ANL/EVS/AGEM/TR-08-17

Argonne NATIONAL LABORATORY

July 2008 Monitoring Results for Barnes, Kansas

Environmental Science Division

USDA United States Department of Agriculture

Work sponsored by Commodity Credit Corporation,
United States Department of Agriculture

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by
Applied Geosciences and Environmental Management Section
Environmental Science Division, Argonne National Laboratory

September 2008

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Notation

AGEM	Applied Geosciences and Environmental Management
AMSL	above mean sea level
BGL	below ground level
°C	degree(s) Celsius
CCC	Commodity Credit Corporation
COC	chain of custody
DO	dissolved oxygen
EPA	U.S. Environmental Protection Agency
ft	foot (feet)
gal	gallon(s)
KDHE	Kansas Department of Health and Environment
L	liter(s)
µg/L	microgram(s) per liter
µS/cm	microsiemen(s) per centimeter
mg/L	milligram(s) per liter
min	minute
mV	millivolt(s)
ORP	oxidation-reduction potential
RBSL	risk-based screening level
TOC	top of casing
USDA	U.S. Department of Agriculture
VOC	volatile organic compound

July 2008 Monitoring Results for Barnes, Kansas

1 Introduction and Background

The Commodity Credit Corporation of the U.S. Department of Agriculture (CCC/USDA) operated a grain storage facility at Barnes, Kansas, during most of the interval 1949-1974. Carbon tetrachloride contamination was initially detected in 1986 in the town's public water supply wells. In 2006-2007, the CCC/USDA conducted a comprehensive targeted investigation at and near its former property in Barnes to characterize this contamination. Those results were reported previously (Argonne 2008a).

In November 2007, the CCC/USDA began quarterly groundwater monitoring at Barnes. The monitoring is being conducted on behalf of the CCC/USDA by Argonne National Laboratory, in accord with the recommendations made in the report for the 2006-2007 targeted investigation (Argonne 2008a). The objective is to monitor the carbon tetrachloride contamination identified in the groundwater at Barnes. The sampling is presently conducted in a network of 28 individual monitoring wells (at 19 distinct locations), 2 public water supply wells, and 1 private well (Figure 1.1).

The results of the 2006-2007 targeted investigation and the subsequent monitoring events in November 2007 (Argonne 2008b) and March 2008 (Argonne 2008c) demonstrated the presence of carbon tetrachloride contamination in groundwater at levels slightly exceeding the Kansas Department of Health and Environment (KDHE) Tier 2 risk-based screening level (RBSL) of 5.0 µg/L for this compound. The contaminant plume appears to extend from the former CCC/USDA property northwestward, toward the Barnes public water supply wells. Information obtained during the 2006-2007 investigations indicates that at least one other potential source might have contributed to the groundwater contaminant plume (Argonne 2008a).

This current report presents the results of the third monitoring event, conducted in July 2008. During this third monitoring event, low-flow sampling methods were used to purge and sample all wells. This was the second event at Barnes during which low-flow sampling methods were used.

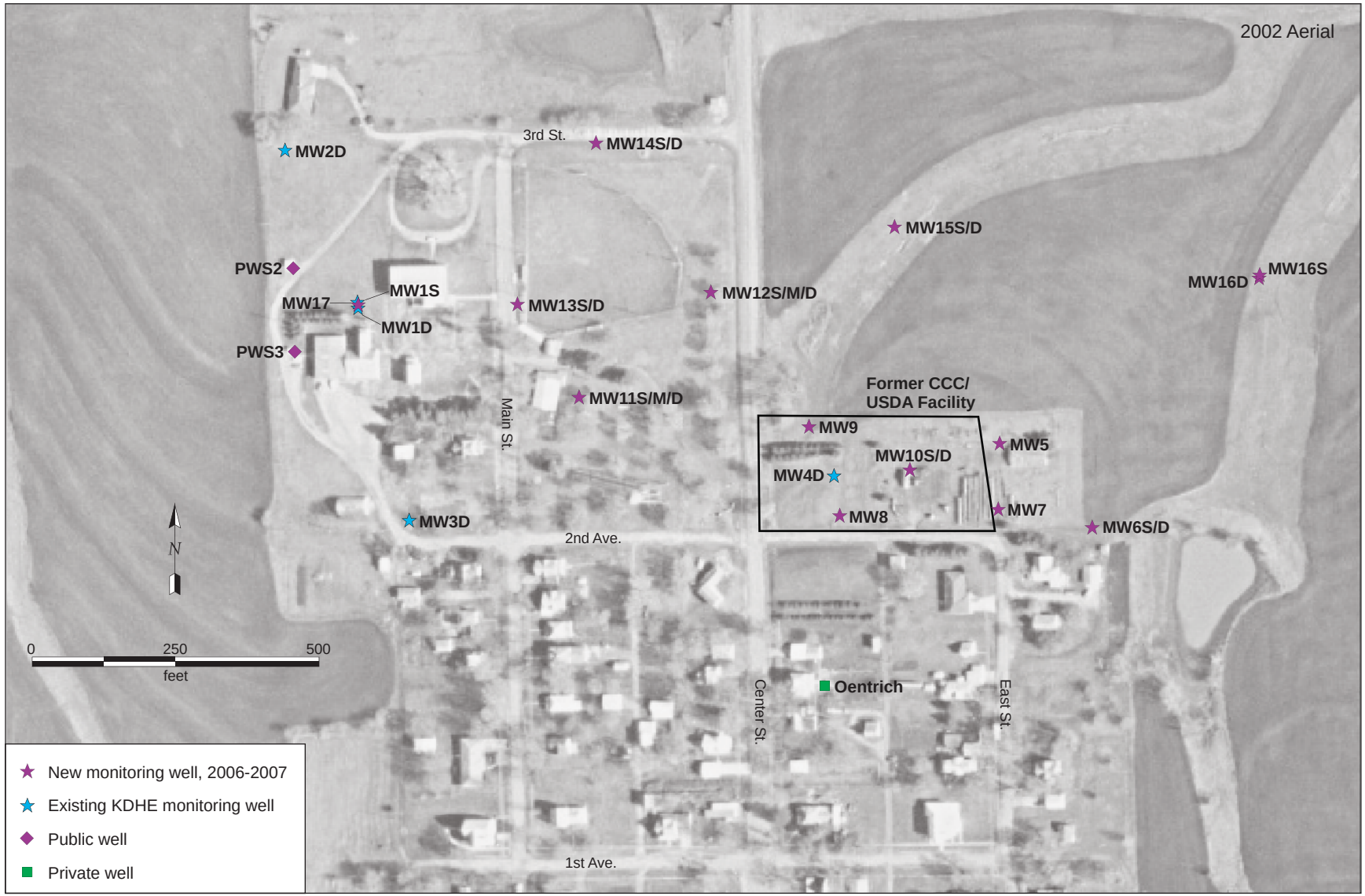


FIGURE 1.1 Groundwater sampling locations at Barnes in July 2008. Source of photograph: NAPP (2002).

2 Sampling and Analysis Activities

2.1 Measurement of Groundwater Levels

The groundwater sampling event at Barnes on July 9-12, 2008, involved 28 monitoring wells (MW1S, MW1D, MW2D, MW3D, MW4D, MW5, MW6S, MW6D, MW7, MW8, MW9, MW10S, MW10D, MW11S, MW11M, MW11D, MW12S, MW12M, MW12D, MW13S, MW13D, MW14S, MW14D, MW15S, MW15D, MW16S, MW16D, MW17). All of the well locations are shown in Figure 1.1. A chronological summary of the field activities is in Appendix A, Table A.

Before implementation of the low-flow sampling described in Section 2.2, a hand-held water level indicator was used to measure the depth to groundwater and the total depth of each well, to within 0.01 ft, from the top of the well casing. Monitoring wells MW1S and MW12S were measured but were found to be dry and consequently could not be sampled. Two public water supply wells (PWS2 and PWS3) and one private well (Oentrich) were sampled but could not be measured because of well construction issues. The hand-measured water level data are presented in Section 3.1 and discussed in Section 3.3.

In addition to the manual water level measurements, data recorders have been gathering long-term data on the groundwater elevation and gradient at monitoring wells MW1D, MW2D, MW3D, MW4D, MW7, MW9, MW14D, MW15D, and MW16D and at the Oentrich private well (Figure 2.1). The data loggers record water levels continuously at 30-min intervals. During the current monitoring period, the data loggers were downloaded on July 9, 2008.

During the download on July 9, 2008, problems were discovered that had caused the following data recorders to stop working:

- The data recorder in well MW3D was found to be damaged, probably because of water infiltrating into the well vault. The recorder was subsequently removed and replaced.

- The battery for the data recorder in well MW7 had failed prematurely on June 25, 2008. The battery was replaced.

- The data recorder at the Oentrich private well was found to have been removed on May 9, 2008. The recorder was removed when the property owner repaired the well pump and installed a new sanitary seal that the limits access to the well. The data recorder could not be replaced.

Currently, nine recorders are installed and working properly (all locations in Figure 2.1 except for the Oentrich well). The automatically recorded groundwater level data are presented and discussed in Section 3.1.

2.2 Monitoring Well Sampling and Analyses

After measurement of water levels, low-flow groundwater sampling techniques, according to U.S. Environmental Protection Agency (EPA) guidelines (Puls and Barcelona 1996), were used to purge and sample the monitoring wells. The Oentrich well and the public water supply wells were sampled at their respective faucets. The Oentrich well was pumped for 5 min before sampling; the public water supply wells were pumped for 0.5 h (Table A.1 in Appendix A).

The low-flow sampling of monitoring wells involved the use of a bladder pump and field measurement equipment designed to determine when representative formation water was entering the well casing. Stabilization of formation water in the screened area of the well was determined by measuring the static water levels and monitoring the levels of pH, temperature, specific conductivity, oxidation-reduction potential (ORP), and dissolved oxygen (DO) during pumping.

The following procedure was followed for each well sampled:

1. A bladder pump was inserted into the well to a depth midway between the top and bottom of the screen. To minimize disturbance of the solids that are typically present at the bottom of a well, care was taken not to lower the equipment or pump to the bottom of the well screen.

2. The pumping rate for the bladder pump was set to ensure that minimal drawdown occurred in each well during pumping. The rate was monitored by measuring the static water level continuously throughout pumping.

3. Poly tubing was used to connect the bladder pump and to an in-line flow cell. Formation parameters, including pH, temperature, specific conductivity, ORP, and DO, were measured continuously in the in-line flow cell during pumping. Measurements were recorded every 4 min until 3 successive measurements for each parameter were within a range indicating that the formation water was stable. The range for formation stabilization varies for each parameter, as follows: pH, within 0.1; temperature, within 3%; specific conductivity, within 3%; ORP, within 10 mV; and DO, within 10%.

4. After formation stabilization occurred, the poly tubing was disconnected from the in-line flow cell, and a representative groundwater sample was transferred from the poly tubing into laboratory-approved containers.

5. Poly tubing for each well was kept and dedicated for reuse at that well. In addition, pumping rate data were recorded for each well as a reference for subsequent sampling events.

The sequence of activities during the July 2008 well sampling event is summarized in Appendix A, Table A.1. The field measurements are in Appendix A, Table A.2.

Groundwater samples designated for analyses for volatile organic compounds (VOCs) were collected in appropriate laboratory containers, labeled, packaged, and chilled to 4°C by placement in ice-filled coolers. The samples were shipped via an overnight delivery service to the Applied Geosciences and Environmental Management (AGEM) Laboratory at Argonne for VOCs analyses with EPA Method 524.2 (EPA 1995). Aliquots of selected samples (chosen in the field) were also shipped to TestAmerica Laboratories, Inc., South Burlington, Vermont, for verification VOCs analyses according to EPA Contract Laboratory Program protocols.

The analytical results are presented and discussed in Section 3.2.

2.3 Handling and Disposal of Investigation-Derived Waste

Purge water generated as potentially contaminated investigation-derived waste was containerized on-site in 55-gal drums. The accumulated purge water was sampled and analyzed for VOCs (including ethylene dibromide) and nitrates. The analytical results indicated no detectable concentrations of carbon tetrachloride, chloroform, or ethylene dibromide. Nitrate was present at 3.7 mg/L. With the approval of the KDHE (2008a), the water was discharged on-site on July 31, 2008.

2.4 Quality Control for Sample Collection, Handling, and Analysis

Quality assurance/quality control procedures followed during the July 2008 monitoring event are described in detail in the *Master Work Plan* (Argonne 2002). The results are summarized as follows:

- Sample collection and handling activities were monitored by the documentation of samples as they were collected and the use of chain-of-custody forms and custody seals to ensure sample integrity during handling and shipment.

- Samples designated for VOCs analyses were received with custody seals intact and at the appropriate preservation temperature. All samples sent to the AGEM Laboratory were analyzed within the required holding times.

- Quality control samples collected to monitor sample-handling activities (trip blanks and equipment rinsates) and method blanks analyzed with the samples to monitor analytical methodologies were all free of carbon tetrachloride and chloroform contamination.

- Groundwater samples were analyzed for VOCs at the AGEM Laboratory by the purge-and-trap method and a gas chromatograph-mass spectrometer system. Calibration checks analyzed with each sample delivery group were required to be within ±20% of the standard. Surrogate standard determinations

performed on samples and blanks were within the specified range of 80-120% for all samples, in either the initial analysis or a successful reanalysis.

- Results from the AGEM Laboratory for dual analyses of the groundwater samples are in Appendix B, Table B.1. The results of the dual analyses compare well, indicating consistency in the sampling and analytical methodologies. Analytical results for quality control samples are also in Appendix B, Table B.1.

- In accordance with the procedures defined in the *Master Work Plan* (Argonne 2002), five groundwater samples were submitted to a second laboratory (TestAmerica) for verification analysis according to the protocols of the EPA's Contract Laboratory Program. Documentation is in Appendix C. The results from the two laboratories compare well over the range of contaminant concentrations detected, with average relative percent difference values of 10.7% for carbon tetrachloride and 12.0% for chloroform. Methylene chloride was not detected by either laboratory. The trace detection of carbon tetrachloride in the sample from public well PWS3 was confirmed in verification analysis.

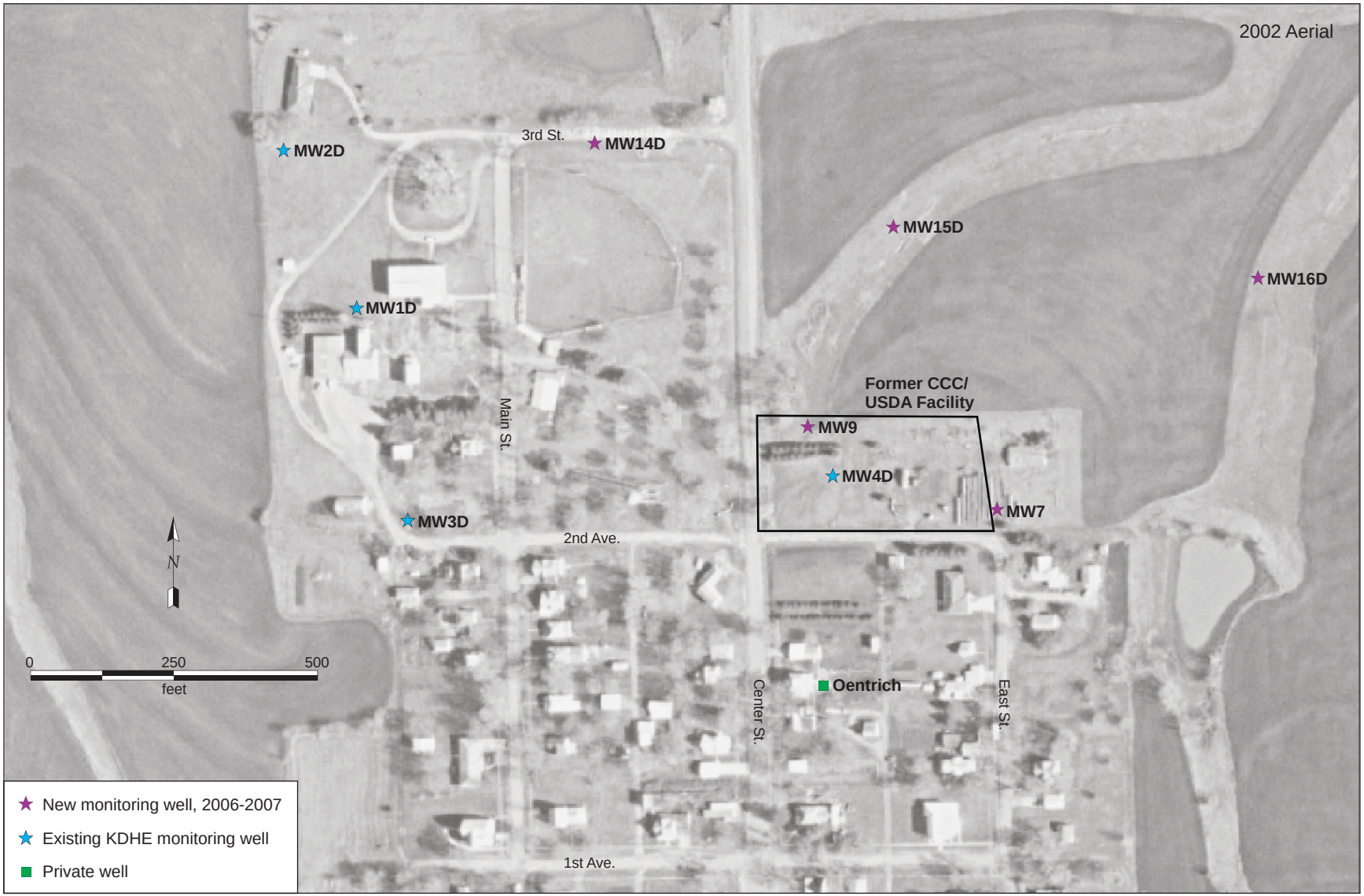


FIGURE 2.1 Wells at Barnes equipped with data loggers for water level monitoring, as of December 19, 2007, and May 9, 2008. Source of photograph: NAPP (2002).

