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ANL/EVS/AGEM/TR-10-04

Annual Report of Monitoring at Morrill, Kansas, in 2009

Environmental Science Division

USDA United States Department of Agriculture

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

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Annual Report of Monitoring at Morrill, Kansas, in 2009

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

August 2010

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
DO	dissolved oxygen
EPA	U.S. Environmental Protection Agency
ft	foot (feet)
gal	gallon(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(s)
mV	millivolt(s)
ORP	oxidation-reduction potential
RPD	relative percent difference
SOP	standard operating procedure
TOC	top of casing
USDA	U.S. Department of Agriculture
VOC	volatile organic compound

Annual Report of Monitoring at Morrill, Kansas, in 2009

1 Introduction and Background

In September 2005, the Commodity Credit Corporation of the U.S. Department of Agriculture (CCC/USDA) initiated periodic sampling of groundwater in the vicinity of a grain storage facility formerly operated by the CCC/USDA at Morrill, Kansas. The sampling at Morrill is being performed on behalf of the CCC/USDA by Argonne National Laboratory, in accord with a monitoring program approved by the Kansas Department of Health and Environment (KDHE 2005), to monitor levels of carbon tetrachloride contamination identified in the groundwater at this site (Argonne 2004, 2005a). This report provides results for monitoring events in April and September 2009.

Under the KDHE-approved monitoring plan (Argonne 2005b), groundwater was initially sampled twice yearly for a period of two years (in fall 2005, in spring and fall 2006, and in spring and fall 2007). The samples were analyzed for volatile organic compounds (VOCs), as well as for selected geochemical parameters to aid in the evaluation of possible natural contaminant degradation (reductive dechlorination) processes in the subsurface environment.

The analytical results for groundwater sampling events at Morrill from September 2005 to October 2008 were documented previously (Argonne 2006a,b, 2007, 2008a,b, 2009). Those results consistently demonstrated the presence of carbon tetrachloride contamination, at levels exceeding the KDHE Tier 2 risk-based screening level of 5.0 μg/L for this compound, in a groundwater plume extending generally south-southeastward from the former CCC/USDA facility, toward Terrapin Creek at the south edge of the town. Low levels (≤ 1.3 μg/L) of carbon tetrachloride were persistently detected at monitoring well MW8S, on the bank of an intermittent tributary to Terrapin Creek. This observation suggested a possible risk of contamination of the surface waters of the creek. That concern is the regulatory driver for ongoing monitoring.

In light of the early findings, in 2006 the CCC/USDA recommended expansion of the approved monitoring program to include the collection and analysis of surface water samples along Terrapin Creek (Argonne 2006a). At the request of the KDHE (2007a), locations for both surface water and shallow sediment sampling were discussed with the KDHE in January 2007. An addendum to the existing monitoring plan (Appendix A) and a standard operating procedure (SOP AGEM-15; Appendix B) for sediment sampling were submitted to the KDHE on the basis

of these discussions and were subsequently approved (KDHE 2008b). Results of sediment sampling prior to 2009 were reported previously (Argonne 2008a,b; 2009). To supplement the original scope of the monitoring, Argonne also sampled natural vegetation along Terrapin Creek in October 2006, April 2007, and July 2007 for analyses for VOCs. The results of these plant tissue analyses were reported previously (Argonne 2008a, 2009).

The April and September 2009 sampling events reported here represent a continuation of the two-year monitoring program, as requested by the KDHE (2007b). The groundwater sampling is presently conducted, in accord with the monitoring plan (Argonne 2005b) and the addendum to that plan (Appendix A in this report), in a network of 12 monitoring wells and 3 private wells (Figure 1.1), at locations approved by the KDHE (2008b).

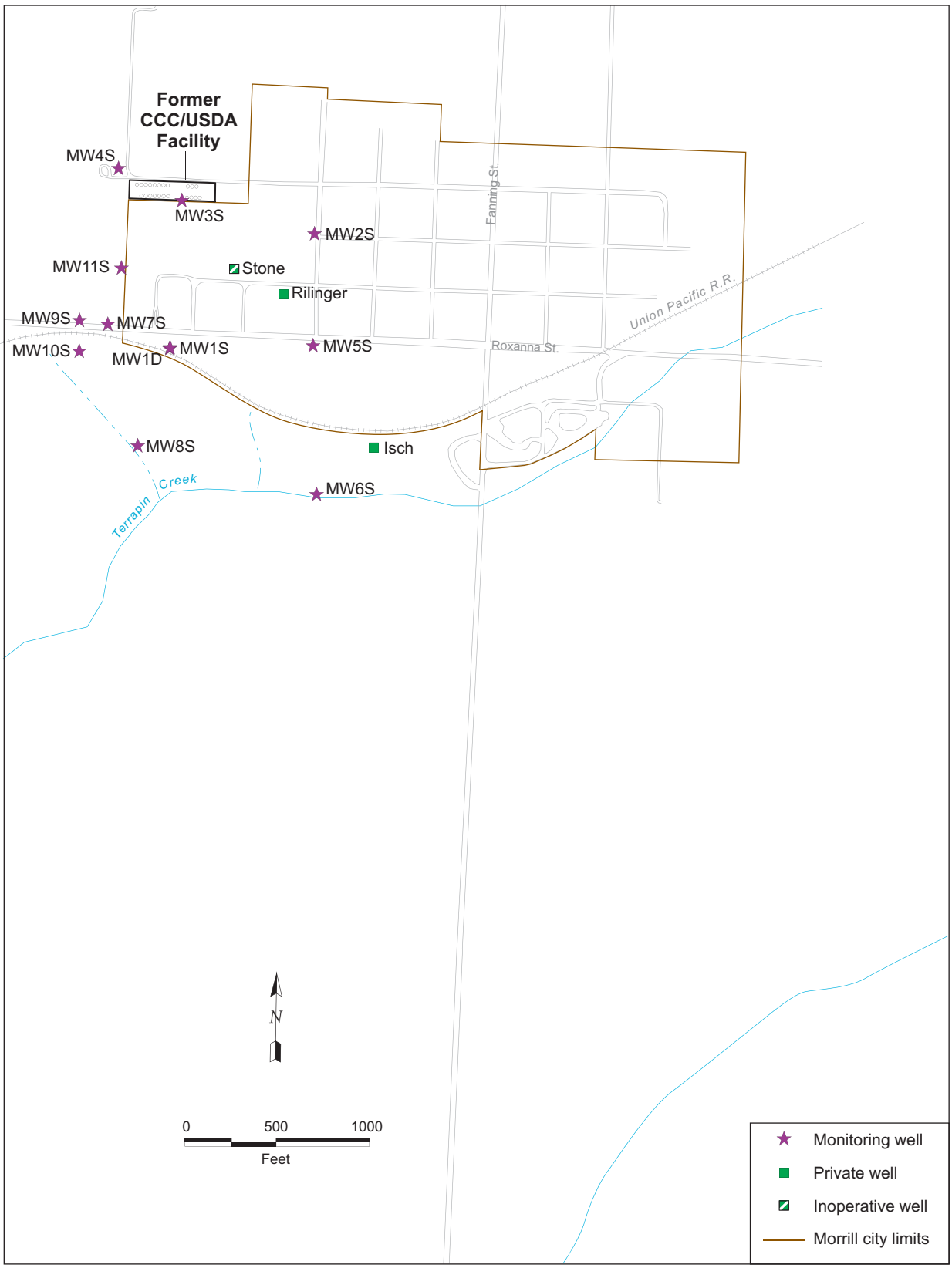

FIGURE 1.1 Monitoring network at Morrill, as of September 2009.

2 Sample Collection and Analysis Activities

2.1 Measurement of Groundwater Levels

Before each well was purged in preparation for sampling, a water level indicator was used (where possible) to measure the depth to groundwater and the total depth from the top of the well casing, with an accuracy of ± 0.01 ft.

Data recorders currently installed in wells MW1S-MW4S and MW6S-MW8S are gathering long-term data on the groundwater elevation and gradient at Morrill. The data recorders in these wells were downloaded during the current reporting period on March 25, May 8, and October 20, 2009. Water levels were measured manually in all monitoring wells on these dates, as well as in conjunction with the sampling events on April 22-24 and September 2-4, 2009.

The groundwater level data are discussed in Section 3.1.

2.2 Monitoring and Private Well Sampling and Analyses

Monitoring wells MW1D and MW1S-MW11S and the Stone, Isch, and Rilinger private wells (Figure 1.1) were sampled on April 22-24 and September 2-4, 2009.

Except as noted otherwise, samples were collected from monitoring wells by using a low-flow bladder pump. After measurement of water levels, each monitoring point was purged of a small volume in accord with U.S. Environmental Protection Agency (EPA) procedure EPA/540/S-95/504 (Puls and Barcelona 1996; Yeskis and Zavala 2002) and the equipment manufacturers' instructions. Field measurements of temperature, pH, conductivity, dissolved oxygen (DO), and oxidation-reduction potential (ORP) were taken during purging until the measurements stabilized. Field measurements of iron(II) were made as outlined in the monitoring plan (Argonne 2005b), in accord with procedures in the *Master Work Plan* (Argonne 2002). Samples from the Isch and Rilinger private wells were collected after a 5-min purge with the dedicated pump. The sample from the Stone private well was collected after purging of the well by bailing.

Samples were again collected from selected monitoring wells (MW1S, MW3S, and MW11S) after purging of three well volumes to verify that samples collected with the low-flow method were representative of site conditions. This comparison sampling is discussed further in Section 3.5.

The sequence of activities during the April and September 2009 sampling events is summarized in Appendix A.

Groundwater samples for VOCs analyses 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). Separate aliquots of selected samples (chosen in the field) were shipped to TestAmerica Laboratories, Inc., South Burlington, Vermont, for verification VOCs analysis.

As recommended at the end of the original two-year monitoring period (Argonne 2008a), routine analyses for the attenuation parameters sulfate, sulfide, methane, total organic carbon, carbon dioxide, alkalinity, chloride, and dissolved hydrogen were discontinued after the October 2007 sampling event.

The groundwater analysis results are presented and discussed in Section 3.2.

2.3 Surface Water and Sediment Sampling and Analyses

At the request of the KDHE (2007a), surface water samples and corresponding samples of the underlying shallow sediments in the creek bed were collected for VOCs analyses in March and October 2007, in April and October 2008, and in April and September 2009 at five locations along Terrapin Creek (Figure 2.1), as outlined in the addendum (Appendix A in this report) to the monitoring plan (Argonne 2005b). The sampling was conducted in accord with procedures in the *Master Work Plan* (Argonne 2002) and SOP AGEM-15 (Appendix B in this report). Surface water flow in Terrapin Creek south of Morrill originates at the outfall from an earthen dam and retention pond approximately 1,900 ft southwest of the former CCC/USDA facility (Figure 2.1). Surface water and sediment sampling location SMB, which is directly downstream of this outfall, is believed to lie upgradient, or cross-gradient, to groundwater flow (and hence possible

contaminant migration) from the vicinity of the former CCC/USDA facility. (See Section 3.1.) Sampling locations SM1-SM4 were selected to lie downgradient and downstream from the carbon tetrachloride detections previously identified at MW8S and elsewhere in the monitoring well network.

Samples of surface water were collected in appropriate containers, labeled, preserved at 4°C, and shipped by an overnight delivery service to the AGEM Laboratory for VOCs analyses with EPA Method 524.2 (EPA 1995). Samples of the shallow creek bed sediments were collected by scooping the materials directly into appropriate laboratory containers. The samples were labeled, preserved on dry ice, and shipped to the AGEM Laboratory for sample preparation and VOCs analyses with modified EPA Methods 5030B and 8260B.

The surface water and sediment analysis results are presented and discussed in Section 3.3.

2.4 Vegetation Sampling and Analyses

Vegetation sampling has been proven to provide an accurate indication of contaminants in near-surface groundwater; it is used at Morrill and at other CCC/USDA sites for tracking the movement of carbon tetrachloride plumes through the uptake of the contaminant into tree and vegetation tissue. The sampling at Morrill serves as an early warning for potential movement of carbon tetrachloride into Terrapin Creek downgradient from the former CCC/USDA facility.

Vegetation samples were collected at locations along Terrapin Creek and its tributaries south and southeast of the former CCC/USDA facility. Locations were selected along the apparent direction of groundwater flow from the former facility. Vegetation samples were collected at 18 locations in July 2007 (Argonne 2008a), at 25 locations in July 2008 (Argonne 2009), and at 22 locations in August 2009. The July 2008 sampling event included, for the first time, vegetation recovered from the former CCC/USDA property and at selected locations along the downgradient trend of the plume toward Roxanna Street. Branch tissue samples were collected at 22 locations from mature willow, cottonwood, maple, Osage orange, elm, juniper, hackberry, and walnut trees.

Figure 2.2 illustrates the locations of the vegetation sampling conducted on August 27, 2009. Analytical results are presented and discussed in Section 3.4.

The tree tissue samples were collected in appropriate laboratory containers, labeled, preserved on dry ice, and shipped to the AGEM Laboratory for carbon tetrachloride and chloroform analyses by a headspace technique based on a modification of EPA Method 5021 (http://www.epa.gov/epahome/index/; Alvarado and Rose 2004).

2.5 Handling and Disposal of Investigation-Derived Waste

The small volume of purge water generated as potentially contaminated investigation-derived waste was containerized on-site. The accumulated purge water was sampled and analyzed for VOCs (including ethylene dibromide) and nitrates by a KDHE-certified laboratory (Pace Analytical Services, Lenexa, Kansas). The analytical results (Appendix D) indicated no detectable concentrations of carbon tetrachloride, chloroform, ethylene dibromide, or nitrate. On November 18, 2009, the wastewater was received at the Sabetha municipal water treatment facility for disposal.

2.6 Quality Control for Sample Collection, Handling, and Analysis

The quality control/quality assurance procedures followed during the April and September 2009 monitoring events are described in detail in the *Master Work Plan* (Argonne 2002) and SOP AGEM-15 (Appendix B). These procedures 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 were analyzed within the required holding times.

- Quality control samples (equipment rinsates and trip blanks) collected to monitor sample collection and handling activities, were free of carbon tetrachloride contamination. Method blanks used to monitor analytical methodologies were free of carbon tetrachloride and chloroform contamination.

- Groundwater, surface water, and sediment samples were analyzed for VOCs at the AGEM Laboratory with the purge-and-trap method on a gas chromatograph-mass spectrometer system. Calibration checks with each sample delivery group were within the required ±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. The low relative percent difference (RPD) values for duplicate analyses of selected samples (approximately 3%) demonstrated consistency in the analytical methodology.

- In accordance with the procedures defined in the *Master Work Plan* (Argonne 2002), the analyses of water samples at the AGEM Laboratory were verified by a second laboratory. Three groundwater samples collected during each of the 2009 monitoring events were also submitted to TestAmerica for analysis according to the EPA's Contract Laboratory Program methodology. Results show good agreement over the range of contaminant concentrations detected, with average RPD values of 4.6% for carbon tetrachloride and <1% for chloroform. Summary pages for the verification organic analyses by TestAmerica for sampling conducted on April 22-24 and September 2-4, 2009, are in Appendix E.

- Vegetation samples were analyzed for carbon tetrachloride and chloroform at the AGEM Laboratory by using a gas chromatograph with electron capture detection to achieve the low detection limits required. An 11-point calibration of the gas chromatograph system was established on the basis of the mass of known quantities of carbon tetrachloride and chloroform.

- To verify the suitability of the low-flow sampling methodology for obtaining representative samples from the monitoring wells at Morrill, at the request of

the KDHE (2008a), four wells were also sampled in 2008 after purging of three well volumes. Results suggested that the low-flow technique is acceptable but that the positioning of the pump intake relative to the well screen and static water level at the time of sampling is critical in obtaining a representative sample with this method (Argonne 2009). Comparative sampling was again conducted at three of the four wells in 2009. Results indicate that use of the low-sampling technique at monitoring well MW1S (screened at 11-51 ft BGL and located along the centerline of the plume) is problematic. The effect was accounted for in the interpretation used in this report, and recommendations for correcting the problem are made.

- The results of the comparison sampling are discussed further in Section 3.5.

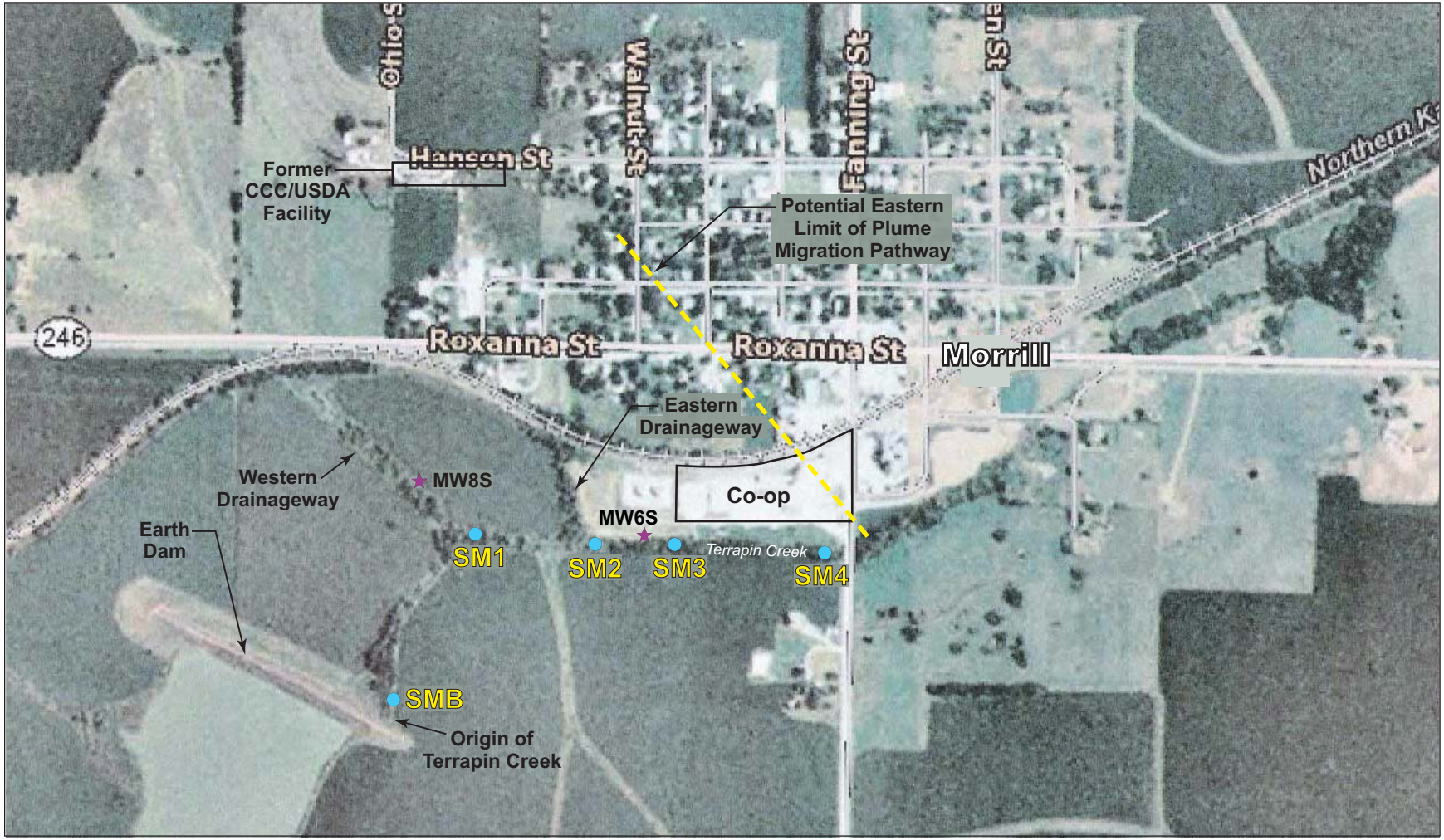

FIGURE 2.1 Locations of surface water and creek bed sediment sampling along Terrapin Creek at Morrill in September 2009.

FIGURE 2.2 Locations of native vegetation sampling downgradient of the former CCC/USDA facility and along Terrapin Creek at Morrill in August 2009.

3 Results and Discussion

3.1 Groundwater Level Data

Depths to groundwater were measured manually in all available monitoring wells during the current review period on March 25, May 8, and October 20, 2009. These hand-measured water level data, along with hand-measured levels from April 30 and September 19, 2008, are in Table 3.1.

Earlier estimates of the potentiometric surface at Morrill, based on manual measurements on April 30 and September 19, 2008, are depicted in Figures 3.1a and 3.1b, respectively. Persistently low water levels observed at MW11S empirically suggest the apparent presence of a groundwater "sink" southwest of the former facility in the vicinity of this monitoring well. This observation is likely an artifact, however, associated with the greater depth of completion of well MW11S in the aquifer unit and the local groundwater flow system (both horizontal and vertical) at this location, relative to nearby wells MW3S, MW4S, and MW7S. To eliminate this influence on the interpreted groundwater flow directions, the estimated potentiometric surfaces presented in Figures 3.1c-e for the current review period (March 25, May 8, and October 20, 2009, respectively) were generated by excluding the anomalous water level measurements from MW11S.

Figures 3.1c-e show that groundwater flow during the early spring (March 25; Figure 3.1c) and later part of the current review period (October 20; Figure 3.1e) was predominantly to the south-southeast, from the vicinity of the former CCC/USDA facility toward Terrapin Creek. A slight shift toward more southerly groundwater flow, and possibly toward the southwest in the immediate vicinity of the intermittent tributary that flows into Terrapin Creek (directly south of the former CCC/USDA facility), is apparent in conjunction with significantly higher groundwater levels in the potentiometric surface for May 8 (Figure 3.1d).

Hydrographs recorded for the Morrill monitoring wells (Figures 3.2a and 3.2b) illustrate that the observed May 2009 rise in water levels reflects a seasonal response to spring precipitation and recharge, followed by generally declining groundwater levels during the remainder of the year. This response has been observed annually (to varying extents) throughout Argonne's investigations at the Morrill site.

The hydrographs in Figures 3.2a and 3.2b for monitoring well MW6S are marked by a series of sharp downward "spikes" in the water level at this location during July and August of both 2008 and 2009. The observed events are believed to reflect transient drawdown in response to pumping of the Grimm irrigation well (TD12), which was installed just south of the MW6S location in March 2008 (Argonne 2008b). Little or no distinct response to the pumping of this well is apparent at the other monitored well locations; however, the operation of the Grimm well empirically coincides with the decline in water levels observed at all locations in the summer and fall of 2008 and 2009. A similar seasonal decline in water levels was also observed at Morrill in summer and fall 2007, in the absence of the Grimm well pumping, suggesting that spring precipitation and recharge represent the predominant factors affecting the local groundwater level patterns at Morrill.

3.2 Groundwater Analysis Results

The analytical data for VOCs in the groundwater samples collected in April and September 2009 are in Table 3.2, together with data for the previous sampling events conducted under the KDHE-approved monitoring plan (Argonne 2005b). The April and September 2009 data for carbon tetrachloride in groundwater are illustrated in Figures 3.3a and 3.3b, respectively. For comparison, the results of the groundwater sampling performed in April and October 2008 are in Figures 3.4a and 3.4b, respectively.

In April 2009 (Figure 3.3a), carbon tetrachloride was detected at 6 of the 15 monitoring locations, at concentrations ranging from 1.0 μg/L at well MW9S to a maximum of 46 μg/L at MW11S. Low levels of chloroform (1.0-1.4 μg/L were detected at the two wells showing the highest carbon tetrachloride values and at a third location (MW2S) where carbon tetrachloride was not detected (Table 3.2). Sampling to compare low-flow and three-well-volume purging methods was not conducted in April 2009.

In September 2009 (Figure 3.3b), carbon tetrachloride was detected at 7 of the 15 monitoring locations, at concentrations ranging from < 1 μg/L (in the Stone private well) to a maximum of 39 μg/L at MW11S. Low levels of chloroform (< 1 μg/L to a maximum of 1.1 μg/L at MW1S) were detected in association with carbon tetrachloride at two of the monitoring locations (Table 3.2). Sampling to compare the low-flow and three-well-volume purging methods was conducted in September 2009. Those results are discussed in Section 3.5.

The results in Table 3.2, Figures 3.3a,b, and Figures 3.4a,b indicate that no significant changes were observed in the levels or distribution of carbon tetrachloride in the groundwater at Morrill during the current review period, or in comparison to the results of the spring and fall 2008 monitoring events.

A previous report (Argonne 2009) suggested that lower-than-normal carbon tetrachloride concentrations in wells MW1S, MW3S, and MW5S in April 2008 were the result of higher-than-normal water levels. The perceived October 2008 increase (return to "normal") at MW5S appears to have been a transient spike that did not continue into 2009. The spring 2008 decrease at MW3S, whether related to water level, to other factors (e.g., sampling procedure), or to a combination of factors, also appears to have been transient. Chloroform concentrations followed similar patterns with respect to historical results. The results of field measurements on the groundwater samples are in Table 3.3.

3.3 Surface Water and Sediment Analysis Results

Table 3.4 presents the results of VOCs analyses of the surface water and shallow sediment samples collected (at the request of the KDHE) along Terrapin Creek. No carbon tetrachloride was detected in the surface water samples at an analytical method detection limit of 0.1 μg/L. Similarly, no carbon tetrachloride was identified in the associated sediment samples at an analytical method detection limit of 1.0 μg/kg. The 2009 results therefore indicate that the surface waters and underlying sediments of Terrapin Creek remain uncontaminated by carbon tetrachloride.

3.4 Vegetation Analysis Results and Observations

The July 2008 vegetation sampling event involved an expansion of the database to include locations at and directly downgradient from the former CCC/USDA facility (locations MR019 to MR024; Figure 2.2). The expanded sampling continued in August 2009. The sampling area was expanded to verify the assumed potential for identification of the plume extending from the former facility and toward Terrapin Creek on the basis of evidence of contaminant uptake in vegetation. This proven methodology has been successful recently at other CCC/USDA sites.

Analytical data for carbon tetrachloride and chloroform in tree branch samples collected in August 2009 (and in previous years) are shown in Table 3.5. Trace concentrations of carbon tetrachloride were identified at 4 of 22 locations sampled (MR007, MR017, MR018, and MR023; Figure 2.2). The analytical method detection limit was 0.1 µg/kg. Although no carbon tetrachloride was detected at these locations in 2008, a low concentration had been reported for MR007 in 2007. At two locations where carbon tetrachloride was detected in 2008 (MR010 and MR019), no carbon tetrachloride was detected in 2009.

The detection of carbon tetrachloride at 0.7 µg/kg at location MR007 in August 2009 could possibly reflect concentrations in nearby and upgradient shallow groundwater at monitoring well MW8S (1.9 µg/L in September 2009). Groundwater seepage has also been observed periodically near the MR007 location. Location MR023 is near a bin at the former CCC/USDA facility, and finding trace quantities of carbon tetrachloride in vegetation at this location could be expected.

Trace concentrations of carbon tetrachloride were detected in August 2009 in vegetation at locations MR018 and MR017 (Figure 3.5) near Terrapin Creek, though contamination has never been detected in surface water and sediment of the creek (Table 3.4). Sampling at Morrill and elsewhere has demonstrated that carbon tetrachloride can be taken up seasonally — at detectable levels — in tissues of trees whose roots intercept low concentrations of carbon tetrachloride in groundwater. We hypothesize that the low concentrations in groundwater under Terrapin Creek are sufficient for uptake by the trees. The low-level detections in vegetation are consistent with the observation, at other sites, that vegetation sampling is a valuable early indicator of plume expansion, and they validate the assumption made in areal expansion of the vegetation sampling effort at Morrill.

3.5 Comparison of Analytical Results for Samples Collected after Low-Flow Purging and after Purging of Three Well Volumes

At the request of the KDHE (2008a), selected wells were sampled in October 2008 by using both the low-flow purging technique and the three-well-volume purging technique to confirm the suitability of the low-flow method for groundwater sampling at Morrill. As reported previously (Argonne 2009), samples were collected in October 2008 from wells MW1S, MW2S, MW3S, and MW11S by both methods. Result for all pairs except the MW1S samples compared favorably; the low-flow results for this well were dramatically lower than three-volume-purge

results. The low-flow results were thought to have been compromised procedurally by the positioning of the pump inlet. A general drop in groundwater levels had made the positioning of the pump inlet in October 2008 inconsistent with the positioning in April 2008. Low-flow results for MW1S in October 2008 were therefore considered non-representative, and the value for the sample obtained after purging of three well volumes was honored instead (Argonne 2009).

In the September 2009 sampling, however, the low-flow results for MW1S remained lower than the three-well-volume results. The low-flow values reported for carbon tetrachloride at well MW1S were 0.7 μg/L (estimated) in October 2008 and "not detected" in April and September 2009. Carbon tetrachloride concentrations for samples collected from well MW1S after purging of three well volumes were 35 μg/L in October 2008 and 34 μg/L in September 2009. (No method comparison was made in April 2009.) For this well, the 2009 low-flow results compare well with historic low-flow results, and the 2009 three-well-volume results compare well with historic three-well-volume results. The observed concentration differences between methods reflect hydraulic and/or contaminant flow properties that result in higher concentrations in three-well-volume samples than in low-flow samples from any of the depths sampled. Multi-depth low-flow or no-purge sampling could improve understanding of the contaminant and groundwater flow conditions and might suggest a more suitable low-flow sampling depth that would provide acceptable analytical results for future monitoring needs.

