

T.H. Law

Geokwan Environmental Ltd

ENVIRONMENTAL ENGINEERS

October 15, 1991

Canadian Tire Corporation
Box 770, Station K
Toronto, Ontario
M4P 2V8

ATTN: Mr. Hugh Law, Real Estate Manager

Dear Sir,

RE: Progress Report No. 4
Asphalt Paving and Installation of Vapour Extraction System
Canadian Tire Store, Brandon, Manitoba
Our Project No.'s E238 & E239

During the period from June 4 to June 25, 1991, the installation of the remainder of the Stage 2 vapour extraction system (i.e. at the parking lot) at the above noted project was completed. During this time period, the trenches (Stage 1 & 2) which were installed in November, 1990 were asphalted, the remainder of the pipe installation and trenching was completed, and the last vapour extraction unit was hooked up.

1. ASPHALTING OF TRENCHES COMPLETED IN 1990

On June 3, 1991, Geokwan Environmental Ltd. was informed that Zenith Paving Ltd. was in the process of asphaltting the trenches installed by our firm in November, 1990. They had begun on May 30, 1991 at the request of Mr. Merv Dillabough. In order to ensure that the remaining work was done in accordance with the project specifications, our inspector travelled to Brandon on June 4, 1991. The purpose of this trip was to test the compaction of the A base and asphalt and to ensure that the casings of the vapour extraction wells were not covered during the asphaltting operation.

In addition, the work done from May 30 to June 3 was inspected to ensure satisfactory workmanship and to verify that the wells had not been covered. During this inspection, it was revealed that 2 wells had been covered and that a considerable number of casings had been placed too low. These low casings could not properly protect and cover the top of the wells. The asphalt and low casings at these locations were repaired on June 6 and 7, 1991 by Zenith Paving Ltd.

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The details of our inspection can be found on the enclosed inspector's logs in Appendix A. All compaction test results of the 1990 trenches are enclosed in Appendix D. In addition, a sieve analysis and Standard Proctor test were performed on the A Base sample, the results of which are in Appendix C.

2. COMPLETION OF VES INSTALLATION

From June 16 to 20, 1991, the remainder of the Stage 2 header pipe installation and trenching was completed by Cumming & Dobbie Ltd. During this time period, a total of 770' of pipe and trenching was completed. The work was started on Sunday, June 16, 1991 and finished during the night from Monday June 17 to Wednesday June 19, 1991 (9:00 PM to 6:00 AM). The completed trenches were backfilled and compacted to 2" from grade, and then asphalted from 7:00 to 9:00 AM. Details on the work done each day can be found in the inspector's daily report, Appendix B, and the results of all compaction testing can be found in Appendix E.

Due to the problem of surface water flooding in the header pipe near V9 during the spring, a slight modification was made to the overall layout of the extraction system. V10 was moved from its original position near V9, to the top of the Gas Bar. In order to accommodate this change, a new trench was installed to join trenches 1, 2, and 3. (see Plate PR4-1 for as-built drawing showing all changes). This design change will have trenches 1, 2, 3 and 4 joined together and pumped in combination by Units V7, V8 and V10. It is expected to help alleviate the problem of the header pipe being flooded in the Spring, and will enhance the effectiveness of the entire subsurface vapour management systems.

On June 25, 1991, a site visit was made by our Mr. Walter Kwan, P. Eng. to install V10 and replace V6 and V8 which were damaged by the flooded water in the header pipes. V10 was installed on the gas bar roof in place of V6. V8 was replaced with a new unit, V11. V9 was permanently removed offsite at the end of August, 1991, as the modification to the system design was such that only 9 vapor extraction units were needed for removing the subsurface volatile vapors in the treatment areas. The locations of the seven vapour extraction units are indicated on Plate PR4-3 to 6.

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3. VAPOUR MANAGEMENT SYSTEM MONITORING

The Stage 1 & 2 vapour management systems were monitored on a regular basis. This includes measurements of the volatile vapour removed by each VEU, the product thickness, ground water levels and total volatile vapour concentrations in all wells. all relevant field data are shown in Table A to F inclusive.

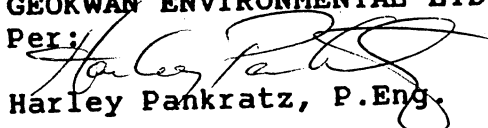
Details of the aerial distribution of the volatile vapour measured in June, August and September, 1991 are shown on Plate PR4-1A, 1B & 1C. From these plates, it can be readily seen that the lateral extent of the 100 % LEL vapour plume in the treatment areas has been substantially reduced by the Stage 1 & 2 vapour management systems. It should be appreciated that the vapour clean up effort and system performance had been somewhat hampered by the seasonally high ground water tables and flooding of the header pipes in the spring of 1991. This water flooding difficulty is expected to be improved next spring as all trenches have now been paved with asphaltic concrete.

4. PRODUCT RECOVERY

Product recovery through the 2 large diameter recovery wells and the vapour extraction wells was undertaken frequently by Clark Septic Service of Brandon. However, the product recovery process has been slow. Based on the monitoring data obtained to-date from the vapour extraction wells, it now becomes apparent that there are several hydrocarbon product pools in the Stage 1 & 2 areas, especially in the southwest corner of the store. Hydrocarbon pools are also suspected in the interior of the existing Canadian Tire Store. The aerial distribution of the product plume detected at the vapour extraction wells from June, 1991 to September 1991 is shown on Plate PR4-2A to 2C.

To expedite the product recovery, we strongly recommend that an additional large diameter recovery well be installed at the southwest corner of the store as soon as possible. In addition, a detailed delineation and verification of the possible presence of hydrocarbon product pools beneath the Canadian Tire Store, using a combination of electromagnetic geophysical methods and core holes should be considered.

Yours truly,
GEOKWAN ENVIRONMENTAL LTD

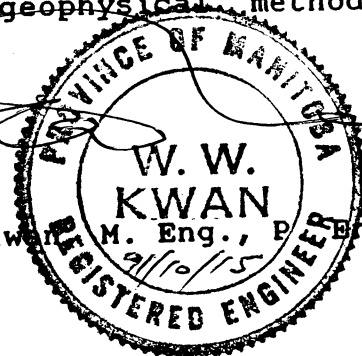
Per: 

Harley Pankratz, P.Eng.

WK/tbs

Encl.

Walter Kwan M. Eng., P. Eng.



APPENDIX A

INSPECTOR'S DAILY REPORT ASPHALTING OF TRENCHES INSTALLED IN 1990

Tuesday June 4, 1991

- left for Brandon at 9:30 AM
- arrived at Canadian Tire Store at 12:30 PM. On arrival, Zenith Paving was excavating and compacting Trench 5.
- A site inspection upon arrival revealed that trench 4, as well as all trenching north and east of the store had been previously completed. A total of 2374 sq. ft. of asphalt had been placed.
- The A base in trench 5 was compacted until 2:30 PM.
- Trench 5 asphalted from 2:30 to 5:30 PM
- Compaction of all A Base and asphalt tested with Nuclear Densometer.
- A total of approximately 1045 sq. ft. of asphalt was placed during the day.
- Inspected all wells along trench 4. The casings at MW 130, 123, 122, 121 and 119 were too low and will require raising.
- Checked all extraction units. V6 and V8 not working.

Wednesday June 5, 1991

- arrived on site at 7:00 AM.
- Zenith working on the south east trench in front of the store (MW 57 to MW 66).
- existing cold patch removed and underlying A base compacted until 7:50 AM.
- Trench asphalted from 8:00 AM to 9:00 AM.
- Compaction of A Base and asphalt tested with Nuclear Densometer.
- Zenith began excavation of trench in front of Auto Centre at 10:00 AM (MW 106 to 113).
- A Base compacted until 12:00 PM.
- Asphalted from 1:00 PM to 2:15 PM.
- All A Base and Asphalt compaction tested with a Nuclear Densometer.
- 4' section of Asphalt east of MW 112 was soft and could not be compacted due to a saturated subgrade. The section was dug out and replaced.
- Zenith began work at west end of trench 5 and trench 4 behind Gas kiosk at 2:30 PM.
- Excavated and compacted A Base and placed asphalt from 2:30 to 5:30 PM.
- During day, all casings north and east of the store were

checked. The casings at MW 75, 99, 100, 103, 116, 117 and control point at northwest corner were too low, and will require raising.

- A total of approximately 942 sq. feet of asphalt was placed during the day.

Thursday, June 6, 1991

- arrived on site at 7:45 AM.
- Zenith in process of excavating and compacting small area in front of Seasonal Centre (MW 66 to 68).
- Asphalted from 8:30 AM to 9:30 AM.
- Zenith began excavation on trench 3 at 10:00 AM (MW 118 to 53 to 179).
- Excavated until 1:45 PM, and then compacted until 3:00 PM.
- Asphalted from 3:15 PM to 5:30 PM.
- All A Base and asphalt compaction tested with a Nuclear Densometer.
- Zenith saw cut asphalt at MW 121, 122, and 123 in order to raise the low casings.
- Casings were raised and the patches asphalted.
- A total of approximately 845 sq. ft. of asphalt placed during the day.

Friday June 7, 1991

- Due to heavy rains during AM, Zenith did not begin until 10:00 AM
 - Excavated and compacted north south connection between trench 3 and trench 4, and trench 3 east from 10:30 AM to 2:15 PM (MW 180 to 171 to V9).
 - Zenith saw cut asphalt at remainder of monitoring wells which require the casings raised.
 - Asphalted trenches 3 and 4 from 2:30 PM to 4:00 PM.
 - Asphalted remainder of patches after casing were raised.
 - A total of approximately 480 sq. ft. of asphalt placed during the day.
 - Left for Winnipeg at 4:00 PM. Arrived in Winnipeg at 6:30 PM.
- * Note: An additional 80 sq.ft. of asphalt was placed under the direction of Mr. M. Dillabough. This asphalt was not related to the installation of the vapour extraction system.

APPENDIX B

INSPECTOR'S DAILY REPORT INSTALLATION OF REMAINDER OF VAPOUR EXTRACTION SYSTEM

Saturday June 15, 1991

- leave Winnipeg at 10:30 AM.
- arrive in Brandon at 1:00 PM.
- picked up pipe and insulation from storage compound and took to Canadian Tire Store.
- Rental equipment from Regent Rentals received at site.
- Arrange for 30 yards of A Base and 20 yards of Pea Gravel to be delivered to the site by Cumming & Dobbie.
- Unload all supplies into site office.
- Leave site at 4:30 PM.

Sunday June 16, 1991

- Arrive at site at 8:30 AM
- 260' of pipe installed and trench completed from MW 171 to east of MW 162.
- Compaction of granular A Base in trench tested with a nuclear densometer.
- Cumming & Dobbie crew left site at 6:15 PM.
- Left site at 7:30 PM.

Monday June 17, 1991

- Due to heavy rains overnight, trench was inundated with water.
- Arrived on site at 5:40 AM, and began to pump water from trench. Pumping completed at 7:30 AM.
- A Base was re-leveled with the aid of a loader from Cumming & Dobbie.
- A 12' long soft spot near MW 166 was removed to 8" from grade by Zenith Paving. New A Base was placed in this area and compacted.
- Entire trench was recompactd.
- Zenith paved from 11:00 AM to 2:00 PM.
- A total of 563 sq. ft. of asphalt placed.
- Arrived on site for night shift at 9:00 PM.
- 120' of pipe installed and trench completed during night (MW 53 to MW 148 and east of MW 162 to 183).
- Cumming & Dobbie crew left site at 4:00 AM.
- Left site at 6:00 AM.

Tuesday June 18, 1991

- Derek Trinke inspected the placement of asphalt from 7:00 AM to 9:30 AM. Tested compaction with Nuclear Densometer.
- A total of 363 sq. ft. of asphalt placed.
- Arrived on site for night shift at 9:00 PM.
- 175' of pipe installed and trench completed from MW 161 to 155.
- Compaction of granular A Base fill tested with a nuclear densometer.
- Cumming & Dobbie crew left site at 5:00 AM.
- Left site at 5:00 AM

Wednesday June 19, 1991

- Derek Trinke inspected the placement of asphalt from 7:00 AM to 9:00 AM.
- A total of 430 sq. ft. of asphalt placed.
- Arrived on site for night shift at 9:00 PM.
- 205' of pipe installed from MW 155 to 148.
- Compaction of granular A Base fill tested with a nuclear densometer.
- Cumming & Dobbie crew left site at 6:00 AM.
- left site at 6:00 AM.

Thursday June 20, 1991

- Derek Trinke inspected the placement of asphalt from 7:00 AM to 10:00 AM.
- A total of 510 sq. ft. of asphalt placed.
- MW 75 and MW 102 which had been previously buried with asphalt were uncovered, the casings raised and the patches re-asphalted.
- All rental equipment returned to Regent Rentals.
- Carried out survey of new top of pipe elevations.
- Left for Winnipeg at 4:30 PM.
- Arrived in Winnipeg at 7:00 PM.

APPENDIX C

SIEVE AND PROCTOR TEST RESULTS

On June 4, 1991, a sample of granular A Base was recovered from the stockpile at the Canadian Tire store in Brandon, Manitoba. The sample was shipped to our Winnipeg laboratory where a sieve analysis and Standard Proctor test were performed. The following test results were obtained:

1. Sieve Analysis

<u>SIEVE SIZE</u>	<u>PERCENT PASSING</u>	<u>SPECIFICATION</u>
1"	100.0	100
3/4"	98.5	---
1/2"	87.7	70 - 90
3/8"	80.2	---
#4	62.1	40 - 75
#10	47.6	20 - 55
#40	24.5	10 - 35
#100	11.2	---
#200	9.3	5 - 15

2. Standard Proctor Test

Maximum Density: 2160 kg/cu.m.
Optimum Moisture: 8.4 %
Proctor Type: Standard

APPENDIX D

COMPACTION TEST RESULTS ASPHALTING OF TRENCHES INSTALLED NOV. 1990

The following test results were obtained from June 4 to 7, 1991 at the Canadian Tire Store in Brandon, Manitoba with the aid of a Nuclear densometer:

A Base

<u>Test No.</u>	<u>Test Location</u>	<u>Percent Moisture</u>	<u>Dry Density (kg/cu.m)</u>	<u>Percent Compaction</u>
June 4, 1991				
1	2' W of MW141	6.2	1997	92.4
2	5' W of MW138	7.2	2142	99.2
3	10' E of MW136	6.7	2119	98.1
4	10' SE of Control Point	7.3	2026	93.8
5	2' W of MW132	7.7	2125	98.4
June 5, 1991				
6	4' W of MW58	5.9	2020	93.5
7	2' E of MW61	5.2	2064	95.6
8	4' N of MW64	5.8	2046	94.7
9	5' W of MW107	6.3	2030	94.0
10	2' E of MW109	6.0	2072	95.9
11	6' E of MW112	5.8	2051	95.0
12	2' S of Gas Kiosk	5.9	2039	94.4
June 6, 1991				
13	8' N of MW53	5.6	2120	98.2

<u>Test No.</u>	<u>Test Location</u>	<u>Percent Moisture</u>	<u>Dry Density (kg/cu.m)</u>	<u>Percent Compaction</u>
14	10' W of MW174	6.0	2157	99.9
15	2' W of MW177	6.6	2117	98.1
16	2' E of MW179	6.3	2100	97.2

June 7, 1991

17	30' E of MW186	6.4	2283	105.7
18	10' W of MW172	5.8	2070	95.8
19	15' S of Control Point	6.9	2091	96.8

Maximum Dry Density	2160 Kg/ cu.m
Optimum Moisture	8.4 %
Specified Compaction	95 %
Proctor Type	Standard

ASPHALT

<u>Test No.</u>	<u>Test Location</u>	<u>Corrected Density (kg/cu.m)</u>	<u>Percent Compaction</u>
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June 4, 1991

1	10' W of MW132	2210	94.1
2	Retest of area 1	2262	96.3
3	3' W of MW134	2242	95.5
4	Retest of area 3	2268	96.6
5	10' NW of MW143	2146	91.4
6	Retest of area 5	2189	93.2
7	10' E of MW138	2250	95.8

Appendix D

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<u>Test No.</u>	<u>Test Location</u>	<u>Corrected Density (kg/cu.m)</u>	<u>Percent Compaction</u>
8	10' E of MW140	2211	94.2
9	Retest of area 8	2261	96.3
June 5, 1991			
10	2' E of MW64	2180	92.8
11	4' W of MW61	2162	92.1
12	2' W of MW58	2146	91.4
13	Retest of area 10	2228	94.9
14	Retest of area 11	2220	94.5
15	Retest of area 12	2209	94.1
16	5' W of MW107	2219	94.5
17	6' E of MW109	2250	95.8
18	2' W of MW112	2220	94.6
June 6, 1991			
19	2' W of MW67	2258	96.2
20	17' S of MW53	2235	95.2
21	5' E of MW173	2218	94.5
22	2' W of MW175	2229	94.9
23	2' W of MW177	2220	94.5
24	Retest of area 21	2272	96.8
25	10' E of MW178	2260	96.3

<u>Test No.</u>	<u>Test Location</u>	<u>Corrected Density (kg/cu.m)</u>	<u>Percent Compaction</u>
26	5' W of MW180	2300	98.0
June 7, 1991			
27	8' E of MW186	2248	95.7
28	14' W of MW172	2318	98.7
29	22' S of MW171	2280	97.1

Material Type: Asphalt
Marshall Density 2348 kg/cu.m.
Specified Compaction: 96 %

APPENDIX E

COMPACTION TEST RESULTS
COMPLETION OF VAPOUR EXTRACTION SYSTEM TRENCHES
STAGE 2 - 1991

The following test results were obtained from June 16 to 20, 1991 at the Canadian Tire Store in Brandon, Manitoba with the aid of a nuclear densometer:

A Base

<u>Test No.</u>	<u>Test Location</u>	<u>Percent Moisture</u>	<u>Dry Density (kg/cu.m)</u>	<u>Percent Compaction</u>
June 16, 1991				
1	3' E of MW170 10" below grade	6.8	2008	93.0
2	10' W of MW167 10" below grade	6.2	1959	90.7
3	10' W of MW169 10" below grade	6.6	1955	90.5
4	15' W of MW169 2" below grade	6.4	1994	92.3
5	5' W of MW171 2" below grade	6.5	1936	89.1
6	2' E of MW164 2" below grade	6.7	2018	93.4
7	retest of area 5	6.0	2021	93.6
June 18, 1991				
8	12' SW of MW162 8" below grade	9.0	1954	90.5
9	retest of area 8	8.1	1987	92.0
10	10' S of MW148 8" below grade	7.6	1981	91.7

<u>Test No.</u>	<u>Test Location</u>	<u>Percent Moisture</u>	<u>Dry Density (kg/cu.m)</u>	<u>Percent Compaction</u>
11	retest of area 10	7.4	1995	92.4
12	20' S of MW 148 2" below grade	8.1	2028	93.9
13	5' N of MW 53 2" below grade	7.9	2004	92.8
14	17' SW of MW162 2" below grade	7.6	1989	92.1
June 19, 1991				
15	10' W OF MW161 8" below grade	7.1	2121	98.2
16	15' E of MW156 8" below grade	6.2	2095	97.0
17	10' E of MW160 2" below grade	6.4	2142	99.2
18	10' E of MW158 2" below grade	6.6	2117	98.0
19	4' W of MW157 2" below grade	6.6	2149	99.5
June 20, 1991				
20	10' E of MW147 2" below grade	6.8	2072	95.9
21	5' E of MW152 2" below grade	6.1	2087	96.6
22	10' W of MW155 2" below grade	7.0	2090	96.8

Maximum Dry Density: 2160 Kg/ cu.m Specified Compaction: 95 %
Optimum Moisture: 8.4% Proctor Type: Standard

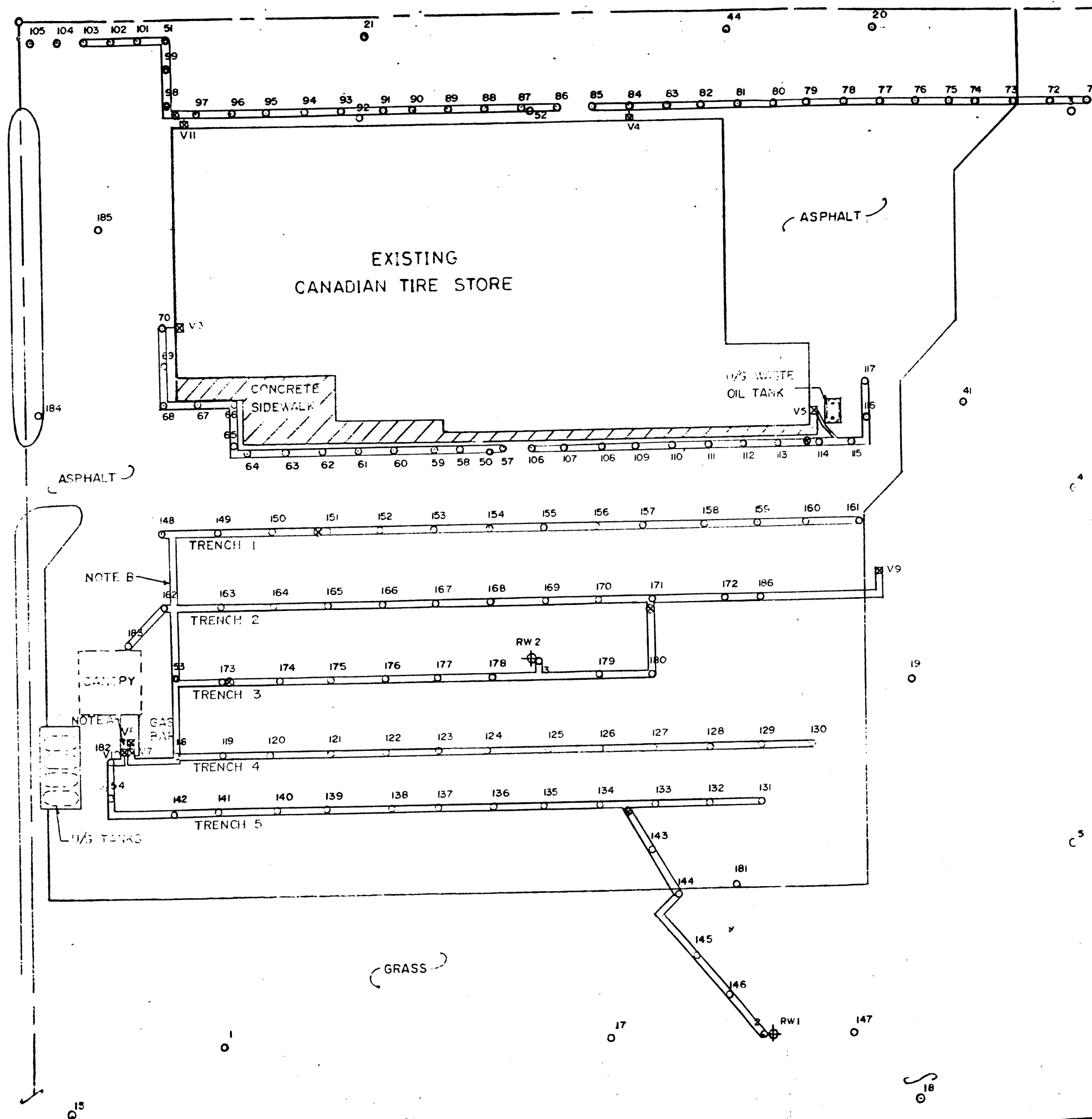
Asphalt

<u>Test No.</u>	<u>Test Location</u>	<u>Corrected Density (kg/cu.m)</u>	<u>Percent Compaction</u>
June 17, 1991			
1	10' E of MW169	2128	90.6
2	6' E of MW170	2228	94.9
3	Retest of area 1	2219	94.5
4	10' E of MW167	2178	92.7
5	2' E of MW166	2260	96.2
6	5' E of MW163	2259	96.2
7	Retest of area 4	2222	94.6
June 18, 1991			
8	10' NE of MW183	2235	95.1
9	17' N of MW162	2260	96.3
10	5' N of MW53	2254	96.0
11	Retest of area 8	2272	96.8
June 19, 1991			
12	15' E of MW168	2221	94.6
13	Retest of area 12	2350	100.1
14	5' E of MW170	2307	98.3
15	Retest of area 14	2450	104.3
16	5' W of MW172	2386	101.6
17	Retest of area 13	2420	103.1

<u>Test No.</u>	<u>Test Location</u>	<u>Corrected Density (kg/cu.m)</u>	<u>Percent Compaction</u>
June 20, 1991			
18	10' E of MW148	2272	96.8
19	10' E of MW150	2238	95.3
20	10' W of MW154	2263	96.4

Material Type: Asphalt
Marshall Density 2348 kg/cu.m.
Specified Compaction: 96 %

18th STREET



NOTE A - V10 MOVED FROM FORMER LOCATION TO TOP OF GAS BAR AS OUTLINED IN REPORT.
NOTE B - NEW TRENCHES INSTALLED AS OUTLINED IN REPORT.

LEGEND

- MONITORING WELL
- ⊕ RECOVERY WELL
- ⊗ VAPOR EXTRACTION UNIT
- CONTROL POINT

**Geokwan
Environmental Ltd**

SITE REMEDIATION STAGE 1 & 2
VAPOR EXTRACTION
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

SCALE: 1"=60'

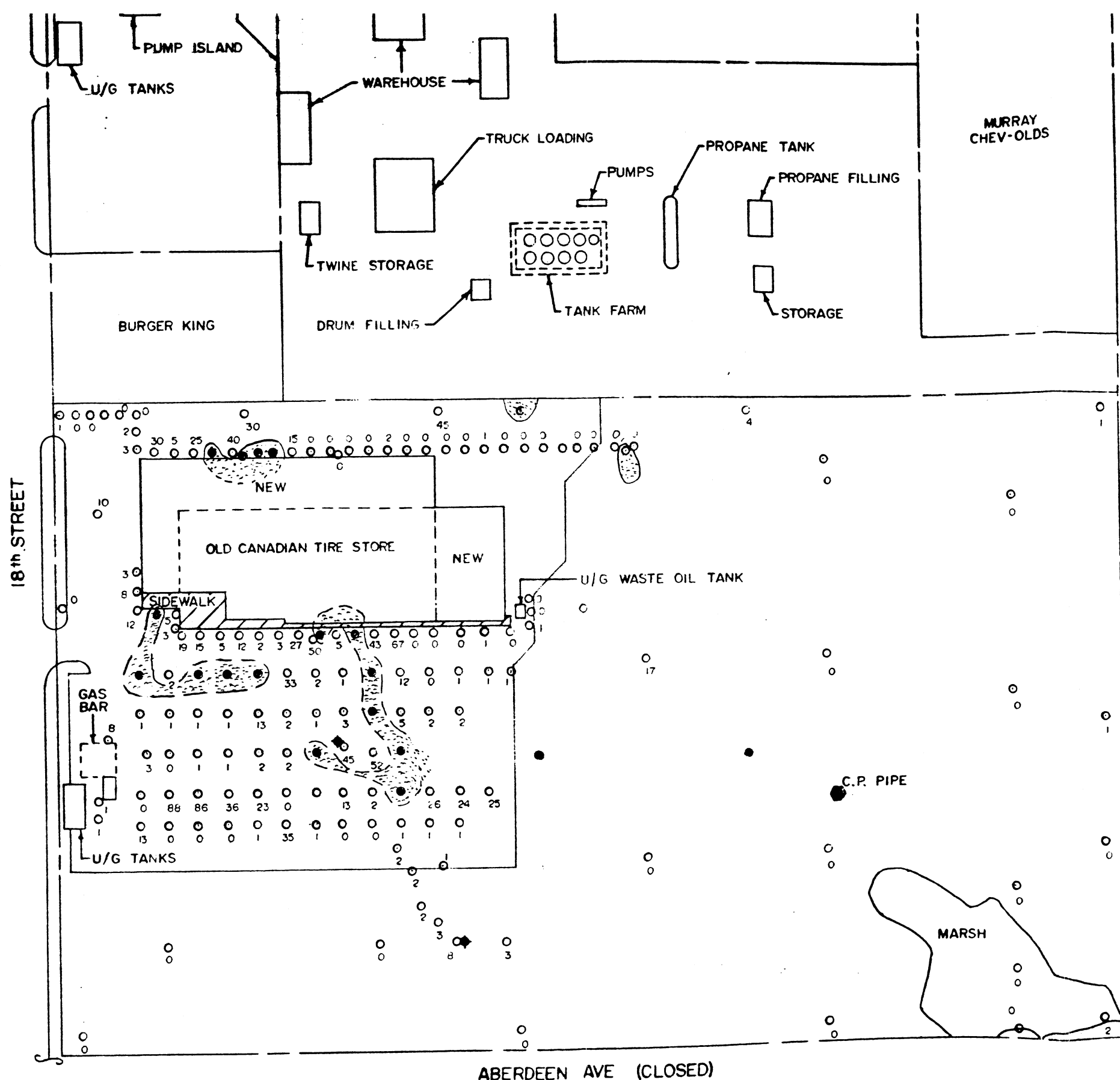
MADE: RK

PLATE: PR4-1

DATE: DEC 6/90

CHKD: WK

JOB: E 238 & E 239



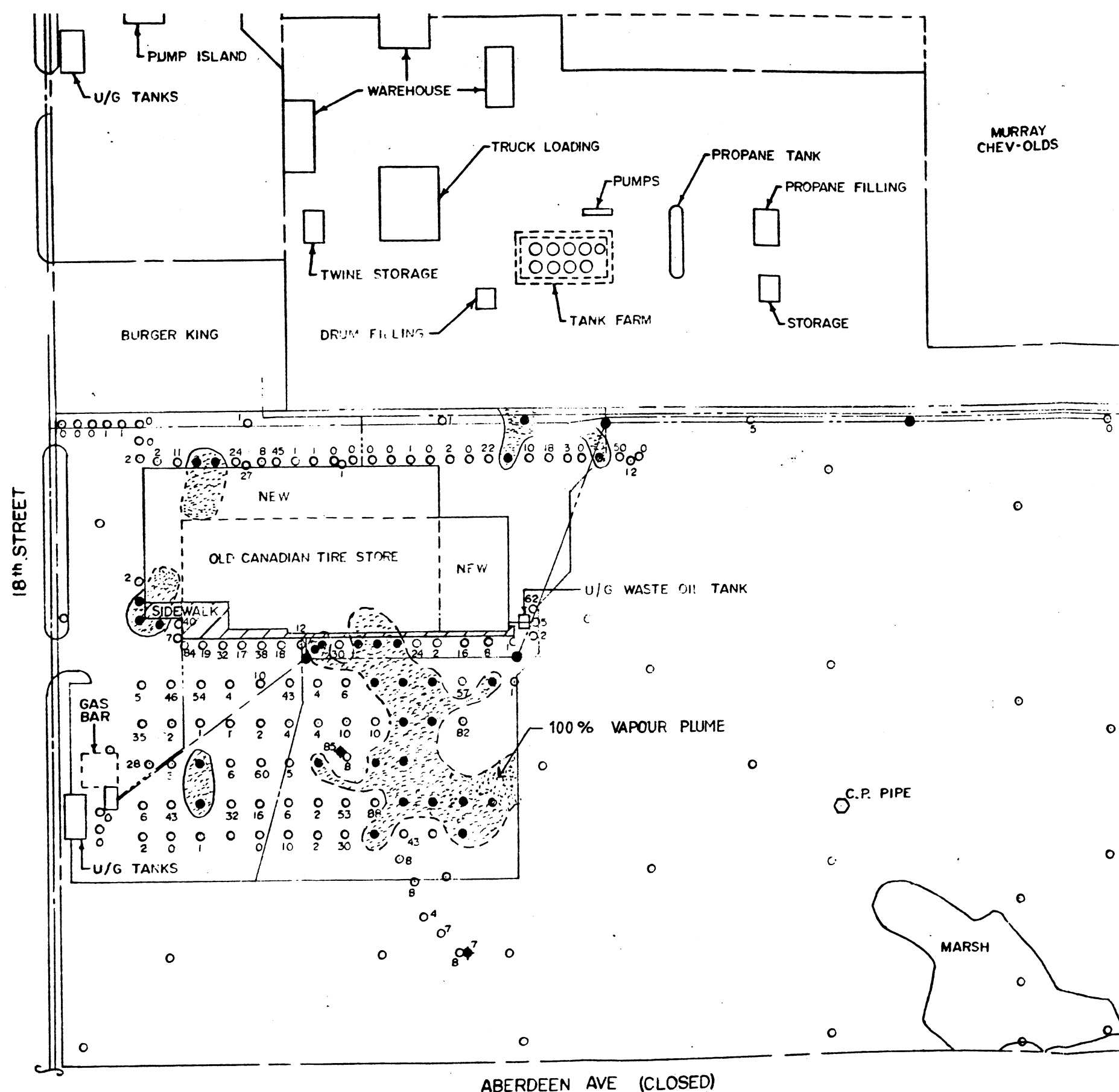
LEGEND

- MONITORING WELL
- ◆ RECOVERY WELL
- VAPOUR PIPE INSTALLED BY OTHERS
- REPRESENTS 100% LEL
- ¹⁷ REPRESENTS 17% LEL

**Geokwan
Environmental Ltd**

SOIL VAPOUR DISTRIBUTION (% LEL) - JUNE 11-13/91
CANADIAN TIRE CORPORATION LTD.
18TH STREET & ABERDEEN AVENUE
BRANDON, MANITOBA

SCALE: 1" = 120'	DATE: June 19/91	MADE: RK	CHKD: WK	JOB: E238 & E239	PLATE: PR4-1A
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LEGEND

- MONITORING WELL
- ◆ RECOVERY WELL
- SEWER
- WATER MAIN
- W.W. SEWER
- GAS
- HYDRO
- MH
- REPRESENTS 100% LEL
- REPRESENTS 45% LEL

NOTE: NO READINGS WERE TAKEN IN THE SWAMP AREA TO THE EAST OF THE PARKING LOT ON THIS TRIP. THEREFORE THE VAPOUR PLUME CANNOT BE SHOWN IN THAT AREA.

