ANNUAL MONITORING REPORT – 2000/2001

PAYNESVILLE MUNICIPAL WATER SUPPLY – MPCA
PAYNESVILLE, MINNESOTA
MPCA SITE ID # LEAK00000131

Terracon Project No. 41987018
May 2, 2001

Prepared for:

MINNESOTA POLLUTION CONTROL AGENCY
1800 College Road
Baxter, Minnesota 56425

Prepared by:

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Terracon

Section 1. GROUND WATER MONITORING

Discuss the groundwater monitoring results, including water level measurements and analytical results, performed since the remedial investigation (RI) report or the last progress report submitted.

Fluid levels were collected from wells (map unit number in parentheses) DW-1(1), DW-2(2), DW-3(3), DW-4(4), DW-5(45), DW-6(46); Midtown wells MW-10(24), MW-10D(5), MW-14(25), MW-14D(6), MW-16(27), and MW-17(28); Johnson wells MW-4(44) and MW-5(7); City of Paynesville monitoring wells identified as map units 42 and 43; and test well CTW-18(18) on a monthly basis (Figures 1 and 2). Well construction information is summarized in Table 1. The fluid level data is presented in Table 2. The fluid level data from wells screened between 75 and 90 feet below ground surface was used to prepare the ground water contour maps depicted in Figures 3A through 3D. The contour maps indicate that the horizontal ground water flow direction is to the southeast. A southeasterly flow direction is consistent with previously collected data. Fluid level data from select monitoring wells screened within the drinking water aquifer and/or located near recovery well DW-5 are depicted on hydrographs in Figures 4A and 4B. The hydrographs illustrate season fluctuations in ground water elevations, and in the case of wells CMW-42 (42) and DW-5 (45) (Figure 4A) the results of ground water pumping activities. Anomalous fluid levels from well MW-17 (28) during September 1999 and well MW-5 (7) during December 1999 appear to be the result of field errors. These data were not used in the preparation of the ground water contour maps. Fluid level and well depth measurements from monitoring well MW-4 (44) indicate that screen or casing may have failed as the bottom now appears to be approximately 12 ½ feet below the top of the riser pipe.

Ground water samples were collected from monitoring wells DW-3 (3) and DW-6 (46) on a quarterly basis during 2000 for laboratory analysis. Ground water samples were collected from monitoring wells MW-16 (27) and MW-17 (28) during April 2000 by Pinnacle Engineering as part of their activities associated with the Midtown Auto site. The analytical results from additional ground water samples collected from the Midtown Auto site wells was not available. Ground water samples were collected from recovery well DW-5, City Well CW-3, City Well CW-4 and the water treatment plant influent and effluent on a monthly bases during 2000 for laboratory analysis. The sampling frequency for recovery well DW-5 and City Well CW-3 was shifted to quarterly during mid-2000. Two samples were taken from the water treatment plant effluent. The first sample included HCl as a preservative and the second sample did not contain the HCl preservative. City Well CW-3 and the water treatment plant influent and effluent were sampled to monitoring drinking water quality. The storm sewer outfall from CW-4 were also sampled for laboratory analysis during April 2000. Recovery well DW-5 (45), DW-6(46), DW-3 (3), and city well CW-4 were monitored to assess their impact on containing the plume and for discharge permit requirements. The laboratory results are summarized in Table 3. Laboratory reports and sampling information forms are included in Appendix A.

Laboratory results for monitoring wells MW-16 (27), water treatment plant influent, and water treatment plant effluent exhibited non-detectable concentrations of target volatile organic compounds throughout 2000 reporting period. A sample from the water treatment plant was collected and analyzed by the Minnesota Department of Health (MDH). The City of Paynesville provided Terracon with the results of the MDH analysis. The MDH results showed a benzene concentration of 0.2 ug/L, which are below the detection level for the analysis performed for Terracon by Legend Technical Services.

Laboratory results from City Well CW-3 (9) detected a benzene concentration of 0.35 ug/L for the February 2000 sampling. All successive laboratory results from City Well CW-3 (9) were below the detection level for benzene. However, the laboratory detection level changed from 0.30 ug/L to 0.50 ug/L between the June and July sampling rounds. Benzene concentations may have fluctuated above the 0.30 ug/L level while staying below the new laboratory detection level of 0.50 ug/L. Laboratory results from City Well CW-4 (10) continued to decrease during 2000 sampling to non-detectable concentrations. It appears that decreased pumping of CW-3 in conjunction with the pumping activity at the recovery well DW-5 has led to some degree of stabilization of the northward migration of the plume (Figure 4A).

DW-3 (3) began to show the presence of hydrocarbons: benzene, toluene, and xylenes (Table 3). The presence of these organic chemicals may or may not be due to the changing groundwater dynamics brought on by remediation activities.

Laboratory analysis results for the river discharge from CW-4 indicated a low benzene concentration. The concentration did not exceed the MDH HRLs.

DW-5 (45) and DW-6 (46) continued to show fluctuating concentrations of petroleum constituents, indicating that the remediation system is successfully removing contaminated groundwater.

Section 2. VAPOR IMPACT MONITORING

If vapor impacts were detected during previous assessments, discuss the results of follow-up vapor monitoring. Include in your discussion the sampling instrument and sampling method.

No new vapor surveys were conducted during the 2000 testing period. The results of the 1999 vapor survey are attached (Table 4).

NOTE: If vapor concentrations exceed 10 percent of the lower explosive limit, exit the building and contact the local fire department immediately. Then contact the Minnesota Duty Officer (24 hours) at 651/649-5451 (metro and outside Minnesota) or 1-800/422-0798 (Greater Minnesota). TTY users call 651/297-5353 (V/TTY) or 1-800/627-3529 (V/TTY). **Vapor mitigation is required.**

Section 3. RECOMMENDATIONS

Discuss your recommendations. Your recommendation should be based on fact sheet #3.1, *Leaking Underground Storage Tank Program.*
N/A
If additional corrective action is recommended, please provide your justification.
N/A
If significant reduction of risk has been achieved at the site, recommendations and rationale for the reduction or termination of corrective actions may be presented.
N/A
If additional monitoring is recommended, indicate the proposed monitoring schedule and frequency.

Decreased dissolved phase petroleum concentrations in ground water samples collected from City Well CW-3 and CW-4 indicated that ground water extraction activities utilizing recovery well DW-5 and City Well CW-4 appear to have resulted in containment of the petroleum plume. Benzene concentrations in the effluent from recovery well DW-5 appear to be approaching asymptotic levels. It appears that the decreasing benzene concentrations in City Well CW-4 are mainly the result of the reduced pumping rate of City Well CW-4, and to a lesser extent, the pumping activities at recovery well DW-5. The appearance of Volatile Organic Compounds in DW-3 suggests that containment efforts and the utilization of the new municipal wells may have altered the plume/groundwater dynamics. Terracon recommends that plume containment activities utilizing recovery well DW-5 and City Well CW-4 continue until after the new monitoring well, between DW-3 and the new municipal wells, is installed. The associated ground water monitoring activities should also be continued.

Specifically, Terracon recommends the following activities:

- *Conduct monthly site visits to collect fluid level data from wells DW-1(1), DW-2(2), DW-3(3), DW-4(4), DW-5(45), and DW-6(46); Midtown wells MW-10(24), MW-10D(5), MW-14(25), MW-14D(6), MW-16(27), and MW-17(28); Johnson Motors wells MW-4(44) and MW-5(7); City of Paynesville monitoring wells identified as map units 42 and 43. Fluid levels will also be collected from two new monitoring wells planned to installed during May 2001 southeast of well DW-3.*

- *Continue ground water extraction activities utilizing recovery well DW-5 and City Well CW-4(10) to contain the petroleum plume. Collect quarterly ground water effluent samples from recovery well DW-5. The samples will be analyzed for the presence of BTEX, MTBE, and GRO. Perform routine maintenance on the ground water extraction system on an as needed basis. Redevelop recovery well DW-5 if the ground water pumping rate does not increase in response to the anticipated recharge of the aquifer this spring. Once both the new city wells have been activated and the new monitoring have been installed and sampled, consider suspending pumping activities at recovery well DW-*

5 and/or modifying the ground water pumping rate and schedule for City Well CW-4 to evaluate its impact on containing the petroleum plume.