3 Results and Discussion

3.1 Groundwater Level Data

The manual water level measurements taken during sampling on July 9-12, 2008, are in Table 3.1. These measurements are discussed in Section 3.3. Table 3.1 also includes manual water level measurements made in May 2007-April 2008.

Figure 3.1 presents water level contours for December 19, 2007, and May 9, 2008, for the network of recording transducers installed for long-term water level monitoring at Barnes. The network on those dates included wells MW1D, MW2D, MW3D, MW4D, MW7, MW9, MW14D, MW15D, MW16D, and the Oentrich private well. The Oentrich well was removed from the network later on May 9, 2008, when the property owner replaced the pump and installed a new sanitary seal that limits access to the well (see Section 2.1).

Extensive documentation of the potentiometric surface at Barnes during the targeted investigation (Argonne 2008a) and subsequent monitoring events indicated that operation of the public water supply wells strongly influences the groundwater flow direction. The more recent contours for the network, for May 9, 2008 (Figure 3.1), continue to show that flow directions are significantly different before pumping begins (top) versus during pumping (bottom).

The flow directions shown for May 9, 2008 (Figure 3.1), are easterly prior to pumping of the public wells and northwesterly during periods of pumping. Previous data (for example, the contours for December 19, 2007, also in Figure 3.1) have indicated a northeasterly direction prior to pumping and a northwesterly direction during pumping. The apparent change during non-pumping hours in the present monitoring period might have resulted from the absence of data from the southern control point at MW3D. During the data download on July 9, 2008, the data logger in MW3D was found to be damaged and not working. The data could not be recovered. The recorder has now been replaced (Section 2.1). With control reestablished at MW3D, subsequent sampling events should either confirm the apparent change in flow direction or demonstrate that the absence of this important data collection point affected the interpretation of groundwater flow direction.

The hydrographs in Figure 3.2 summarize data for the period January 1, 2008, to July 9, 2008, for the recording transducers. As indicated in Section 2.1, the recorder in well MW3D

malfunctioned, and thus no trace for this well appears in Figure 3.2. In addition, the battery in the well MW7 recorder failed on June 25, 2008, and the recorder for the Oentrich well was removed on May 9, 2008. The traces for these two wells end on these respective dates.

The water level data for well MW15D indicate a persistent pattern of higher groundwater levels. This pattern of higher water levels in a deeper well might indicate that vertical hydraulic gradients are present.

The patterns in Figure 3.2 are similar to patterns recorded in 2007 during the targeted investigation and in subsequent monitoring events (Argonne 2008a,b,c). The hydrographs show responses to pumping of the public water supply wells that are characterized by drawdowns of as much as 2.25 ft during pumping, with almost immediate rebound when pumping stops. The most prominent drawdowns are consistently observed in wells MW1D and MW2D, which are the closest monitoring points to the public wells.

In 2007, water levels at Barnes rose by approximately 7-8 ft (Argonne 2008a,b). During January 2008, the levels remained relatively stable. Subsequently, the levels increased through July 9, 2008, showing an overall increase of 6.5-11 ft since January 2008 (Figure 3.2).

3.2 Analytical Results for Volatile Organic Compounds in Groundwater Samples and Lateral Distribution of the Contaminants

The analytical data for VOCs in the groundwater samples collected in July 2008 are in Table 3.2, together with data for the previous sampling events at Barnes. The lateral distribution of carbon tetrachloride in groundwater in the July-August 2006 and March-April 2007 sampling events is illustrated in Figure 3.3, while the November 2007 and March 2008 results are illustrated in Figure 3.4. The July 2008 distribution is illustrated in Figure 3.5, with the March 2008 data for comparison. The overall carbon tetrachloride distribution patterns are similar for the five events.

Overall, carbon tetrachloride was detected in July 2008 in 21 of the 29 groundwater samples collected (at 14 of the 20 distinct monitoring locations; Figure 3.5 and Table 3.2). Carbon tetrachloride concentrations in the 29 samples were as follows:

- Not detected at an instrument detection limit of 0.1 µg/L in 8 samples (MW2D, MW3D, MW5, MW6S, MW11S, MW15D, MW16S, and MW16D).

- Trace levels below the method quantitation limit of 1.0 µg/L in 9 samples (MW1D, MW6D, MW11D, MW12D, MW14D, MW17, PWS2, PWS3, and the Oentrich private well).

- Concentrations of 1.0-4.9 µg/L in 5 samples (MW7, MW9, MW10D, MW11M, and MW15S).

- Concentrations at or above the RBSL value of 5.0 µg/L in 7 samples (MW4D, MW8, MW10S, MW12M, MW13S, MW13D, and MW14S).

The maximum carbon tetrachloride concentration detected was 49 µg/L (at MW10S, on the former CCC/USDA property).

In November 2007 and March 2008 (Figure 3.6), trace to low concentrations of chloroform were found in association with the more elevated carbon tetrachloride concentrations. In July 2008, chloroform concentrations ranging from trace levels to 4.2 µg/L (at MW12M) were detected in 12 of the 29 groundwater samples (at 9 of the 20 distinct sampling locations; Table 3.2 and Figure 3.7). As in the November 2007 and March 2008 sampling events, in July 2008 chloroform occurred in association with the more elevated carbon tetrachloride levels identified (at MW4D, MW8, MW10S, MW12M, MW13S, MW13D, and MW14S in July 2008).

The lateral distribution of carbon tetrachloride in groundwater in July 2008 was similar to the distribution observed during previous sampling events in 2007 and 2008, with a slight increase in contaminant migration near the public water supply wells. These wells showed trace concentrations of carbon tetrachloride, below the method quantitation limit (estimated at 0.8 µg/L in PWS2 and 0.2 µg/L in PWS3), during the July 2008 sampling event. This marks the first observation since July 2000 (PWS2) or March 2007 (PWS3) of detectable concentrations of carbon tetrachloride in these wells.

The most significant changes noted in carbon tetrachloride distribution since the March 2008 sampling were observed in wells MW4D and MW13D. The carbon tetrachloride concentrations decreased from March 2008 to July 2008 in wells MW4D (on the former

CCC/USDA property; from 18 µg/L to 9.4 µg/L) and MW13D (northwest of the former CCC/USDA property and adjacent to the high school; from 11 µg/L to 5.9 µg/L).

In the sentinel wells, as defined previously (Section 5.1 of Argonne 2008a), carbon tetrachloride was detected at trace concentrations below the method quantitation limit of 1.0 µg/L in wells MW1D, MW6D, MW14D, and MW17. No carbon tetrachloride was detected (at an instrument detection limit of 0.1 µg/L) in sentinel wells MW2D, MW3D, MW6S, MW15D, MW16S, and MW16D. Sentinel wells that showed slight increases in concentrations of carbon tetrachloride include MW14S and MW15S.

3.3 Vertical Distribution of Carbon Tetrachloride and Evaluation of Data to Distinguish Aquifer Zones by Depth

The designations "S," "M," and "D" in monitoring well names were assigned at the time of well installation. They indicate shallow, medium, and deep screens (relative depths) in an individual well, rather than the aquifer zone screened. After the March 2008 monitoring, a detailed evaluation of the hand-measured water levels (Table 3.1) and VOCs data (Table 3.2) was conducted in an attempt to differentiate aquifer zones by depth. The data collected in July 2008 were evaluated similarly. The data from both events suggest at least three vertically distinct zones within the aquifer. The aquifer zones are as follows:

- **Shallow Aquifer Zone.** The only monitoring wells believed to be completed in the *shallow zone* are MW1S, MW11S, and MW12S. Wells MW1S and MW12S were dry during the March and July 2008 sampling events; well MW11S showed a water level elevation of approximately 1,312 ft AMSL in the July event.

- **Intermediate Aquifer Zone.** The *intermediate zone* is believed to be represented by monitoring wells MW10S, MW11M, MW12M, MW13S, and MW17. Water level elevations measured manually for these wells in July 2008 were approximately 1,255-1,258 ft AMSL.

- **Deep Aquifer Zone.** Monitoring wells believed to represent the *deep zone* include MW1D, MW2D, MW3D, MW4D, MW5, MW6S, MW6D, MW7, MW8, MW9, MW10D, MW11D, MW12D, MW13D, MW14S, MW14D,

MW15S, MW15D, MW16S, and MW16D. The water level elevations measured manually in these monitoring wells in July 2008 were approximately 1,229-1,239 ft AMSL. On the basis of its hand-measured water level in November 2007 (approximately 1,220 ft AMSL [Table 3.2] and the automatic measurements [Figure 3.2]), the Oentrich well is also considered to be screened in the deep aquifer zone. All of the wells equipped with data loggers for water level monitoring are screened in the deep zone.

The vertical distribution of the carbon tetrachloride in groundwater indicates that the highest concentrations were detected in the intermediate zone, at wells MW10S (49 µg/L), MW12M (27 µg/L), and MW13S (17 µg/L). The deep-zone wells at these locations showed lower concentrations (3.9 µ/L at MW10D, a trace [estimated at 0.7 µg/L] at MW12D, and 5.9 µg/L at MW13D). Figures 3.8 and 3.9 illustrated the interpreted contaminant distributions in the intermediate and deep zones, respectively. The shallow-zone well (MW11S) continued to show no detectable concentrations of carbon tetrachloride (Table 3.2 and Figure 3.5).

TABLE 3.1 Hand-measured water levels at Barnes, November 2007, December 2007, March 2008, and July 2008.

		Water Level on Date Indicated							
	Reference Elevation	11/18-19/07		12/19/07		3/4-10/08		7/9-12/08	
Well	(ft AMSL)	ft TOC[a]	ft AMSL	ft TOC[a]	ft AMSL	ft TOC[a]	ft AMSL	ft TOC[a]	ft AMSL
Shallow aquifer zone									
MW1S	1351.58	Dry	–	Dry	–	Dry	–	Dry	–
MW11S	1336.58	29.20	1307.38			27.70	1308.88	24.80	1311.78
MW12S	1327.46	Dry	–			Dry	–	Dry	–
Intermediate aquifer zone									
MW10S	1331.33	77.81	1253.52			77.47	1253.86	73.40	1257.93
MW11M	1336.51	82.33	1254.18			82.65	1253.86	78.85	1257.66
MW12M	1327.46	74.50	1252.96			74.77	1252.69	70.10	1257.36
MW13S	1342.36	92.23	1250.13			92.10	1250.26	87.00	1255.36
MW17	1351.77	102.68	1249.09			101.75	1250.02	96.60	1255.17
Deep aquifer zone									
MW1D	1351.33	124.89	1226.44	125.54	1225.79	127.66	1223.67	119.40	1231.93
MW2D	1348.85	122.56	1226.29	123.20	1225.65	125.55	1223.30	117.15	1231.70
MW3D	1345.99	126.25	1219.74	120.09	1225.90	121.90	1224.09	113.30	1232.69
MW4D	1326.32	101.39	1224.93	100.54	1225.78	101.74	1224.58	93.60	1232.72
MW5	1327.20	102.78	1224.42			102.00	1225.20	93.80	1233.40
MW6S	1323.13	96.10	1227.03			94.50	1228.63	88.10	1235.03
MW6D	1323.15	98.50	1224.65			98.50	1224.65	89.50	1233.65
MW7	1329.91	105.50	1224.41	104.48	1225.43	105.62	1224.29	97.50	1232.41
MW8	1330.06	105.17	1224.89			104.38	1225.68	95.75	1234.31
MW9	1321.86	97.20	1224.66	96.25	1225.61	96.40	1225.46	87.65	1234.21
MW10D	1331.33	106.22	1225.11			106.36	1224.97	97.30	1234.03
MW11D	1336.53	112.46	1224.07			110.50	1226.03	102.10	1234.43
MW12D	1327.52	102.00	1225.52			103.30	1224.22	93.70	1233.82
MW13D	1342.37	117.83	1224.54			118.19	1224.18	107.90	1234.47
MW14S	1332.69	106.75	1225.94			106.95	1225.74	99.40	1233.29
MW14D	1332.74	107.10	1225.64	107.23	1225.51	106.95	1225.79	101.00	1231.74
MW15S	1309.34	84.33	1225.01			84.66	1224.68	80.30	1229.04
MW15D	1309.29	70.20	1239.09	80.84	1228.45	80.80	1228.49	70.30	1238.99
MW16S	1299.47	75.30	1224.17			75.50	1223.97	67.35	1232.12
MW16D	1299.52	74.50	1225.02	74.62	1224.90	75.00	1224.52	66.30	1233.22
Oentrich[b]	1336.93	NM[c]		116.55	1220.38	NM	NM	NM	NM

[a] TOC, top of casing.

[b] The Oentrich well water level was measured from the concrete at the top of the well vault. The value shown was corrected by 5.5 ft to give a measured depth from the top of the casing.

[c] NM, not measured (sampled from faucet).

TABLE 3.2 Analytical results from the AGEM Laboratory for volatile organic compounds in groundwater samples collected at Barnes, July 2006 to July 2008.

Location	Screen Interval (ft BGL)	Sample	Sample Date	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride
Previously existing KDHE monitoring wells						
MW1S	13.3-23.3	Not sampled (well dry)	7/19/06	–	–	–
		Not sampled (well dry)	4/4/07	–	–	–
		Not sampled (well dry)	11/18/07	–	–	–
		Not sampled (well dry)	3/4/08	–	–	–
		Not sampled (well dry)	7/9/08	–	–	–
MW1D	139.85-159.4	BAMW1D-W-21688	7/19/06	1.0	ND[a]	ND
		BAMW1D-W-22565	4/4/07	1.2	ND	ND
		BAMW1D-W-22593	11/18/07	ND	ND	ND
		BAMW1D-W-22627	3/4/08	0.2 J[b]	ND	ND
		BAMW1D-W-22668	7/9/08	0.2 J	ND	ND
MW2D	133.26-152.93	BAMW2D-W-21687	7/19/06	ND	ND	ND
		BAMW2D-W-22564	4/4/07	ND	ND	ND
		BAMW2D-W-22594	11/18/07	ND	ND	ND
		BAMW2D-W-22628	3/7/08	ND	ND	ND
		BAMW2D-W-22669	7/10/08	ND	ND	ND
MW3D	133.02-152.73	BAMW3D-W-21686	7/19/06	ND	ND	ND
		BAMW3D-W-22567	4/4/07	ND	ND	ND
		BAMW3D-W-22595	11/19/07	ND	ND	ND
		BAMW3D-W-22629	3/7/08	ND	ND	ND
		BAMW3D-W-22670	7/10/08	ND	ND	ND
MW4D	98.38-118.22	BAMW4D-W-21690	7/20/06	2.1	ND	ND
		BAMW4D-W-22583	4/6/07	3.5	0.1 J	ND
		BAMW4D-W-22596	11/19/07	1.7	0.4 J	ND
		BAMW4D-W-22642	3/9/08	18	0.4 J	ND
		BAMW4D-W-22671	7/12/08	9.4	0.5 J	ND
CCC/USDA wells installed during the 2006-2007 investigation						
MW5	110-120	BAMW5-W-22589	4/6/07	0.6 J	ND	ND
		BAMW5-W-22597	11/19/07	0.6 J	ND	ND
		BAMW5-W-22637	3/8/08	0.7 J	ND	ND
		BAMW5-W-22672	7/11/08	ND	ND	ND
MW6S	90.5-100.5	Not sampled (well dry)	4/4/07			
		BAMW6S-W-22598	11/19/07	0.3 J	ND	ND
		BAMW6S-W-22635	3/8/08	0.4 J	ND	ND
		BAMW6S-W-22673	7/11/08	ND	ND	ND
MW6D	105-115	BAMW6D-W-22573	4/5/07	ND	ND	ND
		BAMW6D-W-22599	11/19/07	0.5 J	ND	ND
		BAMW6D-W-22636	3/8/08	0.8 J	ND	ND
		BAMW6D-W-22674	7/11/08	0.9 J	ND	ND

TABLE 3.2 (Cont.)

