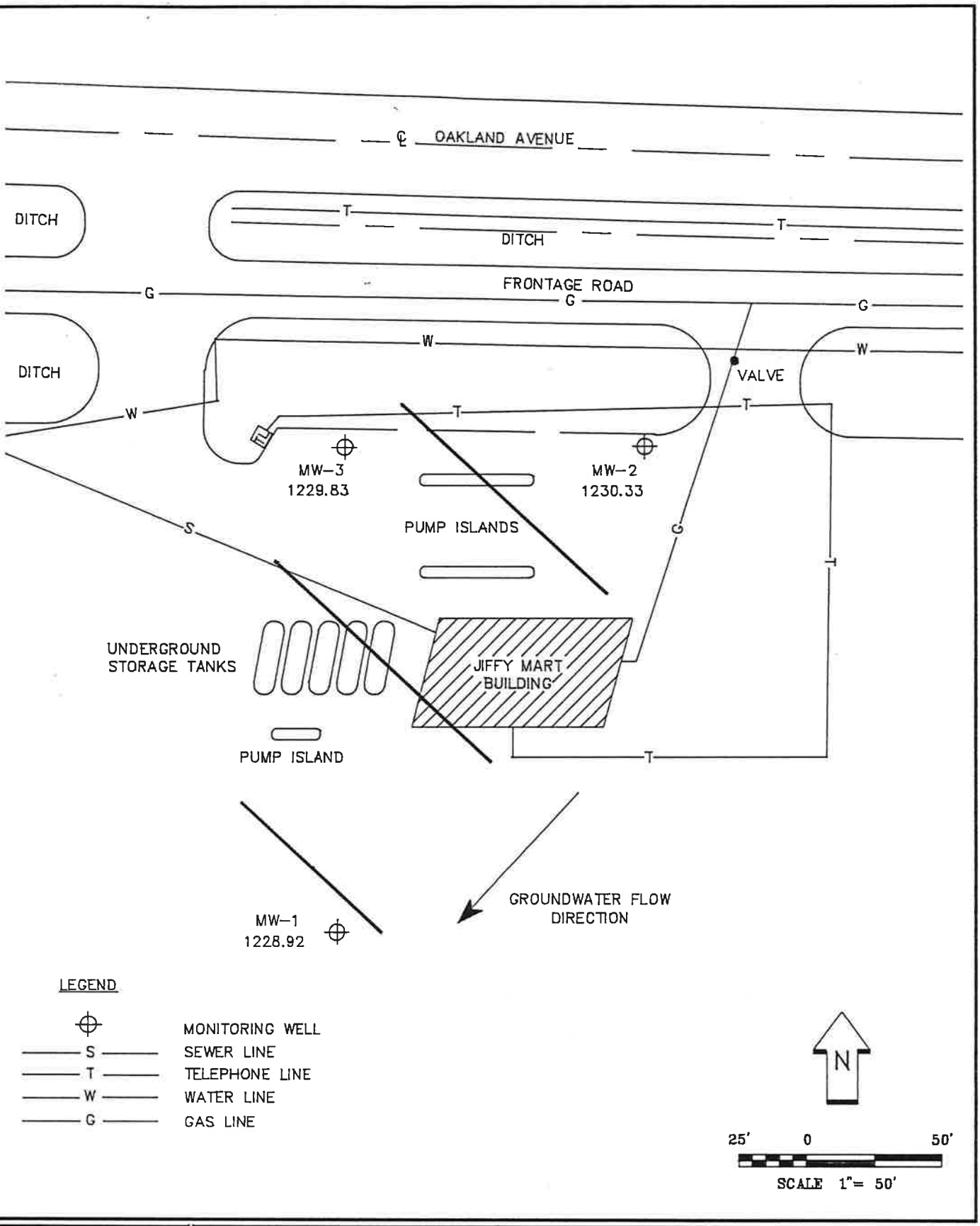
INT	DATE	SHEET
DRAWN BY: KMR	3-21-92	2
APP'D BY: MB		OF
JOB No. CMKX-91-0319		2
DWG. No. MK10319		FIGURE #
SCALE 1"=50'		2



