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March–June 2009 Monitoring Results for Barnes, Kansas

Environmental Science Division

USDA
United States Department of Agriculture
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by
Applied Geosciences and Environmental Management Section
Environmental Science Division, Argonne National Laboratory

September 2009

United States Department of Agriculture

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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)
hr	hour(s)
in.	inch(es)
KDHE	Kansas Department of Health and Environment
L	liter(s)
µg/kg	microgram(s) per kilogram
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
PWS	public water supply
RBSL	risk-based screening level
USDA	U.S. Department of Agriculture
VOC	volatile organic compound

March and June 2009 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 (Argonne 2008a-d, 2009) demonstrated the presence of carbon tetrachloride contamination in groundwater at levels 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 investigation indicates that at least one other potential source might have contributed to the groundwater contaminant plume (Argonne 2008a). The former agriculture building owned by the local school district, located immediately east of well PWS3, is also a potential source of the contamination.

This current report presents the results of the fifth and sixth quarterly monitoring events, conducted in March and June 2009. During these two monitoring events, low-flow sampling methods were used to purge and sample all wells. These were the fourth and fifth events at Barnes during which the low-flow sampling method was used.

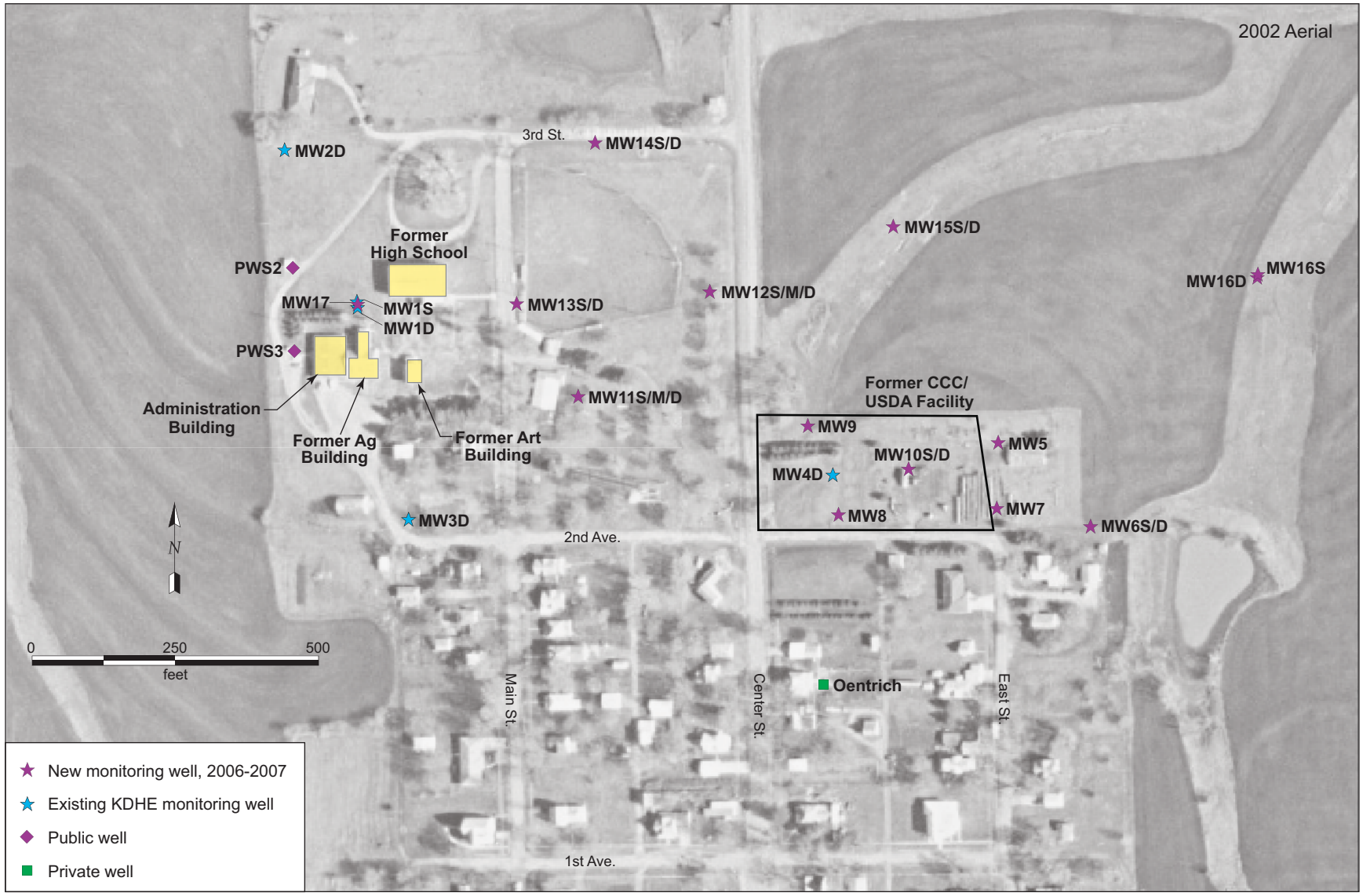


FIGURE 1.1 Groundwater sampling locations at Barnes in March and June 2009. Source of photograph: NAPP (2002).

2 Conceptual Site Model

Barnes lies in a transition zone between the Flint Hills and the glaciated region. The area's topography consists of gently sloping hills of Pleistocene loess (with variations in elevation < 50 ft) overlying a shale unit and interbedded shale, limestone, and siltstone of the Permian Chase Group. Groundwater for the public water supply is produced from the bedrock aquifer of the Chase Group.

The site lithology and subsurface contaminant conditions were determined in the 2006-2007 investigation through the collection of continuous core samples at 13 locations (MW5-MW17) extending from east of the former CCC/USDA grain storage facility and westward, across the area of concern, toward the public water supply wells (Argonne 20008a). The predominant lithology consists of a thin layer of silty clay to clayey silt with fine sand in the upper 2-20 ft. This layer is underlain by highly weathered shale interbedded with thin layers of fractured limestone at depths of approximately 18-132 ft BGL (below ground level). No soil contamination at concentrations above the RBSL of 200 µg/kg for the soil-to-groundwater protection pathway was detected at any of the 13 locations. Trace concentrations (< 10 µg/kg) of carbon tetrachloride were detected in soil at 3 locations on the former CCC/USDA facility property. These low concentrations would not result in higher concentrations in groundwater, and therefore the soil on the former CCC/USDA property is not considered to be an ongoing significant source for the carbon tetrachloride contamination in groundwater.

Groundwater is present predominantly in the fractured limestone layers. Monitoring wells were installed and screened at various depths, with several locations completed as nested wells to determine contaminant concentrations at depths where water-bearing zones were indicated. Throughout the monitoring program, a detailed evaluation of the hand-measured water levels and carbon tetrachloride data has been conducted to investigate the stratigraphy of the saturated zone. The accumulated water level data suggest that at least three vertically distinct aquifer zones are present: shallow, intermediate, and deep. These zones are discussed further in Section 4.1. The vertical distribution of the carbon tetrachloride in groundwater indicates that the highest concentrations occur in the intermediate aquifer zone (approximately 50-70 µg/L over the course of the monitoring program to date). Lower concentrations have been detected in the deep aquifer zone, and no carbon tetrachloride has been detected in the shallow zone. Trace levels of carbon tetrachloride have been detected periodically in the two public water supply wells; these wells are believed to be screened over all three aquifer zones.

Extensive documentation of the potentiometric surface at Barnes during the targeted investigation and subsequent monitoring events (Argonne 2008a-d, 2009) has indicated that operation of the public water supply wells strongly influences the groundwater flow direction. The accumulated data document a predominant direction of groundwater flow to the northeast under non-pumping conditions. In contrast, flow is toward the northwest, in the approximate direction of the public water supply wells, when pumping is occurring. The data demonstrate that the public water supply wells are operated daily, with drawdowns of as much as 2.25 ft during pumping. Pumping and subsequent water level recovery periods typically range from 3 hr to 7 hr in duration, resulting in groundwater levels (and apparent flow directions) that shift relatively continuously throughout much of each day. For this reason, water level data collected by the automatic recorders, which are coincident in time at all monitored locations, provide the primary basis for determination of the topology of the potentiometric surface at any point in the cycles of groundwater pumping and recovery.

The automatic recorder data also provide critical information needed to evaluate the hydrologic regime in anticipation of a corrective action study. The accumulated data prior to November 2008 for recorders installed in deep-zone wells indicated the presence of both vertical and lateral influences on the local hydraulic gradients. In November 2008, intermediate-zone wells were equipped with automatic water level recorders to obtain detailed data on the potential temporal variability of the hydraulic heads in this aquifer zone.

3 Sampling and Analysis Activities

3.1 Measurement of Groundwater Levels

The groundwater sampling events at Barnes on March 4-5 and June 16-19, 2009, 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.1.

Before implementation of the low-flow sampling described in Section 3.2, 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. During the March 2009 event, monitoring wells MW1S and MW12S were measured but were found to be dry and consequently could not be sampled. During the June 2009 event, however, water was present at the base of monitoring well MW12S (< 1 ft), and a sample was collected. 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.

In addition to the manual water level measurements, data recorders have been gathering long-term data on the groundwater elevation and gradient at selected monitoring wells across the investigation area since 2006. The data loggers record water levels continuously at 60-min intervals. To augment the data generated by recorders installed in the deeper aquifer zone, in November 2008 water level recorders were installed in five wells — MW10S, MW11M, MW12M, MW13S, and MW17 — to investigate the potential hydraulic influences on groundwater flow and contaminant migration in the intermediate aquifer zone, in which the highest concentrations of carbon tetrachloride in groundwater have been identified. At present, a total of 14 wells are being monitored for water levels, at the locations shown in Figure 3.1.

The hand-measured and automatically recorded groundwater level data are presented and discussed in Section 4.1.

3.2 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; Yeskis and Zavala 2002), were used to purge and sample the monitoring wells. The Oentrich well and the public water supply wells were sampled at their respective faucets after purging for 5-10 min (Table A.1 in Appendix A). During both sampling events in March and June 2009, the public water supply well PWS2 had been in operation prior to sampling. For public wells PWS2 and PWS3, samples of untreated ("raw") produced water were collected at the wellheads prior to mixing and introduction into the public distribution system.

Under the exact requirements of K.A.R. 28-15, compliance samples would be collected from the distribution system after treatment and after water from the wells had been combined, as indicated in 40 CFR 141.24(f)(3). The sampling of individual wellheads at Barnes to test each well is a more stringent comparison with the Tier 2 standard of 5.0 µg/L than sampling of the blended water. In view of the additional margin of protection in this approach, the CCC/USDA has proposed to adhere to (and not exceed) the federal regulation's provision [141.24(f)(15)(i)] that "for systems which are conducting monitoring at a frequency greater than annual, compliance is determined by a running annual average of all samples taken at each sampling point."

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 screen (Puls and Barcelona 1996; Yeskis and Zavala 2002). 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 pump to the bottom of the casing.

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 periodically throughout pumping.

3. Polyethylene tubing was used to connect the bladder pump 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 three 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 stabilization of the formation water parameters occurred, the polyethylene tubing was disconnected from the in-line flow cell, and a representative groundwater sample was pumped through the tubing into laboratory-approved containers.

5. The polyethylene 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 March and June 2009 well sampling events 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 4.2.

3.3 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 (less than two drums) has been sampled for VOCs (including ethylene dibromide) and nitrates. The samples are being analyzed by a Kansas-certified laboratory, Pace Analytical Services (Lenexa, Kansas). If the analytical results indicate concentrations of carbon tetrachloride, chloroform, ethylene dibromide, and nitrate below the KDHE RBSL standards, the water will be discharged on-site per agreement with the KDHE.

3.4 Quality Control for Sample Collection, Handling, and Analysis

Quality assurance/quality control procedures followed during the March and June 2009 monitoring events 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 an equipment rinsate) 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 on 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, with average relative percent difference values for carbon tetrachloride and chloroform of approximately 5% and 3%, respectively, over the two monitoring events, 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), 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 favorably over the range of contaminant concentrations detected; average relative percent difference values for carbon tetrachloride and chloroform were approximately 13% and 10%, respectively, over the two monitoring events, for samples in which contamination was detected.

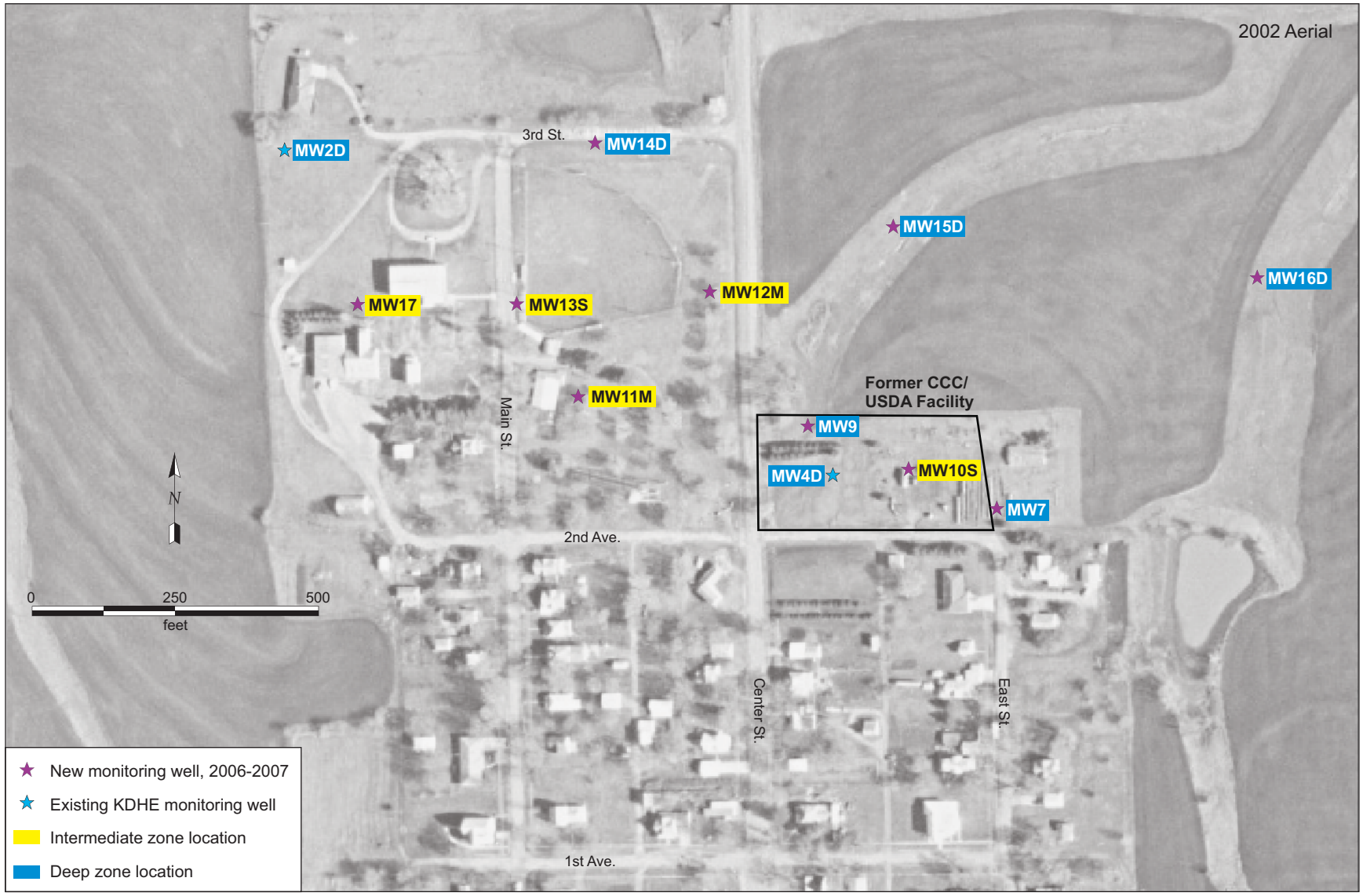


FIGURE 3.1 Wells at Barnes equipped with data loggers for automatic water level monitoring. Source of photograph: NAPP (2002).

4 Results and Discussion

4.1 Groundwater Level Data

The manual water level measurements taken during sampling on March 4-5 and June 17-19, 2009, and prior recent monitoring events, are in Table 4.1. Evaluation of manual water level measurements (together with the contaminant distribution data discussed in Section 4.2) continues to suggest that three vertically distinguishable aquifer zones are present at Barnes: shallow, intermediate, and deep. The designations "S," "M," and "D" in monitoring well names (Table 4.1) were assigned at the time of well installation. They indicate shallow-, medium-, and deep-screened (relative depths) wells in an individual well cluster, rather than the aquifer zone screened. Table 4.2 shows the approximate water level elevations for wells screened in the three aquifer zones, as indicated by the long-term monitoring data accumulated since 2007. During the March 2009 event, the approximate water level elevations were 1,308 ft AMSL in wells screened in the shallow aquifer zone, 1,251-1,256 ft AMSL in wells screened in the intermediate zone, and 1,230-1,236 ft AMSL in wells screened in the deep aquifer zone. As in the prior monitoring events, three vertically distinguished aquifer zones are also evident in the June 2009 event (Table 4.2).

Water level data collected by the automatic recorders, which are coincident in time at all monitored locations, provide the primary basis for determination of the topology of the potentiometric surface at any point in the cycles of groundwater pumping and recovery. Water levels measured by hand over a finite time period in the areally distributed network of monitoring wells at this site cannot generally be relied on to yield a meaningful representation of groundwater flow directions under pumping conditions, because of the documented short-term, transient water level variations that are related to pumping cycles in the public water supply wells. Figure 4.1 presents water level contours (under non-pumping conditions) for February 11 and May 21, 2009, for the network of wells currently being monitored (see Section 3.1). Because of electrical malfunctions at recorders MW7 and MW16 (Figures 3.1 and 4.2a) in the eastern portion of the monitoring area, the groundwater flow pattern for pumping conditions cannot be illustrated for the current quarters. As noted below, however, the observed water level trends indicate that the frequency and magnitude of the pumping cycles previously documented for the public supply wells continued throughout the current review period.

The hydrographs in Figures 4.2a and 4.2b summarize data for the period November 1, 2008, to May 21, 2009, for the recording transducers. Overall, the groundwater level trends in the deeper monitoring wells (Figure 4.2a) were similar to those observed previously. Levels were generally stable through February-April but began to rise in May.

Prior to November 2008, data from recorders in the deep portion of the aquifer (particularly MW15D) suggested the presence of vertical hydraulic gradients. In November 2008, wells in the intermediate portion of the aquifer (MW10S, MW11M, MW12M, MW13S, and MW17; Table 4.1) were equipped with automatic water level recorders to generate detailed data on the potential temporal variability of the hydraulic heads in this aquifer zone. The observed groundwater levels in the intermediate zone (Figure 4.2b) do not show the degree of drawdown response observed in the deep wells.

These data, together with the analyses of groundwater samples for VOCs discussed in Section 4.2, support a plausible working interpretation for the movement of groundwater (and carbon tetrachloride) in the study area. The existing results suggest that the entire saturated sequence at Barnes is hydraulically interconnected but varies internally in both vertical and horizontal permeability. The permeability in the more shaly parts of the section (which include the intermediate aquifer zone) appears to be generally lower than the permeability in the deep aquifer zone, and migration pathways might therefore be more complex in the shaly materials. The shaly materials of the intermediate zone appear to have sufficient vertical permeability to have allowed infiltration of carbon tetrachloride into the deeper parts of the section. The vertical permeability is still quite low, however, as evidenced by the significant vertical gradients documented in the nested wells (Table 4.2).