Location	Screen Interval (ft BGL)	Sample	Sample Date	Concentration (µ/L) Carbon Tetrachloride	Chloroform	Methylene Chloride
CCC/USDA wells installed during the 2006-2007 investigation (cont.)						
MW7	116-126	BAMW7-W-22588	4/6/07	1.0	ND	ND
		BAMW7-W-22600	11/19/07	2.6	ND	ND
		BAMW7-W-22643	3/9/08	2.8	ND	ND
		BAMW7-W-22675	7/12/08	1.7	ND	ND
MW8	110-120	BAMW8-W-22584	4/6/07	14	0.7 J	ND
		BAMW8-W-22601	11/19/07	23	0.6 J	ND
		BAMW8-W-22652	3/10/08	19	0.6 J	ND
		BAMW8-W-22676	7/11/08	21	0.6 J	ND
MW9	100-110	BAMW9-W-22582	4/5/07	1.0	ND	ND
		BAMW9-W-22602	11/19/07	7.7	0.6 J	ND
		BAMW9-W-22647	3/9/08	3.0	0.3 J	ND
		BAMW9-W-22678	7/11/08	1.3	0.3 J	ND
MW10S	93-103	BAMW10S-W-22586	4/6/07	20	1.4	ND
		BAMW10S-W-22603	11/19/07	11	0.7 J	ND
		BAMW10S-W-22649	3/10/08	56	2	ND
		BAMW10S-W-22679	7/11/08	49	1.8	ND
MW10D	115-125	BAMW10D-W-22585	4/6/07	2.4	0.2 J	ND
		BAMW10D-W-22604	11/19/07	6.3	0.5 J	ND
		BAMW10D-W-22646	3/9/08	5.7	0.5 J	ND
		BAMW10D-W-22680	7/11/08	3.9	0.7 J	ND
MW11S	40-50	BAMW11S-W-22570	4/4/07	ND	1.1	ND
		BAMW11S-W-22605	11/19/07	ND	0.6 J	ND
		BAMW11S-W-22630	3/5/08	ND	0.6 J	ND
		BAMW11S-W-22681	7/10/08	ND	0.4 J	ND
MW11M	90-100	BAMW11M-W-22572	4/5/07	ND	ND	ND
		BAMW11M-W-22606	11/19/07	3.7	ND	ND
		BAMW11M-W-22644	3/6/08	2.4	0.5 J	ND
		BAMW11M-W-22682	7/10/08	2.4	0.7 J	ND
MW11D	125-135	BAMW11D-W-22571	4/4/07	1.1	ND	ND
		BAMW11D-W-22607	11/19/07	0.8 J	ND	ND
		BAMW11D-W-22639	3/5/08	0.4 J	ND	ND
		BAMW11D-W-22683	7/10/08	0.9 J	ND	ND
MW12S	43-50	Not sampled (well dry)	4/5/07			
		Not sampled (well dry)	11/19/07			
		Not sampled (well dry)	3/10/08			
		Not sampled (well dry)	7/10/08			
MW12M	90-100	BAMW12M-W-22580	4/5/07	20	4.2	ND
		BAMW12M-W-22609	11/19/07	18	5.1	ND
		BAMW12M-W-22651	3/10/08	18	2.6	ND
		BAMW12M-W-22685	7/10/08	27	4.2	ND

TABLE 3.2 (Cont.)

Location	Screen Interval (ft BGL)	Sample	Sample Date	Concentration (µ/L) Carbon Tetrachloride	Chloroform	Methylene Chloride
CCC/USDA wells installed during the 2006-2007 investigation (cont.)						
MW12D	115-125	BAMW12D-W-22576	4/5/07	0.6 J	ND	ND
		BAMW12D-W-22610	11/18/07	1.6	ND	ND
		BAMW12D-W-22641	3/9/08	1.0	ND	ND
		BAMW12D-W-22686	7/11/08	0.7 J	ND	ND
MW13S	112-122	BAMW13S-W-22575	4/5/07	21	1.6	ND
		BAMW13S-W-22611	11/19/07	17	1.8	ND
		BAMW13S-W-22650	3/10/08	17	1.5	ND
		BAMW13S-W-22687	7/9/08	17	1.9	ND
MW13D	127-137	BAMW13D-W-22574	4/5/07	3.5	0.4 J	ND
		BAMW13D-W-22612	11/19/07	5.9	0.2 J	ND
		BAMW13D-W-22645	3/9/08	11	1.1	ND
		BAMW13D-W-22688	7/9/08	5.9	0.9 J	ND
MW14S	108-118	BAMW14S-W-22569	4/4/07	0.9 J	ND	ND
		BAMW14S-W-22613	11/18/07	1.2	ND	ND
		BAMW14S-W-22640	3/8/08	4.3	0.3 J	ND
		BAMW14S-W-22689	7/10/08	5.6	0.3 J	ND
MW14D	123-133	BAMW14D-W-22568	4/4/07	1.2	ND	ND
		BAMW14D-W-22614	11/18/07	0.6 J	ND	ND
		BAMW14D-W-22638	3/8/08	0.7 J	ND	ND
		BAMW14D-W-22690	7/10/08	0.5 J	ND	ND
MW15S	88-98	BAMW15S-W-22560	4/4/07	1.5	ND	ND
		BAMW15S-W-22615	11/18/07	8.7	0.4 J	ND
		BAMW15S-W-22648	3/10/08	1.8	0.2 J	ND
		BAMW15S-W-22691	7/12/08	2.2	0.3 J	ND
MW15D	105-115	BAMW15D-W-22561	4/4/07	ND	ND	ND
		BAMW15D-W-22616	11/18/07	ND	ND	ND
		BAMW15D-W-22631	3/8/08	0.2 J	ND	ND
		BAMW15D-W-22692	7/12/08	ND	ND	ND
MW16S	76-86	BAMW16S-W-22563	4/4/07	ND	ND	ND
		BAMW16S-W-22617	11/19/07	ND	ND	ND
		BAMW16S-W-22632	3/7/08	0.4 J	ND	ND
		BAMW16S-W-22693	7/11/08	ND	ND	ND
MW16D	90-100	BAMW16D-W-22562	4/4/07	ND	ND	ND
		BAMW16D-W-22618	11/19/07	ND	ND	ND
		BAMW16D-W-22633	3/7/08	ND	ND	ND
		BAMW16D-W-22694	7/11/08	ND	ND	ND
MW17	120-130	BAMW17D-W-22566	4/4/07	ND	ND	ND
		BAMW17D-W-22619	11/19/07	ND	ND	ND
		BAMW17-W-22634	3/5/08	0.3 J	ND	ND
		BAMW17-W-22695	7/9/08	0.4 J	ND	ND

TABLE 3.2 (Cont.)

Location	Screen Interval (ft BGL)	Sample	Sample Date	Concentration (µ/L) Carbon Tetrachloride	Chloroform	Methylene Chloride
Private wells						
Oentrich	150	BAOENT-W-21693	7/20/06	0.3 J	ND	ND
		BAOENT-W-21713	8/2/06	0.6 J	ND	ND
		BAOENTRICH-W-22579	4/5/07	0.6 J	ND	ND
		BAOENTRICH-W-22622	11/19/07	0.8 J	ND	ND
		BAOENTRICH-W-22654	3/6/08	1.3	ND	ND
		BAOENTRICH-W-22695	7/11/08	0.3 J	ND	ND
Sedivy	138	BACW-W-21849	8/22/06	ND	ND	ND
		BASED2-W-21913	9/13/06	ND	ND	ND
Sedivy1	90	Not sampled (well dry)	9/13/06	–	–	–
Public water supply wells						
PWS2	155	BAPWS2-W-22510	3/9/07	ND	ND	ND
		BAPW2-W-22578	4/5/07	ND	ND	ND
		BAPW2-W-22620	11/20/07	ND	ND	ND
		BAPWS2-W-22655	3/6/08	ND	ND	ND
		BAPWS2-W-22696	7/11/08	0.8 J	ND	ND
PWS3	160	BAPWS3-W-22511	3/9/07	0.2 J	ND	ND
		BAPW3-W-22577	4/5/07	ND	ND	ND
		BAPW3-W-22621	11/20/07	ND	ND	ND
		BAPWS3-W-22656	3/6/08	ND	ND	ND
		BAPWS3-W-22697	7/11/08	0.2 J	ND	ND

[a] ND, contaminant not detected at an instrument detection limit of 0.1 µg/L.

[b] Qualifier J indicates an estimated concentration below the purge-and-trap method quantitation limit of 1.0 µg/L.

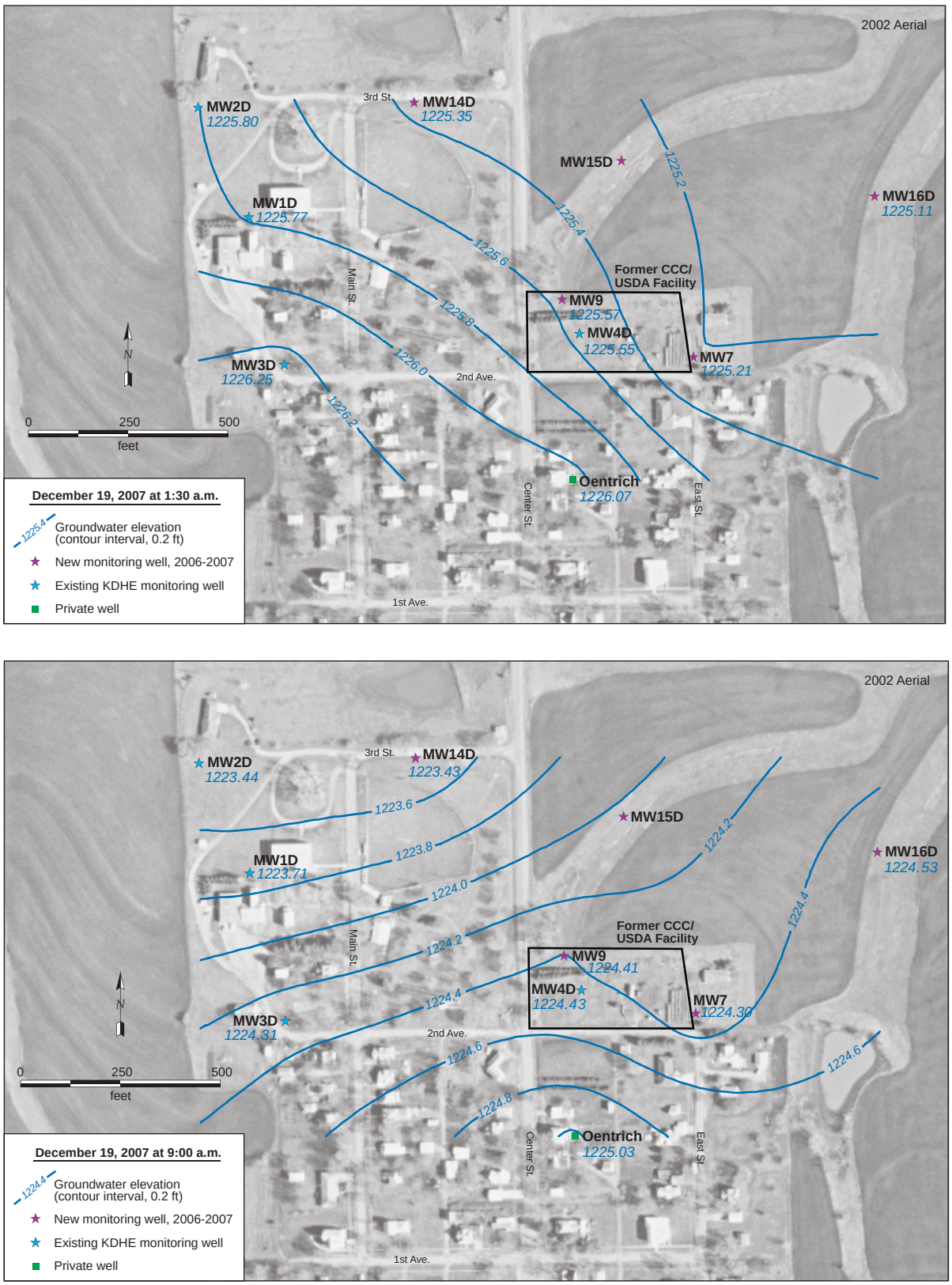


FIGURE 3.1 Potentiometric surface maps depicting the groundwater flow direction at Barnes in December 2007 and May 2008, before pumping of the public water supply wells (top panels) and during pumping (bottom panels). Source of photograph: NAPP (2002).

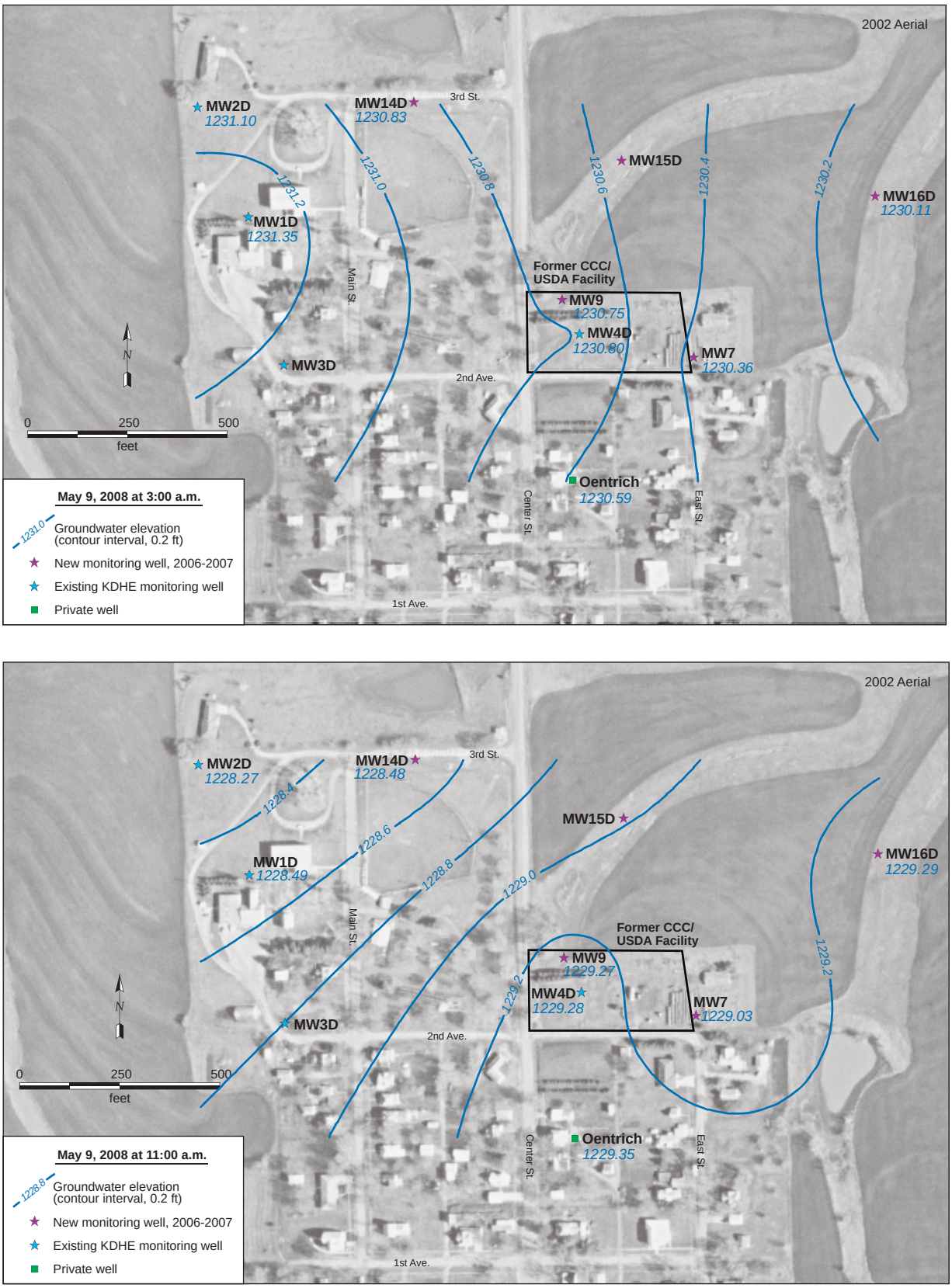
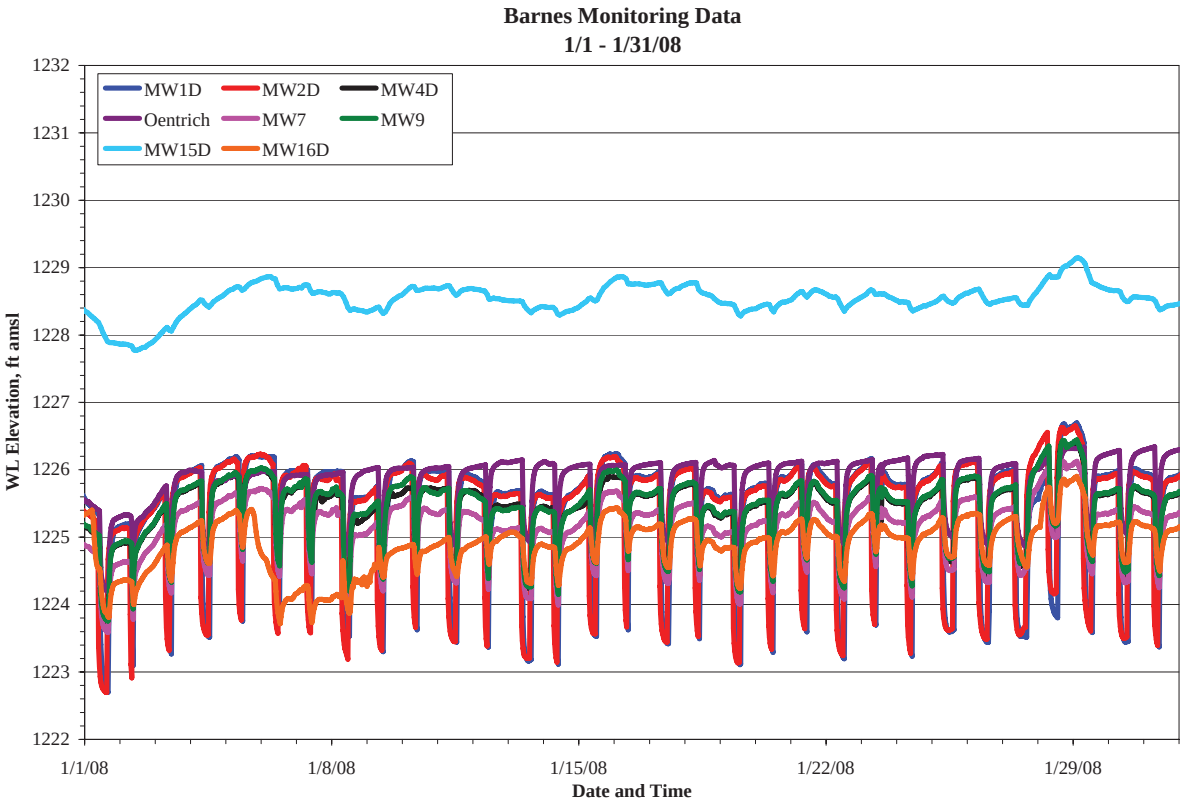