BRAUN INTERTEC

GROUNDWATER CONTOUR 02-06-92
Remedial Investigation
Jiffy Mart
Austin, Minnesota

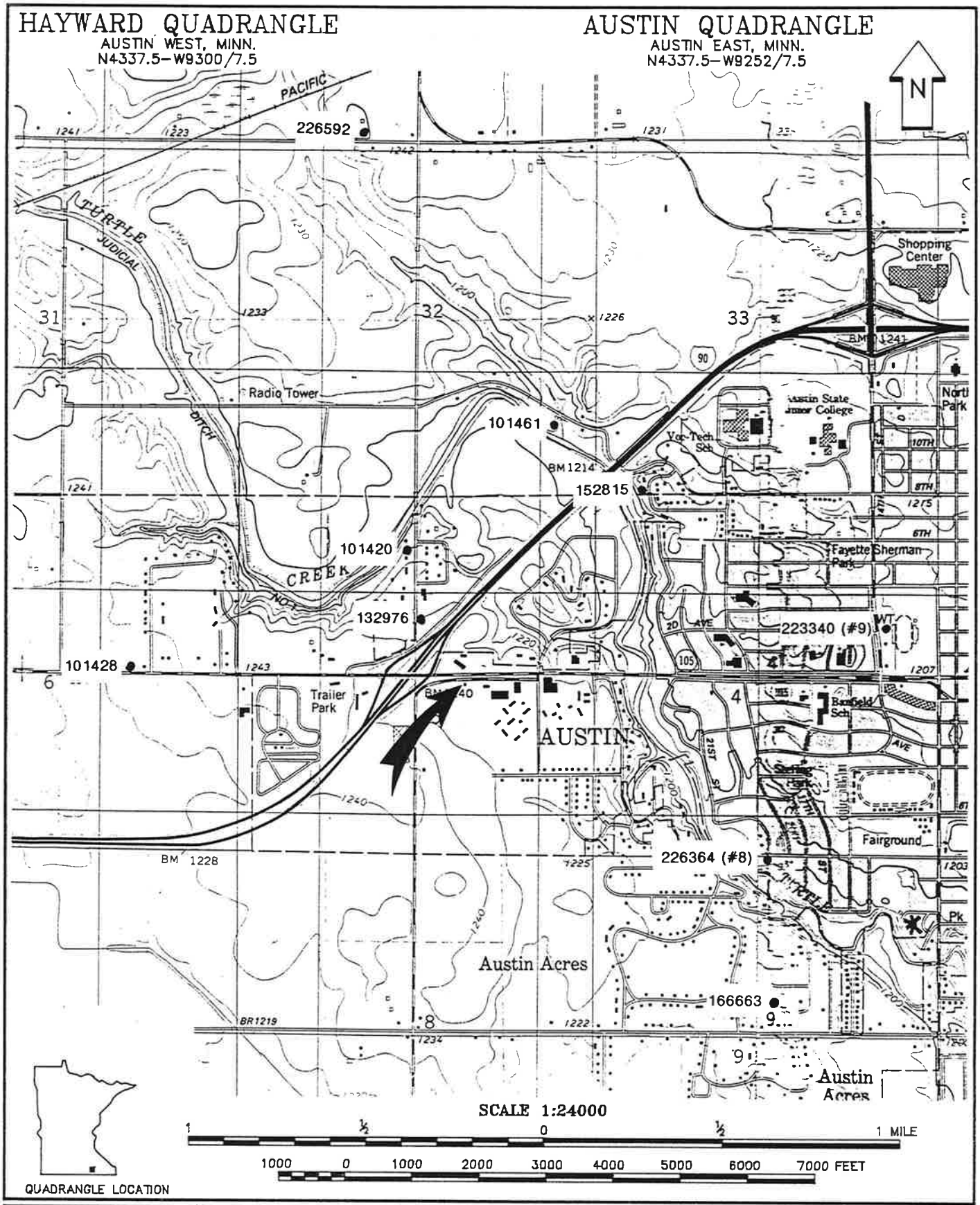
INT	DATE	SHEET
DRAWN BY: NTM	05-28-92	2
APP'D BY: CAH		OF
JOB No. CMKX-91-0319		2
DWG. No. MK10319		FIGURE #
SCALE 1"=50'		3