Although smaller in magnitude than the differences identified for well MW1S, apparently consistent differences have also been observed in the carbon tetrachloride concentrations detected in samples collected by the low-flow and three-well-volume methods at well MW5S. Prior to implementation of the low-flow method, carbon tetrachloride levels of about 6 μg/L were routinely observed for this well. Except for a single value of 1.7 μg/L (October 2008), however, the analyses of all subsequent low-flow samples from this well have not detected carbon tetrachloride.

Low-flow sampling as it is currently performed appears to yield representative groundwater samples that are suitable for continued monitoring purposes from a majority of the Morrill monitoring wells that were not included in the comparative testing described above. Carbon tetrachloride contamination has not been detected in four wells (MW1D, MW4S, MW6S, and MW10S) to date with either sampling method. Samples from well MW7S showed a twofold to threefold drop in concentrations in the last sampling event *before* the low-flow method was instituted, and the concentrations have remained in that range in all subsequent low-

flow samples. The measured concentrations in groundwater samples from well MW8S shifted from just below to just above the quantitation limit after low-flow sampling was implemented. Similarly, the concentrations at MW9S shifted from not detected to < 2 μg/L after low-flow sampling was adopted. The results for these wells suggest that the sensitivities of the three-well-volume and low-flow sampling techniques at low contaminant concentrations are comparable.

TABLE 3.1 Hand-measured groundwater levels at Morrill in 2008 and 2009.

		April 30, 2008		September 19, 2008		March 25, 2009		May 8, 2009		October 20, 2009	
Well	Top of Casing Elevation (ft AMSL)	Depth to Water (ft BGL)	Groundwater Elevation (ft AMSL)	Depth to Water (ft BGL)	Groundwater Elevation (ft AMSL)	Depth to Water (ft BGL)	Groundwater Elevation (ft AMSL)	Depth to Water (ft BGL)	Groundwater Elevation (ft AMSL)	Depth to Water (ft BGL)	Groundwater Elevation (ft AMSL)
MW1S	1124.68	15.96	1108.72	23.51	1101.17	28.13	1096.55	18.05	1106.63	25.21	1099.47
MW1D	1124.63	–	–	30.01	1094.62	31.05	1093.58	30.34	1094.29	30.75	1093.88
MW2S	1137.07	22.84	1114.23	32.20	1104.87	38.20	1098.87	25.53	1111.54	34.72	1102.35
MW3S	1135.76	15.34	1120.42	24.42	1111.34	33.95	1101.81	14.64	1121.12	27.13	1108.63
MW4S	1143.61	24.71	1118.90	34.62	1108.99	43.59	1100.02	27.82	1115.79	35.95	1107.66
MW5S	1122.21	10.75	1111.46	21.21	1101.00	26.55	1095.66	14.49	1107.72	23.45	1098.76
MW6S	1090.97	4.89	1086.08	5.13	1085.84	5.80	1085.17	5.66	1085.31	5.68	1085.29
MW7S	1119.86	7.32	1112.54	15.38	1104.48	21.81	1098.05	8.94	1110.92	16.88	1102.98
MW8S	1098.53	0.61	1097.92	2.98	1095.55	4.14	1094.39	0.73	1097.80	3.54	1094.99
MW9S	1118.31	16.76	1101.55	20.46	1097.85	23.09	1095.22	19.95	1098.36	21.71	1096.60
MW10S	1110.78	9.83	1100.95	12.84	1097.94	14.61	1096.17	12.31	1098.47	13.27	1097.51
MW11S	1133.08	29.81	1103.27	35.67	1097.41	40.29	1092.79	33.50	1099.58	37.26	1095.82

TABLE 3.2 Results of analyses at the AGEM Laboratory for volatile organic compounds in groundwater samples collected at Morrill, October 2003 to September 2009. Shading indicates sample collection with the low-flow procedure.

								Concentration (µg/L)				
Location	Screen Interval (ft BGL)	Sample Date	Depth to Water (ft TOC)[a]	Depth of Well (ft TOC)	Volume Purged	Volume Units	Pump Intake Position (ft BGL)	Carbon Tetrachloride	Chloroform	Methylene Chloride	Comment	Sample
MW1S	11-51	10/23/03	30.36	54.04	70	gal	–	33	1.6	ND[b]		MRMW1S-W-16422
		6/2/04	26.97	53.94	53	gal	–	19	0.9	ND		MRMW1S-W-16461
		9/13/05	24.16	53.9	57	gal	–	35	1.7	ND		MRMW1S-W-19259
		3/22/06	29	53.95	48	gal	–	40	1.8	ND		MRMW1S-W-20008
		9/20/06	26.82	53.97	55	gal	–	23	0.9 J[c]	ND		MRMW1S-W-22495
		3/21/07	25.8	53.98	55	gal	–	23	1.1	ND		MRMW1S-W-16488
		10/1/07	21.65	53.95	63	gal	–	56	2.7	ND		MRMW1S-W-16595
		4/14/08	16.2	54	5.5	L	–	0.3 J	ND	ND	April monitoring.	MRMW1S-W-23230
		4/22/08	16	54	6.25	L	–	0.2 J	ND	ND	Confirm low carbon tetrachloride.	MRMW1S-W-23259
		5/1/08	–	–	3.24	L	22	ND	ND	ND	Vary pump intake.	MRMW1S-22-W-23275
		5/1/08	–	–	3.24	L	27	ND	ND	ND	Vary pump intake.	MRMW1S-27-W-23276
		5/1/08	–	–	4.25	L	48	0.3 J	ND	ND	Vary pump intake.	MRMW1S-48-W-23277
		10/20/08	25.8	54	6	L	31	0.7 J	ND	ND	Low flow.	MRMW1S-W-27620
		10/21/08	–	–	–	–	–	35	1.8	ND	Full purge.	MRMW1S-W-27649
		4/24/09	24.4	54	5	L	39.2	ND	ND	ND		MRMW1S-W-27652
		9/3/09	19	54	8	L	35	ND	ND	ND	Low flow.	MRMW1S-W-29942
		9/4/09	19.3	51.2	244	L	50	34	1.7	ND	Three well volumes.	MRMW1S-W-29971
MW1D	63-88	10/22/03	28.39	88.5	92	gal	–	ND	ND	ND		MRMW1D-W-16421
		6/2/04	26.82	88.6	140	gal	–	ND	ND	ND		MRMW1D-W-16458
		9/13/05	23.72	88.6	200	gal	–	ND	ND	ND		MRMW1D-W-16518
		3/19/06	26.85	88.6	112	gal	–	ND	ND	0.4 J B[d]		MRMW1D-W-19986
		9/20/06	25.52	88.8	125	gal	–	ND	ND	ND		MRMW1D-W-16532
		3/21/07	25.79	88.8	125	gal	–	ND	ND	ND		MRMW1D-W-16487
		10/1/07	22.75	89.38	130	gal	–	ND	ND	ND		MRMW1D-W-16596
		4/14/08	29.51	89	6	L	–	ND	ND	ND		MRMW1D-W-23231
		10/20/08	30.4	89	7	L	75.5	ND	ND	ND		MRMW1D-W-27621
		4/24/09	31	89	7	L	75.5	ND	ND	ND		MRMW1D-W-27653
		9/3/09	27.05	89	6.5	L	75.5	ND	ND	ND		MRMW1D-W-29943
		10/22/03	42.21	53.35	Purged dry, sampled			ND	ND	ND		MRMW02-W-16419
MW2S	13-53	6/2/04	37.44	53.3	31	gal	–	ND	ND	ND		MRMW2S-W-16459
		9/14/05	33.68	53.33	38	gal	–	ND	ND	ND		MRMW2S-W-19264
		3/21/06	40.87	53.32	27	gal	–	ND	ND	ND		MRMW2S-W-19992
		9/18/06	36.53	53.3	28	gal	–	ND	ND	ND		MRMW2S-W-22488
		3/22/07	35.77	53.3	35	gal	–	ND	ND	ND		MRMW2S-W-16559
		10/3/07	31.17	53.4	44	gal	–	ND	ND	ND		MRMW2S-W-16587
		4/15/08	23.55	53.4	2.22	L	–	ND	ND	ND		MRMW2S-W-23232
		10/21/08	33.7	53.5	5	L	33	ND	ND	ND	Low flow.	MRMW2S-W-27622
		10/21/08	–	–	–	–	–	ND	ND	ND	Full purge.	MRMW2S-W-27652
		4/23/09	33.2	53.5	6.5	L	43.35	ND	0.6 J	ND		MRMW2S-W-27654
		9/3/09	29.4	53.5	5.4	L	41.2	ND	ND	ND		MRMW2S-W-29944

TABLE 3.2 (Cont.)

Location	Screen Interval (ft BGL)	Sample Date	Depth to Water (ft TOC)[a]	Depth of Well (ft TOC)	Volume Purged	Volume Units	Pump Intake Position (ft BGL)	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Comment	Sample
MW3S	18-48	10/23/03	36.47	47.79	73	gal	–	89	2.7	ND		MRMW03-W-16423
		6/2/04	30.67	47.5	34	gal	–	110	3.2	ND		MRMW3S-W-16462
		9/13/05	25.6	47.6	50	gal	–	101	3.2	ND		MRMW3S-W-19261
		3/23/06	35.62	47.74	28	gal	–	91	2.6	ND		MRMW3S-W-19994
		9/20/06	29.44	47.75	22	gal	–	49	1.5	ND		MRMW3S-W-22496
		3/22/07	26.19	47.75	45	gal	–	84	2.3	ND		MRMW3S-W-16563
		10/3/07	22.7	47.9	50	gal	–	61	2.0	ND		MRMW3S-W-16585
		4/14/08	16.95	47.8	3.31	L	–	8.2	0.4 J	ND	April monitoring.	MRMW3S-W-23233
		4/22/08	15.8	47.8	6.5	L	–	0.7 J	ND	ND	Confirm low carbon tetrachloride.	MRMW3S-W-23260
		5/1/08	–	–	2.62	L	26	0.4 J	ND	ND	Vary pump intake.	MRMW3S-26-W-23269
		5/1/08	–	–	2.75	L	38	0.4 J	ND	ND	Vary pump intake.	MRMW3S-38-W-23270
		5/1/08	–	–	3.17	L	45	0.5 J	ND	ND	Vary pump intake.	MRMW3S-45-W-23271
		10/21/08	27	47.8	4.2	L	33	55	1.4	ND	Low flow.	MRMW3S-W-27623
		10/21/08	–	–	–	–	–	63	1.6	ND	Full purge.	MRMW3S-W-27650
		4/23/09	26.7	47.8	5	L	37.3	29	1.4	ND		MRMW3S-W-27655
		9/3/09	22.4	47.8	5.5	L	35.2	30	1.1	ND	Low flow.	MRMW3S-W-29945
		9/4/09	22.55	47.8	190	L	46	28	0.9 J	ND	Three well volumes.	MRMW3S-W-29972
MW4S	17-47	10/21/03	46.4	47.8	Purged dry, sampled			ND	ND	ND		MRMW04-W-16418
		6/4/04	43.21	47.8	10	gal	–	ND	ND	ND		MRMW4S-W-16470
		9/14/05	36.21	47.81	8	gal	–	ND	ND	ND		MRMW4S-W-19262
		3/21/06	44.55	47.72	6	gal	–	ND	ND	ND		MRMW4S-W-19993
		9/18/06	41.56	47.75	5.25	gal	–	ND	ND	ND		MRMW4S-W-22487
		3/22/07	38.74	47.75	6	gal	–	ND	ND	ND		MRMW4S-W-16562
		10/3/07	31.11	47.73	30	gal	–	0.5 J R[e]	ND	ND		MRMW4S-W-16586
		1/11/08	–	–	–	–	–	ND	ND	ND		MOMW4S-W-011108
		4/14/08	26.32	47.85	2.48	L	–	ND	ND	ND		MRMW4S-W-23234
		10/20/08	36.7	47.8	8	gal	–	ND	ND	ND		MRMW4S-W-27624
		4/23/09	41.5	47.8	5	L	44.65	ND	ND	ND		MRMW4S-W-27656
		9/4/09	31.6	47.8	6	L	39.3	ND	ND	ND		MRMW4S-W-29946
MW5S	15-55	10/22/03	31.4	55.72	48	gal	–	5.8	ND	ND		MRMW05-W-16420
		6/2/04	26.33	55.65	>57	gal	–	7.0	ND	ND		MRMW5S-W-16460
		9/13/05	22.66	54.2	75	gal	–	6.3	0.2 J	ND		MRMW5S-W-19260
		3/22/06	28.64	54.51	50	gal	–	7.3	0.2 J	ND		MRMW5S-W-19996
		9/20/06	25.43	54.63	52	gal	–	6.4	0.3 J	ND		MRMW5S-W-22493
		3/22/07	25.14	54.56	58	gal	–	6.5	0.4 J	ND		MRMW5S-W-16569
		10/3/07	19.55	54.65	68	gal	–	4.0	0.3 J	ND		MRMW5S-W-16588
		4/14/08	11.2	54.6	6	L	–	ND	ND	ND	April monitoring.	MRMW5S-W-23235
		4/23/08	11.3	54.6	6.5	L	–	ND	ND	ND	Confirm low carbon tetrachloride.	MRMW5S-W-23266
		5/1/08	–	–	3.7	L	20	ND	ND	ND	Vary pump intake.	MRMW5S-20-W-23272
		5/1/08	–	–	3.4	L	28	ND	ND	ND	Vary pump intake.	MRMW5S-28-W-23273
		5/1/08	–	–	4	L	52	ND	ND	ND	Vary pump intake.	MRMW5S-52-W-23274
		10/21/08	22.5	54.6	7	L	35	1.7	ND	ND		MRMW5S-W-27625

TABLE 3.2 (Cont.)

Location	Screen Interval (ft BGL)	Sample Date	Depth to Water (ft TOC)[a]	Depth of Well (ft TOC)	Volume Purged	Volume Units	Pump Intake Position (ft BGL)	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Comment	Sample
MW5S	15-55	4/24/09	22.1	54.6	5.5	L	38.35	ND	ND	ND		MRMW5S-W-27657
		9/3/09	17.6	54.6	5.5	L	36.3	ND	ND	ND		MRMW5S-W-29947
MW6S	10-25	6/3/04	3.34	26.9	45	gal	–	ND	ND	ND		MRMW6S-W-16465
		9/14/05	4.7	26.9	43	gal	–	ND	ND	ND		MRMW6S-W-19263
		3/20/06	5.35	26.91	43	gal	–	ND	ND	ND		MRMW6S-W-19990
		9/18/06	5.48	26.92	27	gal	–	ND	ND	ND		MRMW6S-W-22486
		3/21/07	5.42	26.92	30	gal	–	ND	ND	ND		MRMW6S-W-16486
		10/2/07	5	26.9	31	gal	–	ND	ND	ND		MRMW6S-W-16583
		4/15/08	5.15	26.9	2.5	L	–	ND	ND	ND		MRMW6S-W-23236
		10/20/08	5.7	26.9	5	L	17.5	ND	ND	ND		MRMW6S-W-27626
		4/24/09	6.2	26.9	12	L	17.5	ND	ND	ND		MRMW6S-W-27658
		9/4/09	5.85	26.9	5.4	L	17.5	ND	ND	ND		MRMW6S-W-29948
MW7S	20-45	6/3/04	26.68	46.98	40	gal	–	18	ND	ND		MRMW7S-W-16466
		9/12/05	17.57	46.94	55	gal	–	43	1.1	ND		MRMW7S-W-19258
		3/22/06	22.45	46.98	48	gal	–	21	0.4 J	ND		MRMW7S-W-20000
		9/19/06	20.94	47.02	56	gal	–	38	0.7 J	ND		MRMW7S-W-22490
		3/20/07	18.01	47.02	50	gal	–	16	0.4 J	ND		MRMW7S-W-16481
		10/1/07	12.4	47	70	gal	–	8.1	0.2 J	ND		MRMW7S-W-16581
		4/14/08	7.72	47	1.82	L	–	10	0.3 J	ND		MRMW7S-W-23237
		4/23/08	7.8	47	11	L	–	8.3	0.2 J	ND		MRMW7S-W-23265
		10/20/08	17.2	47	6.3	L	32.5	7.9	ND	ND		MRMW7S-W-27627
		4/23/09	16.7	47	7	L	32.5	9.5	ND	ND		MRMW7S-W-27659
		9/3/09	13.8	47	9	L	32.5	8.0	ND	ND		MRMW7S-W-29949
MW8S	10-25	6/3/04	3.7	26.75	45	gal	–	ND	ND	ND		MRMW8S-W-16464
		9/14/05	4.02	26.82	57	gal	–	0.9 J	ND	ND		MRMW8S-W-19265
		3/20/06	4.57	26.41	43	gal	–	0.6 J	ND	0.4 J B		MRMW8S-W-19991
		9/19/06	4.76	26.83	45	gal	–	1.3	ND	ND		MRMW8S-W-22492
		3/20/07	2.63	26.82	49	gal	–	0.6 J	ND	ND		MRMW8S-W-16483
		10/2/07	2.2	26.8	48	gal	–	0.8 J	ND	ND		MRMW8S-W-16584
		4/15/08	0.7	26.8	5.5	L	–	1.1	ND	ND		MRMW8S-W-23238
		10/20/08	3.6	26.8	8	L	17.5	1.3	ND	ND		MRMW8S-W-27628
		4/23/09	2.3	26.8	6	L	17.5	ND	ND	ND		MRMW8S-W-27660
		9/3/09	2.9	26.8	8.5	L	17.5	1.9	ND	ND		MRMW8S-W-29950
MW9S	38.83-53.83	3/22/06	20.2	58.62	20	gal	–	ND	ND	ND		MRMW9S-W-20004
		9/19/06	18.87	59	22	gal	–	ND	ND	ND		MRMW9S-W-22494
		3/20/07	16.69	59	22	gal	–	ND	ND	ND		MRMW9S-W-16480
		10/1/07	14	58.6	23	gal	–	ND	ND	ND		MRMW9S-W-16582
		4/14/08	16.58	58.63	2.29	L	–	0.8 J	ND	ND		MRMW9S-W-23239
		10/20/08	21.5	58.5	11	L	46.33	1.1	ND	ND		MRMW9S-W-27629
		4/23/09	21.9	58.5	5.5	L	46.33	1.0	ND	ND		MRMW9S-W-27661
		9/4/09	19.95	58.5	5	L	46.33	1.4	ND	ND		MRMW9S-W-29951

TABLE 3.2 (Cont.)

Location	Screen Interval (ft BGL)	Sample Date	Depth to Water (ft TOC)[a]	Depth of Well (ft TOC)	Volume Purged	Volume Units	Pump Intake Position (ft BGL)	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Comment	Sample
MW10S	30-45	3/21/06	12.3	49.6	19	gal	–	ND	ND	ND		MRMW10S-W-19999
		9/18/06	11.08	49.61	20	gal	–	ND	ND	ND		MRMW10S-W-22489
		3/21/07	10.77	49.61	20	gal	–	ND	ND	ND		MRMW10S-W-16485
		10/1/07	6.95	49.65	20	gal	–	ND	ND	ND		MRMW10S-W-16593
		4/14/08	9.82	49.7	1.9	L	–	ND	ND	ND		MRMW10S-W-23240
		10/20/08	13.7	49.7	5.4	L	37.5	ND	ND	ND		MRMW10S-W-27630
		4/23/09	13.6	45	7.5	L	37.5	ND	ND	ND		MRMW10S-W-27662
		9/3/09	12	49.7	7.5	L	37.5	ND	ND	ND		MRMW10S-W-29952
MW11S	53-68	3/22/06	35.2	72.5	20	gal	–	39	0.9 J	ND		MRMW11S-W-20001
		9/19/06	36	73.14	20	gal	–	53	1.0	ND		MRMW11S-W-22491
		3/20/07	34.65	73.14	20	gal	–	37	0.8 J	ND		MRMW11S-W-16479
		10/1/07	31.55	73	20	gal	–	54	1.2	ND		MRMW11S-W-16594
		4/15/08	29.9	72.7	5.5	L	–	35	0.8 J	ND	April monitoring.	MRMW11S-W-23241
		4/22/08	30.2	72.7	7.2	L	–	42	0.9 J	ND	Confirm low carbon tetrachloride.	MRMW11S-W-23261
		10/20/08	37.1	72.7	9	L	60.5	42	0.9 J	ND	Low flow.	MRMW11S-W-27631
		10/21/08	–	–	–	–	–	45	0.9 J	ND	Full purge.	MRMW11S-W-27651
		4/23/09	38.1	72.7	5	L	60.5	46	1.0	ND		MRMW11S-W-27663
		9/3/09	34.7	72.7	7.5	L	60.5	39	0.9 J	ND	Low flow.	MRMW11S-W-29953
		9/4/09	34.95	72.7	72	L	67	41	0.9 J	ND	Three well volumes.	MRMW11S-W-29973
Isch	–	2/19/04	–	–	Pump[f]	–	–	ND	ND	ND		MRJR-W-16502
		9/14/05	–	–	Pump	–	–	ND	ND	ND		MRPRISCH-W-16513
		3/23/06	–	–	20	gal	–	ND	ND	ND		MRISCH-W-19989
		9/19/06	–	–	Pump	–	–	ND	ND	ND		MRISCH-W-16531
		3/22/07	–	–	Pump	–	–	ND	ND	ND		MRISCH-W-16564
		10/3/07	–	–	Pump	–	–	ND	ND	ND		MRISCH-W-16590
		4/15/08	–	–	Pump	–	–	0.4 J	ND	ND		MRISCH-W-23242
		4/22/08	–	–	Pump	–	–	ND	ND	ND		MRISCH-W-23262
		10/21/08	–	–	Pump	–	–	ND	ND	ND		MRISCH-W-27632
		4/22/09	–	–	Pump	–	–	ND	ND	ND		MRISCH-W-27664
		9/2/09	–	–	Pump	–	–	ND	ND	ND		MRISCH-W-29954
Rillinger	–	6/4/04	–	–	Pump	–	–	ND	ND	ND		MRPRIVRIL-W-16471
		9/14/05	–	–	Pump	–	–	2.6	0.1 J	ND		MRPRILL-W-16512
		3/19/06	–	–	Pump	–	–	ND	ND	0.4 J B		MRRILINGER-W-19988
		9/19/06	–	–	Pump	–	–	ND	ND	ND		MRRILI-W-16530
		3/29/07	–	–	Pump	–	–	1.3	1.1	ND		MRRILINGER-W-16561
		10/3/07	–	–	Pump	–	–	13[g]	0.4 J	ND		MRRILINGER-W-16591
		10/8/07	–	–	Pump	–	–	0.4 J	ND	ND		MRRILINGER-W-16592
		1/11/08	–	–	Pump	–	–	6.2	0.5 J	ND		MORIL-W-11108
		4/15/08	–	–	Pump	–	–	9.9	0.4 J	ND		MRRILINGER-W-23243
		10/21/08	–	–	Pump	–	–	0.9 J	ND	ND		MRRILLINGER-W-27633
		4/22/09	–	–	Pump	–	–	1.2	ND	ND		MRRILLINGER-W-27665
		9/2/09	–	–	Pump	–	–	1.0	ND	ND		MRRILLINGER-W-29955

TABLE 3.2 (Cont.)

Location	Screen Interval (ft BGL)	Sample Date	Depth to Water (ft TOC)[a]	Depth of Well (ft TOC)	Volume Purged	Volume Units	Pump Intake Position (ft BGL)	Concentration (µg/L) Carbon Tetrachloride	Chloroform	Methylene Chloride	Comment	Sample
Stone	43[h]	6/4/04	23.35	–	Purged dry		–	10	ND	ND		MRPRIVSTON-W-16475
		9/14/05	17.18	40	–	–	–	2.6	0.3 J	ND		MRPRSTON-W-16511
		3/19/06	17.42	40	100	gal	–	14	0.8 J	0.4 J B		MRSTONE-W-19987
		9/19/06	18.55	38.8	41	gal	–	2.1	ND	ND		MRSTONE-W-16529
		3/22/07	20.62	38.8	56	gal	–	5.4	0.3 J	ND		MRSTONE-W-16560
		10/3/07	14.6	38.6	72	gal	–	2.8	ND	ND		MRSTONE-W-16589
		4/15/08	–	38.86	–	–	–	0.9 J	ND	ND		MRSTONE-W-23244
		10/21/08	–	–	5	gal	–	3.0	ND	ND		MRSTONE-W-27634
		4/23/09	–	–	5	gal	–	1.1	ND	ND		MRSTONE-W-27666
		9/2/09	–	–	5	gal	–	0.9 J	ND	ND		MRSTONE-W-29956
TD12	27-67	4/22/08	–	–	–	–	–	ND	ND	ND	Grimm irrigation well.	MRTD12-W-23264
		10/20/08	–	–	–	–	–	ND	ND	ND	Grimm irrigation well.	MRTD12-W-27635
		4/23/09	–	–	–	–	–	ND	ND	ND	Tile drain into creek.	MRTD12-W-27667
		9/3/09	–	–	–	–	–	ND	ND	ND	Overflow before catchment.	MRTD12-W-29957

[a] Depths were measured from the top of the casing (TOC).

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

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

[d] Qualifier B indicates that the compound was present in the associated method blank.

[e] Qualifier R indicates that the compound was present in the associated equipment rinsate. Resampling confirmed that the well was free of contamination.

[f] The well's dedicated pump was used for sampling. The pump was allowed to run before the sample was collected.

[g] Sample collected after recent reactivation of well. Well resampled on 1/8/07 and 1/11/08.

[h] Total depth.

TABLE 3.3 Field measurements for groundwater samples collected at Morrill, October 2003 to September 2009. Shading indicates sample collection with the low-flow procedure.

Location	Screen Interval (ft BGL)	Sample Date	Depth to Water (ft TOC)	Depth of Well (ft TOC)	Volume Purged	Volume Units	Pump Intake Position (ft BGL)	Temperature (°C)	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Iron II (mg/L)	Carbon Dioxide (mg/L)	Sample
MW1S	11-51	10/23/03	30.36	54.04	70	gal	–[a]	14.6	7.14	933	–	13	–	–	MRMW1S-W-16422
		6/2/04	26.97	53.94	53	gal	–	14.4	7.16	970	–	–	–	–	MRMW1S-W-16461
		9/13/05	24.16	53.9	57	gal	–	15.3	6.95	1174	7.17	200	0	55	MRMW1S-W-19259
		3/22/06	29	53.95	48	gal	–	15.5	7.23	927	9.94	220	0.01	40	MRMW1S-W-20008
		9/20/06	26.82	53.97	55	gal	–	15.7	7.12	973	7.52	–	0.03	40	MRMW1S-W-22495
		3/21/07	25.8	53.98	55	gal	–	16.6	6.48	960	5.45	88	0	40	MRMW1S-W-16488
		10/1/07	21.65	53.95	63	gal	–	16.0	6.80	886	6.79	128	0	30	MRMW1S-W-16595
		4/14/08	16.2	54	5.5	L	–	13.9	7.09	1237	6.38	118	0.02	–	MRMW1S-W-23230
		4/22/08	16	54	6.25	L	–	15.6	6.96	1230	6.10	133	–	–	MRMW1S-W-23259
		5/1/08	–	–	3.24	L	22	17.1	7.11	801	3.34	104	–	–	MRMW1S-22-W-23275
		5/1/08	–	–	3.24	L	27	17.0	7.10	820	3.40	102	–	–	MRMW1S-27-W-23276
		5/1/08	–	–	4.25	L	48	16.3	7.00	1301	3.03	118	–	–	MRMW1S-48-W-23277
		10/20/08	25.8	54	6	L	31	14.0	6.84	1265	5.40	103	0	–	MRMW1S-W-27620
		10/21/08	–	–	TWV[b]	–	–	14.8	7.02	978	–	–	0	–	MRMW1S-W-27649
		4/24/09	24.4	54	5	L	39.2	16.2	7.00	986	8.93	75	0.04	–	MRMW1S-W-27652
		9/3/09	19	54	8	L	35	16.0	6.94	1334	7.08	28	0.04	–	MRMW1S-W-29942
		9/4/09	19.3	51.2	244	L	50	15.0	6.92	950	7.73	61	–	–	MRMW1S-W-29971
MW1D	63-88	10/22/03	28.39	88.5	92	gal	–	14.9	6.87	2620	–	25	–	–	MRMW1D-W-16421
		6/2/04	26.82	88.6	140	gal	–	13.9	6.87	2460	–	–	–	–	MRMW1D-W-16458
		9/13/05	23.72	88.6	200	gal	–	15.5	6.56	2470	–	–	–	–	MRMW1D-W-16518
		3/19/06	26.85	88.6	112	gal	–	12.9	6.95	2460	5.11	230	0	–	MRMW1D-W-19986
		9/20/06	25.52	88.8	125	gal	–	12.5	6.93	2690	–	–	–	–	MRMW1D-W-16532
		3/21/07	25.79	88.8	125	gal	–	15.3	6.39	2540	0.08	12	0.39	40	MRMW1D-W-16487
		10/1/07	22.75	89.38	130	gal	–	16.3	6.60	2230	6.79	5	0.44	45	MRMW1D-W-16596
		4/14/08	29.51	89	6	L	–	14.6	6.99	2637	0.50	32	0.73	–	MRMW1D-W-23231
		10/20/08	30.4	89	7	L	75.5	13.4	6.83	2556	0.24	21	0.37	–	MRMW1D-W-27621
		4/24/09	31	89	7	L	75.5	16.7	6.92	2419	0.37	22	0.28	–	MRMW1D-W-27653
		9/3/09	27.05	89	6.5	L	75.5	16.9	7.00	2200	0.59	16	0.27	–	MRMW1D-W-29943
MW2S	13-53	10/22/03	42.21	53.35	PDS[c]	–	–	16.2	6.86	875	–	20	–	–	MRMW02-W-16419
		6/2/04	37.44	53.3	31	gal	–	16.9	7.07	861	–	–	–	–	MRMW2S-W-16459
		9/14/05	33.68	53.33	38	gal	–	15.2	6.94	801	7.85	142	–	65	MRMW2S-W-19264
		3/21/06	40.87	53.32	27	gal	–	13.0	7.07	863	9.40	262	0.14	25	MRMW2S-W-19992
		9/18/06	36.53	53.3	28	gal	–	13.6	6.99	844	6.81	69	0	80	MRMW2S-W-22488
		3/22/07	35.77	53.3	35	gal	–	15.2	6.40	790	5.82	69	0	30	MRMW2S-W-16559
		10/3/07	31.17	53.4	44	gal	–	16.8	6.97	703	6.70	269	0.01	30	MRMW2S-W-16587
		4/15/08	23.55	53.4	2.22	L	–	11.7	7.23	742	3.22	75	0	–	MRMW2S-W-23232
		10/21/08	33.7	53.5	5	L	33	13.4	7.08	745	8.55	104	0	–	MRMW2S-W-27622
		10/21/08	–	–	TWV	–	–	–	–	–	–	–	–	–	MRMW2S-W-27652
		4/23/09	33.2	53.5	6.5	L	43.35	15.2	6.97	755	9.19	26	0	–	MRMW2S-W-27654
		9/3/09	29.4	53.5	5.4	L	41.2	15.1	7.15	690	8.80	31.7	0.01	–	MRMW2S-W-29944
MW3S	18-48	10/23/03	36.47	47.79	73	gal	–	16.8	7.23	655	–	6	–	–	MRMW03-W-16423
		6/2/04	30.67	47.5	34	gal	–	14.2	7.23	664	–	–	–	–	MRMW3S-W-16462

TABLE 3.3 (Cont.)