FIGURE 3.1 (Cont.)



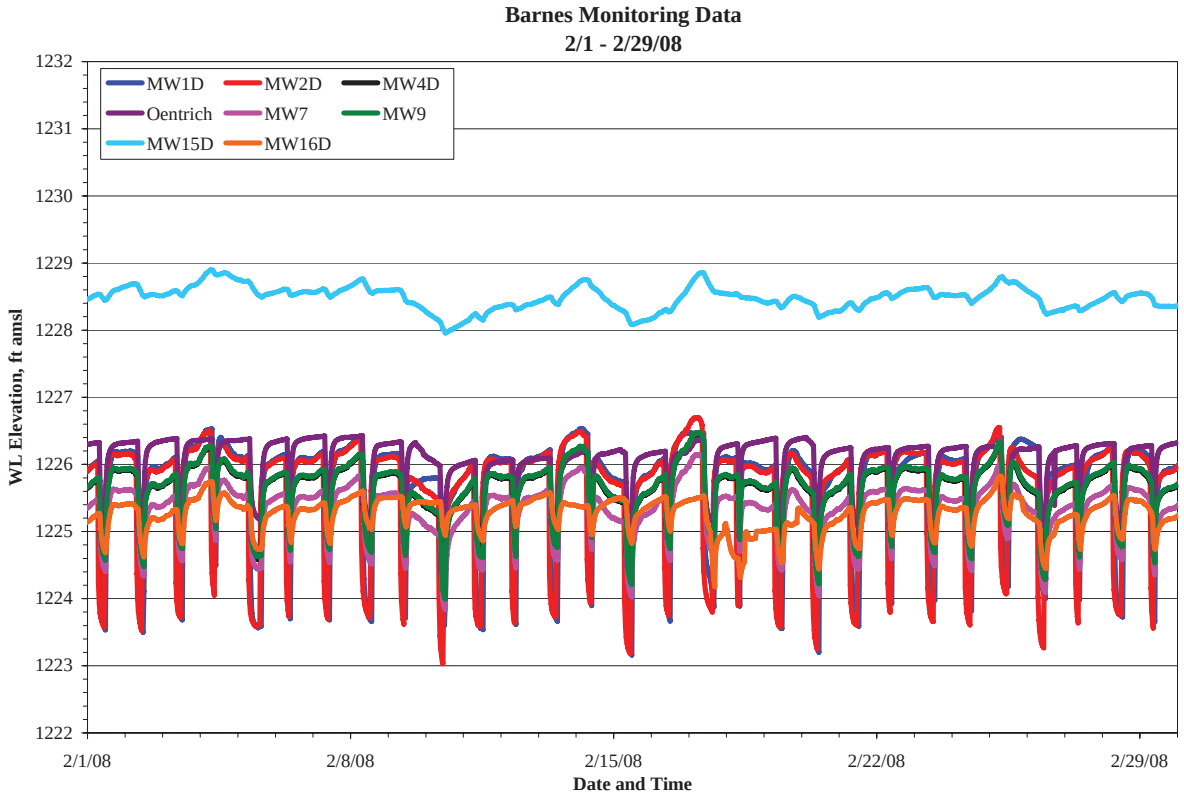
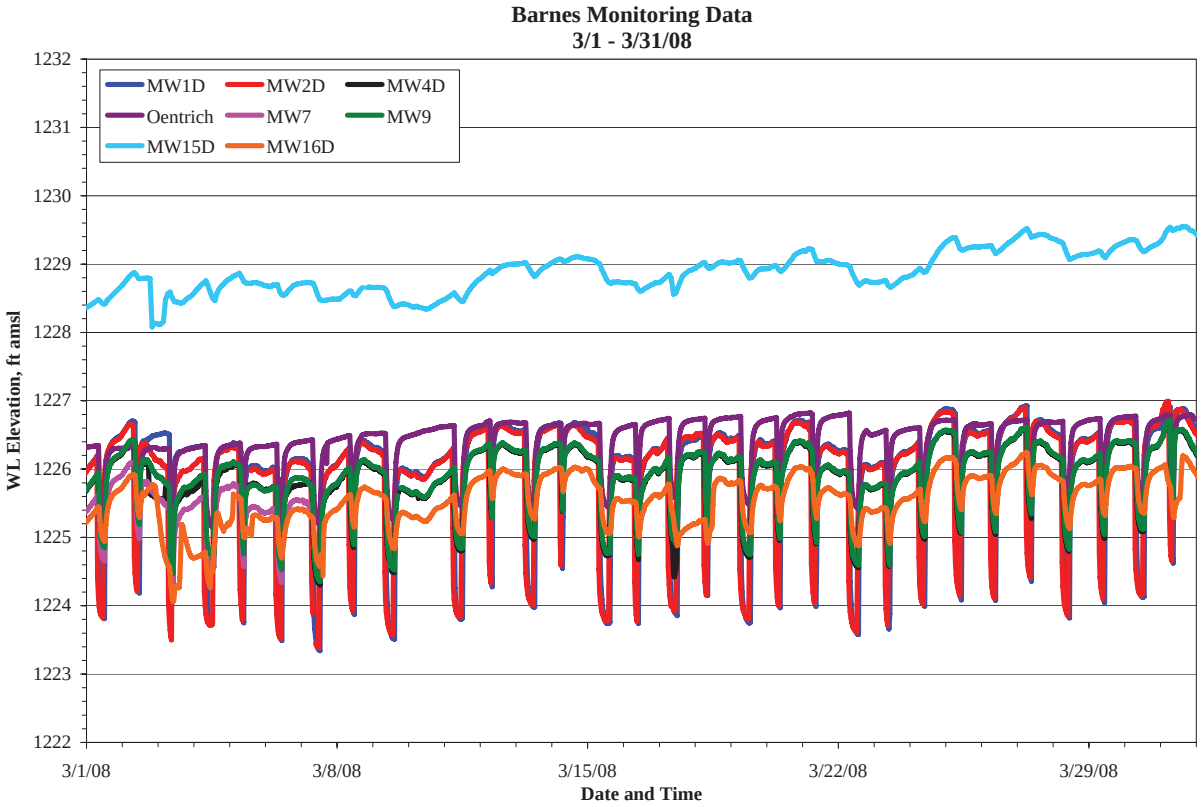


FIGURE 3.2 Hydrographs summarizing monthly results of long-term water level monitoring in wells at Barnes, January to July 2008.



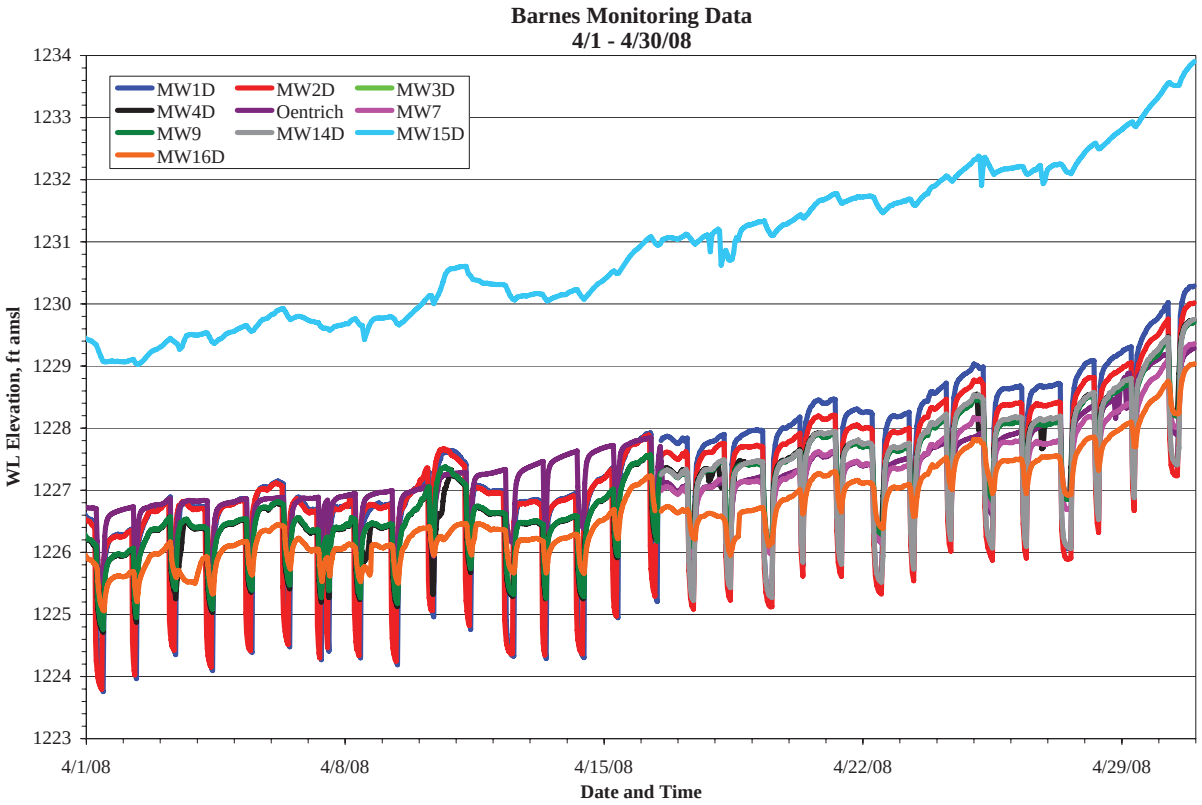


FIGURE 3.2 (Cont.)

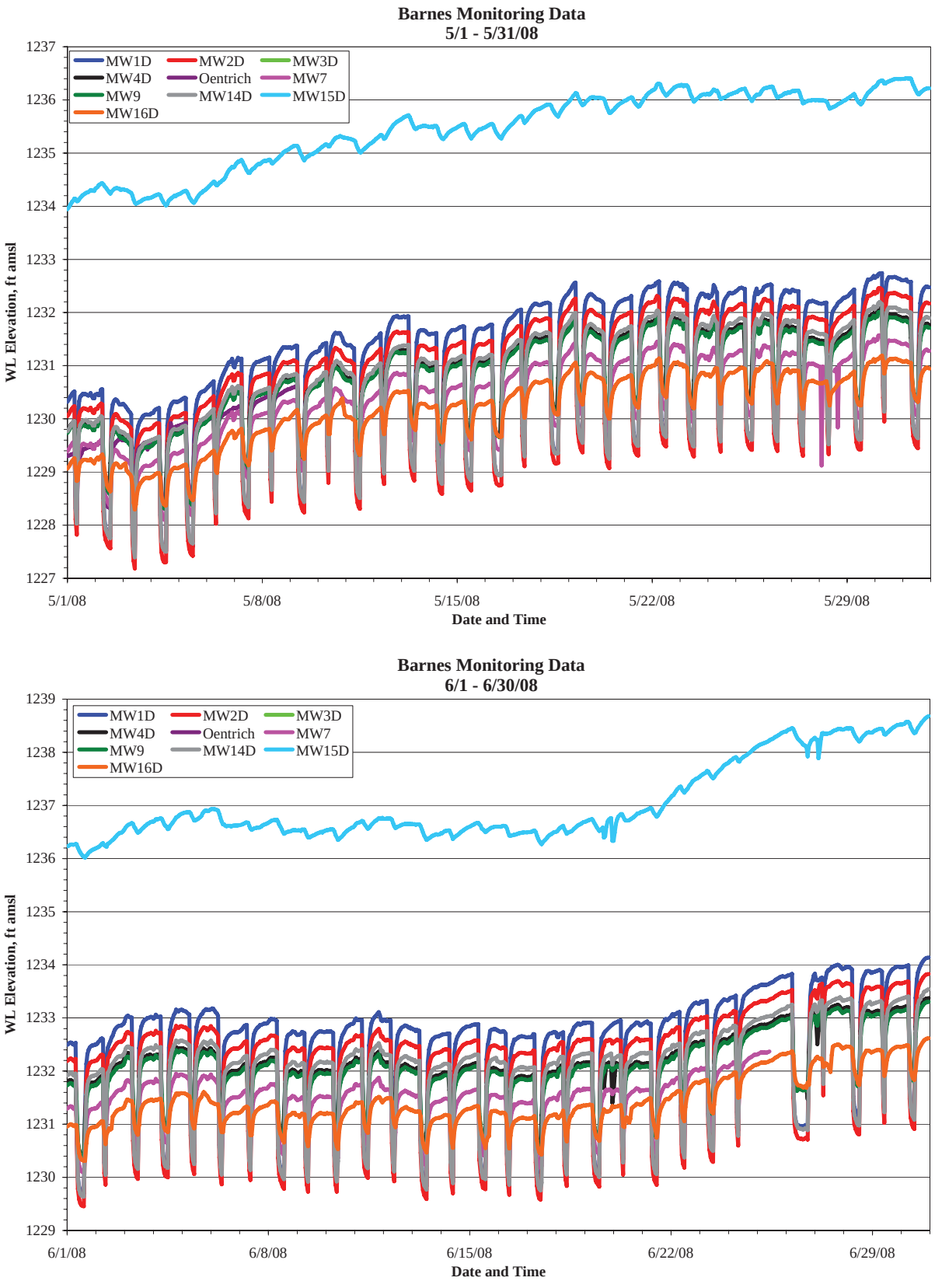


FIGURE 3.2 (Cont.)