BRAUN INTERTEC

GROUNDWATER CONTOUR 05-04-92
Remedial Investigation
Jiffy Mart
Austin, Minnesota

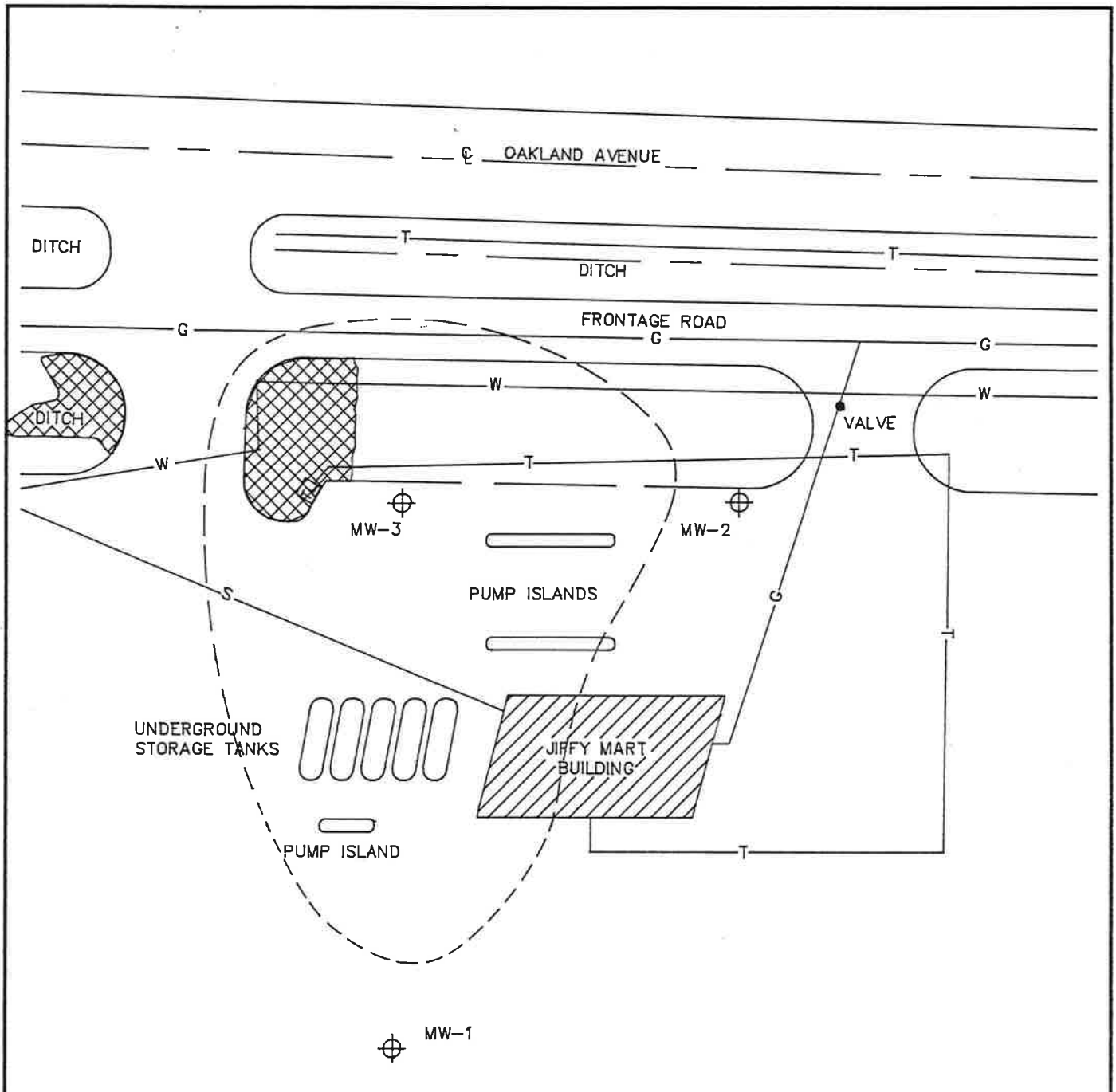
INT	DATE	SHEET
DRAWN BY: NTM	05-28-92	2
APP'D BY: KZ		OF 2
JOB No. CMKX-91-0319		
DWG. No. MK10319		FIGURE # 4
SCALE 1"=50'		



BRAUN INTERTEC

GROUNDWATER RECEPTOR MAP
Remedial Investigation
Jiffy Mail
Austin, Minnesota

INT	REVISION	SHEET
DRAWN BY: NTM	09–23–92	
APP'D BY: TS		OF
JOB No. CMKX–91–0319		
DWG. No. MK10319		FIGURE #
SCALE 1:24000		5



LEGEND

- MONITORING WELL
- S — SEWER LINE
- T — TELEPHONE LINE
- W — WATER LINE
- G — GAS LINE
- ESTIMATED CONTAMINATED SOIL EXTENT
- EXCAVATED CONTAMINATED SOIL (SURFACE RELEASE 07-22-91)

N

25' 0 50'

SCALE 1"= 50'

BRAUN INTERTEC

SOIL CONTAMINATION EXTENT
Remedial Investigation
Jiffy Mart
Austin, Minnesota

INT	DATE	SHEET
DRAWN BY: NTM	05-28-92	
APP'D BY: KZ		OF
JOB No. CMKX-91-0319		
DWG. No. MK10319		FIGURE # 6
SCALE 1"=50'		