**Geokwan
Environmental Ltd**

SOIL VAPOUR DISTRIBUTION (%LEL)
MEASURED AUGUST 22-23/91
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

SCALE: 1" = 120'

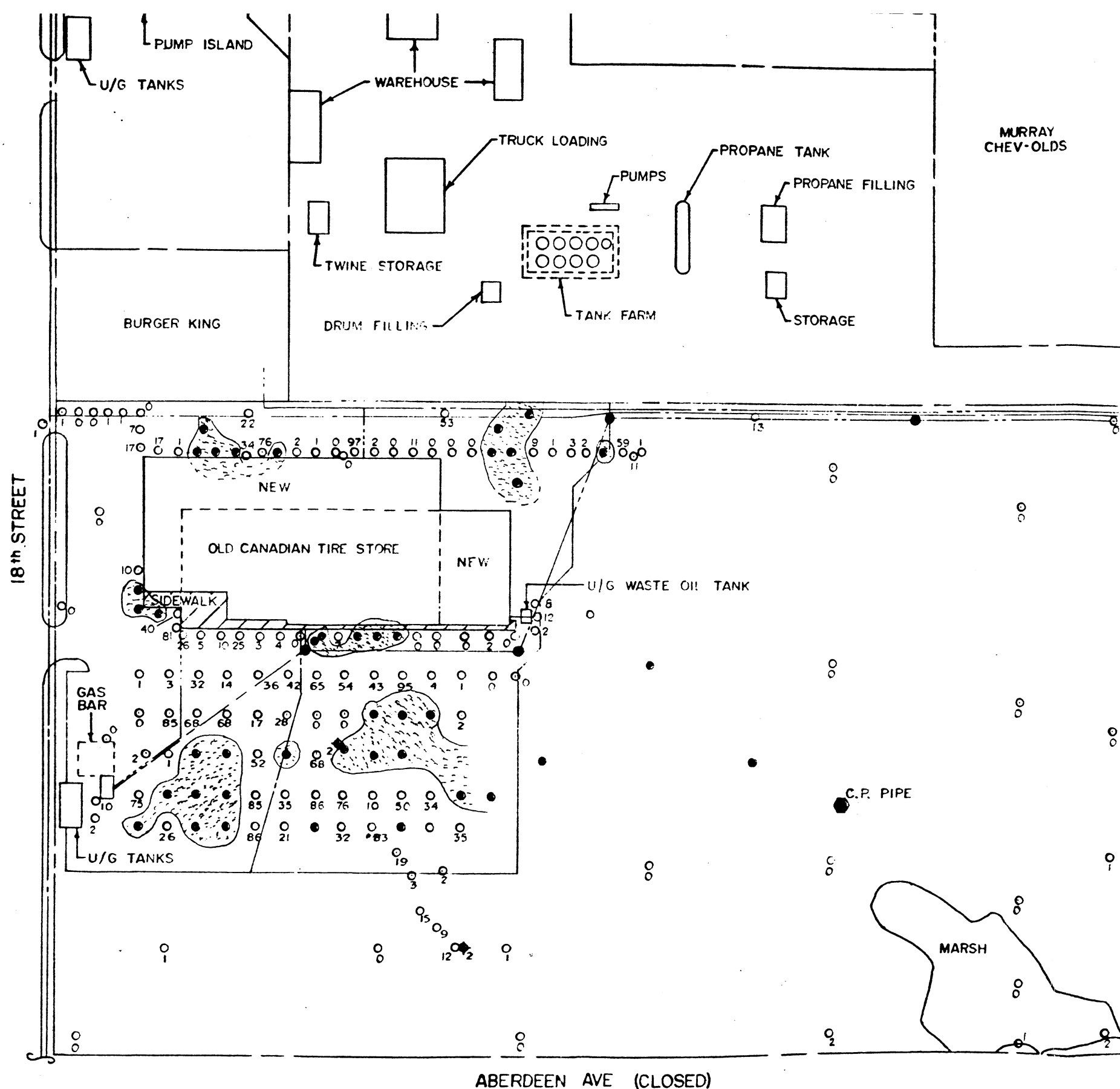
DATE: 01/07/91

MADE: JDT

CHKD: WK

JOB: E238
E239

PLATE: PR4-1B



LEGEND

- MONITORING WELL
- ◆ RECOVERY WELL

- SEWER
- WATER MAIN
- W.W. SEWER
- GAS
- HYDRO

**Geokwan
Environmental Ltd**

SOIL VAPOUR DISTRIBUTION (%LEL) - SEPT 29-30/91
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

SCALE: 1"=120'

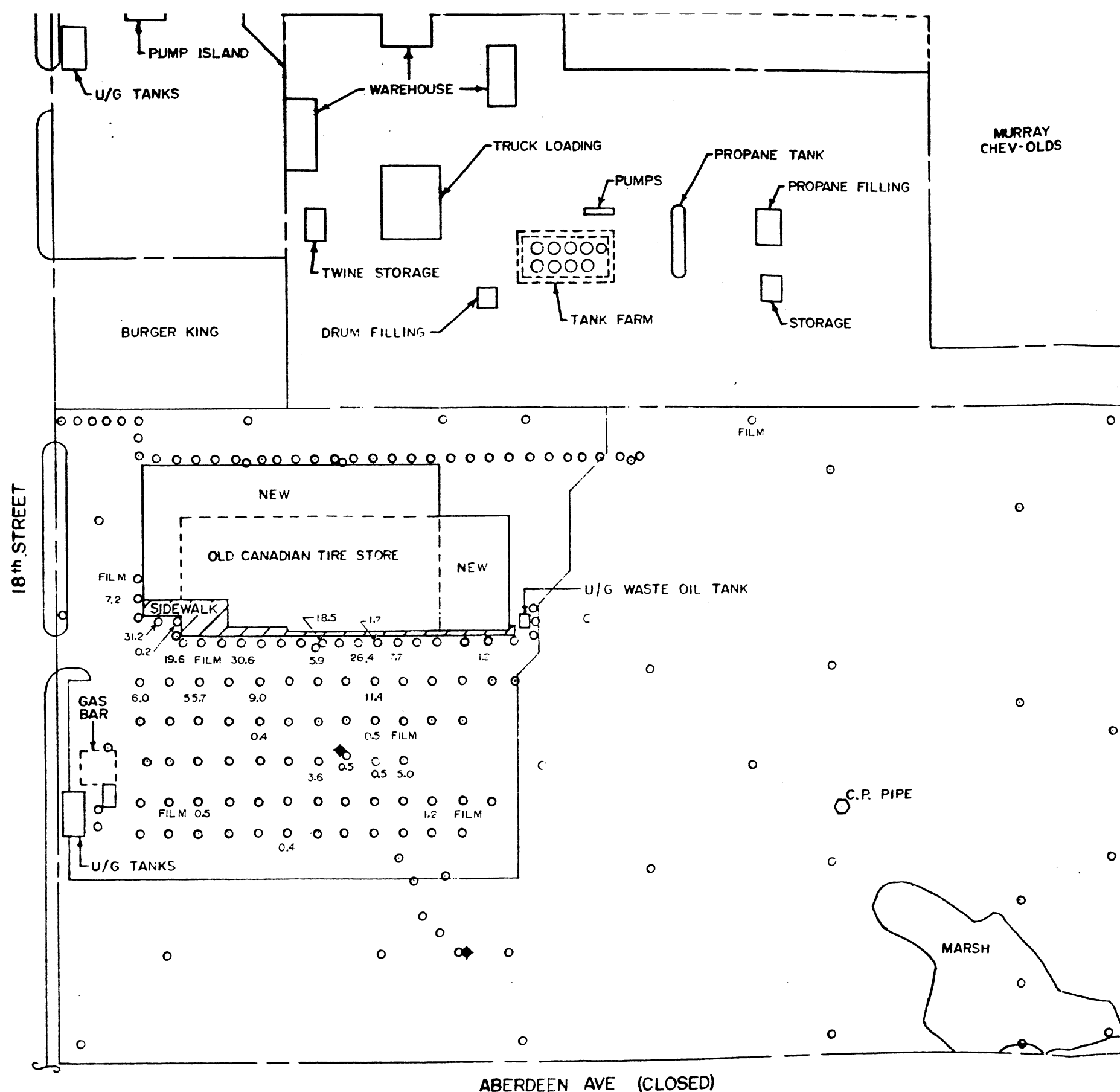
DATE: 01/07/91

MADE: JDT

CHKD: WK

JOB: E238
E239

PLATE: PR4-JC



**Geokwan
Environmental Ltd**

FREE PHASE HYDROCARBON THICKNESS (INCHES)
MEASURED JUNE 11 - 13, 1991
CANADIAN TIRE CORPORATION LTD.
18TH STREET & ABERDEEN AVENUE
BRANDON, MANITOBA

SCALE: 1" = 120'

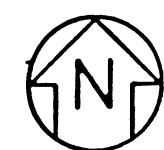
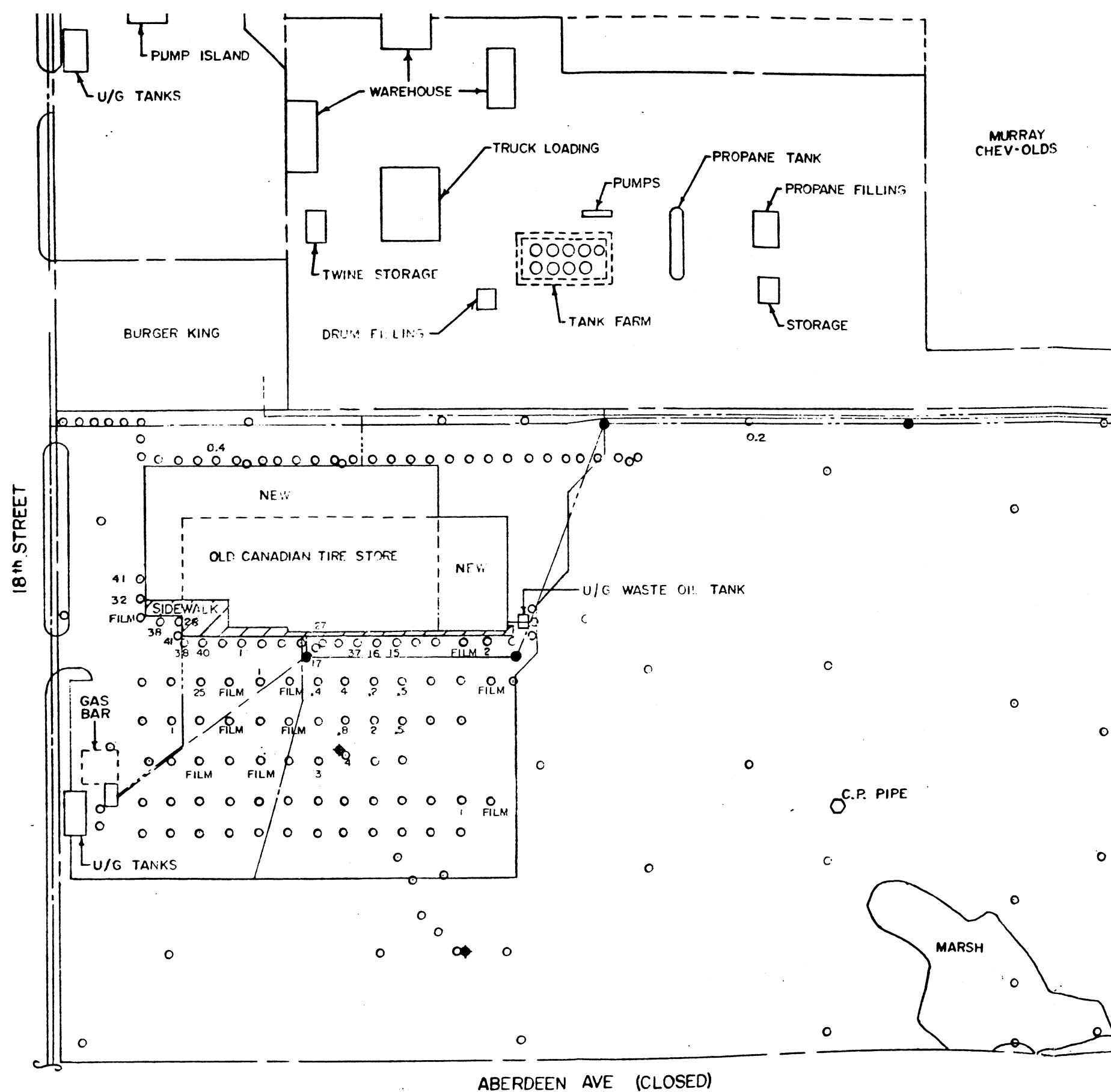
DATE: June 19/91

MADE: RK

CHKD: WK

JOB: E238 & E239

PLATE: PR4-2A



LEGEND

- MONITORING WELL
- ◆ RECOVERY WELL

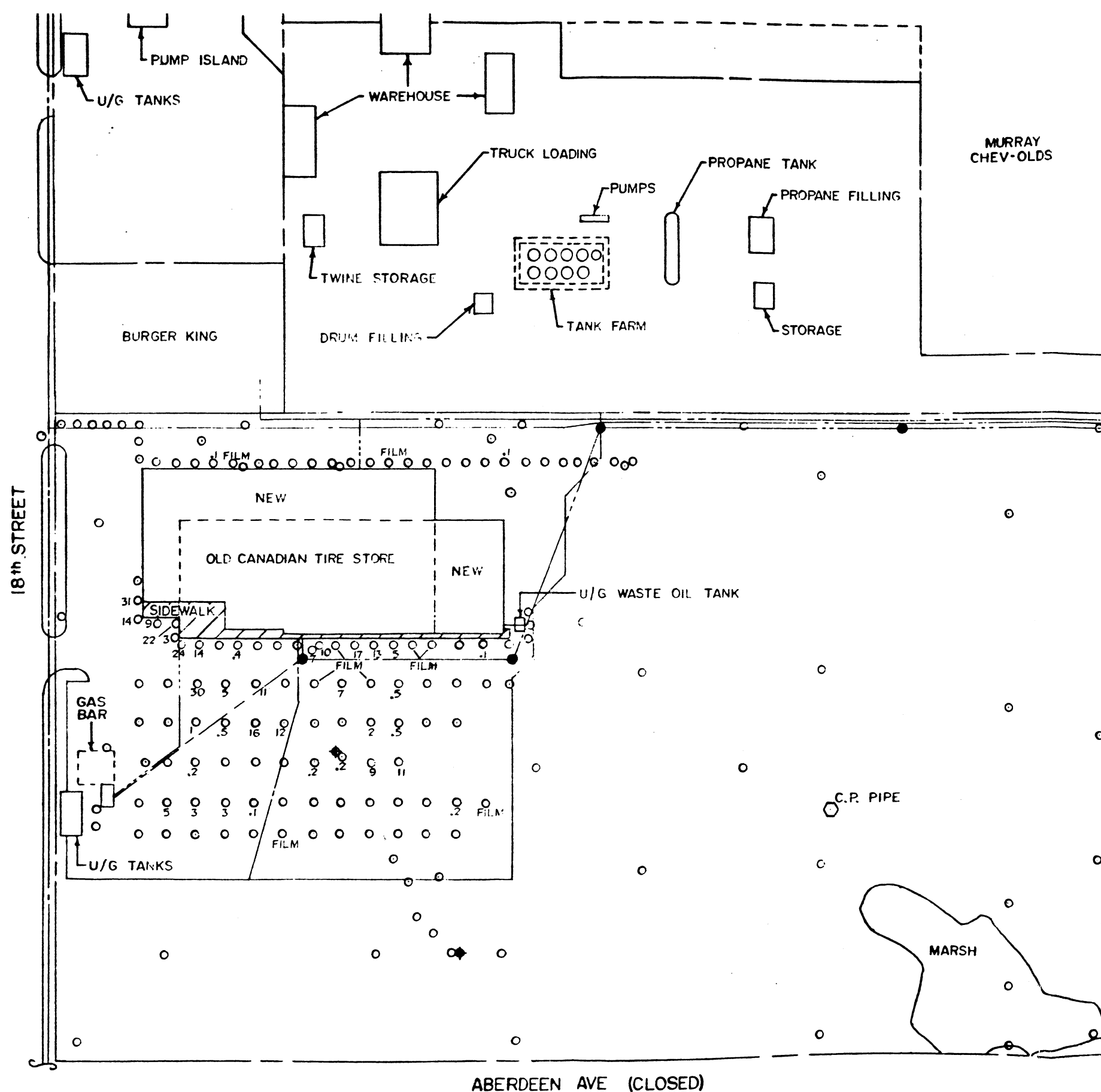
- SEWER
- WATER MAIN
- W.W. SEWER
- GAS
- HYDRO

NOTE: FILM = THICKNESS LESS THAN 0.1"

**Geokwan
Environmental Ltd**

HYDROCARBON THICKNESS (INCHES)
MEASURED AUG. 22-23/91
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

SCALE: 1"=120'	DATE: 01/07/91	MADE: JDT	CHKD: WK	JOB: E 238 E 239	PLATE: PR4-2B
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LEGEND

- MONITORING WELL
- ◆ RECOVERY WELL
- SEWER
- WATER MAIN
- ... W.W. SEWER
- - - GAS
- - - HYDRO

**Geokwan
Environmental Ltd**

HYDROCARBON THICKNESS (INCHES) - SEPT 29-30/91
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

SCALE: 1"=120'

DATE: 01/07/91

MADE: JDT

CHKD: WK

JOB: E238
E239

PLATE: PR4-2C

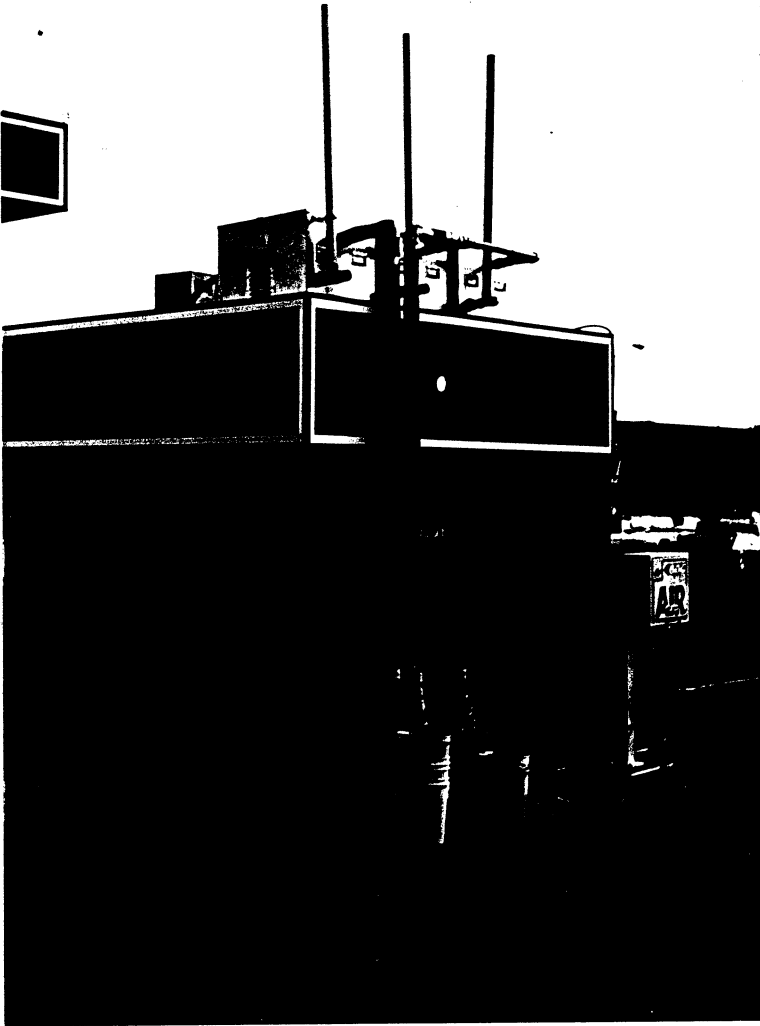


PLATE PR4-3

Vapour Extraction Units
V7, V8 & V10, Stage 2
on the roof of kiosk.
Sept/91.

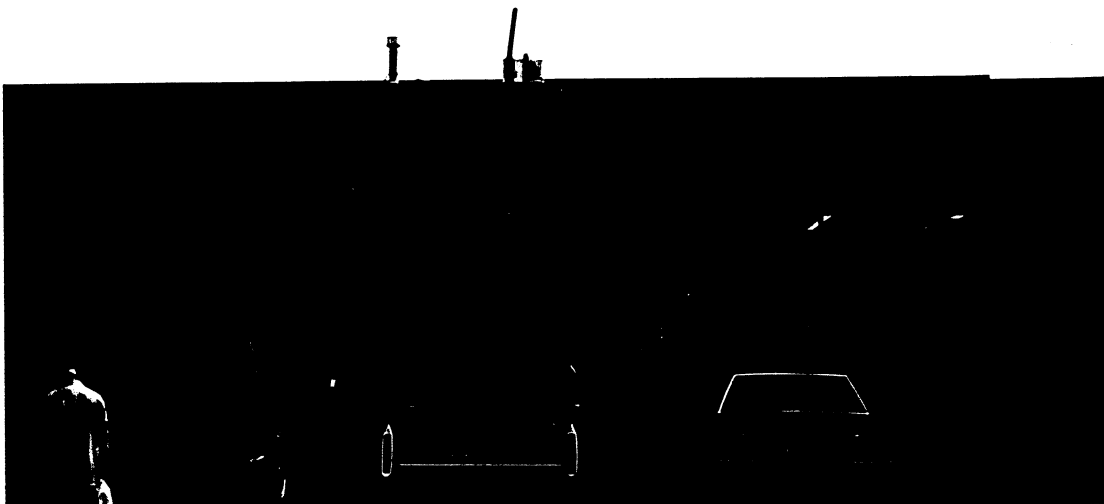


PLATE PR4-4

Vapour Extraction Unit V3
on the roof of seasonal centre. Sept/91

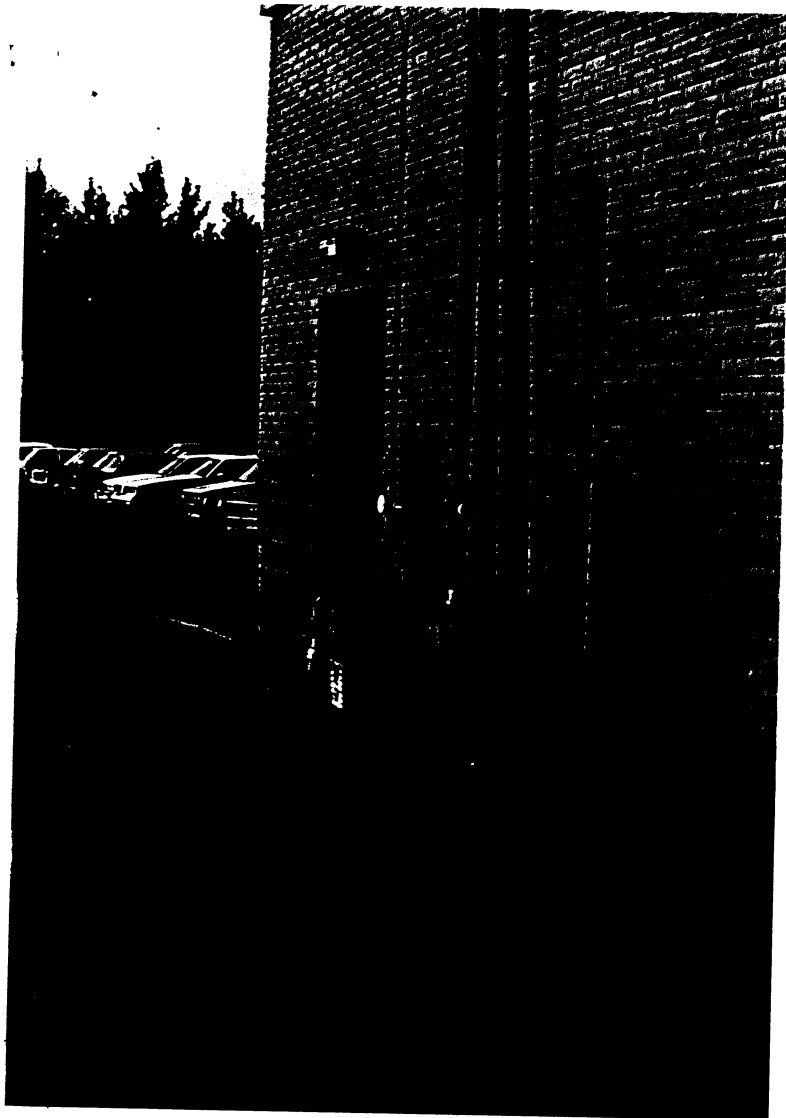


PLATE PR4-5

Vapour Extraction Unit V5
Southeast Corner of Service
Centre. Sept/91

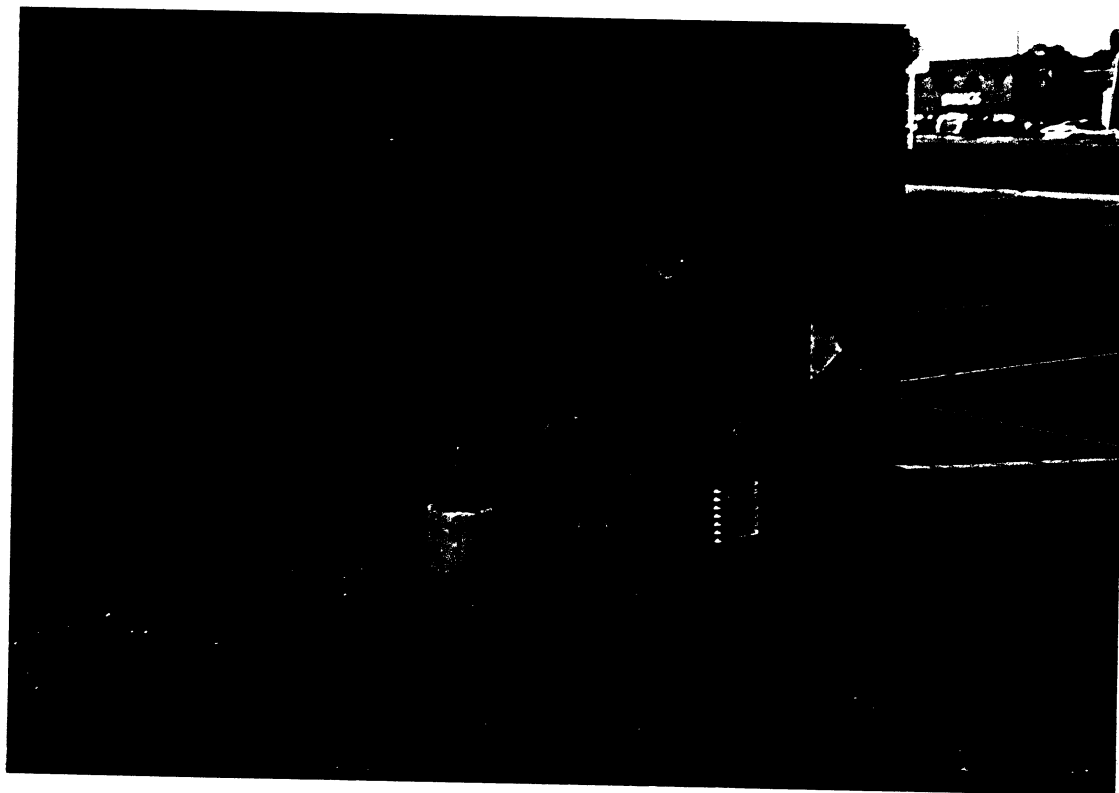


PLATE PR4-6 Vapour Extraction Unit V11
Northwest Corner of Store. Sept/91

October 3, 1991

TABLE A - STAGE 1

E238

SITE REMEDIATION - STAGE 1
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Dec 11-14/90	Elev. (ft) / Sep 29-30/91	Depth to Ground June 11-13/91	Water Table (ft) Aug 22-23/91
50	2.05	5.30 / 8.03	6.88 / 6.45	5.22 / 8.11
57	3.45	6.01 / 7.39	6.05 / 7.35	4.52 / 8.88
58	3.52	5.76 / 7.55	7.35 / 5.96	6.56 / 6.75
59	3.48	5.76 / 7.50	7.33 / 5.93	6.48 / 6.78
60	3.45	5.73 / 7.50	7.30 / 5.93	6.41 / 6.82
61	3.54	5.70 / 7.48	5.05 / 8.13	6.40 / 6.78
62	3.62	5.75 / 7.34	7.32 / 5.77	6.43 / 6.66
63	2.57	4.61 / 8.56	7.30 / 5.87	3.62 / 9.55
64	2.91	4.00 / 9.11	5.94 / 7.17	3.79 / 9.32
65	2.92	5.42 / 7.80	7.42 / 5.80	3.63 / 9.59
66	2.70	3.86 / 8.93	6.92 / 5.87	3.86 / 8.93
67	3.58	4.96 / 7.99	5.06 / 7.89	3.76 / 9.19
68	3.18	5.78 / 7.03	7.22 / 5.59	6.42 / 6.39
69	4.06	4.69 / 8.11	6.54 / 6.26	4.13 / 8.67
70	4.02	3.66 / 9.06	10.21 / 2.51	3.56 / 9.16
71	2.53	2.83 / 6.36	8.87 / 0.32	7.06 / 2.13
72	3.79	4.06 / 5.86	9.16 / 0.76	4.70 / 5.22

Note:

5.30/8.03: 5.03 = groundwater elevation (add 1280.0 ft). 8.03 = depth to ground water table from ground surface.