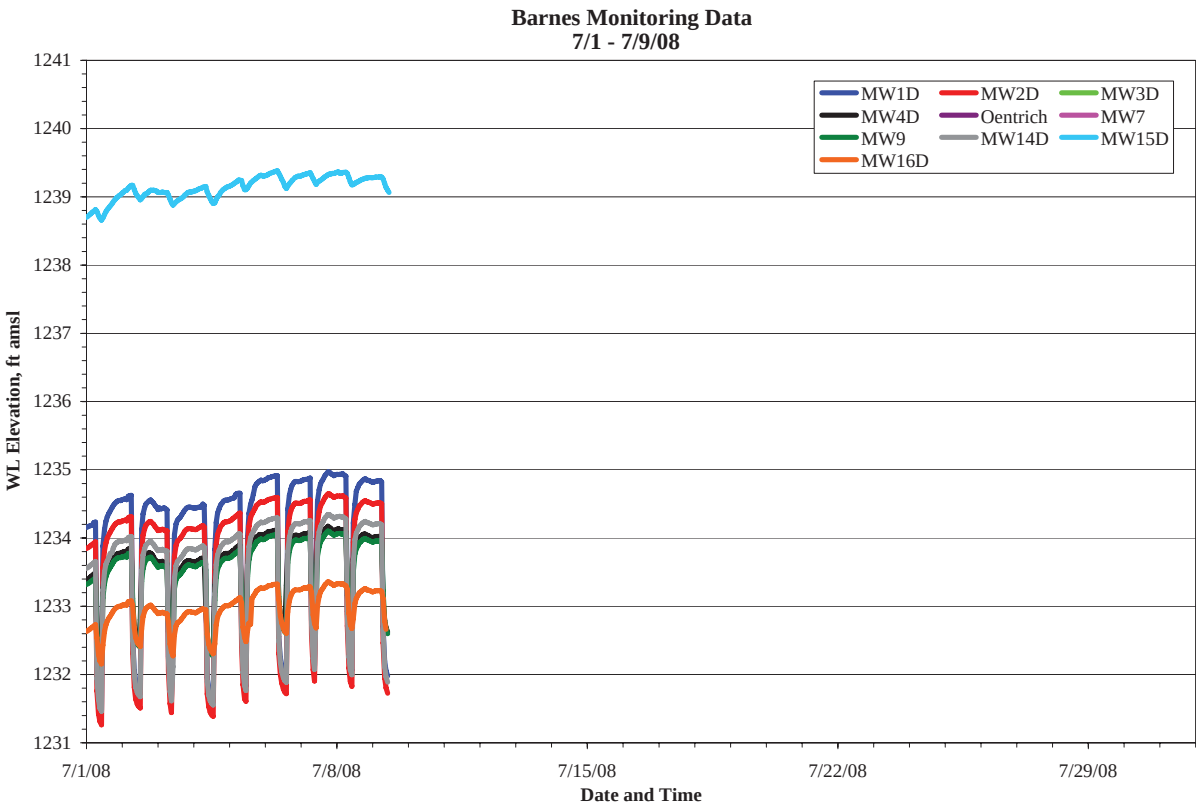


FIGURE 3.2 (Cont.)

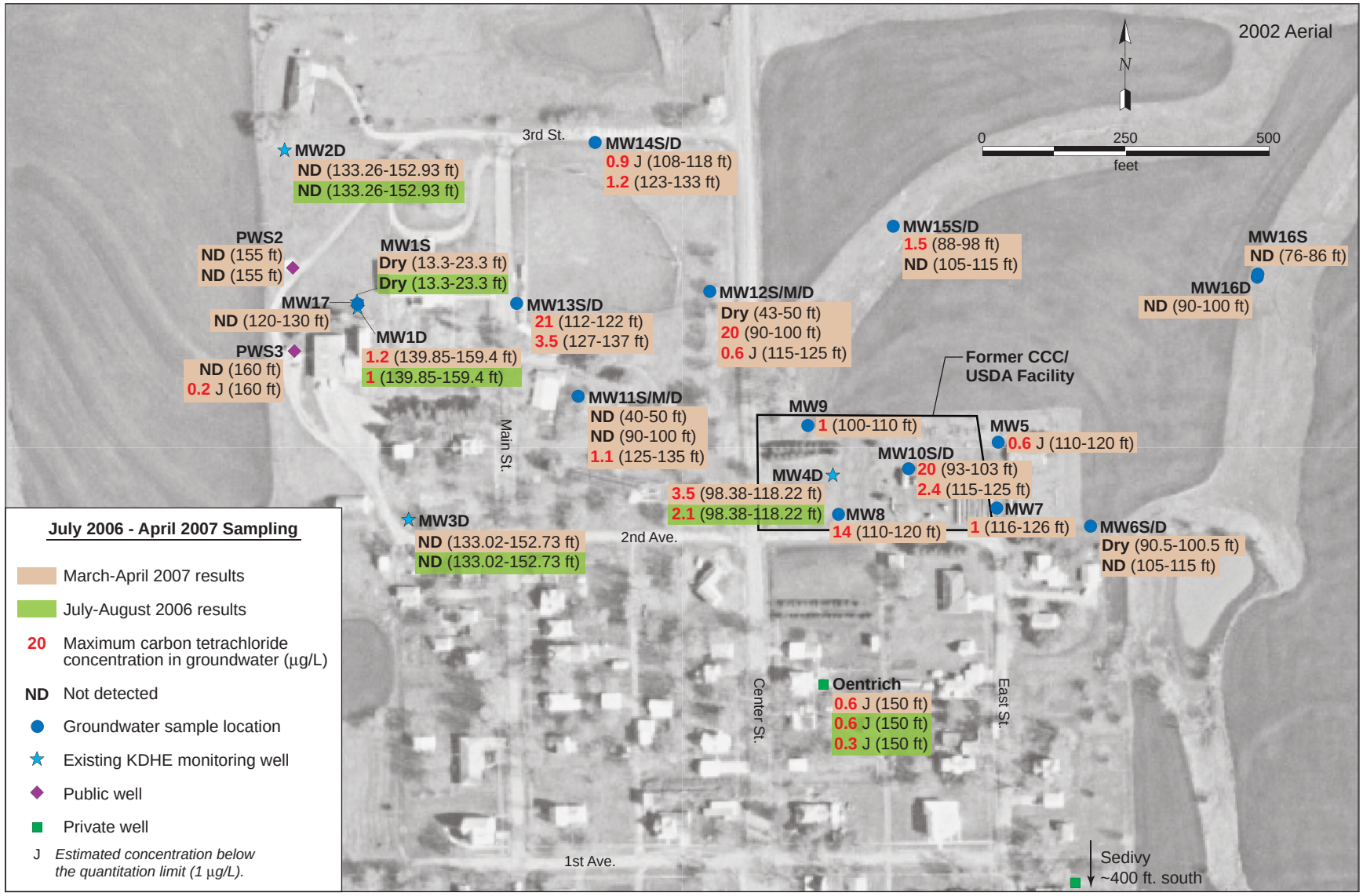


FIGURE 3.3 Analytical results for carbon tetrachloride in groundwater samples collected at Barnes in July-August 2006 and March-April 2007. Source of photograph: NAPP (2002).

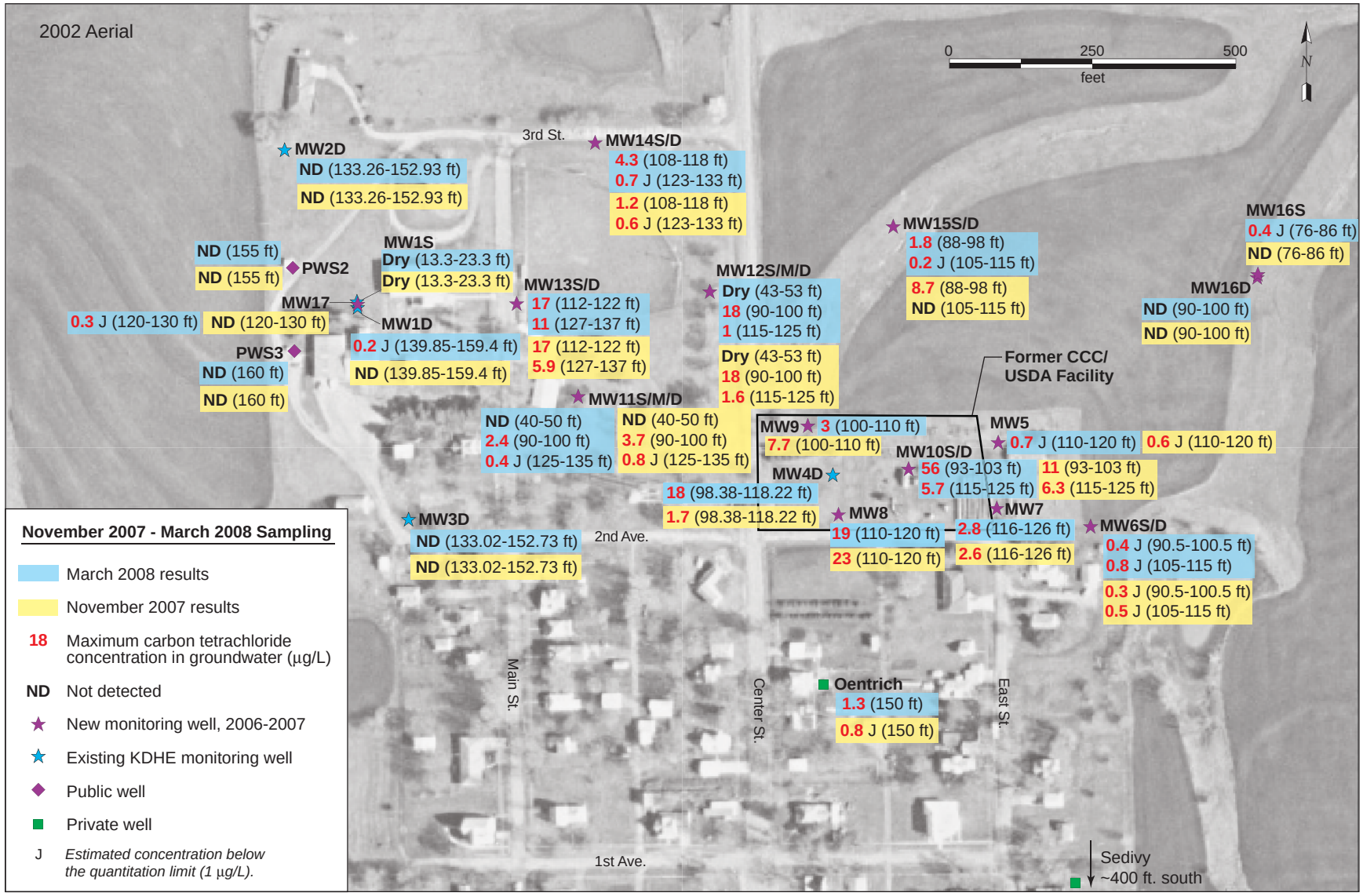


FIGURE 3.4 Analytical results for carbon tetrachloride in groundwater samples collected at Barnes in November 2007 and March 2008. Source of photograph: NAPP (2002).

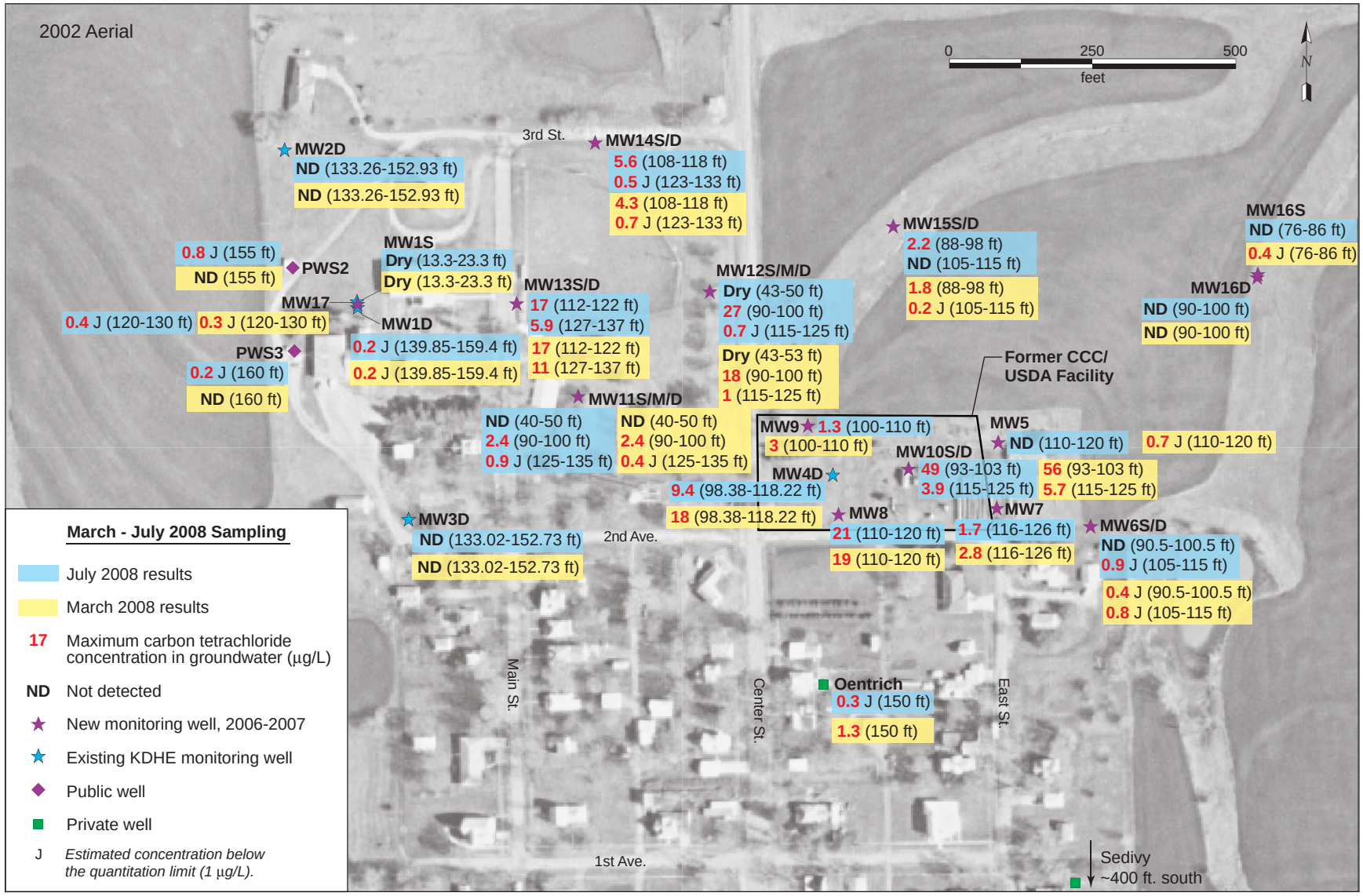


FIGURE 3.5 Analytical results for carbon tetrachloride in groundwater samples collected at Barnes in March 2008 and July 2008. Source of photograph: NAPP (2002).