BRAUN INTERTEC

LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: B-5

LOCATION:
See attached sketch

DATE: 1/14/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1239.4	0.0					
1238.8	0.6		8" Aggregate base.			
			FILL: POORLY GRADED SAND with SILT, fine to medium grained, brown, damp.	21		
1232.9	6.5		with Gravel at 6 feet	28		
		CL	LEAN CLAY, brown, moist, medium to rather stiff. (Glacial Till)	7		
				11		
1227.4	12.0					
		CL	LEAN CLAY, stained, wet, medium. (Glacial Till)	6		
1224.4	15.0					
		SC	CLAYEY SAND with GRAVEL, fine to medium grained, loose. (Glacial Till)	8		
1222.9	16.5					
			END OF BORING			
			Water down 11' 7" immediately after withdrawal of auger.			
			Cave-in depth 12' 4" immediately after withdrawal of auger.			

BRAUN INTERTEC

LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: B-6

LOCATION:
See attached sketch

DATE: 1/14/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1239.3	0.0	SP SM	FILL: POORLY GRADED SAND with SILT, fine to medium grained, brown, moist.	44		
1234.3	5.0		FILL: POORLY GRADED SAND with SILT, fine to medium grained, stained, dark brown, moist.	32		
1232.3	7.0	SC	CLAYEY SAND, fine grained, stained, grey, moist, medium. (Glacial Till)	6		
1229.3	10.0	CL	LEAN CLAY with SAND, fine grained, greyish brown to brown, moist, medium to rather soft. (Glacial Till)	6		
				6		
				6		
				5		
1220.8	18.5		Sand seams at 18 feet			
		SM	SILTY SAND, fine to medium grained, with a trace of Gravel, brown, wet, medium dense. (Alluvium)	22		
				24		
1214.3	25.0			27		
1212.3	27.0	ML	SILT, with seams of Sand, reddish brown, wet, very stiff. (Alluvium)			
1209.3	30.0	SM	SILTY SAND, fine to medium grained, brown, wet, medium dense. (Alluvium)	29		

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LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: B-6 (cont.)

LOCATION:
See attached sketch

DATE: 1/14/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1208.3	31.0	SP SM SC	POORLY GRADED SAND with SILT, fine to medium grained, brown, wet, very dense. (Alluvium)	102		
			CLAYEY SAND, fine to medium grained, reddish brown, moist. (Glacial Till)			
1204.3	35.0		END OF BORING Water down 21 feet with 30 feet of hollow-stem auger in the ground. Water down 13' 8" with cave-in depth of 18' 5".			

BRAUN INTERTEC

LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: B-7

LOCATION:
See attached sketch

DATE: 1/13/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1237.5	0.0	SM	SILTY SAND, fine to medium grained, with a trace of Clay, black, moist, medium dense. (Topsoil)			
1235.0	2.5			11		
			FILL: CLAYEY SAND, fine grained, grey, moist, medium dense.			
1231.5	6.0			13		
		CL	LEAN CLAY with SAND, with a trace of Gravel, stained, grey to brown, wet, rather soft to very soft. (Glacial Till)	4		
				1		
			with Gravel at 11 feet			
				5		
1223.5	14.0					
		SC	CLAYEY SAND, with a trace of Gravel, stained, medium dense. (Glacial Till)	7		
1219.0	18.5			24		
		SP SM	POORLY GRADED SAND with SILT, fine to medium grained, brown, moist, medium dense. (Alluvium)			
1216.0	21.5			16		
			END OF BORING Water down 15' 4" with 20' of hollow-stem auger in the ground.			

BRAUN SM
INTERTEC

LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: B-8

LOCATION:
See attached sketch

DATE: 1/13/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1235.8	0.0					
1234.8	1.0		Topsoil			
			FILL: CLAYEY SAND, fine to medium grained, brown, moist, medium dense.	22		
1231.8	4.0					
		SP SM	POORLY GRADED SAND with SILT, fine to medium grained, black to grey, moist, very loose.	4		
1229.3	6.5		(Glacial Outwash)			
		CL	SANDY LEAN CLAY, brown, moist, rather soft to rather stiff.	4		
			(Glacial Till)	11		
1221.8	14.0			11		
		SP SM	POORLY GRADED SAND with SILT, fine to medium grained, yellowish brown, moist, medium dense.	28		
1219.8	16.0		(Alluvium)			
		SP SM	POORLY GRADED SAND with SILT, fine grained, brown, wet, medium dense.	27		
			(Alluvium)	25		
1213.8	22.0					
		ML	SILT with SAND, fine grained, brown, moist, dense.	37		
1211.8	24.0		(Alluvium)			
			END OF BORING			
			Water down 14' 7" with 20 ' of hollow-stem auger in the ground.			
			Water down 9' 7" with cave-in depth of 15' 4".			