Most of the deep monitoring wells are associated with limestones (see Figures 4.1-4.5 in Argonne 2008a). The logs show that even though MW15D is considered a “deep” well, it is not completed in these limestones. MW15D has always returned much higher measured groundwater levels than would be expected, given its relative areal position at the site (Figures 3.1 and 4.2a) and its screened depth. This observation is qualitatively consistent with the hypothesis that the higher groundwater levels in MW15D are a reflection of lower permeability associated with the shales at this location, versus the nearby limestones — which appear to act as better carrier beds.

The observed groundwater levels in the intermediate-zone wells do not appear to define an apparent flow direction toward the public water supply wells, despite the mapped occurrence

of the carbon tetrachloride plume in this stratigraphic interval (Section 4.2). The relative water levels do, however, appear qualitatively linked to the elevations of the screens in the respective intermediate-zone monitoring wells. Well MW11 has the highest recorded groundwater levels and the shallowest (in terms of elevation) screened interval, with MW10-MW12 the next lower in screened elevations (and water levels), and MW13-MW17 the lowest. The existing data empirically indicate that the measured "head" in each of these wells is more strongly influenced by the vertical position of the well screen than by the areal location of the well in the intermediate zone of the groundwater flow system.

4.2 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 March and June 2009 are in Table 4.3, together with data for the previous sampling events at Barnes. The highest concentration of carbon tetrachloride in sitewide monitoring continues to be found at intermediate-zone well MW10S (located in the eastern portion of the former CCC/USDA facility and screened at 93-103 ft BGL), with detections of 49 µg/L in March 2009 and 76 µg/L in June 2009. Northwest of well MW10S (in the direction of flow toward the public wells when they are in operation), the carbon tetrachloride concentration decreased to 25-28 µg/L at MW12M and 14-16 µg/L at MW13S during the two sampling events.

The lateral distribution of carbon tetrachloride in groundwater in sampling events from July 2008 to June 2009 is illustrated in Figure 4.3. The distribution in March and June 2009 is similar to that during previous events. The most significant change during these reporting periods is the *decrease* in the concentration of carbon tetrachloride in public well PWS2 (from 1.7 µg/L in October 2008 to < 1 µg/L in March 2009 and 1.0 µg/L in June 2009). No contamination was detected in public well PWS3 during these periods. Because of the pulsing influence on groundwater flow patterns, depending on whether the public wells are operating, no clear migration trend toward the public wells has been evident in sitewide monitoring to date.

The lateral distribution of chloroform in groundwater in July 2008 to June 2009 (Figure 4.4) is also similar to the distribution during previous sampling events. The highest concentration of chloroform in sitewide sampling since 2007 has been found at well MW12M, located northwest of the former CCC/USDA facility and screened at 90-100 ft BGL (in the intermediate aquifer zone), with concentrations of 2.6-5.1 µg/L.

The vertical distribution of carbon tetrachloride in groundwater indicates that the highest concentrations are present in the intermediate zone, at wells MW10S (49-76 µg/L), MW12M (25-28 µg/L), and MW13S (14-16 µg/L). The deep-zone wells at these locations show lower concentrations (4.8-5.3 µ/L at MW10D, a trace [estimated at 0.7 µg/L] at MW12D, and 5.9-6.2 µg/L at MW13D). Figures 4.5 and 4.6 illustrate the interpreted contaminant distributions in the intermediate and deep zones, respectively, in March 2009. The shallow-zone wells — MW11S (sampled previously) and MW12S (sampled for the first time in June 2009) — continue to show no detectable concentrations of carbon tetrachloride (Table 4.3 and Figure 4.3).

In keeping with the groundwater level relationships outlined in Section 4.1, the above observations suggest that groundwater and carbon tetrachloride might be relatively less mobile in the (shaly) intermediate-zone lithologies than in the deeper limestones. Both vertical and horizontal hydraulic gradients are expected to drive contaminant migration in the shaly materials, while horizontal groundwater flow (and contaminant migration) might predominate in the deeper limestones. Because of the inferred higher permeability in the deeper limestones, the carbon tetrachloride in this zone might be more effectively mixed and diluted by groundwater movement in response to the oscillatory hydraulic gradients imparted by pumping of the public wells, while the movement of groundwater and hence carbon tetrachloride in the intermediate-zone lithologies is more restricted.

TABLE 4.1 Hand-measured water levels at Barnes, October 2008-May 2009.

		Water Level on Date Indicated									
	Reference	10/22-24/08		11/19/08		2/11/09		3/4-5/09		5/21/09	
Well	Elevation (ft AMSL)	ft TOC[a]	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	–	NM[b]	–	–	–	–	–
MW11S	1336.58	22.50	1314.08	NM	–	NM	–	28.00	1308.58	–	–
MW12S	1327.46	Dry	–	Dry	–	NM	–	–	–	–	–
Intermediate aquifer zone											
MW10S	1331.33	72.00	1259.33	72.13	1259.20	75.13	1256.20	76.00	1255.33	74.56	1256.77
MW11M	1336.51	77.80	1258.71	77.40	1259.11	79.87	1256.64	80.30	1256.21	79.42	1257.09
MW12M	1327.46	69.72	1257.74	68.69	1258.77	71.46	1256.00	76.50	1250.96	70.97	1256.49
MW13S	1342.36	86.00	1256.36	85.02	1257.34	87.98	1254.38	88.75	1253.61	87.11	1255.25
MW17	1351.77	95.15	1256.62	94.81	1256.96	97.48	1254.29	98.10	1253.67	96.71	1255.06
Deep aquifer zone											
MW1D	1351.33	113.77	1237.56	113.62	1237.71	118.55	1232.78	119.90	1231.43	116.82	1234.51
MW2D	1348.85	113.55	1235.30	111.61	1237.24	116.34	1232.51	117.10	1231.75	114.59	1234.26
MW3D	1345.99	108.50	1237.49	108.20	1237.79	113.05	1232.94	116.10	1229.89	111.28	1234.71
MW4D	1326.32	89.90	1236.42	90.72	1235.60	94.34	1231.98	94.75	1231.57	–	–
MW5	1327.20	91.40	1235.80	NM	–	NM	–	96.90	1230.30	–	–
MW6S	1323.13	84.60	1238.53	NM	–	NM	–	87.00	1236.13	–	–
MW6D	1323.15	87.15	1236.00	NM	–	NM	–	93.00	1230.15	–	–
MW7	1329.91	94.90	1235.01	96.67	1233.24	98.19	1231.72	99.80	1230.11	96.50	1233.41
MW8	1330.06	93.40	1236.66	NM	–	NM	–	98.60	1231.46	–	–
MW9	1321.86	86.60	1235.26	86.19	1235.67	89.91	1231.95	90.40	1231.46	88.16	1233.70
MW10D	1331.33	95.00	1236.33	NM	–	113.69	1217.64	101.30	1230.03	–	–
MW11D	1336.53	101.03	1235.50	NM	–	NM	–	105.03	1231.50	–	–
MW12D	1327.52	91.12	1236.40	NM	–	NM	–	96.80	1230.72	–	–
MW13D	1342.37	105.30	1237.07	NM	–	NM	–	110.58	1231.79	–	–
MW14S	1332.69	96.20	1236.49	NM	–	NM	–	101.30	1231.39	–	–
MW14D	1332.74	96.10	1236.64	96.18	1236.56	100.57	1232.17	103.20	1229.54	98.89	1233.85

TABLE 4.1 (Cont.)

Well	Reference Elevation (ft AMSL)	Water Level on Date Indicated									
		10/22-24/08		11/19/08		2/11/09		3/4-5/09		5/21/09	
		ft TOC[a]	ft AMSL	ft TOC[a]	ft AMSL	ft TOC[a]	ft AMSL	ft TOC[a]	ft AMSL	ft TOC[a]	ft AMSL
Deep aquifer zone (cont.)											
MW15S	1309.34	73.20	1236.14	NM	–	NM	–	78.80	1230.54	–	–
MW15D	1309.29	67.60	1241.69	67.33	1241.96	72.49	1236.80	73.60	1235.69	68.31	1240.98
MW16S	1299.47	64.80	1234.67	NM	–	NM	–	69.60	1229.87	–	–
MW16D	1299.52	63.90	1235.62	64.31	1235.21	68.56	1230.96	69.00	1230.52	67.09	1232.43
Oentrich[c]	1336.93	NM	–	NM	–	NM	–	NM	–	NM	–

[a] TOC, top of casing.

[b] NM, not measured.

[c] 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.

TABLE 4.2 Elevation ranges measured for the three aquifer zones, June 2007-July 2009.

	Elevation of Aquifer Zone (ft AMSL)		
Date	Shallow	Intermediate	Deep
June 2009	1,274-1,310	1,255-1,258	1,232-1,241
March 2009	1,308	1,251-1,256	1,229-1,236
November 2008	–	1,257-1,259	1,233-1,242
October 2008	1,314	1,256-1,259	1,235-1,242
July 2008	1,312	1,255-1,258	1,229-1,239
March 2008	1,309	1,250-1,254	1,223-1,229
November 2007	1,307	1,249-1,254	1,220-1,239
June 2007	1,276-1,314	1,247-1,254	1,221-1,228

TABLE 4.3 Analytical results from the AGEM Laboratory for volatile organic compounds in groundwater samples collected at Barnes, July 2006 to June 2009.

Location	Depth (ft BGL)	Sample	Sample Date	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Pumping Status of Public Wells
Previously existing 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	–	–	–	
		Not sampled (well dry)	10/22/08	–	–	–	
		Not sampled (well dry)	3/4/09	–	–	–	
		Not sampled (well dry)	6/17/09	–	–	–	
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	
		BAMW1D-W-27720	10/22/08	ND	ND	ND	
		BAMW1D-W-22703	3/4/09	ND	ND	ND	
		BAMW1D-W-28639	6/17/09	ND	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	
		BAMW2D-W-27721	10/22/08	ND	ND	ND	
		BAMW2D-W-22704	3/4/09	ND	ND	ND	
		BAMW2D-W-28640	6/18/09	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	

TABLE 4.3 (Cont.)

Location	Depth (ft BGL)	Sample	Sample Date	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Pumping Status of Public Wells
Previously existing monitoring wells (cont.)							
MW3D	133.02-152.73	BAMW3D-W-22629	3/7/08	ND	ND	ND	
		BAMW3D-W-22670	7/10/08	ND	ND	ND	
		BAMW3D-W-27722	10/22/08	ND	ND	ND	
		BAMW3D-W-22705	3/4/09	ND	ND	ND	
		BAMW3D-W-28641	6/17/09	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	
		BAMW4D-W-27723	10/23/08	7.6	ND	ND	
		BAMW4D-W-22706	3/5/09	7.2	0.3 J	ND	
		BAMW4D-W-28642	6/18/09	9.1	ND	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	
		BAMW5-W-27724	10/23/08	3.0	ND	ND	
		BAMW5-W-22707	3/5/09	3.2	ND	ND	
		BAMW5-W-28643	6/19/09	4.8	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	
		BAMW6S-W-27725	10/23/08	ND	ND	ND	
		BAMW6S-W-22708	3/5/09	ND	ND	ND	
		BAMW6S-W-28644	6/18/09	ND	ND	ND	

TABLE 4.3 (Cont.)

Location	Depth (ft BGL)	Sample	Sample Date	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Pumping Status of Public Wells
CCC/USDA wells installed during the 2006-2007 investigation (cont.)							
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	
		BAMW6D-W-27726	10/23/08	1.1	ND	ND	
		BAMW6D-W-22709	3/5/09	1.4	ND	ND	
		BAMW6D-W-28645	6/18/09	1.5	ND	ND	
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	
		BAMW7-W-27727	10/23/08	2.1	ND	ND	
		BAMW7-W-22710	3/5/09	1.4	ND	ND	
		BAMW7-W-28646	6/19/09	1.4	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	
		BAMW8-W-27728	10/23/08	24	1.0	ND	
		BAMW8-W-22711	3/5/09	20	1.3	ND	
		BAMW8-W-28647	6/19/09	26	1.7	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	
		BAMW9-W-27729	10/24/08	2.2	0.2 J	ND	
		BAMW9-W-22712	3/5/09	2.3	ND	ND	
		BAMW9-W-28648	6/17/09	1.1	ND	ND	

TABLE 4.3 (Cont.)

Location	Depth (ft BGL)	Sample	Sample Date	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Pumping Status of Public Wells
CCC/USDA wells installed during the 2006-2007 investigation (cont.)							
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	2.0	ND	
		BAMW10S-W-22679	7/11/08	49	1.8	ND	
		BAMW10S-W-27730	10/23/08	68	2.3	ND	
		BAMW10S-W-22713	3/5/09	49	2.1	ND	
		BAMW10S-W-28649	6/19/09	76	2.5	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	
		BAMW10D-W-27731	10/23/08	4.4	0.6 J	ND	
		BAMW10D-W-22714	3/5/09	5.3	0.4 J	ND	
		BAMW10D-W-28650	6/19/09	4.8	0.6 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	
		BAMW11S-W-27732	10/23/08	ND	0.3 J	ND	
		BAMW11S-W-22715	3/4/09	ND	ND	ND	
		BAMW11S-W-28651	6/19/09	ND	ND	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	
		BAMW11M-W-27733	10/23/08	1.7	2.1	ND	
		BAMW11M-W-22716	3/4/09	0.6 J	1.2	ND	
		BAMW11M-W-28652	6/19/09	ND	1.1	ND	

TABLE 4.3 (Cont.)

Location	Depth (ft BGL)	Sample	Sample Date	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Pumping Status of Public Wells
CCC/USDA wells installed during the 2006-2007 investigation (cont.)							
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	
		BAMW11D-W-27734	10/23/08	0.9 J	0.2 J	ND	
		BAMW11D-W-22717	3/4/09	0.8 J	ND	ND	
		BAMW11D-W-28653	6/19/09	ND	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	–	–	–	
		Not sampled (well dry)	10/22/08	–	–	–	
		Not sampled (well dry)	3/4/09	–	–	–	
		BAMW12S-W-28654	6/19/09	ND	ND	ND	
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	
		BAMW12M-W-27736	10/22/08	18	4.5	ND	
		BAMW12M-W-22719	3/4/09	25	4.4	ND	
		BAMW12M-W-28655	6/19/09	28	4.9	ND	
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	
		BAMW12D-W-27737	10/22/08	0.9 J	ND	ND	
		BAMW12D-W-22757	3/4/09	0.7 J	ND	ND	
		BAMW12D-W-28656	6/19/09	ND	ND	ND	

TABLE 4.3 (Cont.)

Location	Depth (ft BGL)	Sample	Sample Date	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Pumping Status of Public Wells
CCC/USDA wells installed during the 2006-2007 investigation (cont.)							
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	
		BAMW13S-W-27738	10/22/08	20	1.6	ND	
		BAMW13S-W-22758	3/4/09	14	1.1	ND	
		BAMW13S-W-28657	6/18/09	16	1.1	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	
		BAMW13D-W-27739	10/22/08	6.6	0.6 J	ND	
		BAMW13D-W-22759	3/4/09	5.9	0.6 J	ND	
		BAMW13D-W-28658	6/18/09	6.2	ND	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	
		BAMW14S-W-27740	10/22/08	5.6	0.3 J	ND	
		BAMW14S-W-28620	3/4/09	5.6	0.4 J	ND	
		BAMW14S-W-28659	6/18/09	3.7	0.6 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	
		BAMW14D-W-27741	10/22/08	ND	ND	ND	
		BAMW14D-W-28621	3/5/09	0.6 J	ND	ND	
		BAMW14D-W-28660	6/18/09	ND	ND	ND	

TABLE 4.3 (Cont.)

Location	Depth (ft BGL)	Sample	Sample Date	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Pumping Status of Public Wells
CCC/USDA wells installed during the 2006-2007 investigation (cont.)							
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	
		BAMW15S-W-27742	10/23/08	1.9	ND	ND	
		BAMW15S-W-28622	3/5/09	2.5	ND	ND	
		BAMW15S-W-28661	6/17/09	3.2	0.5 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	
		BAMW15D-W-27743	10/24/08	ND	ND	ND	
		BAMW15D-W-28623	3/5/09	ND	ND	ND	
		BAMW15D-W-28662	6/17/09	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	
		BAMW16S-W-27744	10/23/08	0.9 J	ND	ND	
		BAMW16S-W-28624	3/5/09	1.4	ND	ND	
		BAMW16S-W-28663	6/18/09	1.6	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	
		BAMW16D-W-27745	10/23/08	ND	ND	ND	
		BAMW16D-W-28625	3/5/09	ND	ND	ND	
		BAMW16D-W-28664	6/18/09	ND	ND	ND	

TABLE 4.3 (Cont.)

Location	Depth (ft BGL)	Sample	Sample Date	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Pumping Status of Public Wells
CCC/USDA wells installed during the 2006-2007 investigation (cont.)							
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	
		BAMW17-W-27746	10/22/08	0.7 J	ND	ND	
		BAMW17-W-28626	3/4/09	1.0	ND	ND	
		BAMW17-W-28665	6/17/09	1.0	ND	ND	
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	
		BAOENTRICH-W-27747	10/23/08	0.9 J	ND	ND	
		BAOENTRICH-W-28627	3/5/09	1.1	ND	ND	
		BAOENTRICH-W-28666	6/18/09	0.9 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	Well has been pumping today.
		BAPW2-W-22578	4/5/07	ND	ND	ND	Sampled after letting run for 5-10 min.
		BAPW2-W-22620	11/20/07	ND	ND	ND	Well on at time of sampling.
		BAPWS2-W-22655	3/6/08	ND	ND	ND	Let water run from tap for 2-3 min, then sampled.
		BAPWS2-W-22696	7/11/08	0.8 J	ND	ND	Running for 30 min.

TABLE 4.3 (Cont.)

Location	Depth (ft BGL)	Sample	Sample Date	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Pumping Status of Public Wells
Public water supply wells (cont.)							
PWS2	155	BAPW2-W-27748	10/23/08	1.7	ND	ND	Well was pumping for 5 min.
		BAPWS2-W-28628	3/5/09	0.9 J	ND	ND	Well operating to fill water tower prior to sampling.
		BAPWS2-W-28667	6/18/09	1.0	ND	ND	Well pumping since 6 a.m. on June 18. Let run from tap for 5 min, then sampled.
PWS3	160	BAPWS3-W-22511	3/9/07	0.2 J	ND	ND	Well has been pumping today.
		BAPW3-W-22577	4/5/07	ND	ND	ND	Well has been pumping all day.
		BAPW3-W-22621	11/20/07	ND	ND	ND	Well on at time of sampling. Sample collected from tap in well house. Let water run from tap for 2-3 min, then sampled.
		BAPWS3-W-22656	3/6/08	ND	ND	ND	
		BAPWS3-W-22697	7/11/08	0.2 J	ND	ND	Running for 30 min.
		BAPW3-W-27749	10/23/08	ND	ND	ND	Well was pumping for 30 min.
		BAPWS3-W-28629	3/5/09	ND	ND	ND	Ran for 5 min.
		BAPWS3-W-28668	6/18/09	ND	ND	ND	Well was used on June 17. Let pump run for 10 min, then sampled.

[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.