Location	Screen Interval (ft BGL)	Sample Date	Depth to Water (ft TOC)	Depth of Well (ft TOC)	Volume Purged	Volume Units	Pump Intake Position (ft BGL)	Temperature (°C)	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Iron II (mg/L)	Carbon Dioxide (mg/L)	Sample
MW3S	18-48	9/13/05	25.6	47.6	50	gal	–	14.6	7.13	663	8.82	223	0	100	MRMW3S-W-19261
		3/23/06	35.62	47.74	28	gal	–	8.9	7.16	662	6.74	269	0.08	25	MRMW3S-W-19994
		9/20/06	29.44	47.75	22	gal	–	12.9	7.15	669	7.64	105	0	–	MRMW3S-W-22496
		3/22/07	26.19	47.75	45	gal	–	15.0	6.44	578	5.90	261	0.17	30	MRMW3S-W-16563
		10/3/07	22.7	47.9	50	gal	–	15.3	6.97	594	0.38	282	0	20	MRMW3S-W-16585
		4/14/08	16.95	47.8	3.31	L	–	13.7	7.17	693	3.52	165	0	–	MRMW3S-W-23233
		4/22/08	15.8	47.8	6.5	L	–	16.0	6.99	685	6.71	155	–	–	MRMW3S-W-23260
		5/1/08	–	–	2.62	L	26	13.2	7.17	675	3.83	161.1	–	–	MRMW3S-26-W-23269
		5/1/08	–	–	2.75	L	38	12.7	7.12	671	4.21	193	–	–	MRMW3S-38-W-23270
		5/1/08	–	–	3.17	L	45	12.6	7.03	675	4.57	205	–	–	MRMW3S-45-W-23271
		10/21/08	27	47.8	4.2	L	33	12.6	7.17	673	6.42	115	0	–	MRMW3S-W-27623
		10/21/08	–	–	TWV	–	–	14.3	7.11	522	–	–	0	–	MRMW3S-W-27650
		4/23/09	26.7	47.8	5	L	37.3	17.0	7.06	662	9.40	-63	0.01	–	MRMW3S-W-27655
		9/3/09	22.4	47.8	5.5	L	35.2	16.3	7.28	640	7.69	12	0.01	–	MRMW3S-W-29945
		9/4/09	22.55	47.8	190	L	46	14.2	6.57	659	9.09	95	–	–	MRMW3S-W-29972
MW4S	17-47	10/21/03	46.4	47.8	PDS	–	–	–	7.17	758	–	–	–	–	MRMW04-W-16418
		6/4/04	43.21	47.8	10	gal	–	15.4	6.93	769	–	–	–	–	MRMW4S-W-16470
		9/14/05	36.21	47.81	8	gal	–	15.4	7.30	751	8.00	174	0	50	MRMW4S-W-19262
		3/21/06	44.55	47.72	6	gal	–	6.7	7.25	729	10.90	154	0	25	MRMW4S-W-19993
		9/18/06	41.56	47.75	5.25	gal	–	13.1	7.25	728	8.05	41	0	50	MRMW4S-W-22487
		3/22/07	38.74	47.75	6	gal	–	14.2	6.53	765	5.91	78	0.10	25	MRMW4S-W-16562
		10/3/07	31.11	47.73	30	gal	–	16.4	6.95	715	7.40	281	0.10	30	MRMW4S-W-16586
		1/11/08	–	–	–	–	–	11.3	7.56	757	–	–	–	–	MOMW4S-W-011108
		4/14/08	26.32	47.85	2.48	L	–	13.1	7.28	783	3.80	213	0	–	MRMW4S-W-23234
		10/20/08	36.7	47.8	8	gal	–	14.5	7.16	756	8.71	104	0	–	MRMW4S-W-27624
		4/23/09	41.5	47.8	5	L	44.65	15.8	7.16	717	9.45	22	0.05	–	MRMW4S-W-27656
		9/4/09	31.6	47.8	6	L	39.3	15.0	7.13	731	8.23	80	0.04	–	MRMW4S-W-29946
MW5S	15-55	10/22/03	31.4	55.72	48	gal	–	15.3	7.10	816	–	6	–	–	MRMW05-W-16420
		6/2/04	26.33	55.65	>57	gal	–	14.3	7.21	817	–	–	–	–	MRMW5S-W-16460
		9/13/05	22.66	54.2	75	gal	–	16.0	7.04	763	13.90	228	0	60	MRMW5S-W-19260
		3/22/06	28.64	54.51	50	gal	–	13.9	7.25	781	4.52	234	0.06	35	MRMW5S-W-19996
		9/20/06	25.43	54.63	52	gal	–	13.9	7.19	787	5.82	73	0	35	MRMW5S-W-22493
		3/22/07	25.14	54.56	58	gal	–	15.5	6.50	436	3.98	159	0.08	30	MRMW5S-W-16569
		10/3/07	19.55	54.65	68	gal	–	16.5	7.18	850	1.87	268	0.04	25	MRMW5S-W-16588
		4/14/08	11.2	54.6	6	L	–	14.1	6.90	1008	3.73	143	0.02	–	MRMW5S-W-23235
		4/23/08	11.3	54.6	6.5	L	–	14.9	6.88	1009	3.27	184	–	–	MRMW5S-W-23266
		5/1/08	–	–	3.7	L	20	15.2	6.92	1014	2.99	126	–	–	MRMW5S-20-W-23272
		5/1/08	–	–	3.4	L	28	15.1	6.90	997	2.38	124	–	–	MRMW5S-28-W-23273
		5/1/08	–	–	4	L	52	15.1	6.89	989	2.06	128	–	–	MRMW5S-52-W-23274
		10/21/08	22.5	54.6	7	L	35	13.2	7.04	818	5.54	180	0	–	MRMW5S-W-27625
		4/24/09	22.1	54.6	5.5	L	38.35	15.2	6.98	817	6.68	77	0	–	MRMW5S-W-27657
		9/3/09	17.6	54.6	5.5	L	36.3	16.5	7.10	873	3.07	23	0.02	–	MRMW5S-W-29947
MW6S	10-25	6/3/04	3.34	26.9	45	gal	–	15.1	6.89	2410	–	–	–	–	MRMW6S-W-16465
		9/14/05	4.7	26.9	43	gal	–	14.1	7.06	2350	0.01	54	0	60	MRMW6S-W-19263
		3/20/06	5.35	26.91	43	gal	–	9.8	6.91	2360	1.37	89	0.38	60	MRMW6S-W-19990

TABLE 3.3 (Cont.)

Location	Screen Interval (ft BGL)	Sample Date	Depth to Water (ft TOC)	Depth of Well (ft TOC)	Volume Purged	Volume Units	Pump Intake Position (ft BGL)	Temperature (°C)	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Iron II (mg/L)	Carbon Dioxide (mg/L)	Sample
MW6S	10-25	9/18/06	5.48	26.92	27	gal	–	12.5	6.96	2410	0.08	-29	0.35	85	MRMW6S-W-22486
		3/21/07	5.42	26.92	30	gal	–	18.0	6.34	2450	0.12	75	0.78	40	MRMW6S-W-16486
		10/2/07	5	26.9	31	gal	–	17.1	7.33	2280	0.20	61	0.19	35	MRMW6S-W-16583
		4/15/08	5.15	26.9	2.5	L	–	8.7	6.99	2485	0.31	-76	0.41	–	MRMW6S-W-23236
		10/20/08	5.7	26.9	5	L	17.5	14.3	6.84	2380	0.36	18	0.28	–	MRMW6S-W-27626
		4/24/09	6.2	26.9	12	L	17.5	15.2	6.93	2270	0.19	-39	0.63	–	MRMW6S-W-27658
		9/4/09	5.85	26.9	5.4	L	17.5	13.8	6.88	2302	0.64	79	0.32	–	MRMW6S-W-29948
MW7S	20-45	6/3/04	26.68	46.98	40	gal	–	13.8	7.19	763	–	–	–	–	MRMW7S-W-16466
		9/12/05	17.57	46.94	55	gal	–	15.0	7.26	760	8.35	240	0	50	MRMW7S-W-19258
		3/22/06	22.45	46.98	48	gal	–	15.2	7.32	740	5.52	268	0.03	25	MRMW7S-W-20000
		9/19/06	20.94	47.02	56	gal	–	13.2	7.15	764	7.37	114	0	25	MRMW7S-W-22490
		3/20/07	18.01	47.02	50	gal	–	14.6	6.43	750	5.31	95	0	30	MRMW7S-W-16481
		10/1/07	12.4	47	70	gal	–	15.6	6.99	725	7.76	269	0.01	35	MRMW7S-W-16581
		4/14/08	7.72	47	1.82	L	–	13.4	7.21	811	2.50	276	0	–	MRMW7S-W-23237
		4/23/08	7.8	47	11	L	–	14.0	7.00	822	7.41	191	–	–	MRMW7S-W-23265
		10/20/08	17.2	47	6.3	L	32.5	14.9	7.02	802	6.38	87	0	–	MRMW7S-W-27627
		4/23/09	16.7	47	7	L	32.5	16.1	7.01	727	9.48	-53	0.01	–	MRMW7S-W-27659
		9/3/09	13.8	47	9	L	32.5	17.4	7.58	814	9.86	102	0.02	–	MRMW7S-W-29949
MW8S	10-25	6/3/04	3.7	26.75	45	gal	–	12.8	7.12	941	–	–	–	–	MRMW8S-W-16464
		9/14/05	4.02	26.82	57	gal	–	14.1	7.30	853	0.02	65	0	40	MRMW8S-W-19265
		3/20/06	4.57	26.41	43	gal	–	12.5	7.04	954	0.90	153	0.05	30	MRMW8S-W-19991
		9/19/06	4.76	26.83	45	gal	–	11.8	7.09	903	0.58	284	0.13	50	MRMW8S-W-22492
		3/20/07	2.63	26.82	49	gal	–	11.0	6.52	1026	0.77	76	0	30	MRMW8S-W-16483
		10/2/07	2.2	26.8	48	gal	–	15.2	6.76	607	2.66	209	0.02	25	MRMW8S-W-16584
		4/15/08	0.7	26.8	5.5	L	–	10.2	7.27	1067	1.58	170	0	–	MRMW8S-W-23238
		10/20/08	3.6	26.8	8	L	17.5	14.0	6.91	1002	0.93	69	0	–	MRMW8S-W-27628
		4/23/09	2.3	26.8	6	L	17.5	11.4	6.88	825	1.76	-35	0.02	–	MRMW8S-W-27660
		9/3/09	2.9	26.8	8.5	L	17.5	14.1	7.52	890	2.09	115	0	–	MRMW8S-W-29950
MW9S	38.83-53.83	3/22/06	20.2	58.62	20	gal	–	14.6	7.17	715	0.41	25	0	35	MRMW9S-W-20004
		9/19/06	18.87	59	22	gal	–	13.0	7.08	707	0.10	113	0	55	MRMW9S-W-22494
		3/20/07	16.69	59	22	gal	–	14.2	6.39	714	0.21	40	0	20	MRMW9S-W-16480
		10/1/07	14	58.6	23	gal	–	15.5	7.05	664	5.50	191	0	30	MRMW9S-W-16582
		4/14/08	16.58	58.63	2.29	L	–	12.6	7.33	709	1.93	266	0.07	–	MRMW9S-W-23239
		10/20/08	21.5	58.5	11	L	46.33	15.1	7.15	690	6.18	106	0	–	MRMW9S-W-27629
		4/23/09	21.9	58.5	5.5	L	46.33	16.0	7.17	669	5.99	-65	0.07	–	MRMW9S-W-27661
		9/4/09	19.95	58.5	5	L	46.33	17.3	7.18	684	5.33	52	0.03	–	MRMW9S-W-29951
MW10S	30-45	3/21/06	12.3	49.6	19	gal	–	6.3	7.11	701	2.10	88	0.01	40	MRMW10S-W-19999
		9/18/06	11.08	49.61	20	gal	–	14.3	7.17	701	0.04	24	0.08	60	MRMW10S-W-22489
		3/21/07	10.77	49.61	20	gal	–	14.5	6.51	720	0.88	11	0	30	MRMW10S-W-16485
		10/1/07	6.95	49.65	20	gal	–	16.3	6.97	664	0.35	248	0.04	35	MRMW10S-W-16593
		4/14/08	9.82	49.7	1.9	L	–	16.0	7.25	723	1.25	181	0	–	MRMW10S-W-23240
		10/20/08	13.7	49.7	5.4	L	37.5	14.3	7.03	710	1.02	56	0	–	MRMW10S-W-27630
		4/23/09	13.6	45	7.5	L	37.5	15.1	7.05	668	1.78	-57	0.07	–	MRMW10S-W-27662
		9/3/09	12	49.7	7.5	L	37.5	14.3	7.59	731	2.03	86	0.07	–	MRMW10S-W-29952

TABLE 3.3 (Cont.)

Location	Screen Interval (ft BGL)	Sample Date	Depth to Water (ft TOC)	Depth of Well (ft TOC)	Volume Purged	Volume Units	Pump Intake Position (ft BGL)	Temperature (°C)	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Iron II (mg/L)	Carbon Dioxide (mg/L)	Sample
MW11S	53-68	3/22/06	35.2	72.5	20	gal	–	14.8	7.33	762	9.40	237	0.06	30	MRMW11S-W-20001
		9/19/06	36	73.14	20	gal	–	13.0	7.24	764	1.42	158	0.02	30	MRMW11S-W-22491
		3/20/07	34.65	73.14	20	gal	–	14.6	6.33	782	3.90	76	0	30	MRMW11S-W-16479
		10/1/07	31.55	73	20	gal	–	16.4	6.49	624	6.57	241	0.04	35	MRMW11S-W-16594
		4/15/08	29.9	72.7	5.5	L	–	13.9	7.30	785	6.14	152	0	–	MRMW11S-W-23241
		4/22/08	30.2	72.7	7.2	L	–	15.1	7.25	790	6.22	163	–	–	MRMW11S-W-23261
		10/20/08	37.1	72.7	9	L	60.5	14.3	7.16	756	8.95	104	0	–	MRMW11S-W-27631
		10/21/08	–	–	TWV	–	–	14.8	7.19	766	–	–	0	–	MRMW11S-W-27651
		4/23/09	38.1	72.7	5	L	60.5	16.5	7.19	722	9.03	-62	0.09	–	MRMW11S-W-27663
		9/3/09	34.7	72.7	7.5	L	60.5	13.9	7.63	777	9.35	102	0.05	–	MRMW11S-W-29953
		9/4/09	34.95	72.7	72	L	67	16.2	6.69	721	8.78	100	–	–	MRMW11S-W-29973
Isch	–	2/19/04	–	–	Pump[d]	–	–	–	–	–	–	–	–	–	MRJR-W-16502
		9/14/05	–	–	Pump	–	–	20.4	6.73	2300	–	–	–	–	MRPRISCH-W-16513
		3/23/06	–	–	20	gal	–	13.0	7.23	9400	–	–	–	–	MRISCH-W-19989
		9/19/06	–	–	Pump	–	–	–	–	–	–	–	–	–	MRISCH-W-16531
		3/22/07	–	–	Pump	–	–	–	–	–	–	–	–	–	MRISCH-W-16564
		10/3/07	–	–	Pump	–	–	–	–	–	–	–	–	–	MRISCH-W-16590
		4/15/08	–	–	Pump	–	–	12.6	7.33	3160	–	–	0.28	–	MRISCH-W-23242
		10/21/08	–	–	Pump	–	–	–	–	–	–	–	–	–	MRISCH-W-27632
		4/22/09	–	–	Pump	–	–	15.3	6.70	2389	–	–	0.04	–	MRISCH-W-27664
		9/2/09	–	–	Pump	–	–	13.9	7.18	2600	–	–	–	–	MRISCH-W-29954
Rillinger	–	6/4/04	–	–	Pump	–	–	15.9	6.99	2450	–	–	–	–	MRPRIVRIL-W-16471
		9/14/05	–	–	Pump	–	–	–	–	–	–	–	–	–	MRPRILL-W-16512
		3/19/06	–	–	Pump	–	–	11.9	7.05	2550	–	–	–	–	MRRILINGER-W-19988
		9/19/06	–	–	Pump	–	–	–	–	–	–	–	–	–	MRRILI-W-16530
		3/29/07	–	–	Pump	–	–	–	–	–	–	–	–	–	MRRILINGER-W-16561
		10/3/07	–	–	Pump	–	–	–	–	–	–	–	–	–	MRRILINGER-W-16591
		1/11/08	–	–	Pump	–	–	12.2	7.46	884	–	–	–	–	MORIL-W-11108
		4/15/08	–	–	Pump	–	–	12.0	7.56	868	–	–	0	–	MRRILINGER-W-23243
		10/21/08	–	–	Pump	–	–	–	–	–	–	–	–	–	MRRILLINGER-W-27633
		4/22/09	–	–	Pump	–	–	14.5	7.14	2279	–	–	0.01	–	MRRILLINGER-W-27665
		9/2/09	–	–	Pump	–	–	14.8	7.60	809	–	–	–	–	MRRILLINGER-W-29955
Stone	43[e]	6/4/04	23.35	–	PDS	–	–	17.1	7.35	682	–	–	–	–	MRPRIVSTON-W-16475
		9/14/05	17.18	40	–	–	–	17.3	6.81	638	–	–	–	–	MRPRSTON-W-16511
		3/19/06	17.42	40	100	gal	–	12.9	6.42	650	–	213	0	–	MRSTONE-W-19987
		9/19/06	18.55	38.8	41	gal	–	16.7	7.12	639	–	–	–	–	MRSTONE-W-16529
		3/22/07	20.62	38.8	56	gal	–	16.7	6.58	679	4.71	19	0.28	35	MRSTONE-W-16560
		10/3/07	14.6	38.6	72	gal	–	16.1	6.97	564	7.07	225	0.07	25	MRSTONE-W-16589
		4/15/08	–	38.86	–	–	–	11.3	7.45	557	–	–	0	–	MRSTONE-W-23244
		10/21/08	–		5	gal	–	–	–	–	–	–	–	–	MRSTONE-W-27634
		4/23/09	–	–	5	gal	–	13.9	7.12	588	–	–	–	–	MRSTONE-W-27666
		9/2/09	–	–	5	gal	–	13.8	7.40	623	–	–	–	–	MRSTONE-W-29956

TABLE 3.3 (Cont.)

Location	Screen Interval (ft BGL)	Sample Date	Depth to Water (ft TOC)	Depth of Well (ft TOC)	Volume Purged	Volume Units	Pump Intake Position (ft BGL)	Temperature (°C)	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Iron II (mg/L)	Carbon Dioxide (mg/L)	Sample

[a] Not measured.

[b] TWV, three well volumes.

[c] PDS, purged dry and then sampled.

[d] The well's dedicated pump was used for sampling. The pump was allowed to run before the sample was collected.

[e] Total depth.

TABLE 3.4 Results of analyses at the AGEM Laboratory for volatile organic compounds in surface water and sediment samples collected at Morrill, March 2007 to September 2009.[a]

				Concentration (µg/L in water; µg/kg in sediment)			
Location	Sample	Sample Date	Medium	Carbon Tetrachloride	Chloroform	Methylene Chloride	Quantitation Limit
SM1	MRSM1-W-16572	3/22/07	Water	ND[b]	ND	ND	1
	MRSM1-S-16573	3/22/07	Sediment	ND	ND	ND	10
	MRSM1-W-16583	10/8/07	Water	ND	ND	ND	1
	MRSM1-S-16584	10/8/07	Sediment	ND	ND	ND	10
	MRSM1-W-23254	4/14/08	Water	ND	ND	ND	1
	MRSM1-S-23254	4/14/08	Sediment	ND	ND	ND	10
	MRSM1-W-27644	10/20/08	Water	ND	ND	ND	1
	MRSM1-S-27644	10/20/08	Sediment	ND	ND	ND	10
	MRSM1-W-27676	4/22/09	Water	ND	ND	ND	1
	MRSM1-S-27676	4/22/09	Sediment	ND	ND	ND	10
	MRSM1-W-29966	9/2/09	Water	ND	ND	ND	1
	MRSM1-S-29966	9/2/09	Sediment	ND	ND	ND	10
SM2	MRSM2-W-16574	3/22/07	Water	ND	ND	ND	1
	MRSM2-S-16575	3/22/07	Sediment	ND	ND	ND	10
	MRSM2-W-16585	10/8/07	Water	ND	ND	ND	1
	MRSM2-S-16586	10/8/07	Sediment	ND	ND	ND	10
	MRSM2-W-23255	4/14/08	Water	ND	ND	ND	1
	MRSM2-S-23255	4/14/08	Sediment	ND	ND	ND	10
	MRSM2-W-27645	10/20/08	Water	ND	ND	ND	1
	MRSM2-S-27645	10/20/08	Sediment	ND	ND	ND	10
	MRSM2-W-27677	4/22/09	Water	ND	ND	ND	1
	MRSM2-S-27677	4/22/09	Sediment	ND	ND	ND	10
	MRSM2-W-29967	9/2/09	Water	ND	ND	ND	1
	MRSM2-S-29967	9/2/09	Sediment	ND	ND	ND	10
SM3	MRSM3-W-16576	3/22/07	Water	ND	ND	ND	1
	MRSM3-S-16577	3/22/07	Sediment	ND	ND	ND	10
	MRSM3-W-16587	10/8/07	Water	ND	ND	ND	1
	MRSM3-S-16588	10/8/07	Sediment	ND	ND	ND	10
	MRSM3-W-23256	4/14/08	Water	ND	ND	ND	1
	MRSM3-S-23256	4/14/08	Sediment	ND	ND	ND	10
	MRSM3-W-27646	10/20/08	Water	ND	ND	ND	1
	MRSM3-S-27646	10/20/08	Sediment	ND	ND	ND	10
	MRSM3-W-27678	4/22/09	Water	ND	ND	ND	1
	MRSM3-S-27678	4/22/09	Sediment	ND	ND	ND	10
	MRSM3-W-29968	9/2/09	Water	ND	ND	ND	1
	MRSM3-S-29968	9/2/09	Sediment	ND	ND	ND	10
SM4	MRSM4-W-16578	3/22/07	Water	ND	ND	ND	1
	MRSM4-S-16579	3/22/07	Sediment	ND	ND	ND	10
	MRSM4-W-16589	10/8/07	Water	ND	ND	ND	1
	MRSM4-S-16590	10/8/07	Sediment	ND	ND	ND	10
	MRSM4-W-23257	4/14/08	Water	ND	ND	ND	1
	MRSM4-S-23257	4/14/08	Sediment	ND	ND	ND	10
	MRSM4-W-27647	10/20/08	Water	ND	ND	ND	1
	MRSM4-S-27647	10/20/08	Sediment	ND	ND	ND	10
	MRSM4-W-27679	4/22/09	Water	ND	ND	ND	1
	MRSM4-S-27679	4/22/09	Sediment	ND	ND	ND	10
	MRSM4-W-29969	9/2/09	Water	ND	ND	ND	1
	MRSM4-S-29969	9/2/09	Sediment	ND	ND	ND	10

TABLE 3.4 (Cont.)

				Concentration (µg/L in water; µg/kg in sediment)			
Location	Sample	Sample Date	Medium	Carbon Tetrachloride	Chloroform	Methylene Chloride	Quantitation Limit
SMB	MRSMB-W-16570	3/22/07	Water	ND	ND	ND	1
	MRSMB-S-16571	3/22/07	Sediment	ND	ND	ND	10
	MRSMB-W-16581	10/8/07	Water	ND	ND	ND	1
	MRSMB-S-16582	10/8/07	Sediment	ND	ND	ND	10
	MRSMB-W-23258	4/14/08	Water	ND	ND	ND	1
	MRSMB-S-23258	4/14/08	Sediment	ND	ND	ND	10
	MRSMB-W-27648	10/20/08	Water	ND	ND	ND	1
	MRSMB-S-27648	10/20/08	Sediment	ND	ND	ND	10
	MRSMB-W-27680	4/22/09	Water	ND	ND	ND	1
	MRSMB-S-27680	4/22/09	Sediment	ND	ND	ND	10
	MRSMB-W-29970	9/2/09	Water	ND	ND	ND	1
	MRSMB-S-29970	9/2/09	Sediment	ND	ND	ND	10

[a] Analyses conducted at the AGEM Laboratory, Argonne, Illinois, with EPA Method 524.2 for surface water samples or modified EPA Method 5030B/8260B for sediment samples.

[b] ND, not detected at the instrument detection limit of 0.1 µg/L for surface water samples or 1.0 µg/kg for sediment samples.

TABLE 3.5 Results of analyses at the AGEM Laboratory for carbon tetrachloride and chloroform in vegetation samples collected at Morrill, October 2006 to August 2009.[a]

				Concentration (µg/kg)	
Location	Sample	Sample Date	Type	Carbon Tetrachloride	Chloroform
MR001	MR001-B-18959	10/14/06	Branch	ND[b]	1.6
	MR001-L-18958	10/14/06	Leaf	ND	3.3
	MR001-B-23173	4/2/07	Branch	ND	ND
	MR001-B-23213	7/26/07	Branch	ND	ND
	MR001-L-23212	7/26/07	Leaf	ND	ND
	MR001-B-16623	7/24/08	Branch	ND	ND
	MR001-B-29924	8/27/09	Branch	ND	ND
MR001A	MR001A-B-16622	7/24/08	Branch	ND	ND
MR002	MR002-B-18961	10/14/06	Branch	ND	ND
	MR002-L-18960	10/14/06	Leaf	ND	ND
	MR002-B-23174	4/2/07	Branch	ND	1.5
	MR002-B-23211	7/26/07	Branch	ND	ND
	MR002-L-23210	7/26/07	Leaf	ND	1.3
	MR002-B-16621	7/24/08	Branch	ND	ND
	MR002-B-29923	8/27/09	Branch	ND	ND
MR003	MR003-B-18963	10/14/06	Branch	ND	1.5
	MR003-L-18962	10/14/06	Leaf	ND	1.8
	MR003-B-23175	4/2/07	Branch	ND	ND
	MR003-B-23209	7/26/07	Branch	ND	ND
	MR003-L-23208	7/26/07	Leaf	ND	0.8
	MR003-B-16620	7/24/08	Branch	ND	ND
	MR003-B-29922	8/27/09	Branch	ND	ND
MR004	MR004-B-18965	10/14/06	Branch	ND	2.1
	MR004-L-18964	10/14/06	Leaf	ND	ND
	MR004-B-23176	4/2/07	Branch	ND	ND
	MR004-B-23205	7/26/07	Branch	ND	ND
	MR004-L-23204	7/26/07	Leaf	ND	ND
	MR004-B-16619	7/24/08	Branch	ND	ND
	MR004-B-29921	8/27/09	Branch	ND	ND
MR005	MR005-B-18967	10/14/06	Branch	ND	ND
	MR005-L-18966	10/14/06	Leaf	ND	1.2
	MR005-B-23177	4/2/07	Branch	ND	ND
	MR005-B-23207	7/26/07	Branch	ND	ND
	MR005-L-23206	7/26/07	Leaf	ND	1.4
MR005A	MR005-B-16618	7/24/08	Branch	ND	ND
	MR005A-B-29920	8/27/09	Branch	ND	ND
MR006	MR006-B-18969	10/14/06	Branch	ND	3.8
	MR006-L-18968	10/14/06	Leaf	ND	ND
	MR006-B-23161	4/2/07	Branch	ND	ND
	MR006-B-23181	7/26/07	Branch	ND	ND
	MR006-L-23180	7/26/07	Leaf	ND	1.3
	MR006-B-16625	7/24/08	Branch	ND	ND
	MR006-B-29930	8/27/09	Branch	ND	ND

TABLE 3.5 (Cont.)