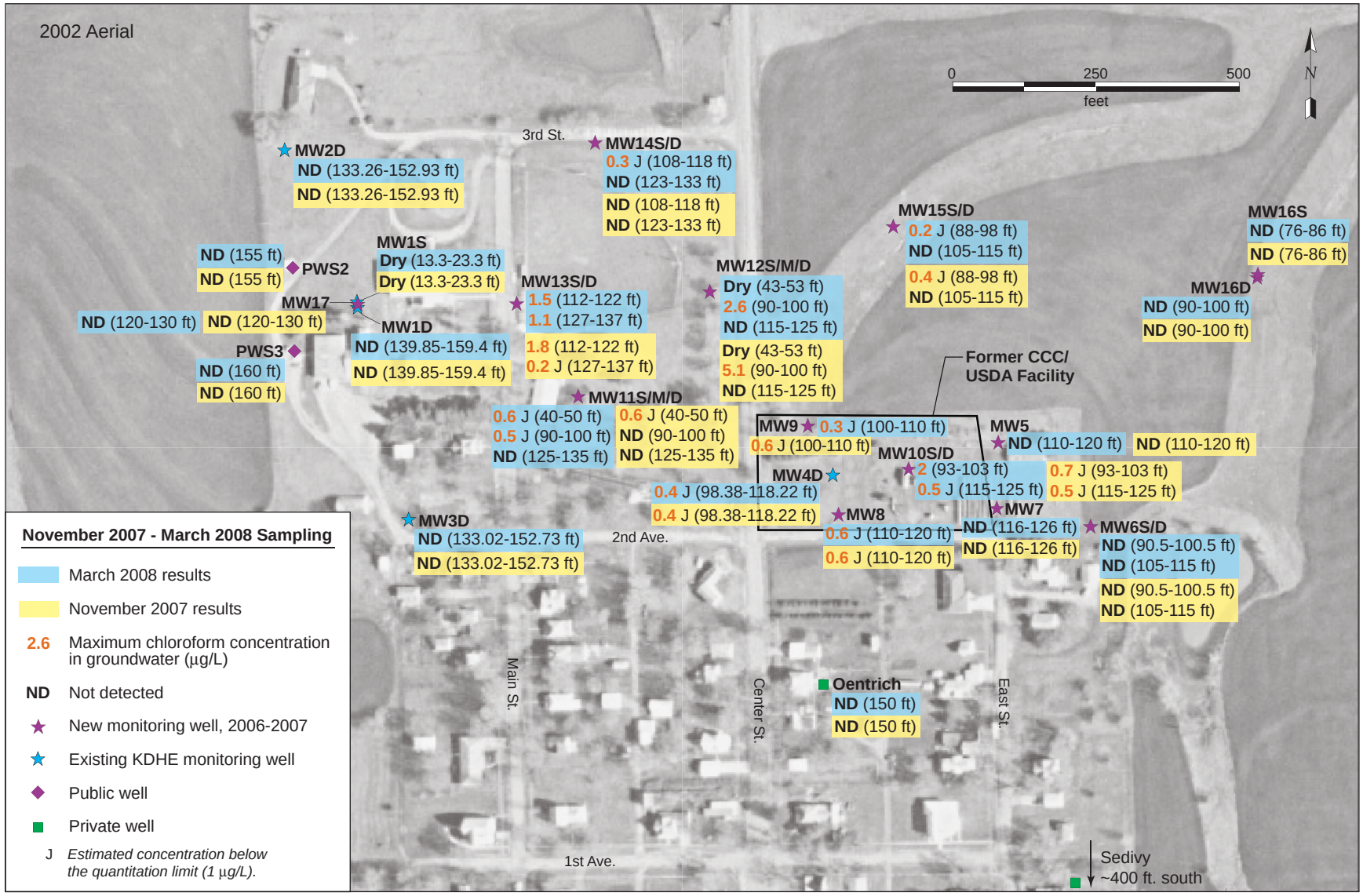


FIGURE 3.6 Analytical results for chloroform in groundwater samples collected at Barnes in November 2007 and March 2008. Source of photograph: NAPP (2002).

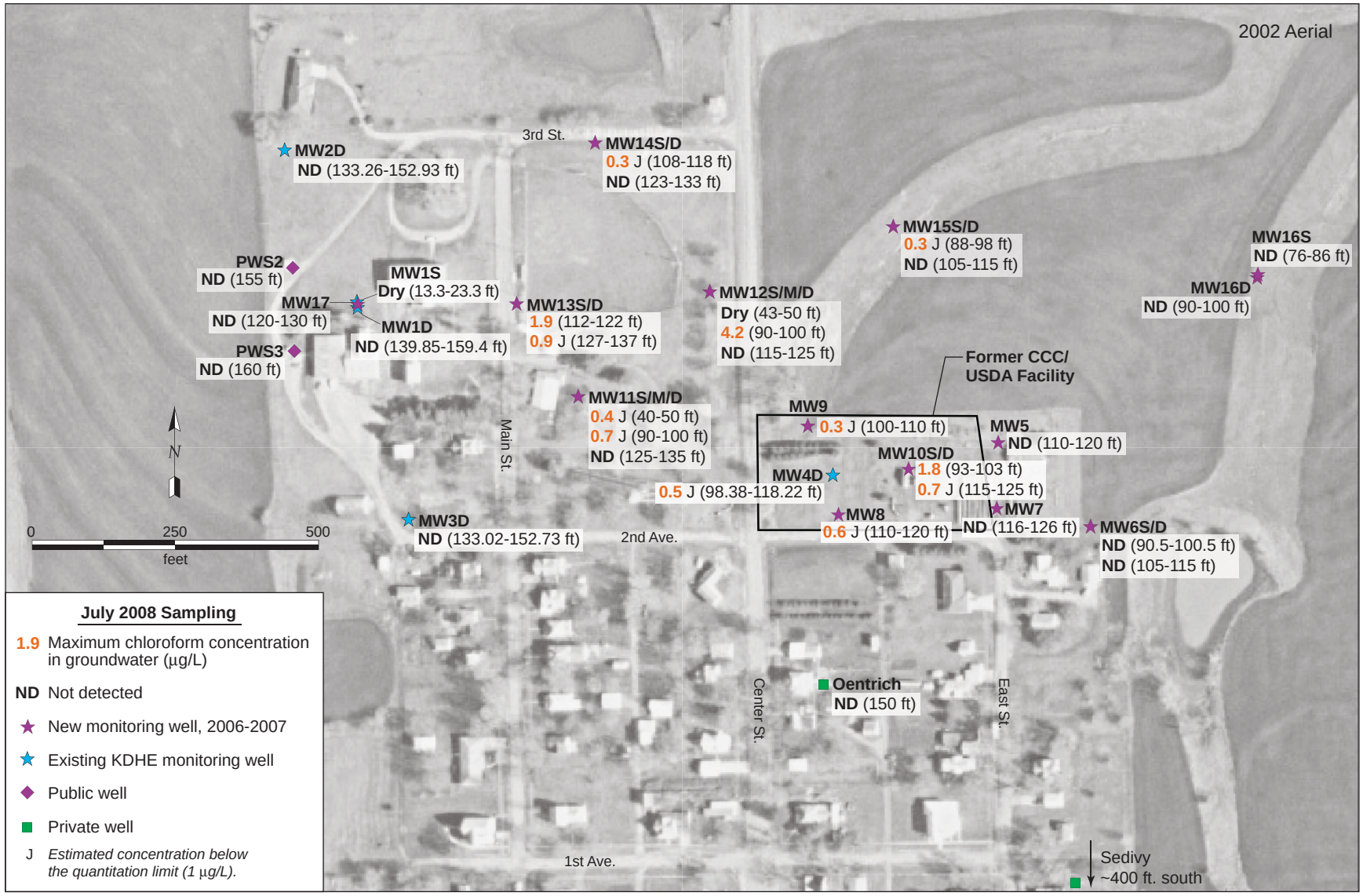


FIGURE 3.7 Analytical results for chloroform in groundwater samples collected at Barnes in July 2008. Source of photograph: NAPP (2002).

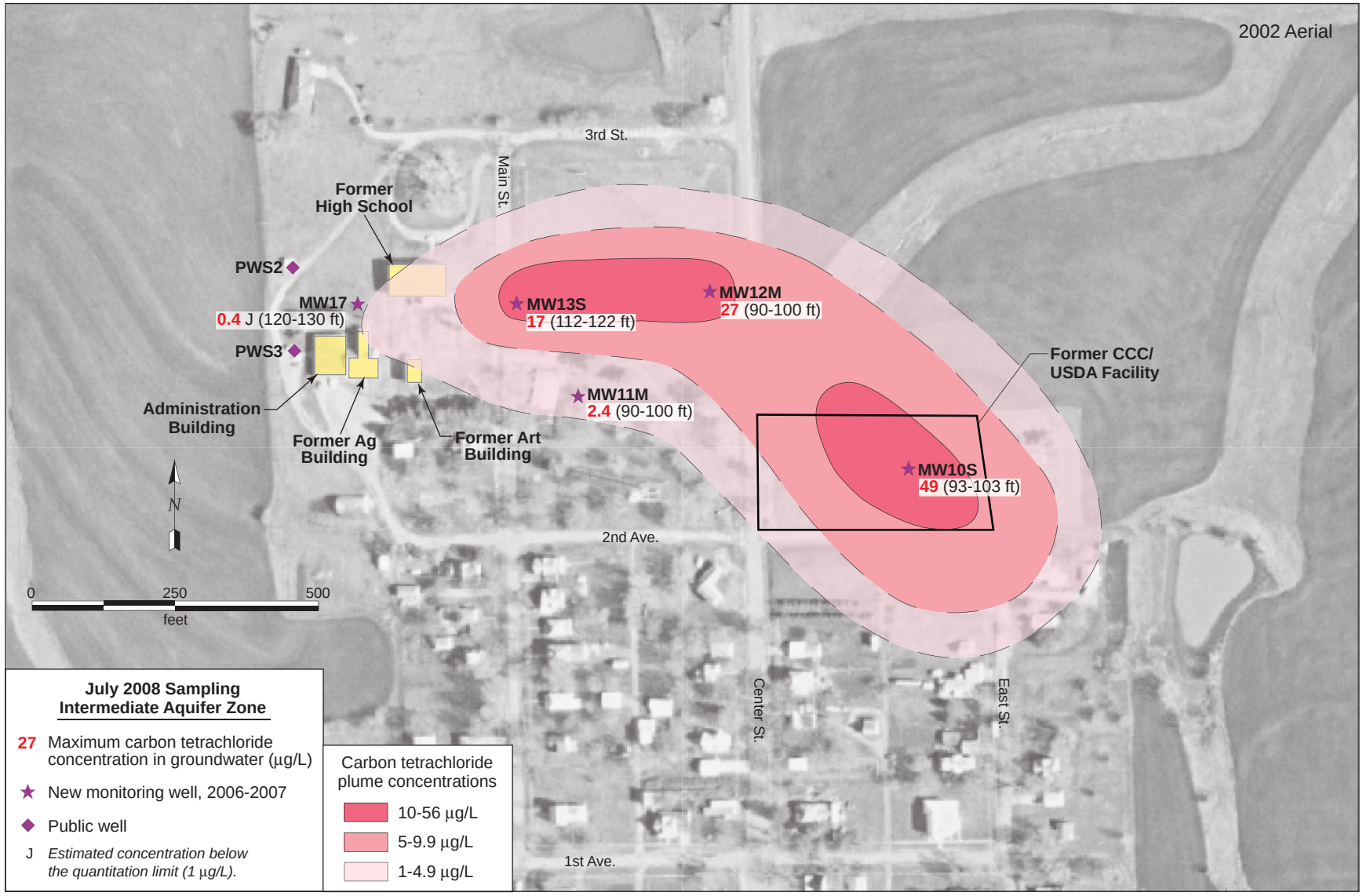


FIGURE 3.8 Interpreted carbon tetrachloride plume in July 2008 in wells screened in the intermediate aquifer zone (approximately 1,255-1,258 ft AMSL). Source of photograph: NAPP (2002).

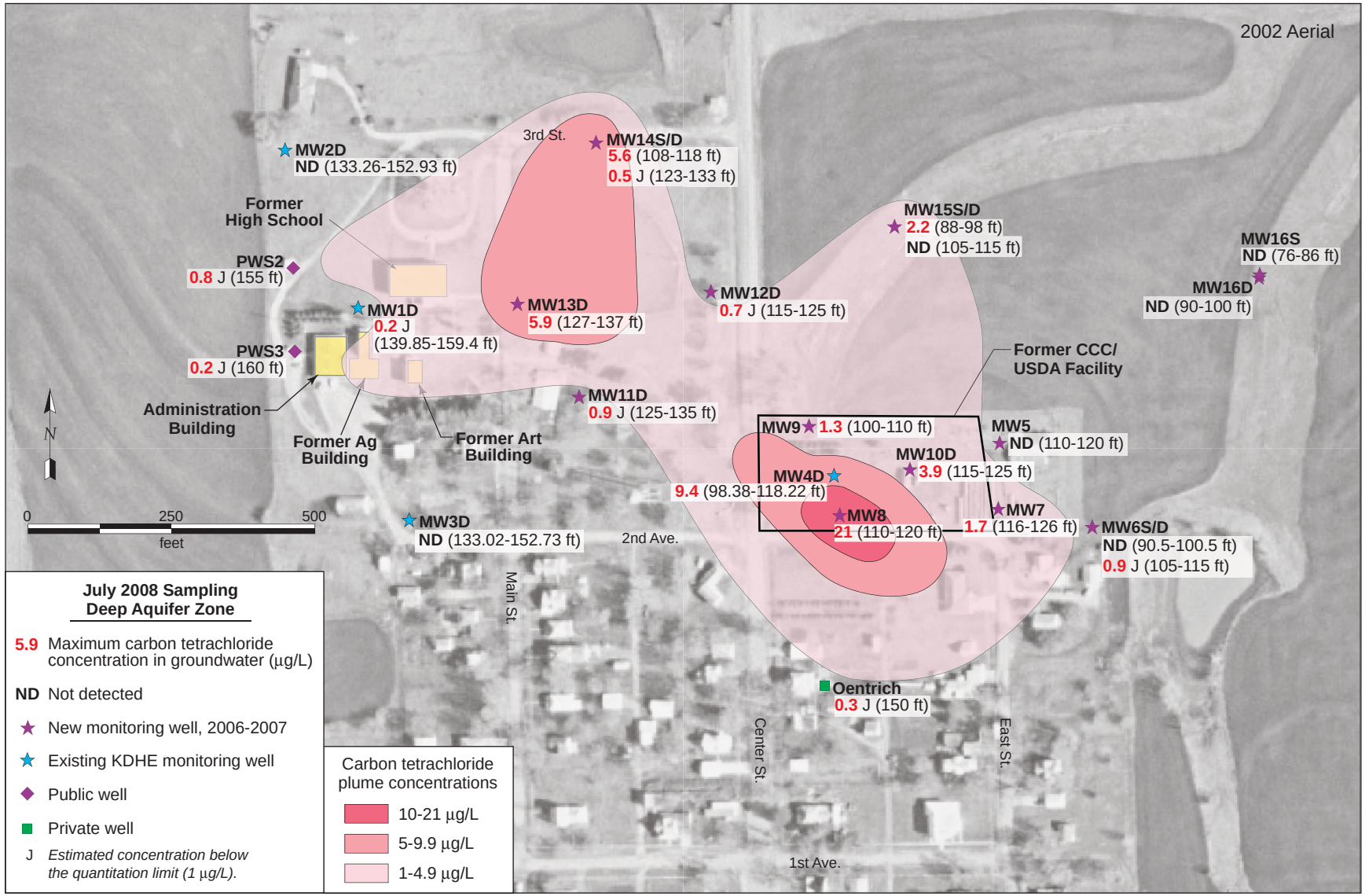


FIGURE 3.9 Interpreted carbon tetrachloride plume in July 2008 in wells screened in the deep aquifer zone (approximately 1,229-1,239 ft AMSL). Source of photograph: NAPP (2002).

4 Conclusions and Ongoing Tasks

4.1 Conclusions

The findings of the July 2008 monitoring event at Barnes support the following conclusions:

- Measurements of groundwater levels obtained manually and through the use of automatic recorders have consistently indicated that the flow direction is strongly influenced by pumping of the public water supply wells. The results (in the absence of data for the southern control point, MW3D) indicate

  - An apparent groundwater flow direction to the east when the public wells *are not pumping* and

  - A northwesterly groundwater flow trend when the public wells *are pumping*.

- Overall, the lateral distribution of carbon tetrachloride in groundwater in July 2008 was similar to the distribution during previous sampling events. The most significant change was the trace detections of carbon tetrachloride in public wells PWS2 and PWS3. This marks the first observation since July 2000 (PWS2) or March 2007 (PWS3) of detectable concentrations of carbon tetrachloride in these wells. Protection of these wells is the driving force for the monitoring program at Barnes.

- Analysis of manual water level measurements and carbon tetrachloride concentrations continued to suggest that three vertically distinguishable aquifer zones are present at Barnes: a shallow zone with a potentiometric surface at approximately 1,312 ft AMSL, an intermediate zone at approximately 1,255-1,258 ft AMSL, and a deep zone at approximately 1,229-1,239 ft AMSL. All monitoring wells equipped with data loggers for water level measurements are screened in the deep aquifer zone.

- Compared to the March 2008 data, the July 2008 data indicate notable decreases in carbon tetrachloride concentrations in two monitoring wells (MW4D and MW13D). Well MW4D is on the former CCC/USDA property, and well MW13D is adjacent to the high school. Both wells are screened in the deep aquifer zone.

- The vertical distribution of the carbon tetrachloride in groundwater continues to indicate that the highest concentrations occurred in the intermediate aquifer zone. Lower concentrations were detected in the deep aquifer zone, and no carbon tetrachloride was detected in the shallow zone.

4.2 Ongoing Tasks

Ongoing tasks related to Barnes are as follows:

- Quarterly monitoring will continue, as recommended in the targeted investigation report (Argonne 2008a).

- In an effort to evaluate the effect of pumping of the public water supply wells on the contaminant plume, an attempt will be made to collect the next set of groundwater samples and water level measurements on a schedule coincident with the well pumping schedule.