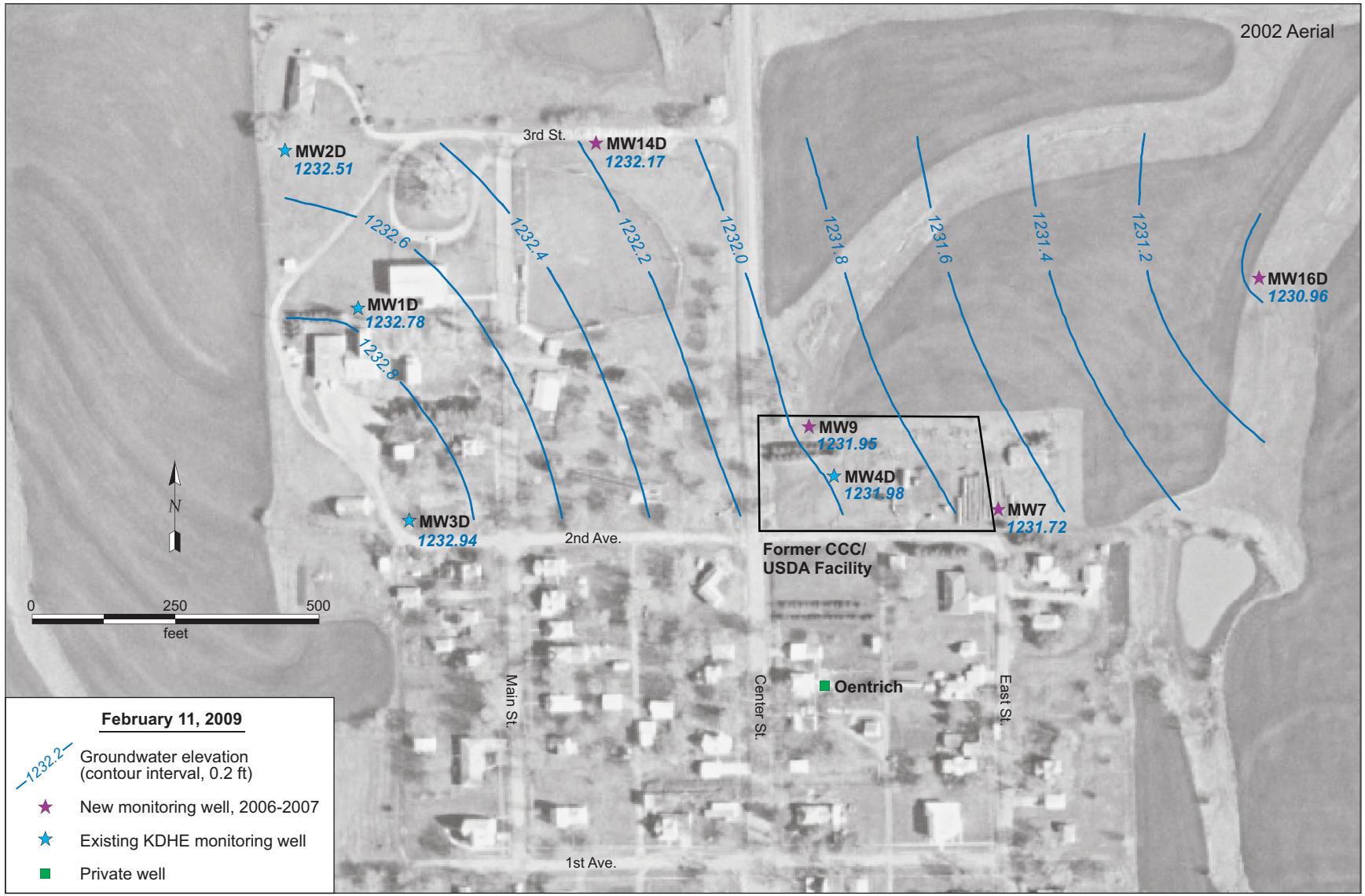


FIGURE 4.1a Potentiometric surface map depicting the groundwater flow direction in the deeper aquifer zone at Barnes under static (non-pumping) conditions on February 11, 2009. Source of photograph: NAPP (2002).

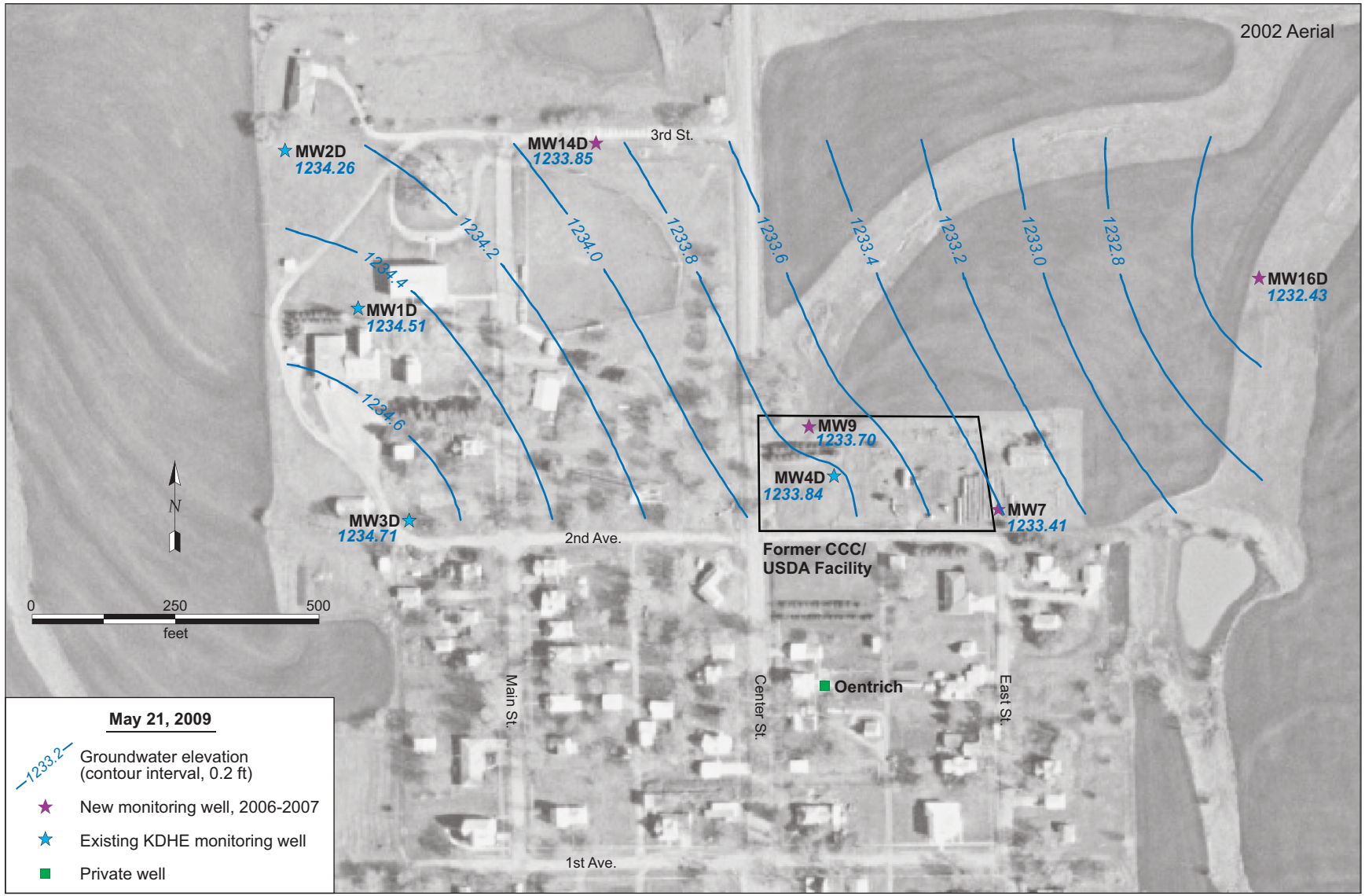
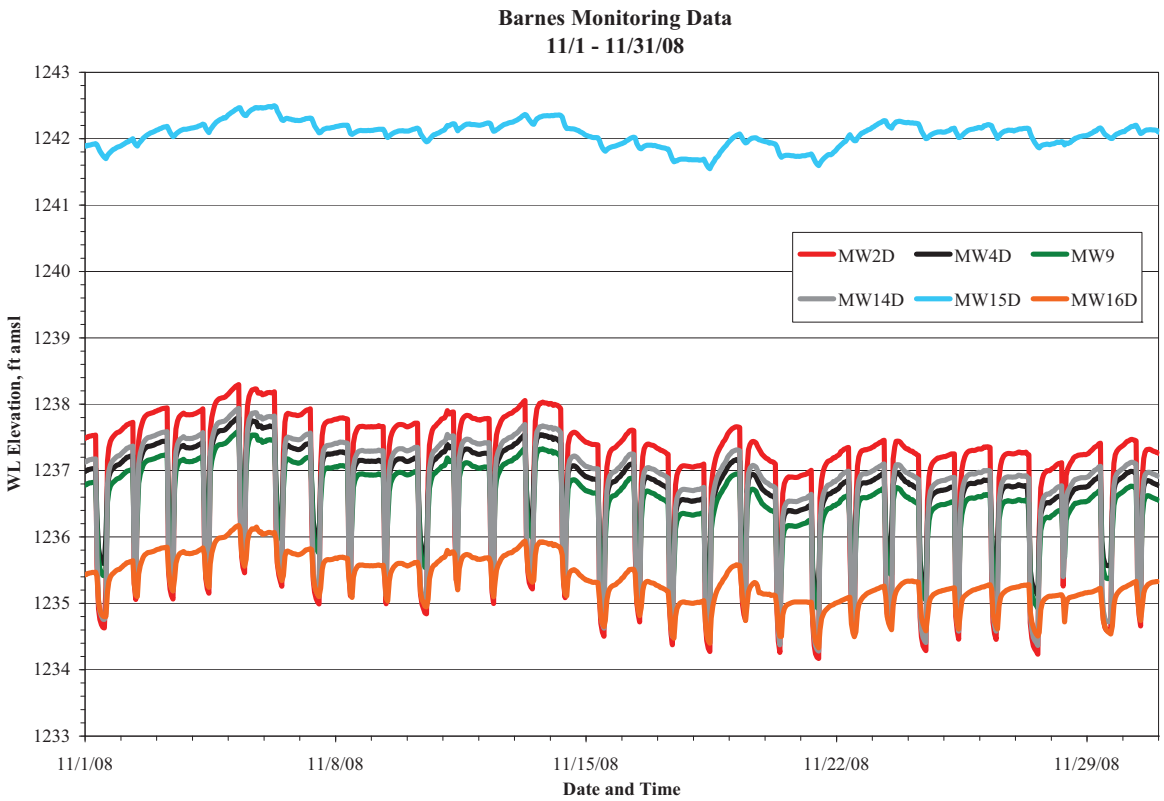


FIGURE 4.1b Potentiometric surface map depicting the groundwater flow direction in the deeper aquifer zone at Barnes under static (non--pumping) conditions on May 21, 2009. Source of photograph: NAPP (2002).



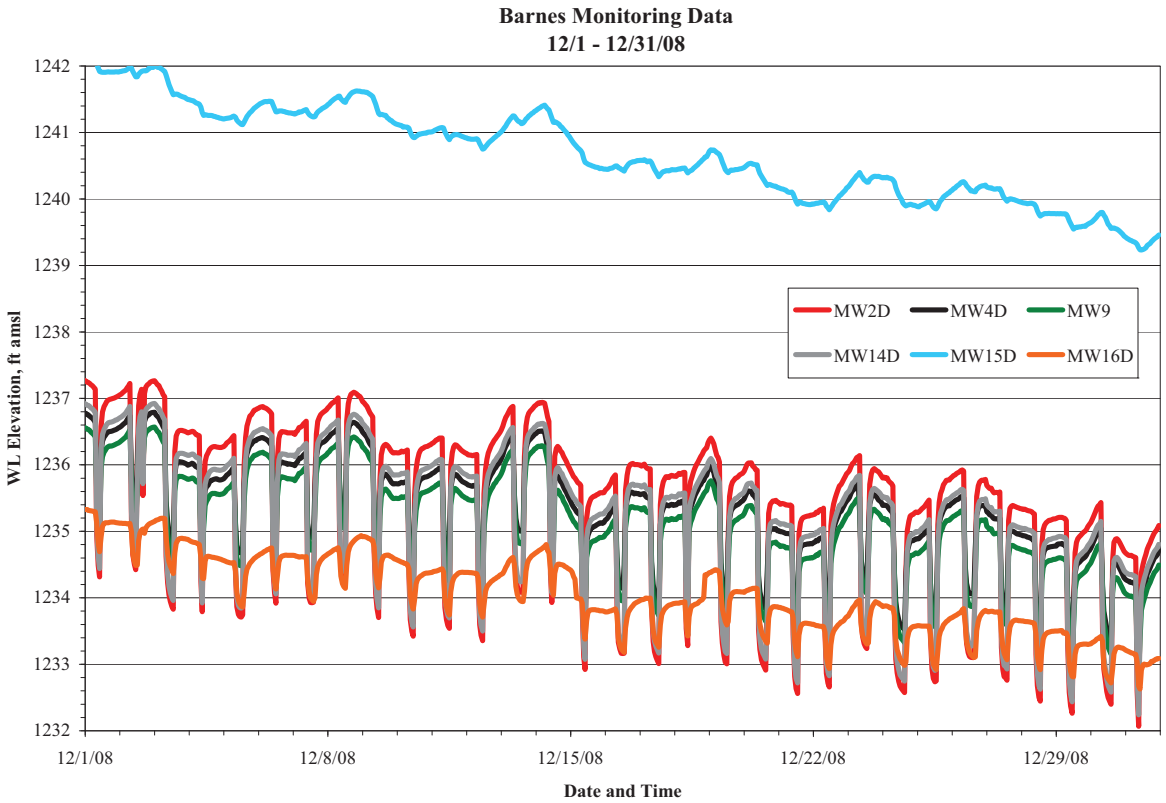
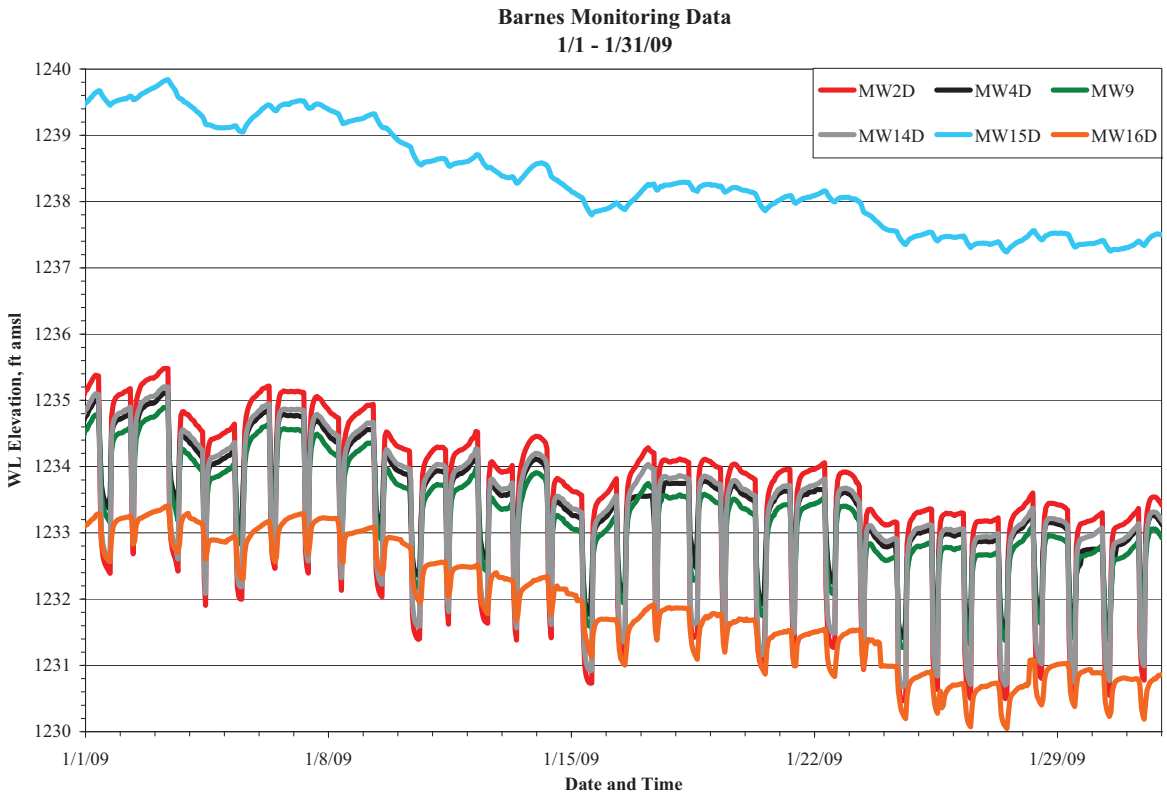


FIGURE 4.2a Hydrographs summarizing monthly results of long-term water level monitoring in the deep-zone wells at Barnes, November 2008 to May 2009.