				Concentration (µg/kg)	
Location	Sample	Sample Date	Type	Carbon Tetrachloride	Chloroform
MR007	MR007-B-18971	10/14/06	Branch	ND	1.6
	MR007-L-18970	10/14/06	Leaf	ND	2.0
	MR007-B-23162	4/2/07	Branch	ND	ND
	MR007-B-23183	7/26/07	Branch	0.1	ND
	MR007-L-23182	7/26/07	Leaf	ND	1.3
	MR007-B-16626	7/24/08	Branch	ND	ND
	MR007-B-29932	8/27/09	Branch	0.7	0.8
MR008	MR008-B-18973	10/14/06	Branch	ND	1.3
	MR008-L-18972	10/14/06	Leaf	ND	2.5
	MR008-B-23163	4/2/07	Branch	ND	0.8
	MR008-B-23185	7/26/07	Branch	ND	ND
	MR008-L-23184	7/26/07	Leaf	ND	ND
	MR008-B-16627	7/24/08	Branch	ND	ND
	MR008-B-29933	8/27/09	Branch	ND	ND
MR009	MR009-B-18975	10/14/06	Branch	ND	0.9
	MR009-L-18974	10/14/06	Leaf	ND	2.5
	MR009-B-23165	4/2/07	Branch	ND	ND
	MR009-B-23189	7/26/07	Branch	ND	ND
	MR009-L-23188	7/26/07	Leaf	ND	1.5
	MR009-B-16629	7/24/08	Branch	ND	ND
	MR009-B-29935	8/27/09	Branch	ND	ND
MR010	MR010-B-18977	10/14/06	Branch	ND	3.4
	MR010-L-18976	10/14/06	Leaf	ND	ND
	MR010-B-23167	4/2/07	Branch	ND	ND
	MR010-B-23193	7/26/07	Branch	ND	0.8
	MR010-L-23192	7/26/07	Leaf	ND	1.4
	MR010-B-16631	7/24/08	Branch	0.1	1.4
	MR010-B-29936	8/27/09	Branch	ND	ND
MR011	MR011-B-18979	10/14/06	Branch	ND	2.2
	MR011-L-18978	10/14/06	Leaf	ND	2.6
	MR011-B-23168	4/2/07	Branch	ND	ND
	MR011-B-23195	7/26/07	Branch	ND	ND
	MR011-L-23194	7/26/07	Leaf	ND	1.7
	MR011-B-16632	7/24/08	Branch	ND	ND
	MR011-B-29937	8/27/09	Branch	ND	ND
MR012	MR012-B-18981	10/14/06	Branch	ND	2.1
	MR012-L-18980	10/14/06	Leaf	ND	2.9
	MR012-B-23169	4/2/07	Branch	ND	ND
	MR012-B-23197	7/26/07	Branch	ND	ND
	MR012-L-23196	7/26/07	Leaf	ND	1.4
	MR012-B-16633	7/24/08	Branch	ND	ND
	MR012-B-29938	8/27/09	Branch	ND	ND
MR013	MR013-B-18983	10/14/06	Branch	ND	ND
	MR013-L-18982	10/14/06	Leaf	ND	2.2
	MR013-B-23160	4/2/07	Branch	ND	ND
	MR013-B-23179	7/26/07	Branch	ND	ND
	MR013-L-23178	7/26/07	Leaf	ND	ND

TABLE 3.5 (Cont.)

				Concentration (µg/kg)	
Location	Sample	Sample Date	Type	Carbon Tetrachloride	Chloroform
MR013	MR013-B-16624	7/24/08	Branch	ND	ND
	MR013-B-29931	8/27/09	Branch	ND	ND
MR014	MR014-B-23164	4/2/07	Branch	ND	ND
	MR014-B-23187	7/26/07	Branch	0.3	ND
	MR014-L-23186	7/26/07	Leaf	ND	ND
	MR014-B-16628	7/24/08	Branch	ND	ND
	MR014-B-29934	8/27/09	Branch	ND	ND
MR015	MR015-B-23166	4/2/07	Branch	ND	0.8
	MR015-B-23191	7/26/07	Branch	ND	ND
	MR015-L-23190	7/26/07	Leaf	ND	ND
	MR015-B-16630	7/24/08	Branch	ND	ND
MR016	MR016-B-23170	4/2/07	Branch	ND	1.1
	MR016-B-23199	7/26/07	Branch	ND	ND
	MR016-L-23198	7/26/07	Leaf	ND	ND
	MR016-B-16634	7/24/08	Branch	ND	ND
	MR016-B-29939	8/27/09	Branch	ND	ND
MR017	MR017-B-23171	4/2/07	Branch	ND	ND
	MR017-B-23203	7/26/07	Branch	ND	ND
	MR017-L-23202	7/26/07	Leaf	ND	ND
	MR017-B-16635	7/24/08	Branch	ND	ND
	MR017-B-29940	8/27/09	Branch	0.1	ND
MR018	MR018-B-23172	4/2/07	Branch	ND	ND
	MR018-B-23201	7/26/07	Branch	ND	ND
	MR018-L-23200	7/26/07	Leaf	ND	3.2
	MR018-B-16636	7/24/08	Branch	ND	ND
	MR018-B-29941	8/27/09	Branch	0.2	ND
MR019	MR019-B-16637	7/24/08	Branch	0.1	ND
	MR019-B-29929	8/27/09	Branch	ND	ND
MR020	MR020-B-20021	7/24/08	Branch	ND	ND
	MR020-B-29928	8/27/09	Branch	ND	ND
MR021	MR021-B-20022	7/24/08	Branch	ND	ND
	MR021-B-29926	8/27/09	Branch	ND	ND
MR022	MR022-B-20023	7/24/08	Branch	ND	ND
MR023	MR023-B-20024	7/24/08	Branch	ND	ND
	MR023-B-29925	8/27/09	Branch	0.2	ND
MR024	MR024-B-20025	7/24/08	Branch	ND	ND
	MR024-B-29927	8/27/09	Branch	ND	ND

TABLE 3.5 (Cont.)

				Concentration (µg/kg)	
Location	Sample	Sample Date	Type	Carbon Tetrachloride	Chloroform

[a] Analyses conducted at the AGEM Laboratory, Argonne, Illinois, with modified EPA Method 5021 (headspace analysis on a gas chromatograph with electron capture detection).

[b] ND, not detected at the method reporting limit of 0.1 µg/kg for carbon tetrachloride or 0.75 µg/kg for chloroform.

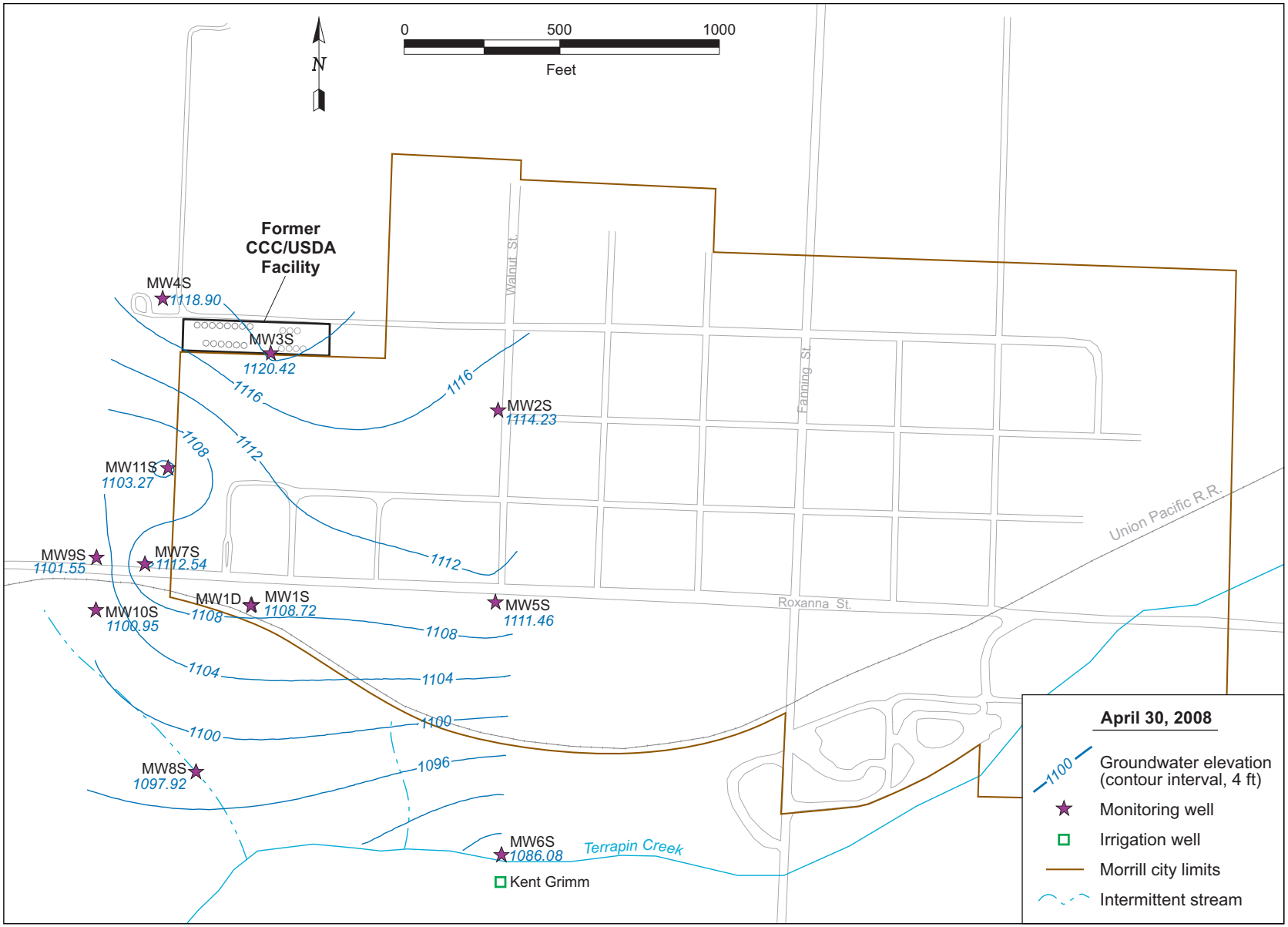

FIGURE 3.1a Potentiometric surface at Morrill, based on water levels measured manually on April 30, 2008.

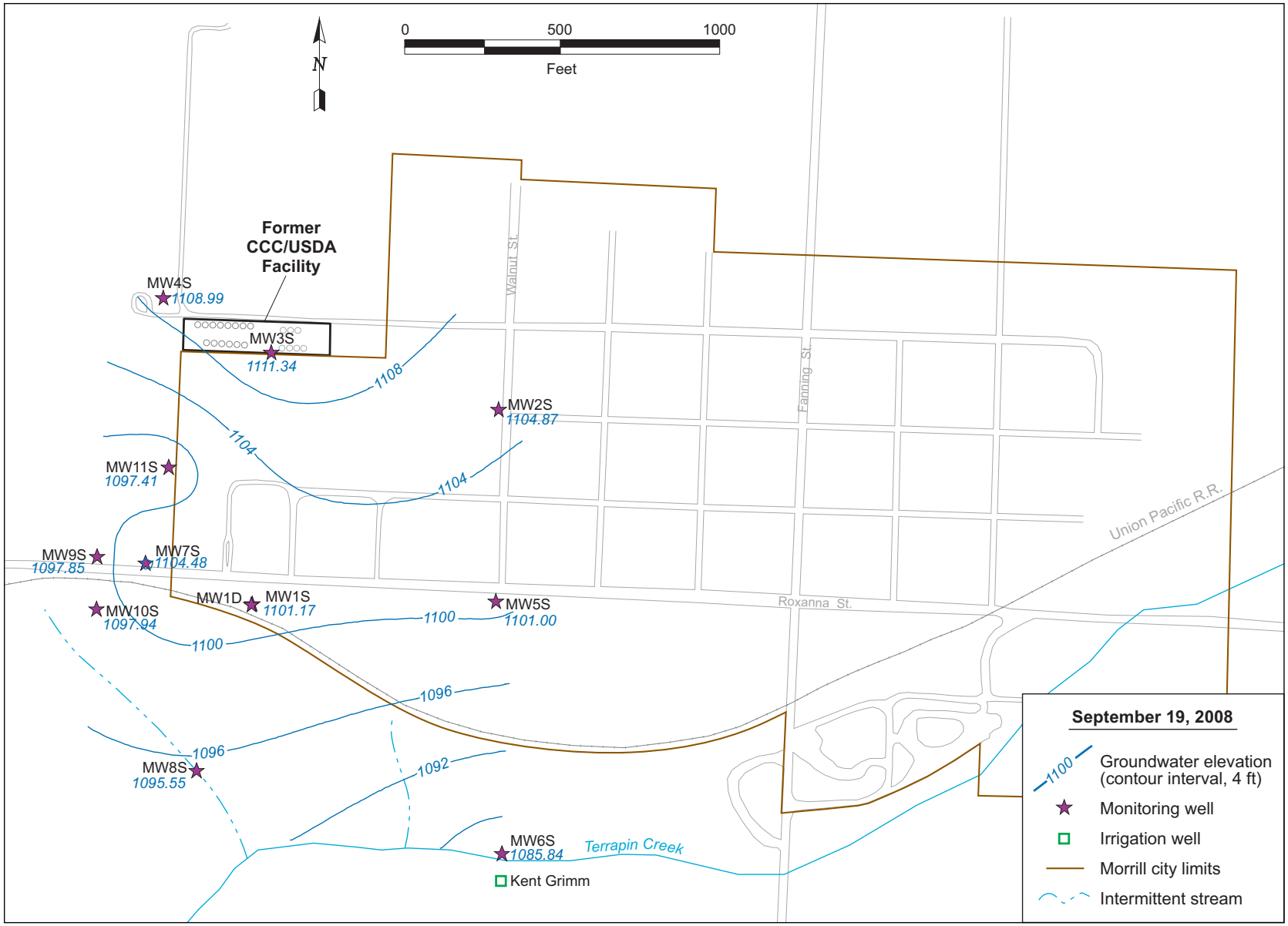

FIGURE 3.1b Potentiometric surface at Morrill, based on water levels measured manually on September 19, 2008.

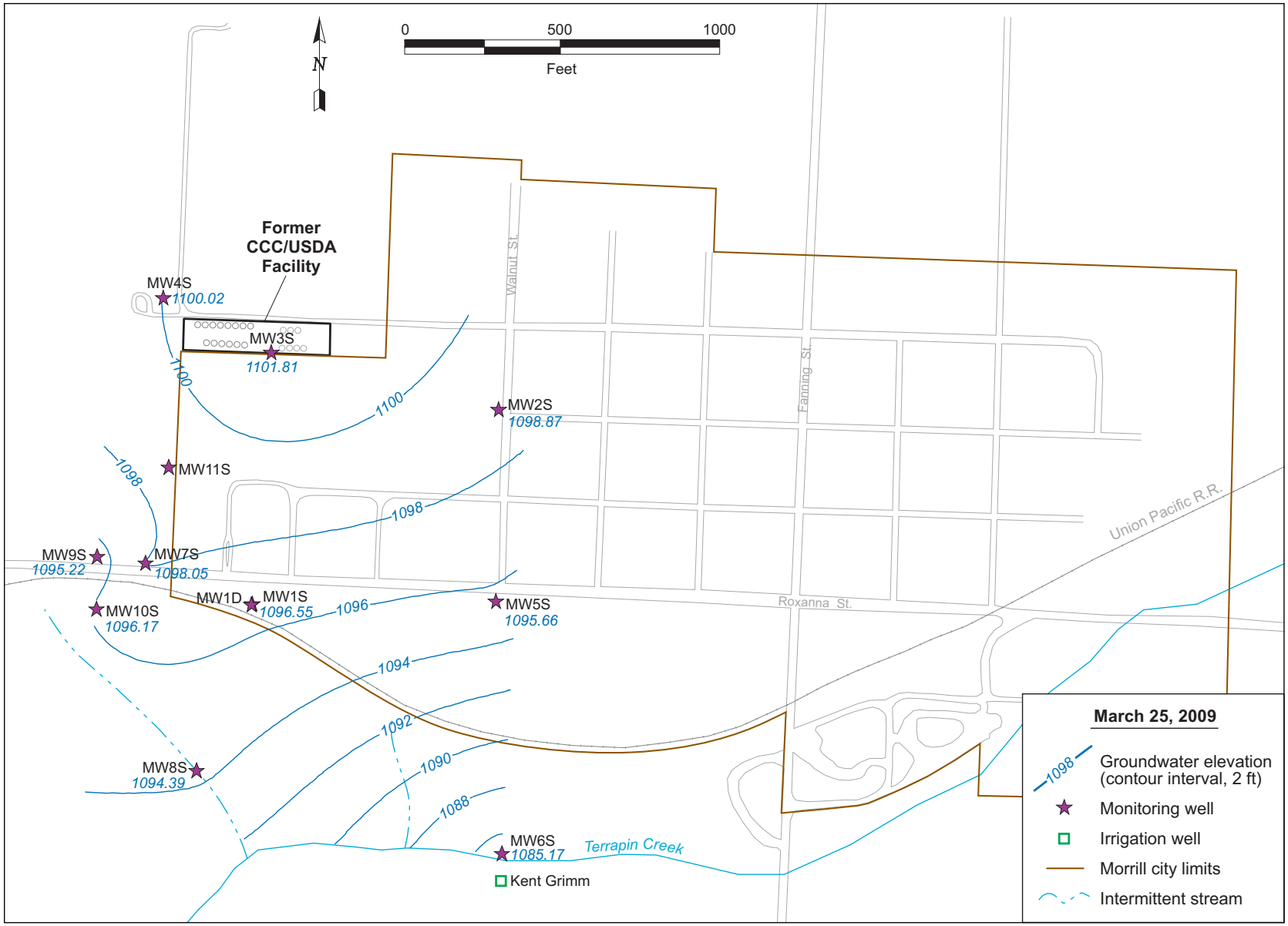

FIGURE 3.1c Potentiometric surface at Morrill, based on water levels measured manually on March 25, 2009.

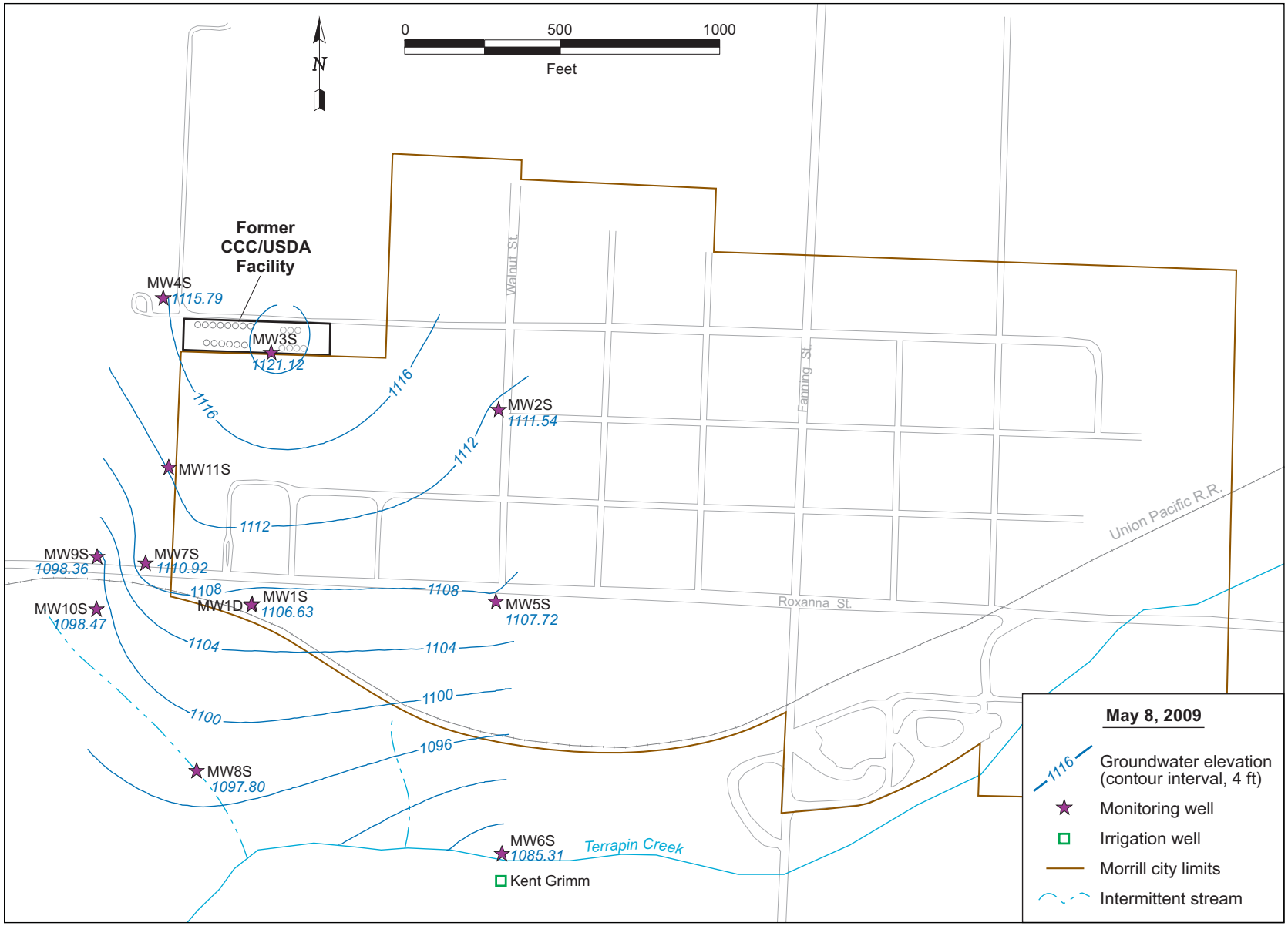

FIGURE 3.1d Potentiometric surface at Morrill, based on water levels measured manually on May 8, 2009.

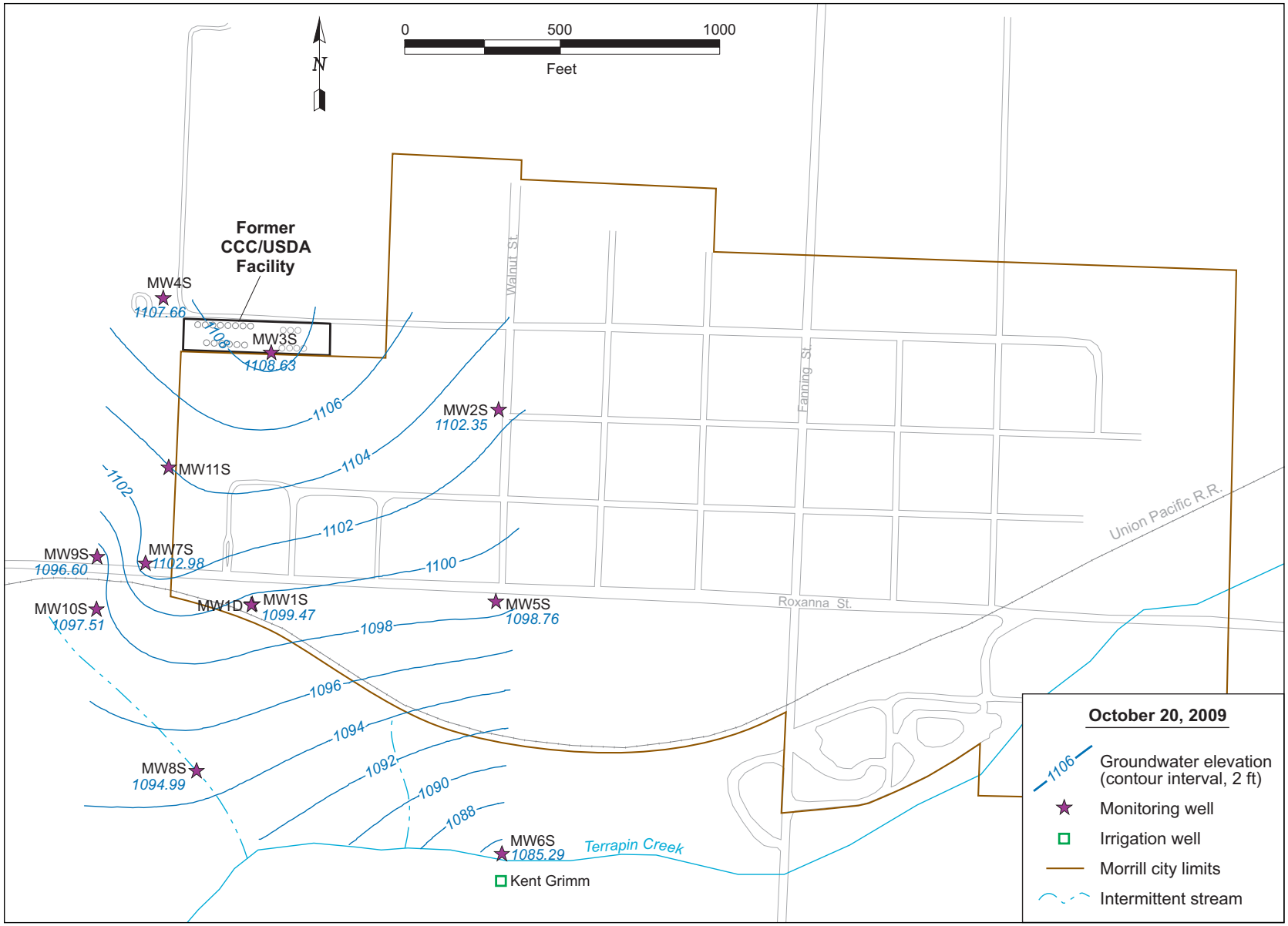

FIGURE 3.1e Potentiometric surface at Morrill, based on water levels measured manually on October 20, 2009.

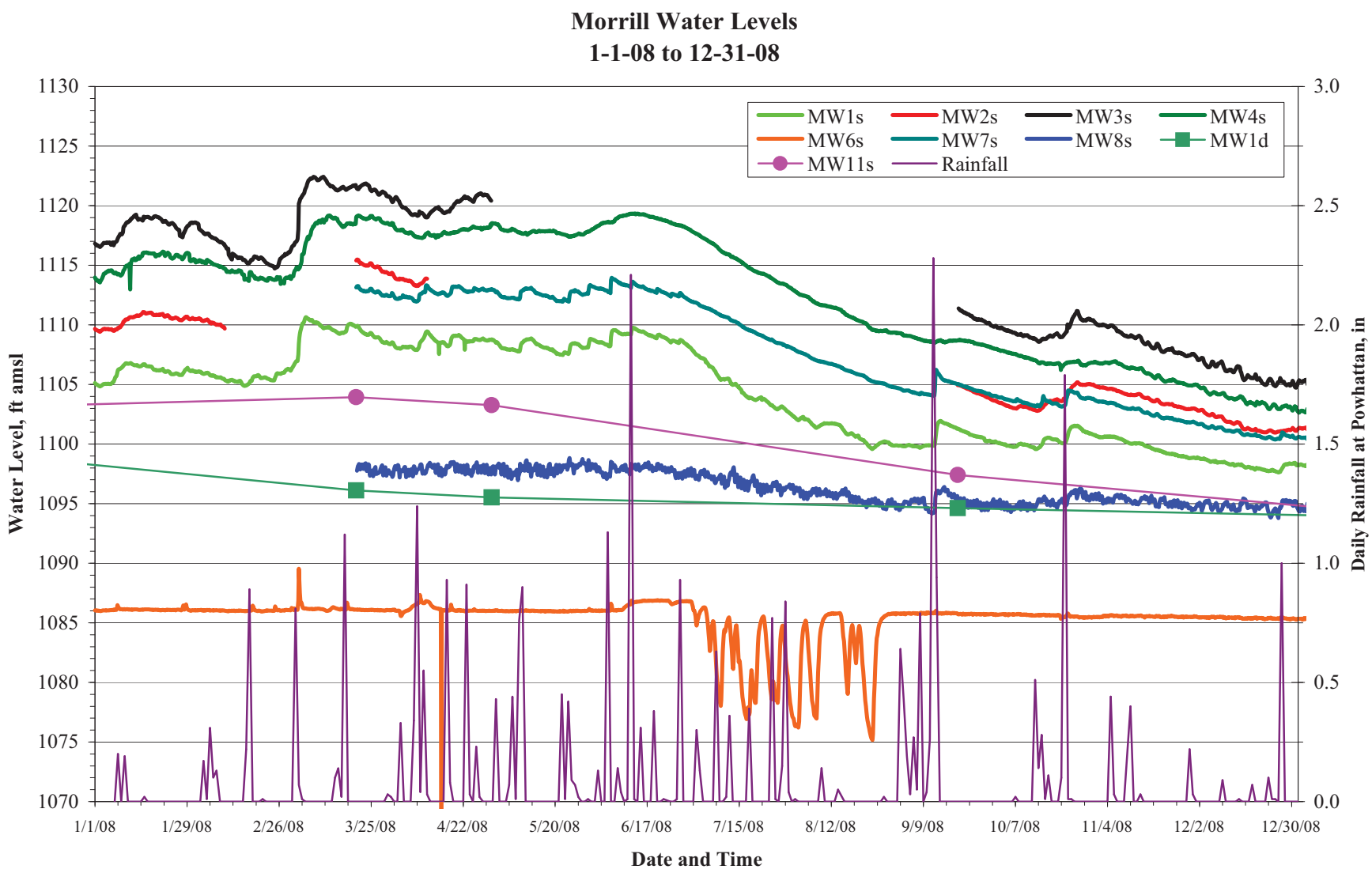

FIGURE 3.2a Hydrographs summarizing results of long-term water level monitoring in wells MW1S-MW4S and MW6S-MW8S at Morrill, from January 1, 2008, to December 31, 2008.