- In cooperation with the city, daily pumping rates are being recorded over a short time period to provide information for further evaluation of the aquifer characteristics. When this additional information is available, an attempt will be made to model the effects of the pumping, including rates and frequency, on the distribution of carbon tetrachloride in the subsurface. It is anticipated that this effort will include estimation of the capture zone for the pumping public water supply wells.

- The conceptual contingent interim measure work plan requested by the KDHE (2008b) for protection of the public water supply wells is currently being developed. Cost estimates have been obtained for treatment at the wellhead

through use of carbon filtration or air stripping. The CCC/USDA and Argonne have also contacted Washington County Rural Water District #2 to determine the feasibility of connecting the city of Barnes to that water supply.

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Appendix A:

Sampling Activities and Field Measurements at Barnes in July 2008

TABLE A.1 Sequence of sampling activities at Barnes in July 2008.[a]

Sample Date	Time	Location	Sample	Type[b]	Depth[c] (ft TOC)	Chain of Custody	Shipping Date	Sample Description
7/9/08	12:00	MW1S	–	–	13.3-23.3	–	–	Well dry.
7/9/08	12:24	MW1D	BAMW1D-W-22668	MW	139.85-159.4	3579	7/10/08	Depth to water = 119.4 ft TOC. Depth of 2-in. well = 159.4 ft TOC. Sample collected by using low-flow bladder pump after purging of 5 L.
7/9/08	13:46	MW17	BAMW17-W-22695	MW	120-130	3579	7/10/08	Depth to water = 96.6 ft TOC. Depth of 2-in. well = 130 t TOC. Sample collected by using low-flow bladder pump after purging of 7 L.
7/9/08	16:43	MW13S	BAMW13S-W-22687	MW	112-122	3579	7/10/08	Depth to water = 87 ft TOC. Depth of 2-in. well = 122 ft TOC. Sample collected by using low-flow bladder pump after purging of 6 L.
7/9/08	17:53	MW13D	BAMW13D-W-22688	MW	127-137	3579	7/10/08	Depth to water = 107.9 ft TOC. Depth of 2-in. well = 137 ft TOC. Sample collected by using low-flow bladder pump after purging of 7 L.
7/10/08	10:50	MW3D	BAMW3D-W-22670	MW	133.02-152.73	3579	7/10/08	Depth to water = 113.3 ft TOC. Depth of 2-in. well = 152.73 ft TOC. Sample collected by using low-flow bladder pump after purging of 6 L.
7/10/08	11:38	MW2D	BAMW2D-W-22669	MW	133.26-152.93	3579	7/10/08	Depth to water = 117.15 ft TOC. Depth of 2-in. well = 152.93 ft TOC. Sample collected by using low-flow bladder pump after purging of 10.5 L.
7/10/08	11:39	MW2D	BAMW2DDUP-W-22698	MW	133.26-152.93	3579	7/10/08	Replicate of sample BAMW2D-W-22669.
7/10/08	14:22	MW14D	BAMW14D-W-22690	MW	123-133	3579	7/10/08	Depth to water = 101 ft TOC. Depth of 2-in. well = 133 ftTOC. Sample collected by using low-flow bladder pump after purging of 8.5 L.
7/10/08	14:32	MW11S	BAMW11S-W-22681	MW	40-50	3579	7/10/08	Depth to water = 24.8 ft TOC. Depth of 1 in. well = 54 ft TOC. Sample collected by using low-flow bladder pump after purging of 3 L.
7/10/08	15:56	MW14S	BAMW14S-W-22689	MW	108-118	3579	7/10/08	Depth to water = 99.4 ft TOC. Depth of 2-in. well = 118 ft TOC. Sample collected by using low-flow bladder pump after purging of 9 L. Aliquots also collected for verification analysis.
7/10/08	16:45	MW11M	BAMW11M-W-22682	MW	90-100	3579	7/10/08	Depth to water = 78.85 ft TOC. Depth of 2-in. well = 100 ft TOC. Sample collected by using low-flow bladder pump after purging of 6 L.
7/10/08	17:00	MW12S	–	–	43-53	–	–	Well dry.
7/10/08	17:44	MW12M	BAMW12M-W-22685	MW	90-100	3579	7/10/08	Depth to water = 70.1 ft TOC. Depth of 2-in. well = 100 ft TOC. Sample collected by using low-flow bladder pump after purging of 8 L.

TABLE A.1 (Cont.)

Sample Date	Time	Location	Sample	Type[b]	Depth[c] (ft TOC)	Chain of Custody	Shipping Date	Sample Description
7/10/08	18:21	MW11D	BAMW11D-W-22683	MW	125-135	3579	7/10/08	Depth to water = 102.1 ft TOC. Depth of 2-in. well = 135 ft TOC. Sample collected by using low-flow bladder pump.
7/10/08	18:33	QC	BAQCTB-W-22701	TB	–	3579	7/10/08	Trip blank sent to the AGEM Laboratory for organic analyses with water samples listed on chain-of-custody form (COC) 3579.
7/11/08	8:56	PWS3	BAPWS3-W-22697	PW	160	3580	7/12/08	Well was pumped for 0.5 h and then sampled from the tap in the well shed.
7/11/08	9:04	PWS2	BAPWS2-W-22696	PW	155	3580	7/12/08	Well was pumped for 0.5 h and then sampled from the tap in the well shed.
7/11/08	10:12	MW16D	BAMW16D-W-22694	MW	90-100	3580	7/12/08	Depth to water = 66.3 ft TOC. Depth of 2-in. well = 99.6 ft TOC. Sample collected by using low-flow bladder pump after purging of 5.5 L.
7/11/08	10:54	MW5	BAMW5-W-22672	MW	110-120	3580	7/12/08	Depth to water = 93.8 ft TOC. Depth of 2-in. well = 120 ft TOC. Sample collected by using low-flow bladder pump after purging of 8 L.
7/11/08	11:31	MW16S	BAMW16S-W-22693	MW	76-86	3580	7/12/08	Depth to water = 67.35 ft TOC. Depth of 2-in. well = 90 ft TOC. Sample collected by using low-flow bladder pump after purging of 10.5 L.
7/11/08	12:10	MW6D	BAMW6D-W-22674	MW	105-115	3580	7/12/08	Depth to water = 89.5 ft TOC. Depth of 2-in. well = 115 ft TOC. Sample collected by using low-flow bladder pump after purging of 5 L.
7/11/08	14:09	MW12D	BAMW12D-W-22686	MW	115-125	3580	7/12/08	Depth to water = 93.7 ft TOC. Depth of 2-in. well = 125 ft TOC. Sample collected by using low-flow bladder pump after purging of 5.5 L. Aliquots also collected for verification analysis.
7/11/08	14:22	MW6S	BAMW6S-W-22673	MW	90.5-100.5	3580	7/12/08	Depth to water = 88.1 ft TOC. Depth of 2-in. well = 100.5 ft TOC. Sample collected by using low-flow bladder pump after purging of 6 L.
7/11/08	15:56	MW10S	BAMW10S-W-22679	MW	93-103	3580	7/12/08	Depth to water = 73.4 ft TOC. Depth of 2-in. well = 103 ft TOC. Sample collected by using low-flow bladder pump after purging of 6.3 L. Aliquots also collected for verification analysis.
7/11/08	16:04	QC	BAQCIR-W-22700	RI	–	3580	7/12/08	Rinsate of decontaminated bladder pump after collection of sample BAMW10S-W-22679.

TABLE A.1 (Cont.)

Sample Date	Time	Location	Sample	Type[b]	Depth[c] (ft TOC)	Chain of Custody	Shipping Date	Sample Description
7/11/08	16:20	MW8	BAMW8-W-22676	MW	110-120	3580	7/12/08	Depth to water = 95.75 ft TOC. Depth of 2-in. well = 124 ft TOC. Sample collected by using low-flow bladder pump after purging of 6 L. Aliquots also collected for verification analysis.
7/11/08	16:40	QC	BAQCIR-W-22701	RI	–	3580	7/12/08	Rinsate of decontaminated bladder pump after collection of sample BAMW8-W-22676.
7/11/08	17:58	MW10D	BAMW10D-W-22680	MW	115-125	3580	7/12/08	Depth to water = 97.3 ft TOC. Depth of 2-in. well = 125 ft TOC. Sample collected by using low-flow bladder pump after purging of 5 L.
7/11/08	18:15	Oentrich	BAOENTRICH-W-22695	DW	150	3580	7/12/08	Hydrant in back yard was allowed to run for 5 min, then sampled.
7/11/08	18:17	MW9	BAMW9-W-22678	MW	100-110	3580	7/12/08	Depth to water = 87.65 ft TOC. Depth of 2-in. well = 120 ft TOC. Sample collected by using low-flow bladder pump after purging of 6 L.
7/12/08	10:30	MW7	BAMW7-W-22675	MW	116-126	3581	7/12/08	Depth to water = 97.5 ft TOC. Depth of 2-in. well = 126 ft TOC. Sample collected by using low-flow bladder pump after purging of 9.5 L.
7/12/08	10:32	MW15D	BAMW15D-W-22692	MW	105-115	3581	7/12/08	Depth to water = 70.3 ft TOC. Depth of 2-in. well = 115 ft TOC. Sample collected by using low-flow bladder pump after purging of 7 L.
7/12/08	12:00	QC	BAQCTB-W-22702	TB	–	3581	7/12/08	Trip blank with sent to the AGEM Laboratory for organic analyses with water samples listed on COCs 3580 and 3581; also sent to TestAmerica for verification organic analysis with samples listed on COC 3583.
7/12/08	12:02	MW15S	BAMW15S-W-22691	MW	88-98	3581	7/12/08	Depth to water = 80.3 ft TOC. Depth of 2-in. well = 98 ft TOC. Sample collected by using low-flow bladder pump after purging of 9 L.
7/12/08	12:14	MW4D	BAMW4D-W-22671	MW	98.38-118.22	3581	7/12/08	Depth to water = 93.6 ft TOC. Depth of 2-in. well = 118.22 ft TOC. Sample collected by using low-flow bladder pump after purging of 5.5 L.
7/16/08	12:15	QC	BNWW	BT	–	Pace	7/16/08	Sample of waste purge water generated during the July 2008 sampling event.
7/16/08	12:20	QC	BNCNTB	TB	–	Pace	7/16/08	Trip blank sent to Pace Analytical Services with wastewater sample for VOCs, ethylene dibromide, and nitrate analyses.

TABLE A.1 (Cont.)

[a] All samples collected were water.

[b] Sample types: BT, wastewater; DW, domestic well; MW, monitoring well; PW, public water supply well; RI, rinsate; TB, trip blank.

[c] Depth is in feet below the top of the well casing.

[d] NR, not recorded.

TABLE A.2 Field measurements for groundwater samples collected at Barnes, July 2006 to July 2008.

Well	Screen Interval (ft BGL)	Sample Date	Temperature (°C)	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)
Previously existing KDHE monitoring wells							
MW1S	13.3-23.3	7/19/06[a]	–	–	–	–	–
		4/4/07[a]	–	–	–	–	–
		11/18/07[a]	–	–	–	–	–
		3/4/08[a]	–	–	–	–	–
		7/9/08[a]	–	–	–	–	–
MW1D	139.85-159.4	7/19/06	22.8	7.15	945	–	–
		4/4/07	15.7	6.30	855	–	–
		11/18/07	12.7	7.62	712	–	–
		3/4/08	5.5	7.22	1167	11.6	244.2
		7/9/08	18.0	7.05	992	16.2	97.5
MW2D	133.26-152.93	7/19/06	24.7	7.72	946	–	–
		4/4/07	15.1	6.32	887	–	–
		11/18/07	12.1	6.96	1448	–	–
		3/7/08	6.5	7.22	1198	4.61	196.5
		7/10/08	18.4	6.91	1163	5.03	155.3
MW3D	133.02-152.73	7/19/06	23.0	7.06	976	–	–
		4/4/07	15.6	6.37	989	–	–
		11/19/07	10.5	7.16	1093	–	–
		3/7/08	8.2	7.09	1195	5.34	254.8
		7/10/08	19.8	6.99	1177	13.8	109.9
MW4D	98.38-118.22	7/20/06	23.5	6.26	968	–	–
		4/6/07	11.3	6.21	1018	–	–
		11/19/07	15.7	6.98	1022	–	–
		3/9/08	11.5	7.14	859	6.57	201.2
		7/12/08	14.4	6.94	1001	6.77	148.7
CCC/USDA wells installed during 2006-2007 investigation							
MW5	110-120	4/6/07	13.9	6.17	1705	–	–
		11/19/07	15.2	6.74	3070	–	–
		3/8/08	9.9	6.76	2770	0.66	123.2
		7/11/08	18.8	6.66	2930	1.32	36.6

TABLE A.2 (Cont.)

Well	Screen Interval (ft BGL)	Sample Date	Temperature (°C)	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)
CCC/USDA wells installed during 2006-2007 investigation (cont.)							
MW6S	90.5-100.5	4/4/07[a]	–	–	–	–	–
		11/19/07	12.0	7.60	723	–	–
		3/8/08	4.7	7.77	673	6.72	272.2
		7/11/08	28.2	7.61	753	9.85	92.4
MW6D	105-115	4/5/07	6.2	6.11	936	–	–
		11/19/07	13.6	7.00	1103	–	–
		3/8/08	9.1	7.15	908	5.56	241.0
		7/11/08	19.8	7.05	999	12.8	99.9
MW7	116-126	4/6/07	14.1	6.30	1051	–	–
		11/19/07	14.6	7.16	890	–	–
		3/9/08	13.1	7.10	1068	4.24	186.4
		7/12/08	14.4	6.95	1238	4.36	98.3
MW8	110-120	4/6/07	12.1	6.23	974	–	–
		11/19/07	14.6	7.03	909	–	–
		3/10/08	13.1	7.09	961	6.71	182.1
		7/11/08	18.6	6.38	1049	6.19	152.2
MW9	100-110	4/5/07	12.9	6.20	976	–	–
		11/19/07	16.5	7.21	1066	–	–
		3/9/08	11.2	7.07	928	5.80	239.0
		7/11/08	17.7	6.58	1010	5.63	188.7
MW10S	93-103	4/6/07	13.2	6.36	1004	–	–
		11/19/07	14.5	7.22	942	–	–
		3/10/08	12.7	7.08	912	5.18	176.1
		7/11/08	17.3	6.91	975	12.8	118.6
MW10D	115-125	4/6/07	12.1	6.21	992	–	–
		11/19/07	14.5	7.42	1175	–	–
		3/9/08	13.7	7.01	1024	5.07	235.9
		7/11/08	17.4	6.78	1090	12.6	117.1
MW11S	40-50	4/4/07	12.8	6.14	1027	–	–
		11/19/07	11.2	7.15	1174	–	–
		3/5/08	9.4	6.81	1122	2.26	240.8
		7/10/08	19.5	6.47	1224	1.86	166.2

TABLE A.2 (Cont.)

Well	Screen Interval (ft BGL)	Sample Date	Temperature (°C)	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)
CCC/USDA wells installed during 2006-2007 investigation (cont.)							
MW11M	90-100	4/5/07	7.5	7.60	1097	–	–
		11/19/07	11.9	7.17	1144	–	–
		3/6/08	10.8	7.06	997	2.65	254.1
		7/10/08	31.9	7.08	1124	3.88	148.9
MW11D	125-135	4/4/07	13.8	6.18	990	–	–
		11/19/07	13.1	7.22	987	–	–
		3/5/08	6.04	7.06	872	6.85	252.0
		7/10/08	17.5	6.25	957	7.14	176.6
MW12S	43-53	4/5/07[a]	–	–	–	–	–
		11/19/07[a]	–	–	–	–	–
		3/10/08[a]	–	–	–	–	–
		7/10/08[a]	–	–	–	–	–
MW12M	90-100	4/5/07	12.6	6.42	867	–	–
		11/19/07	14.9	7.13	835	–	–
		3/10/08	12.6	7.13	665	1.81	211.5
		7/10/08	16.9	7.09	878	8.17	87.1
MW12D	115-125	4/5/07	14	6.36	930	–	–
		11/18/07	15.6	6.95	571	–	–
		3/9/08	8.8	7.13	881	5.25	237.3
		7/11/08	19.9	6.01	987	4.72	196.5
MW13S	112-122	4/5/07	9.8	6.42	946	–	–
		11/19/07	16.5	7.21	893	–	–
		3/10/08	12.2	7.13	810	6.21	199.3
		7/9/08	17.4	6.99	875	7.72	115.7
MW13D	127-137	4/5/07	14.9	6.25	397	–	–
		11/19/07	17	7.00	763	–	–
		3/9/08	13.1	7.09	758	5.95	212.9
		7/9/08	18.6	7.07	848	18.1	56.9
MW14S	108-118	4/4/07	13.4	6.50	704	–	–
		11/18/07	12.9	7.26	966	–	–
		3/8/08	13.2	7.20	729	6.59	207.8
		7/10/08	17.4	7.16	775	16.4	86.7

TABLE A.2 (Cont.)