- *Collect monthly ground water samples from City Wells CW-4, water treatment plant influent, and water treatment effluent. Collect annual ground water samples from City Wells CW-5, CW-6, CW-7 and CW-8. The samples will be analyzed for the presence of volatile organic compounds (VOCs) using Minnesota Department of Health Method 465F and pH. Four samples from city well CW-4 will also be analyzed for total lead consistent with NPDES Permit requirements.*

- *Collect quarterly ground water quality samples for laboratory analysis from monitoring wells DW-3, DW-6 and two yet to be installed monitoring wells; and Midtown wells MW-16 and MW-17. The samples will be analyzed for BTEX, MTBE, and GRO. A duplicate sample or field blank will be analyzed during each sampling event.*

- *Perform reporting and project management duties necessary for continued operation of the remediation system which includes permitting requirements, utility costs, submission of data to MPCA Staff and the City of Paynesville, and the preparation of an annual monitoring report. The annual report will fulfill the requirements of MPCA Fact Sheets #3.26 and #3.31.*

General Comments

The analysis and opinions expressed in this report are based upon data obtained from the soil borings and laboratory chemical analysis at the indicated locations or from other information discussed in this report. This report does not reflect variations in subsurface stratigraphy, hydrogeology, and contaminant distribution which may occur across the site. Actual subsurface conditions may vary and may not become evident without further assessment.

This report is prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted environmental engineering practices. No warranties are intended or made. In the event any changes in the nature or location of suspected sources of contamination as outlined in this report are observed, the conclusions and recommendations contained in this report shall not be valid unless these changes are reviewed and the opinions of this report are modified or verified in writing by Terracon

GROUND WATER PUMP-OUT SYSTEMS

Influent/Effluent concentrations

☒ Attach a table of cumulative ground water influent and effluent discharge concentrations (in ug/L).

Operating parameters

Pumping rate: *~10* gallons per minute
Amount of water table drawdown: *~30* feet

Contaminant mass removal

Estimated contaminant mass removal rate: *0.004* gallons/day
Estimated contaminant mass removal to date: *4.4* gallons
Cumulative mass removal vs time (plot) *Figure 6*

SOIL VENTING SYSTEMS *N/A*

Emission concentrations

☐ Attach a table containing field screening results for each vapor extraction point.
☐ Attach a table of soil vent system emissions concentrations. Include all analytical samples collected since system startup. Collect the samples from a sampling port located upstream of the blower. Analyze the samples for benzene, ethyl benzene, toluene and xylene using EPA Method 18. Include the Screening Emission Rates (SERs) for each compound on the table.

Operating parameters

Extraction airflow rate: standard cubic feet/minute (scfm)

☐ Attach a table of cumulative vacuum data from vent points and monitoring points.

Bioactivity measurements

☐ Attach a table of cumulative extraction system CO_2 and O_2 concentrations.

Contaminant mass removal:

Estimated contaminant mass removal rate: kg/day x gal/kg = gal/day
Estimated contaminant mass removal to date: gallons
Cumulative mass removal vs time (plot)

SOIL VENTING/AIR SPARGING SYSTEMS *N/A*

(Complete the soil venting systems section above for all air sparge/soil venting combination systems)

☐ Attach a table of air injection rates for each sparge point in the system.
Total air injection rate: scfm
Total air removal rate: scfm

TOTAL SITE CONTAMINANT MASS REMOVAL *N/A*

Fill out this section if ground water pump-out is used in combination with a soil venting system or a soil venting/air sparging system.

Total estimated contaminant mass removal rate for the site: gallons/day
Total estimated contaminant mass removal to date for the site: gallons
Cumulative mass removal vs time (plot).

SYSTEM CHANGES

Describe in detail any changes in system operation or configuration made during this reporting period (attach additional pages if needed). Also explain any periods during which the system was not operating.
The system remained operating (pumping) for the entire reporting period. However, the counter for the system hours failed between the October 2000 and November 2000 visits. The system failure was repaired on January 31, 2001. Although the system hours were not automatically recorded, the total gallons of water pumped were consistently recorded with the flow rate and percent availability in Table 5 has been adjusted to reflect the actual conditions. During the January 31, 2001 site visit the pump controller was found to have charred contacts. The pump controller was replace on March 16, 2001. The delay on the pump controller was increased from five to 10 minutes during February 2001 and from 10 to 15 minutes during March 2001.

RECOMMENDATIONS

List recommendations for modifying the monitoring schedule, system operation, system configuration or site closure (attach additional pages if needed):

See Fact Sheet 3.26

OBSERVATIONS

Please provide observations made at the site and describe unusual circumstance that may have influenced the sampling results:
See system changes and Fact Sheet 3.26.

TABLES & GRAPHS

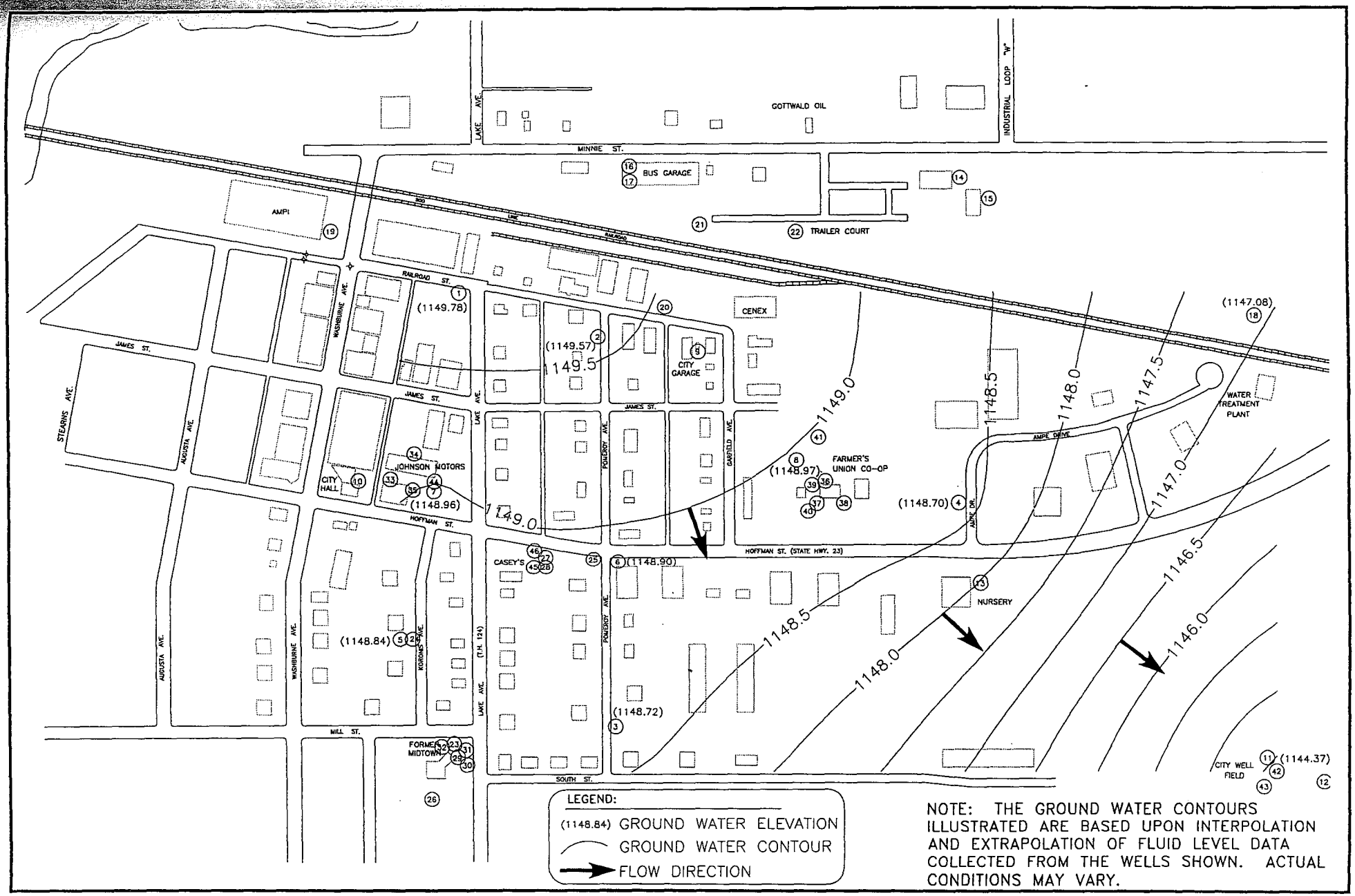
Tables and graphs as requested above.