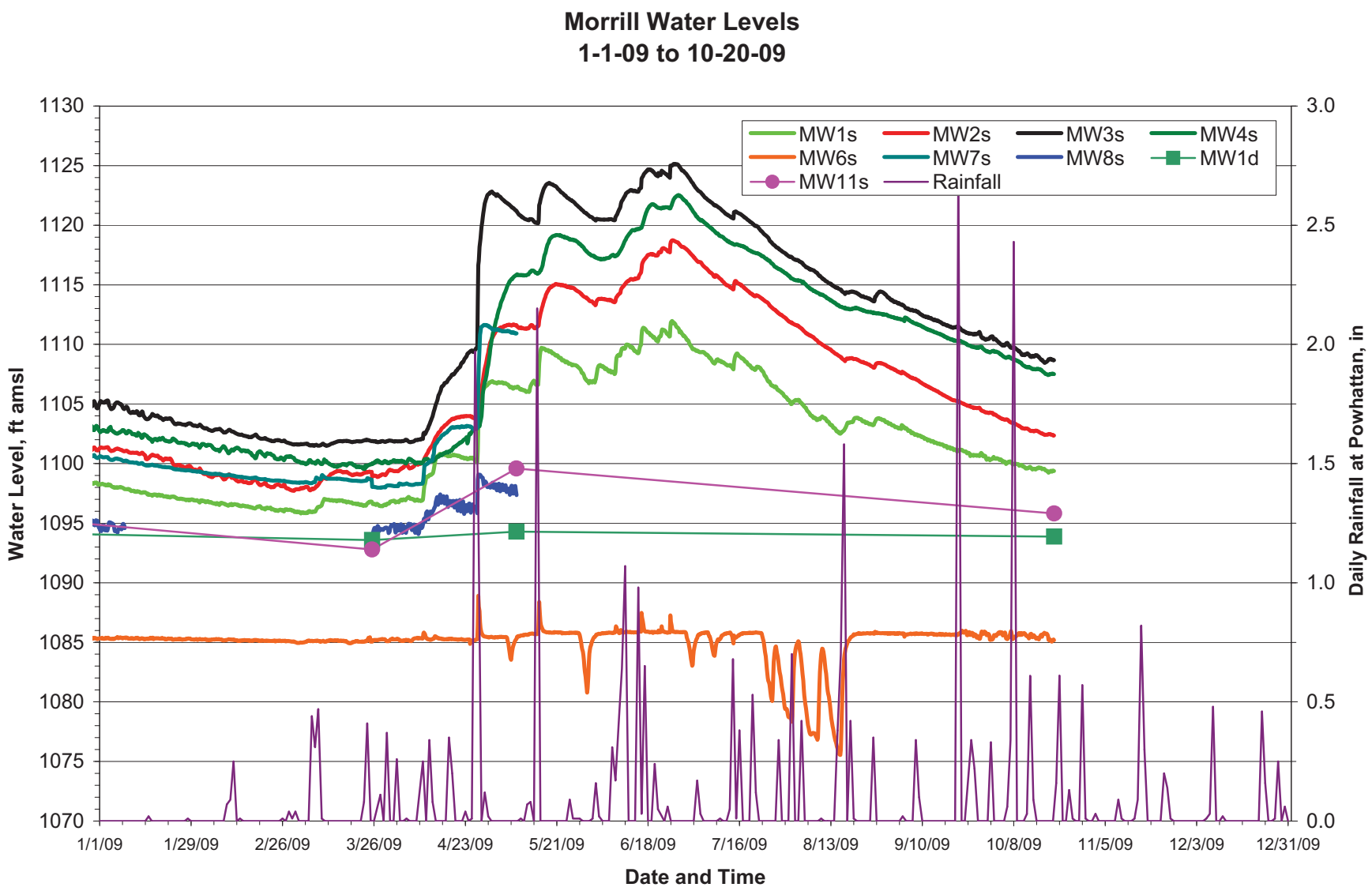

FIGURE 3.2b Hydrographs summarizing results of long-term water level monitoring in wells MW1S-MW4S and MW6S-MW8S at Morrill, from January 1, 2009, to September 19, 2009.

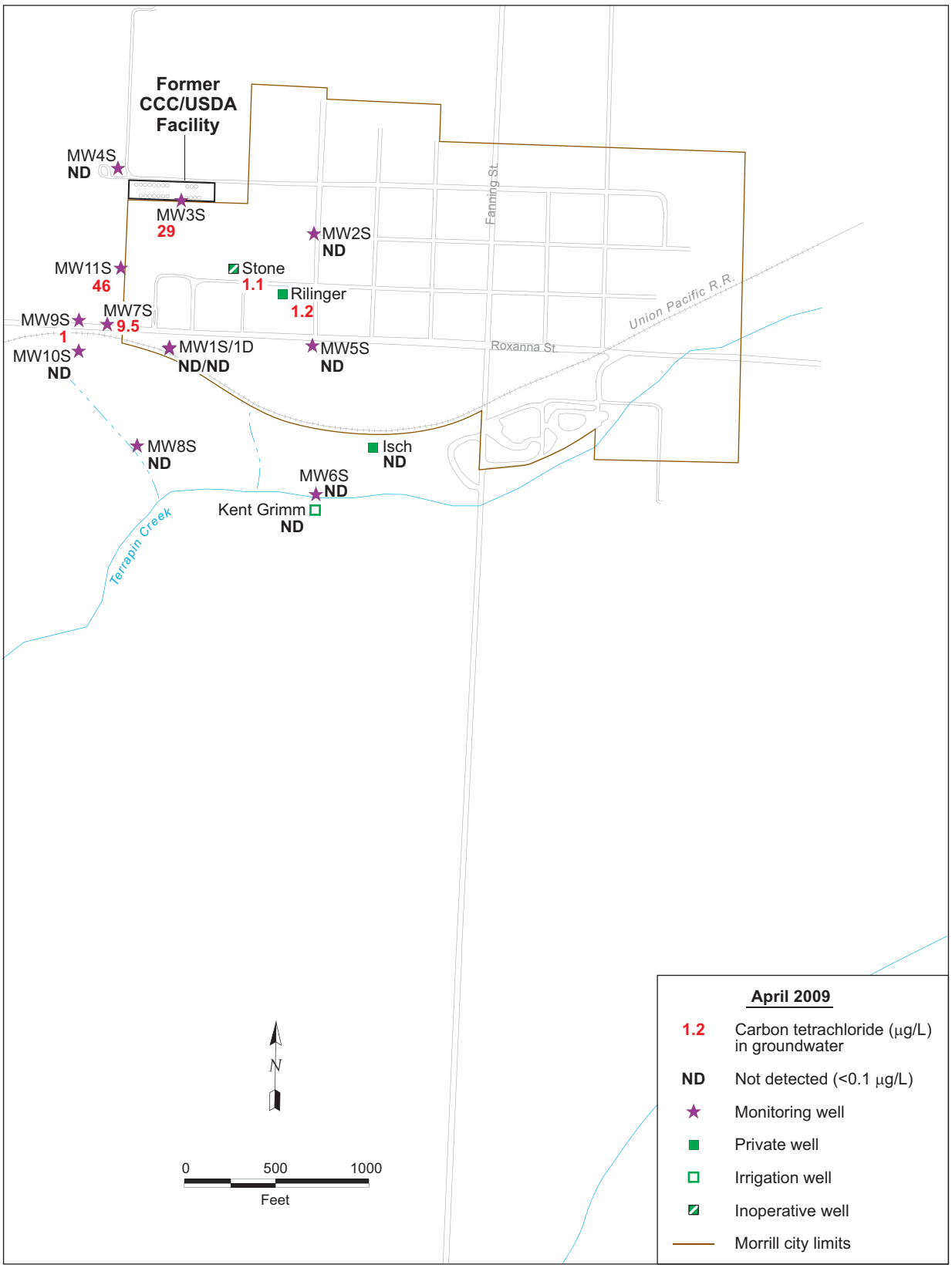

FIGURE 3.3a Carbon tetrachloride concentrations in groundwater at Morrill, April 2009.

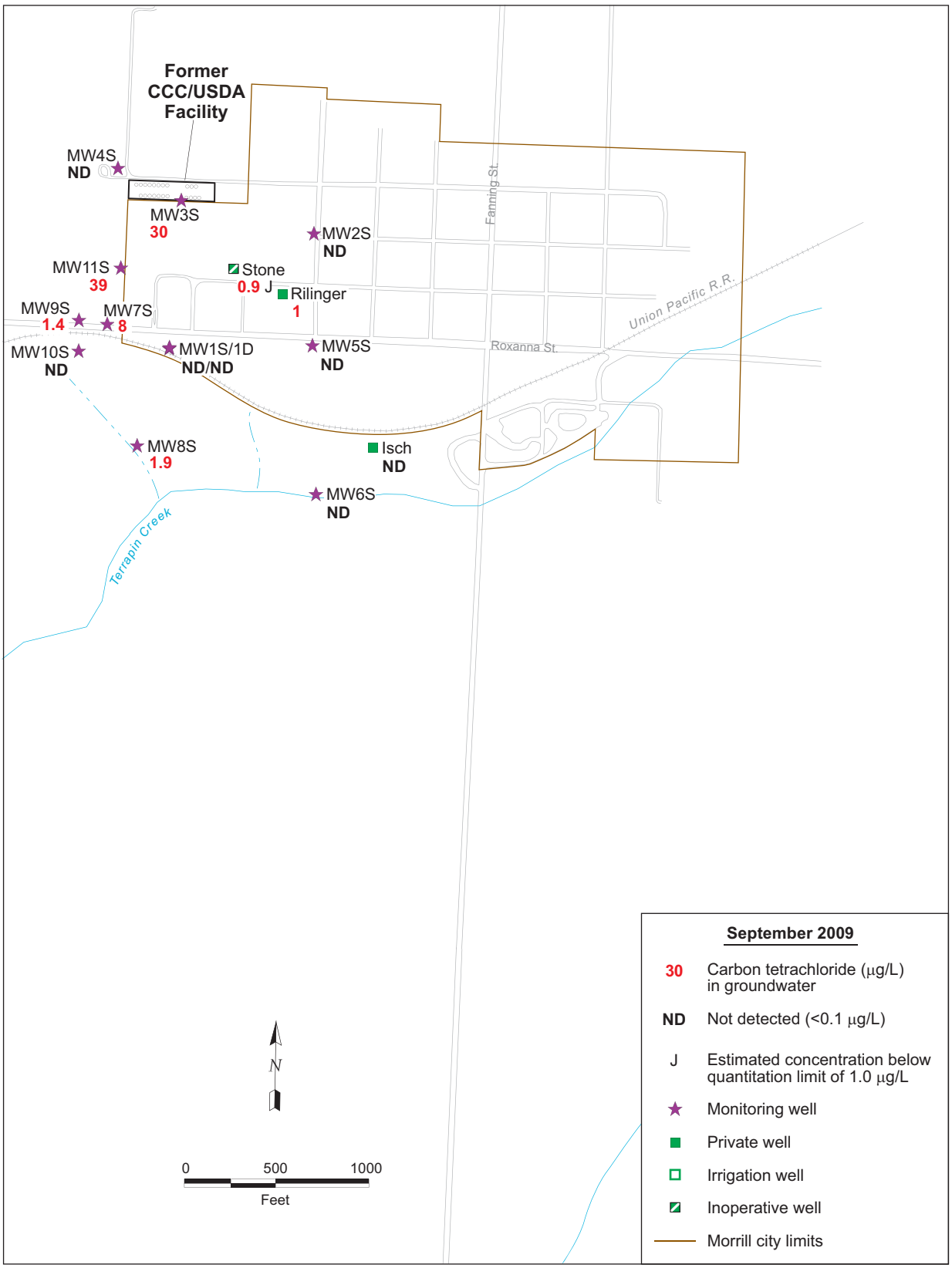

FIGURE 3.3b Carbon tetrachloride concentrations in groundwater at Morrill, September 2009.

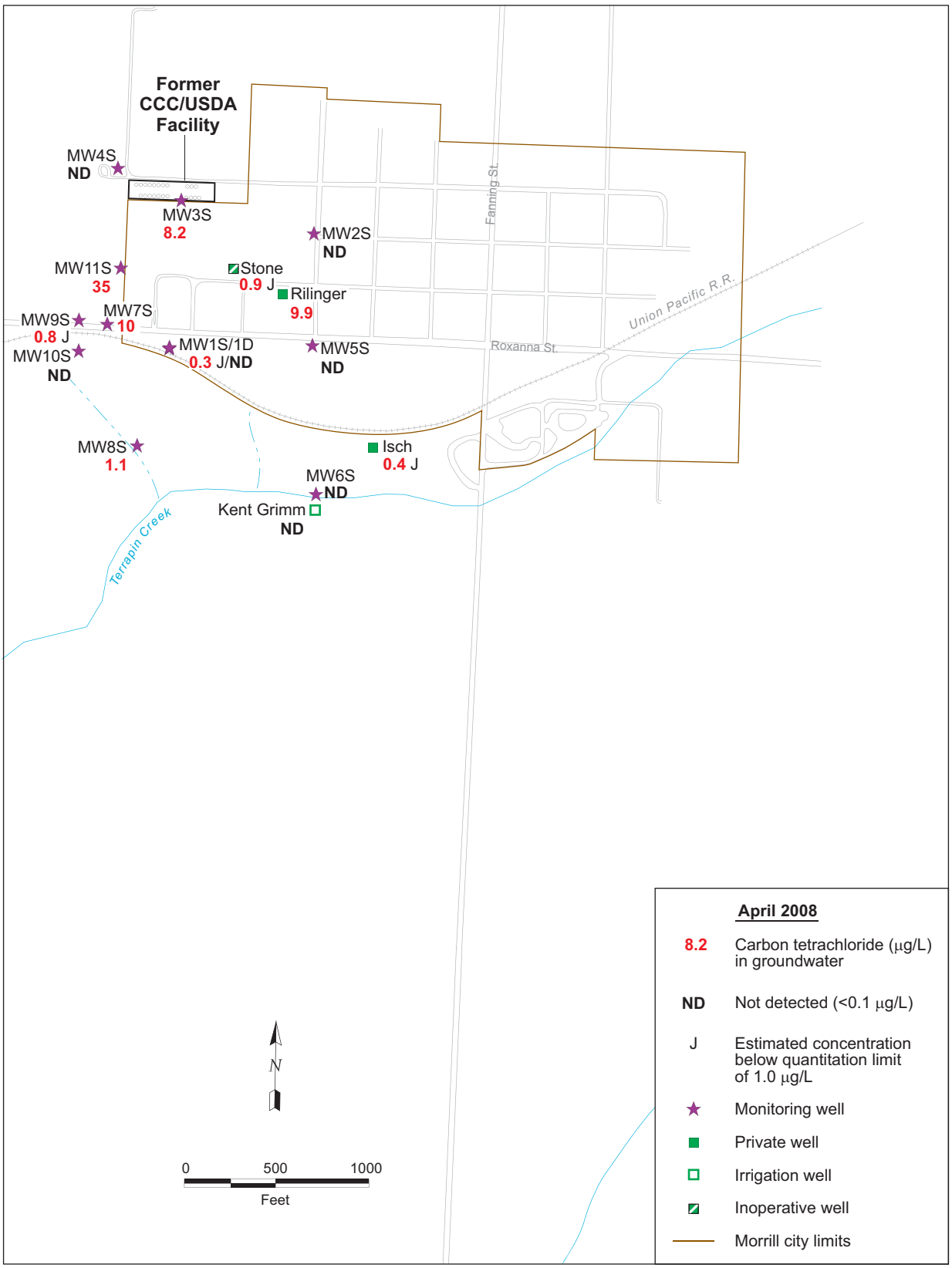

FIGURE 3.4a Carbon tetrachloride concentrations in groundwater at Morrill, April 2008.

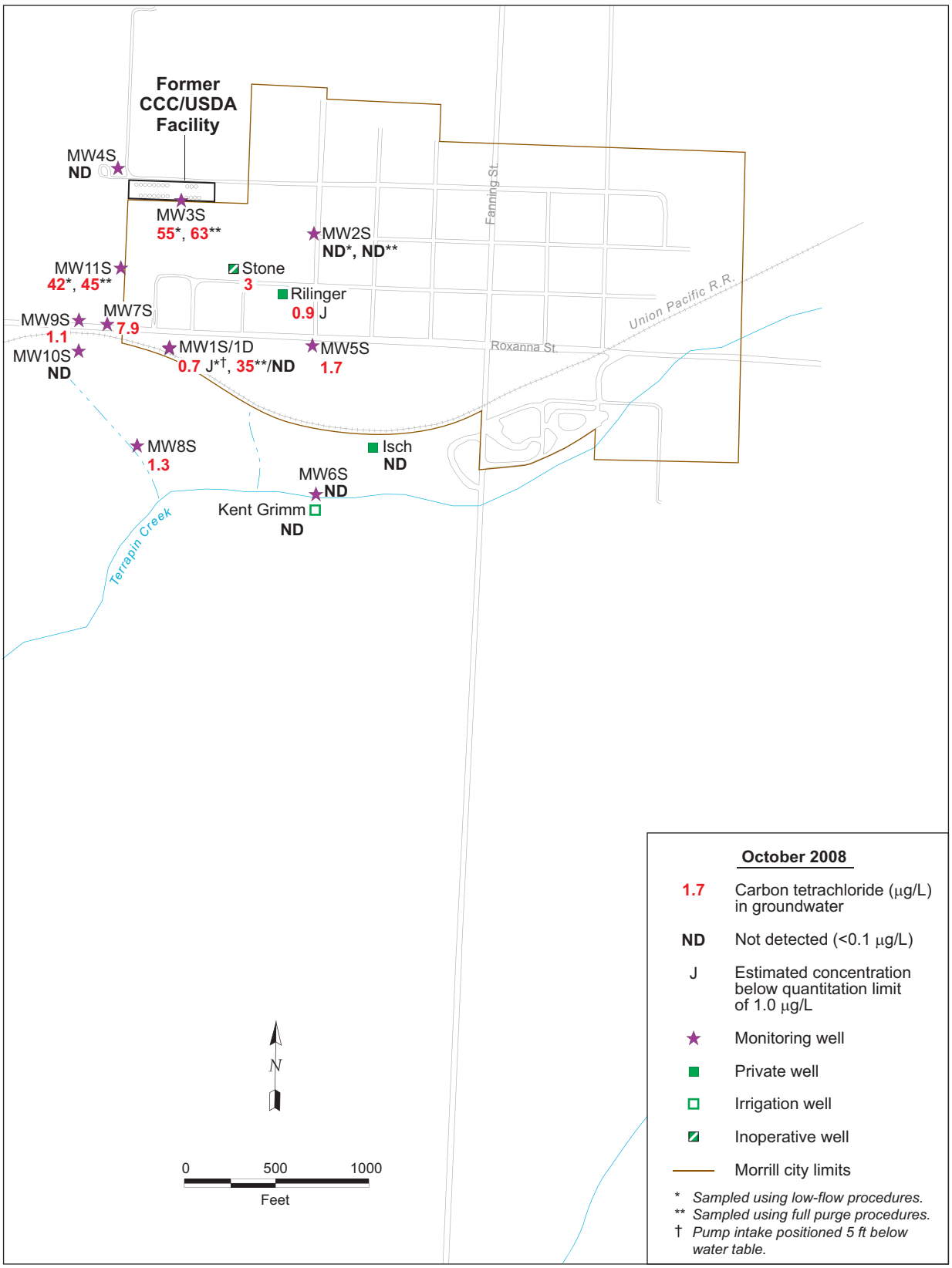

FIGURE 3.4b Carbon tetrachloride concentrations in groundwater at Morrill, October 2008.

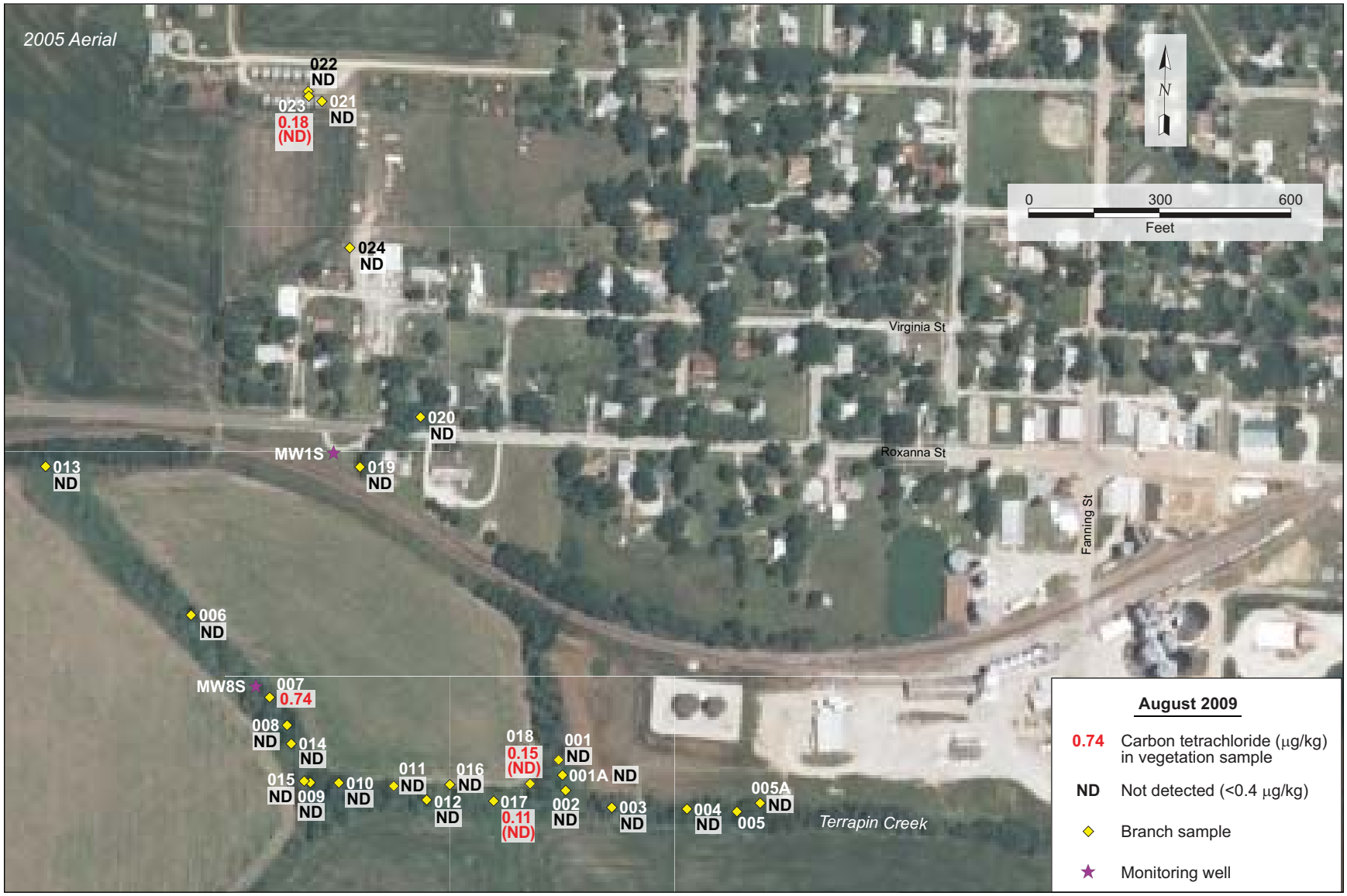

FIGURE 3.5 Carbon tetrachloride concentrations in vegetation at Morrill, August 2009.

4 Conclusions and Recommendations

4.1 Conclusions

The findings of the April and September 2009 monitoring events at Morrill support the following conclusions:

- Groundwater flow during the early spring and the later part of this review period was predominantly to the south-southeast, from the vicinity of the former CCC/USDA facility toward Terrapin Creek. In late spring, a slight shift occurred toward more southerly groundwater flow (possibly southwesterly in the immediate vicinity of the intermittent tributary that flows into Terrapin Creek). This shift in the late spring reflected transient seasonal precipitation and recharge that resulted in higher groundwater levels at this time.

- No significant changes were observed in the levels or distribution of carbon tetrachloride in the groundwater at Morrill during the current review period, or in comparison to the results of the spring and fall 2008 monitoring events. A maximum carbon tetrachloride concentration of 28-30 μg/L was identified in groundwater — at well MW3S — during both the April and September 2009 sampling events.

- No carbon tetrachloride contamination was detected in surface waters or shallow streambed sediments sampled at five locations along Terrapin Creek, downgradient from the former CCC/USDA facility.

- Sampling of tree branch tissues from existing trees for VOCs analyses can be an indicator of shallow subsurface groundwater contamination. Detections of carbon tetrachloride in vegetation at the Morrill site to date have been generally consistent with the documented location of the groundwater plume. Trace concentrations of carbon tetrachloride were detected in vegetation samples collected from trees at 4 of the 22 sampled locations south (downgradient) of the former CCC/USDA facility. The trace detections in vegetation occurred (1) at the former CCC/USDA facility, (2) at a surface

location immediately downslope and downgradient from monitoring well MW8S, and (3) near a dry wash that discharges into Terrapin Creek west of well MW6S. The low-level detections in vegetation near the creek in the absence of detectable contamination in surface water and sediment confirm the value of vegetation sampling as an early indicator of contaminant migration.

4.2 Recommendations

- A work plan for the investigation of the potential for vapor intrusion into homes along the identified extent of the carbon tetrachloride plume and extending 100 ft laterally has been submitted and approved by the KDHE (2010). Argonne and the CCC/USDA will conduct this investigation under optimal indoor air sampling conditions in 2010.

- Comparisons of the low-flow and three-well-volume purging methods indicate that low-flow sampling provides representative results at a majority of the Morrill monitoring wells, with MW5S and MW1S as possible exceptions. Modified or alternative sampling methods should be investigated to ensure that representative samples for analysis can be reliably obtained from these wells.

- The April 2008 event apparently represented a statistical abnormality (Argonne 2009). Continued monitoring of the Morrill network will confirm whether the April 2008 results represented only a limited variation due to atypical weather and groundwater conditions.

- The frequency of sampling should be decreased from twice yearly to once yearly, at the locations established under the approved monitoring plan (Argonne 2005b). The annual events will involve sampling of groundwater from the existing network of 12 monitoring wells and 3 private wells, as well as sampling of surface waters and stream bed sediments at the 5 established locations along Terrapin Creek. The accumulated results of 11 monitoring events, beginning in 2003, have demonstrated little change in the carbon

tetrachloride contamination in terms of migration, concentration, or internal distribution in the affected area. Annual monitoring will be adequate to track future changes.

- Annual vegetation sampling should be continued as part of the monitoring program. Results of research at the CCC/USDA Murdock, Nebraska, remediation site have shown that annual sampling at the height of the growing season is a sensitive indicator of contaminant migration and uptake by trees.