BRAUN SM
INTERTEC

LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: **B-9**

LOCATION:
See attached sketch

DATE: 1/17/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1237.1	0.0					
1236.6	0.5		6" Aggregate base			
			FILL: CLAYEY SAND, fine grained, brown, moist.			
1234.1	3.0	CL	SANDY LEAN CLAY, fine grained, brown, moist to wet, stiff to medium. (Glacial Till)	13		
			with a trace of Gravel at 11 feet	6		
				6		
1218.6	18.5	SM	SILTY SAND, fine grained, brown, wet, medium dense. (Alluvium)	23		
1210.6	26.5			25		
			END OF BORING Water down 18' 9" with 25' of hollow-stem auger in the ground.			

BRAUN INTERTEC

LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: B-10

LOCATION:
See attached sketch

DATE: 1/14/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1237.9	0.0					
1237.4	0.5		6" Bituminous Pavement			
1236.5	1.4		10" Aggregate base			
			FILL: POORLY GRADED SAND with SILT, fine to coarse grained, brown, moist, dense.	38		
1232.9	5.0	OL	ORGANIC SILT, black, moist, medium dense. (Topsoil)	14		
1230.9	7.0	SC	CLAYEY SAND, fine grained, brown, moist, rather soft. (Glacial Till)	5		
1229.4	8.5	CL	LEAN CLAY with SAND, fine grained, brown, wet, rather soft to rather stiff. (Glacial Till)	5		
				6		
			Sand seams at 16 feet	9		
1220.9	17.0	SM	SILTY SAND, fine grained, brown, moist, dense to medium dense. (Alluvium)	39		
			laminated at 21 feet	21		
				20		
				15		
1208.9	29.0		END OF BORING			

BRAUN SM
INTERTEC

LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: B-10 (cont.)

LOCATION:
See attached sketch

DATE: 1/14/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
			Water down 18' 6" with 25 feet of hollow-stem auger in the ground. Water down 16' 6" with cave-in depth of 20'. Monitoring well MW-2 installed in borehole at 29.0'.			

BRAUN INTERTEC

LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: B-11

LOCATION:
See attached sketch

DATE: 1/14/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1238.3	0.0	SP SM	FILL: POORLY GRADED SAND with SILT and GRAVEL, brown, moist.	6		
1232.3	6.0	SC	CLAYEY SAND, fine grained, brown, wet, very loose to medium dense. (Glacial Till)	4		
				3		
				2		
				8		
1222.3	16.0			11		
		CL	LEAN CLAY, brown, wet, rather stiff. (Glacial Till)	10		
1217.8	20.5			21		
1216.3	22.0	SM	SILTY SAND, fine grained, reddish brown, wet, medium dense. (Alluvium)			
		ML	SILT, with Sand seams and iron staining, reddish brown, wet, medium dense to dense. (Alluvium)	27		
				38		
1208.8	29.5					

BRAUN INTERTEC

LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: B-11 (cont.)

LOCATION:
See attached sketch

DATE: 1/14/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
			END OF BORING Water down 14' with 25' of hollow-stem auger in the ground. Water down 11' 8" with cave-in depth of 20'. Monitoring well MW-1 installed in borehole at 29.0'.			

BRAUN INTERTEC

LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: B-12

LOCATION:
See attached sketch

DATE: 1/16/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1238.0	0.0					
1237.0	1.0		1' Aggregate base			
			FILL: POORLY GRADED SAND with SILT, fine to coarse grained, brown, moist.	18		
1235.0	3.0	SC	FILL: CLAYEY SAND, fine grained, brown and black, grey, moist.	13		
1231.0	7.0	SC	CLAYEY SAND, fine grained, greyish brown, moist, loose. (Glacial Till)	6		
1228.0	10.0	SP SM	POORLY GRADED SAND with SILT, fine to medium grained, brown, wet, loose. (Glacial Till)	10		
1225.5	12.5	SC	CLAYEY SAND, fine grained, with a trace of Gravel, brown, wet, loose to medium dense. (Glacial Till)	10 11		
1221.0	17.0	CL	LEAN CLAY, with a trace of Sand, grey, moist, stiff. (Glacial Till)	14		
1218.0	20.0	SM	SILTY SAND, fine grained, brown, wet, medium dense to very dense. (Alluvium)	27 62		
1213.0	25.0			18		
1211.5	26.5	ML	SILT, with Sand seams, brown, wet, medium dense. (Alluvium)			
			END OF BORING Water down 19' 2" with 25' of hollow-stem auger in the ground.			