SITE REMEDIATION - STAGE 1
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
73	3.76	4.48 / 6.35	8.43 / 2.40	5.20 / 5.63
74	4.17	5.00 / 5.50	7.58 / 2.92	5.42 / 5.08
75	4.11	5.26 / 5.24	---	5.47 / 5.03
76	4.21	5.35 / 5.36	7.13 / 3.58	5.57 / 5.14
77	4.18	5.35 / 5.77	7.26 / 3.86	5.66 / 5.46
78	4.30	5.42 / 6.16	7.20 / 4.38	5.78 / 5.80
79	4.32	5.58 / 6.22	8.26 / 3.54	6.43 / 5.37
80	4.78	6.82 / 5.18	9.62 / 2.38	7.16 / 4.84
81	4.94	7.08 / 5.21	9.53 / 2.76	8.56 / 3.73
82	5.38	7.21 / 5.46	9.59 / 3.08	8.52 / 4.15
83	5.29	7.36 / 5.35	9.21 / 3.50	8.31 / 4.40
84	5.54	7.36 / 5.32	9.32 / 3.36	8.82 / 3.86
85	6.18	7.47 / 5.16	9.20 / 3.43	8.08 / 4.55
86	6.32	7.25 / 5.47	8.24 / 4.48	7.88 / 4.84
87	5.63	6.99 / 5.76	8.09 / 4.66	7.83 / 4.92
88	5.34	6.52 / 6.35	7.75 / 5.12	7.54 / 5.33
89	5.26	6.23 / 6.69	6.97 / 5.95	7.73 / 5.19
90	4.58	5.75 / 7.25	5.88 / 7.12	6.52 / 6.48
91	4.59	5.64 / 7.39	5.85 / 7.18	6.40 / 6.63

SITE REMEDIATION - STAGE 1
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
92	4.40	5.56 / 7.50	5.64 / 7.42	7.23 / 5.83
93	4.44	5.44 / 7.57	5.62 / 7.39	6.45 / 6.56
94	4.03	5.32 / 7.60	5.74 / 7.18	6.27 / 6.65
95	4.28	5.28 / 7.56	5.82 / 7.02	5.96 / 6.88
96	4.24	5.22 / 7.51	5.80 / 6.93	5.76 / 6.97
97	4.26	5.21 / 7.30	5.81 / 6.70	5.76 / 6.75
98	4.42	5.18 / 6.74	5.76 / 6.16	5.78 / 6.14
99	4.09	5.11 / 6.26	5.63 / 5.74	5.55 / 5.82
51	3.93	4.97 / 6.26	5.39 / 5.84	5.39 / 5.84
101	3.97	4.95 / 5.92	5.37 / 5.50	5.40 / 5.47
102	3.83	5.01 / 5.75	---	5.55 / 5.21
103	4.22	4.98 / 5.69	5.44 / 5.23	8.70 / 1.97
104	3.92	5.01 / 5.76	5.46 / 5.31	5.40 / 5.37
105	3.97	5.03 / 5.90	5.46 / 5.47	5.41 / 5.52
106	3.56	5.79 / 7.62	7.34 / 6.07	6.41 / 7.00
107	2.86	4.46 / 8.90	5.46 / 7.90	3.88 / 9.48
108	3.19	5.09 / 8.27	7.27 / 6.09	5.33 / 8.03
109	3.75	4.84 / 8.49	6.65 / 6.68	5.23 / 8.10
110	3.50	5.53 / 7.75	7.20 / 6.08	5.98 / 7.30

SITE REMEDIATION - STAGE 1
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
111	3.40	5.50 / 7.70	7.13 / 6.07	5.91 / 7.29
112	3.37	5.50 / 7.72	7.06 / 6.16	5.88 / 7.34
113	3.30	5.49 / 7.67	6.92 / 6.24	5.68 / 7.48
114	3.30	5.57 / 7.31	6.77 / 6.11	6.29 / 6.59
115	3.14	5.53 / 6.90	6.70 / 5.73	6.67 / 5.76
116	3.57	5.70 / 6.29	7.03 / 4.96	7.00 / 4.99
117	3.84	5.85 / 6.04	7.58 / 4.31	6.49 / 5.40

October 3, 1991

TABLE A - STAGE 2

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SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
1	--	10.16 / 5.79	10.48 / 5.67	---
2	6.95*	2.97 / 6.76	4.89 / 4.84	3.97 / 5.76
3	3.06	3.82 / 5.18	4.41 / 4.59	3.75 / 5.25
4	--	6.04 / 3.35	8.56 / 0.73	---
5	--	4.99 / 4.37	6.28 / 3.08	---
6	--	4.19 / 1.49	5.15 / 0.53	---
7	--	3.18 / 4.93	3.49 / 4.62	---
8	--	2.25 / 5.68	2.33 / 5.60	---
9	--	1.94 / 6.15	1.94 / 6.15	---
10	--	1.81 / 4.89	1.84 / 4.86	---
11	--	2.59 / 3.46	4.31 / 1.74	---
12	--	4.05 / 1.54	5.15 / 0.44	---
13	3.48	5.74 / 6.85	7.52 / 5.07	6.10 / 6.49
15	--	10.59 / 11.38	10.26 / 11.71	---
17	--	4.00 / 6.90	4.52 / 6.38	---

Notes:

10.86 / 5.09: 10.86 = ground water elvation (add 1280.0 ft.).
5.09 = depth to ground water table from ground surface.

* - add 1270.0 ft. to ground water elevation.

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
18	--	4.57 / 8.45	---	---
19	2.95	5.64 / 2.99	7.17 / 2.58	---
20	3.54	4.81 / 6.49	5.83 / 5.47	5.26 / 6.04
21	4.01	5.22 / 7.28	5.52 / 6.98	5.69 / 6.81
22	1.07	2.46 / 6.92	2.60 / 6.78	2.62 / 6.76
23	--	1.79 / 7.59	1.72 / 7.66	2.15 / 7.23
25	--	1.79 / 4.61	1.79 / 4.61	---
27	--	2.52 / 6.17	2.80 / 5.89	---
29	--	3.90 / 3.14	5.20 / 1.84	---
30	--	3.80 / 1.10	5.45 / 0.55	---
32	--	4.23 / 4.59	5.43 / 3.39	---
38	--	4.65 / 5.50	6.15 / 4.00	---
41	3.56	---	---	---
44	--	6.66 / 5.01	7.87 / 3.80	7.33 / 4.34
52	5.66	7.12 / 5.67	8.25 / 4.54	7.75 / 5.04
53	6.84	9.71 / 5.42	10.52 / 4.61	10.60 / 4.53
54	8.35	11.03 / 6.39	10.50 / 6.92	11.68 / 5.74
118	8.00	10.02 / 6.05	11.38 / 4.69	12.90 / 3.17
119	7.06	8.91 / 6.68	10.74 / 4.85	10.56 / 5.03

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
120	6.82	8.71 / 6.52	10.62 / 4.61	9.30 / 5.93
121	6.31	8.36 / 6.15	10.62 / 3.89	9.95 / 4.56
122	4.94	8.26 / 5.64	10.11 / 3.79	9.70 / 4.20
123	5.38	7.62 / 5.90	9.68 / 3.84	9.46 / 4.06
124	4.55	6.75 / 6.45	---	8.87 / 4.33
125	3.83	5.95 / 6.85	7.87 / 4.93	7.09 / 5.71
126	3.54	5.70 / 6.78	7.39 / 5.09	6.30 / 6.18
127	3.41	5.60 / 6.57	7.22 / 4.95	8.10 / 5.93
128	3.28	5.54 / 6.28	6.88 / 4.94	5.56 / 6.26
129	3.08	5.39 / 6.08	6.78 / 4.69	5.76 / 5.71
130	2.94	5.43 / 5.69	6.64 / 4.48	9.53 / 1.59
131	2.95	5.33 / 6.45	6.71 / 5.07	5.09 / 6.69
132	3.13	----**	7.06 / 4.96	--- **
133	3.22	5.52 / 6.81	7.26 / 5.07	5.82 / 6.51
134	--	5.57 / 7.18	7.56 / 5.20	6.07 / 6.69
135	4.14	6.73 / 6.47	8.30 / 4.90	7.56 / 5.64
136	4.58	----**	9.03 / 4.60	8.37 / 5.26
137	4.85	7.67 / 6.37	9.70 / 4.34	8.77 / 5.27
138	5.99	8.15 / 6.30	10.11 / 4.34	9.19 / 5.26

** - Monitoring well is plugged. No reading could be taken.

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
139	6.24	8.77 / 6.21	10.67 / 4.31	10.08 / 4.90
140	6.39	8.86 / 6.68	10.77 / 4.77	8.91 / 6.63
141	7.62	10.51 / 5.76	11.19 / 5.08	13.89 / 2.38
142	8.22	10.51 / 6.35	10.73 / 6.13	10.40 / 6.46
143	--	5.30 / 7.34	7.16 / 5.48	5.59 / 7.05
144	2.38	4.22 / 8.15	6.00 / 6.37	4.28 / 8.09
145	1.82	3.32 / 7.51	5.44 / 5.39	3.74 / 7.09
146	1.81	3.42 / 6.58	4.91 / 5.09	3.80 / 6.20
147	2.45	4.48 / 5.31	5.50 / 4.29	---
148	5.01	8.66 / 5.05	8.71 / 5.00	9.34 / 4.37
149	4.24	6.69 / 6.67	8.12 / 5.14	8.14 / 5.12
150	--	3.90 / 9.19	3.58 / 9.51	4.52 / 8.57
151	2.68	5.54 / 7.40	7.45 / 5.49	6.27 / 6.67
152	3.54	4.83 / 8.02	6.85 / 6.00	5.58 / 7.27
153	3.47	5.46 / 7.30	7.43 / 5.33	5.99 / 6.77
154	3.43	5.58 / 7.08	7.48 / 5.18	6.06 / 6.60
155	3.37	5.04 / 7.54	7.32 / 5.26	5.76 / 6.82
156	3.41	5.84 / 6.59	6.55 / 5.88	6.21 / 6.22
157	2.87	5.19 / 7.11	7.18 / 5.12	5.15 / 7.15

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
158	3.02	5.56 / 6.41	6.99 / 4.98	5.53 / 6.44
159	2.95	5.50 / 6.10	6.85 / 4.75	5.15 / 6.45
160	2.92	5.28 / 6.00	6.84 / 4.44	5.25 / 6.03
161	--	5.43 / 5.49	6.77 / 4.10	---
162	6.75	9.62 / 4.95	10.29 / 4.28	10.57 / 4.00
163	5.54	7.61 / 6.40	9.42 / 4.59	8.48 / 5.53
164	5.14	6.64 / 6.88	8.97 / 4.55	7.82 / 5.70
165	4.41	6.19 / 6.80	8.39 / 4.60	8.05 / 4.94
166	2.67	4.28 / 8.43	7.48 / 5.23	5.68 / 7.03
167	3.43	4.63 / 7.80	7.44 / 4.99	6.05 / 6.38
168	3.44	5.80 / 6.40	7.46 / 4.74	6.22 / 5.98
169	3.41	5.50 / 6.51	7.45 / 4.56	6.02 / 5.99
170	3.31	5.85 / 5.98	7.26 / 4.57	5.97 / 5.86
171	3.85	5.63 / 6.03	7.29 / 4.39	5.73 / 5.93
172	3.27	5.51 / 5.82	6.97 / 4.36	5.44 / 5.89
173	6.63	9.15 / 5.67	10.07 / 4.36	10.19 / 4.63
174	5.84	8.27 / 5.95	10.15 / 4.07	9.40 / 4.82
175	5.89	7.93 / 5.82	9.89 / 3.86	10.15 / 3.60
176	4.51	6.63 / 6.74	8.61 / 4.76	8.21 / 5.16

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
177	4.53	6.49 / 6.57	8.65 / 4.41	8.89 / 4.17
178	4.19	6.02 / 6.82	7.38 / 5.46	6.32 / 6.52
179	4.09	5.45 / 6.84	7.91 / 4.38	5.27 / 7.02
180	3.90	4.76 / 7.30	7.63 / 4.43	6.25 / 5.81
181	--	4.58 / 6.82	5.40 / 5.95	---
182	8.38	10.32 / 6.72	10.42 / 6.62	11.77 / 5.27
183	7.23	10.06 / 5.14	10.45 / 4.75	10.82 / 4.38
184	4.62	6.91 / 7.39	6.81 / 7.49	---
185	4.01	5.42 / 6.47	6.07 / 5.82	---
186	3.11	5.49 / 5.65	6.55 / 4.59	5.37 / 5.77
187	--	5.18 / 6.74	---	---
188	--	5.45 / 6.93	---	---
189	--	5.33 / 6.09	---	---
190	--	6.20 / 5.97	---	---
RW1	6.11 *	2.73 / 6.98	5.05 / 4.70	3.75 / 6.00
RW2	3.43	6.14 / 6.43	7.40 / 5.17	6.29 / 6.28
CP	--	5.41 / 4.68	4.89 / 3.78	---

Note:

1) CP = Monitoring well installed by others in 1985

October 3, 1991

TABLE B - STAGE 1

E238

SITE REMEDIATION - STAGE 1
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	<u>Dec. 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug. 22-23/91</u>
57	>100	>100	100	100
50	>100	>100	50	100
58	>100 (3900)	0	27	12
59	>100	4	3	18
60	>100	3	2	38
61	>100	25	12	17
62	>100	10	5	32
63	>100 (4700)	5	15	19
64	>100	26	19	84
65	>100	81	3	7
66	92	40	5	40
67	>100 (+12000)	>100	100	100
68	>100	>100	12	100
69	>100	>100	8	100
70	>100 (1000)	10	3	2
71	>100	1	0	0

Note: (5500) represents the total gasoline vapour concentration measured in the monitoring well (in ppm).

SITE REMEDIATION - STAGE 1
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	<u>Dec. 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug. 22-23/91</u>
72	>100 (3000)	59	0	50
73	>100	>100	0	100
74	>100 (3200)	2	0	0
75	10	3	--	3
76	15	1	0	18
77	20	9	0	10
78	>100	>100	0	100
79	>100 (2000)	>100	1	22
80	83	0	0	0
81	55	0	0	2
82	52	0	0	0
83	88	11	0	1
84	86	0	2	0
85	30	2	0	0
86	>100	97	0	0
87	>100	0	0	0
88	80	1	0	1
89	30	2	15 (200)	1

SITE REMEDIATION - STAGE 1
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	<u>Dec. 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug. 22-23/91</u>
90	>100	>100	100 (12000)	45
91	>100	76	100	8
92	>100	34	100 (7200)	27
93	>100 (12000)	>100	40	24
94	>100	>100	100 (6400)	100
95	>100	>100	25	>100
96	>100 (1000)	1	5	11
97	>100	17	30 (0)	2
98	98	17	3	2
99	>100	7	2	0
51	27	0	0	0
101	7	1	0	1
102	11	1	--	1
103	2	0	0	0
104	1	0	0	0
105	1	1	1	0
106	>100 (5000)	7	5	30
107	>100	>100	100	100

SITE REMEDIATION - STAGE 1
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	<u>Dec. 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug. 22-23/91</u>
108	>100 (+12000)	>100	43	100
109	>100	>100	67	100
110	>100 (2000)	0	0	24
111	>100	0	0	2
112	53 (600)	0	0	16
113	0	2	1	8
114	6	0	0	1
115	>100	2	1	2
116	>100 (8000)	12	0	5
117	>100 (+12000)	8	0	62

October 3, 1991

TABLE B - STAGE 2

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SITE REMEDIATION - STAGE 2
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
1	1	1	0	--
2	>100 (12000)	12	8 (600)	8
3	--	11	100 (0)	12
4	--	>100	17	--
5	--	0	0	--
6	--	0	0	--
7	--	0	0	--
8	2	0	0	0
9	--	0	0	0
10	--	0	0	--
11	--	0	0	--
12	--	0	0	--
13	>100 (+12000)	>100	45	8
15	--	0	0	--
17	--	0	0	--
18	1	0	0	--

Notes:

1) (1000) refers to gasoline vapour concentration (ppm) in MW

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
19	0	>100	100 (200)	--
20	>100 (150)	100	100 (1000)	>100
21	>100 (+12000)	22	30 (600)	1
22	36 (2000)	13	4	5
23	0	0	1	0
25	--	0	1	--
27	--	1	0	--
29	--	2	2	--
30	--	1	0	--
32	--	2	0	--
38	--	>100	100 (200)	--
41	--	--	--	--
44	--	53	45 (50)	1
52	>100 (+12000)	0	0	1
53	>100 (12000)	2	3	28
54	5	2	1	0
118	>100	75	0	6
119	26	>100	88	43

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
120	>100	>100	86	>100
121	95	>100	36	32
122	>100	85	23	16
123	>100	35	0	6
124	>100	86	--	2
125	>100	76	13	53
126	3	10	2	88
127	5	50	100	>100
128	5	34	26	>100
129	15	>100	24	>100
130	>100	>100	25	>100
131	>100	35	1	100
132	(500) 78	--**	1	--**
133	(500) >100	>100	1	43
134	>100	83	0	>100
135	>100	32	0	30
136	>100	100	1	1.5
137	>100 (3800)	21	35	10
138	>100	86	1	0

** - Monitoring well is plugged. No reading could be taken.

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
139	>100	>100	0	--**
140	60	>100	0	1
141	>100	26	0	0
142	>100	100	13	2
143	>100	19	1.5	8
144	5	3	2	8
145	30 (500)	15	2	4
146	62 (2200)	9	3	7
147	20 (500)	1	4	--
148	>100	1	100	5
149	>100	3	2	46
150	>100	32	100	54
151	>100 (100)	14	100	4
152	>100	36	100	10
153	>100 (100)	42	33	43
154	>100 (4500)	65	2	4
155	>100	54	1	6
156	90	43	100	100
157	>100	95	12	>100

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
158	>100	4	0	>100
159	70	1	1	57
160	>100	0	1	>100
161	--	0	1	1
162	>100	0	1	35
163	>100	85	1	2
164	>100	68	1	1
165	>100	68	1	1
166	>100	17	13	2
167	>100	28	2	4
168	>100	0	1	4
	(100)			
169	>100	0	3	10
	(2200)			
170	>100	>100	100	10
171	>100	>100	5	>100
172	50	>100	2	>100
173	>100	1	0	3
174	>100	>100	1	100
175	>100	>100	1	6
176	>100	52	2	60

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elev. (ft) / Depth to Ground Water Table (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
177	>100 (2200)	>100	2	5
178	>100 (500)	68	100	100
179	10	>100	52	>100
180	>100	>100	100	>100
181	70 (100)	2	1	--
182	>100	10	0.5	0
183	>100 (15000)	0	8	5
184	80 (2300)	0	0	--
185	>100 (300)	0	10	--
186	>100	2	2	82
187	--	1	--	--
188	--	>100	--	--
189	--	>100	--	--
190	--	>100	--	--
RW1	--	2	22	7
RW2	--	2	2	85
CP	--	>100	100 (100)	--

Note:

1) CP = Monitoring well installed by others in 1985

October 3, 1991

TABLE C - STAGE 1

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SITE REMEDIATION - STAGE 1
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Dec. 11-14/90	Hydrocarbon Thickness (ft.)			Aug. 22-23/91
		Sep 29-30/91	June 11-13/91		
57	0.15	0.80	1.54		2.28
50	1.75	0.60	0.49		1.48
58	Nil	Nil	Nil		Nil
59	Nil	Nil	Nil		Nil
60	0.12	Nil	Nil		Nil
61	0.04	0.03	2.55		0.10
62	Nil	Nil	Nil		Nil
63	1.15	1.20	Film		3.34
64	0.99	2.00	1.63		3.20
65	1.01	0.27	Nil		3.44
66	0.84	1.80	0.02		2.30
67	0.28	0.74	2.60		3.20
68	0.79	Nil	Nil		Film
69	Nil	1.16	0.60		2.66
70	Nil	2.62	Film		3.40
71	Nil	Nil	Nil		Nil
72	Nil	Nil	Nil		Nil
73	Nil	Nil	Nil		Nil

SITE REMEDIATION - STAGE 1
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	<u>Dec. 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug. 22-23/91</u>
74	Nil	Nil	Nil	Nil
75	Nil	Nil	---	Nil
76	Nil	Nil	Nil	Nil
77	0.12	Nil	Nil	Nil
78	Nil	0.01	Nil	Nil
79	Nil	Nil	Nil	Nil
80	Nil	Nil	Nil	Nil
81	Nil	Nil	Nil	Nil
82	Nil	Nil	Nil	Nil
83	Nil	Nil	Nil	Nil
84	Nil	Film	Nil	Nil
85	Nil	Nil	Nil	Nil
86	Nil	Nil	Nil	Nil
87	Nil	Nil	Nil	Nil
88	Nil	Nil	Nil	Nil
89	Nil	Nil	Nil	Nil
90	Nil	Nil	Nil	Nil
91	Nil	Nil	Nil	Nil

SITE REMEDIATION - STAGE 1
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	<u>Dec. 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug. 22-23/91</u>
92	Nil	Nil	Nil	Nil
93	Nil	Film	Nil	Nil
94	Nil	0.01	Nil	0.03
95	Nil	Nil	Nil	Nil
96	Nil	Nil	Nil	Nil
97	Nil	Nil	Nil	Nil
98	Nil	Nil	Nil	Nil
99	Nil	Nil	Nil	Nil
51	Nil	Nil	Nil	Nil
101	Nil	Nil	Nil	Nil
102	Nil	Nil	---	Nil
103	Nil	Nil	Nil	Nil
104	Nil	Nil	Nil	Nil
105	Nil	Nil	Nil	Nil
106	Nil	Film	Nil	Nil
107	0.94	1.45	2.20	3.02
108	0.64	1.10	0.14	1.30
109	Nil	0.42	0.64	1.24

SITE REMEDIATION - STAGE 1
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	<u>Dec. 11-14/90</u>	<u>Nov 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug. 22-23/91</u>
110	Nil	Film	Nil	Nil
111	Nil	Film	Nil	Nil
112	Nil	Nil	Nil	Film
113	Nil	0.01	0.10	0.16
114	Nil	Nil	Nil	Nil
115	Nil	Nil	Nil	Nil
116	Nil	Nil	Nil	Nil
117	Nil	Nil	Nil	Nil

October 3, 1991

TABLE C - STAGE 2

E239

SITE REMEDIATION - STAGE 2
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft.)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
1	---	Nil	Nil	---
2	1.00	Nil	Nil	Nil
3	Nil	Nil	Nil	Nil
4	---	Nil	Nil	---
5	---	Nil	Nil	---
6	---	Nil	Nil	---
7	Nil	Nil	Nil	---
8	Nil	Nil	Nil	Nil
9	---	Nil	Nil	Nil
10	Nil	Nil	Nil	---
11	---	Nil	Nil	---
12	---	Nil	Nil	---
13	0.40	0.02	0.04	0.32
15	---	Nil	Nil	---
16	---	Nil	Nil	---
17	Nil	Nil	Nil	---
18	Nil	Nil	Nil	---
19	Nil	Nil	Nil	---

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION / DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft.)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
20	Nil	Nil	Nil	Nil
21	Nil	Nil	Nil	Nil
22	0.04	Nil	Dissolved Film	0.02
23	---	Nil	Nil	Nil
25	---	Nil	Nil	---
27	Nil	Nil	Nil	---
29	Nil	Nil	Nil	---
30	---	Nil	Nil	---
32	Nil	Nil	Nil	---
38	---	Nil	Nil	---
41	Nil	Nil	---	---
44	---	Nil	Nil	Nil
52	Nil	Nil	Nil	Nil
53	Nil	Nil	Nil	Nil
54	Nil	Nil	Nil	Nil
118	Nil	---	Nil	Nil
119	Nil	0.40	Film	Nil
120	Nil	0.25	0.04	Nil

TABLE C - STAGE 2

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SITE REMEDIATION - STAGE 2
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	<u>Dec 11-14/90</u>	Hydrocarbon Thickness (ft.)			<u>Aug 22-23/91</u>
		<u>Sep 29-30/91</u>	<u>June 11-13/91</u>		
121	Nil	0.21	Nil		Nil
122	1.29	0.01	Nil		Nil
123	Nil	Nil	Nil		Nil
124	Nil	Nil	---		Nil
125	Nil	Nil	Nil		Nil
126	Nil	Nil	Nil		Nil
127	Nil	Nil	Nil		Nil
128	Nil	Nil	0.10		0.10
129	Nil	0.02	Film		Film
130	Nil	Film	Nil		Nil
131	Nil	Nil	Nil		Nil
132	Nil	----**	Nil		----**
133	Nil	Nil	Nil		Nil
134	--	Nil	Nil		Nil
135	Nil	Nil	Nil		Nil
136	Nil	----**	Nil		Nil
137	Nil	Film	0.03		Nil
138	Nil	Nil	Nil		Nil
139	Nil	Nil	Nil		Nil

** - MW is plugged. No reading could be taken

SITE REMEDIATION - STAGE
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
140	Nil	Nil	Nil	Nil
141	Nil	Nil	Nil	Nil
142	Nil	Nil	Nil	Nil
143	---	Nil	Nil	Nil
144	Nil	Nil	Nil	Nil
145	Nil	Nil	Nil	Nil
146	Nil	Nil	Nil	Nil
147	Nil	Nil	Nil	---
148	0.04	Nil	0.50	Nil
149	Nil	Nil	Nil	Nil
150	---	2.54	4.64	2.12
151	0.95	0.42	Nil	Film
152	Nil	0.92	0.75	0.10
153	Nil	Nil	Nil	Film
154	0.10	Film	Nil	0.03
155	Nil	0.60	Nil	0.30
156	Nil	Film	0.95	0.02
157	0.32	0.04	Nil	0.04
158	Nil	Nil	Nil	Nil

SITE REMEDIATION - STAGE 2
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
159	Nil	Nil	Nil	Nil
160	Nil	Nil	Nil	Film
161	---	Nil	Nil	Nil
162	Nil	Nil	Nil	Nil
163	Nil	Nil	Nil	0.09
164	Nil	0.10	Nil	Nil
165	Nil	0.04	Nil	Film
166	0.96	1.30	0.03	Nil
167	0.03	1.00	Nil	Film
168	Nil	Nil	Nil	Nil
169	Nil	Nil	Nil	0.07
170	Nil	0.16	0.04	0.14
171	0.10	0.04	Film	0.04
172	Nil	Nil	Nil	Nil
173	Nil	Nil	Nil	Nil
174	Nil	0.02	Nil	Film
175	Nil	Nil	Nil	Nil
176	Nil	Nil	Nil	Film
177	Nil	Nil	Nil	Nil

SITE REMEDIATION - STAGE 2
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft)			
	<u>Dec 11-14/90</u>	<u>Sep 29-30/91</u>	<u>June 11-13/91</u>	<u>Aug 22-23/91</u>
178	Nil	0.02	0.30	0.26
179	0.39	0.72	0.04	Nil
180	Film	0.92	0.42	Nil
181	---	Nil	Nil	---
182	Nil	Nil	Nil	Nil
183	Nil	Nil	Nil	Nil
184	Nil	Nil	Nil	---
185	Nil	Nil	Nil	---
186	Nil	Nil	Nil	Nil
187	---	Nil	---	---
188	---	Nil	---	---
189	---	Nil	---	---
190	---	Nil	---	---
RW1	Nil	Nil	Nil	Nil
RW2	Nil	Nil	Nil	Nil
CP	Nil	Nil	Nil	---

Note:

1) CP = Monitoring well installed by others in 1985

October 3, 1991

TABLE D - STAGE 1

E238

SITE REMEDIATION - STAGE 1
VAPOUR EXTRACTION UNIT DATA
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

Suction Pressure (inches of Water)

<u>Unit</u>	<u>Dec. 8/90</u>	<u>Apr. 9/91</u>	<u>June 13/91</u>	<u>Aug. 22/91</u>	<u>Sep. 29/91</u>
3	15.0	17.0	37.0	37.0	36.0
4	15.0	36.0	41.0	36.0	29.0
5	18.0	18.5	28.0	28.0	30.5
11(8)*	18.0	**	*	39.0	37.0

Outlet Vapour Concentration (%LEL)

<u>Unit</u>	<u>Dec. 8/90</u>	<u>Apr. 9/91</u>	<u>June 13/91</u>	<u>Aug. 22/91</u>	<u>Sep. 29/91</u>
3	22	9	3	19	11
4	38	8	1.5	0.33	0.20
5	15	5	1	0.25	0.25
11(8)*	23	**	*	0.33	0.15

Hydrocarbon Vapour Removal Rate (cu. yd./day)

<u>Unit</u>	<u>Dec. 8/90</u>	<u>Apr. 9/91</u>	<u>June 13/91</u>	<u>Aug. 22/91</u>	<u>Sep 29/91</u>
3	9.0	3.6	0.8	4.7	2.9
4	15.5	2.1	0.3	0.1	0.1
5	5.9	1.9	0.3	0.1	0.1
11(8)*	9.0	**	*	0.1	0.04

Notes:

- * - On June 13, 1991, vapour extraction unit #8 was found to be not working and was thus replaced by unit #11 on June 25, 1991. No reading could be taken on June 13.
- ** - The main header pipe had become flooded and thus no reading could be taken.

GEOKWAN ENVIRONMENTAL LTD.

October 3, 1991

TABLE D - STAGE 2

E239

SITE REMEDIATION - STAGE 2
VAPOUR EXTRACTION UNIT DATA
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

Suction Pressure (inches of Water)

<u>Unit</u>	<u>Dec. 8/90</u>	<u>Apr. 9/91</u>	<u>June 13/91</u>	<u>Aug. 22/91</u>	<u>Sep 29/90</u>
8(6)*	13.0	26.0	*	35.0	16.0
7	20.0	26.0	12.0	36.0	16.0
9	35.0	**	40.0	Discontinued	-
10***	--	--	--	19.0	18.0

Outlet Vapour Concentration (%LEL)

<u>Unit</u>	<u>Dec. 8/90</u>	<u>Apr. 9/91</u>	<u>June 13/91</u>	<u>Aug. 22/91</u>	<u>Sep 29/90</u>
8(6)*	5	2	*	1.5	4.0
7	60	1	3	1.5	2.8
9	100	**	8	Discontinued	-
10***	--	--	--	0.5	6.0

Hydrocarbon Vapour Removal Rate (cu. yd./day)

<u>Unit</u>	<u>Dec. 8/90</u>	<u>Apr. 9/91</u>	<u>June 13/91</u>	<u>Aug. 22/91</u>	<u>Sep. 29/91</u>
8(6)*	2.1	0.7	*	0.4	1.6
7	22.7	0.4	1.3	0.4	1.1
9	27.7	**	1.8	-	-
10***	--	--	--	0.2	2.4

Notes:

- * - On June 13, 1991, vapour extraction unit #6 was found to be not working and was thus replaced by the reconditioned unit #8 on June 25, 1991. No reading could be taken on June 13.
- ** - The water trapped in the main header pipe had frozen solid and thus no reading could be taken.
- *** - At the end of August 1991, vapour extraction unit # 9 was discontinued, and unit #10 was installed on the gas bar roof.