Web pages and phone numbers

MPCA staff	http://data.pca.state.mn.us/pca/emplsearch.html
MPCA toll free	1-800-657-3864
LUST web page	http://www.pca.state.mn.us/programs/lust_p.html
MPCA Infor. Request	http://www.pca.state.mn.us/about/inforequest.html
PetroFund Web Page	http://www.commerce.state.mn.us/mainpf.htm
PetroFund Phone	651-297-1119, or 1-800-638-0418
State Duty Officer	**651-649-5451 or 1-800-422-0798**

Upon request, this document can be made available in other formats, including Braille, large print and audio tape. TTY users call 651/282-5332 or Greater Minnesota 1-800/657-3864.

Printed on recycled paper containing at least 10 percent fibers from paper recycled by consumers.



NOTE: THE GROUND WATER CONTOURS ILLUSTRATED ARE BASED UPON INTERPOLATION AND EXTRAPOLATION OF FLUID LEVEL DATA COLLECTED FROM THE WELLS SHOWN. ACTUAL CONDITIONS MAY VARY.

Terracon
3535 HOFFMAN ROAD EAST
WHITE BEAR LAKE, MN 55110
(651) 770-1500 FAX (651) 770-1657

0 400
Approximate Scale (Feet)

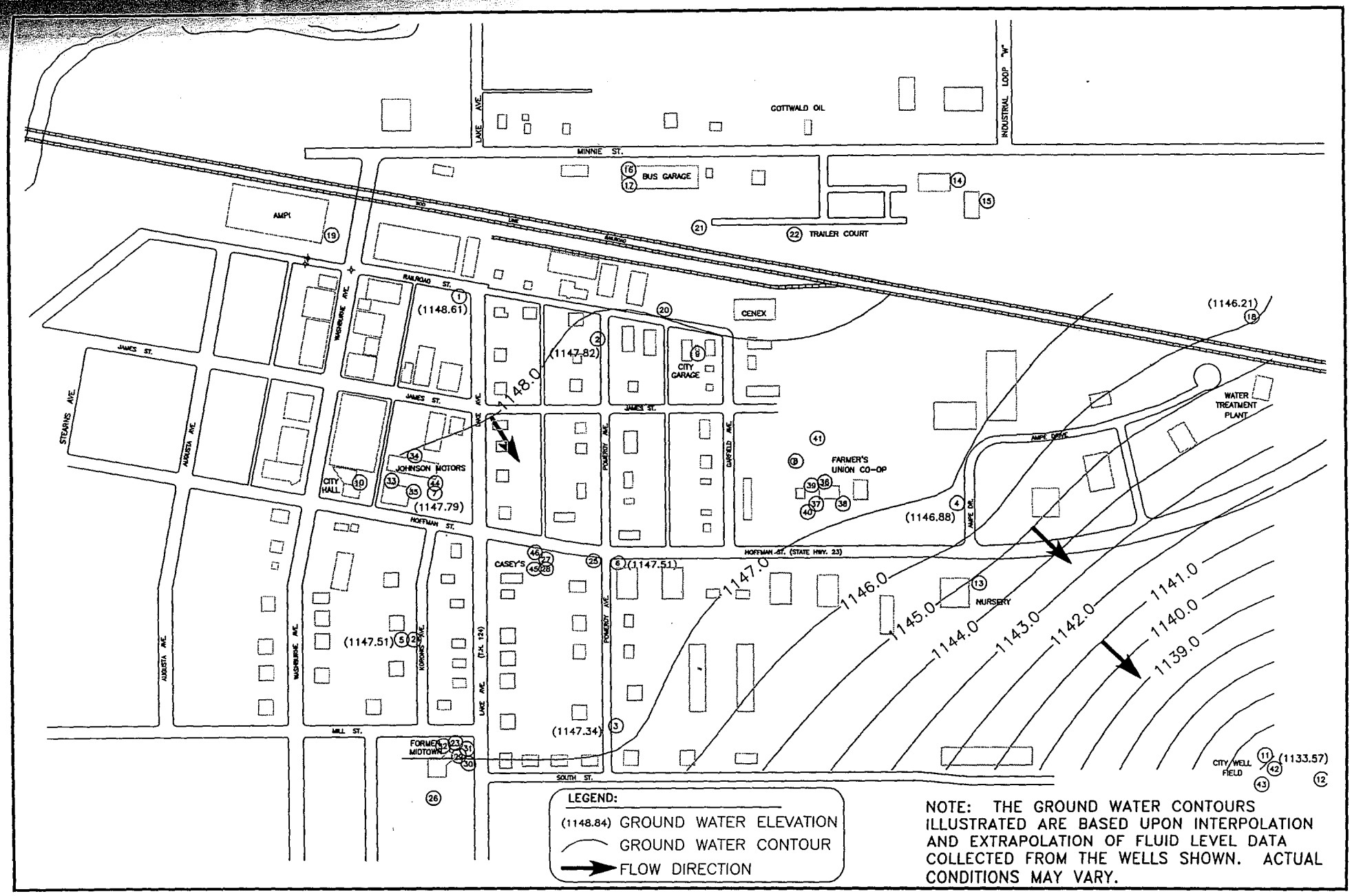
N

MPCA – PAYNESVILLE
PAYNESVILLE, MINNESOTA
TERRACON PROJECT NO. 41987018

DRAWN BY:	JLK
CHECKED BY:	PJW
FILE:	018GW-00.DWG
SCALE:	AS SHOWN
DATE:	3/26/01

GROUND WATER ELEVATIONS
MEASURED 1/13/00

FIGURE 3A



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PAYNESVILLE, MINNESOTA
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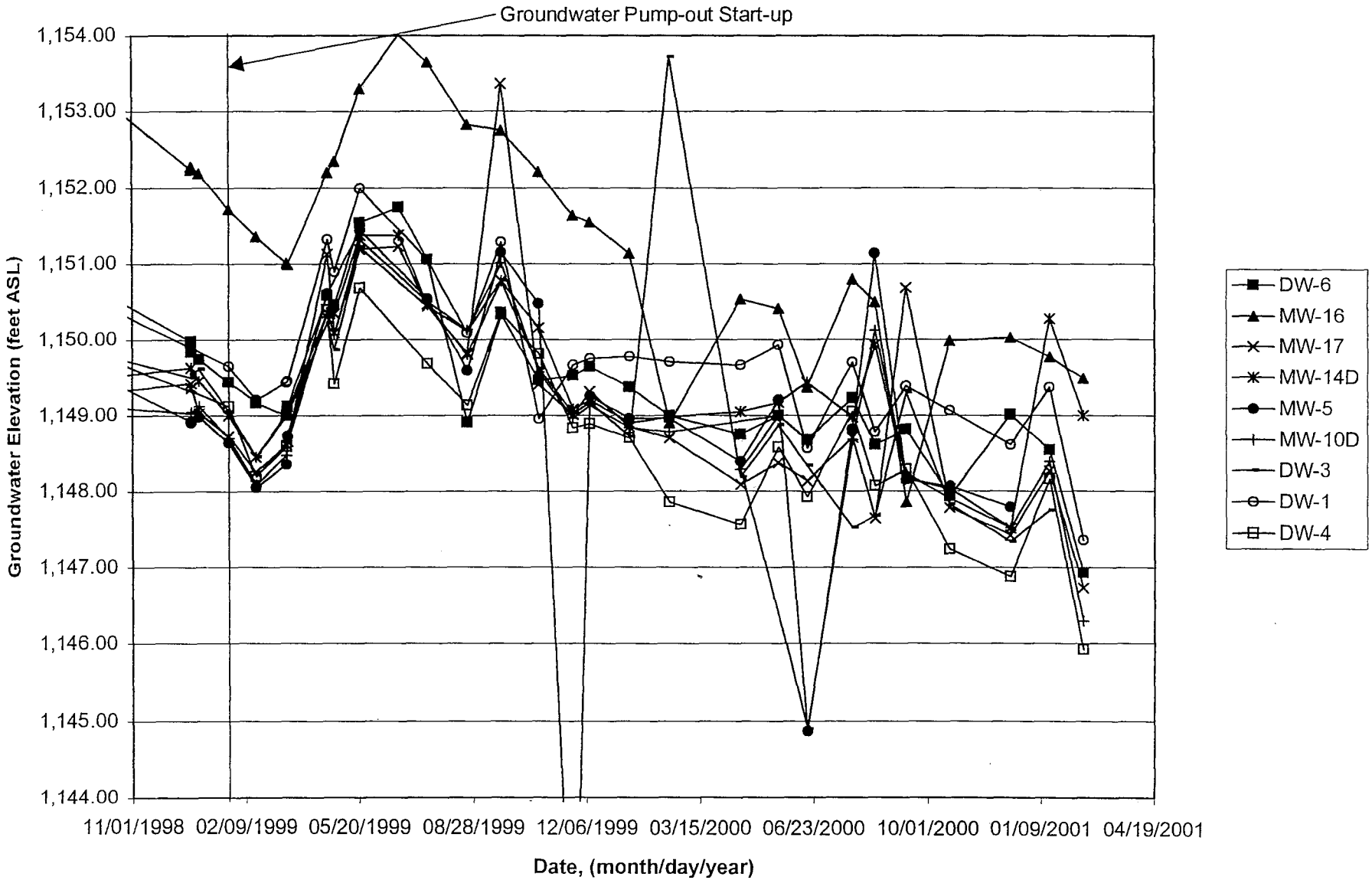
DRAWN BY:	JLK
CHECKED BY:	PJW
FILE:	018GW-00.DWG
SCALE:	AS SHOWN
DATE:	3/26/01

GROUND WATER ELEVATIONS
MEASURED 12/13/00

FIGURE 3D

FIGURE 4A - BACKGROUND WELLS HYDROGRAPH
MPCA - PAYNESVILLE
PAYNESVILLE, MINNESOTA
TERRACON PROJECT NO. 41987018



Terracon

TABLE 3

PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA
TERRACON PROJECT NO. 41987018

GROUND WATER ANALYTCAL RESULTS - WELLS

ID#	Sample		Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	1,2-DCA (µg/L)	GRO (µg/L)	DRO (µg/L)