BRAUN SM
INTERTEC

LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: B-13

LOCATION:
See attached sketch

DATE: 1/17/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1237.4	0.0					
1236.9	0.5		6" Aggregate base			
			FILL			
1234.4	3.0	CL	SANDY LEAN CLAY, fine grained, brown, moist to wet, rather stiff. (Glacial Till)	11		
				6		
				9		
1218.4	19.0	SM	SILTY SAND, fine grained, brown to reddish brown, wet, dense. (Alluvium)	36		
				41		
1210.9	26.5		END OF BORING			
			Water down 19' 6" with 26' 6" of hollow-stem auger in the ground.			

BRAUN INTERTEC

LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: B-14

LOCATION:
See attached sketch

DATE: 1/16/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1238.1	0.0		FILL: POORLY GRADED SAND with SILT, fine to medium grained, brown, moist.			
1234.6	3.5	OL	ORGANIC SILT, black, moist, very stiff. (Topsoil)	30		
1232.6	5.5	SC	CLAYEY SAND, fine grained, brown, moist, very loose. (Glacial Till)	4		
1223.1	15.0	CL	LEAN CLAY with SAND, brown, moist, medium. (Glacial Till)	7		
1220.1	18.0	SM	SILTY SAND, fine grained, brown to reddish brown, wet to moist, medium dense. (Alluvium)	30		
				24		
1209.1	29.0	SC	CLAYEY SAND, fine grained, with a trace of			

BRAUN INTERTEC

LOG OF BORING

PROJECT: CMKX-91-0319
REMEDIAL INVESTIGATION

Jiffy Mart
1830 SE 3rd St.
Rochester, Minnesota

BORING: B-14 (cont.)

LOCATION:
See attached sketch

DATE: 1/16/92

SCALE: 1" = 4'

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
1206.6	31.5		Gravel, reddish brown, moist, medium dense. (Glacial Till)	30		
			END OF BORING Water down 18' 1" with 30' of hollow-stem auger in the ground. Monitoring well MW-3 installed in borehole at 29.0'.			

Austin Jiffy Mart

Austin MN

PROJECT: CMK-0319
COLLECTED: Braun 02/06/92
RECEIVED: 02/06/92
SAMPLE MATRIX: Liquid (water)

	BRAUN I.D.:	92-0243-01	92-0243-02	92-0243-03	92-0243-04
	CLIENT I.D.:	MW-1	MW-2	MW-3	FB
PARAMETER	--UNITS--				
Dichlorodifluoromethane	ug/L	<5.0	<5.0	<5.0	<5.0
Chloromethane	ug/L	<5.0	<5.0	<5.0	<5.0
Vinyl Chloride	ug/L	<1.0	<1.0	<1.0	<1.0
Bromomethane	ug/L	<5.0	<5.0	<5.0	<5.0
Chloroethane	ug/L	<1.0	<1.0	<1.0	<1.0
Dichlorofluoromethane	ug/L	<5.0	<5.0	<5.0	<5.0
Trichlorofluoromethane	ug/L	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichlorotrifluoroethane	ug/L	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethylene	ug/L	<1.0	<1.0	<1.0	<1.0
Allyl Chloride (3-Chloropropene)	ug/L	<1.0	<1.0	<1.0	<1.0
Methylene Chloride	ug/L	<5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethylene	ug/L	<0.2	<0.2	<0.2	<0.2
1,1-Dichloroethane	ug/L	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethylene	ug/L	<0.2	<0.2	<0.2	<0.2
Chloroform	ug/L	<1.5	<1.5	<1.5	<1.5
1,1,1-Trichloroethane	ug/L	<2.0	<2.0	<2.0	<2.0
1,1-Dichloro-1-propene	ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	ug/L	<1.6	<1.6	<1.6	<1.6
1,2-Dichloroethane	ug/L	<0.3	<0.3	11	<0.3
1,1,2-Trichloroethylene	ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	ug/L	<0.3	<0.3	<0.3	<0.3
Dibromomethane	ug/L	<5.0	<5.0	<5.0	<5.0
2,3-Dichloro-1-propylene	ug/L	<0.2	<0.2	<0.2	<0.2
cis-1,3-Dichloro-1-propene	ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloro-1-propene	ug/L	<0.2	<0.2	<0.2	<0.2
1,1,2-Trichloroethane	ug/L	<1.2	<1.2	<1.2	<1.2
Tetrachloroethylene	ug/L	<1.0	<1.0	<1.0	<1.0
1,3-Dichloropropane	ug/L	<1.0	<1.0	<1.0	<1.0
Chlorodibromomethane	ug/L	<2.5	<2.5	<2.5	<2.5

< = less than: compound not detected at or above indicated detection limit
- = Analysis not requested