GEOKWAN ENVIRONMENTAL LTD.

October 3, 1991

TABLE E - STAGE 1

E238

SITE REMEDIATION - STAGE 1
LIQUID HYDROCARBON REMOVED BY PUMPING
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>Date</u>	<u>Liquid Hydrocarbons Recovered (Gal.)</u>
Dec. 11/90	1.50
Apr. 11/91	1.40
June 13/91	2.04
Aug. 23/91	5.64
Oct. 1/91	<u>2.15</u>
	12.73 imp. gallons

Note: The liquid hydrocarbon was removed by Clark's Septic Service and disposed at the city of Brandon landfill.

October 3, 1991

TABLE E - STAGE 2

E239

SITE REMEDIATION
LIQUID HYDROCARBON REMOVED BY PUMPING
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>Date</u>	<u>Liquid Hydrocarbons Recovered (Gal.)</u>
Dec. 11/90	1.00
Apr. 11/91	0.60
June 13/91	1.30
Aug. 23/91	0.54
Oct. 1/ 91	<u>1.31</u>
	4.75 imp. gallons

Note: The liquid hydrocarbon was removed by Clark's Septic Service and disposed at the city of Brandon landfill.

October 3, 1991

TABLE F - STAGE 2

E239

SITE REMEDIATION - STAGE 2
GROUND SURFACE / TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>MW No.</u>	<u>Ground Surface Elevation (ft.)</u>	<u>Top of Pipe Elevation (ft.)</u>
1	1295.95	1296.08
2	1289.73	1289.39
3	1289.00	1288.94
4	1289.39	1289.84
5	1289.36	1289.67
6	1285.68	1286.29
7	1288.11	1289.53
8	1287.93	1288.62
9	1288.09	1288.42
10	1286.70	1288.19
11	1286.05	1287.13
12	1285.59	1286.01
13	1292.59	1292.38
15*	1301.97	1302.56
17	1290.90	1291.28
18	1293.02	1293.53
19	1289.75	1289.19

Note: * - Denotes that the monitoring well was damaged during the spring thaw and was therefore repaired during the April 9/91 field trip.

SITE REMEDIATION - STAGE 2
GROUND SURFACE / TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>MW No.</u>	<u>Ground Surface Elevation (ft.)</u>	<u>Top of Pipe Elevation (ft.)</u>
20	1291.30	1290.91
21	1292.50	1292.20
22	1289.38	1289.16
23	1289.38	1289.02
25	1286.40	1286.66
27	1288.69	1290.56
29	1287.04	1288.46
30	1284.90	1286.05
32	1288.82	1290.05
38	1290.15	1290.65
41	1290.37	1289.88
44	1291.67	1291.33
52	1292.79	1292.49
53	1295.13	1294.87
54	1297.42	1297.06
118	1296.07	1295.78
119	1295.59	1295.36
120	1295.23	1294.89

SITE REMEDIATION - STAGE 2
GROUND SURFACE / TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>MW No.</u>	<u>Ground Surface Elevation (ft.)</u>	<u>Top of Pipe Elevation (ft.)</u>
121	1294.51	1294.12
122	1293.90	1293.44
123	1293.52	1293.32
124*	1293.20	1292.75
125*	1292.80	1292.39
126*	1292.48	1292.14
127	1292.17	1291.77
128	1291.82	1291.48
129*	1291.47	1291.24
130	1291.12	1290.88
131	1291.78	1291.31
132	1292.02	1291.68
133	1292.33	1291.92
134	1292.76	1292.41
135	1293.20	1292.80
136	1293.63	1293.27
137*	1294.04	1293.73
138*	1294.45	1293.99

SITE REMEDIATION - STAGE 2
GROUND SURFACE / TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>MW No.</u>	<u>Ground Surface Elevation (ft.)</u>	<u>Top of Pipe Elevation (ft.)</u>
139	1294.98	1294.52
140	1295.54	1295.21
141	1296.27	1295.99
142	1296.86	1296.58
143	1292.64	1292.39
144	1292.37	1292.26
145	1290.83	1290.62
146	1290.00	1289.71
147	1289.79	1289.50
148**	1293.71	1293.44
149**	1293.26	1293.14
150**	1293.09	1292.84
151**	1292.94	1292.44
152**	1292.85	1292.28
153**	1292.76	1292.15
154**	1292.66	1292.10

Note: ** Denotes a change of top of pipe elevation due to the completion of the vapour extraction system in June 1991.

SITE REMEDIATION - STAGE 2
GROUND SURFACE / TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>MW No.</u>	<u>Ground Surface Elevation (ft.)</u>	<u>Top of Pipe Elevation (ft.)</u>
155**	1292.58	1292.02
156**	1292.43	1292.28
157**	1292.30	1291.47
158**	1291.97	1291.68
159**	1291.60	1291.37
160**	1291.28	1290.96
161**	1290.82	1290.67
162**	1294.57	1294.39
163**	1294.01	1293.38
164**	1293.52	1292.74
165**	1292.99	1292.49
166**	1292.71	1292.28
167**	1292.43	1291.91
168**	1292.20	1291.77
169**	1292.01	1291.52
170	1291.83	1291.55
171	1291.66	1291.33
172	1291.33	1291.01

SITE REMEDIATION - STAGE 2
GROUND SURFACE / TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>MW No.</u>	<u>Ground Surface Elevation (ft.)</u>	<u>Top of Pipe Elevation (ft.)</u>
173	1294.82	1294.39
174	1294.22	1293.90
175	1293.75	1293.49
176	1293.37	1292.91
177	1293.06	1292.79
178	1292.84	1292.48
179	1292.29	1292.05
180*	1292.06	1291.65
181	1291.40	1291.15
182	1297.04	1296.72
183	1295.20	1294.87
184	1294.30	1293.96
185	1291.89	1291.62
186	1291.14	1290.77
187***	1291.92	1291.72
188***	1292.38	1292.13
189***	1291.42	1291.19

Note: *** Denotes new monitoring well installed in September, 1991.

SITE REMEDIATION - STAGE 2
GROUND SURFACE / TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>MW No.</u>	<u>Ground Surface Elevation (ft.)</u>	<u>Top of Pipe Elevation (ft.)</u>
190***	1292.17	1291.94
RW1	1289.75	1289.71
RW2	1292.57	1292.35
CP	1288.67	1290.09

Geokwan Environmental Ltd

ENVIRONMENTAL ENGINEERS

JUL 02 1991

Canadian Tire Corporation Ltd.

June 26, 1991

P O Box 770, Station K

Toronto, Ontario M4P 2V8

ATTENTION: Mr. Hugh Law, Real Estate Manager

Dear Sir:

RE: Progress Report No. 3

Site Remediation - Vapor Extraction, Stage 1 & 2

Canadian Tire Property, Brandon, Manitoba

Our Project No. E238 & 239

Patching of hot mix asphalt for those trenches done in November and December 1990 was completed on Friday, June 7, 1991.

All vapor extraction wells (Stage 1 & 2) including the monitoring wells put down prior to the site remediation were monitored by us from June 11 to 13, 1991. All wells in which free phase hydrocarbons were present, were pumped by Clark Septic Services of Brandon. The recovered free phase hydrocarbons and the contaminated water were disposed of at the City of Brandon waste disposal ground.

Excavation, backfilling and asphalt patching of the remainder of the trenches, Stage 2 (i.e. Trench No. 1 & 2) were undertaken during the period between June 16, 1991 and June 20, 1991. The excavation and backfilling were done by Cumming & Dobbie, while the asphalt patching was performed by Zenith Paving. The header installation, connection to the vapor extractor wells, compaction testing of the trench backfill and hot mix asphalt were conducted by our Project Engineer, Mr. Harley Pankratz, P. Eng. and engineering technologist, Mr. Derek Trinke.

Due to the header flooding problems experienced at VEU No. 8 & 9 during the periods of snowmelt and spring surface runoff this year, and since VEU No. 9 is located in a low lying area, it was decided that VEU No. 10 which was designed to be placed beside VEU No. 9 be relocated to the roof of the Canadian Tire gas bar. Consequently, modifications to Trench No. 1 & 2 were necessary, in that these two trenches were connected to Trench No. 3 (west) through vapor extraction well No. 148, 162 & 53. In addition, a new electrical receptacle is required to be mounted on the east

June 26, 1991

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E238 & 239

exterior wall of the gas bar. This electrical work is expected to be complete by GT Smith on June 26, 1991.

The previously reported header flooding problem has caused malfunctioning of vapor extraction unit (VEU) No. 6 & 8. On June 25, 1991, VEU No. 8 and 6 were removed and replaced by the writer with a new unit and VEU No. 10, respectively. VEU No. 6 will be put backed to the roof top of the gas bar, as soon as it is repaired. Generally, the vapor extraction systems of both Stage 1 & 2 perform as expected, and are considered satisfactory.

The formal report by Saskatchewan Research Council regarding the Gas Chromatographic (GC) analysis of the organic phase of the liquid samples recovered from MW77, MW68, MW166, MW122 and MW2 is enclosed.

All inspection and well monitoring data are being prepared and will be submitted under Progress Report No. 4 at a later date.

We trust that you will find the foregoing satisfactory. If you have any questions, please call the writer at your convenience.

Yours truly,

GEOKWAN ENVIRONMENTAL LTD.

Per:

Walter Kwan, M. Eng., P. Eng.

WK:tbs

Encl.



GEOKWAN ENVIRONMENTAL LTD.



Saskatchewan
Research Council

SASKATCHEWAN RESEARCH COUNCIL

Analytical Services
15 Innovation Blvd.
Saskatoon, Saskatchewan Canada
S7N 2X8

Phone: (306) 933-6932
FAX: (306) 933-7922

TELECOPIER TRANSMITTAL COVER SHEET

Date: June 24/91 Time: _____

Please deliver the following page(s) to:

Name: Walter Kwan
Company: Geskevan Environmental
Address: Winnipeg
Telecopier No.: 204-488-8102

This facsimile is being sent by:

Name: Wo Yuen
Phone No.: 306 933-6935

Number of pages being sent (including cover sheet): 11

Please contact us as soon as possible if you do not receive all pages.

June 24, 1991

TO: Walter Kwan
Geokwan Enviromental Ltd.
Winnipeg, Manitoba

FROM: Wo Yuen
Analytical Services

RE: Your Project No. E238/239
SRC Group 91-811, Sample No. 4188-4192

REQUEST: Gas chromatographic analysis of the
organic phase present in the samples.

ANALYTICAL PROCEDURE:

The samples were composed of liquid in two phases. The top phase (organic) was separated from the bottom phase (water). The organic phase was analysed by gas chromatography using a packed column of SE-30 phase. This separates the components of the organic phase into specific compounds or class of compounds. A high resolution separation using a capillary column is available but was not necessary for this purpose.

INTRODUCTION:

As an introduction, the main components of diesel and gasoline fuel are described. Diesel fuel is comprised of a range of mostly aliphatic (paraffinic) hydrocarbons. In terms of petroleum products, diesel would be termed midrange, that is, the carbon number range is in the middle of the petroleum spectrum, from C9-C18. The highest proportion of diesel is in the C13-C14 fraction. As a comparison, motor oil contains hydrocarbons in the C20-C30 range and gasoline mostly less than C10.

The unique point about gasoline is that it is a blended product, not just a certain refinery fraction. There are several classes of compounds in gasoline. The first two mentioned here predominate in proportion. The lightest group is the paraffinic and isoparaffinic group consisting of pentanes (C5), methylpentanes (C6), hexanes (C6), methyl and dimethyl hexanes (C6-7), trimethylpentanes (C8), heptanes (C7), and octanes (C8). The aromatic group is the other major class of compounds in gasoline. These are benzene and the substituted benzene ring compounds such as toluene, xylene, 1,2,4-trimethylbenzene, and numerous others. The two minor groups are the olefins and naphthenes.

When fresh gasoline is exposed to the air, evaporation occurs and the most volatile compounds tend to disappear first. When gasoline is exposed to water and soil, there is a partitioning of compounds between the phases. Some have little affinity for water and thus would not distribute into the water. Other compounds are more soluble in water and would, in time, distribute some fraction into the water phase. The aromatics such as toluene and xylene tend to distribute partially into water, leaving the old gasoline lower in percentage of these compound as compared to fresh gasoline. The soil type also has an effect on the distribution of the compounds. Sand and gravel have little effect but more organic soils could preferentially adsorb certain compounds.



These conditions contribute to the loss of certain components of gasoline leaving what is termed weathered gasoline. When a weathered gasoline is analysed for its fingerprint pattern, the entire range of components are compared to fresh gasoline to see which components have changed relative to others. There are several terms for this analysis: PNA (paraffin, naphthene, aromatic), PONA (paraffin, olefin, naphthene, aromatic), and PIANO (paraffin, isoparaffin, aromatic, naphthene, olefin). Carbon-14 analysis is not relevant to the purpose of studying the weathering of gasoline. It is only useful for geological time dating (hundreds to thousands of years).



MW77 (Sample No. 4188):

There was a very small quantity of organic phase present in this sample. There is only diesel fuel present, no gasoline detected. The lightest fraction of diesel fuel, the C9 and C10 portions, are much lower than in new diesel fuel. This indicates that it is not fresh, probably more than a year old. Since the organic layer is so thin, the weathering of the diesel could appear to be greater than if there was a large pool of organic phase present in which case the age could be several years. Chromatograms of fresh diesel and #4188 are attached.

MW68 (Sample #4189)

MW166 (Sample #4192):

The organic phase in these two samples contains both diesel fuel and *unleaded* gasoline in a ratio of about 1:1. Both these samples are in a sand and/or gravel soil type as per your descriptions. The toluene and xylene and some other aromatics are much lower in proportion to the aliphatics as compared to new gasoline. This means that there has been fairly long contact with water since the aromatics are more soluble than aliphatics in water. Because the very light aliphatics are still present, the fuel is not ancient (i.e., not greater than 5 years). However, depending on the size of the organic pool underground, the age could be anywhere from six months if the pool is small, to several years if the pool is large. The thickness of the organic phase layer is only one indicator of the size of the fuel pool. Other factors are the extent of the pool laterally and the movement of groundwater.

Chromatograms of fresh gasoline, 50% evaporated in air, 90% evaporated in air, and the samples are attached. Toluene and xylene are indicated on the charts by 'T' and 'X' respectively. From the chromatograms, it is obvious that the weathering of the gasoline in the samples is not by an evaporative process since the weathering would then follow a trend set in the pattern of the 50% and 90% evaporated standards. The pattern in the samples is that of a preferential partitioning of some components into another phase as described in the introduction.

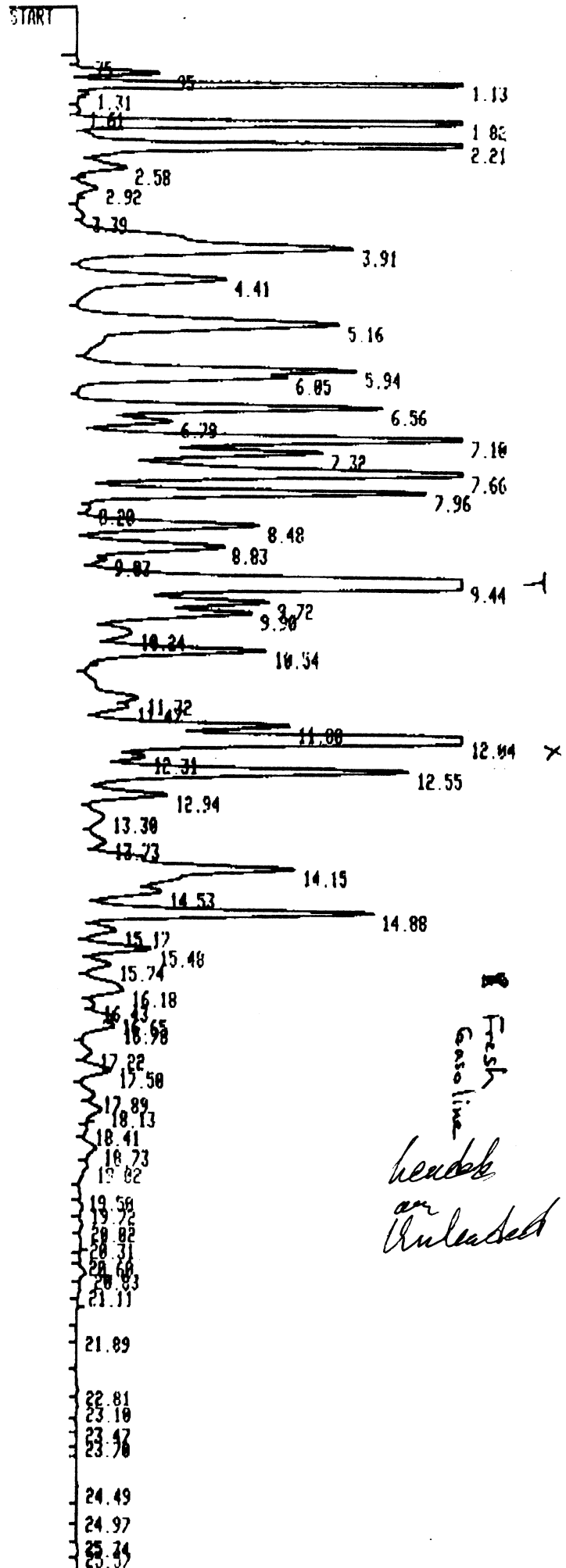
The fingerprint of the diesel portion is also changed from fresh fuel. The extent of the changes points to a long period of exposure.

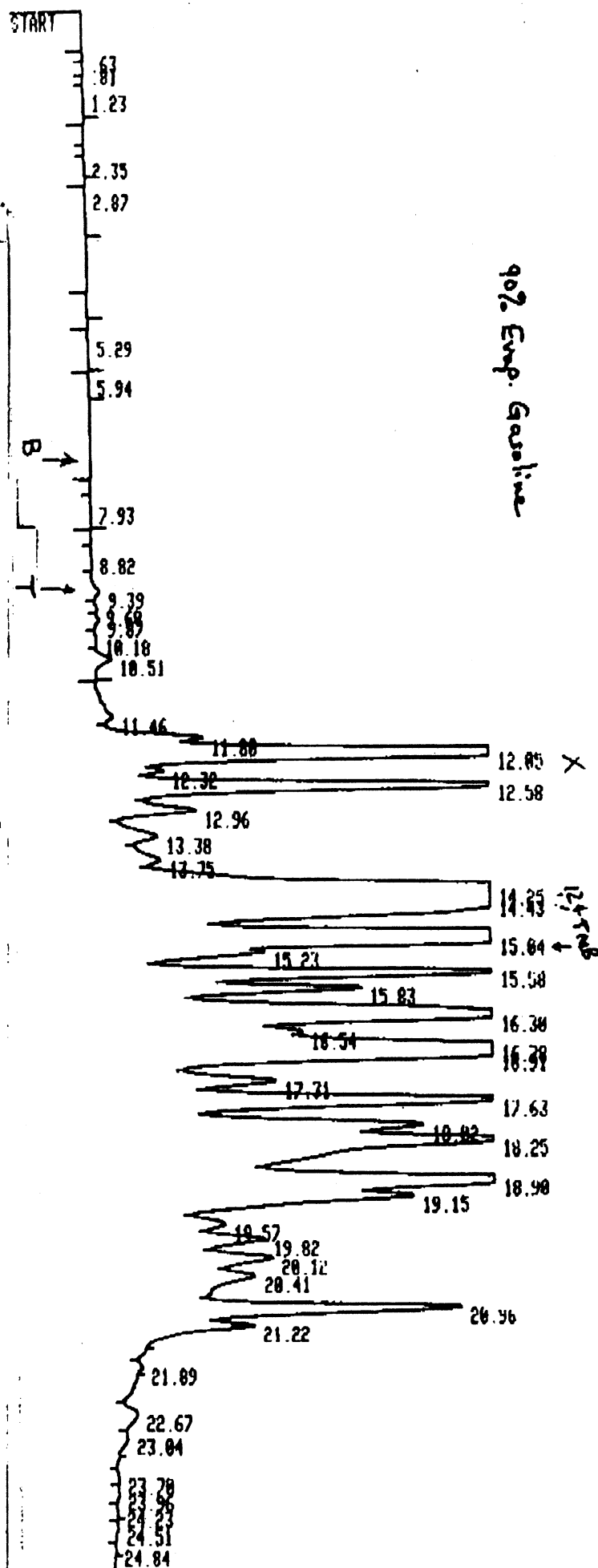
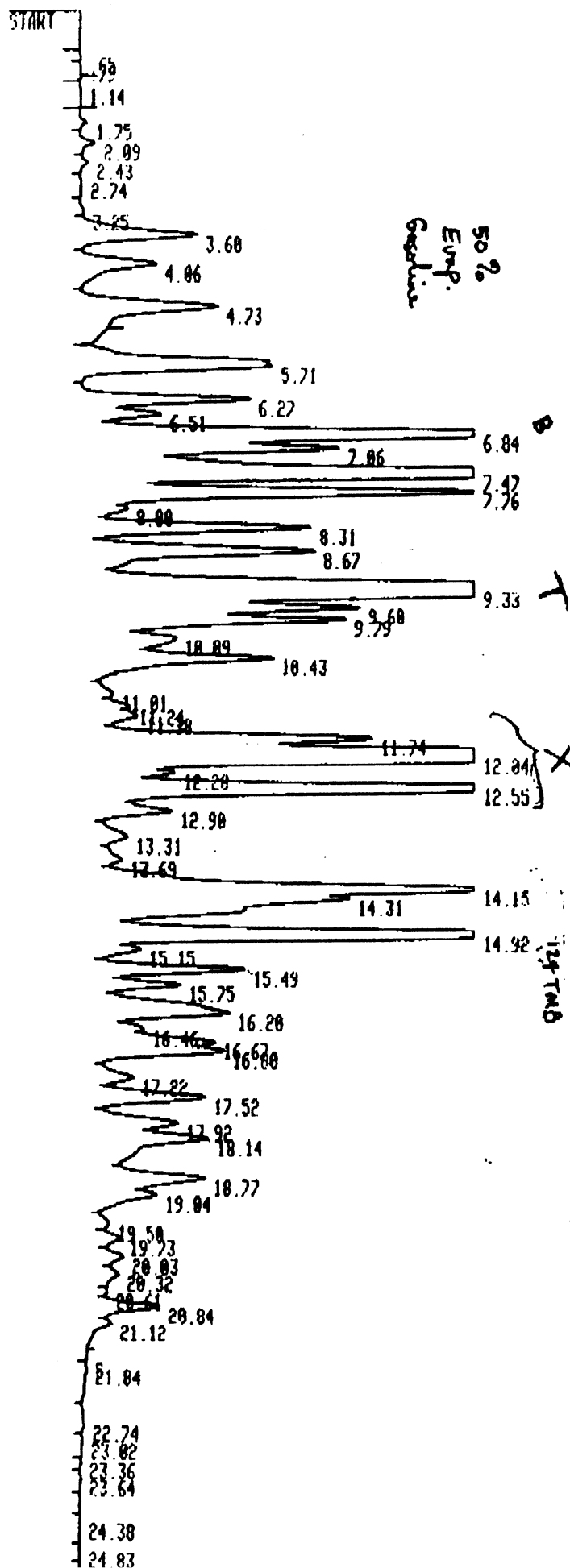


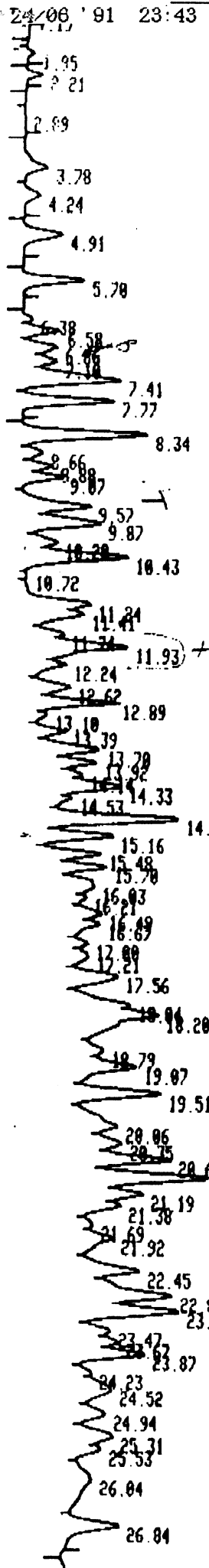
MW122 (Sample #4190)
MW2 (Sample #4191):

The organic phase in these two samples is mostly *leaded* gasoline with a small amount of diesel, about 10% in MW122 and about 5% in MW2. The toluene and xylene and some other aromatics are much lower in proportion to the aliphatics as compared to new gasoline. Considering the lead concentration in the fuel and the proportion of the aromatics, the age of this fuel would be between 1 and 5 years. The fingerprint pattern of these weathered gasoline samples also indicates a phase partitioning process. Chromatograms of these samples are also attached.

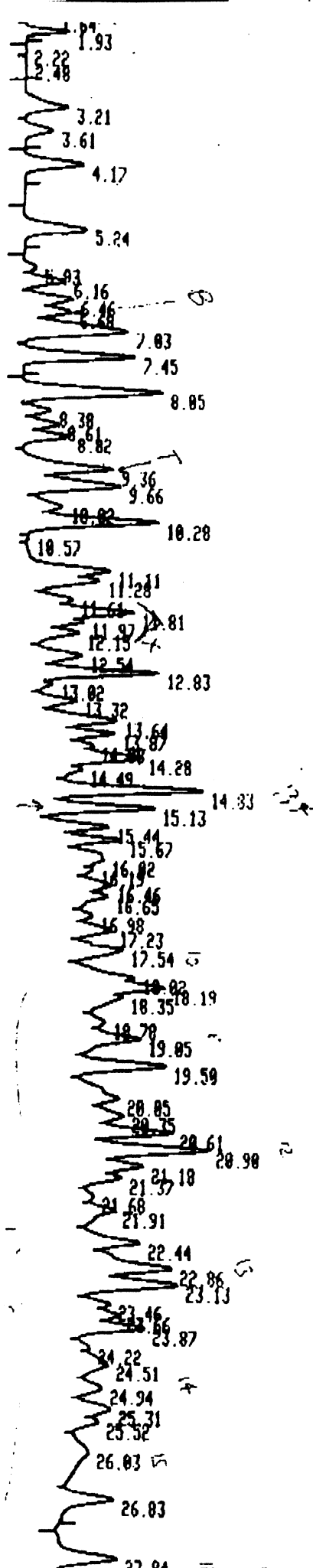




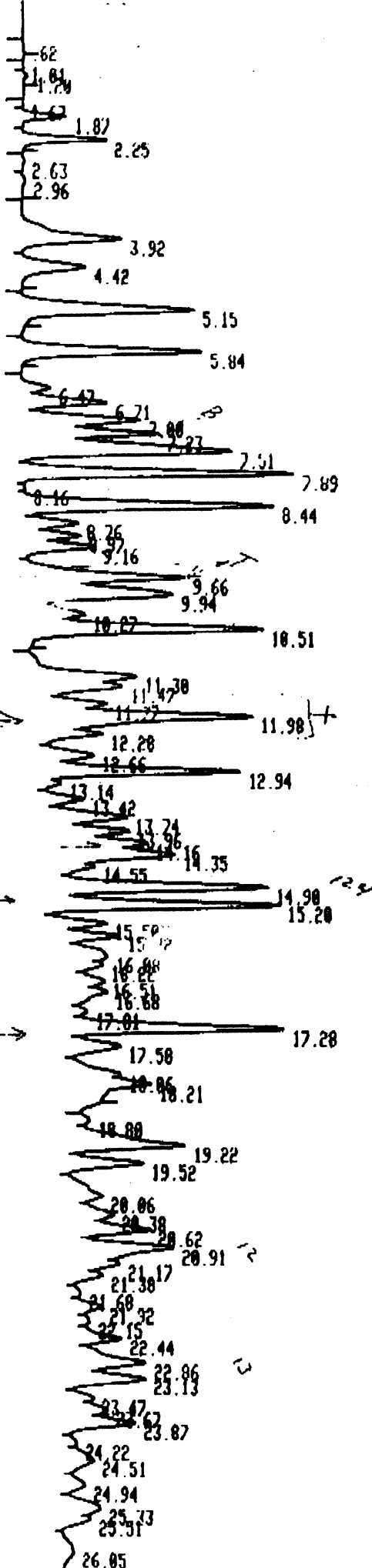
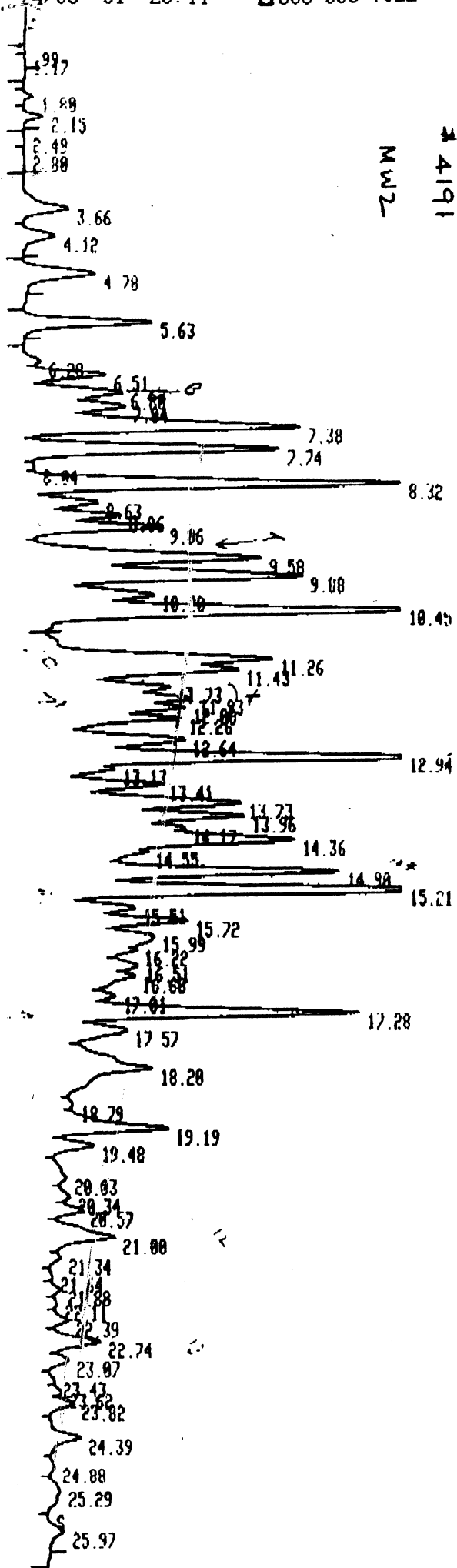




#4192
MW 166



#4189
MW 68



Geokwan Environmental Ltd

ENVIRONMENTAL ENGINEERS

Canadian Tire Corporation Ltd.
P O Box 770, Station K
Toronto, Ontario
M4P 2V8

June 11, 1991

DELIVERED

ATTENTION: Mr. Hugh Law, Real Estate Manager

Dear Sir:

RE: Progress Report No. 2
Site Remediation - Vapor Extraction, Stage 1 & 2
Canadian Tire Property, Brandon, Manitoba
Our Project No. E238 & 239

1.0 Drill Hole/Well Observations

During drilling of the Stage 1 & 2 vapor extraction wells in November, 1990, the soil profiles and soil gas concentrations at regular depths were determined from selected wells (i.e MW 62, 67, 71, 76, 92, 103, 106, 115, 118, 123, 126, 133, 144, 177, 181, 182, 184 & 185). The soil profiles, soil gas concentrations and ground water tables encountered in these wells are indicated on the testhole logs, Plate 2 to 19. The well locations are shown on Plate 1.