Well	Screen Interval (ft BGL)	Sample Date	Temperature (°C)	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)
CCC/USDA wells installed during 2006-2007 investigation (cont.)							
MW14D	123-133	4/4/07	14.7	6.34	932	–	–
		11/18/07	13.2	7.47	739	–	–
		3/8/08	12.0	7.06	1424	1.95	282.4
		7/10/08	17.7	7.07	1459	14.4	85.7
MW15S	88-98	4/4/07	13.1	8.03	854	–	–
		11/18/07	13.9	–	1883	–	–
		3/10/08	12.1	8.67	697	5.49	173.2
		7/12/08	14.0	8.88	660	11.6	93.7
MW15D	105-115	4/4/07	14.8	6.15	2980	–	–
		11/18/07	13.1	6.85	2190	–	–
		3/8/08	9.0	6.85	2912	0.57	130.6
		7/12/08	14.1	6.80	3067	1.05	89.6
MW16S	76-86	4/4/07	12.8	6.35	1708	–	–
		11/19/07	15.0	6.94	1616	–	–
		3/7/08	7.3	6.96	1968	3.45	183.5
		7/11/08	18.8	6.71	2883	1.13	52.0
MW16D	90-100	4/4/07	14.1	6.17	2910	–	–
		11/19/07	12.5	6.78	2400	–	–
		3/7/08	7.0	6.86	2866	0.5	140.0
		7/11/08	18.9	6.64	3134	0.41	31.5
MW17	120-130	4/4/07	16.0	6.44	861	–	–
		11/19/07	8.3	7.15	610	–	–
		3/5/08	5.4	7.12	804	7.02	239.4
		7/9/08	17.5	7.11	843	20.6	89.4
Private wells							
Oentrich	150	7/20/06	–	–	–	–	–
		8/2/06	–	–	–	–	–
		4/5/07	–	–	–	–	–
		11/19/07	12.1	8.26	1830	–	–
		3/6/08	–	–	–	–	–
		7/11/08	–	–	–	–	–

TABLE A.2 (Cont.)

Well	Screen Interval (ft BGL)	Sample Date	Temperature (°C)	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)
Private wells (cont.)							
Sedivy	138	8/22/06	–	–	–	–	–
		9/13/06	22.5	6.57	739	–	–

[a] Not sampled; well dry.

Appendix B:

Results from the AGEM Laboratory for Dual Analyses of Samples Collected at Barnes in July 2008 and for Quality Control Samples

TABLE B.1 Analytical results for samples and replicates collected at Barnes in July 2008 and for quality control samples.

Location	Sample	Sample Date	Depth (ft BGL)	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Analysis Type
MW2D	BAMW2D-W-22669	7/10/08	133.26-152.93	ND[a]	ND	ND	Primary
MW2D	BAMW2DDUP-W-22698	7/10/08	133.26-152.93	ND	ND	ND	Replicate
MW9	BAMW9-W-22678	7/11/08	100-110	1.3	0.3 J[b]	ND	Primary
MW9	BAMW9-W-22678DUP	7/11/08	100-110	1.3	0.3 J	ND	Duplicate
MW11D	BAMW11D-W-22683	7/10/08	125-135	0.9 J	ND	ND	Primary
MW11D	BAMW11D-W-22683DUP	7/10/08	125-135	0.8 J	ND	ND	Duplicate
PWS2	BAPWS2-W-22696	7/11/08	155	0.8 J	ND	ND	Primary
PWS2	BAPWS2-W-22696DUP	7/11/08	155	0.7 J	ND	ND	Duplicate
QC	BAQCIR-W-22700	7/11/08	–	ND	ND	ND	Rinsate after MW10S
QC	BAQCIR-W-22701	7/11/08	–	ND	ND	ND	Rinsate after MW8
QC	BAQCTB-W-22701	7/10/08	–	ND	ND	ND	Trip blank
QC	BAQCTB-W-22702	7/12/08	–	ND	ND	ND	Trip blank

[a] ND, contaminant not detected at an instrument detection limit of 0.1 µg/L.

[b] Qualifier J indicates an estimated concentration below the method quantitation limit of 1.0 µg/L.

Appendix C:

Sample Documentation from TestAmerica Laboratories, Inc.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

July 29, 2008

TestAmerica Laboratories, Inc.

Mr. Clyde Dennis
Argonne National Laboratory
9700 S. Cass Avenue
Building 203, Office B149
Argonne, IL 60439

Re: Laboratory Project No. 21005
Case: BARNES; SDG: 126520

Dear Mr. Dennis:

Enclosed are analytical results for samples that were received by TestAmerica Burlington on July 14th, 2008. Laboratory identification numbers were assigned, and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 07/14/08 ETR No: 126520		
759578	BAMW14S-W-22689	07/10/08	WATER
759579	BAMW8-W-22676	07/11/08	WATER
759580	BAMW12D-W-22686	07/11/08	WATER
759581	BAMW10S-W-22679	07/11/08	WATER
759582	BAPWS3-W-22697	07/11/08	WATER
759583	BAQCTB-W-22702	07/12/08	WATER
759854	VHBLK01	07/14/08	WATER

Documentation of the condition of the samples at the time of their receipt and any exception to the laboratory's Sample Acceptance Policy is documented in the Sample Handling section of this submittal. The samples, as received, were not acid preserved. On that basis the laboratory did provide for the analytical work to be performed within seven days of sample collection.

In order to accommodate field length limitations in processing the data summary forms, the laboratory did, in certain instances, abbreviate the sample identifier. The electronically formatted data provides for the full sample identifier.

SOM01.2 Volatile Organics (Trace Level Water)

A storage blank was prepared for volatile organics analysis, and stored in association with the storage of the sample. That storage blank, identified as VHBLK01, was carried through the holding period with the samples, and analyzed.

30 Community Drive Suite 11 South Burlington, VT 05403 **tel** 802.660.1990 **fax** 802.660.1919 **www.testamericainc.com**

Sample BAMW10S-W-22679 was analyzed at a 5.2-fold dilution, based on the results of preliminary screening. An additional, more concentrated analysis was performed on the sample in order to provide for a lower reporting of possible target analyte constituents that were not identified in the primary analysis. That analysis was performed without a dilution. Both sets of results for the analysis of sample BAMW10S-W-22679 are included in this submittal. Each of the analyses associated with the sample set exhibited an acceptable internal standard performance. There was an acceptable recovery of each deuterated monitoring compound (DMC) in the analysis of the method blank and the analysis of the storage blank. The analysis of the samples in this sample set did meet the technical acceptance criteria specific to DMC recoveries, although not all DMC recoveries were within the control range in each analysis. The technical acceptance criteria does provide for the recovery of up to three DMCs to fall outside of the control range in the analysis of field samples. With the exception of that performed on sample BAQCTB-W-22702, the recoveries of 2-butanone-d_5 and 2-hexanone-d_5 were elevated in the analysis of each of the field samples. Matrix spike and matrix spike duplicate analyses were not performed on the samples in this sample set. Trace concentrations of acetone and 1,2,3-trichlorobenzene were identified in the analysis of the method blank associated with the analytical work. The derived concentration of each compound in that analysis was below the established reporting limit, and the analysis did meet the technical acceptance criteria for a compliant method blank acquisition. The analysis of the storage blank associated with the sample set was free of target analyte contamination. Present in the storage blank and method blank analyses was a non-target constituent that represented a compound that is related to either the DMC formulation or to column bleed. The fact that the presence of this compound is not within the laboratory's control is at issue. The derived results for that compound have been qualified with an "X" qualifier to reflect the source of the contamination. An instrument blank was analyzed following the more concentrated analysis of sample BAMW10S-W-22679. A trace concentration of acetone was identified in that analysis at a concentration below the established reporting limit, and the analysis did meet the technical acceptance criteria for a compliant instrument blank acquisition.

The responses for each target analyte met the relative standard deviation criterion in the initial calibration. The response for each target analyte met the percent difference criterion in the continuing calibration check acquisition. The response for each target analyte met the 50.0 percent difference criterion in the closing calibration check acquisition. In the initial calibration and the calibration check acquisitions, the response for acetone did not meet the minimum relative response criterion of 0.010 in each instance. The relative response for acetone was above 0.009 in all instances.

The primary quantitation mass for methylcyclohexane that is specified in the Statement of Work is mass 83. The laboratory did identify a contribution to mass 83 from 1,2-dichloropropane-d_6, one of the deuterated monitoring compounds (DMCs). The laboratory did change the primary quantitation mass assignment to mass 55 for the quantification of methylcyclohexane.

Manual integration was employed in deriving certain of the analytical results. The values that have been derived from manual integration are qualified on the quantitation reports. Extracted ion current profiles for each manual integration are included in the data package, and further documented in the Sample Preparation section of this submittal.

Any reference within this report to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The analytical results associated with the samples presented in this test report were generated under a quality system that adheres to requirements specified in the NELAC standard. Release of the data in this test report and any associated electronic deliverables is authorized by the Laboratory Director's designee as verified by the following signature.

If there are any questions regarding this submittal, please contact me at 802 660-1990.

Sincerely,

Kirk F. Young
Project Manager

Enclosure

TestAmerica Burlington Data Qualifier Definitions

Organic

U: Compound analyzed but not detected at a concentration above the reporting limit.

J: Estimated value.

N: Indicates presumptive evidence of a compound. This flag is used only for tentatively identified compounds (TICs) where the identification of a compound is based on a mass spectral library search.

P: SW-846: The relative percent difference for detected concentrations between two GC columns is greater than 40%. Unless otherwise specified the higher of the two values is reported on the Form I.

CLP SOW: Greater than 25% difference for detected concentrations between two GC columns. Unless otherwise specified the lower of the two values is reported on the Form I.

C: Pesticide result whose identification has been confirmed by GC/MS.

B: Analyte is found in the sample and the associated method blank. The flag is used for tentatively identified compounds as well as positively identified compounds.

E: Compounds whose concentrations exceed the upper limit of the calibration range of the instrument for that specific analysis.

D: Concentrations identified from analysis of the sample at a secondary dilution.

A: Tentatively identified compound is a suspected aldol conden sation product.

X,Y,Z: Laboratory defined flags that may be used alone or combined, as needed. If used, the description of the flag is defined in the project narrative.

Inorganic/Metals

E: Reported value is estimated due to the presence of interference.

N: Matrix spike sample recovery is not within control limits.

* Duplicate sample analysis is not within control limits.

B: The result reported is less than the reporting limit but greater than the instrument detection limit.

U: Analyte was analyzed for but not detected above the reporting limit.

Method Codes:

P	ICP-AES
MS	ICP-MS
CV	Cold Vapor AA
AS	Semi-Automated Spectrophotometric

3583

MATRIX: Water	ARGONNE NATIONAL LABORATORY CHAIN OF CUSTODY RECORD*	Shipping Container No.
RECEIVING LAB: Test America		Shipping Info:
PROJECT/SITE: Barnes KS		ANL Field Contact (Name & Temporary Phone): Bob Sediy (402) 465-9021
SAMPLER(S) (Signature)		

DATE OF COLLECTION	SAMPLE ID NUMBER(S)	Number of containers	ANALYSIS VOC	REMARKS
July 10, 2008	BAMW145-W-22689	2	2	2 x 40 mL for VOC
July 11, 2008	BAMW8 - W-22676	2	2	2 x 40 mL for VOC
↓ ↓	BAMW12D-W-22686	2	2	↓ ↓
	BAMW10S-W-22679	2	2	
July 11, 2008	BAPWS3 - W-22697	2	2	2 x 40 mL for VOC
July 12, 2008	BAQCTB-W-22702	1	1	1 x 40 mL for VOC

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
	7-12-08	13:16					

Relinquished by (Signature)	Date	Time	Received for Laboratory by	Date	Time	Remarks
				7/14/08	0900	

Y	N	FOR LAB USE ONLY
√		Custody seal was intact when shipment received.
√		Sample containers were intact when received.
√		Shipment was at required temperature when received.
	√	Sample labels, Tags and COC agree.

*A sample is under custody if:
1. It is in your possession; or,
2. It is in your view, after having been in your possession; or,
3. It was in your possession and you locked it up; or,
4. It is in a designated secure area.

Argonne National Laboratory, Applied Geosciences & Environmental Mgt. Group, Environmental Research Division, 9700 S. Cass Avenue, Argonne, IL 60439

ER-160 (4-01)

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
MW10S22679

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759581

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759581I2

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	2.5	
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	57	E
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
MW10S22679

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759581

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759581I2

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.31	J
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
MW10S22679DL

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759581D1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759581D

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 5.2

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	2.6	U
74-87-3	Chloromethane	2.6	U
75-01-4	Vinyl chloride	2.6	U
74-83-9	Bromomethane	2.6	U
75-00-3	Chloroethane	2.6	U
75-69-4	Trichlorofluoromethane	2.6	U
75-35-4	1,1-Dichloroethene	2.6	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	2.6	U
67-64-1	Acetone	26	U
75-15-0	Carbon disulfide	2.6	U
79-20-9	Methyl acetate	2.6	U
75-09-2	Methylene chloride	2.6	U
156-60-5	trans-1,2-Dichloroethene	2.6	U
1634-04-4	Methyl tert-butyl ether	2.6	U
75-34-3	1,1-Dichloroethane	2.6	U
156-59-2	cis-1,2-Dichloroethene	2.6	U
78-93-3	2-Butanone	26	U
74-97-5	Bromochloromethane	2.6	U
67-66-3	Chloroform	2.5	DJ
71-55-6	1,1,1-Trichloroethane	2.6	U
110-82-7	Cyclohexane	2.6	U
56-23-5	Carbon tetrachloride	58	D
71-43-2	Benzene	2.6	U
107-06-2	1,2-Dichloroethane	2.6	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
MW10S22679DL

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759581D1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759581D

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 5.2

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	2.6	U
108-87-2	Methylcyclohexane	2.6	U
78-87-5	1,2-Dichloropropane	2.6	U
75-27-4	Bromodichloromethane	2.6	U
10061-01-5	cis-1,3-Dichloropropene	2.6	U
108-10-1	4-Methyl-2-pentanone	26	U
108-88-3	Toluene	2.6	U
10061-02-6	trans-1,3-Dichloropropene	2.6	U
79-00-5	1,1,2-Trichloroethane	2.6	U
127-18-4	Tetrachloroethene	2.6	U
591-78-6	2-Hexanone	26	U
124-48-1	Dibromochloromethane	2.6	U
106-93-4	1,2-Dibromoethane	2.6	U
108-90-7	Chlorobenzene	2.6	U
100-41-4	Ethylbenzene	2.6	U
95-47-6	o-Xylene	2.6	U
179601-23-1	m,p-Xylene	2.6	U
100-42-5	Styrene	2.6	U
75-25-2	Bromoform	2.6	U
98-82-8	Isopropylbenzene	2.6	U
79-34-5	1,1,2,2-Tetrachloroethane	2.6	U
541-73-1	1,3-Dichlorobenzene	2.6	U
106-46-7	1,4-Dichlorobenzene	2.6	U
95-50-1	1,2-Dichlorobenzene	2.6	U
96-12-8	1,2-Dibromo-3-chloropropane	2.6	U
120-82-1	1,2,4-Trichlorobenzene	2.6	U
87-61-6	1,2,3-Trichlorobenzene	2.6	U

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
MW12D22686

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759580

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759580

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	3.2	JB
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.21	J
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.91	
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
MW12D22686

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759580

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759580

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.36	J
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
MW14S22689

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759578

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759578

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	2.2	JB
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.33	J
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	5.1	
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
MW14S22689

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759578

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759578

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.37	J
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
MW822676

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759579

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759579I2

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	3.8	JB
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.75	
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	19	
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
MW822676

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759579

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759579I2

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.41	J
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.22	J
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
PWS322697

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759582

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759582

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.25	J
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
PWS322697

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759582

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759582

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
QCTB22702

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759583

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759583

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	2.8	JB
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.29	J
107-06-2	1,2-Dichloroethane	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
QCTB22702

Lab Name: TestAmerica BURLINGTON Contract: 21005

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 126520

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 759583

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 759583

Level: (TRACE/LOW/MED) TRACE Date Received: 07/14/2008

% Moisture: not dec. Date Analyzed: 07/15/2008

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	0.50	U
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	2.3	
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.25	J
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

Environmental Science Division
Argonne National Laboratory
9700 South Cass Avenue, Bldg. 203
Argonne, IL 60439-4843
www.anl.gov

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