Quality control data reviewed: LRO

	BRAUN I.D.:	92-0243-01	92-0243-02	92-0243-03	92-0243-04
	CLIENT I.D.:	MW-1	MW-2	MW-3	FB
PARAMETER	--UNITS--				
1,2-Dibromoethane	ug/L	<0.2	<0.2	6.6	<0.2
Chlorobenzene	ug/L	<1.0	<1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	0.5	<0.5
Bromoform	ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	ug/L	<1.2	<1.2	<1.2	<1.2
1,2,3-Trichloropropane	ug/L	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	ug/L	<1.5	<1.5	<1.5	<1.5
1,2-Dichlorobenzene	ug/L	<0.2	<0.2	<0.2	<0.2
1,4-Dichlorobenzene	ug/L	<0.2	<0.2	<0.2	<0.2
Ethyl Ether	ug/L	<1.0	<1.0	590	<1.0
Acetone	ug/L	<50	<50	270	<50
Methyl Ethyl Ketone	ug/L	<5.0	<5.0	890	<5.0
Tetrahydrofuran	ug/L	<5.0	<5.0	5600	<5.0
Benzene	ug/L	<1.0	<1.0	1700	<1.0
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	140	<5.0
Toluene	ug/L	<1.0	<1.0	7300	<1.0
Ethyl Benzene	ug/L	<1.0	<1.0	670	<1.0
Xylenes, Total	ug/L	<1.0	<1.0	8000	<1.0
Cumene	ug/L	<3.0	<3.0	60	<3.0
Methyl Tertiary Butyl Ether	ug/L	<1.0	<1.0	<1.0	-
Total Hydrocarbons as Gasoline	ug/L	<100	<100	94000	<100
Total Hydrocarbons as Fuel Oil	ug/L	<500	<500	b	<500
Lead, Dissolved	ug/L	<2	<2	9	-

*******FOOTNOTES********

b = Total Hydrocarbons calculated as gasoline.

< = less than: compound not detected at or above indicated detection limit

- = Analysis not requested

Quality control data reviewed: LRO

Discussion

Routine Braun Intertec QA/QC was followed. No anomalies were encountered in the analysis of these samples.

We appreciate the opportunity to meet your analytical needs. If you have any questions or need additional information, please call Linda Crawford at (612) 942-4810.

Sincerely,

Linda Crawford
Project Manager

Anne L. Ochs
Laboratory Manager

lcc/alo:mjz

Attachments
Chain of Custody

BRAUN INTERTEC

Chain Of Custody - ECS

Log-In/Report # 92-0243

Page 1 of 1

Site Identification

AUSTIN JIFFY MART
AUSTIN MN

Project #: CMICX 91 0319

a = soil d = liquid
b = water e = tube or filter
c = solid f = sludge
o = other (specify) _____

Evidence tape intact? (Check One) Yes ○ No ○ NA ○

Project Manager: KARL RENK / Lab LCC

Sampled by: WHO

Comments: DISSOLVED Pb

Sample No. (Lab Use Only)	Sample Identification	Collection Date	Collection Time	Sample Matrix Code	Bottle type and number: VOA	Filtered Metals	Unfiltered Metals	General	Cyanide	Oil and Grease	Nutrients	Tubes	Whirl Pak	Other	See attached sheet:	Analysis/ Remarks
92-0243-1	MW-1	2-6-92	10:58	b	6	1										BETX, THC, VOC MTBE Pb.
-2	MW-2	2-6-92	11:38	b	6	1										" " " " "
-3	MW 3	2-6-92	12:14	b	6	1										" " " " "
-4	FB	2-6-92	9:25	b	3											" " " "
-5	TB	2-6-92	8:00	b	3											HOLD

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
Wayne Hoban	2-6-92	2:30					

Relinquished by:	Date:	Time:	Received by:	Received for laboratory by:	Date:	Time:
				Christine Portugal-Smith	2/6/92	2:30 pm

BRAUN SM
INTERTEC

Braun Intertec Environmental, Inc.
6875 Washington Avenue South
P.O. Box 39108
Minneapolis, Minnesota 55439-0108
612-941-5600 Fax: 942-4844

Engineers and Scientists Serving the Built and Natural Environments

January 29, 1992

Project No. CMKX-91-0319
Report No. 92-0120

Re: Conoco Jiffy Mart
Austin, MN

Braun Intertec Environmental, Inc. (Braun Intertec) received the following samples on January 17, 1992 for chemical analyses.