Based on the soil gas measurements at the observed well locations, the hydrocarbon contamination to the subsoils has extended to depths of approximately 10' to 15' from the present ground surface. For comparison purpose, the highest soil gas measured and the associated soil type and depth in each of the observed wells are listed below:

<u>MW No.</u>	<u>Highest Soil Gas</u>	<u>Rating</u>	<u>Soil Type</u>	<u>Depth From Grade</u>
62	10,000+ ppm	very high	sand	9.0 - 11.0'
67	12,000+	very high	sand	6.5 - 11.0'
71	3,000	moderate	fill	4.0 - 6.5'
76	4,500	moderate	fill	4.0 - 6.5'
92	12,000+	very high	sand	6.5 - 8.5'
103	< 500	very low	all soils	0.0 - 16.0'
106	2,800	moderate	silt & sand	7.0 - 10.5'
115	< 500	very low	all soils	0.0 - 16.0'
118	12,000+	very high	silt	4.0 - 7.5'
123	7,000	high	silt	4.5 - 7.5'

June 11, 1991

- 2 -

E238 & 239

126	4,800	moderate	sand	7.0 - 9.5'
133	5,050	high	sand & till	9.0 - 11.0'
144	1,800	moderate	sand	9.0 - 11.0'
177	7,900	high	sand	6.5 - 8.9'
181	500	low	sand	7.5 - 10.5'
182	1,500	moderate	silt & sand	6.5 - 10.0'
184	1,800	moderate	silty clay	9.0 - 11.0'
185	500	low	sand	6.5 - 9.2'

During the period between November 15 and 18, 1990, measurements of the total soil gas (i.e flammable hydrocarbon vapor in terms of % L.E.L.) inside the newly installed wells for the Stage 1 & 2 remediation and the adjacent, existing monitoring wells were conducted by our field engineer, using our hydrocarbon surveyor. The aerial distribution of these flammable vapors is indicated on Plate 20 which represents the initial flammable vapor concentrations in the subsurface, prior to the start of the site remediation.

For assessment purpose, the locations of the various hydrocarbon storage tanks (removed approximately from 1969 to 1970) of the old refinery, which are inferred from our interpretation of historic aerial photos, and the total flammable vapor measurements from November 15 to 18, 1990 are shown on Plate 21. It is of interest to note that most of the wells with very high flammable vapors are located at or in the general vicinity of the old hydrocarbon storage tanks. The types of hydrocarbon products stored in these old tanks cannot be determined, although an extensive and exhaustive search for such information was attempted by our firm. Perhaps, the previous owner, Gulf Oil, may have the required information.

2.0 Vapor Management System Installation, Stage 1 & 2

As of December 4, 1990, installation of the vapor management system - Stage 1 including the vent pipes and vapor extraction pumps (i.e V3, V4, V5 & V8), as well as cold asphalt patching of the trench in front of the store and about 160' of the northeast trench were complete. With the exception of approximately 730' of trenching (i.e. Trench 1 and the westerly portion of trench 2 in the parking lot), installation of the Stage 2 vapor management system was also complete as of this date.

It was not considered viable to continue the trenching work for

June 11, 1991

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E238 & 239

Stage 2 after December 4, 1991, due to the expected high costs and difficulties caused by the freezing temperatures and thickness of the frozen soils at that time.

Construction of the outstanding work of Stage 2 is now tentatively scheduled to commence on Sunday, June 16, 1991, with an estimated completion time of 1 week. Cumming and Dobbie, and Zenith Paving, both of Brandon, will be engaged to perform excavation and trench patching with hot mix asphaltic concrete, respectively (see Geokwan letters dated June 7 & 11, 1991 in appendix D for contract details).

The locations of the vapor extraction wells, 2 large diameter recovery wells, header pipes, vapor extraction pumps for both Stage 1 & 2 are indicated on Plate 1 appended. Also shown on this plate is the outstanding portion of the Stage 2 trench which has been highlighted in "yellow".

Details of the Stage 2 trenching work undertaken between Friday, November 23, 1990 and Tuesday, December 4, 1990, can be found on the inspector's daily report in Appendix C.

3.0 System Performance Monitoring

The vapor management systems of both Stage 1 & 2 were put into operation on December 4, 1990. To evaluate the performance of the vapor management systems, monitoring of the various components was undertaken on a regular basis.

For the wells, the parameters measured included the groundwater elevation, product thickness (if any), total flammable vapor concentration, ground surface and top of pipe elevations.

For each vapor extraction unit (VEU), the measured parameters consisted of suction pressure and outlet vapor concentration which were needed for computing the daily removal rate of the flammable hydrocarbon vapor from the subsurface. To ensure that each VEU was capable of removing the flammable vapor from its allocated wells, the suction pressure of each well was checked with a pressure gauge.

Removal of the free hydrocarbon product from the recovery wells and the affected vapor extraction or monitoring wells (e.g. MW

June 11, 1991

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E238 & 239

22) was conducted twice (December, 1990 and April, 1991) by Clark Septic Service of Brandon.

All relevant monitoring data are shown in Tables A to F, Stage 1, and Tables A to F, Stage 2 appended. For ease of reference, the aerial distribution of free product thickness encountered in the newly installed wells from December 11 to 14, 1991, is given on Plate 1 and 23. It should be noted that the various hydrocarbon thicknesses shown on Plate 1 are accurate at the well locations only, and that between the wells, the hydrocarbon thicknesses are inferred from the drill hole/well observations and may be subject to considerable error.

The monitoring data indicated that the vapor management systems, Stage 1 & 2, performed excellently as expected in December, 1990 and January 1991. For the Stage 1 units, the hydrocarbon vapors were removed at a rate of about 6 to 16 cubic yard per day (or 9 to 25 gallons of equivalent liquid gasoline per day). The hydrocarbon vapor removal rates of the Stage 2 units ranged from 2 to 28 cubic yard per day (or 3 to 43 gallons per day in terms of liquid gasoline).

The system performance decreased somewhat since February, 1991, due to the problems of ice jamming in the vapor extraction wells and water flooding and subsequent ice blockage in the main header pipes. Flooding of the header pipes were caused by the unexpected snowmelt resulting from the exceptionally warm weather in the beginning of February, 1991, mid March 1991 and the spring surface runoff. As no storm sewers are provided at this site, all roof water and surface runoff can easily penetrate into the header pipes, through the unpaved trenches. The excessive amount of surface runoff had caused erosion and settlements of the trench backfill and as such, all trenches in the parking lot had to be levelled with new granular A base fill many times by Cumming and Dobbie, from February to May 1991.

On February 8, 1991, the writer and our site remediation specialist, Dr. C. Chan made a field trip and undertook repair to the vapor extraction units, V9 and V8. The header pipe of V9 was completely flooded with surface water. The water was partly removed and unit V9 was reversed for blowing air into the header pipe. V9 will be modified for extracting subsurface vapor again once the trench is paved and the header dewatered in late Spring, 1991. A similar problem of partial header flooding occurred at V8. This unit was working fine after draining the header and as

June 11, 1991

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E238 & 239

such, no modification was undertaken. During the field trip on April 9, 1991, the header pipe of V8 was jammed with solid ice and thus, V8 was temporarily shut down, until the trench could be paved and the header drained. For similar reasons, the vapor extraction unit, V6 had to be temporarily shut down. It is planned that all vapor extraction units will be restored to their peak capacities, once the remainder of the Stage 2 trenching and the related hot mix asphalt patching are complete.

4.0 Hot Mix Asphalt Patching At Trenches

As of Friday afternoon, June 7, 1991, patching of compacted hot mixed asphalt for all existing trenches, Stage 1 & 2 was satisfactorily completed. Details of this work plus well repair caused by the asphalt work will be covered in a separate report.

5.0 Hydrocarbon Record - Manitoba Environment

With the assistance of Mr. Dave Ediger, P. Eng. and Mr. Morris Mazerolla of Manitoba Environment, some information on the hydrocarbon products and spills at the Gulf Bulk Plant (presently known as Petro-Canada Bulk Plant), located immediately north of the Canadian Tire property, and results of the pressure testing of underground tanks of the associated Petro-Canada Service Station, taken from late October to the beginning of November 1990 was obtained. All pertinent details are in Appendix A. 

In summary, there were 7 major spills of gasoline and diesel fuel at the Gulf Bulk Plant from October 3, 1977 to August 18, 1983. The Manitoba Environment record does not show any major spills at the Gulf Bulk Plant after August 18, 1983.

In 1976, the tank farm at the Gulf Bulk plant included 11 storage tanks (see Appendix A for tank locations), of which 2 were for regular gasoline (located nearest to the Canadian Tire property), 1 for solvent, 1 for premium gasoline, 1 for kerosene and 6 for diesel fuel. A mayor tank replacement program appeared to occur in November, 1982 or early 1983. At that time, 9 replacement tanks were apparently registered with Manitoba Environment, of which 3 were for diesel fuel, 4 for regular gasoline, 1 for unleaded gasoline and 1 for solvent. The orientation and locations of these 9 tanks were not shown in the Manitoba Environment documents.

6.0 Hydrocarbon Type & Age

On the basis of personal communications with many reputable chemists (for example, Alberta Research Council, Saskatchewan Research Council, Manitoba Research Council, etc.) and chemical engineers in both Canada and the United States, it may be stated that the approximate age of the gasoline present in the subsurface may be estimated with some confidence, if the detected gasoline represents a recent spill or leakage, and that it is not possible to accurately determine the age of diesel fuel which has leaked into the subsurface.

As a number of liquid hydrocarbon pools were detected in the Canadian Tire parking lot and a small hydrocarbon pool detected at MW 77 (see Plate 1) near the northeast corner of the Canadian Tire Store, in mid December 1990, 4 representative, free phase hydrocarbon samples obtained from MW 77, 68, 166, 122 & 2 were submitted to Saskatchewan Research Council (SRC), for evaluating the type and age of hydrocarbons present. The preliminary test results from SRC are summarized below, and detailed in Appendix B.

6.1 The hydrocarbon in MW 77 is a diesel fuel of probably more than a year old. This is similar to the finding by Manitoba Research Council at MW 22 where aged diesel fuel was confirmed.

6.2 At MW68 & 166, the hydrocarbons consist of diesel fuel and unleaded gasoline in an approximate ratio of 1:1. The age of the hydrocarbons may range from 6 months if the underground organic pool is small, to 5 years or less if the pool is large.

6.3 At MW122 & 2, the hydrocarbons are mainly leaded gasoline with a trace (5% - MW 2) to some (10% - MW122) diesel fuel. This finding is similar to the test result of MW 13 prepared earlier by Manitoba Research Council.

7.0 VES Monitoring - June/91

The entire vapor extraction systems, Stage 1 & 2, including all wells are presently monitored by our field engineers in Brandon. The results of this will be forwarded to you shortly.

June 11, 1991

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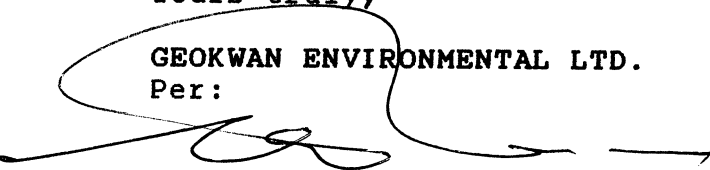
E238 & 239

We trust that the foregoing is adequate for your present purpose. If you have any questions, please call the writer at your convenience.

Yours truly,

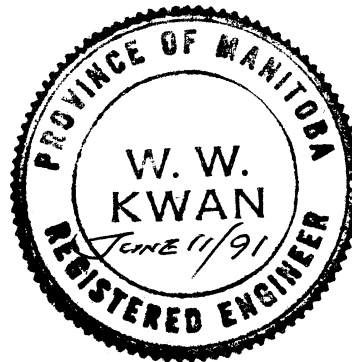
GEOKWAN ENVIRONMENTAL LTD.

Per:


Walter Kwan, M. Eng., P.Eng.

WK:tbs

Encl.



GEOKWAN ENVIRONMENTAL LTD.

Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT

CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 1

LOGGED / DWN: RK/HP

CHKD.: WK

DATE OF INV.: Nov. 11/90

JOB: E238

MW62

10 20 30 40 50 60

(ft)

SOIL DESCRIPTION

SOIL SAMPLE

DRILL TYPE

Wp ☐ W_i ☐ W ☐
WATER CONTENT %

DEPTH

SOIL SYMBOL

DATUM

SURFACE ELEVATION 1293.09'

COND.

TYPE

5" Auger

OTHER TESTS
pp (tsf)

0

ASPHALT

1

FILL

- sandy gravel, some clay

2

3

4

CLAY

5

- black, stiff, fissured, some organics

6

- laminated silt layers

7

- faint HC odor

8

SAND

- fine, silty, strong HC odor

9

- wet at 8'

10

- green discoloration

11

- gravelly below 9.5'

12

- grey-black hydrocarbons

13

- saturated, some clay below 10.5'

14

CLAY - glacial till structure

15

- Brown, silty, firm to stiff

16

- faint HC odor

17

- trace sand & gravel

End hole at 16' from grade

18

Notes

1) Monitoring well installed to 15' from grade.

19

20

Water Level
(Dec.12/90)

▽

1.05

2 4 6 8 10 12
SOIL VAPOUR (x10³ ppm)

Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT

CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 1

LOGGED / DWN : HP/RK

CHKD.: WK

DATE OF INV.: Nov. 12, 1990

JOB: E238

MW71

10 20 30 40 50 60		(ft)	SOIL DESCRIPTION		SOIL SAMPLE		DRILL TYPE
Wp ☐ W ₁ ☐ W ☐		DEPTH	SOIL SYMBOL	DATUM	COND.	TYPE	5" Auger
WATER CONTENT %				SURFACE ELEVATION 1289.19'			OTHER TESTS
		0		<u>FILL</u>			
		1		- sandy gravel to 1'			
		2		- clay with some gravel below 1'			
		3		- stiff, green discoloration			
		4		- black, silty below 2'4"			
		5		- moderate HC odor			
		6		- crushed concrete/rubble below 4'			
		7		<u>SILT</u>			
		8		- moist, firm, trace sand, some clay			
		9		- green discoloration			
		10		- moderate HC odor			
		11		<u>CLAY</u>			
		12		- brown, silty, faint HC odor			
		13		- stiff			
		14		<u>CLAY TILL</u>			
		15		- brown, silty			
		16		- very faint HC odor to 15'			
		17		- some sand and gravel			
		18		- firm to stiff			
		19		- grey, stiff below 12'			
		20		- sandy, gravelly, some silt			
		21		End hole at 16' from grade.			
		22		Note:			
		23		1) Monitoring well installed to 15' from grade.			
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Water Level.
(Dec.12/90)



Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT

CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 1

LOGGED / DWN: HP/RK

CHKD.: WK

DATE OF INV.: Nov. 12/90

JOB: E238

MW76

10 20 30 40 50 60		(ft)	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
Wp ☐ W _i ☐ W ☐		DEPTH	DATUM	COND.	TYPE		5" Auger
WATER CONTENT %			SURFACE ELEVATION 1290.71'				OTHER TESTS
							pp (tsf)
		0	ASPHALT				
		1	FILL				
		2	- moist, sandy gravel				
		3	- gravelly, sandy black clay at 1.25'				
		4	- some silt, trace organics, concrete				
		5	- faint to moderate HC odor below 3.5'				
		6	- wet gravel layer below 6'				
		7	- black hydrocarbons in gravel layer				
		8	SILT				
		9	- firm, slight green discoloration				
		10	- moderate HC odor				
		11	CLAY TILL				
		12	- brown, some sand & gravel				
		13	- stiff, silty				
		14	- some silt, gravelly, sandy below 11.5'				
		15	- trace red oxidation stains				
		16	- grey below 14'				
		17	- stiff to very stiff				
		18	End hole at 16' from grade				
		19	NOTE:				
		20	1) Monitoring well installed to 15' from grade.				

Water Level (Dec.12/90) 1.60 1.85

SOIL VAPOUR ($\times 10^3$ ppm)

PLATE 5

Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT

CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 1

LOGGED / DWN: RK/HP

CHKD.: WK

DATE OF INV.: Nov.12/90

JOB: E238

MW103

10 20 30 40 50 60		(ft)	SOIL DESCRIPTION	SOIL SAMPLE		DRILL TYPE
Wp ☐ W _i ☐ W ☐		DEPTH	DATUM	COND.	TYPE	5" Auger
WATER CONTENT %.			SURFACE ELEVATION 1290.67'			OTHER TESTS pp (tsf)
		0	ASPHALT			
		1	FILL			
		2	- sandy gravel			
		3	- black, organic clay below 2'			
		4	- gravelly below 3'8"			
		5				
		6	SAND			
		7	- moist to wet, medium grained			
		8	- moderate HC odor			
		9	- black HC discoloration			
		10	CLAY TILL			
		11	- faint HC odor			
		12	- green discoloration			
		13	- brown below 7:5'			
		14	- sandy, gravelly, some silt			
		15	- stiff			
		16	- grey, sandy, silty some gravel below 11', no HC odor			
		17	End hole at 16' from grade.			
		18	NOTE			
		19	1) Monitoring well installed to 15' from grade			
		20				

Water Level
(Dec.12/90)

1.85

Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT

CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 1

LOGGED / DWN: RK/HP

CHKD.: WK

DATE OF INV.: Nov. 12/90

JOB: E238

MW92

WATER CONTENT %		DEPTH (ft)	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p □	W _i △	W ○		DATUM	COND.	TYPE		
WATER CONTENT %				SURFACE ELEVATION 1293.06'			OTHER TESTS	
		0	ASPHALT					
		1	FILL					
		2	- dry, sandy gravel					
		3	- trace styrofoam insulation					
		4	- sandy, gravelly black clay below 3'					
		5	- faint HC odor					
		6	CLAY- organic, black, trace sand					
		7	- silty, moderate HC odor					
		8	SAND					
		9	- fine, moist, black discoloration					
		10	- moderate HC odor, visible HC					
		11	CLAY					
		12	- tan-grey, silty					
		13	- moderate HC odor					
		14	- stiff					
		15	CLAY TILL					
		16	- tan-grey, some sand & gravel					
		17	- silty, moist, stiff to very stiff					
		18	- brown below 12.5'					
		19	- no odor below 13'					
		20	- trace of red oxidation stains below 13'					
		21	End hole at 16' from grade.					
		22	NOTE					
		23	1) Monitoring well installed to 15' from grade.					

Water Level
(Dec.11/90)

Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 1

LOGGED / DWN: RK/HP

CHKD.: WK

DATE OF INV. Nov. 13, 1990

JOB: E238

MW106

10 20 30 40 50 60		(ft)	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE		DRILL TYPE
Wp □	W _i △	W ○		DATUM	COND.	TYPE	5" Auger
WATER CONTENT %				SURFACE ELEVATION 1293.41'			OTHER TESTS
		0	ASPHALT				
		1	FILL				
		2	- moist sandy gravel, some clay				
		3	- black, gravelly clay at 4.5'				
		4	- faint HC odor below 4.5'				
		5					
		6					
		7	SILT				
		8	- firm, moist, trace of organics				
		9	- some clay				
		10	- black discoloration, moderate HC odor				
		11	SAND				
		12	- silty, fine, moist				
		13	- green discoloration, moderate HC odor				
		14	- fine gravel layer at 10.4'				
		15	CLAY TILL				
		16	- brown, moist, stiff				
		17	- silty, some gravel and sand				
		18	- faint HC odor to 12'				
		19	- some silt lenses at 14'				
		20					
			End hole at 16' from grade.				
			Note:				
			1) Monitoring well installed to 15' from grade				

Water Level
(Dec.12/90)



Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT

CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 1

LOGGED / DWN: RK/HP

CHKD.: WK

DATE OF INV.: Nov. 13, 1990

JOB: E238

MW115

10 20 30 40 50 60		(ft)	SOIL DESCRIPTION	SOIL SAMPLE		DRILL TYPE
W _p □	W _i △	W _z ⊙	DATUM	COND.	TYPE	5" Auger
WATER CONTENT %			SURFACE ELEVATION 1292.43'			OTHER TESTS
		0	ASPHALT			
		1	FILL			
		2	moist, sandy gravel			
		3	gravelly, sandy, brown clay below 3.75'			
		4				
		5				
		6				
		7	SILT- black, clayey, some sand trace of organics faint HC odor			
		8	SAND			
		9	fine, silty, moist green discoloration gravelly from 8.75 to 9.5'			
		10	CLAY TILL			
		11	brown, silty			
		12	firm, moist			
		13	some gravel and sand			
		14	gravelly, rust stains below 11'			
		15	stiff, sandy, some silt below 11'			
		16				
		17	End hole at 16' from grade.			
		18	NOTE:			
		19	1) Monitoring well installed to 15' from grade.			
		20				

Water Level
(Dec.12/90)

▽

Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT

CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 2

LOGGED / DWN: HP/RK

CHKD.: WK

DATE OF INV.: Nov. 13, 1990

JOB: E239

MW118

10 20 30 40 50 60		(ft)	SOIL DESCRIPTION	SOIL SAMPLE		DRILL TYPE
W _p □ W _i △ W ○		DEPTH	DATUM	COND.	TYPE	5" Auger
WATER CONTENT %		SOIL SYMBOL	SURFACE ELEVATION 1296.07'			OTHER TESTS pp (tsf)
		0	ASPHALT			
		1	FILL			
		2	- sandy gravel, some clay			
		3				
		4	SILT			
		5	- firm, moist, sandy, some clay			
		6	- green discoloration			
		7	- trace of organics			
		8	- moderate HC odor			
		9	- moderate to strong HC odor below 5.5'			
		10	- trace gravel below 8'			
		11	CLAY TILL			
		12	- brown, gravelly, some silt and sand			
		13	- stiff			
		14	- faint to moderate HC odor			
		15	- rusty stain			
		16	- silty, some sand at 10.5'			
		17	- trace gravel			
		18	- faint HC odor below 10.5'			
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TESTHOLE LOG

PROJECT

CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 2

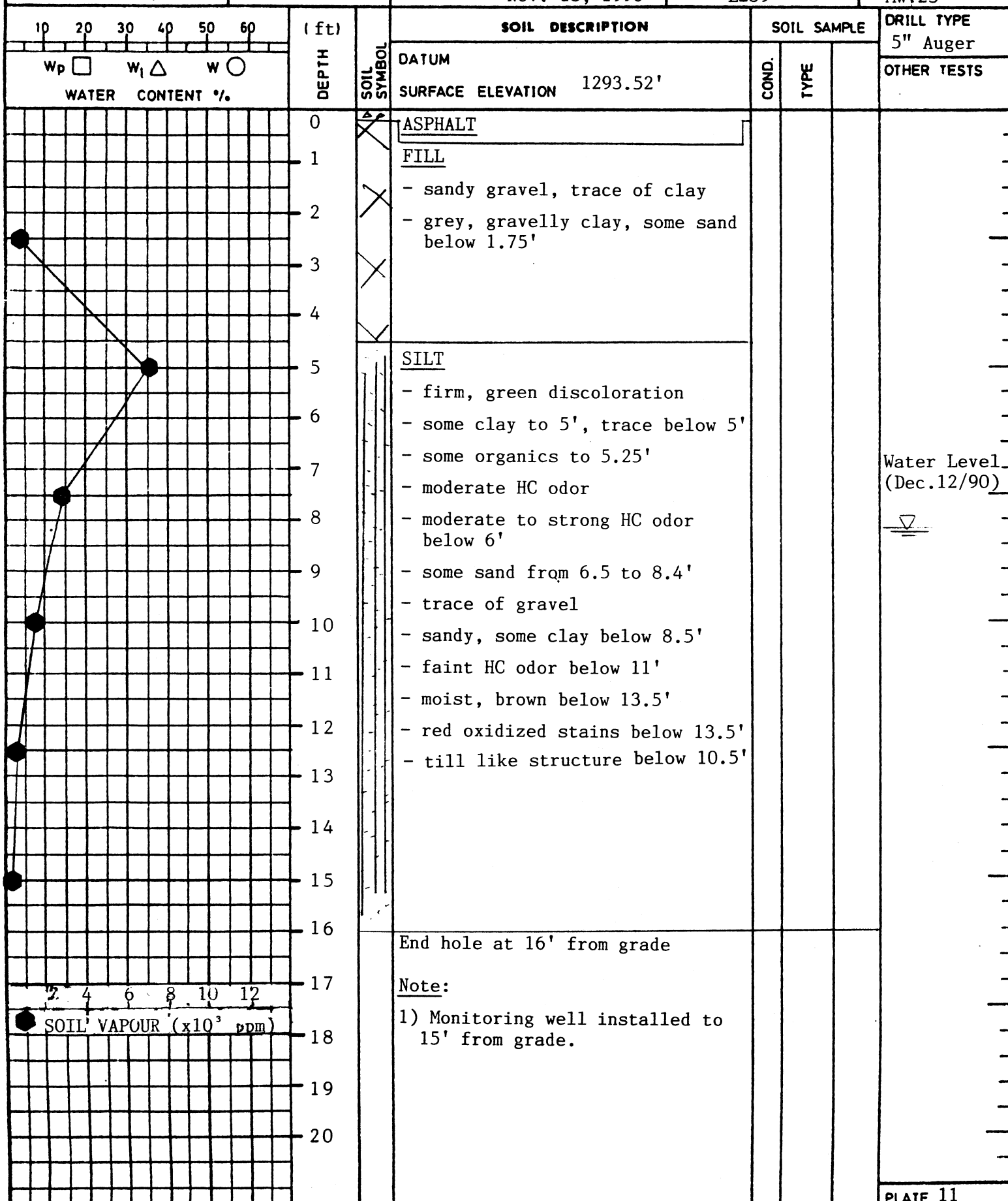
LOGGED / DWN : HP/RK

CHKD.: WK

DATE OF INV. : Nov. 13, 1990

JOB : E239

MW123



Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 2

LOGGED / DWN: RK/HP CHKD.: WK DATE OF INV.: Nov. 13, 1990 JOB: E239 MW 126

WATER CONTENT %		DEPTH (ft)	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE		DRILL TYPE	OTHER TESTS
W _p □	W _i △			DATUM	COND.	TYPE		
SURFACE ELEVATION 1292.48'								
		0	△	ASPHALT				
		1	△	FILL				
		2	△	- sandy gravel to 1.75'				
		3	△	- brown, gravelly, sandy clay below 1.75'				
		4	△					
		5	△	CLAY				
		6	△	- black, some organics				
		7	△	- some sand and silt				
		8	△	- moist, stiff				
		9	△	- faint HC odor				
		10	△	- sandy below 6.5'				
		11	△	SAND				
		12	△	- fine, silty, moist to wet				
		13	△	- moderate HC odor, green discoloration				
		14	△	- wet at 8'				
		15	△	CLAY TILL				
		16	△	- grey, some sand, gravel and silt				
		17	△	- stiff				
		18	△	- faint HC odor				
		19	△	- brown, very faint HC odor below 11'				
		20	△	- sandy, gravelly, stiff to very stiff at 11'				
		21	△	- red oxidation stains below 12.75'				
		22	△	End hole at 16' from grade.				
		23	△	Note:				
		24	△	1) Monitoring well installed to 15' from grade.				
		25	△					
		26	△					
		27	△					
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		29	△					
		30	△					

Water Level
(Dec.12/90)

▽

Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 2

LOGGED / DWN: RK/HP CHKD.: WK DATE OF INV.: Nov. 13, 1990 JOB: E239 MW 133

10 20 30 40 50 60		(ft)	SOIL DESCRIPTION	SOIL SAMPLE		DRILL TYPE
W _p □	W _i △	W ○	DATUM	COND.	TYPE	5" Auger
WATER CONTENT %			SURFACE ELEVATION 1292.33'			OTHER TESTS
		0	ASPHALT			
		1	FILL			
		2	- sandy gravel to 2.5'			
		3	- black gravelly clay below 2.5'			
		4	- faint HC odor			
		5	SILT- firm, moist, green discoloration			
		6	- moderate HC odor			
		7	CLAY			
		8	- black, some silt and sand,			
		9	trace organics			
		10	- firm to stiff			
		11	SAND			
		12	- fine, silty, moist to wet			
		13	- green discoloration			
		14	- moderate to strong HC odor			
		15	CLAY TILL			
		16	- gravelly, sandy, some silt			
		17	- stiff			
		18	- green discoloration			
		19	- faint HC odor			
		20	- brown at 10.5', some sand and gravel			
		21	- no HC odor below 10.5'			
		22	- red oxidation stains			
		23	- grey at 13.5'			
		24	- silty, stiff to very stiff at 13.5'			
		25	End hole at 16' from grade.			
		26	Note:			
		27	1) Monitoring well installed to 15' from grade.			
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Water Level-
(Dec.12/90)-



Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 2

LOGGED / DWN: RK/HP		CHKD.: WK	DATE OF INV.: Nov. 13, 1990		JOB: E239		MW 144	
10 20 30 40 50 60 Wp ☐ W _i ☐ W ☐ WATER CONTENT %		(ft) DEPTH	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE		DRILL TYPE	
				DATUM	COND.	TYPE	5" Auger	
				SURFACE ELEVATION 1292.37'			OTHER TESTS	
		0	X	<u>FILL</u>				
		1	X	- sandy, gravelly clay				
		2	X	- dry				
		3	X	- organics to 1'				
		4		<u>SILT</u>				
		5		- dry, stiff, brown				
		6		- sandy, some clay				
		7		<u>SAND</u>				
		8		- fine, brown, dry, silty				
		9		- black, moist at 8'				
		10		- strong HC odor below 8'				
		11		<u>CLAY TILL</u>				
		12		- brown, silty, stiff				
		13		- some gravel				
		14		- grey below 14.5', some silt and gravel, sandy				
		15						
		16		End hole at 16' from grade				
		17						
2 4 6 8 10 12 SOIL VAPOUR (x10 ³ ppm)		18		<u>Note</u>				
		19		1) Monitoring well installed to 15' from grade.				
		20						

Water Level
(Dec.12/90)



Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT

CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 2

LOGGED / DWN: RK/HP

CHKD.: WK

DATE OF INV.: Nov. 13, 1990

JOB: E239

MW 177

10 20 30 40 50 60		(ft)	SOIL DESCRIPTION	SOIL SAMPLE		DRILL TYPE
Wp ☐ W _i ☐ W ☐		DEPTH	DATUM	COND.	TYPE	5" Auger
WATER CONTENT %.			SURFACE ELEVATION 1293.06'			OTHER TESTS
		0	<u>ASPHALT</u>			
		1	<u>FILL</u>			
		2	- sandy gravel, some clay			
		3	- black clay, some gravel and sand below 1.5'			
		4	- silty			
		5	- faint HC odor			
		6	<u>SILT</u> - firm to stiff, moist, clayey			
		7	- green discoloration, moderate HC odor			
		8	- organics			
		9	<u>SAND</u>			
		10	- fine, silty, moist			
		11	- strong HC odor			
		12	- black, wet below 8'			
		13	<u>CLAY</u>			
		14	- firm to stiff, silty			
		15	- green discoloration, moderate HC odor			
		16	- faint HC odor at 11'			
		17	<u>CLAY TILL</u>			
		18	- brown, silty, stiff			
		19	- some sand and gravel, stiff to very stiff at 13'			
		20	- no HC odor at 13'			
		21	End hole at 15.5' from grade.			
		22	Note			
		23	1) Monitoring well installed to 15' from grade.			
2 4 6 8 10 12		24				
SOIL VAPOUR (x10 ³ ppm)		25				
		26				
		27				
		28				
		29				
		30				

Water Level
(Dec.13/90)



Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 2

LOGGED / DWN : RK/HP

CHKD.: WK

DATE OF INV.: Nov. 13, 1990

JOB: E239

MW 181

10 20 30 40 50 60		(ft)	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p □	W _i △	W ○		DATUM	COND.	TYPE	OTHER TESTS	
WATER CONTENT %			DEPTH	SURFACE ELEVATION				
			0	ASPHALT				
			1	FILL				
				- sandy gravel, trace clay				
			2	- black clay, some gravel below 3.5'				
			3	- faint HC odor				
			4					
			5					
			6	SILT				
				- black, clayey, organic				
				- firm to stiff, moist				
				- faint HC odor				
			7	- green discoloration below 6.25'				
				- moderate HC odor below 6.25'				
			8	SAND				
				- fine, silty, moist to wet				
			9	- green discoloration, moderate HC odor				
			10					
			11	CLAY TILL				
				- brown, sandy, silty				
			12	- stiff				
			13	- oxidized rust stains				
				- trace gravel below 13'				
			14					
			15					
			16					
				End hole at 16' from grade				
			17	Note				
				1) Monitoring well installed to 16' from grade.				
			18					
			19					
			20					

Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT

CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 2

LOGGED / DWN: RK/HP

CHKD.: WK

DATE OF INV.: Nov. 13, 1990

JOB: E239

MW 182

10 20 30 40 50 60		(ft)	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE 5" Auger
W _p □	W ₁ △	W ○			COND.	TYPE	OTHER TESTS	
WATER CONTENT %			DEPTH	DATUM				
				SURFACE ELEVATION 1297.04'				
			0	ASPHALT				Water Level (Dec.12/90) 
			1	FILL				
			2	- moist, sandy gravel, trace clay				
			3	- pea gravel from 1.5 to 3'				
			4	- grey clay, some gravel below 3'				
			5	SILT				
			6	- tan, moist, sandy				
			7	- strong HC odor				
			8	- laminated clay layers to 5.75'				
			9	- green below 5.5'				
			10	SAND				
			11	- fine, black, moist, silty				
			12	- strong HC odor				
			13	CLAY TILL				
			14	- grey, silty, trace sand				
			15	- firm to stiff, moist				
			16	- faint HC odor				
			17	- no HC odor below 14'				
			18	End hole at 15.5' from grade.				
			19	Note:				
			20	1) Monitoring well installed to 15' from grade.				

Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT

CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 2

LOGGED / DWN: RK/HP

CHKD.: WK

DATE OF INV.: Nov. 13, 1990

JOB: E239

MW 184

10 20 30 40 50 60		(ft)	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
Wp ☐ W _i ☐ W ☐		DEPTH	DATUM	COND.	TYPE		5" Auger
WATER CONTENT %			SURFACE ELEVATION 1294.30'				OTHER TESTS
		0	<u>FILL</u>				
		1	- sodded				
		2	- sandy gravel, trace clay				
		3	<u>CLAY</u> - stiff, black, sandy				
		4	- some roots				
		5	- faint HC odor				
		6	<u>SILT</u> - grey, clayey, moist, firm to stiff				
		7	- faint HC odor; green discoloration below 5'				
		8	<u>CLAY</u>				
		9	- brown to green, stiff				
		10	- silty, some sand & gravel				
		11	- faint HC odor				
		12	- moderate to strong HC odor below 8'				
		13	- moderate HC odor, silt lenses below 11'				
		14	<u>CLAY TILL</u>				
		15	- brown, stiff, sandy, silty, trace of gravel				
		16	- faint HC odor to 12.5'				
		17	- very stiff, gravelly below 14'				
		18	End hole at 16' from grade				
		19	Note:				
		20	1) Monitoring well installed to 15' from grade.				

Water Level
(Dec.12/90)

▽

Geokwan Environmental Ltd

TESTHOLE LOG

PROJECT

CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 2

LOGGED / DWN: RK/HP

CHKD.: WK

DATE OF INV.: Nov. 13, 1990

JOB: E239

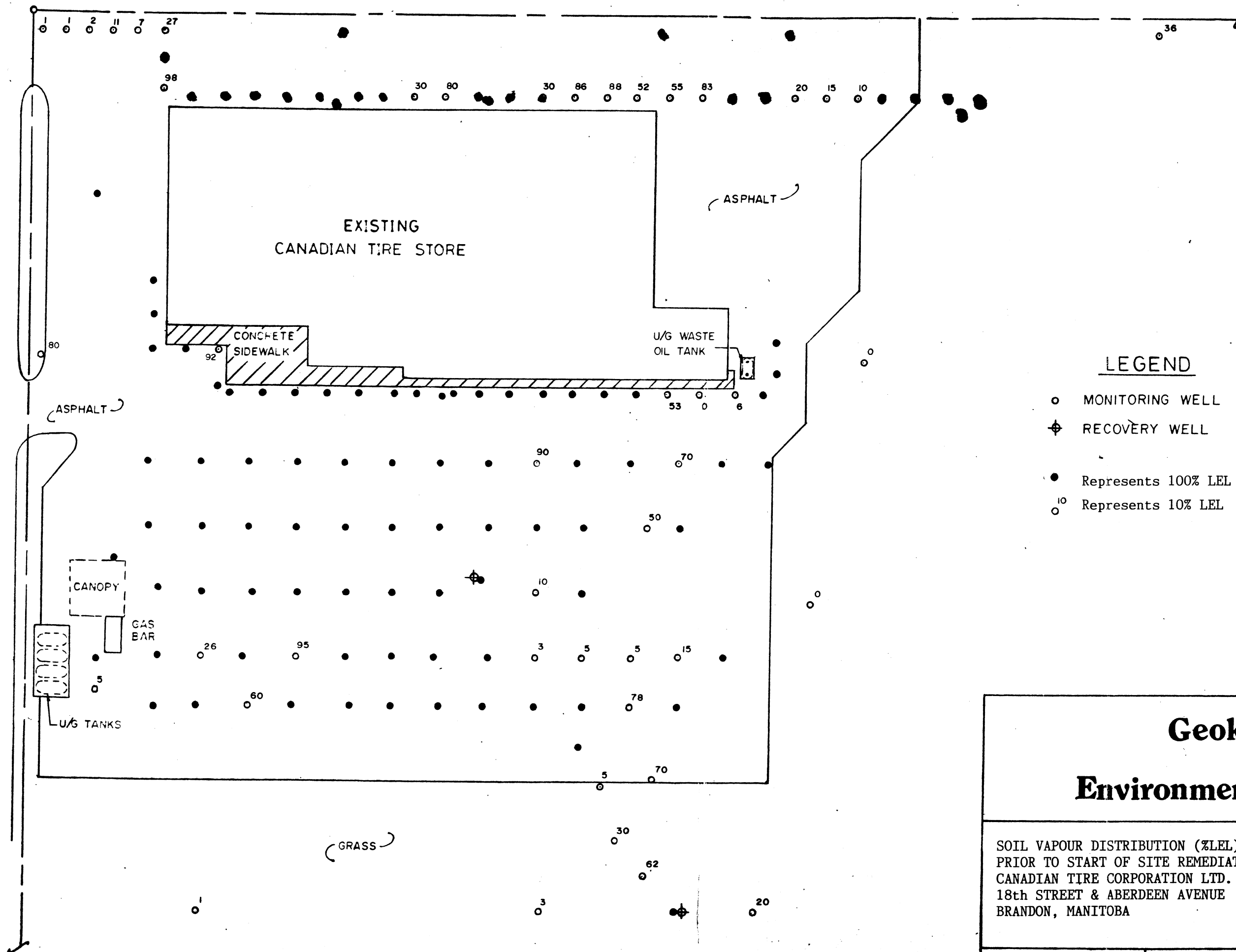
MW 185

10 20 30 40 50 60		(ft)	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
Wp ☐ W _i ☐ W ☐		DEPTH	DATUM	COND.	TYPE		5" Auger
WATER CONTENT %			SURFACE ELEVATION 1291.89'				OTHER TESTS
		0	ASPHALT				
		1	FILL				
		2	- dry sandy gravel, trace clay				
		3	CLAY				
		4	- black, sandy, stiff				
		5	- moist, organic				
		6	- faint HC odor				
		7	- silt lenses below 3.5'				
		8	SAND				
		9	- fine, moist, silty				
		10	- moderate HC odor				
		11	- green discoloration, strong HC odor at 6.25'				
		12	- black, strong HC odor below 8.75'				
		13	CLAY TILL				
		14	- brown, stiff, silty				
		15	- faint HC odor below 10'				
		16	- trace sand and gravel				
		17	- very stiff, gravelly, sandy, oxidized at 10.5'				
		18	- grey, slightly oxidized below 13.5'				
		19	End hole at 16' from grade.				
		20	Note				
			1) Monitoring well installed to 15' from grade.				

Water Level -
(Dec.12/90) -



18th STREET



LEGEND

- MONITORING WELL
- ⊕ RECOVERY WELL
- Represents 100% LEL
- ¹⁰ Represents 10% LEL

Geokwan Environmental Ltd

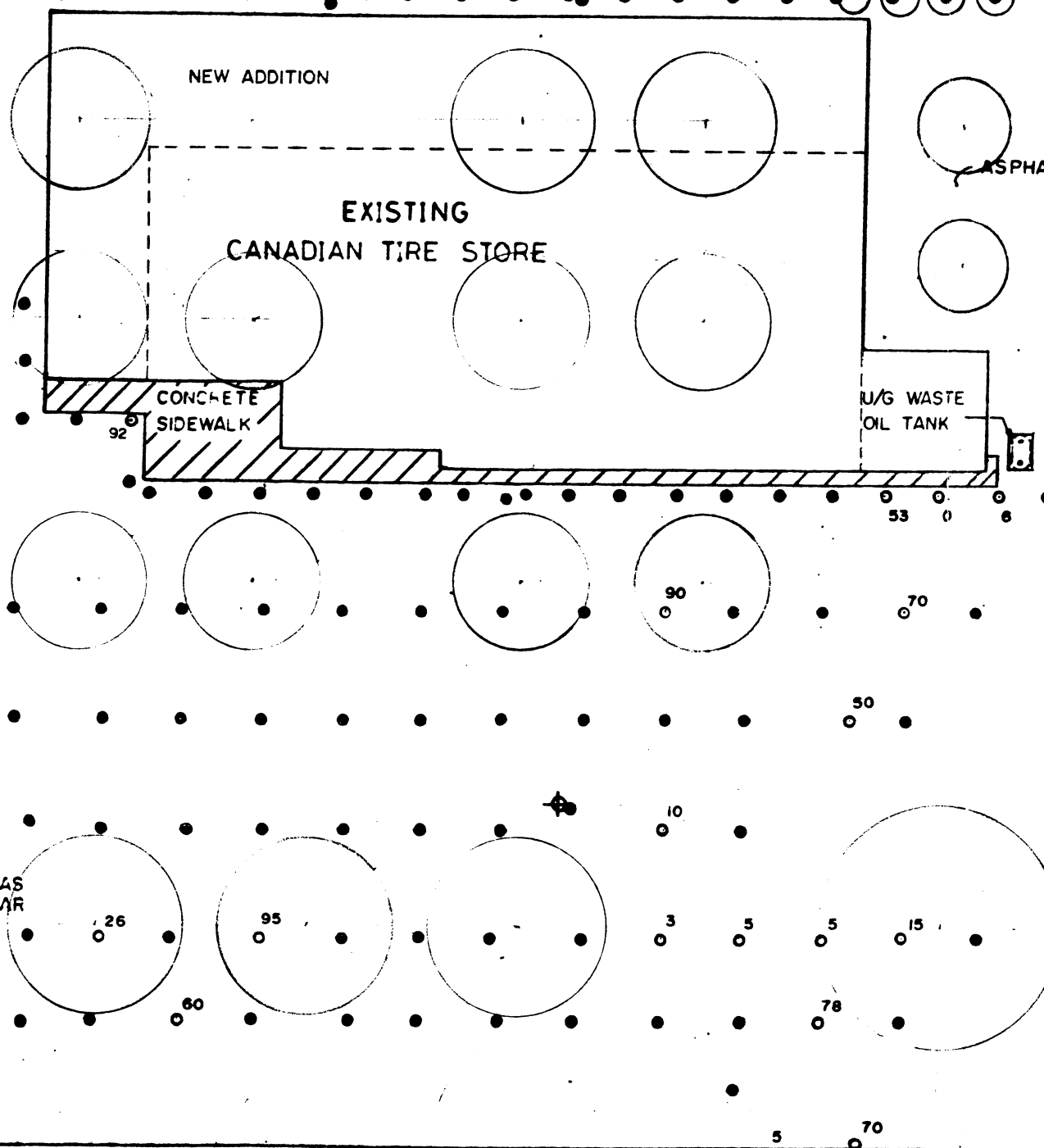
SOIL VAPOUR DISTRIBUTION (%LEL) - November 15 - 18, 1990
PRIOR TO START OF SITE REMEDIATION
CANADIAN TIRE CORPORATION LTD.
18th STREET & ABERDEEN AVENUE
BRANDON, MANITOBA

SCALE: 1"=60'

MADE: RK

PLATE: 20

18th STREET



LEGEND

- MONITORING WELL
- ◆ RECOVERY WELL
- OLD STORAGE TANK
- Represents 100% LEL
- ¹⁰ Represents 10% LEL

1. TL - OLD STORAGE TANK LOCATION
SHOWN ARE VERY APPROXIMATE
AND INFERRED FROM HISTORIC
AERIAL PHOTOS.

Geokwan Environmental Ltd

SOIL VAPOUR DISTRIBUTION (%LEL) - November 15 - 18, 1990
PRIOR TO START OF SITE REMEDIATION
CANADIAN TIRE CORPORATION LTD.
18th STREET & ABERDEEN AVENUE
BRANDON, MANITOBA

SCALE: 1"=60'	MADE: RK	PLATE: 21
DATE: DEC 6/90	CHKD: WK	JOB: E 238 & E 239



EXISTING
CANADIAN TIRE STORE

ASPHALT

CONCRETE
SIDEWALK

U/G WASTE
OIL TANK

LEGEND

- MONITORING WELL
- ⊕ RECOVERY WELL
- Represents 100% LEL
- ¹⁰ Represents 10% LEL

18th STREET

ASPHALT

CANOPY

GAS
BAR

U/G TANKS

GRASS

Geokwan

Environmental Ltd

SOIL VAPOUR DISTRIBUTION (%LEL) - December 11 - 14, 1990
DURING SITE REMEDIATION
CANADIAN TIRE CORPORATION LTD.
18th STREET & ABERDEEN AVENUE
BRANDON, MANITOBA

SCALE: 1"=60'	MADE: RK	PLATE: 22
DATE: DEC 6/90	CHKD: WK	JOB: E 238 & E 239

18th STREET

0.5
(1.2)



EXISTING
CANADIAN TIRE STORE

ASPHALT

CONCRETE
SIDEWALK

U/G WASTE
OIL TANK

LEGEND

- MONITORING WELL
- ⊕ RECOVERY WELL

1.2 = Measurement taken December 11 - 14/90
 (1.2) = Measurement taken November 16 - 19/90
 FILM = Reading less than 0.1"

CANOPY

GAS
BAR

U/G TANKS

GRASS

Geokwan

Environmental Ltd

FREE PHASE HYDROCARBON THICKNESS (INCHES)
 MEASURED NOVEMBER 16 - 19, 1990 & DECEMBER 11 - 14, 1990
 CANADIAN TIRE CORPORATION LTD.
 18th STREET & ABERDEEN AVENUE
 BRANDON, MANITOBA

SCALE: 1"=60'	MADE: RK	PLATE: 23
DATE: DEC 6/90	CHKD: WK	JOB: E 238 & E 239

MONITORING DATA, DEC/90 - APR/91

SITE REMEDIATION, STAGE 2

CANADIAN TIRE PROPERTY, BRANDON

- * Table A - Groundwater Elevation (7 Pages)
- * Table B - Total Combustible Vapour (6 Pages)
- * Table C - Hydrocarbon Thickness (6 Pages)
- * Table D - VES Data (1 Page)
- * Table E - Liquid Hydrocarbons Removed (1 Page)
- * Table F - Ground Surface & Top of Pipe Elevations
(7 Pages)

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION/DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elevation (ft)/Depth to Water Table (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
1	--	---	10.86/5.09
2	* 6.95	0.19/9.54	5.01/4.82
3	3.06	2.43/6.57	4.44/4.56
4	--	---	8.10/1.29
5	--	---	5.52/3.84
6	--	---	4.75/0.93
7	--	---	3.43/4.68
8	--	---	2.34/5.59
9	--	---	1.39/6.70
10	--	---	1.53/5.17
11	--	---	4.78/1.27
12	--	---	5.01/0.58
13	3.48	---	--
15	--	---	9.01/12.96
17	--	---	4.86/6.04

Note:

0.19/9.54, 0.19 = ground water elevation, 9.54 = depth to ground water from ground surface.

Add 1280' to the ground water elevation for the actual geodetic elevation.

*Add 1270' for the geodetic elevation.

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION/DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elevation (ft)/Depth to Water Table (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
18	--	---	2.11/10.91
19	2.95	2.53/7.22	7.15/2.60
20	3.54	3.63/7.67	4.41/6.89
21	4.01	3.39/9.11	4.40/8.10
22	1.07	0.82/8.56	2.74/6.64
23	--	0.51/8.87	1.60/7.78
25	--	---	1.48/4.92
27	--	---	2.68/6.01
29	--	---	4.88/2.16
30	--	---	5.05/0.10
32	--	---	5.03/3.79
38	--	---	4.62/5.53
41	3.56	2.38/7.99	5.98/4.39
44	--	3.73/7.94	6.13/5.54
52	5.66	5.29/7.50	5.85/--

Note:

2.11/10.91, 2.11 = ground water elevation, 10.91 = depth to ground water from ground surface.

Add 1280' to the ground water elevation for the actual geodetic elevation.

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION/DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elevation (ft)/Depth to Water Table (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
53	6.84	---	---
54	8.35	---	8.41/9.01
118	8.00	---	---
119	7.06	---	---
120	6.82	---	---
121	6.31	---	---
122	4.94	---	---
123	5.38	---	---
124	4.55	---	---
125	3.83	---	---
126	3.54	---	---
127	3.41	---	---
128	3.28	---	4.78/7.04
129	3.08	---	---
130	2.94	---	---
131	2.95	---	---

Note:

8.41/9.01, 8.41 = ground water elevation, 9.01 = depth to ground water from ground surface.

Add 1280' to the ground water elevation for the actual geodetic elevation.

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION/DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elevation (ft)/Depth to Water Table (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
132	3.13	---	---
133	3.22	---	---
134	--	---	---
135	4.14	---	---
136	4.58	---	---
137	4.85	---	5.85/8.19
138	5.99	---	---
139	6.24	---	---
140	6.39	---	---
141	7.62	---	---
142	8.22	---	---
143	--	---	---
144	2.38	---	6.05/6.32
145	1.82	---	5.41/5.42
146	1.81	2.07/7.93	5.41/4.59
147	2.45	1.24/8.55	5.04/4.75

Note:

5.85/8.19, 5.85 = ground water elevation, 8.19 = depth to ground water from ground surface.

Add 1280' to the ground water elevation for the actual geodetic elevation.

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION/DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elevation (ft)/Depth to Water Table (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
148	5.01	2.31/11.40	1.16/12.55
149	4.24	3.88/9.38	---
150	--	---	3.83/9.26
151	2.68	---	---
152	3.54	3.15/9.70	3.81/9.04
153	3.47	3.13/9.66	---
154	3.43	3.14/9.52	---
155	3.37	2.99/9.59	---
156	3.41	3.03/9.40	3.79/8.64
157	2.87	2.78/9.52	---
158	3.02	2.78/9.19	---
159	2.95	2.55/9.05	3.47/8.13
160	2.92	1.56/9.72	---
161	--	---	---
162	6.75	4.63/9.94	4.99/9.58
163	5.54	4.07/9.94	4.22/9.79

Note:

1.16/12.55, 1.16 = ground water elevation, 12.55 = depth to ground water from ground surface.

Add 1280' to the ground water elevation for the actual geodetic elevation.

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION/DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elevation (ft)/Depth to Water Table (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
164	5.14	4.20/9.32	---
165	4.41	3.75/9.24	---
166	2.67	2.38/10.33	2.83/9.88
167	3.43	3.36/9.07	---
168	3.44	3.10/9.10	3.76/8.44
169	3.41	3.04/8.97	3.79/8.22
170	3.31	2.96/8.87	3.98/7.85
171	3.85	---	---
172	3.27	---	---
173	6.63	---	---
174	5.84	---	---
175	5.89	---	---
176	4.51	---	---
177	4.53	---	---
178	4.19	---	---
179	4.09	---	---

Note:

4.20/9.32, 4.20= ground water elevation, 9.32 = depth to ground water from ground surface.

Add 1280' to the ground water elevation for the actual geodetic elevation.

SITE REMEDIATION - STAGE 2
GROUND WATER ELEVATION/DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elevation (ft)/Depth to Water Table (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
180	3.90	---	---
181	--	---	---
182	8.38	---	8.36/8.68
183	7.23	5.31/9.89	5.75/9.45
184	4.62	3.78/10.52	3.54/10.76
185	4.01	3.32/8.57	3.45/8.44
186	3.11	---	---
RW1	* 6.11	0.81/8.94	3.98/5.77
RW2	3.43	3.09/9.48	3.77/8.80
CP	--	---	4.99/3.68

Note:

8.36/8.68, 8.36 = ground water elevation, 8.68 = depth to ground water from ground surface.

Add 1280' to the ground water elevation for the actual geodetic elevation.

* Add 1270' for the geodetic elevation.

CP = Monitoring well installed by others in 1985.

SITE REMEDIATION - STAGE 2
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	<u>Nov. 15-18/90</u>	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
1	1	--	--	0
2	>100 (12000)	>100	30	30
3	--	1	2	32
4	--	--	--	0
5	--	--	--	1
6	--	--	--	0
7	--	1	--	0
8	2	1	--	0
9	--	--	--	0
10	--	1	--	0
11	--	--	--	0
12	--	--	--	0
13	>100 (+12000)	>100	--	--
15	--	--	--	0
17	--	3	--	0
18	1	0	--	0

Note:

(12000) is the total gasoline vapour concentration measured in the monitoring well (in ppm).

**SITE REMEDIATION - STAGE 2
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA**

MW No.	Total Combustible Vapour (% LEL)			
	<u>Nov. 15-18/90</u>	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
19	0	35 (100)	0	22 (0)
20	>100 (150)	0	100	1
21	>100 (+12000)	1 (100)	12	3
22	36 (2000)	5 (200)	0	4
23	0	--	--	1
25	--	--	--	0
27	--	2	--	0
29	--	>100	--	3
30	--	--	--	0
32	--	5	--	1
38	--	--	--	100
41	--	1	0	1
44	--	--	31	1
52	>100 (+12000)	1	2	3 (150)
53	>100 (12000)	13	--	--
54	5	5 (300)	--	1

Note:

(100) = gasoline vapour concentration in ppm.

SITE REMEDIATION - STAGE 2
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	Nov. 15-18/90	Dec. 11-14/90	Feb. 4-5/91	Apr. 9-11/91
118	>100	31 (12000)	--	--
119	26	22 (6200)	--	--
120	>100	5	--	--
121	95	>100 (12000)	--	--
122	>100	>100	--	--
123	>100	17	--	--
124	>100	34 (2400)	--	--
125	>100	0	--	--
126	3	1	--	--
127	5	2	--	--
128	5	4	--	>100
129	15	25 (500)	--	--
130	>100	32	--	--
131	>100 (500)	2	--	--
132	78 (500)	1	--	--
133	>100	1	--	--
134	>100	1	--	--
135	>100	1	--	--

Note: (12000) = gasoline vapour concentration in ppm.

SITE REMEDIATION - STAGE 2
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	<u>Nov. 15-18/90</u>	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
136	>100	1	--	--
137	>100 (3800)	25	--	5
138	>100	70	--	--
139	>100	70	--	--
140	60	10	--	--
141	>100	1	--	--
142	>100	38	--	--
143	>100	0	--	--
144	5	1	--	2
145	30 (500)	3	--	3
146	62 (2200)	25	22	3
147	20 (500)	3	3	0
148	>100	2 (300)	24	>100
149	>100	0	5	--
150	>100	--	--	5
151	>100 (100)	25 (1500)	--	--
152	>100	3	0	3
153	>100 (100)	0	0	--

Note: (3800) = gasoline vapour concentration in ppm.

SITE REMEDIATION - STAGE 2
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	Nov. 15-18/90	Dec. 11-14/90	Feb. 4-5/91	Apr. 9-11/91
154	>100 (4500)	8 (550)	>100	--
155	>100	0	36	--
156	90	0	1	15
157	>100	6	0	--
158	>100	0	0	--
159	70	0	0	2
160	>100	1	1	--
161	--	--	6	--
162	>100	3 (500)	0	1
163	>100	3 (1000)	3	0
164	>100	2	5	--
165	>100	36	2	--
166	>100	20	2	30
167	>100	10	49	--
168	>100 (100)	0	3	100
169	>100 (2200)	5	>100	>100(12000)
170	>100	1	62	>100
171	>100	6	--	--

Note: (4500) = gasoline vapour concentration in ppm.

**SITE REMEDIATION - STAGE 2
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA**

MW No.	Total Combustible Vapour (% LEL)			
	Nov. 15-18/90	Dec. 11-14/90	Feb. 4-5/91	Apr. 9-11/91
172	50	3	--	--
173	>100	20 (6000)	--	--
174	>100	25	--	--
175	>100	50 (1900)	--	--
176	>100	10	--	--
177	>100 (2200)	10	--	--
178	>100 (500)	5	--	--
179	10	5	--	--
180	>100	85 (12000)	--	--
181	70 (100)	--	--	2
182	>100	0	--	5
183	>100 (15000)	0	0	0
184	80 (2300)	0	2	1
185	>100 (300)	0	4	0
186	>100	0	--	--
RW1	--	8	52	16
RW2	--	0	0	3
CP	--	>100	--	100

Note: (6000) = gasoline vapour concentration in ppm.

SITE REMEDIATION - STAGE 2
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
1	---	---	Nil
2	1.00	0.50	Nil
3	Nil	Nil	Nil
4	---	---	Nil
5	---	---	Nil
6	---	---	Nil
7	Nil	---	Nil
8	Nil	---	Nil
9	---	---	Nil
10	Nil	---	Nil
11	---	---	Nil
12	---	---	Nil
13	0.40	----*	----*
15	---	---	Nil
16	---	---	Nil
17	Nil	---	Nil
18	Nil	---	Nil
19	Nil	Nil	Nil
20	Nil	Nil	Nil

Note: See footnotes for table C (Stage 1) - Page 1

SITE REMEDIATION - STAGE 2
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
21	Nil	Nil	Nil
22	0.04	Nil	Nil
23	---	Nil	Nil
27	Nil	---	Nil
29	Nil	---	Nil
32	Nil	---	Nil
38	---	---	Nil
41	Nil	Nil	Nil
44	---	Nil	Nil
52	Nil	Nil	Nil
53	Nil	---	---
54	Nil	---	Nil
118	Nil	---	---
119	Nil	---	---
120	Nil	---	---
121	Nil	---	---
122	1.29	----*	----*
123	Nil	---	---

Note: Refer to Page C1 - Stage 1

SITE REMEDIATION - STAGE 2
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
124	Nil	---	---
125	Nil	---	---
126	Nil	---	---
127	Nil	---	---
128	Nil	----*	0.14
129	Nil	---	---
130	Nil	---	---
131	Nil	---	---
132	Nil	---	---
133	Nil	---	---
134	---	---	---
135	Nil	---	---
136	Nil	---	---
137	Nil	---	Nil
138	Nil	---	---
139	Nil	---	---
140	Nil	---	---

Note: Refer to Page C1 - Stage 1

SITE REMEDIATION - STAGE 2
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
141	Nil	---	---
142	Nil	---	---
143	---	---	---
144	Nil	---	Nil
145	Nil	---	Nil
146	Nil	Nil	Nil
147	Nil	Nil	Nil
148	0.04	0.30	2.09
149	Nil	Nil	---
150	---	---	Nil
151	0.95	---	---
152	Nil	Nil	Nil
153	Nil	Nil	---
154	0.10	Nil	---
155	Nil	Nil	---
156	Nil	Nil	0.02
157	0.32	0.05	---*

Note: Refer to Page C1 - Stage 1

SITE REMEDIATION - STAGE 2
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
158	Nil	Nil	---
159	Nil	Nil	Nil
160	Nil	Nil	---
161	---	Nil	---
162	Nil	Nil	Nil
163	Nil	Nil	Nil
164	Nil	Nil	---
165	Nil	Nil	---
166	0.96	0.83	1.00
167	0.03	Nil	---
168	Nil	Nil	Nil
169	Nil	Nil	0.10
170	Nil	Nil	0.02
171	0.10	---	---
172	Nil	---	---
173	Nil	---	---
174	Nil	---	---

Note: Refer to Page C1 - Stage 1

SITE REMEDIATION - STAGE 2
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
175	Nil	---	---
176	Nil	---	---
177	Nil	---	---
178	Nil	---	---
179	0.39	---	---
180	film	---*	---*
181	---	---	Nil
182	Nil	---	Nil
183	Nil	Nil	Nil
184	Nil	Nil	Nil
185	Nil	Nil	Nil
186	Nil	---	---
RW1	Nil	0.10	0.03
RW2	Nil	Nil	Nil
CP	Nil	---	Nil

Note: Refer to Page C1 - Stage 1

SITE REMEDIATION - STAGE 2
VAPOUR EXTRACTION UNIT DATA
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

Suction Pressure (Inches of Water)

<u>Unit</u>	<u>Dec 8/90</u>	<u>Dec 11/90</u>	<u>Feb 4-5/91</u>	<u>Apr 9/91</u>
6	13	13.5	23.0	26.0
7	20	18.0	31.0	26.0
9	35	37.0	Note a	Note b

Outlet Vapour Concentrations (% LEL)

<u>Unit</u>	<u>Dec 8/90</u>	<u>Dec 11/90</u>	<u>Feb 4-5/91</u>	<u>Apr 9/91</u>
6	5	8	5	2
7	60	32	8	1
9	100	67	Note a	Note b

Hydrocarbon Vapour Removal Rate (cu. yd./day)

<u>Unit</u>	<u>Dec 8/90</u>	<u>Dec 11/90</u>	<u>Feb 4-5/91</u>	<u>Apr 9/91</u>
6	2.1	3.4	1.8	0.7
7	22.7	12.6	2.4	0.4
9	27.7	16.6	Note a	Note b

Note:

- a) Vapour extraction unit #9 was sucking runoff water trapped inside the main header pipe. No reading was taken.
- b) The water trapped in the main header pipe had frozen solid.