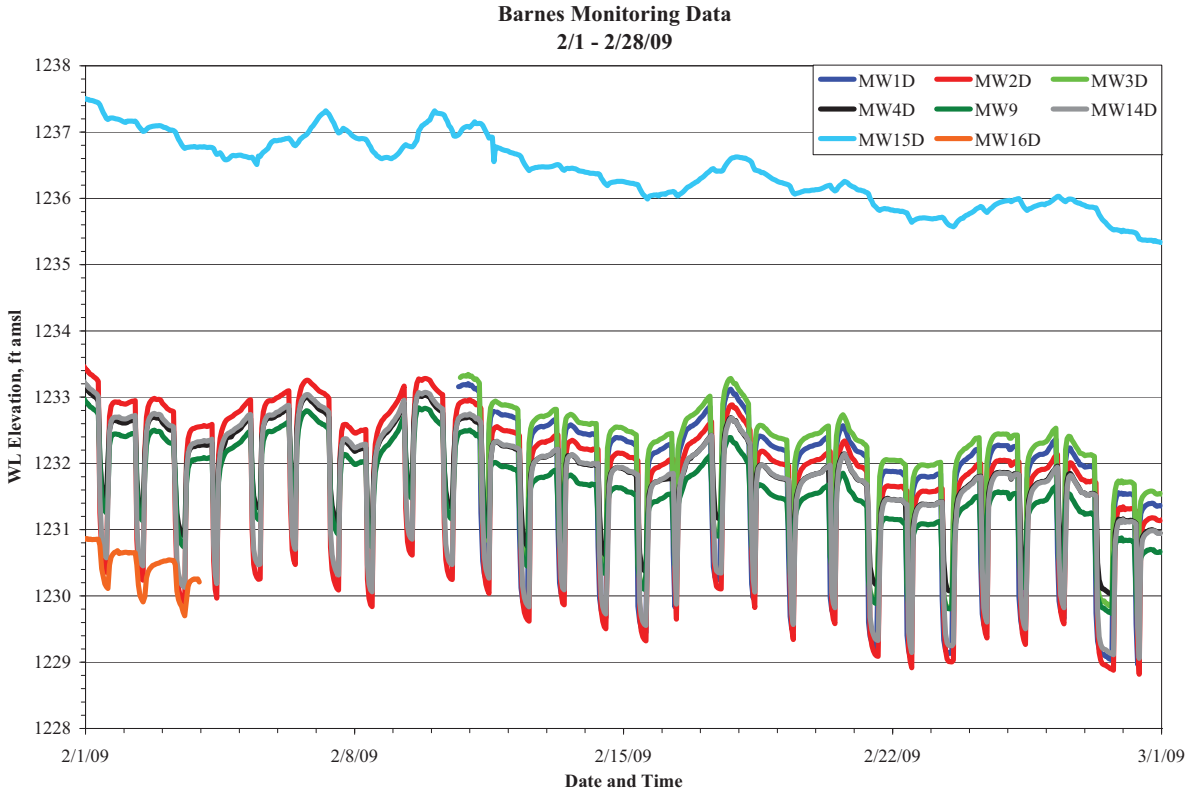
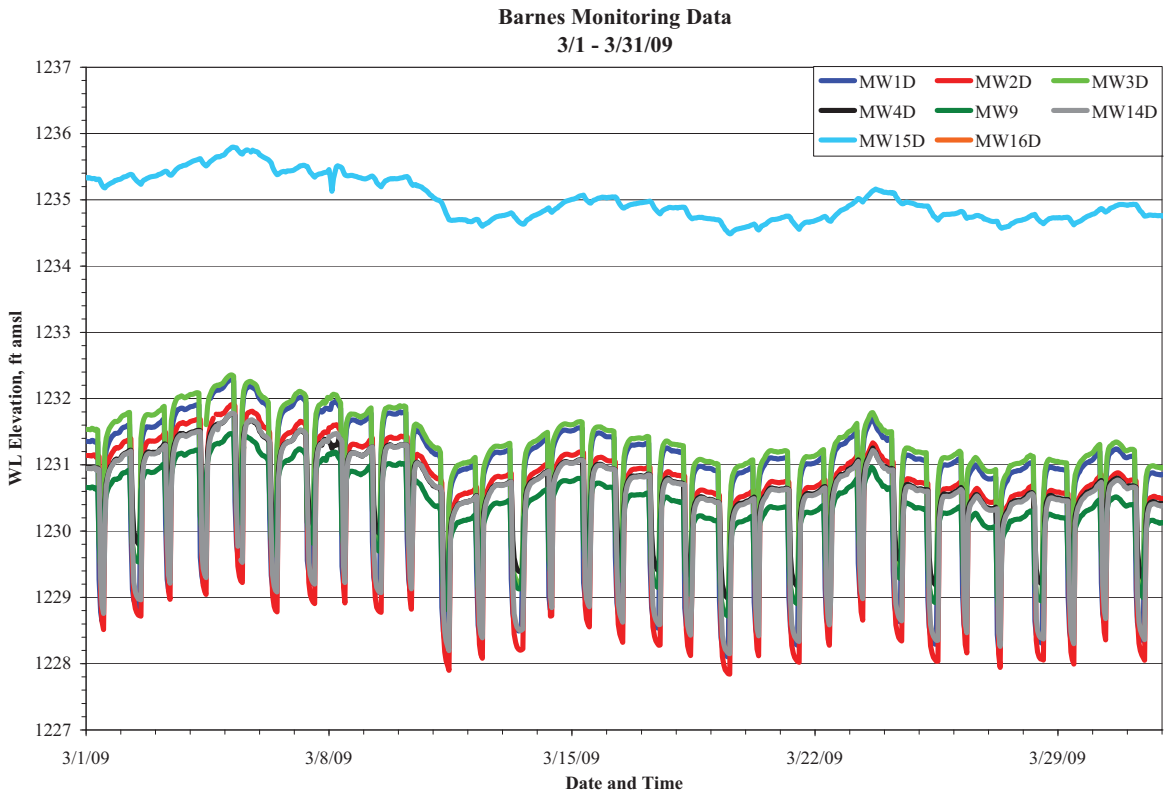


FIGURE 4.2a (Cont.)



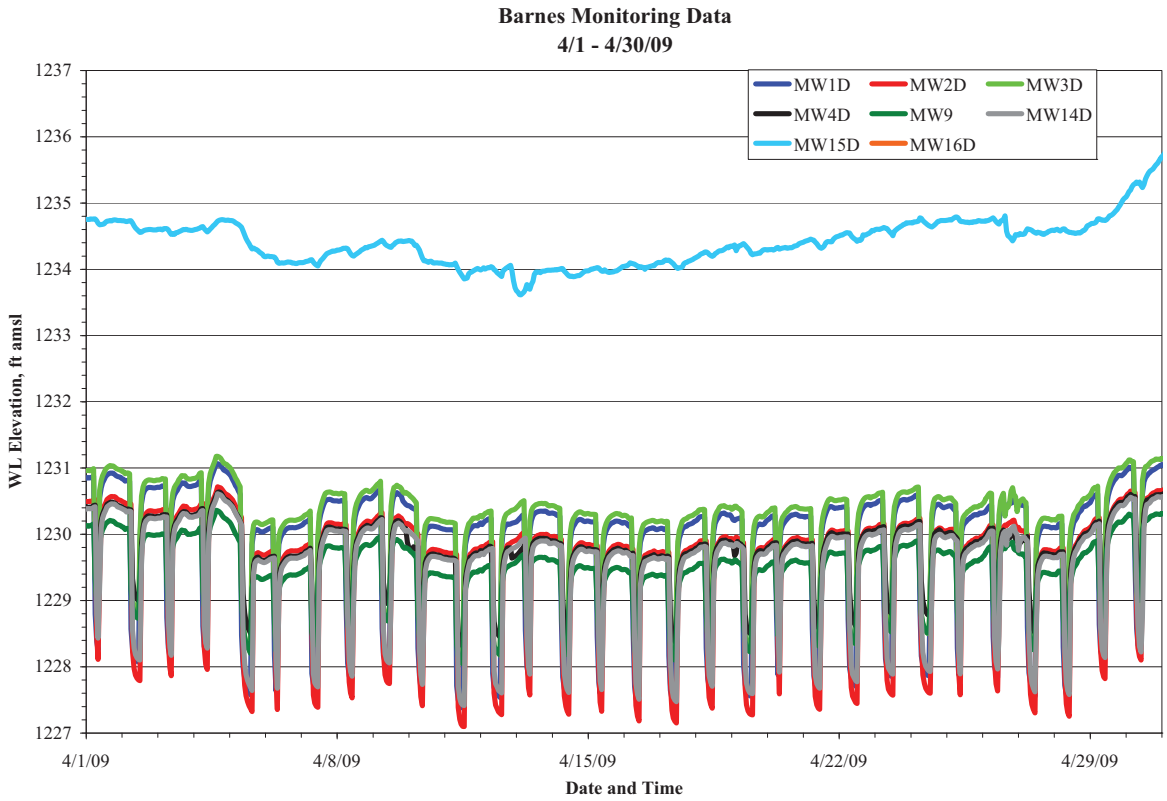


FIGURE 4.2a (Cont.)

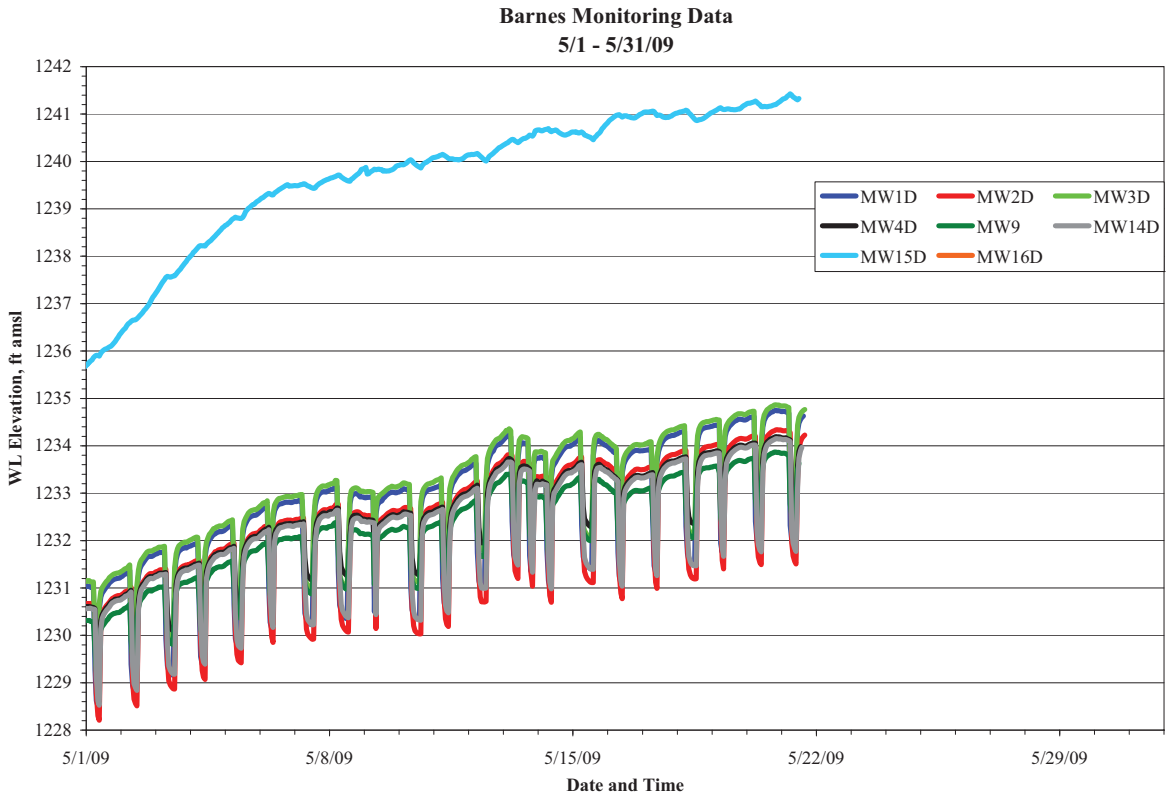
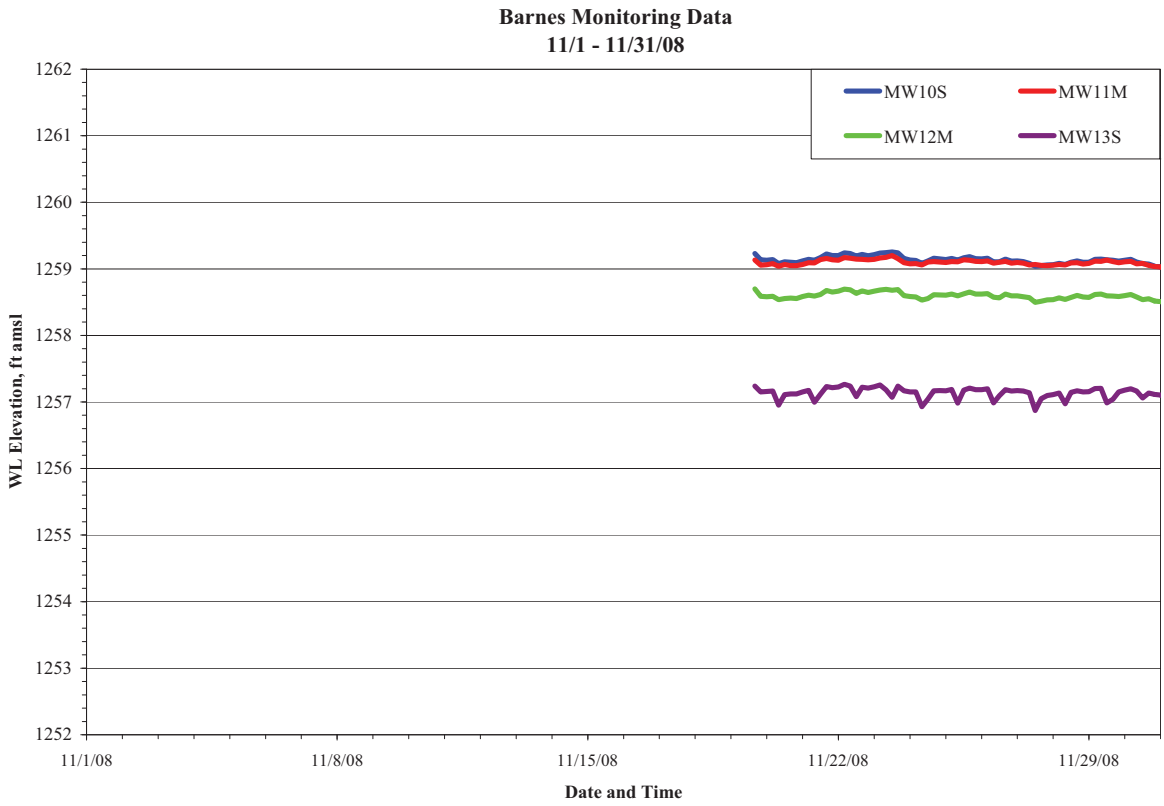


FIGURE 4.2a (Cont.)



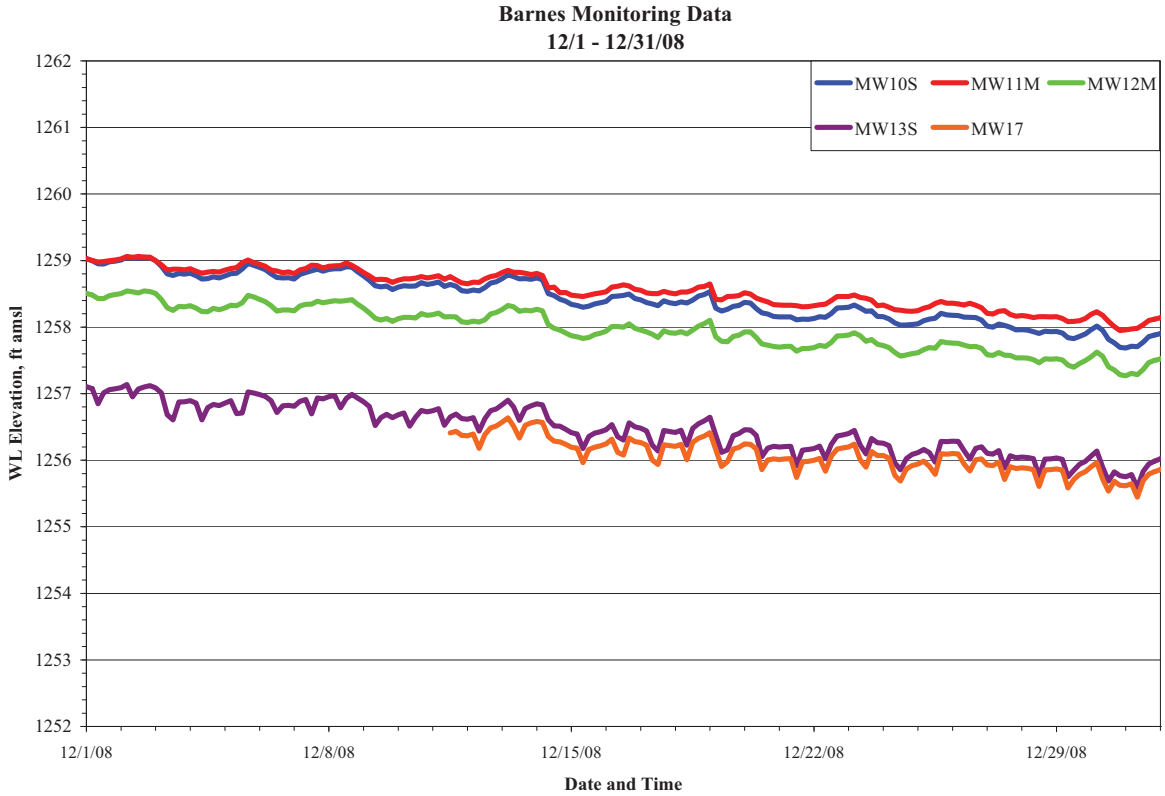
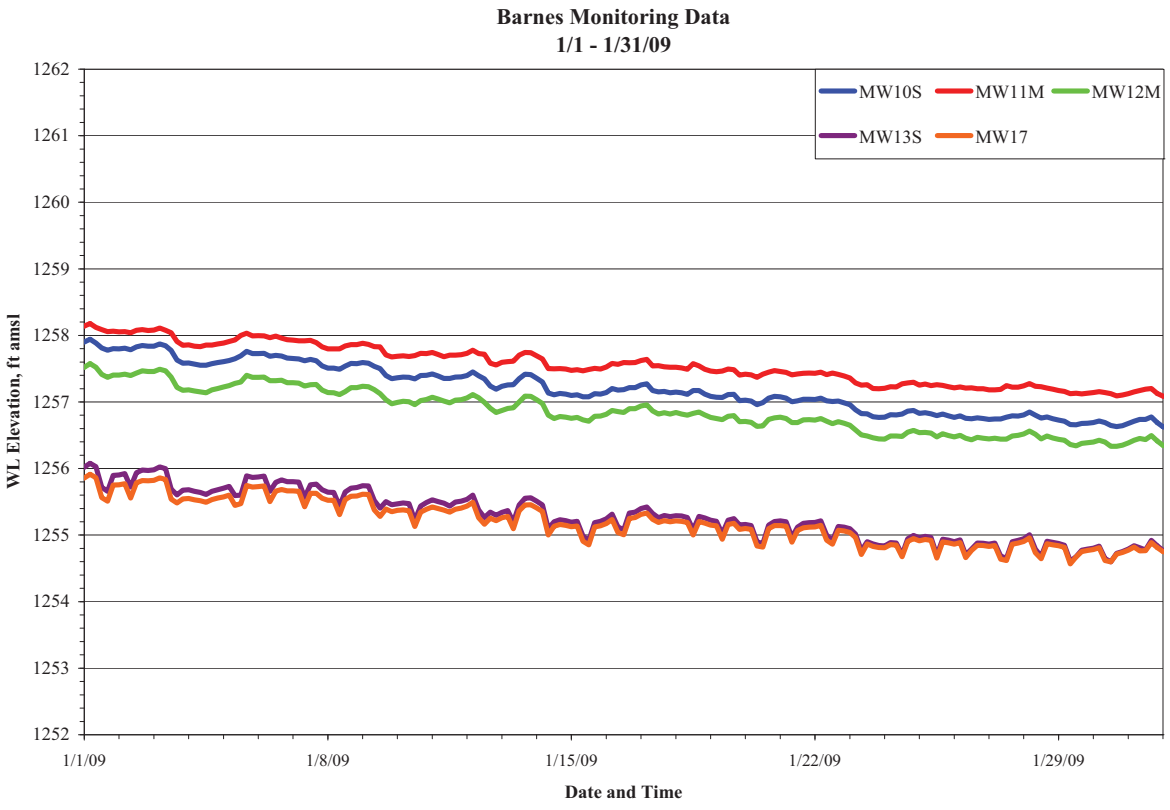


FIGURE 4.2b Hydrographs summarizing monthly results of long-term water level monitoring in the intermediate-zone wells at Barnes, November 2008 to May 2009.