Braun Intertec I.D.	Client Sample I.D.	Sample Matrix
92-0120-01	B-5 12.5'	Solid
92-0120-02	B-6 12.5'	Solid
92-0120-03	B-6 30.0'	Solid
92-0120-04	B-7 20.0'	Solid
92-0120-05	B-8 17.5'	Solid
92-0120-06	B-9 25.0'	Solid
92-0120-07	B-10 25.0'	Solid
92-0120-08	B-11 25.0'	Solid
92-0120-09	B-12 25.0'	Solid
92-0120-10	B-13 15.0'	Solid
92-0120-11	B-14 10.0'	Solid
92-0120-12	B-14 15.0'	Solid

Results

Analytical results are summarized on the following laboratory report.

Methodology

The samples were analyzed following Braun Intertec standard operating procedures based on the methods listed below.

Parameters	Method	Date Analyzed
BETX/THCs	SW 846 3810	01/22-01/23/92
Methyl Tertiary Butyl Ether	SW 846 3810	01/22-01/23/92
Lead, Total	SW 846 6010	01/24/92

Conoco Jiffy Mart

Austin MN

PROJECT: CMK-0319
COLLECTED: Braun 01/13-01/17/92
RECEIVED: 01/17/92
SAMPLE MATRIX: Solid (soil)

PARAMETER	--UNITS--	BRAUN I.D.: 92-0120-01 CLIENT I.D.: B-5 12.5'	92-0120-02 B-6 12.5'	92-0120-03 B-6 30.0'	92-0120-04 B-7 20.0'
Benzene	mg/Kg	<0.3	<0.3	<0.3	<0.3
Toluene	mg/Kg	<0.3	<0.3	<0.3	<0.3
Ethyl Benzene	mg/Kg	<0.3	<0.3	<0.3	<0.3
Xylenes, Total	mg/Kg	<0.3	0.3	<0.3	<0.3
Methyl Tertiary Butyl Ether	mg/Kg	<1.0	<1.0	<1.0	<1.0
Total Hydrocarbons as Gasoline	mg/Kg	2.0	9.2 e	<1.0	<1.0
Total Hydrocarbons as Fuel Oil	mg/Kg	b	b	<1.0	<1.0
Lead, Total	mg/Kg	4.8	4.3	1.8	3.5

PARAMETER	--UNITS--	BRAUN I.D.: 92-0120-05 CLIENT I.D.: B-8 17.5'	92-0120-06 B-9 25.0'	92-0120-07 B-10 25.0'	92-0120-08 B-11 25.0'
Benzene	mg/Kg	<0.3	<0.3	<0.3	<0.3
Toluene	mg/Kg	<0.3	<0.3	<0.3	<0.3
Ethyl Benzene	mg/Kg	<0.3	<0.3	<0.3	<0.3
Xylenes, Total	mg/Kg	<0.3	<0.3	<0.3	<0.3
Methyl Tertiary Butyl Ether	mg/Kg	<1.0	<1.0	<1.0	<1.0
Total Hydrocarbons as Gasoline	mg/Kg	1.4	<1.0	<1.0	<1.0
Total Hydrocarbons as Fuel Oil	mg/Kg	b	<1.0	<1.0	<1.0
Lead, Total	mg/Kg	2.7	4.8	3.9	2.9

PARAMETER	--UNITS--	BRAUN I.D.: 92-0120-09 CLIENT I.D.: B-12 25.0'	92-0120-10 B-13 15.0'	92-0120-11 B-14 10.0'	92-0120-12 B-14 15.0'
Benzene	mg/Kg	<0.3	<0.3	<0.3	0.3

< = less than: compound not detected at or above indicated detection limit
- = Analysis not requested

Quality control data reviewed: URO

PARAMETER	--UNITS--	BRAUN I.D.: 92-0120-09 CLIENT I.D.: B-12 25.0'	92-0120-10 B-13 15.0'	92-0120-11 B-14 10.0'	92-0120-12 B-14 15.0'
Toluene	mg/Kg	<0.3	<0.3	<0.3	0.4
Ethyl Benzene	mg/Kg	<0.3	<0.3	<0.3	<0.3
Xylenes, Total	mg/Kg	<0.3	<0.3	<0.3	2.9
Methyl Tertiary Butyl Ether	mg/Kg	<1.0	<1.0	<1.0	<1.0
Total Hydrocarbons as Gasoline	mg/Kg	<1.0	<1.0	46 e	68 e
Total Hydrocarbons as Fuel Oil	mg/Kg	<1.0	<1.0	b	b
Lead, Total	mg/Kg	5.8	7.0	7.0	6.2

*******FOOTNOTES********

b = Total Hydrocarbons calculated as gasoline.

e = See discussion section.

< = less than: compound not detected at or above indicated detection limit

- = Analysis not requested

Quality control data reviewed: LRD