	MONITORING WELLS											
1	DW-1	*G	03/05/1998	<1	<1	<1	<3	<5	<5	<1	-	-
1	DW-1		03/25/1998	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
1	DW-1	*G	06/13/1998	<1	<1	<1	<3	-	<5	<1	-	-
1	DW-1		06/13/1998	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-
2	DW-2	G	03/06/1998	<1	<1	<1	<3	<5	<5	20	-	-
2	DW-2		03/25/1998	<0.30	<0.30	<0.50	<0.80	<1.0	<0.40	<0.50	-	-
2	DW-2	G	06/13/1998	<1	<1	<1	<3	-	<5	<1	-	-
2	DW-2		06/13/1998	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-
3	DW-3	G	03/16/1998	<1	<1	<1	<3	<5	<5	<1	-	-
3	DW-3		03/25/1998	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
3	DW-3	G	06/13/1998	<1	<1	<1	<3	-	<5	<1	-	-
3	DW-3		06/13/1998	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-
3	DW-3		09/22/1999	<1.0	<1.0	<1.0	<1.0	<5.0	-	-	<100	-
3	DW-3		12/09/1999	<1.0	<1.0	<1.0	<1.0	<5.0	-	-	<100	-
3	DW-3		04/20/2000	<1.0	2.2	<1.0	<3.0	<5.0	-	-	<100	-
3	DW-3		07/27/2000	<1.0	<1.0	<1.0	<1.0	<5.0	-	-	<100	-
3	DW-3		10/20/2000	4.9	<1.0	<1.0	<3.0	<5.0	-	-	<100	-
3	DW-3		01/16/2001	<1.0	4.4	<1.0	3.0	<5.0	-	-	<100	-
4	DW-4	G	03/16/1998	<1	<1	<1	<3	<5	<5	<1	-	-
4	DW-4		03/25/1998	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
4	DW-4	G	06/13/1998	<1	<1	<1	<3	-	<5	<1	-	-
4	DW-4		06/13/1998	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-
46	DW-6	G	08/20/1998	330	<100	<100	<300	-	<500	<100	-	-
46	DW-6		04/05/1999	140	3.9	29	17.4	-	-	-	720	150
46	DW-6		06/21/1999	120	2.1	25	14	-	-	-	660	100
46	DW-6		09/22/1999	99	1.4	16	9.3	10	-	-	400	-
46	DW-6		12/09/1999	64	5.3	20	29	20	-	-	570	-
46	DW-6		04/20/2000	170	1.6	9.8	24	13	-	-	760	-
46	DW-6		07/27/2000	51	1.6	9.8	13	<5.0	-	-	260	-
46	DW-6		10/20/2000	40	<1	10	7.3	6.2	-	-	370	-
46	DW-6		01/16/2001	93	1.5	5.0	17	5.1	-	-	420	-
21	BEI-MW-2		03/25/1998	<0.30	0.61	<0.50	<1.2	<1.0	<0.40	<0.50	-	170
27	MW-16		04/05/1999	<1.0	<1.0	<1.0	<3.0	-	-	-	<50	<100
27	MW-16		06/21/1999	<1.0	<1.0	<1.0	<3.0	-	-	-	<50	<100