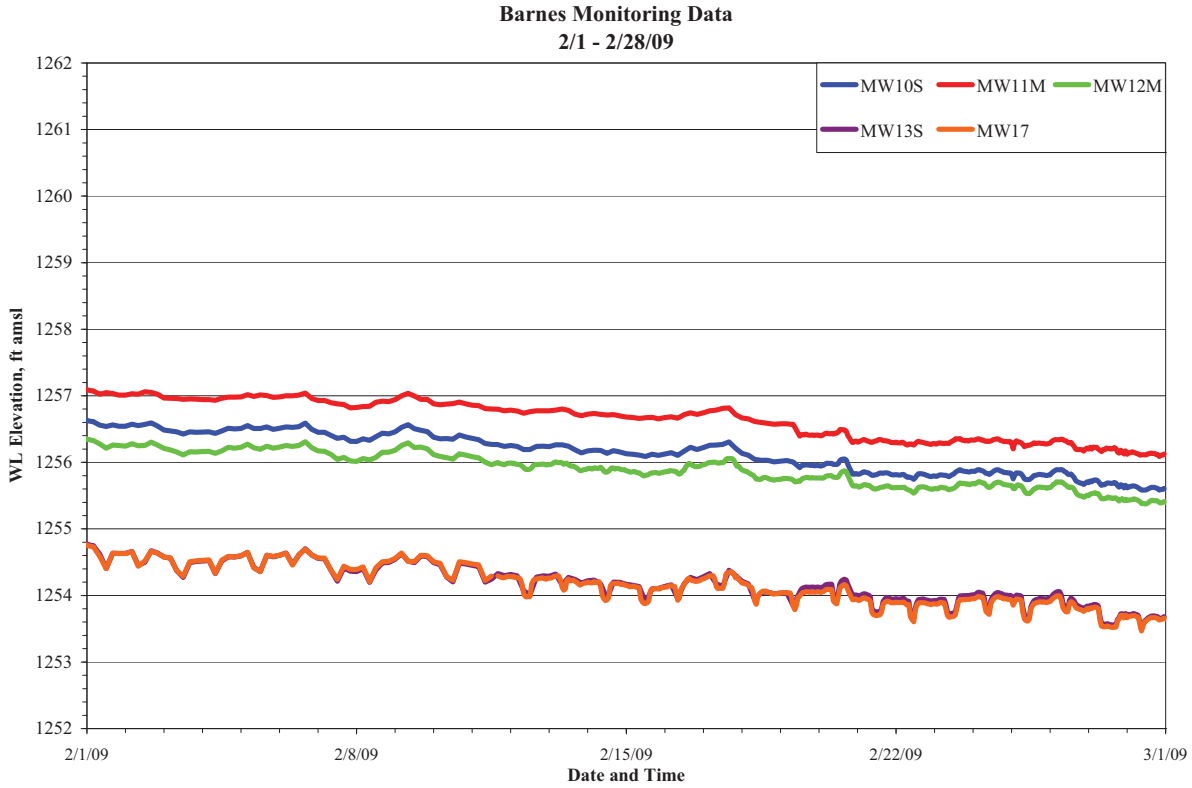
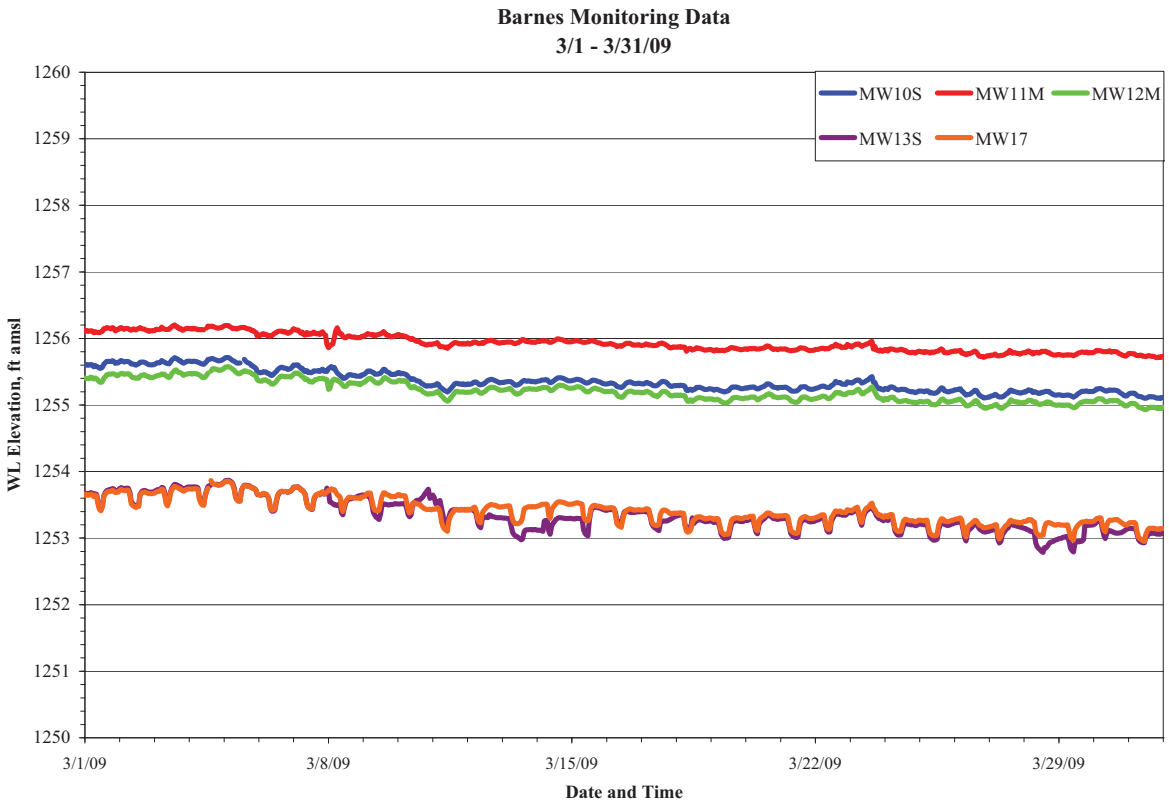


FIGURE 4.2b (Cont.)



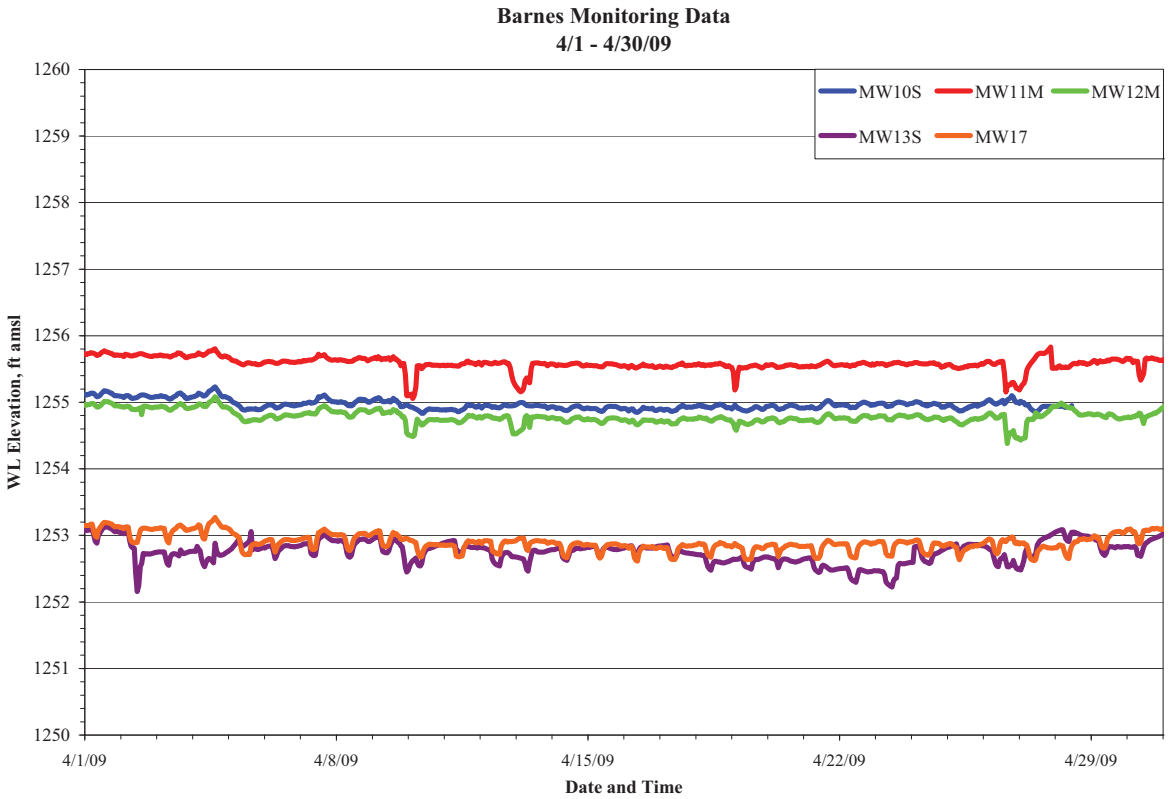


FIGURE 4.2b (Cont.)

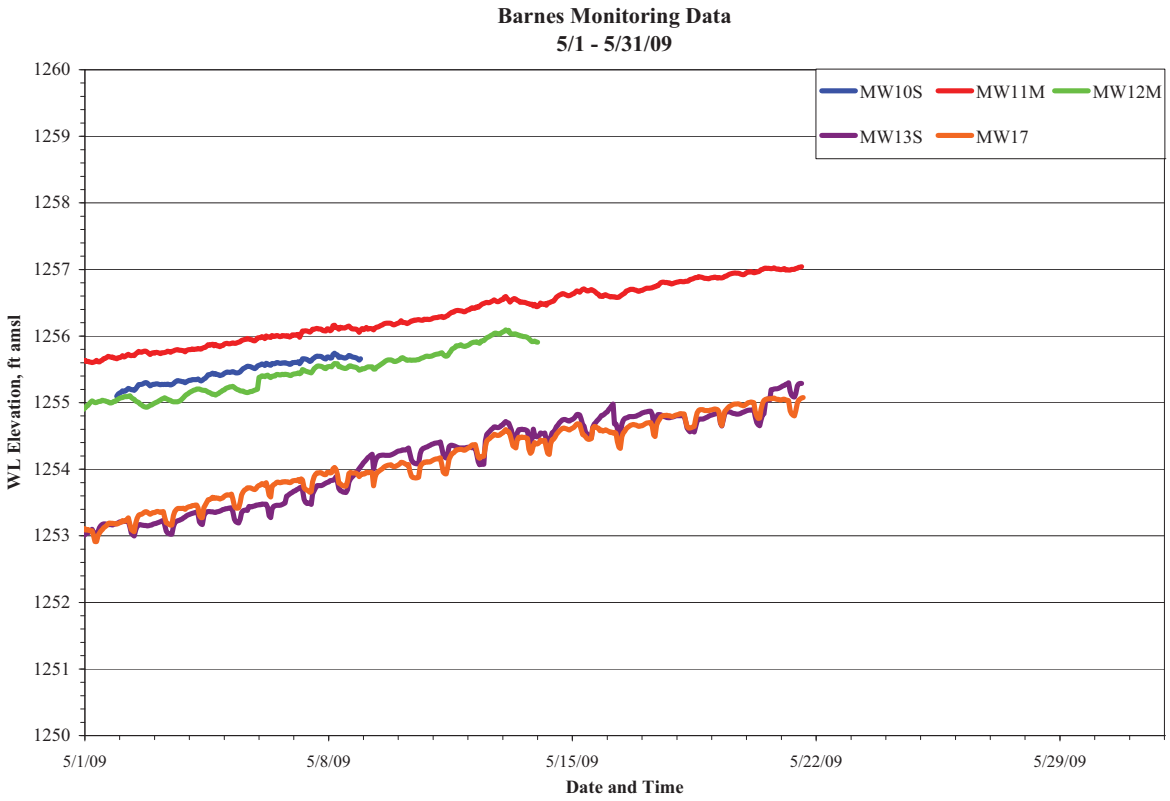


FIGURE 4.2b (Cont.)

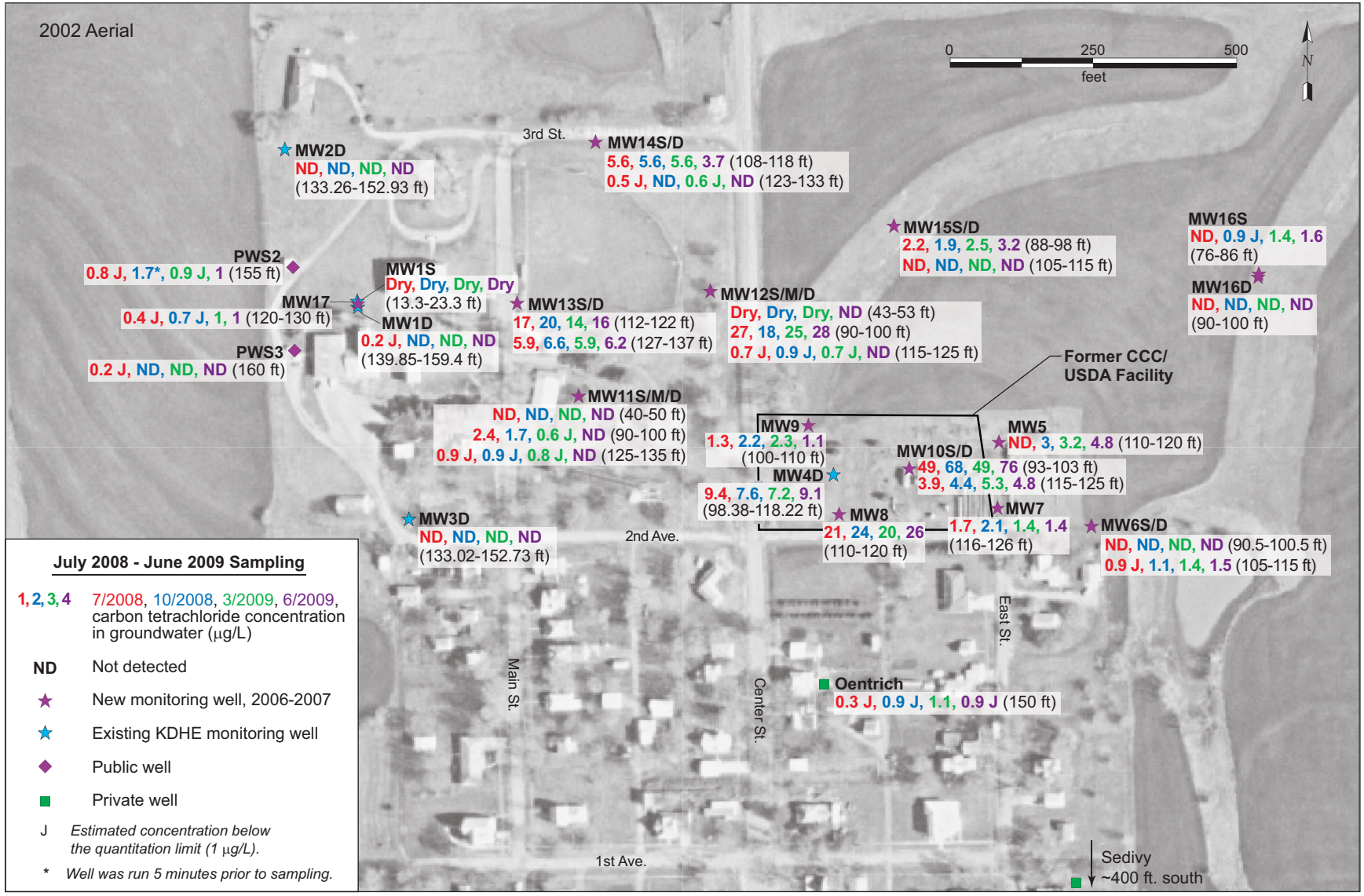


FIGURE 4.3 Analytical results for carbon tetrachloride in groundwater samples collected at Barnes in July 2008 to June 2009. Source of photograph: NAPP (2002).

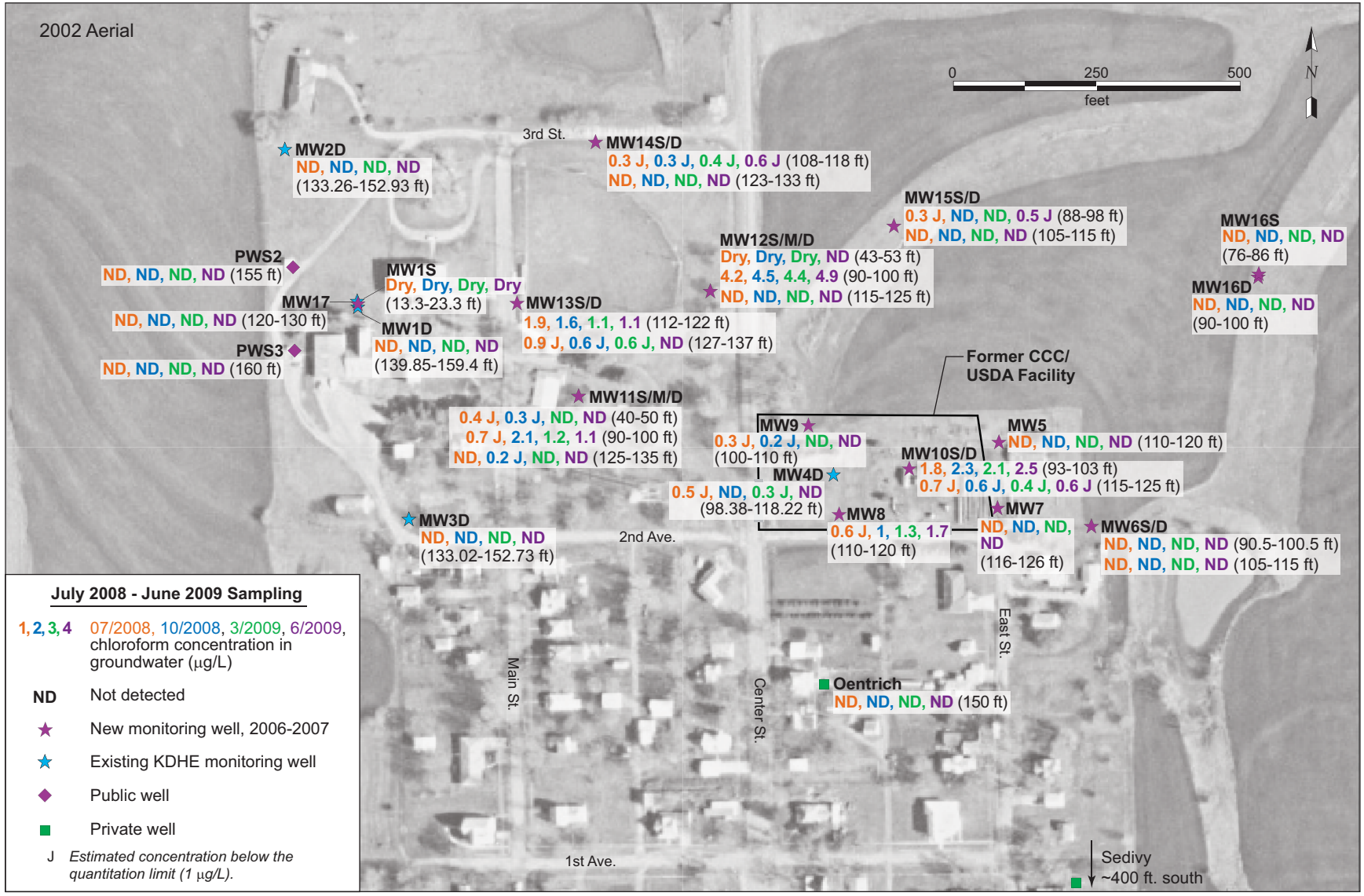


FIGURE 4.4 Analytical results for chloroform in groundwater samples collected at Barnes in July 2008 to June 2009. Source of photograph: NAPP (2002).