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Appendix A:

Addendum to Groundwater Monitoring Plan

Proposed Addendum to the Groundwater Monitoring Plan for Morrill, Kansas

Introduction and Background

Initial site characterization studies performed on behalf of the Commodity Credit Corporation of the U.S. Department of Agriculture (CCC/USDA) by Argonne National Laboratory demonstrated that a plume of carbon tetrachloride contamination is present in the groundwater at the former CCC/USDA grain storage facility in Morrill, Kansas (Argonne 2004). These investigations showed that the plume extended to the south-southeast from the former facility, in the apparent direction of Terrapin Creek (Figure 1). Carbon tetrachloride was not detected in samples of surface water collected at three locations along Terrapin Creek during the initial investigation (Argonne 2004). To investigate the potential transport and fate of the carbon tetrachloride contamination, the CCC/USDA initiated a program of groundwater monitoring at this site in September 2005, with the approval of the Kansas Department of Health and Environment (KDHE).

Under the KDHE-approved monitoring plan (Argonne 2005), groundwater samples for analysis for volatile organic compounds (VOCs) are collected twice yearly in a suite of monitoring and private wells distributed along the inferred groundwater flow and contaminant migration pathway. Groundwater sampling in nine monitoring wells and three private wells (MW1D, MW1S–MW8S, Isch, Rillinger, and Stone; Figure 2) was conducted during the first monitoring event in September 2005. The results of this sampling demonstrated a need for additional permanent monitoring points to better constrain the potential movement of the groundwater plume. With the approval of the KDHE, the monitoring well network was expanded in January 2006 to include three wells (MW9S, MW10S, and MW11S) near the inferred western margin of the carbon tetrachloride plume (Argonne 2006a).

The results of continuous, automated groundwater level monitoring in selected wells at the site (Argonne 2006a) have confirmed groundwater flow from the former CCC/USDA facility toward Terrapin Creek (Figure 3). Groundwater level relationships observed among the monitoring wells strongly suggest that groundwater movement in the vicinity of Terrapin Creek might be influenced by possible groundwater seepage to the creek in the area south and east of the former CCC/USDA facility and the Co-op. (See Figure 3 in the accompanying document, *Reconnaissance Visit along Terrapin Creek, South of the Former CCC/USDA Grain Bin Site and Existing Co-op in Morrill, Kansas, January 2007.*)

The results of the groundwater sampling and analyses in September 2005 and March and September 2006 (Argonne 2006a,b) have shown relatively little clear downgradient migration of the contaminant plume at Morrill. (Compare Figures 2, 4, and 5.) Low levels of carbon tetrachloride have been detected, however, in shallow groundwater (approximately 3 ft to 5.5 ft below ground level) at monitoring well MW8S. Contaminated monitoring well MW8S lies along the western of two shallow drainageways that direct surface water flow toward Terrapin Creek from the north. The persistence of contamination in the groundwater at this location therefore suggests a threat of carbon tetrachloride release to Terrapin Creek.

On the basis of these observations, the KDHE requested that sampling of the surface waters and the shallow sediments of Terrapin Creek be initiated as part of the monitoring program at Morrill (KDHE 2007). The KDHE's concerns regarding possible surface water and groundwater interaction along Terrapin Creek were discussed by Mr. Carey of the KDHE and members of the Argonne technical staff in a telephone conference on January 9, 2007. Per the discussions with Mr. Carey, Argonne conducted reconnaissance along the projected groundwater (and carbon tetrachloride) migration pathway south of the former CCC/USDA facility, toward and along Terrapin Creek, to gain additional information on the observable hydrologic relationships in this area. The results of this investigation (Argonne 2007) were reviewed by Mr. Carey and members of the Argonne technical staff in a telephone conference on January 25, 2007. On the basis of these discussions, the recommendations below for surface water and sediment sampling are presented for consideration by the KDHE.

Recommendations for Additional Monitoring Locations

Figure 6 shows five locations that are proposed for surface water and sediment sampling for VOCs analyses, in conjunction with the existing KDHE-approved groundwater monitoring program at Morrill. The relationships of the proposed locations to several of the key hydrologic features identified along Terrapin Creek as a result of Argonne's investigations can be summarized as follows:

- Sampling location SM1 is just east (downstream) of the intersection of the western surface drainageway and Terrapin Creek. Location SM1 is topographically and hydraulically downgradient from contaminated monitoring well MW8S.
- Location SM2 is downstream (east) of the intersection of the eastern surface drainageway (along the western edge of the Co-op property) and Terrapin creek, and upstream of existing (uncontaminated) groundwater monitoring well MW6S.
- Sampling location SM3 is downstream (east) from monitoring well MW6S, and upstream from two large outfalls (possibly municipal storm drains) that discharge into Terrapin Creek from its northern bank, directly south of the Co-op.
- Location SM4 is near the eastern edge of the Co-op property at Fanning St., downstream from the two identified outfalls. SM4 lies near the inferred eastern limit of projected carbon tetrachloride migration toward the creek, based on Argonne's interpreted patterns of groundwater flow south of the former CCC/USDA facility.
- Terrapin Creek originates as the outflow from a large (approximately 24-in.-diameter) conduit exiting from the base of an earth dam located approximately 0.3 mi southwest of Morrill. Location SMB is therefore recommended as a possible "background" sampling location along the shallow, most upstream

portion of the creek near the dam. The suggested sampling point lies upgradient from or cross-gradient to the interpreted patterns of groundwater flow south of the former CCC/USDA facility.

Proposed Sampling Program

The CCC/USDA recommends twice yearly surface water sampling for VOCs analyses at the proposed locations along Terrapin Creek. The sampling schedule would coincide with the groundwater sampling presently conducted under the KDHE-approved monitoring plan (Argonne 2005). With the approval of the KDHE, surface water sampling at these locations will begin with the next regular sampling event at Morrill, which is currently planned for March 2007.

The CCC/USDA also proposes the collection of near-surface sediments (to a depth of approximately 0.3 ft beneath the sediment-water interface) for analysis for VOCs at the suggested locations (SM1–SM4 and SMB) during the planned March 2007 sampling event.

At the request of the KDHE, a draft Standard Operating Procedure (SOP) for sediment sampling prepared by Argonne is attached as Appendix 1. The Argonne SOP is consistent with the sampling guidance provided in the U.S. Environmental Protection Agency (EPA) *Methods for Collection, Storage and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual* (EPA-823-B-01-002), as well as with the KDHE *Sediment Policy* (BER-ARS-045) and *Sediment Sampling SOP* (BER-04). Upon review and approval by the KDHE, the Argonne SOP will be incorporated into the revised *Master Work Plan* for Kansas, scheduled to be issued in 2007.

Per Argonne's January 25, 2007, discussions with Mr. Carey, the CCC/USDA recommends that the results of the initial sediment sampling and analyses be reviewed and discussed with the KDHE, to determine whether a program of regular sediment and surface water sampling is necessary at this time.

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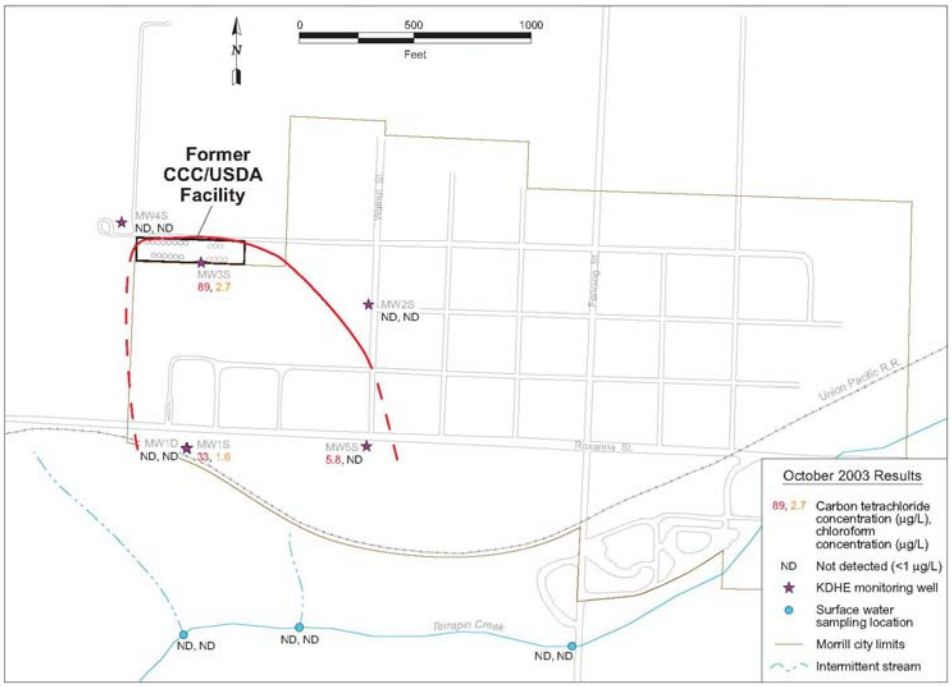

FIGURE 1 Carbon tetrachloride levels in groundwater and surface water at Morrill, October 2003.

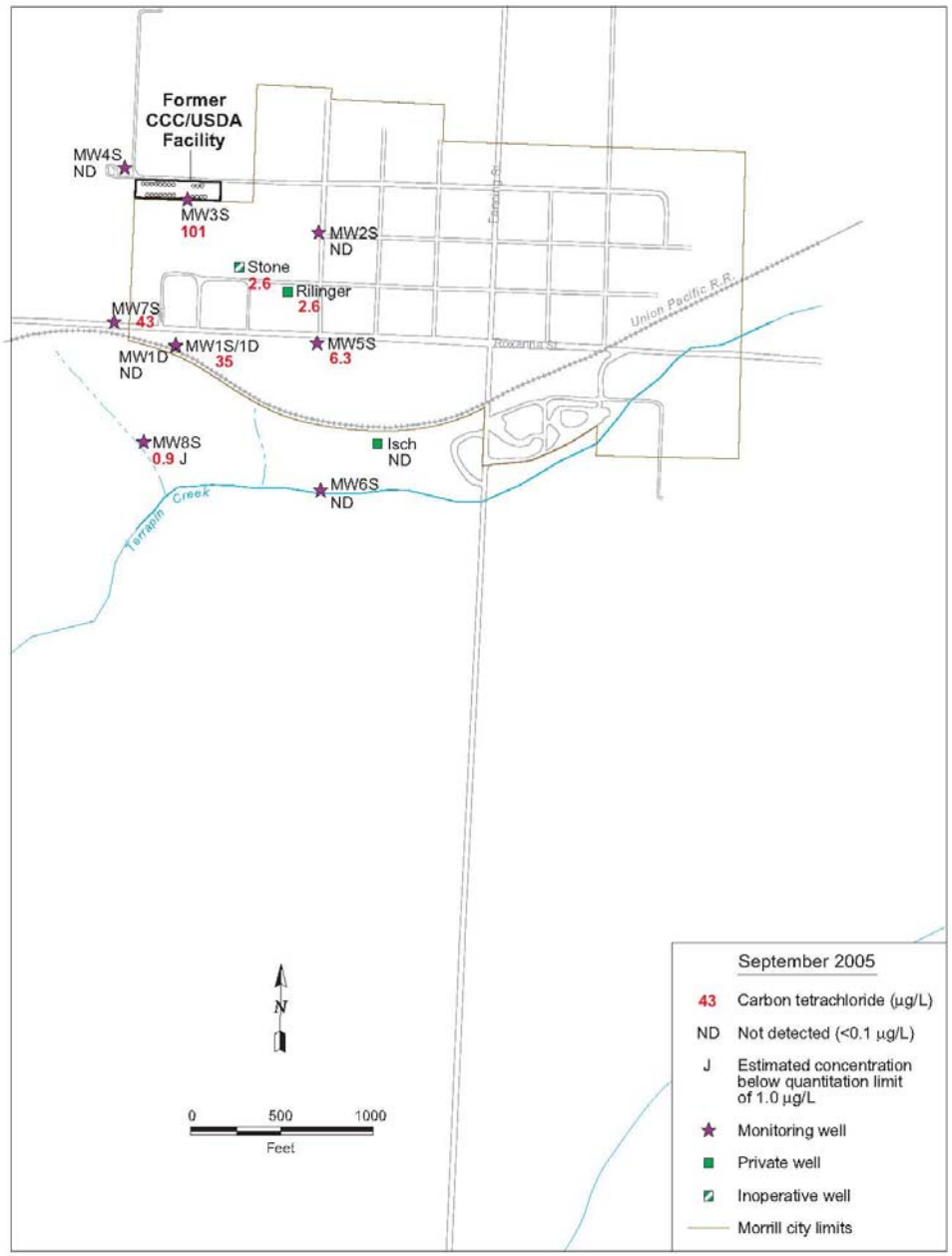

FIGURE 2 Carbon tetrachloride levels in groundwater at Morrill, September 2005.

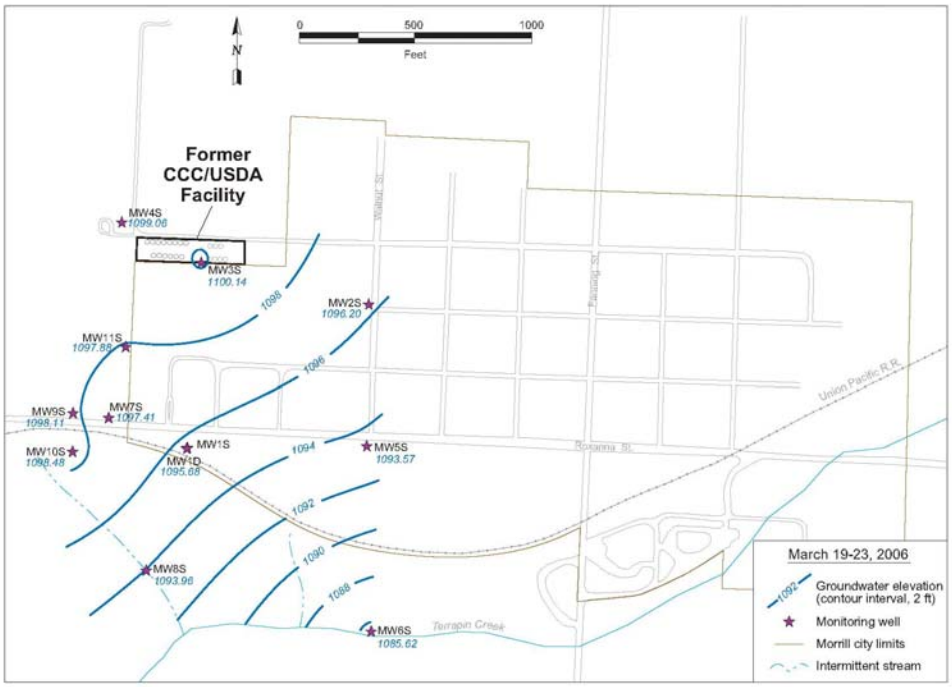

FIGURE 3 Potentiometric surface at Morrill, based on water levels measured manually on March 19–23, 2006.

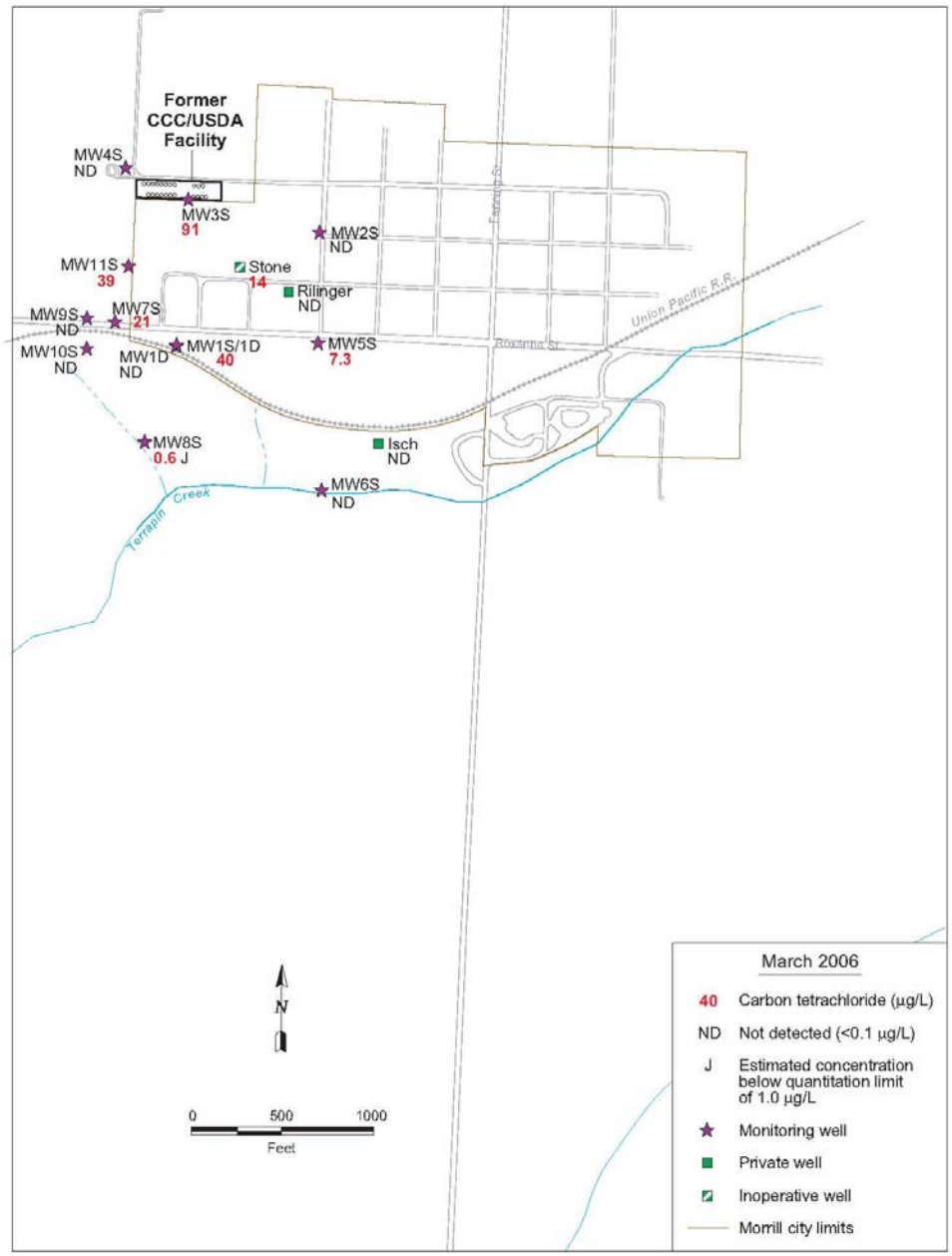

FIGURE 4 Carbon tetrachloride levels in groundwater at Morrill, March 2006.

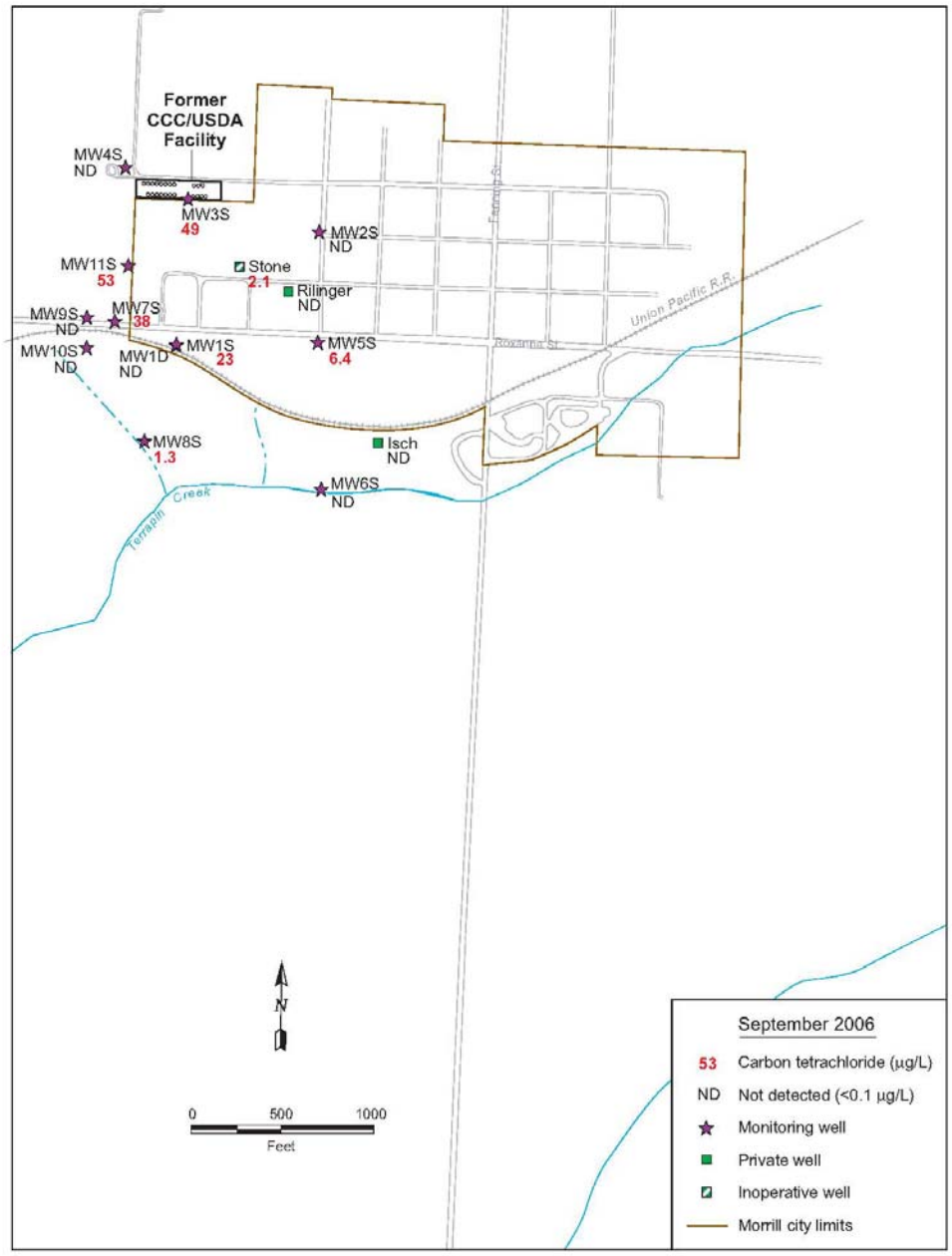

FIGURE 5 Carbon tetrachloride levels in groundwater at Morrill, September 2006.

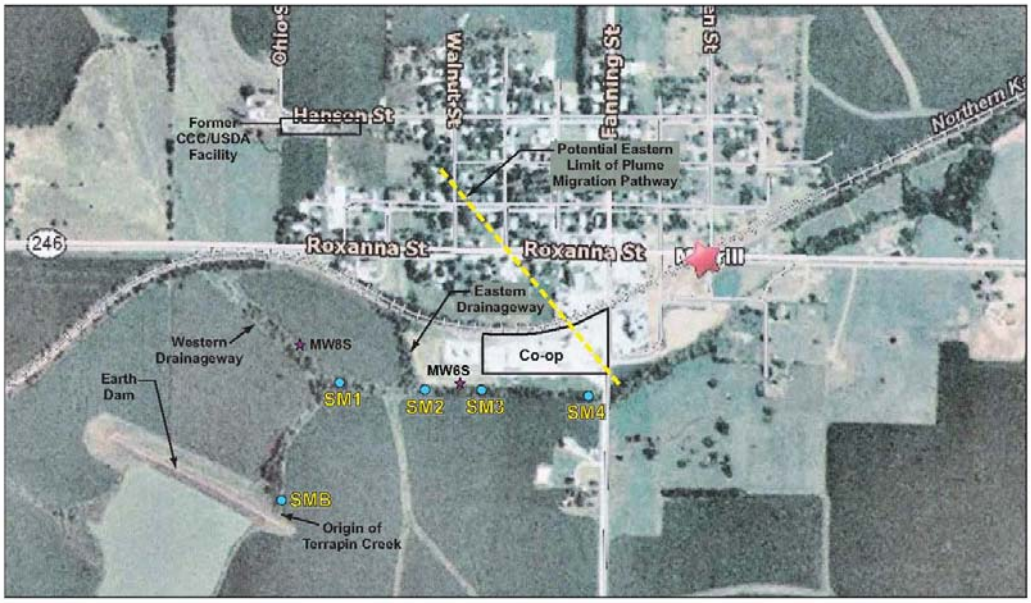

FIGURE 6 Proposed locations for surface water and sediment sampling (SM1–SM4, SMB) along Terrapin Creek at Morrill.

Appendix B:

Sediment Sampling Procedure

AGEM-15:
Standard Operating Procedure for Sediment Sampling

1 Purpose and Scope

This standard operating procedure (SOP) addresses the collection of sediment samples. For the purposes of this document, "sediments" are any eroded mineral or organic materials that are submerged beneath a static (lake, pond, reservoir, etc.) or flowing (river, creek, etc.) aqueous layer. Sediment collection may be required for the determination of numerous investigative parameters, including material particle size and composition, depositional stratigraphy, and hydraulic properties; or for geochemical or biological analyses as required to meet specific program technical objectives or regulatory requirements.

This SOP describes methods for direct sediment sampling with hand-operated collection devices that are applicable to relatively shallow sediment and surface water environments (i.e., small stream and creek beds, small ponds, or near the banks of larger surface water bodies), under the assumption that the sampling can be performed by personnel located on relatively firm, dry ground. If project objectives require the sampling of deeply submerged (below more than 2 ft of water) sediments or deeply buried sediment horizons, appropriate sampling equipment, collection methods, and safety considerations must be described in detail as part of the site-specific work plan and health and safety plan.

The sample collection, preservation, and storage methods outlined here are intended to provide samples suitable for the analysis of possible inorganic, semi-volatile, or volatile organic compounds (VOCs) in sediments, in accord with the KDHE *Sediment Policy* (KDHE BER-ARS-045). The methods presented are generic, however, and may require modification to accommodate site-specific technical, logistic, analytical, or regulatory requirements. Any deviations from the methods in this SOP that are required to meet program objectives are to be addressed as follows:

- Discussed and approved by the CCC/USDA and KDHE project managers prior to implementation.
- Documented in the site Sampling Logbook.
- Reported in conjunction with the presentation and interpretation of the sampling (and analysis, as required) results.

2 Regulatory Considerations and Guidance

This SOP was developed in accord with the technical recommendations and guidance provided in the following regulatory documents:

- KDHE *Sediment Policy* (BER-ARS-045, January 2004)

- KDHE *Collection of Sediment Samples SOP* (BER-04, Rev. 1, February 2000)
- KDHE *Decontamination of Equipment SOP* (BER-05, Rev. 1, October, 2000)
- EPA *Methods for Collection, Storage and Manipulation of Sediments for Chemical and Toxicological Analysis: Technical Manual* (EPA-823-b-01-002, October, 2001)
- EPA *Superfund Program Representative Sampling Guidance — Volume 5: Water and Sediment* (December, 1995)
- EPA *Sediment Sampling SOP* (SOP 2016, Rev. 0.0, 1994)

3 Method Summary

Samples may be collected by one or more approaches, to meet specific program and analysis requirements.

If preservation of the sedimentary structure is not critical, near-surface sediments (0 ft to approximately 0.5 ft below the sediment-water interface) may be scooped directly from beneath an aqueous layer into a sample container. Alternatively, a beaker, trowel, shovel, or similar implement made of a suitably inert material may be used to retrieve a sample and transfer it to a container.

In other cases, relatively undisturbed samples of near-surface or deeper sediments that reflect the depositional profile with depth (up to approximately 2 ft below the sediment-water interface) may be required. Such relatively undisturbed samples may be collected by using a bucket or tube auger, or a hand coring device. Sediments collected by using these methods may be transferred directly from the sampling device to a container by using a suitable spoon, spatula, or other tool, or they may be first placed in an intermediate container (pan, bowl, foil sheet, etc.) to facilitate visual inspection and further handling.

The collection of multiple sediment samples may be necessary to adequately represent potential variations in sediment (or associated contaminant), properties beneath a surface water body (depending on the thickness of the sediments), the areal extent and morphology of the water body, the rate(s) and direction(s) of water flow, and other site-specific parameters. Therefore, the location(s) and frequency of sediment sampling required to address an individual program's technical objectives must be evaluated in conjunction with the development of the site-specific work plan.

The collection, compositing, and homogenization of multiple "grabs" of sediment may be required to provide a sufficient volume or mass of material for selected analyses. Homogenization is not appropriate for samples to be used for VOCs analyses; in this case, the sediments should be transferred as quickly as possible from the collection device (or an intermediate container, if necessary) into the sample container.

4 Sample Handling, Containers, and Preservation

The following practices are to be followed during handling, preservation, and storage of sediment samples:

- Implements or devices used to collect and handle the sediment samples should preferably be made of glass, Teflon, Teflon-coated materials, polyvinyl chloride, or stainless steel. Plastics or other materials suitable for use with specific sample analysis techniques may be employed as appropriate. All materials that come into contact with the sediment samples are to be recorded in the Sampling Logbook.

- The use of pre-cleaned, disposable, or single-use sampling equipment is preferred. Pre-clean all non-disposable equipment in accord with specifications in Section 3.9 of the *Master Work Plan*[1] (to become SOP AGEM-16).