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PAYNESVILLE, MINNESOTA
TERRACON PROJECT NO. 41987018

GROUND WATER ANALYTCAL RESULTS - WELLS

ID#	Sample		Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	1,2-DCA (µg/L)	GRO (µg/L)	DRO (µg/L)
27	MW-16		10/06/1999	<1.0	<1.0	<1.0	<3.0	-	-	-	<50	<100
27	MW-16		12/09/1999	<1.0	<1.0	<1.0	<1.0	<5.0	-	-	<100	-
27	MW-16		04/20/2000	<1.0	<1.0	<1.0	<3.0	<5.0	-	-	<100	-
28	MW-17	G	06/13/1998	2,100	<100	<100	<300	-	<500	140	-	-
28	MW-17		04/05/1999	360	<2.0	<2.0	<6.0	-	-	-	540	<100
28	MW-17		06/21/1999	35	<1.0	<1.0	<3.0	-	-	-	<50	<100
28	MW-17		10/06/1999	2.8	<1.0	<1.0	<3.0	-	-	-	<50	<100
28	MW-17		12/09/1999	9.2	1.7	1.2	5.8	<5.0	-	-	<100	-
28	MW-17		04/20/2000	3	<1.0	<1.0	<3.0	<5.0	-	-	<100	-
	POTABLE WELLS											
9	CW-3		03/25/1998	18	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		05/20/1998	11	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3	G	06/10/1998	9.3	<1	<1	<3	-	<5	<1	-	-
9	CW-3		06/10/1998	7.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-
9	CW-3		08/20/1998	6.2	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
9	CW-3		09/09/1998	5.2	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
9	CW-3		10/05/1998	4.8	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
9	CW-3		11/18/1998	3.4	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
9	CW-3		12/15/1998	2.9	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
9	CW-3		01/25/1999	1.6	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
9	CW-3		02/18/1999	1.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
9	CW-3		03/17/1999	0.86	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
9	CW-3		04/22/1999	0.63	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
9	CW-3		05/21/1999	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
9	CW-3		06/24/1999	0.37	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		07/19/1999	0.48	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		08/23/1999	1.4	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		09/22/1999	1.1	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		10/25/1999	0.59	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		11/24/1999	0.35	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		12/09/1999	0.36	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		01/13/2000	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	-	-
9	CW-3		02/17/2000	0.35	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		03/13/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		04/20/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		05/23/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		06/17/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		07/27/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
9	CW-3		08/16/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-

TABLE 3

PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA
TERRACON PROJECT NO. 41987018

GROUND WATER ANALYTCAL RESULTS - WELLS

ID#	Sample		Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	1,2-DCA (µg/L)	GRO (µg/L)	DRO (µg/L)
9	CW-3		09/12/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
9	CW-3		10/20/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
9	CW-3		11/20/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
9	CW-3		01/16/2001	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	<100	-
10	CW-4		12/19/1990	2.2	<0.2	<0.2	0.4	<0.2	<0.5	0.3	-	-
10	CW-4		10/23/1997	16	<0.30	<0.50	<1.2	<1.0	<0.40	1.5	-	-
10	CW-4		03/25/1998	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
10	CW-4	G	06/10/1998	3.0	<1	<1	<3	-	<5	2.2	-	-
10	CW-4		06/10/1998	2.9	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	-	-
10	CW-4	G	06/13/1998	3.5	<1	<1	<3	-	<5	2.7	-	-
10	CW-4		08/20/1998	6.6	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
10	CW-4		09/09/1998	8.8	<0.3	<0.5	<1.2	<1.0	<0.4	0.78	-	-
10	CW-4		10/05/1998	12	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
10	CW-4		11/18/1998	19	<0.3	<0.5	<1.2	<1.0	<0.4	0.6	-	-
10	CW-4		12/15/1998	18	0.4	<0.5	<1.2	<1.0	<0.4	0.8	-	-
10	CW-4		01/25/1999	20	0.38	0.51	<1.2	<1.0	<0.4	1.1	-	-
10	CW-4		02/18/1999	19	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
10	CW-4		03/17/1999	19	<0.3	0.55	<1.2	<1.0	<0.4	0.88	-	-
10	CW-4		04/22/1999	12	<0.3	<0.50	<1.2	<1.0	<0.4	0.51	-	-
10	CW-4		05/21/1999	8.8	<0.3	<0.50	<1.2	<1.0	<0.4	0.62	-	-
10	CW-4		06/24/1999	11	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
10	CW-4		07/19/1999	7.7	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
10	CW-4		08/23/1999	7.3	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
10	CW-4		09/22/1999	6.7	<0.30	<0.50	<1.2	<1.0	<0.40	0.59	-	-
10	CW-4		10/25/1999	6.6	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
10	CW-4		11/24/1999	5.7	<0.30	<0.50	<1.2	<1.0	<0.40	0.5	-	-
10	CW-4		12/09/1999	4.9	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
10	CW-4		01/13/2000	3.5	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	-	-
10	CW-4		02/17/2000	3.0	<0.30	<0.50	<1.2	<1.0	<0.40	0.72	-	-
10	CW-4		03/13/2000	2.4	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
10	CW-4	*	04/20/2000	1.7	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
10	CW-4		05/23/2000	0.49	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
10	CW-4		06/17/2000	1.0	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
10	CW-4		07/27/2000	0.66	<0.30	<0.50	<1.2	<1.0	<0.40	0.67	-	-
10	CW-4		08/16/2000	0.56	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
10	CW-4		09/12/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
10	CW-4		10/20/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
10	CW-4		11/20/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
10	CW-4		12/13/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
10	CW-4		01/16/2001	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	<100	-

TABLE 3

PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA
TERRACON PROJECT NO. 41987018

GROUND WATER ANALYTCAL RESULTS - WELLS

ID#	Sample	Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	1,2-DCA (µg/L)	GRO (µg/L)	DRO (µg/L)
10	CW-4	02/15/2001	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	0.55	-	-
10	CW-4	03/08/2001	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
11	CW-5	01/13/2000	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	-	-
12	CW-6	01/13/2000	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	-	-
	CW-Influent	03/25/1998	5.8	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Influent G	04/23/1998	1.0	<1	<1	<3	<5	<5	<1	-	-
	CW-Influent	06/10/1998	3.7	1.0	4.7	1.3	<1.0	<1.0	<1.0	-	-
	CW-Influent	08/20/1998	0.5	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Influent	10/05/1998	1.1	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Influent	11/18/1998	0.34	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Influent	12/15/1998	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Influent	01/25/1999	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Influent	02/18/1999	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Influent	03/17/1999	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Influent	04/22/1999	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Influent	05/21/1999	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Influent	06/24/1999	<0.30	<0.30	<0.50	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Influent	07/19/1999	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Influent	08/23/1999	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Influent	09/22/1999	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Influent	10/25/1999	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Influent	11/24/1999	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Influent	12/09/1999	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Influent	01/13/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-
	CW-Influent	02/17/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Influent	03/13/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Influent	04/20/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Influent	05/23/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Influent	06/17/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Influent [1]	07/27/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Influent	08/16/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	CW-Influent	09/12/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	CW-Influent	10/20/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	CW-Influent	11/20/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	CW-Influent	12/13/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	CW-Influent	01/16/2001	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	<100	-
	CW-Influent [1]	02/15/2001	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-

TABLE 3

PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA
TERRACON PROJECT NO. 41987018