SITE REMEDIATION - STAGE 2
LIQUID HYDROCARBON REMOVED BY PUMPING
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>Date</u>	<u>Liquid Hydrocarbon Recovered (Gal)</u>
Dec 11/90	1.0
Apr 11/90	0.6

Total =	1.6 Imp. Gallons

SITE REMEDIATION - STAGE 2
GROUND SURFACE/TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>MW No.</u>	<u>G.S. Elev. (ft.)</u>	<u>Top of Pipe Elev. (ft.)</u>
1	1295.95	1296.08
2	1289.73	1289.39
3	1289.00	1288.94
4	1289.39	1289.84
5	1289.36	1289.67
6	1285.68	1286.29
7	1288.11	1289.53
8	1287.93	1288.62
9	1288.09	1288.42
10	1286.70	1288.19
11	1286.05	1287.13
12	1285.59	1286.01
13	1292.59	1292.38
15*	1301.97	1302.56
17	1290.90	1291.28
18	1293.02	1293.53
19	1289.75	1289.19

Note: * Denotes that the monitoring well was damaged during the spring thaw and was therefore repaired during the April 9/91 field trip.

SITE REMEDIATION - STAGE 2
GROUND SURFACE/TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	G.S. Elev. (ft.)	Top of Pipe Elev. (ft.)
20	1291.30	1290.91
21	1292.50	1292.20
22	1289.38	1289.16
23	1289.38	1289.02
25	1286.40	1286.66
27	1288.69	1290.56
29	1287.04	1288.46
30	1284.90	1286.05
32	1288.82	1290.05
38	1290.15	1290.65
41	1290.37	1289.88
44	1291.67	1291.33
52	1292.79	1292.49
53	1295.13	1294.87
54	1297.42	1297.06
118	1296.07	1295.78
119	1295.59	1295.36

**SITE REMEDIATION - STAGE 2
GROUND SURFACE/TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA**

MW No.	G.S. Elev. (ft.)	Top of Pipe Elev. (ft.)
120	1295.23	1294.89
121	1294.51	1294.12
122	1293.90	1293.44
123	1293.52	1293.32
124*	1293.20	1292.75
125*	1292.80	1292.39
126*	1292.48	1292.14
127	1292.17	1291.77
128	1291.82	1291.48
129 *	1291.47	1291.24
130	1291.12	1290.88
131	1291.78	1291.31
132	1292.02	1291.68
133	1292.33	1291.92
134	1292.76	1292.41
135	1293.20	1292.80
136	1293.63	1293.27

Note: * See Page F1 - Stage 2

**SITE REMEDIATION - STAGE 2
GROUND SURFACE/TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA**

MW No.	G.S. Elev. (ft.)	Top of Pipe Elev. (ft.)
137*	1294.04	1293.73
138*	1294.45	1293.99
139	1294.98	1294.52
140	1295.54	1295.21
141	1296.27	1295.99
142	1296.86	1296.58
143	1292.64	1292.39
144	1292.37	1292.26
145	1290.83	1290.62
146	1290.00	1289.71
147	1289.79	1289.50
148	1293.71	1293.41
149	1293.26	1293.04
150	1293.09	1292.63
151	1292.94	1292.63
152	1292.85	1292.65

Note: * See Page F1 - Stage 2

SITE REMEDIATION - STAGE 2
GROUND SURFACE/TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	G.S. Elev. (ft.)	Top of Pipe (Elev. (ft.))
153	1292.76	1292.43
154	1292.66	1292.43
155	1292.58	1292.27
156	1292.43	1292.11
157	1292.30	1291.98
158	1291.97	1291.64
159	1291.60	1291.07
160	1291.28	1290.94
161	--	--
162	1294.57	1294.19
163	1294.01	1293.62
164	1293.52	1293.22
165	1292.99	1292.59
166	1292.71	1292.41
167	1292.43	1292.11
168	1292.20	1291.96
169	1292.01	1291.79

SITE REMEDIATION - STAGE 2
GROUND SURFACE/TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	G.S. Elev. (ft.)	Top of Pipe Elev. (ft.)
170	1291.83	1291.55
171	1291.66	1291.33
172	1291.33	1291.01
173	1294.82	1294.39
174	1294.22	1293.90
175	1293.75	1293.49
176	1293.37	1292.91
177	1293.06	1292.79
178	1292.84	1292.48
179	1292.29	1292.05
180*	1292.06	1291.65
181	--	--
182	1297.04	1296.72
183	1295.20	1294.87
184	1294.30	1293.96
185	1291.89	1291.62
186	1291.14	1290.77

Note: * See Page F1 - Stage 2

SITE REMEDIATION - STAGE 2
GROUND SURFACE/TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	G.S. Elev. (ft.)	Top of Pipe Elev. (ft.)
RW1	1289.75	1289.71
RW2	1292.57	1292.35
CP	1288.67	1290.09

DOCUMENTS OBTAINED FROM
MANITOBA ENVIRONMENT

- * Hydrostatic Test Results On Tanks
Petro-Canada Service Station
18TH & Richmond, Brandon, MB
October 17 - November 2, 1990 (4 Pages)
- * Storage Tank System Registration Form
Gulf Bulk Plant, Brandon,
11 Tanks in 1976, (2 Pages)
- * Registration Form, New Storage Tank Installation
Gulf Bulk Plant, Brandon
9 Above Ground Tanks, November 1982, (3 Pages)
- * Gasoline & Diesel Fuel Spills
Gulf Bulk Plant, Brandon
(6 Pages)

Oct 03/77	Gasoline	1500 Gallons
Dec 04/79	Diesel Fuel	1200 Gallons
Feb 23/81	Gasoline	6000 Gallons
Mar 27/81	Purple Gasoline	5000 Gallons
Mar 10/82	Gasoline	2670 Litres
Oct 20/82	Diesel Fuel	8500 Litres
Aug 18/83	Diesel Fuel	6100 Litres
- * Canadian Tire Gas Bar, Brandon
Pinhole Leak Discovered During
Hydrostatic Test In New Tank

Sept 23/89	Unleaded Gasoline	Leakage Quantity Unknown
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HYDROSTATIC TEST RESULTS

Please PRINT Only

STATION NAME: PETRO CANADA INC, FARM CENTRE

ADDRESS: 18TH ST. & RICHMOND AVE, BRANDON, MAN. R7A5Y7 RA BOX 100

GENERAL CONTRACTOR: _____

TANK TESTING CONTRACTOR: A/S. PUMP SERVICE, BRANDON, MAN. 728-2574

TESTING FOREMAN: J. G. HODGE

TESTING ASSISTANT: D. PANDOLFI

PROJECT ENGINEER: _____

DATE OF TESTING: OCTOBER 17/90

WEATHER: (snow/rain/sunny): OVER CAST

RECEIVED MAY 24 1991

AIR TEMPERATURE AT START OF TEST: 0

AIR TEMPERATURE OVERNIGHT: -4°C

TEMPERATURE OF PRODUCT IN TANK AT START OF TEST: +8°C

TEMPERATURE OF PRODUCT IN BARREL AT START OF TEST: +2°C

SERIAL #:

MANUFACTURER:

NOMINAL VOLUME: 22,730 LITRES PRODUCT: DIESEL CARD LOCK

TIME	PRESS. psi	LITRES INJECTED	TEMP. deg C	TIME	PRESS. psi	LITRES INJECTED	TEMP. deg C
10 AM	9 #	37.8	+8°C	11:40	8.75	0	
10:30	9 #	.8		11:40	9 #	.1	+8°C
11:00	9 #	.3					
11:05	9 #	0					
11:10	8.75	0					
11:15	8.75	0					
11:20	8.75	0					
11:25	8.75	0					
11:30	8.75	0					
11:35	8.75	0					

HYDROSTATIC TEST RESULTS

Please PRINT Only

STATION NAME: PETRO CANADA INC., BOX 100

Ph: 728-4554

ADDRESS: 18TH ST. & RICHMOND AVE. BRANDON, MAN R7A5Y7

GENERAL CONTRACTOR: _____

TANK TESTING CONTRACTOR: ANS. PUMP SERVICE

TESTING FOREMAN: J.G. HODGE

TESTING ASSISTANT: D. PANDOLFI

PROJECT ENGINEER: _____

DATE OF TESTING: OCTOBER 31/90

WEATHER: (snow/rain/sunny): OVERCAST

AIR TEMPERATURE AT START OF TEST: +2°C

AIR TEMPERATURE OVERNIGHT: +1°C

TEMPERATURE OF PRODUCT IN TANK AT START OF TEST: +9°C

RECEIVED MAY 24 1991

TEMPERATURE OF PRODUCT IN BARREL AT START OF TEST: +2°C

SERIAL #: _____ MANUFACTURER: _____

NOMINAL VOLUME: 2X 22,730 LITRES PRODUCT: REGULAR UNLEADED GAS
Syphoned Together

TIME	PRESS. psi	LITRES INJECTED	TEMP. deg C	TIME	PRESS. psi	LITRES INJECTED	TEMP. deg C
9:30 AM	9 #	106.2	+9°C				
10:00	9 #	3.3					
10:30	9 #	-2					
11:00	9 #	.1					
11:05	9 #						
11:10	9 #						
11:15	9 #						
11:20	9 #						
11:25	9 #						
11:30	9 #	0	+9°C				

HYDROSTATIC TEST RESULTS

Please PRINT Only

STATION NAME: PetroCANADA INC. BOX 100

PH: 728-4554

ADDRESS: 18th ST & RICHMOND AVE, BRANDON, MAN R7A 5Y7

GENERAL CONTRACTOR: _____

TANK TESTING CONTRACTOR: AJS. PUMP ServiceTESTING FOREMAN: J. B. HODGETESTING ASSISTANT: D. PANDOLFI

PROJECT ENGINEER: _____

DATE OF TESTING: NOVEMBER 2/90WEATHER: (snow/rain/sunny): OVERCASTAIR TEMPERATURE AT START OF TEST: 0 °CAIR TEMPERATURE OVERNIGHT: 0 °CTEMPERATURE OF PRODUCT IN TANK AT START OF TEST: +9 °C RECEIVED MAY 24 1991TEMPERATURE OF PRODUCT IN BARREL AT START OF TEST: 0 °C

SERIAL #: _____ MANUFACTURER: _____

NOMINAL VOLUME: 22,730 LITRES PRODUCT: MAXIMUM PLUS

TIME	PRESS. psi	LITRES INJECTED	TEMP. deg C	TIME	PRESS. psi	LITRES INJECTED	TEMP. deg C
9:40AM	9 #	132.1	+9 °C	12:35	9 #	0	
10:10	9 #	2		12:40	9 #	0	+10 °C
10:40	9 #	1.8					
11:20	9 #	.5					
11:40	9 #	.4					
12:10	9 #	.3					
12:15	9 #	0					
12:20	9 #	0					
12:25	9 #	0					
12:30	9 #	0					

HYDROSTATIC TEST RESULTS

Please PRINT Only

STATION NAME: PETRO CANADA INC BOX 100 PH: 728-4554
 ADDRESS: 18th ST & RICHMOND AVE, BRANDON, MAN R7A5Y7

GENERAL CONTRACTOR: _____

TANK TESTING CONTRACTOR: A-15. PUMP SERVICETESTING FOREMAN: J. G. HODGETESTING ASSISTANT: D. PANDOLFI

PROJECT ENGINEER: _____

DATE OF TESTING: NOVEMBER 2/90WEATHER: (snow/rain/sunny): OVERCASTAIR TEMPERATURE AT START OF TEST: 0°CAIR TEMPERATURE OVERNIGHT: 0°CTEMPERATURE OF PRODUCT IN TANK AT START OF TEST: +9°C RECEIVED MAY 24 1991TEMPERATURE OF PRODUCT IN BARREL AT START OF TEST: 0°C

SERIAL #: _____ MANUFACTURER: _____

NOMINAL VOLUME: 22,730 Litres PRODUCT: MAXIMUM Supreme

TIME	PRESS. psi	LITRES INJECTED	TEMP. deg C	TIME	PRESS. psi	LITRES INJECTED	TEMP. deg C
9:50AM	9#	65.4	+9°C	12:20	8.50	0	
10:20	9#	1.6		12:25	8.50	0	
10:50	9#	.9		12:30	8.50	0	
11:20	9#	.5		12:35	8.25	0	
11:50	9#	.4		12:40	8.25	0	
11:55	9#	0		12:45	8.25	0	
12:00	8.75	0		12:50	8.25	0	
12:05	8.75	0		12:55	8.25	0	
12:10	8.50	0		1:00	8.25	0	
12:15	8.50	0		1:05	8.25	0	
				1:05	9#	.2	+9°C

STORAGE TANK SYSTEM (S.T.S.) REGISTRATION FORM

Required by

MANITOBA DEPARTMENT OF MINES, RESOURCES and ENVIRONMENTAL MANAGEMENT

Pursuant to the Manitoba Regulation under the Clean Environment Act
respecting the Handling and Storage of Gasoline and Associated Products.

EXISTING SYSTEMS

1. Business Name GULF OIL CAN LTD 1825-1826Business Address or Legal Description 18 ST & RICHMONDAVE BRANDON MANOperator of S.T.S. GULF SERVICESOwner of S.T.S. GULF CANADA2. Plan of S.T.S. showing roads, buildings, distances and other distinctive
features. Use separate sheet if required.

Assign a number to each tank.

RECEIVED MAY 24 1991

Daily 20,000 GALS (V.G.) 4

3. Provide the information indicated below for each tank. Use separate
sheet if required.

Tank No.	Tank Material (Fiberglass or steel)	Tank Type (Aboveground or Underground)	Tank Capacity (gallons)	Product Normally In Tank	Estimated Age of Tank
		See attachment			

RECEIVED MAY 24 1991

KEROSENE
10000
#11

SOLVENT
10000
#12

BULK
STORAGE

DIESEL
CLEAR
17500
#4

PRM
17500
#3

REG GAS
MRK
1000000
#10

DIESEL
CLEAR
17500
#3

DIESEL
MRK
17500
#7

DIESEL
MRK
17500
#2

DIESEL
MRK
17500
#6

REG GAS
CLEAR
1000000
#9

DIESEL
MRK
17500
#1

weekly w

1976

Registration Form
New Storage Tank Installation

- 2 -

Tank Construction Specification - Check Appropriate Box:

ULC S603	☐	ULC S603.1	☐
ULC S615	☐	ULC S601	☐
API 650	☐	Variance Approved	☐

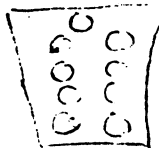
Projected Installation Date:

SPRING 82

RECEIVED MAY 24 1991

Attach a drawing of the proposed installation, showing tank and piping location, adjacent roads and buildings and corrosion protection equipment or dikes, where applicable.

EN



R-1522

OFFICE

15th

I hereby certify that the information provided by me on this registration form is complete and accurate.

Signed:

Bampfaloeel PER T.A. Murphy.

Date:

Nov 10/82

FORWARD THE COMPLETED FORM WITH DRAWING TO:

Environmental Control Services
Box 7, Building 2
139 Tuxedo Avenue
WINNIPEG, Manitoba
R3C 0V8

NEW STORAGE TANK SYSTEM INSTALLATION

complete 10195

Business Name: GULF CENTREBusiness Address: 18TH & RICHMOND AVE
BRANDON.1525 18TH STOwner: GULF CANADA LTD.Operator: T J MURPHYInstaller: HAY PETROLEUM, EDMONTON
REGINA 350 HALIFAX ST.

Please check one of the following:

RECEIVED MAY 24 1991

- New Installation, no existing tankage at this location ☐
- New Installation, all existing tankage to remain ☐
- Tank Replacement, some or all existing tanks/piping to be removed ☒

PROVIDE INFORMATION AS OUTLINED BELOW:

BULK

Tank No.	1	2	3	4	5	6	7	8	9
Tank Type <u>aboveground/underground</u> steel/fiberglass	ALL ABOVE GROUND SEE ATTACHED								
Tank Capacity	SHEET								
Tank Manufacturer									

16.431

TANK DIPS

RECEIVED MAY 24 1991

DATE: Nov 10/82

PRODUCT	TANK #	^{Sale} M-LEET	CM-INCHES	LITRES
LS. CL.	1	25,000		
ESEL MKD.	2	25,000		
NO LEAD	3	20,000		
ESEL MKD.	4	20,000		
CL. CLEAR	5	20,000		
ULAR MKD.	6	20,000		
ULAR CLEAR	7	12,500		
ULAR MKD.	8	12,500		
SOLVENT	9.	5,000		

e No.	Date	Company	Location	Description
.4.156	77 09 12	Paul's Hauling	RIDGEVILLE, Manitoba	Approximately 24,000 lbs. of liquid fertilizer were spilled when a tank truck overturned. The spilled product was contained in a ditch and pumped out.
.4.157	77 09 20	Shell Bulk Plant	WASKADA, Manitoba	An estimated 1265 gallons of gasoline were lost over a one week period as a result of a leaking gasket on a pump system. An initial excavation did not locate any of the spilled product.
.4.158	77 09 26	Mariapolis Co-op Bulk Plant	MARIAPOLIS, Manitoba	One hundred gallons of gasoline were spilled when a bulk plant was overfilled. The spill occurred during heavy rain and the product dissipated before any clean-up could be initiated.
.4.159	77 09 25	Manitoba Hydro Selkirk Generating Station	SELKIRK, Manitoba	Approximately 100 gallons of light fuel oil were spilled at the generating plant. The product flowed through a storm sewer system and into the Red River. An inspection on the following day showed no visible traces of oil on the river.
.4.160	77 10 03 X	Gulf Bulk Plant	BRANDON, Manitoba	Due to an error in hose connections on a tank truck, approximately 1500 gallons of gasoline were spilled. A recovery trench was excavated and some contaminated soil was removed from the area.
.4.161	77 10 03	Sherb Residence	10th Street, BRANDON, Manitoba	An estimated 90 gallons of fuel oil were spilled at a private residence. The product flowed down the backlane and onto an adjacent property. Contaminated soil was removed by the City of Brandon.
.4.162	77 10 05	Cadham Bay	LAKE MANITOBA	Vandals opened the drain plug on an overhead tank, releasing approximately 350 gallons of gasoline which flowed into Cadham Bay. The product was contained in the bay area no clean-up was attempted.
.4.163	77 10 18	Co-op Bulk Plant	ROBLIN, Manitoba	A leak in an aboveground tank resulted in the loss of 216 gallons of gasoline over a one week period. An exploratory excavation beside the tank did not locate the lost product. Further excavation will be attempted after the tank has been moved.
.4.164	77 10 24	Shell Bulk Plant	ARBORG, Manitoba	A faulty hose connection caused the loss of 39 gallons of diesel fuel during the filling of a bulk tank. The spill area was covered with gravel.

File No.	Date	Company	Location	Description
4.304	79 11 20	Shell Bulk Plant	STONEWALL, Man.	A bulk tank was overfilled, resulting in the spillage of 880 gallons of gasoline. The product was contained within the diked area. The saturated sand fill was removed from the area. A number of test holes were drilled around the property, but no petroleum contamination was found. No further action proposed.
4.305	79 11 30	Interprovincial Pipeline Pumping Station	GEENBORO, Manitoba.	A corrosion leak developed in an unused pipe loop at the pumping station. When the loop was reactivated, 500 barrels of crude oil were spilled. Four hundred and fifty barrels were recovered and returned to the pipeline. The remaining product was to be cleaned up under supervision of Environment Canada staff. Final report to be prepared by Environmental Protection Service.
4.306	79 12 04	Gulf Oil Bulk Plant	BRANDON, Manitoba.	Twelve hundred gallons of diesel fuel were spilled when an above-ground bulk tank was overfilled. The spilled product seeped into the ground inside the diked area. The contaminated soil was removed from the spill area on December 5 under the supervision of an E.C.B. representative. No further action proposed.
4.307	79 12 06	Imperial Oil	2 miles west of STONEYMOUNTAIN, Man.	An Imperial Oil agency truck overturned on an approach road to a customer's yard. The spilled product consisted of 1500 gallons of diesel fuel and 500 gallons of gasoline. The spilled product pooled in a ditch and was burned off site. No further action proposed.
4.308	79 12 07	Texaco Bulk Plant	VIRDEN, Manitoba.	Eight hundred gallons of gasoline were spilled when a leak developed in a pump. The spilled product was contained within the diked area of the plant. Approximately 150 gallons of liquid were pumped out and burned at the waste disposal ground. Contaminated snow and gravel was also removed. Due to susceptibility of the area to groundwater contamination, further monitoring of the spill area will be arranged.
4.309	79 12 07	Imperial Oil Bulk Plant	THE PAS, Manitoba.	A broken pump seal resulted in the loss of 400 gallons of gasoline. The spill was contained on the plant property and covered with sand. The contaminated sand was then hauled to the local waste disposal ground. No further action proposed.

File No.	Date	Company	Location	Description
4.359	Feb. 5/81	Texaco Bulk Plant	Ashern, Manitoba	A bulk storage tank was overfilled when the truck driver neglected to open a valve to an alternate tank. 700 gallons of diesel fuel were spilled. There was no containment dike around the tanks, and the product flowed to an adjacent low-lying area. Contaminated snow and soil was removed from the area and deposited at the local waste disposal ground. No further clean up activity is proposed. Legal action against the truck driver is being considered.
4.360	Feb. 10/81	Swan River-The Pas Transfer	Hwy. 59 North E. St. Paul	A tank truck operated by Swan River-The Pas Transfer developed a leak in a compartment seam. The truck was parked on the shoulder of the highway and 1000 gallons of heating oil drained into the ditch. The product was contained in the snow in the ditch. Contaminated snow was removed from the ditch the following day and hauled to a landfill site.
4.361	Feb. 11/81	Co-op Bulk Plant	Fisher Branch	200 gallons of heating oil were spilled when a bulk storage tank was overfilled. The truck driver connected the delivery line to the wrong tank and pumped the product into a tank that was already full. The spilled product was contained within the diked area. Saturated snow and gravel was removed from the spill area. No further clean up required. Legal action is being considered against the truck driver.
4.362	Feb. 23/81	Gulf Farm Center	Brandon, Manitoba.	A ruptured seam in the bulk storage tank resulted in the spillage of 6000 gallons of gasoline. The product stayed within the containment dike and the majority was pumped out by a vacuum truck. A containment d trench was installed outside the dike to collect any subsurface seepage. Further monitoring of the spill area will be carried out.

File No.	Date	Company	Location	Description
4.363	March 5, 1981	CNR-Symington Yards	Symington Yards	A CNR locomotive struck a piece of equipment protruding between the rails, causing a puncture of its fuel tank. Approx. 2500 gallons of diesel fuel were spilled. 400 gallons were recovered and the remainder soaked into the ground. The spill area was covered with absorbent and all contaminated material was to be removed to a landfill site.
4.364	March 27/81	Interprovincial Co-op Chemical Plant	945 Marion Street	A fire was discovered in a hopper containing 1200 lbs. of MANEB, a fungicide. Winnipeg Fire Department responded and flushed the material from the hopper into a drain leading to the city sewer system. Since the material could be present in North End Sewage Treatment Plant effluent, a sampling program was initiated along the Red River. Final results are not yet available.
4.365	March 27/81	Gulf Bulk Plant	Brandon, Manitoba.	A leak in a bulk storage tank resulted in the loss of 5000 gallons of purple gasoline. The tank was pumped out when the leak was discovered and collection trenches were dug under the supervision of E.C.S. personnel. The trenches were pumped out until no further seepage occurred.
4.366	April 8/81	Interprovincial Coop	945 Marion St. Wpg.	A fire occurred in a chemical plant hopper containing 1500 lbs. of the fungicide, Maneb. The contents of the hopper were flushed via a floor drain to the city sewer system. City of Wpg. officials were alerted to the fact that the material would be entering the N. End Sewage Treatment Plant. No further action required.
4.367	April 16/81	Man. Hydro Gen. Stn.	Pukatawagon, Man.	A fuel oil storage tank failure resulted in the spillage of 2500 gallons of oil. The product was contained within the diked area and attempts were made to pump the pooled product into an empty tank. Incident was turned over to Environment Canada for follow up.

File No.	Date	Company	Location	Description
4.394	March 9/82	Gulf Service Centre	Neepawa	An underground storage tank was overfilled while product was being transferred from a bulk tank. Forty-two hundred liters of gasoline were spilled around the area of the underground storage tank. A vacuum truck recovered 110 litres of spilled product from an adjacent ditch. All contaminated snow was removed from the service station yard and the ditch. Sand was spread over the spill area to absorb any residual contamination. All contaminate material was hauled to the local waste disposal ground and burned.
4.395	March 10/82	Gulf Centre	18th St.-Brandon	A bulk tank overflow resulted in the spillage of 2670 litres of gasoline. Due to construction work in progress at the bulk plant, the containment dike around the tank had been removed. A vacuum truck was brought in immediately to pump up the spilled product. The spilled product was contained in snow and gravel around the tank and all contaminated material was scraped up and removed. The material was taken to the Brandon waste disposal ground and burned.
4.396	March 15/82	Olin Fibres Ltd.	Killarney	A valve coupling broke on a tank truck which had just been loaded at the Olin plant site. The leaking truck was moved to a remote corner of the yard, where 7100 litres of diesel fuel spilled into a roadside ditch at the edge of the property. A drainage pit was excavated in the ditch and all accumulated liquid product was pumped out by a vacuum truck. Contaminated snow was scraped off the site. All liquid and snow was deposited at the Killarney waste disposal ground and burned.

File No.	Date	Company	Location	Description
4.414	Oct. 4/82		Junction of PTH #10 and 16	A tank truck carrying liquid oxygen overturned on the roadside. The overturned unit had to be emptied before it could be righted. The oxygen was vented to atmosphere under the supervision of a WS&H Officer from Brandon. The highway was closed to traffic while the venting occurred.
4.415	October 13/82	G.N. Transportation	North of Kola, Municipal Road	A G.N. Transportation tank truck carrying crude oil overturned on a municipal road, spilling 6300 litres of its load. The spilled product accumulated in a roadside ditch and most of it was removed by a vacuum truck. The residual product was burned off at the site. Petroleum Branch and ECS personnel were at the site. No further action was required after the burn-off.
4.416	Oct. 18/82	CNR (Steelgas Propane Storage Site)	Churchill, Man.	A CNR tank car struck a tank filling line, shearing off the line and resulting in the loss of 11.6 tonnes of propane from the storage tank. All personnel were cleared from the area and the propane was allowed to dissipate into the atmosphere. No serious incident resulted from the spill. CNR and Steelgas are investigating the cause of the incident.
4.417	Oct. 20/82	Gulf Bulk Plant.	Brandon, Man.	A bulk tank overflow resulted in the spillage of 8500 litres of diesel fuel. The spilled product was contained within a newly constructed dike. Almost all the product was recovered from the diked area, pumped into the tank truck and returned to the Shell Refinery for re-refining. The dike was then flooded with water to float the residual product. The diesel/water mixture was pumped out by a vacuum truck, taken to the local waste disposal ground and burned.

File	Date	Location	Product Quantity	Incident Cause Category	Reported by	Reported to	Responder (con. #)	Staff Hours Days	Remarks
7.4 min. July 21	July 21	CEB Wps - Westmin	Propane - min	Leaking hose ②	W.F.D 3	Engs #	EP3		no on-site response req'd
7.4 min. July 23	July 23	3 day - Cansill pr Wps	12-00-26 liquid - 500 L	Vandalism of tank ③	Resident 5	Engs #	ERT	1.0	ref to Info Centre.
7.4 min. July 23	July 23	Wps	Max fogging complaint	Truck overturn ②	Resident 2	Engs #	ERT	1.75	ref to APC
7.4 min. July 25	July 25	#1 Hwy - Elbe	Gasoline 50,000 L	NH3 odors	RCHP 15	Engs #			
7.4 min. July 26	July 26	Brandon, Simplot	Wanted intruder removing odor from flatted basement	odor from flatted basement	Resident 6	Engs #			ref to City Health Dept
7.4 min. July 29	July 29	Wps	Pile of garbage @ door of apt. bldg	apt. bldg	W.F.D 3	Engs #			Wanted info on removal of additional leak from tank
7.4 min. July 25	July 25				CJOB News	Engs #			
7.4 min. Aug 2	Aug 2	Me Lib, Gulf h	Diesel - 500 L	Tank overfill ①	Gulf 1	Engs #	ERT	1.0	
7.4 min. Aug 3	Aug 3	Plou Coulee - Shell h	Diesel - 60 L	Transfer ①	Shell 3	H.D. 2			
7.4 min. Aug 4	Aug 4	149 Main St - Coring	Ammonia Refrigerant 1	Expt Failure - Norstart ③	W.F.D 3	Engs #	ERT	0.5	Incident Handled by Wps
7.4 min. Aug 5	Aug 5	Gradview - ESSO h	Diesel - 5000 L	Transfer - tank overfill ①	PSSD 5	Engs #	ERT	1.0	Reported 4 days later
7.4 min. Aug 5	Aug 5	651 Main St Wps	Complaint about substance dumped in back lane	dumped in back lane ①	Resident 1	Engs #			ref to City Health Dept
7.4 min. Aug 6	Aug 6	Spraying for Yards	Petroleum Naphtha	Transfer - tanker leak	CN 3	Engs #			Handled by EBS
7.4 min. Aug 8	Aug 8	Sgt Boniface	Complaint about odors from greenhouse	Transfer - tanker leak	Resident 3	Engs #			ref to Air Poll. Sec.
7.4 min. Aug 8	Aug 8	West End Wps	Report of Dead Birds		Resident 3	Engs #			ref to Env. Stand + Studies
7.4 min. Aug 8	Aug 8	St. James - Kibbicki St	Propane - 4 L	Expt Failure - Imbricapack ③	Man Hydrco 1	Engs #			
7.4 min. Aug 8	Aug 8	Guston	Gasoline - 2600 L	Transfer - tank leak ⑤	Diner (Sgt) 3	Engs #	ERT	1.0	
7.4 min. Aug 8	Aug 8	9032 Notre Dame	Diesel Fuel - 400 L	Expt Failure - fuel tank leak ③	W.F.D 1	Engs #	ERT		
7.4 min. Aug 9	Aug 9	CEB Portago	sealer/runner - 20 L	storage - pad fell over ⑤	CEB Bldg 1	Engs #			
7.4 min. Aug 11	Aug 11	Alderg - Gulf h	Diesel - 270 L	Transfer - hose break ①	Gulf h 5	Engs #			ref to Information Centre
7.4 min. Aug 11	Aug 11	Wps	Question on mosquito	no fogging ①	Resident 1	Engs #			
7.4 min. Aug 15	Aug 15	Baldur	Diesel fuel - 450 L	Transfer - overfill ①	Essy/Resident 3	Engs #	ERT	0.5	
7.4 min. Aug 17	Aug 17	Wps	Blow - 10 L	Product left in back lane ①	W.F.D 3	Engs #	ERT	0.25	Bleach picked up & diluted to sewer
7.4 min. Aug 18	Aug 18	Brandon - Gulf h	Diesel - 6100 L	Transfer - bulk tank overfill ①	B.F.D 3	Engs #	ERT	4.0	
7.4 min. Aug 16	Aug 16	M. J. Sauris	Blow - 4 L	Expt. Failure - blown cap ②	Man Hydrco 1	Engs #			
7.4 min. Aug 17	Aug 17	Reston, Gulf h	Gasoline - 622 L	Transfer - truck valve left open ①	Gulf 1	Engs #			
7.4 min. Aug 12	Aug 12	ascene Shop - CN	Cleaning Soln - 200 L	Handling - drum fell over ⑤	CN 1	Engs #			Handled by EPS

ENVIRONMENTAL ACCIDENT DATA - SEPTEMBER

LOCATION	PRODUCT	QUANTITY	DATE	DESCRIPTION
SNOW LAKE, MB	ELECTRICAL OIL NON-PCB	75L	89.09.01	VEHICLE SHEARED OFF POLE.MOUNTED TRANSFORMER RUPTURED ON IMPACT.
REPAP	ASKAREL (P.C.B.)	UNKNOWN	89.09.08	TRANSFORMER FAILURE
BENITO, MB.	DIESEL FUEL	1350 L	89.09.09	DELIVERY TO WRONG BULK TANK, TANK OVERFILLED.
GILBERT PLAINS, MANITOBA	DIESEL	150 L	89.09.11	BULK TANK OVERFILLED.
LANDSIDE AVE	ELECTRICAL OIL NON-PCB	90 L	89.09.14	VALVE BROKE OFF WHEN LOWERING TRANSFORMER.
WINNIPEG, MB.	RUBBER SOLVENT CEMENT		89.09.14	1L OF SOLVENT/CEMENT LEAKED ONTO A SECOND CONTAINER.
WINNIPEG, MB.	MERCURY	20 GRAMS	89.09.18	THERMOMETER BROKE ON LIVING ROOM RUG.
WINNIPEG, MB.	PLEXIGLASS BONDING AGENT		89.09.21	MR. BROOKS CONCERNED ABOUT THE FUMES FROM A BONDING AGENT.
RCMP STATION			89.09.21	ARE ANHYDROUS AMMONIA REGS OUT YET.
BRANDON, MB.	SODIUM CHLORATE LIQUOR	40 L	89.09.21	VALVE BREAK SPRAYED 10 L OF SODIUM CHLORATE ONTO THE GROUND.
BRANDON, MANITOBA	SODIUM CHLORATE LIQUOR	40 L	89.09.21	30 L SPILLED FRM OVERFLOW DURING LOADING OF SODIUM CHLORATE CAR.
HWY #1 EAST OF PORTAGE	DIESEL	300 L	89.09.22	VEHICLE ROLLED SPLITTING BOTH SADDLE TANKS.
HWY 6	TRANSFORMER OIL-NON PCB	APPROX 200 GAL	89.09.23	TRUCK ROLLED AND DIESEL FUEL WAS LOST.
BRANDON	GASOLINE	UNKNOWN	89.09.23	PINHOLS LEAK DISCOVERED DURING HYDROSTATIC TEST IN NEW TANK.
CANADIAN OCCIDENTAL BRANDON	SODIUM CHLORATE BRINE MIXTURE	APPROX 10 L	89.09.24	LEAK INTO TRENCH INTO BUILDING
		60 GAL	89.09.24	SEAL ON AGGATOR LET GO ALLOWING PRODUCT TO SPILL ONTO GRAVEL AREA
WINNIPEG, MB.	SMOKELESS GUNPOWDER		89.09.25	CAN WAS CRACKED SPILLING GUNPOWDER.
WINNIPEG, MB.	FLOURESCENT LIGHT BALLAST		89.09.25	5-45 GAL DRUMS WITH PCB LABELS WERE REPORTED BESIDE ROAD.
HWY #1	DIESEL	UNKNOWN	89.09.26	TRACTOR UNIT BLEW O RING ON FUEL PUMP CAUSING SPILL TO HWY & LOT.
PORTAGE LA PRAIRIE	DIESEL	1000L	89.09.26	UNLOADING TO UNDERGROUND STORAGE DISCONNECTED
WINNIPEG	OIL	UNKNOWN	89.09.27	WRONG DAMAGING PIPE CITY WORKS FOUND SMALL AMOUNT OF OIL IN SEWER.
WINKLER	TRANSFORMER OIL <5 PPM	2 L	89.09.27	TRANSFORMER ON POLE HAD LEAKED 2 L OIL.
WINNIPEG	EXPLOSIVES B	3 X .45 KG	89.09.28	WORKERS DISCOVERED SMOKELESS POWDER WAS SHIPPED.ASKED IF LEGAL.
BLOODVEIN INDIAN RESERVE	DIESEL	3200 L	89.09.29	VANDALISM - HOSE TO ABOVE-GROUND TANK WAS CUT.