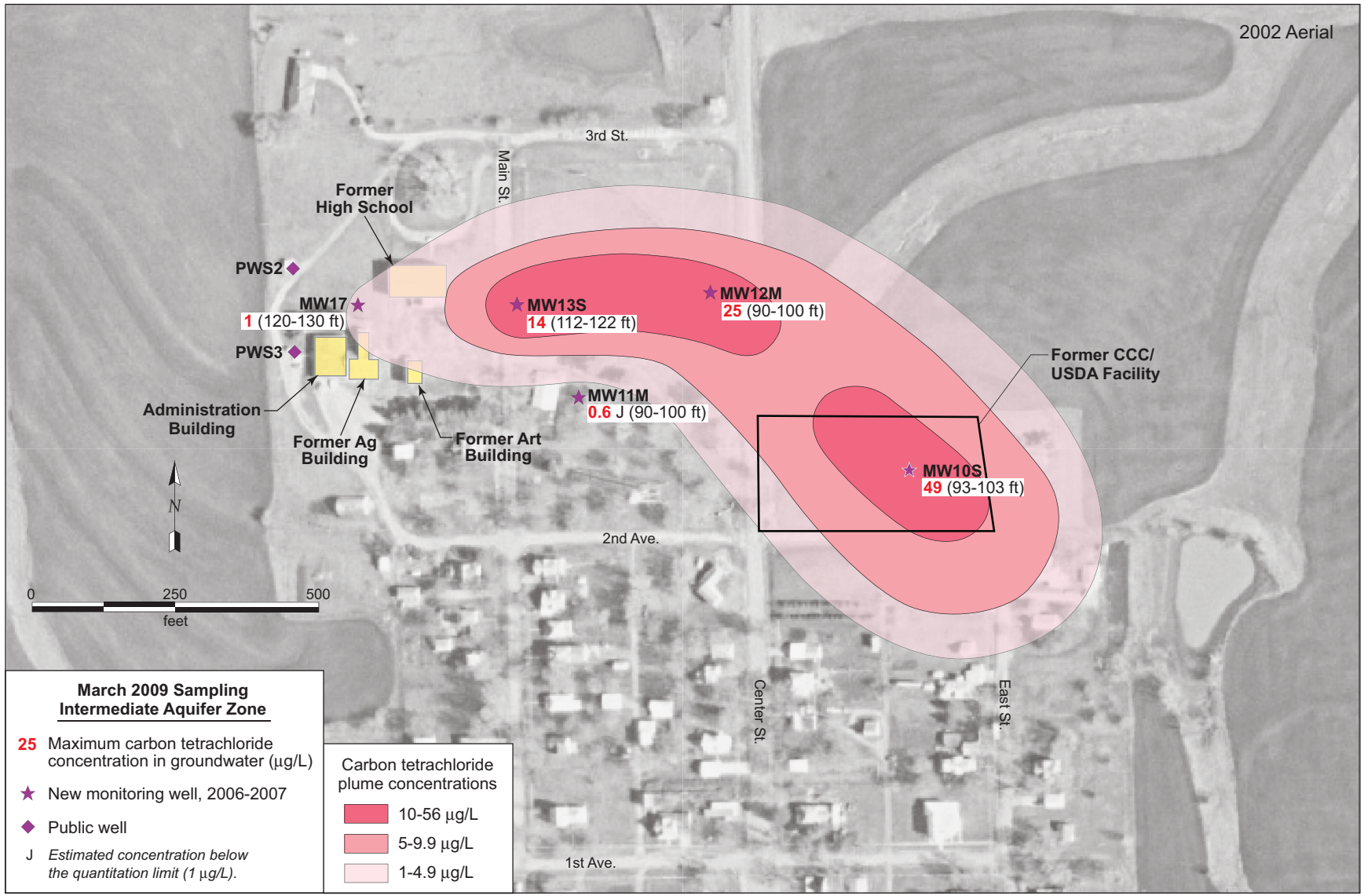


FIGURE 4.5 Interpreted carbon tetrachloride plume in March 2009 in wells screened in the intermediate aquifer zone (groundwater levels approximately 1,251-1,256 ft AMSL). Source of photograph: NAPP (2002).

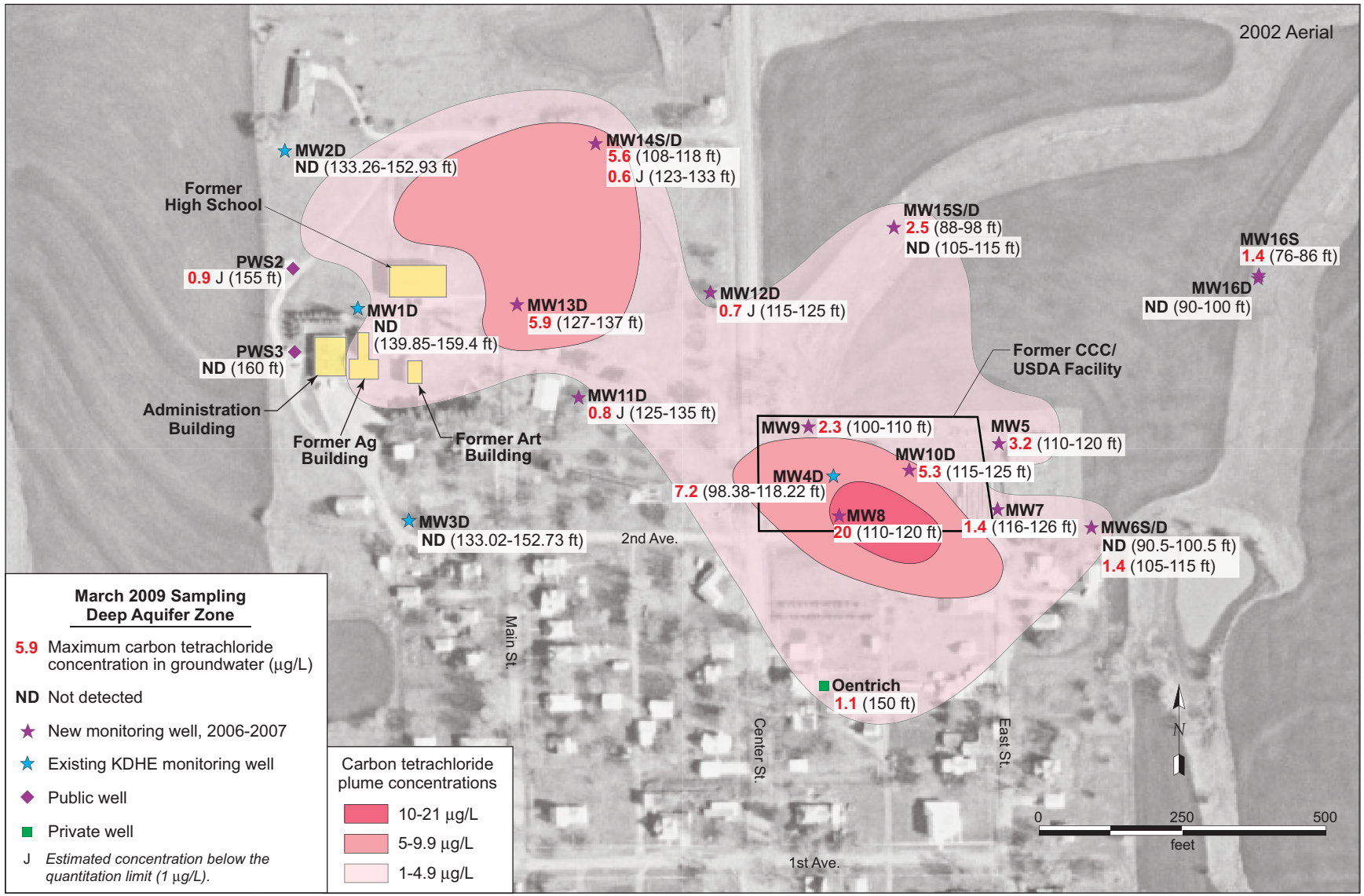


FIGURE 4.6 Interpreted carbon tetrachloride plume in March 2009 in wells screened in the deep aquifer zone (groundwater levels approximately 1,230-1,236 ft AMSL). Source of photograph: NAPP (2002).

5 Conclusions, Ongoing Tasks, and Recommendations

5.1 Conclusions

The findings of the March and June 2009 monitoring events 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 have demonstrated

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

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

- Evaluation of manual water level measurements and carbon tetrachloride concentrations continues to suggest that three vertically distinguishable aquifer zones are present at Barnes: shallow, intermediate, and deep. As of November 2008, all 5 monitoring wells screened in the intermediate aquifer zone and 9 of 20 wells completed in the deep aquifer zone are monitored with automatic water level recorders. Additional recorders will be added as warranted.

- The vertical distribution of the carbon tetrachloride in groundwater continues to indicate that the highest concentrations occur in the intermediate aquifer zone. Lower concentrations have been detected in the deep aquifer zone, and no carbon tetrachloride has been detected in the shallow zone.

- The conceptual model of the groundwater flow system at Barnes, postulated on the basis of the accumulated results, suggests that the observed vertical hydraulic gradients and higher carbon tetrachloride concentrations in the

intermediate zone might reflect generally lower permeability and hence less effective groundwater and contaminant migration in the intermediate zone than in the deep aquifer zone.

- Use of the low-flow sampling method during the five monitoring events from March 2008 to June 2009 indicated that the maximum concentration of carbon tetrachloride identified in sitewide monitoring has consistently been detected in intermediate-zone well MW10S, located in the eastern portion of the former CCC/USDA facility.

- Overall, the lateral distribution of carbon tetrachloride in groundwater in March and June 2009 is similar to the distribution during previous sampling events. The most significant change is the *decrease* in the concentration of carbon tetrachloride in public well PWS2 (from 1.7 µg/L in October 2008 to < 1 µg/L in March 2009 and to 1.0 µg/L in June 2009). No contamination was detected in public well PWS3.

5.2 Ongoing Tasks

Ongoing tasks related to Barnes are as follows:

- Automatic water level recorders installed in selected wells across the investigation area are continuing to provide critical data needed to evaluate the hydrologic regime in anticipation of a corrective action study.

- 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. This effort is expected to include estimation of the capture zone for the pumping public water supply wells. The exact value of the effort will be predicated on the accuracy and level of detail of data provided by the city of Barnes for use in the modeling.

- A conceptual contingent interim measure work plan is in place for the use of granular activated carbon system for protection of the public water supply wells (KDHE 2009).

5.3 Recommendations

- In monitoring since 1986 (23 years) by the City of Barnes, carbon tetrachloride concentrations in the public wells have never been at or above the MCL. Furthermore, the CCC/USDA-Argonne quarterly sitewide monitoring (6 events over 20 months from November 2007 to June 2009) has demonstrated no carbon tetrachloride concentrations at or above the MCL, in the public wells or in nearby monitoring wells. A reduction in the frequency of monitoring from quarterly to annual is therefore recommended. This recommendation is consistent with the following (directly quoted) provisions of 40 CFR 141.24 (f)(11):

> (11) If a contaminant listed in § 141.61(a) (2) through (21) is detected at a level exceeding 0.0005 mg/l in any sample, then:
>
> > (i) The system must monitor quarterly at each sampling point which resulted in a detection.
> >
> > (ii) The State may decrease the quarterly monitoring requirement specified in paragraph (f)(11)(i) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the State make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.
> >
> > (iii) If the State determines that the system is reliably and consistently below the MCL, the State may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter(s) which previously yielded the highest analytical result.

- The CCC/USDA will seek to coordinate its annual sampling of the public wells with the annual sampling schedule of the City of Barnes, so that the public wells are, in fact, sampled twice yearly at intervals of approximately six months.

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Appendix A:

Sampling Activities and Field Measurements at Barnes in March and June 2009

TABLE A.1 Sequence of sampling activities at Barnes in March and June 2009.[a]

Sample Date	Time	Sample	Type[b]	Location	Depth[c] (ft BGL)	Chain of Custody	Shipment Date	Sample Description
March 2009 sampling								
3/4/09	10:30	BAMW3D-W-22705	MW	MW3D	133.02–152.73	6160	3/5/09	Depth to water = 116.1 ft. Depth of 2-in. well = 152.73 ft. Sample collected by using low-flow bladder pump after purging of 6 L. Pump intake positioned at 142.88 ft.
3/4/09	10:31	BAMW3DDUP-W-28632	MW	MW3D	133.02-152.73	6160	3/5/09	Replicate of sample BAMW3D-W-22705.
3/4/09	10:49	BAMW11S-W-22715	MW	MW11S	40–50	6157	3/5/09	Depth to water = 28 ft. Depth of 1 in. well = 50 ft. Sample collected by using low-flow bladder pump after purging of 4.5 L. Pump intake positioned at 45 ft.
3/4/09	10:50	BAMW11SDUP-W-28630	MW	MW11S	40–50	6157	3/5/09	Replicate of sample BAMW11S-W-22715.
3/4/09	11:44	BAMW11M-W-22716	MW	MW11M	90–100	6157	3/5/09	Depth to water = 80.3 ft. Depth of 2-in. well = 100 ft. Sample collected by using low-flow bladder pump after purging of 5.25 L. Pump intake positioned at 95 ft.
3/4/09	12:56	BAMW11D-W-22717	MW	MW11D	125–135	6157	3/5/09	Depth to water = 105.03 ft. Depth of 2-in. well = 135 ft. Sample collected by using low-flow bladder pump after purging of 7.5 L. Pump intake positioned at 130 ft.
3/4/09	13:05	BAMW1S-dry-Mar09	MW	MW1S	13.3–23.3	–	–	Well was dry.
3/4/09	13:18	BAMW1D-W-22703	MW	MW1D	139.85–159.4	6160	3/5/09	Depth to water = 119.9 ft. Depth of 2-in. well = 159.4 ft. Sample collected by using low-flow bladder pump after purging of 8 L. Pump intake positioned at 149.63 ft. Aliquots for verification analysis by TestAmerica collected.
3/4/09	14:08	BAMW12M-W-22719	MW	MW12M	90–100	6157	3/5/09	Depth to water = 76.5 ft. Depth of 2-in. well = 99 ft. Sample collected by using low-flow bladder pump after purging of 3.75 L. Pump intake positioned at 95 ft.
3/4/09	14:56	BAMW17-W-28626	MW	MW17	120–130	6160	3/5/09	Depth to water = 98.1 ft. Depth of 2-in. well = 130 ft. Sample collected by using low-flow bladder pump after purging of 6.5 L. Pump intake positioned at 125 ft.

TABLE A.1 (Cont.)

Sample Date	Time	Sample	Type[b]	Location	Depth[c] (ft BGL)	Chain of Custody	Shipment Date	Sample Description
March 2009 sampling (cont.)								
3/4/09	15:00	BAMW12D-W-22757	MW	MW12D	115–125	6157	3/5/09	Depth to water = 96.8 ft. Depth of 2-in. well = 125 ft. Sample collected by using low-flow bladder pump after purging of 5.5 L. Pump intake positioned at 120 ft.
3/4/09	16:42	BAMW2D-W-22704	MW	MW2D	133.26–152.93	6160	3/5/09	Depth to water = 117.1 ft. Depth of 2-in. well = 152.93 ft. Sample collected by using low-flow bladder pump after purging of 6.2 L. Pump intake positioned at 143.10 ft.
3/4/09	16:50	BAQCIR-W-28634	RI	QC	–	6160	3/5/09	Rinsate of decontaminated sampling line after collection of sample BAMW2D-W-22704.
3/4/09	16:55	BAMW13D-W-22759	MW	MW13D	127–137	6157	3/5/09	Depth to water = 110.58 ft. Depth of 2-in. well = 137 ft. Sample collected by using low-flow bladder pump after purging of 3.5 L. Pump intake positioned at 132 ft.
3/4/09	17:43	BAMW13S-W-22758	MW	MW13S	112–122	6157	3/5/09	Depth to water = 88.75 ft. Depth of 2-in. well = 122 ft. Sample collected by using low-flow bladder pump after purging of 5.5 L. Pump intake positioned at 117 ft.
3/4/09	17:50	BAMW12S-dry-Mar09	MW	MW12S	43–53	–	–	Well was dry.
3/4/09	18:14	BAMW14S-W-28620	MW	MW14S	108–118	6160	3/5/09	Depth to water = 101.3 ft. Depth of 2-in. well = 118 ft. Sample collected by using low-flow bladder pump after purging of 5.2 L. Pump intake positioned at 113 ft.
3/5/09	7:40	BAPWS3-W-28629	PW	PWS3	160	6160	3/5/09	Sampled from tap in pump house after purging for 5 min.
3/5/09	7:50	BAPWS2-W-28628	PW	PWS2	155	6160	3/5/09	Sampled from tap in pump house after purging for 5 min. PWS2 had been operating earlier to fill the city water tower.
3/5/09	8:05	BAOENTRICH-W-28627	DW	Oentrich	150	6160	3/5/09	Sampled from hydrant in backyard. Let run for 5 min, then sampled.

TABLE A.1 (Cont.)

Sample Date	Time	Sample	Type[b]	Location	Depth[c] (ft BGL)	Chain of Custody	Shipment Date	Sample Description
March 2009 sampling (cont.)								
3/5/09	9:12	BAMW14D-W-28621	MW	MW14D	123–133	6160	3/5/09	Depth to water = 103.2 ft. Depth of 2-in. well = 133 ft. Sample collected by using low-flow bladder pump after purging of 5.3 L. Pump intake positioned at 128 ft.
3/5/09	9:49	BAMW6D-W-22709	MW	MW6D	105–115	6157	3/5/09	Depth to water = 93 ft. Depth of 2-in. well = 115 ft. Sample collected by using low-flow bladder pump after purging of 5 L. Pump intake positioned at 110 ft.
3/5/09	10:05	BAMW6S-W-22708	MW	MW6S	90.5–100.5	6157	3/5/09	Depth to water = 87 ft. Depth of 2-in. well = 100.5 ft. Sample collected by using low-flow bladder pump after purging of 5 L. Pump intake positioned at 95.5 ft.
3/5/09	10:54	BAMW7-W-22710	MW	MW7	116–126	6160	3/5/09	Depth to water = 99.8 ft. Depth of 2-in. well = 126 ft. Sample collected by using low-flow bladder pump after purging of 6.9 L. Pump intake positioned at 121 ft.
3/5/09	11:54	BAMW10D-W-22714	MW	MW10D	115–125	6157	3/5/09	Depth to water = 101.3 ft. Depth of 2-in. well = 125 ft. Sample collected by using low-flow bladder pump after purging of 4.5 L. Pump intake positioned at 120 ft. Aliquots collected for verification analysis by TestAmerica.
3/5/09	12:08	BAMW5-W-22707	MW	MW5	110–120	6160	3/5/09	Depth to water = 96.9 ft. Depth of 2-in. well = 120 ft. Sample collected by using low-flow bladder pump after purging of 6 L. Pump intake positioned at 115 ft.
3/5/09	12:47	BAMW10S-W-22713	MW	MW10S	93–103	6157	3/5/09	Depth to water = 76 ft. Depth of 2-in. well = 103 ft. Sample collected by using low-flow bladder pump after purging of 5.5 L. Pump intake positioned at 98 ft.
3/5/09	12:48	BAMW10SDUP-W-28631	MW	MW10D	115–125	6157	3/5/09	Replicate of sample BAMW10S-W-22713.
3/5/09	13:26	BAMW8-W-22711	MW	MW8	110–120	6164	3/6/09	Depth to water = 98.6 ft. Depth of 2-in. well = 120 ft. Sample collected by using low-flow bladder pump after purging of 5.2 L. Pump intake positioned at 115 ft.