GROUND WATER ANALYTCAL RESULTS - WELLS

ID#	Sample	Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	1,2-DCA (µg/L)	GRO (µg/L)	DRO (µg/L)
	CW-Filtered	03/25/1998	6.8	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Filtered G	04/23/1998	<1	<1	<1	<3	<5	<5	<1	-	-
	CW-Filtered	06/10/1998	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Filtered	08/20/1998	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Filtered	10/05/1998	0.73	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Filtered	11/18/1998	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Filtered	12/15/1998	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Filtered	01/25/1999	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Filtered	02/18/1999	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Filtered	03/17/1999	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Filtered	04/22/1999	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Filtered	05/21/1999	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Filtered	06/24/1999	<0.3	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	CW-Filtered	07/19/1999	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Filtered	08/23/1999	0.35	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Filtered	09/22/1999	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Filtered	10/25/1999	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Filtered	11/24/1999	5.80	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Filtered	12/09/1999	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Filtered	01/13/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-
	CW-Filtered	02/17/2000	<0.30	<0.30	<0.50	<1.2	<1.0	2.1**	<0.50	-	-
	CW-Filtered	03/13/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Filtered	04/20/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Filtered [1]	05/23/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Filtered [1]	06/17/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Filtered [1]	07/27/2000	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	CW-Filtered	08/16/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	CW-Filtered [1]	09/12/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	CW-Filtered [1]	10/20/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	CW-Filtered [1]	11/20/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	CW-Filtered	12/13/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	CW-Filtered	01/16/2001	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	<100	-
	CW-Filtered	02/15/2001	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	CW-Filtered	02/28/2001	0.2	<0.2	<0.2	<0.4	<2.0	<0.5	<0.2	-	-
	Storm Dis.	03/17/1999	<0.3	0.86	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	Storm Dis.	04/22/1999	3.0	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	<100	<100
	Storm Dis.	09/22/1999	1.8	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	Storm Dis.	12/09/1999	1.1	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-
	Storm Dis.	03/13/2000	0.6	<0.3	<0.5	<1.2	<1.0	<0.4	<0.5	-	-

TABLE 3

PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA
TERRACON PROJECT NO. 41987018

GROUND WATER ANALYTCAL RESULTS - WELLS

ID#	Sample	Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	1,2-DCA (µg/L)	GRO (µg/L)	DRO (µg/L)
13	Nusery Well G	02/26/1998	<1	<1	<1	<3	<5	<5	<1	-	-
13	Nusery Well	02/26/1998	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
19	AMPI Well	03/25/1998	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
17	Bus Gar. (south)	03/25/1998	<0.30	0.35	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
	GW PUMPING TEST AND EXTRACTION										
10	CW-4-1	05/20/1998	<1.0	<1.0	<1.0	<1.0	<5.0	NA	NA	<100	-
10	CW-4-2	05/20/1998	<1.0	<1.0	<1.0	<1.0	<5.0	NA	NA	<100	-
10	CW-4-3	05/20/1998	<0.30	<0.30	<0.50	<1.2	<1.0	<0.40	<0.50	-	-
10	CW-4-4	05/20/1998	<1.0	<1.0	<1.0	<1.0	49	NA	NA	<100	-
10	CW-4-5	05/21/1998	<1.0	<1.0	<1.0	<1.0	<5.0	NA	NA	<100	-
10	CW-4-6	05/21/1998	0.41	<0.30	<0.50	<1.2	<1.0	<0.40	0.46	-	-
45	DW-5 G	08/20/1998	2,200	140	<100	<300	-	<500	100	-	-
45	DW-5 - 2 hrs G	08/20/1998	2,300	120	<100	<300	-	<500	110	-	-
45	DW-5 - 2 hrs G*	08/20/1998	760	120	73	65	1.7	<0.40	41	2700	-
45	DW-5	12/24/1998	1,600	81	64	41	<5.0	-	-	2,800	-
45	DW-5	12/30/1998	1,300	47	51	41	44	-	-	1,700	-
45	DW-5	01/25/1999	600	28	41	41	5.4	-	-	1,100	-
45	DW-5	02/18/1999	400	13	25	<5.0	<25	-	-	550	-
45	DW-5	03/17/1999	380	13	22	17	<5.0	-	-	610	-
45	DW-5	04/22/1999	240	<1.0	13	18	<5.0	-	-	590	-
45	DW-5 *	05/21/1999	160	8.7	14	13	<1.0	-	5.8	-	-
45	DW-5	06/24/1999	170	6.2	9.9	8.9	<5.0	-	-	280	-
45	DW-5	07/19/1999	170	5.7	11	11	<5.0	-	-	300	-
45	DW-5	08/23/1999	160	6.2	12	8.9	5.3	-	-	280	-
45	DW-5	09/22/1999	170	5.7	11	8.6	<5.0	-	-	280	-
45	DW-5	10/25/1999	160	5.6	12	10	<5.0	-	-	260	-
45	DW-5	11/24/1999	150	5.8	11	10	5.2	-	-	250	-
45	DW-5	12/09/1999	140	5.7	12	9.7	<5.0	-	-	230	-
45	DW-5	01/13/2000	140	10	12	15	<130	-	-	290	-
45	DW-5	02/17/2000	150	5.5	12	11	<5.0	-	-	270	-
45	DW-5	03/13/2000	140	4.3	11	9	<5.0	-	-	220	-
45	DW-5	04/20/2000	140	8	11	13	6.7	-	-	320	-
45	DW-5	05/23/2000	96	3.6	8.2	7.8	<5.0	-	-	180	-
45	DW-5	06/17/2000	150	4.9	11	10	<5.0	-	-	270	-
45	DW-5	07/27/2000	130	4	9.2	9.8	<5.0	-	-	210	-
45	DW-5	10/20/2000	57	2.1	5.5	6	<5.0	-	-	120	-

TABLE 3

PAYNESVILLE PUBLIC WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA
TERRACON PROJECT NO. 41987018

GROUND WATER ANALYTCAL RESULTS - WELLS

ID#	Sample		Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	1,2-DCA (µg/L)	GRO (µg/L)	DRO (µg/L)
45	DW-5		01/16/2001	79	3.3	7.7	9.9	<5.0	-	-	170	-
	QA/QC DUPLICATES AND BLANKS											
46	DW-6	D	10/20/2000	43	<1	9.7	7.3	<5.0	-	-	340	-
3	DW-3	D	01/16/2001	<1.0	3.4	1.1	3.6	<5.0	-	-	<100	-
	Trip Blank	[1]	10/20/2000	<0.50	0.58	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	Trip Blank		11/20/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	Trip Blank		12/13/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	
	Trip Blank	[1]	01/16/2001	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	
	Method Blank		10/20/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	<100	-
	Method Blank		11/20/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	Method Blank		12/13/2000	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	-	-
	Method Blank		01/16/2001	<0.50	<0.50	<0.50	<1.5	<1.0	<0.50	<0.50	<100	-
	HRL		-	10	1,000	700	10,000	NE	300	4	NE	NE
	MCL		-	5	1,000	700	10,000	NE	NE	5	NE	NE
	NPDES		-	114	253	-	166	-	-	190	500	-

Concentrations are in micrograms per liter (µ g/L) which is equivalent to parts per billion.

1,2-DCA = 1,2-Dichloroethane

GRO = Gasoline Range Organics

DRO = Diesel Range Organics

G = Samples analyzed using GC in Geoprobe Sampling Vehicle.

* = Other petroleum related volatile organic compounds detected.

** = Concentration due to sample carry over.

HRL = Health Risk Limit (MDH, 1996)

MCL = Maximum contaminant levels (EPA, 1996)

< = Less than the practical quantification limits.