APPENDIX B

E238 & E239

CHEMICAL ANALYSIS

HYDROCARBON TYPE & AGE

MEMORANDUM DATED MAY 29, 1991

BY

SASKATCHEWAN RESEARCH COUNCIL

GEOKWAN ENVIRONMENTAL LTD.



Saskatchewan
Research Council

Memorandum

May 29, 1991

TO: Walter Kwan, Geokwan Enviromental

FROM: Wo Yuen, Analytical Services

RE: Your Project No. E238/239

SUMMARY OF ANALYSIS

Gas chromatographic analysis of the organic phase present in the samples.

MW77:

There was a very small quantity of organic phase present in this sample. There is only diesel fuel, no gasoline detected. The lightest fraction of diesel fuel, the C9 and C10 portions, are much lower than in new diesel fuel. This indicates that it is not fresh, probably more than a year old.

MW68, MW166:

The organic phase in these two samples contains both diesel fuel and unleaded gasoline in a ratio of about 1:1. Both these samples are in a sand and/or gravel soil type as per your descriptions. The toluene and xylene and some other aromatics are much lower in proportion to the aliphatics as compared to new gasoline. This means that there has been fairly long contact with water since the aromatics are more soluble than aliphatics in water. Because the very light aliphatics are still present, the fuel is not ancient (i.e., greater than 5 years). However, depending on the size of the organic pool underground, the age could be anywhere from six months if the pool is small, to older if the pool is large.

MW122, MW2:

The organic phase in these two samples is mostly leaded gasoline with a small amount of diesel, about 10% in MW122 and about 5% in MW2. The toluene and xylene and some other aromatics are much lower in proportion to the aliphatics as compared to new gasoline. Considering the lead concentration in the fuel and the proportion of the aromatics, the age of this fuel would be between 1 and 5 years.

A more detailed report with examples of the chromatograms will be forwarded within two days.

APPENDIX C

E238 & E239

INSPECTOR'S DAILY REPORTS

NOV 21/90 TO DEC 4/90

GEOKWAN ENVIRONMENTAL LTD.

INSPECTOR'S DAILY REPORT
DAY SHIFT

Friday, November 23/90

- Cumming & Dobbie Construction began trenching at 1 P.M.
- Worked on trench 5, starting at the Canadian Tire Gas Bar going south. Approximately 100' of trench was completed (MW182-MW141).
- Frost approximately 12" in thickness.

Saturday, November 24/90

- Began trenching at 8 A.M.
- Worked on trench 5. Approximately 100' of trench was completed. (MW141 - MW138).
- Frost approximately 16" in thickness.
- Left for Winnipeg at 17:00.

Monday, November 26/90

- Arrived in Brandon at 08:30
- Began trenching at 09:00.
- Continued work on trench 5. Approximately 100' of trench was completed (MW138 - 135).
- Frost approximately 18" in thickness.

Tuesday, November 27/90

- Arrived on site at 08:00
- Cumming & Dobbie Construction quit operations for the day shift.
- Inspected the installation of RW 1 & 2 by Subterranean.

Wednesday, November 28/90

- Arrived on site at 08:00
- Cumming & Dobbie Construction began trenching at 08:15.
- Approximately 60' of trench 5 (south) was completed (MW134 - MW144).
- Frost approximately 20" in thickness.

Thursday, November 29/90

- Arrived on site at 08:00
- Continued work on trench 5 (south). Approximately 120' of trench was installed (MW144 - MW2).
- Frost thickness approximately 6".

INSPECTOR'S DAILY REPORT
DAY SHIFT

Friday, November 30/90

- Arrived on site at 08:00
- C & C Construction began work on trench 4. Approximately 55' of trench was installed (MW128 - MW130).
- Trenching was started on trench 2, from vapour extraction unit (V6) going south. Approximately 20' of trench was completed.
- Frost approximately 24" in thickness.

Saturday, December 1/90

- Arrived on site at 08:00
- Began placing steel casings over top monitoring wells not connected to a vapour extraction unit (MW148 - 170, 183).
- Left Brandon at 15:00.
- Arrived in Winnipeg at 18:00.

INSPECTOR'S DAILY REPORT
NIGHT SHIFT

Wednesday, November 21/90

- Left for Brandon at 6 P.M.
- Arrived in Brandon at 9 P.M.

Thursday, November 22/90

- Met Cumming & Dobbie's men at 8 A.M.
- Saw blades did not fit saw & so sent men back.
- R. Kupchak & I arranged for rentals and equipment for work to begin.
- R. Kupchak & I performed site survey for stage 1.

Friday, November 23/90

- Laid out chalk lines for trenching, and arranged for labourers to saw.
- Returned at 8 P.M. trenched along trench 5 & trench 4 near the gas bar.
- Approximately 100' of trench completed (V7-MW120).
- Frost approximately 12" thick.

Saturday, November 24/90

- Began trenching at 8 P.M.
- Worked on Trench 3. Approximately 100' of trench completed (MW118-MW174).
- Frost approximately 12" thick.

Monday, November 26/90

- Arrived in Brandon at 5:30 P.M.
- Began work shortly thereafter.
- Finished approximately 60' of trench 4 (MW120-MW123).
- Cut lighting cable in parking lot. Fixed by G.T. Smith.
- Backhoe broke down at 2 A.M.
- Frost approximately 18" thick.

Tuesday, November 27/90

- Began work at 6 P.M.
- Finished trench 5, approximately 110' of trench completed (MW134-131).
- Frost approximately 18" thick.

INSPECTORS DAILY REPORT
NIGHT SHIFT

Wednesday, November 28/90

- Began work at 6 P.M.
- Approximately 110' of trench 4 completed (MW126-129).
- Frost approximately 21" thick.

Thursday, November 29/90

- Began work at 6 P.M.
- Approximately 100' of trench 4 completed (MW126-MW129).
- Frost approximately 21" thick.

Friday, November 30/90

- Began work at 8 P.M.
- Completed west portion of trench 3 (MW174-MW177), and started east portion of trench 3 (MW178-MW180).
- Approximately 110' of trench completed.
- Frost approximately 2' thick.

Saturday, December 1/90

- Installed service boxes over wells that will not be hooked up until next spring (MW148-MW170).

Sunday, December 2/90

- Began work at 6 A.M.
- Backhoe was not operational until 10 A.M.
- Backhoe broke down again at 3 P.M.
- Approximately 70' of trench 3 was completed (MW172-MW180).
- Frost approximately 2' thick.

Monday, December 3/90

- Began work at 9 P.M.
- Completed east portion of trench 2, (MW171 - East edge of parking lot), and link between trenches 2 and 3 (MW171-MW180).
- Approximately 155' of trench completed.
- Frost approximately 2'6" thick.

Tuesday, December 4/90

- Removed all extra materials from site.
- All rental equipment returned.
- Installed 30' pressure treated hydro pole as per drawing.
- Installed riser pipes onto said hydro pole

CANADIAN TIRE PROPERTY
SITE REMEDIATION - STAGE 2
RELEVANT CORRESPONDENCE (4 PAGES)

- * Geokwan Letter Dated June 7/91
To Zenith Paving Ltd.
- * Geokwan Letter Dated June 10/91
To Cumming & Dobbie (1986) Ltd.

Geokwan Environmental Ltd

ENVIRONMENTAL ENGINEERS

Zenith Paving Ltd.
P.O. Box 786
Brandon, MB

June 7, 1991

FAXED 1-727-3748

ATTENTION: Mr. Dave Cumming

Dear Sir:

RE: Hot Mix Asphalt Patching for New Trenches
Canadian Tire Store, Brandon, Manitoba
Our Project No. E239-1

On behalf of Canadian Tire Corporation Ltd., we are pleased to confirm the acceptance of your quotation dated June 4, 1991 for the above noted project, but subject to the following conditions:

- 1) Supply and place 2" (compacted thickness) hot mix asphalt compacted to at least 96% Marshall density and as per City of Brandon 1991 specifications. Gradation of aggregates shall be class A and the mix proportions (Marshall stability, Marshall Flow Index, % voids in aggregate, % voids filled, % voids in total mixture and % moisture content by weight) shall be in accordance with "other" under Section 13 (mix proportions) of the City of Brandon specifications.
- 2) Your working hours are tentatively set for 6 a.m. to 9 a.m., starting June 17, 1991 to approximately June 22, 1991. Approximately 100' to 150' of trench will require asphalt patching each working day.
- 3) Payment of your work shall be based on the unit rate of \$1.23 per sq. ft., (provincial tax & GST included). The area of asphalt placed will be measured and determined by our field engineer, Mr. Harley Pankratz, P. Eng., which will form the basis for payment.
- 4) Your invoice should be addressed to Canadian Tire Corporation Ltd. c/o Geokwan Environmental Ltd. and for the attention of the writer. Payment terms are net 30 days.
- 5) A copy of your third party liability insurance of at least one million dollars and in favour of Canadian Tire Corporation, as well as proof of your registration with the Manitoba Workers Compensation Board are required.

June 7, 1991

- 2 -

E239-1

Please sign at the space provided below and return a copy of same by FAX, signifying your agreement to the above.

Yours truly,

GEOKWAN ENVIRONMENTAL LTD.

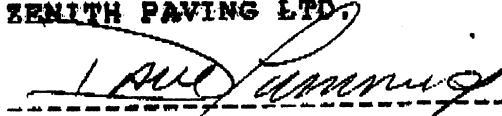
per:

Walter Kwan, M. Eng., P. Eng.

c.c. H. Law, CTC, Toronto
M. Dillabough, CTS, Brandon

Accepted By:

ZENITH PAVING LTD.



(Authorized Signature)

June 12, 1991

(Date)

GEOKWAN ENVIRONMENTAL LTD.

Geokwan Environmental Ltd

ENVIRONMENTAL ENGINEERS

Cumming & Dobbie (1986) Ltd.
P.O. Box 1927
Brandon, MB

June 10, 1991

FAXED 1-727-6075

ATTENTION: Mr. Richard Osterbeck

Dear Richard:

**RE: Supply of Equipment & Operators
For New Trenching Work
Canadian Tire Store, Brandon
Our Project NO. E239-1**

On behalf of Canadian Tire Corporation Ltd., we are pleased to accept your quotation dated June 3, 1991 for the above noted project and subject to the following conditions:

- 1) The equipment rates quoted (i.e. large backhoe, small backhoe, loader - HMI, tandem truck and asphalt saw) include the supply of the operator, and will be charged only when the equipment are in use. When the operator of the equipment is working as a labourer, for hand shovelling, backfilling of the trenches, etc, a charge of \$18 per hour as a skilled labourer will apply.
- 2) A pavement saw (has to fit Geokwan saw blade) and a skilled labourer will be required for pavement cutting approximately from 9 p.m. to 11 p.m. June 11, 1991, 6 a.m. to 9 a.m. or longer June 12, 1991 and if needed, 6 a.m. to 9 a.m. or longer June 13, 1991. Our Project Engineer, H. Pankratz, P. Eng., will be in Brandon to-morrow (June 11) and will contact you on this.
- 3) The proposed work schedule, equipment & material, required are as follows:
 - 3a) Sunday, June 16, 1991 8:30 a.m. - 5:00 p.m.
June 17 - 21, 1991 9:00 p.m. - 6:00 a.m.
 - 3b) - Small backhoe (12" bucket) with operator (Wayne preferred)
- One loader - HMI with operator
- One non-skilled labourer (please confirm rate) 18/hr
- One tandem dump truck (10 cu. yd.)
 - 3c) Granular A Base (20 cu. yd.) and 3/8" pea gravel (20 cu. yd.) for delivery to the site on Saturday afternoon (June 16, 1991), as directed by our H. Pankratz, P. Eng.

John
16

June 10, 1991

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E239-1

- 4) The dump truck will be charged only when it is being used and occupied by a driver. The broken asphalt will have to be hauled away. In this regard, the truck travelling time to and from site will be charged. Please confirm the location of the disposal site and any dump charges. *no dump charges at his own gravel pit.*
- 5) You confirm that you will supply all equipment, materials and labour required, on a continuous basis and until the job is finished.
- 6) You are responsible for your workers and equipment for workers compensation and general liability insurance throughout the construction period. A copy of your third party liability insurance of at least one million dollars and in favour of Canadian Tire Corporation shall be forwarded to our office.
- 7) The invoice for your services rendered should be addressed to Canadian Tire Corporation Ltd., c/o Geokwan Environmental Ltd. Payment terms are 30 days from the date of receiving the invoice.

Please sign at the space provided below and return a copy of same by FAX ASAP, signifying your agreement to the above.

Yours truly,
GEOKWAN ENVIRONMENTAL LTD.
per:

Walter Kwan, M. Eng., P. Eng.

c.c. H. Law, CTC
M. Dillabough, CTS

Accepted By:
Cumming & Dobbie (1986) Ltd.

Richard P. Osterbeck
(Authorized Signature)

June 11/91
(Date)

GEOKWAN ENVIRONMENTAL LTD.

MONITORING DATA, DEC/90 - APR/91

SITE REMEDIATION, STAGE 1

CANADIAN TIRE PROPERTY, BRANDON

- * Table A - Groundwater Elevation (4 Pages)
- * Table B - Total Combustible Vapour (4 Pages)
- * Table C - Hydrocarbon Thickness (4 Pages)
- * Table D - VES Data (1 Page)
- * Table E - Liquid Hydrocarbons Removed (1 Page)
- * Table F - Ground Surface & Top of Pipe Elevations
(4 Pages)

April 16, 1991

TABLE A - STAGE 1

E238

SITE REMEDIATION - STAGE 1
GROUND WATER ELEVATION/DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elevation (ft)/Depth to Water Table (ft)		
	Dec 11-14/90	Feb 4-5/91	Apr 9-11/91
50	2.05	3.18/10.15	3.58/9.75
57	3.45	---	1.00/12.40
58	3.52	---	1.50/11.81
59	3.48	3.28/9.98	3.64/9.62
60	3.45	3.17/10.06	3.63/9.60
61	3.54	3.20/9.98	1.84/11.34
62	3.62	3.37/9.77	3.67/9.42
63	2.57	---	2.98/10.19
64	2.91	---	3.30/9.81
65	2.92	---	3.59/9.63
66	2.70	---	3.10/9.69
67	3.58	2.70/10.25	3.46/9.49
68	3.18	2.64/10.17	---
69	4.06	2.46/10.34	3.95/8.85
70	4.02	2.86/9.86	3.91/8.81
71	2.53	1.98/7.21	3.33/5.86
72	3.79	2.51/7.41	---

Note:

3.18/10.15, 3.18 = groundwater elevation. 10.15 = depth to ground water from ground surface.

Add 1280' to ground water elevation for the actual geodetic elevation.

SITE REMEDIATION - STAGE 1
GROUND WATER ELEVATION/DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elevation (ft)/Depth to Water Table (ft)		
	<u>Dec 11-14/90</u>	<u>Feb 4-5/91</u>	<u>Apr 9-11/91</u>
73	3.76	2.46/8.37	---
74	4.17	---	---
75	4.11	---	5.19/5.31
76	4.21	---	---
77	4.18	3.50/7.62	---
78	4.30	3.44/8.14	4.46/7.12
79	4.32	3.06/8.74	5.32/6.48
80	4.78	---	---
81	4.94	3.76/8.53	---
82	5.38	---	---
83	5.29	4.51/8.20	---
84	5.54	4.62/8.06	---
85	6.18	5.06/7.57	---
86	6.32	---	5.21/7.51
87	5.63	---	---
88	5.34	---	---
89	5.26	---	---

Note:

2.46/8.37, 2.46 = ground water elevation, 8.37 = depth to ground water from ground surface.

Add 1280' to ground water elevation for the actual geodetic elevation.

SITE REMEDIATION - STAGE 1
GROUND WATER ELEVATION/DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elevation (ft)/Depth to Water Table (ft)		
	<u>Dec 11-14/90</u>	<u>Feb 4-5/91</u>	<u>Apr 9-11/91</u>
90	4.58	---	---
91	4.59	---	---
92	4.40	4.01/9.05	3.85/9.21
93	4.44	---	---
94	4.03	3.79/8.55	---
95	4.28	---	---
96	4.24	---	---
97	4.26	---	---
98	4.42	---	---
99	4.09	---	---
51	3.93	6.57/4.66	---
101	3.97	---	---
102	3.83	---	---
103	4.22	---	---
104	3.92	3.12/8.05	---
105	3.97	---	3.62/7.31
106	3.56	---	3.53/9.88

Note:

4.01/9.05, 4.01 = ground water elevation, 9.05 = depth to ground water from ground surface.

Add 1280' to ground water elevation for the actual geodetic elevation.

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SITE REMEDIATION - STAGE 1
GROUND WATER ELEVATION/DEPTH BELOW GROUND SURFACE
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Ground Water Elevation (ft)/ Depth to Water Table (ft)		
	<u>Dec 11-14/90</u>	<u>Feb 4-5/91</u>	<u>Apr 9-11/91</u>
107	2.86	---	3.54/9.82
108	3.19	---	3.91/9.45
109	3.75	---	4.03/9.30
110	3.50	---	4.41/8.87
111	3.40	---	4.58/8.62
112	3.37	---	4.68/8.54
113	3.30	---	4.82/8.34
114	3.30	---	4.84/8.04
115	3.14	---	---
116	3.57	---	---
117	3.84	---	---

Note:

3.54/9.82, 3.54 = ground water elevation, 9.82 = depth to ground water from ground surface.

Add 1280' to ground water elevation for the actual geodetic elevation.

April 16, 1991

TABLE B - STAGE 1

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SITE REMEDIATION - STAGE 1
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	Nov. 15-18/90	Dec. 11-14/90	Feb. 4-5/91	Apr. 9-11/91
57	>100	>100	--	30 (5500)
50	>100	>100	28	6
58	>100 (3900)	5	--	4
59	>100	2	6	12
60	>100	15	23	2
61	>100	5 (600)	14	15 (2000)
62	>100	1	15	20
63	>100 (4700)	5	--	5
64	>100	10	--	4
65	>100	3 (950)	--	8
66	92	1	--	17
67	>100 (+12000)	2	19	2
68	>100	26 (1000)	25	--
69	>100	0	4	1
70	>100 (1000)	>100	25	6
71	>100	1	15	2

Note : (5500) is the total gasoline vapour concentration measured in the monitoring well (in ppm).

SITE REMEDIATION - STAGE 1
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	Nov. 15-18/90	Dec. 11-14/90	Feb. 4-5/91	Apr. 9-11/91
72	>100 (3000)	2	9	--
73	>100	55	3	--
74	>100 (3200)	1	--	--
75	10	2	--	1
76	15	3	--	--
77	20	5 (300)	3	--
78	>100	1	2	1
79	>100 (2000)	1	3	43
80	83	1	--	--
81	55	1	6	--
82	52	1	--	--
83	88	0	8	--
84	86	1	3	--
85	30	1	3	--
86	>100	0	--	4 (150)
87	>100	0	--	--
88	80	0	--	--

Note : (3000) is the total gasoline vapour concentration measured in the monitoring well (in ppm).

SITE REMEDIATION - STAGE 1
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	<u>Nov. 15-18/90</u>	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
89	30	0	--	--
90	>100	0	--	--
91	>100	0	--	--
92	>100	0	0	28 (4000)
93	>100 (+12000)	0	--	--
94	>100	0	3	--
95	>100	0	--	--
96	>100 (1000)	0	--	--
97	>100	0	--	--
98	98	0	--	--
99	>100	0	--	--
51	27	0	2	--
101	7	0	--	--
102	11	1	--	--
103	2	0	--	--
104	1	1	1	--
105	1	0	--	0
106	>100 (5000)	1	--	2

Note : (4000) is the total gasoline vapour concentration measured in the monitoring well (in ppm).

SITE REMEDIATION - STAGE 1
CONCENTRATION OF COMBUSTIBLE VAPOUR IN AIR
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Total Combustible Vapour (% LEL)			
	<u>Nov. 15-18/90</u>	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
107	>100	>100 (10000)	--	3
108	>100 (+12000)	>100	--	18
109	>100	5	--	35
110	>100 (2000)	0	--	5
111	>100	0	--	0
112	53 (600)	0	--	0
113	0	0	--	2
114	6	1	--	1
115	>100	0	--	--
116	>100 (8000)	3	--	--
117	>100 (+12000)	3	--	--

Note : (10000) is the total gasoline vapour concentration measured in the monitoring well (in ppm).

April 16, 1991

TABLE C - STAGE 1

E238

SITE REMEDIATION
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
50	1.75	0.04	0.04
57	0.15	---*	3.16
58	Nil	---	Nil
59	Nil	Nil	Nil
60	0.12	film	Nil
61	0.04	0.02	2.08
62	Nil	Nil	Nil
63	1.15	---*	0.90
64	0.99	---*	0.60
65	1.01	---*	0.30
66	0.84	---*	0.46
67	0.28	0.66	0.40
68	0.79	0.70	---*
69	Nil	0.23	0.06
70	Nil	Nil	Nil
71	Nil	Nil	Nil

Note: (---) signify that no measurement was taken inside the well because of ice jamming or snow covering.

(---*) signify no measurement was taken but liquid hydrocarbon is suspected to be present inside the well.

SITE REMEDIATION - STAGE 1
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
72	Nil	Nil	---
73	Nil	Nil	---
74	Nil	---	---
75	Nil	---	Nil
76	Nil	---	---
77	0.12	0.02	---*
78	Nil	Nil	Nil
79	Nil	Nil	Nil
80	Nil	---	---
81	Nil	Nil	---
82	Nil	---	---
83	Nil	Nil	---
84	Nil	Nil	---
85	Nil	Nil	---
86	Nil	---	Nil
87	Nil	---	---
88	Nil	---	---

Note: (---) signify that no measurement was taken inside the well because of ice jamming or snow covering.

(---*) signify no measurement was taken but liquid hydrocarbon is suspected to be present inside the well.

SITE REMEDIATION - STAGE 1
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
89	Nil	---	---
90	Nil	---	---
91	Nil	---	---
92	Nil	Nil	Nil
93	Nil	---	---
94	Nil	Nil	---
95	Nil	---	---
96	Nil	---	---
97	Nil	---	---
98	Nil	---	---
99	Nil	---	---
51	Nil	Nil	---
101	Nil	---	---
102	Nil	---	---
103	Nil	---	---
104	Nil	Nil	---
105	Nil	---	Nil
106	Nil	---	Nil

Note: (---) signify that no measurement was taken inside the well because of ice jamming or snow covering.

(---*) signify no measurement was taken but liquid hydrocarbon is suspected to be present inside the well.

SITE REMEDIATION - STAGE 1
HYDROCARBON THICKNESS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	Hydrocarbon Thickness (ft)		
	<u>Dec. 11-14/90</u>	<u>Feb. 4-5/91</u>	<u>Apr. 9-11/91</u>
107	0.94	---*	0.02
108	0.64	---*	Nil
109	Nil	---*	film
110	Nil	---	Nil
111	Nil	---	Nil
112	Nil	---	Nil
113	Nil	---	Nil
114	Nil	---	Nil
115	Nil	---	---
116	Nil	---	---
117	Nil	---	---

Note: (---) signify that no measurement was taken inside the well because of ice jamming or snow covering.

(---*) signify no measurement was taken but liquid hydrocarbon is suspected to be present inside the well.

April 16, 1991

TABLE D - STAGE 1

E238

SITE REMEDIATION - STAGE 1
VAPOUR EXTRACTION UNIT
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>Unit</u>	<u>Suction Pressure (Inches of Water)</u>			
	<u>Dec 8/90</u>	<u>Dec 11/90</u>	<u>Feb 4-5/91</u>	<u>Apr 9/91</u>
3	15.0	19.5	46.0	17.0
4	15.0	15.0	34.0	36.0
5	18.0	18.5	30.0	18.5
8	18.0	17.0	30.0	Note a

Note: a) No reading was taken on unit #8 because surface water had seeped inside the header pipe and froze solid.

<u>Unit</u>	<u>Outlet Vapour Concentrations (% LEL)</u>			
	<u>Dec 8/90</u>	<u>Dec 11/90</u>	<u>Feb 4-5/91</u>	<u>Apr 9/91</u>
3	22	16	6	9
4	38	30	68	8
5	15	13	9	5
8	23	15	31	Note a

<u>Unit</u>	<u>Hydrocarbon Vapour Removal Rate (cu.yd./day)</u>			
	<u>Dec 8/90</u>	<u>Dec 11/90</u>	<u>Feb 4-5/91</u>	<u>Apr 9/91</u>
3	9.0	6.1	0.7	3.6
4	15.5	12.7	19.4	2.1
5	5.9	5.1	2.9	1.9
8	9.0	6.1	9.7	-

April 16, 1991

TABLE E - STAGE 1

E238

SITE REMEDIATION - STAGE 1
LIQUID HYDROCARBONS REMOVED BY PUMPING
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>Date</u>	<u>Liquid Hydrocarbons Recovered (Gal)</u>
Dec 11/90	1.50
Apr 11/91	1.40

	Total = 2.90 Imp. Gallons

April 16, 1991

TABLE F - STAGE 1

E238

SITE REMEDIATION - STAGE 1
GROUND SURFACE/TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

MW No.	G.S. <u>Elev. (ft.)</u>	Top of Pipe <u>Elev. (ft.)</u>
50	1293.33	1293.10
57	1293.40	1293.20
58	1293.31	1293.10
59	1293.26	1293.06
60	1293.23	1292.95
61	1293.18	1292.90
62	1293.09	1292.87
63	1293.17	1292.92
64	1293.11	1292.95
65	1293.22	1292.97
66	1292.79	1292.56
67	1292.95	1292.66
68	1292.81	1292.62
69	1292.80	1292.49
70	1292.72	1292.56
71	1289.19	1288.87
72	1289.92	1289.51

SITE REMEDIATION - STAGE 1
GROUND SURFACE/TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>MW No.</u>	<u>G.S. Elev. (ft.)</u>	<u>Top of Pipe Elev. (ft.)</u>
73	1290.83	1290.42
74	1290.50	1290.16
75	1290.50	1290.23
76	1290.71	1290.43
77	1291.12	1290.82
78	1291.58	1291.24
79	1291.80	1291.48
80	1292.00	1291.76
81	1292.29	1291.88
82	1292.67	1292.27
83	1292.71	1292.39
84	1292.68	1292.34
85	1292.63	1292.28
86	1292.72	1292.32
87	1292.75	1292.43
88	1292.87	1292.50
89	1292.92	1292.63

**SITE REMEDIATION - STAGE 1
GROUND SURFACE/TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA**

MW No.	G.S. Elev. (ft.)	Top of Pipe Elev. (ft.)
90	1293.00	1292.78
91	1293.03	1292.73
92	1293.06	1292.73
93	1293.01	1292.76
94	1292.92	1292.63
95	1292.84	1292.56
96	1292.73	1292.40
97	1292.51	1292.21
98	1291.92	1291.62
99	1291.37	1291.07
51	1291.23	1290.93
101	1290.87	1290.65
102	1290.76	1290.45
103	1290.67	1290.30
104	1290.77	1290.42
105	1290.93	1290.70
106	1293.41	1293.19

SITE REMEDIATION - STAGE 1
GROUND SURFACE/TOP OF PIPE ELEVATIONS
CANADIAN TIRE PROPERTY
BRANDON, MANITOBA

<u>MW No.</u>	<u>G.S. Elev. (ft.)</u>	<u>Top of Pipe Elev. (ft.)</u>
107	1293.36	1293.16
108	1293.36	1293.11
109	1293.33	1293.07
110	1293.28	1292.98
111	1293.20	1292.85
112	1293.22	1292.96
113	1293.16	1292.92
114	1292.88	1292.54
115	1292.43	1292.14
116	1291.99	1291.68
117	1291.89	1291.63