- If possible, pre-clean enough sampling equipment to sample all required locations during each sampling event. Protect decontaminated equipment by wrapping in foil, storing in clean sealed containers, or other means as appropriate.

- If required, perform field decontamination of non-disposable equipment between uses in accord with specifications in Section 3.9 of the *Master Work Plan*.

- If field conditions preclude standard decontamination of the sampling implement(s) between sampling locations, and if the aqueous layer overlying the target sediments is reasonably clear, remove visible contamination by scrubbing, and rinse with surface water at the just-sampled location. Rinse again at the next location prior to sampling. Collect a rinsate sample if the sediments are to be used for geochemical or VOCs analyses. (This approach is appropriate only in the absence of petroleum or other potential contaminants of interest requiring surfactants or other cleaning agents for removal.)

- Place recovered sediment samples for geochemical or VOCs analyses in certified (I-Chem or equivalent), pre-cleaned and labeled VOCs sampling containers fitted with Teflon lids or cap liners. Glass wide-mouth (60 mL or 125 mL) "soil jars" or 40-mL vials are typically used; other container sizes may be substituted to meet specific analysis needs.

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[1] *Final Master Work Plan: Environmental Investigations at Former CCC/USDA Facilities in Kansas, 2002 Revision*, ANL/ER/TR-02/004, prepared for the Commodity Credit Corporation, U.S. Department of Agriculture, Washington, D.C., by Argonne National Laboratory, Argonne, Illinois, December.

- Fill sample containers for geochemical or VOCs analyses as completely as possible, to minimize or eliminate headspace in the container.
- Preserve samples for VOCs and geochemical analyses by refrigeration at 4°C ± 2°C through use of ice or mechanical means. Preservation temperatures are to be maintained throughout sample shipping and storage prior to analysis.
- Implement any specialized sample preservation methods as necessary to meet specific laboratory analysis requirements.
- Sediment samples for mineralogic, particle size distribution, or bulk physical property analyses may be placed *only* in labeled glass or plastic containers, or in sealable plastic bags, and stored at ambient temperature. Samples for analyses requiring the preservation of original moisture content are to be handled as for VOCs analyses.
- Analyses of the preserved sediment samples are to be carried out within appropriate holding times; for VOCs analyses, the maximum holding time is 14 days.

5 Equipment and Supplies

The field equipment and materials needed for sediment sample collection may include the following:

- Map(s)/aerial photo(s)/sampling location plan
- Survey stakes, flags
- Hammer
- Compass
- Tape measure
- GPS unit
- Sample/field logbook(s)
- Pen(s), calculator
- Scoop(s)
- Spatula
- Trowel
- Spade/shovel
- Post-hole digger
- Beaker(s)
- Bucket auger
- Tube auger
- Hand-corer with supplies (liner tubes, sediment "catchers," etc.)
- Extension rods, poles
- T-handle
- pH/conductivity/temperature probe and meter
- Nitrile sampling gloves

- Sample jars, vials, etc. with Teflon caps or cap liners
- Sealable plastic bags
- Pre-numbered sample labels
- Blank sample labels
- Indelible markers
- Cooler(s)
- Ice, freezer packs ("blue" ice)
- Bucket and brushes
- Distilled water
- Alconox or other detergent
- Paper towels
- Boots/wading gear
- First aid kit
- Cell phone

6 Preparation

The following activities are to be completed prior to sampling:

- Review the program's technical and sampling objectives, site maps and aerial photos, the proposed sampling method(s) and location(s), site-specific health and safety information, and the field staff and equipment needs.
- Consult with CCC/USDA, KDHE, and AGEM project managers, AGEM staff, local officials, private property owners, and others as necessary to confirm that sponsor and regulatory approval for the planned sampling activity has been obtained, together with access to the required sampling locations.
- Obtain and decontaminate (as necessary) all required equipment and supplies.
- Perform an on-site safety survey prior to the initiation of work activities, and review the site-specific health and safety plan. If the on-site inspection indicates that significant modifications to the site-specific health and safety plan are required, suspend activities until all necessary changes are discussed with and approved by the AGEM program manager and the Environmental Science Division (EVS) field safety coordinator.
- Perform an on-site "walk-through" survey to (1) identify site boundaries; (2) determine the general conditions of stream flow, stream depth, pond size, and pond depth; and (3) identify any natural or anthropogenic features (seeps, springs, or tributaries, outfalls, impoundments, dumping locations, land use practices, etc.) that could affect the proposed sampling plan or sample analysis results.
- Identify and mark the proposed sampling locations. With the approval of the CCC/USDA and KDHE project managers, adjust locations if necessary to

accommodate identified logistic or technical concerns that could affect the proposed sampling plan or the sample analysis results.

7 Procedures

The sample collection process and sample recovery methods to be used during sediment sampling are outlined in this section. Appropriate recovery method(s) are to be selected on a site-by-site basis, to accommodate the specific program's technical, analytical, and logistic needs.

7.1 Sediment Sample Collection Process

Sample at only one location at any one time, to prevent possible confusion during sample collection, handling, or labeling. Conduct the sampling as follows:

- Record the location and depth of each sampling point in the Sampling Logbook, in sufficient detail to permit resampling from the same point at a later time, or by other personnel unfamiliar with the sampling area. Approximate the sampling location on an aerial photo, base map, or topographic map; sketch the location and include descriptive information in the Sampling Logbook, with reference to permanent nearby landmarks if present. If conditions permit, install a permanent or semi-permanent location marker (i.e., a labeled ground stake, a marked washer nailed to an adjacent tree, flagging, etc.) at the sampling point, or as close to it as possible.

- Record in the Sampling Logbook any additional conditions or features of the sampling location that might be required or useful during the interpretation of sample data (i.e., weather conditions at the time of sampling, water depth and flow conditions, the presence of nearby discharges, etc.)

- Prepare one (or more, if multiple containers are required for each sample) unique sample label(s). Assign a unique sample identification number in accord with AGEM conventions for sample designations. Include the date, time, and site of sample collection, as well as the sample preservation method employed. Record the sample information in the Sampling Logbook, and similarly mark a sealable plastic bag for sample container storage.

- Wear sampling gloves (made of an appropriate material relative to the expected contaminant[s] and intended sample analyses) during all sample container handling and sample collection operations.

- Determine the pH, conductivity, and temperature of the water immediately above the sediment sampling point by using a direct-reading probe/meter. Record the measurements in the Sampling Logbook.

- Rinse the required sampling device (Section 7.2 of this SOP) in the existing overlying water near the intended sediment sampling location, but at a sufficient distance *downstream* from the sampling point to prevent disturbance of the sediment.
- Recover and containerize the sample aliquot(s) by using the selected method (Section 7.2).
- Quickly and carefully wipe or rinse material from the container opening (which would prevent complete sealing) and tightly close the container.
- Quickly clean and dry the exterior of each sample container, apply the sample label, and place the container in the marked sealable plastic bag.
- Place the bagged sample in a holding cooler (iced to 4°C for VOCs samples) for temporary transport and storage, or implement other specialized preservation methods as appropriate, to meet specific sample analysis requirements.
- Record the sample collection method, container type, and number of container(s) filled in the Sampling Logbook.

7.2 Sediment Sample Recovery Methods

The sample recovery method employed at each sampling location must be determined on a site-specific basis, to accommodate the unique physical, environmental, and logistic conditions at that location, as well as the investigative purpose of the sediment being collected.

7.2.1 Direct Recovery of Sediment

The following methods may be used for direct recovery of relatively soft to semi-consolidated, near-surface sediments (0 ft to 0.5 ft below the sediment-water interface) from water depths no greater than approximately 2 ft. In each case, care must be taken to avoid excessive "washing" or the loss of fine materials from the sample during its withdrawal through the overlying water column.

7.2.1.1 Collection by Direct Filling of the Sample Container

To fill a sample container with sediment directly, proceed as follows:

- Remove the lid from the sample jar or vial.
- Slowly submerge the container to the sediment surface.

- Collect material by scraping the container into the sediments to the desired depth.

7.2.1.2 Collection with a Scoop, Trowel, Shovel, or Similar Implement

To collect sediment with a scoop, trowel, shovel, or similar implement, proceed as follows:

- Excavate the required thickness and volume of sediment from the target location by using a scoop, trowel, shovel, or similar device, taking care to cause as little agitation or mixing/washing of the sample as possible

- Quickly place the sediment directly into the sample jar or vial, or transfer the material to a temporary intermediate container (pan, bowl, foil sheet, etc.) if necessary. Quickly select the desired material from the temporary container, and place it in the sample jar or vial by using the original collection implement or a suitable spoon, spatula, etc.

Depending on site-specific conditions, it may be convenient or necessary to use a collapsible pole or an extended handle attached to the sample collection device, to provide greater access to the desired sampling location (for example, from an elevated bank adjacent to a stream bed) or to ensure personnel safety during the sampling process.

7.2.2 Sediment Recovery with Less Disturbance

The following methods may be used to recover less disturbed, near-surface or deeper sediment samples (up to approximately 2 ft below the sediment-water interface) that will preserve some or all of the original sedimentary structure.

7.2.2.1 Collection with a Bucket or Tube Auger

To collect relatively undisturbed sediment with a bucket or tube auger, proceed as follows:

- Assemble the auger and handle, with extensions if necessary, per the manufacturer's instructions.

- Slowly lower the auger through the water column to the sediment surface, and push the auger into the sediments to the required depth at an angle of no more than 20° from vertical.

- Rotate the auger to break the contained sediment core free from the underlying materials.

- Slowly withdraw the auger and cored sample. If using a tube auger, ensure that the open slotted side of the auger is facing upward.
- Quickly transfer the sediment to the sample jar or vial, or to a temporary intermediate container (pan, bowl, foil sheet, etc.) if necessary. Quickly select the desired material from the temporary container and place it in the sample jar or vial by using a suitable spoon, spatula, etc.

7.2.2.2 Collection with a Hand Coring Device

To collect relatively undisturbed sediment with a hand coring device, proceed as follows:

- Assemble the corer and handle, with extensions if necessary, per the manufacturer's instructions. If the device is designed for use of a liner inside the core barrel, use a new liner for each sample collected.
- Insert the corer into the sediment with a smooth, continuous motion
- Rotate the corer to break the sediment core free, and withdraw the corer in a single smooth motion.
- Carefully remove the nosepiece and sediment catcher (if installed) from the lower end of the coring barrel.
- If no core barrel liner is used, quickly transfer the required sediment from the core barrel to the sample jar or vial, or to a temporary intermediate container (pan, bowl, foil sheet, etc.) by using a suitable spoon, spatula, etc.
- If a barrel liner is used, remove the liner and the contained sediment core.
- If whole cores (or core segments) are to be retained for later geologic or other analyses, mark and seal both the upper and lower ends of the barrel liner with dedicated caps, aluminum foil and tape, or other means that are suitable for the required analyses. Store the material in an upright position under appropriate preservation conditions. Barrel liners may be *carefully* cut into vertical segments (if necessary) by using a clean hack saw.
- If immediate sampling or examination of the cored sediment is required, quickly transfer the collected material from the core barrel liner to the sample container, or to a temporary intermediate container (pan, bowl, foil sheet, etc.). Depending on the consistency of the cored material, it may be possible to remove it from the liner by simple "pouring" or extrusion. Barrel liners may *carefully* be split lengthwise (if necessary) by using a clean razor knife. Quickly select the desired material from the temporary container, and place it in the sample jar or vial by using a suitable spoon, spatula, etc.

Depending on site-specific conditions, it may be convenient or necessary to use one or more handle extensions on the auger or hand coring device, to provide greater access to the desired sampling location (for example, from an elevated bank adjacent to a stream bed) or to ensure personnel safety during the sampling process. A detailed analysis of the health and safety measures to be employed during sampling must be included in the site-specific work plan and health and safety plan (and approved by the AGEM program manager and EVS field safety coordinator) for any sampling requiring the collection of sediments at a water depth that exceeds 2 ft, or for sediment sampling that cannot be performed by personnel located on relatively firm, dry ground.

7.2.2.3 Collection by Alternative Methods

Depending on site-specific conditions that may affect the location, consistency, or relative accessibility of sediments to be sampled (for example, water flow velocity, presence of physical obstructions, presence of a frozen aqueous layer), alternative methods may be required for the recovery of sediment samples. Procedures for the use of alternative methods (for example, hydraulic or mechanical direct-push techniques) are to be addressed on a case-by-case basis in the site-specific work plan and health and safety plan.

8 Quality Assurance/Quality Control

Sediment samples are to be collected, handled, and analyzed in accord with the general quality assurance/quality control procedures outlined in Section 4 of the *Master Work Pla*n. The following additional measures are to be implemented as part of the sediment sampling process:

- Record all sample location, collection, and descriptive information in a bound project Sampling Logbook, as described in Section 7.1 of this SOP.
- If required to meet project technical objectives, choose locations for the collection of "background" sediment samples that are reasonably expected to be unaffected by the parameter (or contaminant) of investigational interest. Suitable locations and materials for background sampling must be determined on a case-by-case basis.
- Collect field replicates representing at least 10% of the sediment locations sampled, if laboratory analyses of the samples will be performed. A minimum of one replicate must be collected per sampling event.
- Collect rinsate samples (if pertinent to the sample analyses required) to assess the efficiency of the decontamination process and identify potential cross-contamination among samples.

9 Health and Safety

Sediment sampling activities are to be performed in accord with the health and safety requirements outlined in the *Master Work Plan* and in the site-specific work plan and health and safety plan. A detailed analysis of the health and safety measures to be employed during sampling must be included in these site-specific plans (and approved by the AGEM program manager and EVS field safety coordinator) for any sampling event requiring the collection of sediments at water depths that exceed 2 ft, or for sediment sampling that cannot be performed by personnel located on relative firm, dry ground. All members of the sampling party must review and become familiar with this SOP, the *Master Work Plan*, the site-specific work plan, and the site-specific health and safety plan. These documents are to be maintained at the site during the field activities.

9.1 Working Alone

Sediment sampling should not be performed alone, unless written approval is obtained in advance from the AGEM program manager. When working alone is authorized, contact must be maintained, at a minimum, throughout the field activity via cell phone connection between the field staff member and a designated contact person.

9.2 Personal Protective Equipment

Sampling from the banks of creeks, rivers, and the margins of other surface water bodies may present particular risks of slipping, tripping, and falling accidents associated with foot travel over rough, overgrown, or soft and relatively unstable ground. The selection of appropriate personal protective equipment for sediment sampling activities must be made on a site-specific basis. At a minimum, personal protective equipment should include the following:

- Safety glasses
- Safety shoes
- Waterproof boots
- Waterproof work gloves and latex/nitrile sampling gloves

Appendix C:

Sequence of Sampling Activities at Morrill in April-September 2009

TABLE C.1 Sequence of sampling activities in April-September 2009 at Morrill, Kansas.

Sample Date	Time	Sample	Medium	Type[a]	Location	Depth (ft BGL)	Chain of Custody	Shipping Date	Sample Description
April 2009 monitoring									
4/22/09	16:50	MRISCH-W-27664	Water	DW	Isch	–	2821	4/22/09	Well had been pumping almost all day.
4/22/09	17:04	MRRILLINGER-W-27665	Water	DW	Rillinger	–	2821	4/22/09	Allowed pump to run for 5 min, then sampled.
4/22/09	17:30	MRQCTB-W-27670	Water	TB	QC	–	2821	4/22/09	Trip blank sent to the AGEM Laboratory for organic analysis with water samples listed on COC 2821.
4/22/09	17:55	MRSM4-W-27679	Water	NA	SM4	–	2821	4/22/09	Water sample from Terrapin Creek.
4/22/09	17:56	MRSM4-S-27679	Soil	NA	SM4	–	2822	4/22/09	Sediment sample from Terrapin Creek.
4/22/09	18:02	MRSM3-W-27678	Water	NA	SM3	–	2821	4/22/09	Water sample from Terrapin Creek.
4/22/09	18:03	MRSM3-S-27678	Soil	NA	SM3	–	2822	4/22/09	Sediment sample from Terrapin Creek.
4/22/09	18:09	MRSM2-W-27677	Water	NA	SM2	–	2821	4/22/09	Water sample from Terrapin Creek.
4/22/09	18:10	MRSM2-S-27677	Soil	NA	SM2	–	2822	4/22/09	Sediment sample from Terrapin Creek.
4/22/09	18:16	MRSM1-W-27676	Water	NA	SM1	–	2821	4/22/09	Water sample from Terrapin Creek.
4/22/09	18:17	MRSM1-S-27676	Soil	NA	SM1	–	2822	4/22/09	Sediment sample from Terrapin Creek.
4/22/09	18:25	MRSMB-W-27680	Water	NA	SMB	–	2821	4/22/09	Water sample from Terrapin Creek.
4/22/09	18:26	MRSMB-S-27680	Soil	NA	SMB	–	2822	4/22/09	Sediment sample from Terrapin Creek.
4/23/09	9:42	MRMW10S-W-27662	Water	MW	MW10S	30-45	6199	4/23/09	Depth to water = 13.6 ft. Depth of 2-in. well = 45 ft. Sample collected by using low-flow bladder pump after purging of 7.5 L. Pump intake positioned at 37.5 ft.
4/23/09	10:44	MRMW8S-W-27660	Water	MW	MW8S	10-25	6199	4/23/09	Depth to water = 2.3 ft. Depth of 4-in. well = 26.8 ft. Sample collected by using low-flow bladder pump after purging of 6 L. Pump intake positioned at 17.5 ft.
4/23/09	10:45	MRMW8SDUP-W-27668	Water	MW	MW8S	10-25	6199	4/23/09	Replicate of sample MRMW8S-W-27660.
4/23/09	11:30	MRMW7S-W-27659	Water	MW	MW7S	20-45	6199	4/23/09	Depth to water = 16.7 ft. Depth of 4-in. well = 47 ft. Sample collected by using low-flow bladder pump after purging of 7 L. Pump intake positioned at 32.5 ft.
4/23/09	11:37	MRQCIR-W-27673	Water	RI	QC	–	6199	4/23/09	Rinsate of decontaminated sampling line after collection of sample MRMW7S-W-27659.
4/23/09	12:22	MRMW9S-W-27661	Water	MW	MW9S	38.83-53.83	6199	4/23/09	Depth to water = 21.9 ft. Depth of 2-in. well = 58.5 ft. Sample collected by using low-flow bladder pump after purging of 5.5 L. Pump intake positioned at 46.33 ft.

TABLE C.1 (Cont.)

Sample Date	Time	Sample	Medium	Type[a]	Location	Depth (ft BGL)	Chain of Custody	Shipping Date	Sample Description
April 2009 monitoring (cont.)									
4/23/09	13:00	MRMW11S-W-27663	Water	MW	MW11S	53-68	6199	4/23/09	Depth to water = 38.1 ft. Depth of 2-in. well = 72.7 ft. Sample collected by using low-flow bladder pump after purging of 5 L. Pump intake positioned at 60.5 ft.
4/23/09	13:40	MRMW3S-W-27655	Water	MW	MW3S	18-48	6199	4/23/09	Depth to water = 26.7 ft. Depth of 4-in. well = 47.8 ft. Sample collected by using low-flow bladder pump after purging of 5 L. Pump intake positioned at 37.3 ft.
4/23/09	15:15	MRQCTB-W-27671	Water	TB	QC	–	6199	4/23/09	Trip blank sent to the AGEM Laboratory for organic analysis with water samples listed on COC 6199 and to TestAmerica with verification samples listed on COC 6196.
4/23/09	15:26	MRMW4S-W-27656	Water	MW	MW4S	17-47	6199	4/23/09	Depth to water = 41.5 ft. Depth of 4-in. well = 47.8 ft. Sample collected by using bailer after purging of 5 L. Pump intake positioned at 44.65 ft.
4/23/09	15:30	MRTD12-W-27667	Water	DW	TD12	27-67	6199	4/23/09	Collected from tile drain flowing into Terrapin Creek.
4/23/09	16:16	MRMW2S-W-27654	Water	MW	MW2S	13-53	6199	4/23/09	Depth to water = 33.2 ft. Depth of 4-in. well = 53.5 ft. Sample collected by using low-flow bladder pump after purging of 6.5 L. Pump intake positioned at 43.35 ft.
4/23/09	16:38	MRSTONE-W-27666	Water	DW	Stone	43	6199	4/23/09	Purged 5 gal with bailer, then sampled.
4/24/09	8:16	MRMW5S-W-27657	Water	MW	MW5S	15-55	6197	4/24/09	Depth to water = 22.1 ft. Depth of 4-in. well = 54.6 ft. Sample collected by using low-flow bladder pump after purging of 5.5 L. Pump intake positioned at 38.35 ft.
4/24/09	8:30	MRQCIR-W-27675	Water	RI	QC	–	6197	4/24/09	Rinsate of decontaminated sampling line after collection of sample MRMW5S-W-27657.
4/24/09	8:56	MRMW1S-W-27652	Water	MW	MW1S	11-51	6197	4/24/09	Depth to water = 24.4 ft. Depth of 4-in. well = 54 ft. Sample collected by using low-flow bladder pump after purging of 5 L. Pump intake positioned at 39.2 ft.

TABLE C.1 (Cont.)

Sample Date	Time	Sample	Medium	Type[a]	Location	Depth (ft BGL)	Chain of Custody	Shipping Date	Sample Description
April 2009 monitoring (cont.)									
4/24/09	9:37	MRMW1D-W-27653	Water	MW	MW1D	63-88	6197	4/24/09	Depth to water = 31 ft. Depth of 4-in. well = 89 ft. Sample collected by using low-flow bladder pump after purging of 7 L. Pump intake positioned at 75.5 ft.
4/24/09	9:38	MRMW1DDUP-W-27669	Water	MW	MW1D	63-88	6197	4/24/09	Replicate of sample MRMW1D-W-27653.
4/24/09	10:36	MRMW6S-W-27658	Water	MW	MW6S	10-25	6197	4/24/09	Depth to water = 6.2 ft. Depth of 4-in. well = 26.9 ft. Sample collected by using low-flow bladder pump after purging of 12 L. Pump intake positioned at 17.5 ft.
4/24/09	10:48	MRQCIR-W-27674	Water	RI	QC	–	6197	4/24/09	Rinsate of decontaminated sampling line after collection of sample MRMW6S-W-27658.
4/24/09	15:00	MRQCTB-W-27672	Water	TB	QC	–	6197	4/24/09	Trip blank sent to the AGEM Laboratory for organic analysis with water samples listed on COC 6197.
Vegetation sampling in August 2009									
8/27/09	17:34	MR005A-B-29920	Veg	Branch	MR005A	–	2540	8/28/09	20-in. willow west of maple 005, on north side of creek. (Locations 1-5 are behind co-op off Fanning Street on north side of creek. Sample collected 8 ft above ground level.
8/27/09	17:36	MR004-B-29921	Veg	Branch	MR004	–	2540	8/28/09	Willow. Flagging remains, on north side of creek, very close to water. Sample collected 7 ft above ground level.
8/27/09	17:42	MR003-B-29922	Veg	Branch	MR003	–	2540	8/28/09	Willow. Flagging remains. North side of creek. Dying top. Sample collected 7 ft above ground level.
8/27/09	17:46	MR002-B-29923	Veg	Branch	MR002	–	2540	8/28/09	Large willow north side of creek on steep bank near bend in creek. Flagging remains. Sample collected 6 ft above ground level.
8/27/09	17:50	MR001-B-29924	Veg	Branch	MR001	–	2540	8/28/09	Large willow. Top killed. Near garbage/fire pit. Sample collected 6 ft above ground level.

TABLE C.1 (Cont.)

Sample Date	Time	Sample	Medium	Type[a]	Location	Depth (ft BGL)	Chain of Custody	Shipping Date	Sample Description
Vegetation sampling in August 2009 (cont.)									
8/27/09	18:00	MR023-B-29925	Veg	Branch	MR023	–	2540	8/28/09	Moving along northwest corner of town toward the former CCC facility; small hackberry near bin 20 on former facility. Skipped sample at 022 (hemp) this year. Not present. Sample collected 2 ft above ground level.
8/27/09	18:05	MR021-B-29926	Veg	Branch	MR021	–	2540	8/28/09	Small juniper near bin 20. Sample collected 3 ft above ground level.
8/27/09	18:10	MR024-B-29927	Veg	Branch	MR024	–	2540	8/28/09	Black walnut on other side of electric fence, near steel building. This tree is first in row of walnuts. Next go back to Roxanna Street toward pumphouse. Sample collected 3 ft above ground level.
8/27/09	18:20	MR020-B-29928	Veg	Branch	MR020	–	2540	8/28/09	Large sugar maple near hydrant at corner of Virginia and Roxanna Streets. House number 104. Could not locate ash tree recorded as sampled in 2008.
8/27/09	18:22	MR019-B-29929	Veg	Branch	MR019	–	2540	8/28/09	Very large silver maple near railroad and pumphouse. Branches getting too high to sample. Next cross the railroad and go down the agricultural field access road to the creek bed. Sample collected 8 ft above ground level.
8/27/09	18:28	MR006-B-29930	Veg	Branch	MR006	–	2540	8/28/09	Large cottonwood on north side of creek bed. No flag. Sample collected 7 ft above ground level.
8/27/09	18:32	MR013-B-29931	Veg	Branch	MR013	–	2540	8/28/09	Large willow between railroad and farm road on north side of path near culvert. Flag remains.
8/27/09	18:34	MR007-B-29932	Veg	Branch	MR007	–	2540	8/28/09	Large willow on north side of creek, southeast of MW8S. No flag. Woody vegetation begins to thicken on east bank. Sample collected 3 ft above ground level.

TABLE C.1 (Cont.)

Sample Date	Time	Sample	Medium	Type[a]	Location	Depth (ft BGL)	Chain of Custody	Shipping Date	Sample Description
Vegetation sampling in August 2009 (cont.)									
8/27/09	18:38	MR008-B-29933	Veg	Branch	MR008	–	2540	8/28/09	Large cottonwood next to small willow. No flag. Sample collected 3 ft above ground level.
8/27/09	18:40	MR014-B-29934	Veg	Branch	MR014	–	2540	8/28/09	Large multi-stem willow northeast of creek. Sample collected 6 ft above ground level.
8/27/09	18:50	MR009-B-29935	Veg	Branch	MR009	–	2540	8/28/09	Three-stem willow east of creek. Has flag. Sample collected 6 ft above ground level.
8/27/09	19:00	MR010-B-29936	Veg	Branch	MR010	–	3164	8/28/09	Large elm in thicket east of creek. Found prior stake.
8/27/09	19:05	MR011-B-29937	Veg	Branch	MR011	–	3164	8/28/09	Large Osage orange, multi-stem, in thicket. Has stake. Sample collected 6 ft above ground level.
8/27/09	19:10	MR012-B-29938	Veg	Branch	MR012	–	3164	8/28/09	Large recumbent willow across creek. Tree is growing on south side; leans across to the north. Sample collected 5 ft above ground level.
8/27/09	19:14	MR016-B-29939	Veg	Branch	MR016	–	3164	8/28/09	Two-stemmed willow. New tree substituted for one sampled prior. Not found. Washed away? Sample collected 4 ft above ground level.
8/27/09	19:16	MR017-B-29940	Veg	Branch	MR017	–	3164	8/28/09	Very small willow by creek, north side, still has flagging. Down in thick reed canary grass. Watch for holes. Sample collected 4 ft above ground level.
8/27/09	19:22	MR018-B-29941	Veg	Branch	MR018	–	3164	8/28/09	Large multi-stemmed Osage orange on north side of creek at bend. Has flag. Last sample. Continue north along creek and up toward railroad, skirt Ag field, back to pumphouse. Sample collected 6 ft above ground level.
September 2009 monitoring									
9/2/09	17:50	MRSM4-W-29969	Water	NA	SM4	–	3170	9/3/09	Water sample from Terrapin Creek.
9/2/09	17:53	MRSM4-S-29969	Soil	NA	SM4	–	2605	9/3/09	Sediment sample from Terrapin Creek.
9/2/09	18:00	MRSM3-W-29968	Water	NA	SM3	–	3170	9/3/09	Water sample from Terrapin Creek.

TABLE C.1 (Cont.)