NA = not analyzed

[1] = non-petroleum VOC detected

D = Duplicate

#N/A 05/01/2001

TABLE 5

PAYNESVILLE MUNICIPAL WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA
TERRACON PROJECT NO. 41987018

GROUND WATER EXTRACTION SYSTEM
DISSOLVED PHASE CONTAMINANT REMOVAL DATA

COMPOUND	Date	Conc. (ug/l)	Flow Rate (gal/min)	Flow Rate (l/sec)	Emission (ug/sec)	Removal (gal/day)	Removal (kg/day)	Interval (days)	Availability (%)	Total Removal (gal)	Cummulative Removal (gal)
Benzene	12/24/98	1,600	9.6	0.61	970	0.0310	0.0838	0	100%	0.00	0.0
Benzene	12/30/98	1300	9.6	0.61	788	0.0252	0.0681	6	100%	0.15	0.2
Benzene	01/25/99	600	9.5	0.60	360	0.0115	0.0311	26	100%	0.30	0.5
Benzene	02/18/99	400	9.4	0.59	237	0.0076	0.0205	24	96%	0.18	0.6
Benzene	03/17/99	380	9.3	0.59	223	0.0071	0.0193	27	97%	0.19	0.8
Benzene	04/22/99	240	16.0	1.01	242	0.0078	0.0209	36	84%	0.23	1.0
Benzene	05/21/99	160	15.8	1.00	160	0.0051	0.0138	29	66%	0.10	1.1
Benzene	06/24/99	170	11.8	0.74	127	0.0040	0.0109	34	100%	0.14	1.3
Benzene	07/19/99	170	11.4	0.72	122	0.0039	0.0106	25	100%	0.10	1.4
Benzene	08/23/99	160	10.0	0.63	101	0.0032	0.0087	35	100%	0.11	1.5
Benzene	09/22/99	170	10.1	0.64	108	0.0035	0.0094	30	100%	0.10	1.6
Benzene	10/25/99	160	9.9	0.63	100	0.0032	0.0086	33	101%	0.11	1.7
Benzene	11/24/99	150	9.9	0.63	94	0.0030	0.0081	30	99%	0.09	1.8
Benzene	12/09/99	140	9.8	0.62	87	0.0028	0.0075	15	100%	0.04	1.8
Benzene	01/13/00	140	9.8	0.62	87	0.0028	0.0075	35	66%	0.06	1.9
Benzene	02/17/00	150	9.6	0.61	91	0.0029	0.0078	35	54%	0.05	2.0
Benzene	03/13/00	140	10.0	0.63	88	0.0028	0.0076	25	32%	0.02	2.0
Benzene	04/20/00	140	8.5	0.54	75	0.0024	0.0065	38	75%	0.07	2.0
Benzene	05/23/00	96	9.0	0.57	55	0.0017	0.0047	33	45%	0.03	2.1
Benzene	06/17/00	150	9.9	0.62	94	0.0030	0.0081	25	76%	0.06	2.1
Benzene	07/27/00	130	9.9	0.63	81	0.0026	0.0070	40	77%	0.08	2.2
Benzene	10/20/00	57	17.5	1.11	63	0.0020	0.0054	85	58%	0.10	2.3
Benzene	01/16/01	79	2.0	0.13	10	0.0003	0.0009	88	100%	0.03	2.3
Toluene	12/24/98	81	9.6	0.61	49	0.0016	0.0042	0	100%	0.00	0.0
Toluene	12/30/98	47	9.6	0.61	28	0.0009	0.0025	6	100%	0.01	0.0
Toluene	01/25/99	28	9.5	0.60	17	0.0005	0.0015	26	100%	0.01	0.0
Toluene	02/18/99	13	9.4	0.59	8	0.0002	0.0007	24	96%	0.01	0.0
Toluene	03/17/99	13	9.3	0.59	8	0.0002	0.0007	27	97%	0.01	0.0
Toluene	04/22/99	1	16.0	1.01	1	0.0000	0.0001	36	84%	0.00	0.0
Toluene	05/21/99	8.7	15.8	1.00	9	0.0003	0.0007	29	66%	0.01	0.0
Toluene	06/24/99	6.2	11.8	0.74	5	0.0001	0.0004	34	100%	0.01	0.0
Toluene	07/19/99	5.7	11.4	0.72	4	0.0001	0.0004	25	100%	0.00	0.0
Toluene	08/23/99	6.2	10.0	0.63	4	0.0001	0.0003	35	100%	0.00	0.1

TABLE 5

PAYNESVILLE MUNICIPAL WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA
TERRACON PROJECT NO. 41987018

GROUND WATER EXTRACTION SYSTEM
DISSOLVED PHASE CONTAMINANT REMOVAL DATA

COMPOUND	Date	Conc. (ug/l)	Flow Rate (gal/min)	Flow Rate (l/sec)	Emission (ug/sec)	Removal (gal/day)	Removal (kg/day)	Interval (days)	Availability (%)	Total Removal (gal)	Cummulative Removal (gal)
Toluene	09/22/99	5.7	10.1	0.64	4	0.0001	0.0003	30	100%	0.00	0.1
Toluene	10/25/99	5.6	9.9	0.63	4	0.0001	0.0003	33	101%	0.00	0.1
Toluene	11/24/99	5.8	9.9	0.63	4	0.0001	0.0003	30	99%	0.00	0.1
Toluene	12/09/99	5.7	9.8	0.62	4	0.0001	0.0003	15	100%	0.00	0.1
Toluene	01/13/00	10.0	9.8	0.62	6	0.0002	0.0005	35	66%	0.00	0.1
Toluene	02/17/00	5.5	9.6	0.61	3	0.0001	0.0003	35	54%	0.00	0.1
Toluene	03/13/00	4.3	10.0	0.63	3	0.0001	0.0002	25	32%	0.00	0.1
Toluene	04/20/00	8.0	8.5	0.54	4	0.0001	0.0004	38	75%	0.00	0.1
Toluene	05/23/00	3.6	9.0	0.57	2	0.0001	0.0002	33	45%	0.00	0.1
Toluene	06/17/00	4.9	9.9	0.62	3	0.0001	0.0003	25	76%	0.00	0.1
Toluene	07/27/00	4.0	9.9	0.63	3	0.0001	0.0002	40	77%	0.00	0.1
Toluene	10/20/00	2.1	17.5	1.10	2	0.0001	0.0002	85	58%	0.00	0.1
Toluene	01/16/01	3.3	2.0	0.13	0	0.0000	0.0000	88	100%	0.00	0.1
E.Benzene	12/24/98	64	9.6	0.61	39	0.0012	0.0034	0	100%	0.00	0.0
E.Benzene	12/30/98	51	9.6	0.61	31	0.0010	0.0027	6	100%	0.01	0.0
E.Benzene	01/25/99	41	9.5	0.60	25	0.0008	0.0021	26	100%	0.02	0.0
E.Benzene	02/18/99	25	9.4	0.59	15	0.0005	0.0013	24	96%	0.01	0.0
E.Benzene	03/17/99	22	9.3	0.59	13	0.0004	0.0011	27	97%	0.01	0.0
E.Benzene	04/22/99	13	16.0	1.01	13	0.0004	0.0011	36	84%	0.01	0.1
E.Benzene	05/21/99	14	15.8	1.00	14	0.0004	0.0012	29	66%	0.01	0.1
E.Benzene	06/24/99	9.9	11.8	0.74	7	0.0002	0.0006	34	100%	0.01	0.1
E.Benzene	07/19/99	11	11.4	0.72	8	0.0003	0.0007	25	100%	0.01	0.1
E.Benzene	08/23/99	12	10.0	0.63	8	0.0002	0.0007	35	100%	0.01	0.1
E.Benzene	09/22/99	11	10.1	0.64	7	0.0002	0.0006	30	100%	0.01	0.1
E.Benzene	10/25/99	12	9.9	0.63	8	0.0002	0.0006	33	101%	0.01	0.1
E.Benzene	11/24/99	11	9.9	0.63	7	0.0002	0.0006	30	99%	0.01	0.1
E.Benzene	12/09/99	12	9.8	0.62	7	0.0002	0.0006	15	100%	0.00	0.1
E.Benzene	01/13/00	12	9.8	0.62	7	0.0002	0.0006	35	66%	0.01	0.1
E.Benzene	02/17/00	12	9.6	0.61	7	0.0002	0.0006	35	54%	0.00	0.1
E.Benzene	03/13/00	11	10.0	0.63	7	0.0002	0.0006	25	32%	0.00	0.1
E.Benzene	04/20/00	11	8.5	0.54	6	0.0002	0.0005	38	75%	0.01	0.1
E.Benzene	05/23/00	8	9.0	0.57	5	0.0001	0.0004	33	45%	0.00	0.1
E.Benzene	06/17/00	11	9.9	0.62	7	0.0002	0.0006	25	76%	0.00	0.1
E.Benzene	07/27/00	9	9.9	0.63	6	0.0002	0.0005	40	77%	0.01	0.1