TABLE A.1 (Cont.)

Sample Date	Time	Sample	Type[b]	Location	Depth[c] (ft BGL)	Chain of Custody	Shipment Date	Sample Description
March 2009 sampling (cont.)								
3/5/09	14:34	BAMW9-W-22712	MW	MW9	100–110	6164	3/6/09	Depth to water = 90.4 ft. Depth of 2-in. well = 110 ft. Sample collected by using low-flow bladder pump after purging of 4.5 L. Pump intake positioned at 105 ft.
3/5/09	14:35	BAMW9DUP-W-28638	MW	MW9	100–110	6164	3/6/09	Replicate of sample BAMW9-W-22712.
3/5/09	14:54	BAMW4D-W-22706	MW	MW4D	98.38–118.22	6164	3/6/09	Depth to water = 94.75 ft. Depth of 2-in. well = 118.22 ft. Sample collected by using low-flow bladder pump after purging of 5 L. Pump intake positioned at 108.30 ft.
3/5/09	16:07	BAMW16S-W-28624	MW	MW16S	76–86	6164	3/6/09	Depth to water = 69.6 ft. Depth of 2-in. well = 86 ft. Sample collected by using low-flow bladder pump after purging of 5 L. Pump intake positioned at 81 ft.
3/5/09	16:36	BAMW15D-W-28623	MW	MW15D	105–115	6164	3/6/09	Depth to water = 73.6 ft. Depth of 2-in. well = 115 ft. Sample collected by using low-flow bladder pump after purging of 5 L. Pump intake positioned at 110 ft.
3/5/09	16:50	BAMW15S-W-28622	MW	MW15S	88–98	6164	3/6/09	Depth to water = 78.8 ft. Depth of 2-in. well = 98 ft. Sample collected by using low-flow bladder pump after purging of 7 L. Pump intake positioned at 93 ft.
3/5/09	16:53	BAMW16D-W-28625	MW	MW16D	90–100	6164	3/6/09	Depth to water = 69 ft. Depth of 2-in. well = 100 ft. Sample collected by using low-flow bladder pump after purging of 4 L. Pump intake positioned at 95 ft.
3/5/09	17:00	BAQCTB-W-28637	TB	QC	–	6157	3/5/09	Trip blank sent to the AGEM Laboratory for organic analysis with water samples listed on chain-of-custody forms (COCs) 6157 and 6160, as well as to TestAmerica with verification samples listed on COC 4393.
3/6/09	17:55	BAQCTB-W-28635	TB	QC	–	6164	3/6/09	Trip blank sent to the AGEM Laboratory for organic analysis with water samples listed on COC 6164.

TABLE A.1 (Cont.)

Sample Date	Time	Sample	Type[b]	Location	Depth[c] (ft BGL)	Chain of Custody	Shipment Date	Sample Description
June 2009 sampling								
6/17/09	15:08	BAMW3D-W-28641	MW	MW3D	133.02-152.73	2526	6/18/09	Depth to water = 110.15 ft. Depth of 2-in. well = 152.73 ft. Sample collected by using a low-flow bladder pump after purging of of 7.8 L. Pump intake positioned at 142.88 ft.
6/17/09	16:34	BAMW1D-W-28639	MW	MW1D	139.85-159.4	2526	6/18/09	Depth to water = 115.6 ft. Depth of 2-in. well = 159.4 ft. Sample collected by using a low-flow bladder pump after purging of of 4 L. Pump intake positioned at 149.63 ft. Aliquots collected for verification analysis by TestAmerica.
6/17/09	16:40	BAMW1S-dry-Jun09	MW	MW1S	13.3-23.3	–	–	Well was dry.
6/17/09	17:18	BAMW15D-W-28662	MW	MW15D	105-115	2526	6/18/09	Depth to water = 67.74 ft. Depth of 2-in. well = 115 ft. Sample collected by using a low-flow bladder pump after purging of of 10 L. Pump intake positioned at 110 ft. Aliquots collected for verification analysis by TestAmerica.
6/17/09	18:16	BAMW15S-W-28661	MW	MW15S	88-98	2526	6/18/09	Depth to water = 75.92 ft. Depth of 2-in. well = 98 ft. Sample collected by using a low-flow bladder pump after purging of of 7 L. Pump intake positioned at 93 ft.
6/17/09	18:26	BAMW17-W-28665	MW	MW17	120-130	2526	6/18/09	Depth to water = 95.75 ft. Depth of 2-in. well = 130 ft. Sample collected by using a low-flow bladder pump after purging of of 10.5 L. Pump intake positioned at 125 ft.
6/17/09	18:28	BAMW17DUP-W-28669	MW	MW17	120-130	2526	6/18/09	Replicate of sample BAMW17-W-28665.
6/17/09	20:34	BAMW9-W-28648	MW	MW9	100-110	2526	6/18/09	Depth to water = 83.16 ft. Depth of 2-in. well = 110 ft. Sample collected by using a low-flow bladder pump after purging of of 7 L. Pump intake positioned at 105 ft.

TABLE A.1 (Cont.)

Sample Date	Time	Sample	Type[b]	Location	Depth[c] (ft BGL)	Chain of Custody	Shipment Date	Sample Description
June 2009 sampling (cont.)								
6/18/09	9:06	BAMW2D-W-28640	MW	MW2D	133.26-152.93	2527	6/18/09	Depth to water = 115.70 ft. Depth of 2-in. well = 152.93 ft. Sample collected by using a low-flow bladder pump after purging of of 7.5 L. Pump intake positioned at 143.10 ft. Aliquots collected for verification analysis by TestAmerica.
6/18/09	9:45	BAPWS2-W-28667	PW	PWS2	155	2527	6/18/09	Well had been pumping since 6 a.m. on June 18. Let run from tap for 5 min, then sampled.
6/18/09	9:58	BAPWS3-W-28668	PW	PWS3	160	2527	6/18/09	Well was used on June 17. Let pump run for 10 min, then sampled.
6/18/09	10:58	BAMW14S-W-28659	MW	MW14S	108-118	2527	6/18/09	Depth to water = 99.8 ft. Depth of 2-in. well = 118 ft. Sample collected by using a low-flow bladder pump after purging of of 11.4 L. Pump intake positioned at 113 ft.
6/18/09	11:02	BAOENTRICH-W-28666	DW	Oentrich	150	2527	6/18/09	Pumped 10 gal, then sampled.
6/18/09	11:04	BAQCIR-W-28672	RI	QC	–	2527	6/18/09	Rinsate of decontaminated sampling line after collection of sample BAMW14S-W-28659.
6/18/09	12:30	BAQCTB-W-28674	TB	QC	–	2527	6/18/09	Trip blank sent to the AGEM Laboratory for organic analyses with water samples listed on COC 2527.
6/18/09	13:12	BAMW6S-W-28644	MW	MW6S	90.5-100.5	2527	6/18/09	Depth to water = 86.05 ft. Depth of 2-in. well = 100.5 ft. Sample collected by using a low-flow bladder pump after purging of 12 L. Pump intake positioned at 95.50 ft. Aliquots collected for verification analysis by TestAmerica.
6/18/09	14:50	BAMW14D-W-28660	MW	MW14D	123-133	3075	6/20/09	Depth to water = 97.75 ft. Depth of 2-in. well = 118 ft. Sample collected by using a low-flow bladder pump after purging of 6 L. Pump intake positioned at 113 ft.

TABLE A.1 (Cont.)

Sample Date	Time	Sample	Type[b]	Location	Depth[c] (ft BGL)	Chain of Custody	Shipment Date	Sample Description
June 2009 sampling (cont.)								
6/18/09	16:54	BAMW6D-W-28645	MW	MW6D	105-115	3075	6/20/09	Depth to water = 88.7 ft. Depth of 2-in. well = 115 ft. Sample collected by using a low-flow bladder pump after purging of 5 L. Pump intake positioned at 110 ft.
6/18/09	16:56	BAMW6DDUP-W-28670	MW	MW6D	105-115	3075	6/20/09	Replicate of sample BAMW6D-W-28645.
6/18/09	17:06	BAMW16D-W-28664	MW	MW16D	90-100	3074	6/20/09	Depth to water = 66.49 ft. Depth of 2-in. well = 100 ft. Sample collected by using a low-flow bladder pump after purging of 6 L. Pump intake positioned at 95 ft.
6/18/09	17:07	BAMW16DDUP-W-28671	MW	MW16D	90-100	3074	6/20/09	Replicate of sample BAMW16D-W-28664.
6/18/09	17:58	BAMW16S-W-28663	MW	MW16S	76-86	3074	6/20/09	Depth to water = 66.93 ft. Depth of 2-in. well = 86 ft. Sample collected by using a low-flow bladder pump after purging of 6 L. Pump intake positioned at 81 ft.
6/18/09	18:00	BAMW13S-W-28657	MW	MW13S	112-122	3075	6/20/09	Depth to water = 86.85 ft. Depth of 2-in. well = 122 ft. Sample collected by using a low-flow bladder pump after purging of 9 L. Pump intake positioned at 117 ft.
6/18/09	19:02	BAMW13D-W-28658	MW	MW13D	127-137	3074	6/20/09	Depth to water = 106.8 ft. Depth of 2-in. well = 137 ft. Sample collected by using a low-flow bladder pump after purging of 4.8 L. Pump intake positioned at 132 ft.
6/18/09	19:42	BAMW4D-W-28642	MW	MW4D	98.38-118.22	3074	6/20/09	Depth to water = 92.25 ft. Depth of 2-in. well = 118.22 ft. Sample collected by using a low-flow bladder pump after purging of 7 L. Pump intake positioned at 108.30 ft.
6/19/09	9:26	BAMW5-W-28643	MW	MW5	110-120	3074	6/20/09	Depth to water = 93.8 ft. Depth of 2-in. well = 120 ft. Sample collected by using a low-flow bladder pump after purging of 8 L. Pump intake positioned at 115 ft.
6/19/09	10:34	BAMW7-W-28646	MW	MW7	116-126	3074	6/20/09	Depth to water = 95.75 ft. Depth of 2-in. well = 126 ft. Sample collected by using a low-flow bladder pump after purging of 5 L. Pump intake positioned at 121 ft.

TABLE A.1 (Cont.)

Sample Date	Time	Sample	Type[b]	Location	Depth[c] (ft BGL)	Chain of Custody	Shipment Date	Sample Description
June 2009 sampling (cont.)								
6/19/09	11:40	BAMW12M-W-28655	MW	MW12M	90-100	3074	6/20/09	Depth to water = 70.05 ft. Depth of 2-in. well = 100 ft. Sample collected by using a low-flow bladder pump after purging of 6.5 L. Pump intake positioned at 95 ft.
6/19/09	12:28	BAMW12D-W-28656	MW	MW12D	115-125	3074	6/20/09	Depth to water = 93.65 ft. Depth of 2-in. well = 125 ft. Sample collected by using a low-flow bladder pump after purging of 7 L. Pump intake positioned at 120 ft.
6/19/09	12:36	BAMW10S-W-28649	MW	MW10S	93-103	3075	6/20/09	Depth to water = 73.4 ft. Depth of 2-in. well = 103 ft. Sample collected by using a low-flow bladder pump after purging of 9.5 L. Pump intake positioned at 98 ft.
6/19/09	12:55	BAQCIR-W-28673	RI	QC	–	3074	6/20/09	Rinsate of decontaminated sampling line after collection of sample BAMW12D-W-28656.
6/19/09	13:38	BAMW10D-W-28650	MW	MW10D	115-125	3075	6/20/09	Depth to water = 96.75 ft. Depth of 2-in. well = 125 ft. Sample collected by using a low-flow bladder pump after purging of 4.5 L. Pump intake positioned at 120 ft.
6/19/09	14:34	BAMW8-W-28647	MW	MW8	110-120	3075	6/20/09	Depth to water = 95.0 ft. Depth of 2-in. well = 120 ft. Sample collected by using a low-flow bladder pump after purging of 6 L. Pump intake positioned at 115 ft.
6/19/09	14:55	BAMW12S-W-28654	MW	MW12S	43-53	3075	6/20/09	Water present at bottom of well, < 1 ft. Collected sample and partial field measurements after purging of 0.4 L.
6/19/09	16:22	BAMW11D-W-28653	MW	MW11D	125-135	3075	6/20/09	Depth to water = 100.9 ft. Depth of 2-in. well = 135 ft. Sample collected by using a low-flow bladder pump after purging of 9 L. Pump intake positioned at 130 ft.
6/19/09	17:26	BAMW11M-W-28652	MW	MW11M	90-100	3075	6/20/09	Depth to water = 78.90 ft. Depth of 2-in. well = 100 ft. Sample collected by using a low-flow bladder pump after purging of 13 L. Pump intake positioned at 95 ft.

TABLE A.1 (Cont.)

Sample Date	Time	Sample	Type[b]	Location	Depth[c] (ft BGL)	Chain of Custody	Shipment Date	Sample Description
June 2009 sampling (cont.)								
6/19/09	18:40	BAMW11S-W-28651	MW	MW11S	40-50	3075	6/20/09	Depth to water = 26.64 ft. Depth of 1-in. well = 50 ft. Sample collected by using a low-flow bladder pump after purging of 6.5 L. Pump intake positioned at 45 ft.
6/19/09	19:00	BAQCTB-W-28675	TB	QC	–	3074	6/20/09	Trip blank sent to the AGEM Laboratory for organic analyses with water samples listed on COC 3074.
6/19/09	19:01	BAQCTB-W-28676	TB	QC	–	3075	6/20/09	Trip blank sent to the AGEM Laboratory for organic analyses with water samples listed on COC 3075.

[a] All samples collected were water.

[b] Sample types: 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.

TABLE A.2 Field measurements for groundwater samples collected at Barnes, July 2006 to June 2009.

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]	–	–	–	–	–
		10/22/08[a]	–	–	–	–	–
		3/4/09[a]	–	–	–	–	–
		6/17/09[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
		7/9/08	18.1	7.05	992	16.2	98
		10/22/08	12.6	7.07	937	8.95	108
		3/4/09	13.8	7.07	962	8.94	253
		6/17/09	23.3	7.07	1021	5.43	106
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	197
		7/10/08	18.4	6.91	1163	5.03	155
		10/22/08	11.6	7.07	931	6.19	132
		3/4/09	14.5	7.06	1126	5.60	243
		6/18/09	18.7	6.97	1235	3.55	116
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	255
		7/10/08	19.8	6.99	1177	13.8	110
		10/22/08	13.5	7.01	1238	4.46	84
		3/4/09	12.8	7.08	1062	7.00	210
		6/17/09	18.5	6.65	1038	5.90	110
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
		7/12/08	14.4	6.94	1001	6.77	149
		10/23/08	13.0	7.02	973	5.56	94
		3/5/09	15.9	7.61	1402	4.04	17
		6/18/09	18.5	7.03	975	5.72	127

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							
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
		7/11/08	18.8	6.66	2930	1.32	37
		10/23/08	12.8	6.78	2384	0.67	20
		3/5/09	15.9	6.86	2146	2.36	56
		6/19/09	16.4	6.71	2292	1.01	45
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
		7/11/08	28.2	7.61	753	9.85	92
		10/23/08	11.9	11.17	582	5.12	91
		3/5/09	13.9	7.88	603	5.23	18
		6/18/09	19.5	7.70	698	4.52	27
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
		7/11/08	19.8	7.05	999	12.8	100
		10/23/08	12.0	7.18	957	6.27	128
		3/5/09	13.4	7.22	903	3.07	21
		6/18/09	19.0	6.86	992	4.44	114
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
		7/12/08	14.4	6.95	1238	4.36	98
		10/23/08	12.7	7.16	1191	8.61	122
		3/5/09	15.3	7.11	1141	9.93	126
		6/19/09	16.3	7.05	1174	4.32	48
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
		7/11/08	18.6	6.38	1049	6.19	152
		10/23/08	12.9	7.06	948	8.74	97
		3/5/09	16.2	7.12	985	9.43	165
		6/19/09	18.0	7.07	972	6.65	102
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
		7/11/08	17.7	6.58	1010	5.63	189
		10/24/08	13.0	7.06	888	5.42	79
		3/5/09	16.2	7.10	939	8.40	173
		6/17/09	15.9	6.87	907	5.62	146

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.)							
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
		7/11/08	17.3	6.91	975	12.8	119
		10/23/08	13.4	7.08	913	5.39	78
		3/5/09	15.3	7.25	895	2.66	13
		6/19/09	16.0	7.12	925	5.44	104
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	236
		7/11/08	17.4	6.78	1090	12.6	117
		10/23/08	13.5	7.01	1000	5.00	93
		3/5/09	15.9	7.20	969	4.37	12
		6/19/09	16.9	7.08	1035	5.70	109
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	241
		7/10/08	19.5	6.47	1224	1.86	166
		10/23/08	10.2	6.99	1085	5.80	146
		3/4/09	14.5	7.11	1186	4.32	37
		6/19/09	15.0	6.81	1159	3.11	173
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
		7/10/08	31.9	7.08	1124	3.88	149
		10/23/08	12.4	7.06	962	3.19	116
		3/4/09	13.6	7.33	910	4.90	28
		6/19/09	14.7	6.92	973	4.84	185
MW11D	125-135	4/4/07	13.8	6.18	990	–	–
		11/19/07	13.1	7.22	987	–	–
		3/5/08	6.0	7.06	872	6.85	252
		7/10/08	17.5	6.25	957	7.14	177
		10/23/08	12.3	7.11	863	8.71	123
		3/4/09	14.3	7.23	848	4.47	27
		6/19/09	17.4	6.96	885	5.92	131
MW12S	43-53	4/5/07[a]	–	–	–	–	–
		11/19/07[a]	–	–	–	–	–
		3/10/08[a]	–	–	–	–	–
		7/10/08[a]	–	–	–	–	–
		10/22/08[a]	–	–	–	–	–
		3/4/09[a]	–	–	–	–	–
		6/19/09[a]	20.5	7.00	1436	–	–

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.)							
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	212
		7/10/08	16.9	7.09	878	8.17	87
		10/22/08	12.2	7.20	785	8.93	126
		3/4/09	14.1	7.24	851	2.15	20
		6/19/09	17.0	6.99	856	2.34	112
MW12D	115-125	4/5/07	14.0	6.36	930	–	–
		11/18/07	15.6	6.95	571	–	–
		3/9/08	8.8	7.13	881	5.25	237
		7/11/08	19.9	6.01	987	4.72	197
		10/22/08	12.3	7.09	873	7.96	136
		3/4/09	14.4	7.25	923	4.06	21
		6/19/09	16.4	6.96	895	5.08	150
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
		7/9/08	17.4	6.99	875	7.72	116
		10/22/08	13.5	7.08	793	5.08	100
		3/4/09	13.8	7.23	818	4.39	29
		6/18/09	17.6	7.04	803	6.12	104
MW13D	127-137	4/5/07	14.9	6.25	397	–	–
		11/19/07	17.0	7.00	763	–	–
		3/9/08	13.1	7.09	758	5.95	213
		7/9/08	18.6	7.07	848	18.1	57
		10/22/08	13.3	7.06	824	5.28	98
		3/4/09	14.5	7.19	833	4.01	25
		6/18/09	17.5	6.93	828	5.60	117
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	208
		7/10/08	17.4	7.16	775	16.4	87
		10/22/08	13.2	7.11	716	5.81	90
		3/4/09	13.8	7.15	736	8.96	268
		6/18/09	17.5	7.01	742	5.18	97
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
		7/10/08	17.7	7.07	1459	14.5	86
		10/22/08	13.0	7.00	1212	1.41	79
		3/5/09	13.6	7.06	1339	2.15	69
		6/18/09	19.8	7.04	1523	1.99	46

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.)							
MW15S	88-98	4/4/07	13.1	8.03	854	–	–
		11/18/07	13.9	NR	1883	–	–
		3/10/08	12.1	8.67	697	5.49	173
		7/12/08	14.0	8.88	660	11.6	94
		10/23/08	13.0	8.00	789	5.27	67
		3/5/09	15.7	8.78	589	7.48	163
		6/17/09	18.2	9.13	386	4.84	62
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	131
		7/12/08	14.1	6.80	3067	1.05	90
		10/24/08	13.0	6.81	2876	0.34	27
		3/5/09	15.8	6.82	2945	0.41	-15
		6/17/09	18.6	6.71	2887	0.61	51
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	184
		7/11/08	18.8	6.71	2883	1.13	52
		10/23/08	11.6	7.01	1350	6.01	136
		3/5/09	16.3	7.19	1505	2.49	12
		6/18/09	15.9	7.03	971	5.57	101
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	0.50	140
		7/11/08	18.9	6.64	3134	0.41	32
		10/23/08	11.3	6.79	2791	0.45	37
		3/5/09	15.6	6.94	2926	0.27	14
		6/18/09	18.3	6.77	2867	0.30	46
MW17	120-130	4/4/07	16.0	6.44	861	–	–
		11/19/07	8.3	7.15	610	–	–
		3/5/08	5.5	7.12	804	7.02	239
		7/9/08	17.5	7.11	843	20.6	89
		10/22/08	13.1	7.10	777	8.35	110
		3/4/09	14.1	7.12	823	8.47	258
		6/17/09	18.4	7.01	825	5.65	103
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.)							
Oentrich	150	10/23/08	–	–	–	–	–
		3/5/09	–	–	–	–	–
		6/18/09	15.3	7.15	1270	–	–
Sedivy	138	8/22/06	–	–	–	–	–
Sedivy	138	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 March and June 2009 and for Quality Control Samples

TABLE B.1 Analytical results for samples and replicates collected at Barnes in March and June 2009 and for quality control samples.

Sample Date	Location	Depth (ft BGL)	Sample	Analysis Type	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride
March 2009 sampling							
3/4/09	MW3D	133.02-152.73	BAMW3D-W-22705	Primary	ND[a]	ND	ND
3/4/09	MW3D	133.02-152.73	BAMW3DDUP-W-28632	Replicate	ND	ND	ND
3/5/09	MW9	100-110	BAMW9-W-22712	Primary	2.3	ND	ND
3/5/09	MW9	100-110	BAMW9DUP-W-28638	Replicate	2.1	ND	ND
3/5/09	MW10S	93-103	BAMW10S-W-22713	Primary	49	2.1	ND
3/5/09	MW10S	93-103	BAMW10SDUP-W-28631	Replicate	52	2.3	ND
3/4/09	MW11S	40-50	BAMW11S-W-22715	Primary	ND	ND	ND
3/4/09	MW11S	40-50	BAMW11SDUP-W-28630	Replicate	ND	ND	ND
3/4/09	MW12M	90-100	BAMW12M-W-22719	Primary	25	4.4	ND
3/4/09	MW12M	90-100	BAMW12M-W-22719DUP	Duplicate	25	4.7	ND
3/5/09	Oentrich	150	BAOENTRICH-W-28627	Primary	1.1	ND	ND
3/5/09	Oentrich	150	BAOENTRICH-28627DUP	Duplicate	1.1	ND	ND
3/4/09	QC	–	BAQCIR-W-28634	Rinsate after MW2D	ND	ND	ND
3/5/09	QC	–	BAQCTB-W-28637	Trip blank	ND	ND	ND
3/6/09	QC	–	BAQCTB-W-28635	Trip blank	ND	ND	ND
June 2009 sampling							
6/18/09	MW13D	127-137	BAMW13D-W-28658	Primary	6.2	ND	ND
6/18/09	MW13D	127-137	BAMW13D-W-28658DUP	Duplicate	6.7	ND	ND
6/18/09	MW14D	123-133	BAMW14D-W-28660	Primary	ND	ND	ND
6/18/09	MW14D	123-133	BAMW14D-W-28660DUP	Duplicate	ND	ND	ND
6/18/09	MW16D	90-100	BAMW16D-W-28664	Primary	ND	ND	ND
6/18/09	MW16D	90-100	BAMW16DDUP-W-28671	Replicate	ND	ND	ND

TABLE B.1 (Cont.)

Sample Date	Location	Depth (ft BGL)	Sample	Analysis Type	Concentration (µg/L)		
					Carbon Tetrachloride	Chloroform	Methylene Chloride
June 2009 sampling (cont.)							
6/17/09	MW17	120-130	BAMW17-W-28665	Primary	1.0	ND	ND
6/17/09	MW17	120-130	BAMW17DUP-W-28669	Replicate	0.9 J[b]	ND	ND
6/18/09	MW6D	105-115	BAMW6D-W-28645	Primary	1.5	ND	ND
6/18/09	MW6D	105-115	BAMW6DDUP-W-28670	Replicate	1.4	ND	ND
6/18/09	MW6D	105-115	BAMW6D-W-28645DUP	Duplicate	1.5	ND	ND
6/18/09	QC	–	BAQCIR-W-28672	Rinsate after MW14S	ND	ND	ND
6/19/09	QC	–	BAQCIR-W-28673	Rinsate after MW12D	ND	ND	ND
6/18/09	QC	–	BAQCTB-W-28674	Trip blank	ND	ND	ND
6/19/09	QC	–	BAQCTB-W-28675	Trip blank	ND	ND	ND
6/19/09	QC	–	BAQCTB-W-28676	Trip blank	ND	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 method quantitation limit of 1.0 µg/L.

Appendix C:

Sample Documentation from TestAmerica Laboratories, Inc.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

March 23, 2009

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

Re: Laboratory Project No. 21005
Case: BARNES; SDG: 130491

Dear Mr. Dennis:

Enclosed are analytical results for samples that were received by TestAmerica Burlington on March 6th, 2009. Laboratory identification numbers were assigned, and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 03/06/09 ETR No: 130491		
787275	BAMW1D-W-22703	03/04/09	WATER
787276	BAMW12M-W-22719	03/04/09	WATER
787277	BAMW10D-W-22714	03/05/09	WATER
787278	BAMW14D-W-28621	03/05/09	WATER
787279	BAQCTB-W-28637	03/05/09	WATER
787280	VHBLK01	03/06/09	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 attempted to provide for the analytical work to be performed within seven days of sample collection. The analysis of each sample in the sample set did occur on the eleventh day from the date that the samples were collected.

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.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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 samples. That storage blank, identified as VHBLK01, was carried through the holding period with the samples, and analyzed.

Sample BAMW12M-W-22719 was analyzed at a dilution, based on the results of preliminary screening. An additional, more concentrated analysis was performed on the sample in order to provide a lower reporting limit for those target analytes that were not identified as constituents in the primary analysis. Both sets of results for the analysis of sample BAMW12M-W-22719 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 each analysis associated with the sample set. Matrix spike and matrix spike duplicate analyses were not performed on the samples in this sample set. The analysis of the method blank associated with the analytical work was free of target analyte contamination, as was the analysis of the instrument blank following the more concentrated analysis of sample BAMW12M-W-22719, and the analysis of the storage blank associated with the sample set. Present in the storage blank and method blank analyses was a non-target constituent that represented a compound that is related to the DMC formulation. 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.

The responses for each target analyte met the relative standard deviation criterion in the initial calibration. The response for each target analyte met the 50.0 percent difference criterion in the closing calibration check acquisition.

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.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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

Sincerely,

Kirk F. Young
Project Manager

KFY/hsf
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 condensation 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

FedEx # 8389 2392 8112 4393

MATRIX: Water
RECEIVING LAB: Test America
PROJECT/SITE: Barnes KS
SAMPLER(S) (Signature) Matt Miller + Paul Gallagher

ARGONNE NATIONAL LABORATORY CHAIN OF CUSTODY RECORD*

Shipping Container No.
Shipping Info:
ANL Field Contact (Name & Temporary Phone):

DATE OF COLLECTION	SAMPLE ID NUMBER(S)	Number of containers	ANALYSIS: VOC	REMARKS
March 4, 2009	BAMW1D-W-22703	2	2	2x 40 mL for VOC
March 4, 2009	BAMW12M-W-22719	2	2	↓ ↓
March 5, 2009	BAMW10D-W-22714	2	2	2x 40 mL for VOC
↓ ↓	BAMW14D-W-28627	2	2	1x 40 mL for VOC
March 5, 2009	BAQCTB-W-28637	1	1	

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
[signature]	3-5-09	13:47					

Relinquished by (Signature)	Date	Time	Received for Laboratory by	Date	Time	Remarks
			Chon Kall	3/6/09	1030	2.1

Y	N	FOR LAB USE ONLY
X		Custody seal was intact when shipment received.
X		Sample containers were intact when received.
X		Shipment was at required temperature when received.
X		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)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Sample Data Summary – SOM01.2 Volatiles – Trace

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

EPA SAMPLE NO.

BAMW1D22703

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787275

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787275

Level: (TRACE/LOW/MED) TRACE Date Received: 03/06/2009

% Moisture: not dec. Date Analyzed: 03/10/2009

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	0.22	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.

BAMW1D22703

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787275

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787275

Level: (TRACE/LOW/MED) TRACE Date Received: 03/06/2009

% Moisture: not dec. Date Analyzed: 03/10/2009

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	0.35	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.

BAMW12M719

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787276

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787276

Level: (TRACE/LOW/MED) TRACE Date Received: 03/06/2009

% Moisture: not dec. Date Analyzed: 03/10/2009

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	4.6	
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	21	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.

BAMW12M719

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787276

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787276

Level: (TRACE/LOW/MED) TRACE Date Received: 03/06/2009

% Moisture: not dec. Date Analyzed: 03/10/2009

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.
BAMW12M719DL

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787276D1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787276D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/06/2009

% Moisture: not dec. Date Analyzed: 03/10/2009

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 2.0

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	1.0	U
74-87-3	Chloromethane	1.0	U
75-01-4	Vinyl chloride	1.0	U
74-83-9	Bromomethane	1.0	U
75-00-3	Chloroethane	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0	U
67-64-1	Acetone	19	D
75-15-0	Carbon disulfide	1.0	U
79-20-9	Methyl acetate	1.0	U
75-09-2	Methylene chloride	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
1634-04-4	Methyl tert-butyl ether	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	U
78-93-3	2-Butanone	10	U
74-97-5	Bromochloromethane	1.0	U
67-66-3	Chloroform	4.0	D
71-55-6	1,1,1-Trichloroethane	1.0	U
110-82-7	Cyclohexane	1.0	U
56-23-5	Carbon tetrachloride	15	D
71-43-2	Benzene	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U

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

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

EPA SAMPLE NO.
BAMW12M719DL

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787276D1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787276D

Level: (TRACE/LOW/MED) TRACE Date Received: 03/06/2009

% Moisture: not dec. Date Analyzed: 03/10/2009

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 2.0

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	1.0	U
108-87-2	Methylcyclohexane	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
75-27-4	Bromodichloromethane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
108-10-1	4-Methyl-2-pentanone	10	U
108-88-3	Toluene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
127-18-4	Tetrachloroethene	1.0	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	1.0	U
106-93-4	1,2-Dibromoethane	1.0	U
108-90-7	Chlorobenzene	1.0	U
100-41-4	Ethylbenzene	1.0	U
95-47-6	o-Xylene	1.0	U
179601-23-1	m,p-Xylene	1.0	U
100-42-5	Styrene	1.0	U
75-25-2	Bromoform	1.0	U
98-82-8	Isopropylbenzene	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
120-82-1	1,2,4-Trichlorobenzene	1.0	U
87-61-6	1,2,3-Trichlorobenzene	1.0	U

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

EPA SAMPLE NO.
BAMW10D22714

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787277

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787277

Level: (TRACE/LOW/MED) TRACE Date Received: 03/06/2009

% Moisture: not dec. Date Analyzed: 03/10/2009

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	0.58	
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	5.3	
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.
BAMW10D22714

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787277

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787277

Level: (TRACE/LOW/MED) TRACE Date Received: 03/06/2009

% Moisture: not dec. Date Analyzed: 03/10/2009

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.
BAMW14D28621

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787278

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787278

Level: (TRACE/LOW/MED) TRACE Date Received: 03/06/2009

% Moisture: not dec. Date Analyzed: 03/10/2009

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	0.62	
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.

BAMW14D28621

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787278

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787278

Level: (TRACE/LOW/MED) TRACE Date Received: 03/06/2009

% Moisture: not dec. Date Analyzed: 03/10/2009

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	0.66	
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.

BAQCTB28637

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787279

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787279

Level: (TRACE/LOW/MED) TRACE Date Received: 03/06/2009

% Moisture: not dec. Date Analyzed: 03/10/2009

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	5.8	
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	0.50	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.

BAQCTB28637

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787279

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787279

Level: (TRACE/LOW/MED) TRACE Date Received: 03/06/2009

% Moisture: not dec. Date Analyzed: 03/10/2009

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.
VHBLK01

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787280

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787280

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 03/10/2009

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	0.50	U
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.

VHBLK01

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 130491

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 787280

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 787280

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 03/10/2009

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

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

June 29, 2009

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

Re: Laboratory Project No. 21005
Case: BARNES; SDG: 132283

Dear Mr. Dennis:

Enclosed are analytical results for samples that were received by TestAmerica Burlington on June 19th, 2009. Laboratory identification numbers were assigned, and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 06/19/09 ETR No: 132283		
798781	BAMW1D-W-28639	06/17/09	WATER
798782	BAMW15D-W-28662	06/17/09	WATER
798783	BAMW2D-W-28640	06/18/09	WATER
798784	BAPWS2-W-28667	06/18/09	WATER
798785	BAQCTB-W-28674	06/18/09	WATER
798786	BAMW6S-W-28644	06/18/09	WATER
798787	VHBLK01	06/19/09	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 samples. That storage blank, identified as VHBLK01, was carried through the holding period with the samples, and analyzed.

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 the method blank associated with the analytical work, and in the analysis of the storage blank associated with the sample set. 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. The derived recovery of 2-hexanone-d_5 was elevated in the analysis of samples BAMW1D-W-28639, BAMW15D-W-28662, BAMW2D-W-28640, BAPWS2-W-28667, and BAMW6S-W-28644. Matrix spike and matrix spike duplicate analyses were not performed on the samples in this sample set. The analysis of the method blank associated with the analytical work was free of contamination, as was the analysis of the storage blank associated with the sample set. Present in the method blank, instrument blank, and storage blank analyses was a non-target constituent that represented a compound that is related to the DMC formulation. 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.

The responses for each target analyte met the relative standard deviation criterion in the initial calibration. The samples in this sample set were analyzed in an analytical sequence that included the initial calibration. The response for each target analyte met the 50.0 percent difference criterion in the closing calibration check acquisition.

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.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

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

Sincerely,

Kirk F. Young
Project Manager

KFY/hsf
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 condensation 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

FedEx # 8389 2393 5206

2525

MATRIX: Water
RECEIVING LAB: Test America
PROJECT/SITE: Barnes KS
SAMPLER(S) (Signature)

ARGONNE NATIONAL LABORATORY CHAIN OF CUSTODY RECORD*

Shipping Container No.
Shipping Info:
ANL Field Contact (Name & Temporary Phone): Bob Sedivy

DATE OF COLLECTION	SAMPLE ID NUMBER(S)	Number of containers	ANALYSIS: VOC	REMARKS
June 17, 2009	BAMW1D-W-28639	2	2	2x40 mL for VOC
June 17, 2009	BAMW15D-W-28662	2	2	
June 18, 2009	BAMW2D-W-28640	2	2	
	BAPWS2-W-28667	2	2	
	BAQCTB-W-28674	2	2	
June 18, 2009	BAMWGS-W-28644	2	2	2x40 mL for VOC

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
	6/18/09	13:17					

Relinquished by (Signature)	Date	Time	Received for Laboratory by	Date	Time	Remarks
			[illegible]	6/19/09	1020	5-7

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 (12-94)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Sample Data Summary – SOM01.2 Volatiles – Trace

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

EPA SAMPLE NO.
BAMW1DW28639

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798781

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798781

Level: (TRACE/LOW/MED) TRACE Date Received: 06/19/2009

% Moisture: not dec. Date Analyzed: 06/24/2009

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	0.23	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.
BAMW1DW28639

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798781

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798781

Level: (TRACE/LOW/MED) TRACE Date Received: 06/19/2009

% Moisture: not dec. Date Analyzed: 06/24/2009

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.

BAMW15D28662

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798782

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798782

Level: (TRACE/LOW/MED) TRACE Date Received: 06/19/2009

% Moisture: not dec. Date Analyzed: 06/24/2009

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	0.50	U
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.
BAMW15D28662

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798782

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798782

Level: (TRACE/LOW/MED) TRACE Date Received: 06/19/2009

% Moisture: not dec. Date Analyzed: 06/24/2009

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.
BAMW2DW28640

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798783

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798783

Level: (TRACE/LOW/MED) TRACE Date Received: 06/19/2009

% Moisture: not dec. Date Analyzed: 06/24/2009

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	0.50	U
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.
BAMW2DW28640

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798783

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798783

Level: (TRACE/LOW/MED) TRACE Date Received: 06/19/2009

% Moisture: not dec. Date Analyzed: 06/24/2009

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.
BAPWS2W28667

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798784

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798784

Level: (TRACE/LOW/MED) TRACE Date Received: 06/19/2009

% Moisture: not dec. Date Analyzed: 06/24/2009

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	0.91	
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.

BAPWS2W28667

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798784

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798784

Level: (TRACE/LOW/MED) TRACE Date Received: 06/19/2009

% Moisture: not dec. Date Analyzed: 06/24/2009

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.
BAQCTBW28674

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798785

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798785

Level: (TRACE/LOW/MED) TRACE Date Received: 06/19/2009

% Moisture: not dec. Date Analyzed: 06/24/2009

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	4.5	J
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	0.22	J
56-23-5	Carbon tetrachloride	0.50	U
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.
BAQCTBW28674

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798785

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798785

Level: (TRACE/LOW/MED) TRACE Date Received: 06/19/2009

% Moisture: not dec. Date Analyzed: 06/24/2009

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.
BAMW6SW28644

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798786

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798786

Level: (TRACE/LOW/MED) TRACE Date Received: 06/19/2009

% Moisture: not dec. Date Analyzed: 06/24/2009

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	0.27	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.

BAMW6SW28644

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798786

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798786

Level: (TRACE/LOW/MED) TRACE Date Received: 06/19/2009

% Moisture: not dec. Date Analyzed: 06/24/2009

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.
VHBLK01

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798787

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798787

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 06/24/2009

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	0.50	U
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.

VHBLK01

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: BARNES Mod. Ref No.: SDG No.: 132283

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 798787

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 798787

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 06/24/2009

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

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

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