TABLE 5

PAYNESVILLE MUNICIPAL WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA
TERRACON PROJECT NO. 41987018

GROUND WATER EXTRACTION SYSTEM
DISSOLVED PHASE CONTAMINANT REMOVAL DATA

COMPOUND	Date	Conc. (ug/l)	Flow Rate (gal/min)	Flow Rate (l/sec)	Emission (ug/sec)	Removal (gal/day)	Removal (kg/day)	Interval (days)	Availability (%)	Total Removal (gal)	Cummulative Removal (gal)
E.Benzene	10/20/00	6	17.5	1.10	6	0.0002	0.0005	85	58%	0.01	0.2
E.Benzene	01/16/01	8	2.0	0.13	1	0.0000	0.0001	88	100%	0.00	0.2
Xylenes	12/24/98	41	9.6	0.61	25	0.0008	0.0021	0	100%	0.00	0.0
Xylenes	12/30/98	41	9.6	0.61	25	0.0008	0.0021	6	100%	0.00	0.0
Xylenes	01/25/99	41	9.5	0.60	25	0.0008	0.0021	26	100%	0.02	0.0
Xylenes	02/18/99	5	9.4	0.59	3	0.0001	0.0003	24	96%	0.00	0.0
Xylenes	03/17/99	17	9.3	0.59	10	0.0003	0.0009	27	97%	0.01	0.0
Xylenes	04/22/99	18	16.0	1.01	18	0.0006	0.0016	36	84%	0.02	0.1
Xylenes	05/21/99	13	15.8	1.00	13	0.0004	0.0011	29	66%	0.01	0.1
Xylenes	06/24/99	8.9	11.8	0.74	7	0.0002	0.0006	34	100%	0.01	0.1
Xylenes	07/19/99	11	11.4	0.72	8	0.0003	0.0007	25	100%	0.01	0.1
Xylenes	08/23/99	8.9	10.0	0.63	6	0.0002	0.0005	35	100%	0.01	0.1
Xylenes	09/22/99	8.6	10.1	0.64	5	0.0002	0.0005	30	100%	0.01	0.1
Xylenes	10/25/99	10	9.9	0.63	6	0.0002	0.0005	33	101%	0.01	0.1
Xylenes	11/24/99	10	9.9	0.63	6	0.0002	0.0005	30	99%	0.01	0.1
Xylenes	12/09/99	9.7	9.8	0.62	6	0.0002	0.0005	15	100%	0.00	0.1
Xylenes	01/13/00	15.0	9.8	0.62	9	0.0003	0.0008	35	66%	0.01	0.1
Xylenes	02/17/00	11.0	9.6	0.61	7	0.0002	0.0006	35	54%	0.00	0.1
Xylenes	03/13/00	9.0	10.0	0.63	6	0.0002	0.0005	25	32%	0.00	0.1
Xylenes	04/20/00	13.0	8.5	0.54	7	0.0002	0.0006	38	75%	0.01	0.1
Xylenes	05/23/00	7.8	9.0	0.57	4	0.0001	0.0004	33	45%	0.00	0.1
Xylenes	06/17/00	10.0	9.9	0.62	6	0.0002	0.0005	25	76%	0.00	0.1
Xylenes	07/27/00	9.8	9.9	0.63	6	0.0002	0.0005	40	77%	0.01	0.1
Xylenes	10/20/00	6.0	17.5	1.10	7	0.0002	0.0006	85	58%	0.01	0.1
Xylenes	01/16/01	9.9	2.0	0.13	1	0.0000	0.0001	88	100%	0.00	0.1
GRO	12/24/98	2,800	9.6	0.61	1697	0.0543	0.1466	0	100%	0.00	0.1
GRO	12/30/98	1,700	9.6	0.61	1030	0.0329	0.0890	6	100%	0.20	0.3
GRO	01/25/99	1,100	9.5	0.60	660	0.0211	0.0570	26	100%	0.55	0.9
GRO	02/18/99	550	9.4	0.59	326	0.0104	0.0282	24	96%	0.24	1.1
GRO	03/17/99	610	9.3	0.59	358	0.0114	0.0309	27	97%	0.30	1.4
GRO	04/22/99	590	16.0	1.01	596	0.0191	0.0515	36	84%	0.57	2.0
GRO	05/21/99	500	15.8	1.00	499	0.0159	0.0431	29	66%	0.30	2.3
GRO	06/24/99	280	11.8	0.74	209	0.0067	0.0180	34	100%	0.23	2.5

TABLE 5

PAYNESVILLE MUNICIPAL WATER SUPPLY - MPCA
PAYNESVILLE, MINNESOTA
TERRACON PROJECT NO. 41987018

GROUND WATER EXTRACTION SYSTEM
DISSOLVED PHASE CONTAMINANT REMOVAL DATA

COMPOUND	Date	Conc. (ug/l)	Flow Rate (gal/min)	Flow Rate (l/sec)	Emission (ug/sec)	Removal (gal/day)	Removal (kg/day)	Interval (days)	Availability (%)	Total Removal (gal)	Cummulative Removal (gal)
GRO	07/19/99	300	11.4	0.72	216	0.0069	0.0187	25	100%	0.17	2.7
GRO	08/23/99	280	10.0	0.63	177	0.0057	0.0153	35	100%	0.20	2.9
GRO	09/22/99	280	10.1	0.64	179	0.0057	0.0154	30	100%	0.17	3.0
GRO	10/25/99	260	9.9	0.63	163	0.0052	0.0140	33	101%	0.17	3.2
GRO	11/24/99	250	9.9	0.63	156	0.0050	0.0135	30	99%	0.15	3.4
GRO	12/09/99	230	9.8	0.62	142	0.0045	0.0123	15	100%	0.07	3.4
GRO	01/13/00	290	9.8	0.62	179	0.0057	0.0155	35	66%	0.13	3.6
GRO	02/17/00	270	9.6	0.61	163	0.0052	0.0141	35	54%	0.10	3.7
GRO	03/13/00	220	10.0	0.63	139	0.0044	0.0120	25	32%	0.03	3.7
GRO	04/20/00	320	8.5	0.54	172	0.0055	0.0148	38	75%	0.16	3.9
GRO	05/23/00	180	9.0	0.57	102	0.0033	0.0088	33	45%	0.05	3.9
GRO	06/17/00	270	9.9	0.62	168	0.0054	0.0146	25	76%	0.10	4.0
GRO	07/27/00	210	9.9	0.63	132	0.0042	0.0114	40	77%	0.13	4.1
GRO	10/20/00	120	17.5	1.10	133	0.0042	0.0115	85	58%	0.21	4.3
GRO	01/16/01	170	2.0	0.13	21	0.0007	0.0019	88	100%	0.04	4.4

Note: PreT (ug/l) & flow rate (l/sec) were used to calculate the removal rate in gal/day using 1x10-9 kg/ug, 0.37 gal/kg & 86,400 sec/day. The total removal (gal) was calculated using the following: (days since last samples) x (removal rate in gal/day) x (% availability). Availability is the calculated by the following: (days since last sample)/(operational days according the control panel) thereby compensating for the amount of time the system was not functioning as part of its normal operation and down time.

< = Less than the method detection limit
- was not analyzed for this parameter

SER - Significant emission rate
GRO = Gasoline Range Organics

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