Sample Date	Time	Sample	Medium	Type[a]	Location	Depth (ft BGL)	Chain of Custody	Shipping Date	Sample Description
September 2009 monitoring (cont.)									
9/2/09	18:04	MRSM3-S-29968	Soil	NA	SM3	–	2605	9/3/09	Sediment sample from Terrapin Creek.
9/2/09	18:10	MRSM2-W-29967	Water	NA	SM2	–	3170	9/3/09	Water sample from Terrapin Creek.
9/2/09	18:15	MRSM2-S-29967	Soil	NA	SM2	–	2605	9/3/09	Sediment sample from Terrapin Creek.
9/2/09	18:25	MRSM1-W-29966	Water	NA	SM1	–	3170	9/3/09	Water sample from Terrapin Creek.
9/2/09	18:30	MRSM1-S-29966	Soil	NA	SM1	–	2605	9/3/09	Sediment sample from Terrapin Creek.
9/2/09	18:50	MRSMB-W-29970	Water	NA	SMB	–	3170	9/3/09	Water sample from Terrapin Creek.
9/2/09	18:55	MRSMB-S-29970	Soil	NA	SMB	–	2605	9/3/09	Sediment sample from Terrapin Creek.
9/2/09	19:14	MRRILLINGER-W-29955	Water	DW	Rillinger	–	3170	9/3/09	Allowed pump to run for 5 min, then sampled.
9/2/09	19:32	MRSTONE-W-29956	Water	DW	Stone	43	3169	9/3/09	Purged 5 gal with bailer, then sampled.
9/2/09	19:52	MRISCH-W-29954	Water	DW	Isch	–	3170	9/3/09	Allowed pump to run for 5 min, then sampled.
9/3/09	8:40	MRTD12-W-29957	Water	DW	TD12	27-67	3169	9/3/09	Collected from Grimm well overflow before catch pond.
9/3/09	11:53	MRMW1D-W-29943	Water	MW	MW1D	63-88	3170	9/3/09	Depth to water = 27.05 ft. Depth of 4-in. well = 89 ft. Sample collected by using low-flow bladder pump after purging of 6.5 L. Pump intake positioned at 75.5 ft.
9/3/09	12:58	MRMW1S-W-29942	Water	MW	MW1S	11-51	3170	9/3/09	Depth to water = 19 ft. Depth of 4-in. well = 54 ft. Sample collected by using low-flow bladder pump after purging of 8 L. Pump intake positioned at 35 ft.
9/3/09	14:32	MRMW7S-W-29949	Water	MW	MW7S	20-45	3170	9/3/09	Depth to water = 13.8 ft. Depth of 4-in. well = 47 ft. Sample collected by using low-flow bladder pump after purging of 9 L. Pump intake positioned at 32.5 ft.
9/3/09	14:33	MRMW07SDUP-W-29958	Water	MW	MW7S	20-45	3169	9/3/09	Replicate of sample MRMW7S-W-29949.
9/3/09	14:40	MRMW3S-W-29945	Water	MW	MW3S	18-48	3170	9/3/09	Depth to water = 22.4 ft. Depth of 4-in. well = 47.8 ft. Sample collected by using low-flow bladder pump after purging of 5.5 L. Pump intake positioned at 35.2 ft.
9/3/09	15:48	MRMW5S-W-29947	Water	MW	MW5S	15-55	3170	9/3/09	Depth to water = 17.6 ft. Depth of 4-in. well = 54.6 ft. Sample collected by using low-flow bladder pump after purging of 5.5 L. Pump intake positioned at 36.3 ft.

TABLE C.1 (Cont.)

Sample Date	Time	Sample	Medium	Type[a]	Location	Depth (ft BGL)	Chain of Custody	Shipping Date	Sample Description
September 2009 monitoring (cont.)									
9/3/09	16:00	MRQCIR-W-29963	Water	RI	QC	–	3169	9/3/09	Rinsate of decontaminated sampling line after collection of sample MRMW5S-W-29947.
9/3/09	16:06	MRMW8S-W-29950	Water	MW	MW8S	10-25	3170	9/3/09	Depth to water = 2.9 ft. Depth of 4-in. well = 26.8 ft. Sample collected by using low-flow bladder pump after purging of 8.5 L. Pump intake positioned at 17.5 ft.
9/3/09	16:48	MRMW2S-W-29944	Water	MW	MW2S	13-53	3170	9/3/09	Depth to water = 29.4 ft. Depth of 4-in. well = 53.5 ft. Sample collected by using low-flow bladder pump after purging of 5.4 L. Pump intake positioned at 41.2 ft.
9/3/09	16:49	MRMW2SDUP-W-29959	Water	MW	MW2S	13-53	3169	9/3/09	Replicate of sample MRMW2S-W-29944.
9/3/09	17:04	MRMW10S-W-29952	Water	MW	MW10S	30-45	3170	9/3/09	Depth to water = 12 ft. Depth of 2-in. well = 49.7 ft. Sample collected by using low-flow bladder pump after purging of 7.5 L. Pump intake positioned at 37.5 ft. Light grayish in color.
9/3/09	18:00	MRQCTB-W-29960	Water	TB	QC	–	3169	9/3/09	Trip blank sent to the AGEM Laboratory for organic analysis with water samples listed on COCs 3170 and 3169, and to TestAmerica with verification samples listed on COC 3171.
9/3/09	19:54	MRMW11S-W-29953	Water	MW	MW11S	53-68	3172	9/4/09	Depth to water = 34.7 ft. Depth of 2-in. well = 72.7 ft. Sample collected by using low-flow bladder pump after purging of 7.5 L. Pump intake positioned at 60.5 ft.
9/4/09	10:20	MRMW6S-W-29948	Water	MW	MW6S	10-25	3172	9/4/09	Depth to water = 5.85 ft. Depth of 4-in. well = 26.9 ft. Sample collected by using low-flow bladder pump after purging of 5.4 L. Pump intake positioned at 17.5 ft.
9/4/09	11:24	MRMW4S-W-29946	Water	MW	MW4S	17-47	3172	9/4/09	Depth to water = 31.6 ft. Depth of 4-in. well = 47.8 ft. Sample collected by using bailer after purging of 6 L. Pump intake positioned at 39.3 ft.

TABLE C.1 (Cont.)

Sample Date	Time	Sample	Medium	Type[a]	Location	Depth (ft BGL)	Chain of Custody	Shipping Date	Sample Description
September 2009 monitoring (cont.)									
9/4/09	13:12	MRMW9S-W-29951	Water	MW	MW9S	38.83-53.83	3172	9/4/09	Depth to water = 19.95 ft. Depth of 2-in. well = 58.5 ft. Sample collected by using low-flow bladder pump after purging of 5 L. Pump intake positioned at 46.33 ft.
9/4/09	15:06	MRMW11S-W-29973	Water	MW	MW11S	53-68	3172	9/4/09	Depth to water = 34.95 ft. Depth of 2-in. well = 72.7 ft. Sample collected by using low-flow bladder pump after purging of 72 L (3 well volumes). Pump intake positioned at 67 ft.
9/4/09	16:28	MRMW3S-W-29972	Water	MW	MW3S	18-48	3172	9/4/09	Depth to water = 22.55 ft. Depth of 4-in. well = 47.8 ft. Sample collected by using low-flow bladder pump after purging of 190 L (3 well volumes). Pump intake positioned at 46 ft.
9/4/09	16:45	MRQCIR-W-29964	Water	RI	QC	–	3172	9/4/09	Rinsate of decontaminated sampling line after collection of sample MRMW3S-W-29972.
9/4/09	17:49	MRMW1S-W-29971	Water	MW	MW1S	11-51	3172	9/4/09	Depth to water = 19.3 ft. Depth of 4-in. well = 51.2 ft. Sample collected by using low-flow bladder pump after purging of 244 L (3 well volumes). Pump intake positioned at 50 ft.
9/4/09	18:12	MRQCTB-W-29961	Water	TB	QC	–	3172	9/4/09	Trip blank sent to the AGEM Laboratory for organic analysis with water samples listed on COC 3172.

[a] Sample type: DW, domestic well; MW, monitoring well; NA, does not apply; RI, rinsate; TB, trip blank.

Appendix D:

Analytical Results for Waste Purge Water

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1272137

Section A Required Client Information:

Company: TCW Construction
Address: 141 M Street Lincoln NE 68508
Email To: tkamler@tcwconstruction
Phone: (402) 416 7255 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: tkamler@tcwconstruction.com
Copy To: surgnier@prodigy.net
Purchase Order No.:
Project Name: Kansas Waste Water
Project Number:

Section C Invoice Information:

Attention: Travis Kamler
Company Name: TCW Construction
Address: 141 M Street Lincoln NE 68508
Pace Quote Reference:
Pace Project Manager: Trudy Gipson
Pace Profile #:

REGULATORY AGENCY: ☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: KS

Section D Required Client Information

Matrix Codes MATRIX / CODE: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	VOC	EDB	NITRATES	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	AGPURGE-W-924091	WW	C	1/09		9-24-09	0800	60	5	3				2			2	2	1		2(DEAU) 2(DEAT) 8830
2	BAPURGE-W-924092	WW	C	3/09		9/09	1115	65	5	3				2			2	2	1		
3	CNPURGE-W-924093	WW	C	4/09		9/09	1240	71	5	3				2			2	2	1		
4	EVPURGE-W-924094	WW	C	4/09		9/09	1333	71	5	3				2			2	2	1		
5	MRPURGE-W-924095	WW	C	4/09		9/09	1422	71	5	3				2			2	2	1		
6	QCTB-W-924096	WT	G			9/09	1640	75	2	2							2				
7																					
8																					
9																					
10																					
11																					
12																					

Analysis Test ↓ Y/N ↓

Pace Project No./ Lab I.D.: 60606709

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	/TCW	9-24-09	17:00		9/25	850	4.9	Y	Y	Y

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Travis Kamler
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 9-24-2009

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

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Sample Condition Upon Receipt

Client Name: TCW Project # 6066709

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 5558 7682 9061

Optional
Proj. Due Date: 10/7
Proj. Name: KS-JW

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other _____

Thermometer Used T-193 / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 4.9 **Biological Tissue is Frozen:** Yes No

Date and Initials of person examining contents: BW 9/25

Temp should be above freezing to 6°C

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☑Yes ☐No ☐N/A	6. NO3
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	~~☐Yes~~ BW ☑No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☑No ☐N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: WT		ALL SAMPLES COLLECTED 9/24 ACCORDING TO LABELS
All containers needing preservation have been checked.	☐Yes ☐No ☑N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☐No ☑N/A	
exceptions: (VOA), coliform, TOC, O&G, WI-DRO (water)	☑Yes ☐No	Initial when completed ____ Lot # of added preservative ____
Samples checked for dechlorination:	☐Yes ☐No ☑N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes ☑No ☐N/A	15.
Trip Blank Present:	☑Yes ☐No ☐N/A	16.
Trip Blank Custody Seals Present	☑Yes ☐No ☐N/A	
Pace Trip Blank Lot # (if purchased): _____		

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / N

Person Contacted: Travis Kamler Date/Time: 9-25-09

Comments/ Resolution: Per client - all samples collected on 9-24-09. DPH

Project Manager Review: DPH 9-28-09 **Date:** _____

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

F-KS-C-003-Rev.04, 04February2009

9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE ACKNOWLEDGMENT

Samples Submitted By: TCW Construction Inc
Client Project ID: Kansas Waste Water
Client PO#: Credit Card

Pace Project Manager: Trudy Gipson
Phone 1(913)563-1405
trudy.gipson@pacelabs.com
Pace Analytical Project ID: 6066709
Samples Received: September 25, 2009
Estimated Completion: October 07, 2009

Customer Sample ID	Pace Analytical Lab ID	Matrix	Date/Time Collected	Method
AGPURGE-W-924091	6066709001	Water	09/24/09 08:00	300.0 IC Anions 504 GCS EDB and DBCP 8260 MSV
BAPURGE-W-924092	6066709002	Water	09/24/09 11:15	300.0 IC Anions 504 GCS EDB and DBCP 8260 MSV
CNPURGE-W-924093	6066709003	Water	09/24/09 12:40	300.0 IC Anions 504 GCS EDB and DBCP 8260 MSV
EUPURGE-W-924094	6066709004	Water	09/24/09 13:33	300.0 IC Anions 504 GCS EDB and DBCP 8260 MSV
MRPURGE-W-924095	6066709005	Water	09/24/09 14:22	300.0 IC Anions 504 GCS EDB and DBCP 8260 MSV
QCTB-W-924096	6066709006	Water	09/24/09 16:40	8260 MSV

Please contact your project manager if you recognize any discrepancy in this form or have any questions about your project.

Thank you for choosing Pace Analytical Services, Inc.

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

October 13, 2009

Mr. Travis Kamler
TCW Construction Inc
141 M Street
Lincoln, NE 68508

RE: Project: Kansas Waste Water
Pace Project No.: 6066709

Dear Mr. Kamler:
Enclosed are the analytical results for sample(s) received by the laboratory on September 25, 2009. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Trudy Gipson

Trudy Gipson

trudy.gipson@pacelabs.com
Project Manager

Enclosures

cc: Mr. David Surgnier

REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: Kansas Waste Water
Pace Project No.: 6066709

Kansas Certification IDs

Washington Certification #: C2069
Utah Certification #: 9135995665
Texas Certification #: T104704407-08-TX
Oregon Certification #: KS200001
Oklahoma Certification #: 9205/9935
Nevada Certification #: KS000212008A
Louisiana Certification #: 03055
Kansas/NELAP Certification #: E-10116
Iowa Certification #: 118
Illinois Certification #: 001191
Arkansas Certification #: 05-008-0
A2LA Certification #: 2456.01

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SAMPLE SUMMARY

Project: Kansas Waste Water
Pace Project No.: 6066709

Lab ID	Sample ID	Matrix	Date Collected	Date Received
6066709001	**AGPURGE-W-924091**	Water	09/24/09 08:00	09/25/09 08:50
6066709002	**BAPURGE-W-924092**	Water	09/24/09 11:15	09/25/09 08:50
6066709003	**CNPURGE-W-924093**	Water	09/24/09 12:40	09/25/09 08:50
6066709004	**EUPURGE-W-924094**	Water	09/24/09 13:33	09/25/09 08:50
6066709005	**MRPURGE-W-924095**	Water	09/24/09 14:22	09/25/09 08:50
6066709006	**QCTB-W-924096**	Water	09/24/09 16:40	09/25/09 08:50

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SAMPLE ANALYTE COUNT

Project: Kansas Waste Water
Pace Project No.: 6066709

Lab ID	Sample ID	Method	Analysts	Analytes Reported
6066709001	**AGPURGE-W-924091**	EPA 300.0	RAB	1
		EPA 5030B/8260	NPM	70
		EPA 504.1	WAW	1
6066709002	**BAPURGE-W-924092**	EPA 300.0	RAB	1
		EPA 5030B/8260	NPM	70
		EPA 504.1	WAW	1
6066709003	**CNPURGE-W-924093**	EPA 300.0	RAB	1
		EPA 5030B/8260	NPM	70
		EPA 504.1	WAW	1
6066709004	**EUPURGE-W-924094**	EPA 300.0	RAB	1
		EPA 5030B/8260	NPM	70
		EPA 504.1	WAW	1
6066709005	**MRPURGE-W-924095**	EPA 300.0	RAB	1
		EPA 5030B/8260	NPM	70
		EPA 504.1	WAW	1
6066709006	**QCTB-W-924096**	EPA 5030B/8260	NPM	70

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ANALYTICAL RESULTS

Project: Kansas Waste Water
Pace Project No.: 6066709

Sample: MRPURGE-W-924095 **Lab ID: 6066709005** Collected: 09/24/09 14:22 Received: 09/25/09 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
504 GCS EDB and DBCP	Analytical Method: EPA 504.1 Preparation Method: EPA 504.1							
1,2-Dibromoethane (EDB)	ND	ug/L	0.046	1	10/08/09 00:00	10/10/09 05:19	106-93-4	
8260 MSV	Analytical Method: EPA 5030B/8260							
Acetone	ND	ug/L	10.0	1		09/28/09 22:08	67-64-1	
Benzene	ND	ug/L	1.0	1		09/28/09 22:08	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		09/28/09 22:08	108-86-1	
Bromochloromethane	ND	ug/L	1.0	1		09/28/09 22:08	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		09/28/09 22:08	75-27-4	
Bromoform	ND	ug/L	1.0	1		09/28/09 22:08	75-25-2	
Bromomethane	ND	ug/L	1.0	1		09/28/09 22:08	74-83-9	
2-Butanone (MEK)	ND	ug/L	10.0	1		09/28/09 22:08	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	1		09/28/09 22:08	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	1		09/28/09 22:08	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		09/28/09 22:08	98-06-6	
Carbon disulfide	ND	ug/L	5.0	1		09/28/09 22:08	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	1		09/28/09 22:08	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		09/28/09 22:08	108-90-7	
Chloroethane	ND	ug/L	1.0	1		09/28/09 22:08	75-00-3	
Chloroform	ND	ug/L	1.0	1		09/28/09 22:08	67-66-3	
Chloromethane	ND	ug/L	1.0	1		09/28/09 22:08	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	1		09/28/09 22:08	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		09/28/09 22:08	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	2.5	1		09/28/09 22:08	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	1		09/28/09 22:08	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		09/28/09 22:08	106-93-4	
Dibromomethane	ND	ug/L	1.0	1		09/28/09 22:08	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	1		09/28/09 22:08	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		09/28/09 22:08	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		09/28/09 22:08	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	1		09/28/09 22:08	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	1		09/28/09 22:08	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		09/28/09 22:08	107-06-2	
1,2-Dichloroethene (Total)	ND	ug/L	1.0	1		09/28/09 22:08	540-59-0	
1,1-Dichloroethene	ND	ug/L	1.0	1		09/28/09 22:08	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		09/28/09 22:08	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		09/28/09 22:08	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	1		09/28/09 22:08	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	1		09/28/09 22:08	142-28-9	
2,2-Dichloropropane	ND	ug/L	1.0	1		09/28/09 22:08	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	1		09/28/09 22:08	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	1.0	1		09/28/09 22:08	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	1		09/28/09 22:08	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	1		09/28/09 22:08	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	1		09/28/09 22:08	87-68-3	
2-Hexanone	ND	ug/L	10.0	1		09/28/09 22:08	591-78-6	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		09/28/09 22:08	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	1		09/28/09 22:08	99-87-6	

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ANALYTICAL RESULTS

Project: Kansas Waste Water
Pace Project No.: 6066709

Sample: MRPURGE-W-924095 **Lab ID: 6066709005** Collected: 09/24/09 14:22 Received: 09/25/09 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 5030B/8260							
Methylene chloride	ND	ug/L	1.0	1		09/28/09 22:08	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10.0	1		09/28/09 22:08	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		09/28/09 22:08	1634-04-4	
Naphthalene	ND	ug/L	10.0	1		09/28/09 22:08	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	1		09/28/09 22:08	103-65-1	
Styrene	ND	ug/L	1.0	1		09/28/09 22:08	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		09/28/09 22:08	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		09/28/09 22:08	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	1		09/28/09 22:08	127-18-4	
Toluene	ND	ug/L	1.0	1		09/28/09 22:08	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		09/28/09 22:08	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		09/28/09 22:08	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		09/28/09 22:08	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		09/28/09 22:08	79-00-5	
Trichloroethene	ND	ug/L	1.0	1		09/28/09 22:08	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		09/28/09 22:08	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	2.5	1		09/28/09 22:08	96-18-4	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		09/28/09 22:08	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		09/28/09 22:08	108-67-8	
Vinyl chloride	ND	ug/L	1.0	1		09/28/09 22:08	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		09/28/09 22:08	1330-20-7	
4-Bromofluorobenzene (S)	103	%	87-115	1		09/28/09 22:08	460-00-4	
Dibromofluoromethane (S)	108	%	87-113	1		09/28/09 22:08	1868-53-7	
1,2-Dichloroethane-d4 (S)	110	%	81-121	1		09/28/09 22:08	17060-07-0	
Toluene-d8 (S)	108	%	89-111	1		09/28/09 22:08	2037-26-5	
Preservation pH	**7.0**		0.10	1		09/28/09 22:08		
300.0 IC Anions	Analytical Method: EPA 300.0							
Nitrate as N	**0.94**	mg/L	0.10	1		09/26/09 05:22	14797-55-8	

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ANALYTICAL RESULTS

Project: Kansas Waste Water
Pace Project No.: 6066709

Sample: QCTB-W-924096 **Lab ID: 6066709006** Collected: 09/24/09 16:40 Received: 09/25/09 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 5030B/8260							
Acetone	**15.4**	ug/L	10.0	1		09/28/09 22:23	67-64-1	
Benzene	ND	ug/L	1.0	1		09/28/09 22:23	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		09/28/09 22:23	108-86-1	
Bromochloromethane	ND	ug/L	1.0	1		09/28/09 22:23	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		09/28/09 22:23	75-27-4	
Bromoform	ND	ug/L	1.0	1		09/28/09 22:23	75-25-2	
Bromomethane	ND	ug/L	1.0	1		09/28/09 22:23	74-83-9	
2-Butanone (MEK)	ND	ug/L	10.0	1		09/28/09 22:23	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	1		09/28/09 22:23	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	1		09/28/09 22:23	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		09/28/09 22:23	98-06-6	
Carbon disulfide	ND	ug/L	5.0	1		09/28/09 22:23	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	1		09/28/09 22:23	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		09/28/09 22:23	108-90-7	
Chloroethane	ND	ug/L	1.0	1		09/28/09 22:23	75-00-3	
Chloroform	ND	ug/L	1.0	1		09/28/09 22:23	67-66-3	
Chloromethane	ND	ug/L	1.0	1		09/28/09 22:23	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	1		09/28/09 22:23	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		09/28/09 22:23	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	2.5	1		09/28/09 22:23	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	1		09/28/09 22:23	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		09/28/09 22:23	106-93-4	
Dibromomethane	ND	ug/L	1.0	1		09/28/09 22:23	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	1		09/28/09 22:23	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		09/28/09 22:23	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		09/28/09 22:23	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	1		09/28/09 22:23	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	1		09/28/09 22:23	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		09/28/09 22:23	107-06-2	
1,2-Dichloroethene (Total)	ND	ug/L	1.0	1		09/28/09 22:23	540-59-0	
1,1-Dichloroethene	ND	ug/L	1.0	1		09/28/09 22:23	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		09/28/09 22:23	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		09/28/09 22:23	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	1		09/28/09 22:23	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	1		09/28/09 22:23	142-28-9	
2,2-Dichloropropane	ND	ug/L	1.0	1		09/28/09 22:23	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	1		09/28/09 22:23	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	1.0	1		09/28/09 22:23	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	1		09/28/09 22:23	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	1		09/28/09 22:23	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	1		09/28/09 22:23	87-68-3	
2-Hexanone	ND	ug/L	10.0	1		09/28/09 22:23	591-78-6	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		09/28/09 22:23	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	1		09/28/09 22:23	99-87-6	
Methylene chloride	ND	ug/L	1.0	1		09/28/09 22:23	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10.0	1		09/28/09 22:23	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		09/28/09 22:23	1634-04-4	

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ANALYTICAL RESULTS

Project: Kansas Waste Water
Pace Project No.: 6066709

Sample: QCTB-W-924096 **Lab ID: 6066709006** Collected: 09/24/09 16:40 Received: 09/25/09 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 5030B/8260							
Naphthalene	ND	ug/L	10.0	1		09/28/09 22:23	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	1		09/28/09 22:23	103-65-1	
Styrene	ND	ug/L	1.0	1		09/28/09 22:23	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		09/28/09 22:23	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		09/28/09 22:23	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	1		09/28/09 22:23	127-18-4	
Toluene	ND	ug/L	1.0	1		09/28/09 22:23	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		09/28/09 22:23	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		09/28/09 22:23	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		09/28/09 22:23	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		09/28/09 22:23	79-00-5	
Trichloroethene	ND	ug/L	1.0	1		09/28/09 22:23	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		09/28/09 22:23	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	2.5	1		09/28/09 22:23	96-18-4	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		09/28/09 22:23	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		09/28/09 22:23	108-67-8	
Vinyl chloride	ND	ug/L	1.0	1		09/28/09 22:23	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		09/28/09 22:23	1330-20-7	
4-Bromofluorobenzene (S)	103	%	87-115	1		09/28/09 22:23	460-00-4	
Dibromofluoromethane (S)	107	%	87-113	1		09/28/09 22:23	1868-53-7	
1,2-Dichloroethane-d4 (S)	109	%	81-121	1		09/28/09 22:23	17060-07-0	
Toluene-d8 (S)	107	%	89-111	1		09/28/09 22:23	2037-26-5	
Preservation pH	**7.0**		0.10	1		09/28/09 22:23		

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QUALITY CONTROL DATA

Project: Kansas Waste Water
Pace Project No.: 6066709

QC Batch: WETA/10995 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 6066709001, 6066709002, 6066709003, 6066709004, 6066709005

METHOD BLANK: 541949 Matrix: Water
Associated Lab Samples: 6066709001, 6066709002, 6066709003, 6066709004, 6066709005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrate as N	mg/L	ND	0.10	09/25/09 21:46	

LABORATORY CONTROL SAMPLE: 541950

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrate as N	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 541951 541952

Parameter	Units	6066657003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrate as N	mg/L	2.5	5	5	5.7	5.7	65	64	73-114	0	5	M0

MATRIX SPIKE SAMPLE: 542080

Parameter	Units	6066707001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrate as N	mg/L	0.21	5	4.8	92	73-114	

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QUALITY CONTROL DATA

Project: Kansas Waste Water
Pace Project No.: 6066709

QC Batch: MSV/23759 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Water 7 day
Associated Lab Samples: 6066709001, 6066709002, 6066709003, 6066709004, 6066709005, 6066709006

METHOD BLANK: 548226 Matrix: Water
Associated Lab Samples: 6066709001, 6066709002, 6066709003, 6066709004, 6066709005, 6066709006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	1.0	09/28/09 20:06	
1,1,1-Trichloroethane	ug/L	ND	1.0	09/28/09 20:06	
1,1,2,2-Tetrachloroethane	ug/L	ND	1.0	09/28/09 20:06	
1,1,2-Trichloroethane	ug/L	ND	1.0	09/28/09 20:06	
1,1-Dichloroethane	ug/L	ND	1.0	09/28/09 20:06	
1,1-Dichloroethene	ug/L	ND	1.0	09/28/09 20:06	
1,1-Dichloropropene	ug/L	ND	1.0	09/28/09 20:06	
1,2,3-Trichlorobenzene	ug/L	ND	1.0	09/28/09 20:06	
1,2,3-Trichloropropane	ug/L	ND	2.5	09/28/09 20:06	
1,2,4-Trichlorobenzene	ug/L	ND	1.0	09/28/09 20:06	
1,2,4-Trimethylbenzene	ug/L	ND	1.0	09/28/09 20:06	
1,2-Dibromo-3-chloropropane	ug/L	ND	2.5	09/28/09 20:06	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	09/28/09 20:06	
1,2-Dichlorobenzene	ug/L	ND	1.0	09/28/09 20:06	
1,2-Dichloroethane	ug/L	ND	1.0	09/28/09 20:06	
1,2-Dichloroethene (Total)	ug/L	ND	1.0	09/28/09 20:06	
1,2-Dichloropropane	ug/L	ND	1.0	09/28/09 20:06	
1,3,5-Trimethylbenzene	ug/L	ND	1.0	09/28/09 20:06	
1,3-Dichlorobenzene	ug/L	ND	1.0	09/28/09 20:06	
1,3-Dichloropropane	ug/L	ND	1.0	09/28/09 20:06	
1,4-Dichlorobenzene	ug/L	ND	1.0	09/28/09 20:06	
2,2-Dichloropropane	ug/L	ND	1.0	09/28/09 20:06	
2-Butanone (MEK)	ug/L	ND	10.0	09/28/09 20:06	
2-Chlorotoluene	ug/L	ND	1.0	09/28/09 20:06	
2-Hexanone	ug/L	ND	10.0	09/28/09 20:06	
4-Chlorotoluene	ug/L	ND	1.0	09/28/09 20:06	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	10.0	09/28/09 20:06	
Acetone	ug/L	ND	10.0	09/28/09 20:06	
Benzene	ug/L	ND	1.0	09/28/09 20:06	
Bromobenzene	ug/L	ND	1.0	09/28/09 20:06	
Bromochloromethane	ug/L	ND	1.0	09/28/09 20:06	
Bromodichloromethane	ug/L	ND	1.0	09/28/09 20:06	
Bromoform	ug/L	ND	1.0	09/28/09 20:06	
Bromomethane	ug/L	ND	1.0	09/28/09 20:06	
Carbon disulfide	ug/L	ND	5.0	09/28/09 20:06	
Carbon tetrachloride	ug/L	ND	1.0	09/28/09 20:06	
Chlorobenzene	ug/L	ND	1.0	09/28/09 20:06	
Chloroethane	ug/L	ND	1.0	09/28/09 20:06	
Chloroform	ug/L	ND	1.0	09/28/09 20:06	
Chloromethane	ug/L	ND	1.0	09/28/09 20:06	
cis-1,2-Dichloroethene	ug/L	ND	1.0	09/28/09 20:06	
cis-1,3-Dichloropropene	ug/L	ND	1.0	09/28/09 20:06	
Dibromochloromethane	ug/L	ND	1.0	09/28/09 20:06	

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QUALITY CONTROL DATA

Project: Kansas Waste Water
Pace Project No.: 6066709

METHOD BLANK: 548226 Matrix: Water

Associated Lab Samples: 6066709001, 6066709002, 6066709003, 6066709004, 6066709005, 6066709006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Dibromomethane	ug/L	ND	1.0	09/28/09 20:06	
Dichlorodifluoromethane	ug/L	ND	1.0	09/28/09 20:06	
Ethylbenzene	ug/L	ND	1.0	09/28/09 20:06	
Hexachloro-1,3-butadiene	ug/L	ND	1.0	09/28/09 20:06	
Isopropylbenzene (Cumene)	ug/L	ND	1.0	09/28/09 20:06	
Methyl-tert-butyl ether	ug/L	ND	1.0	09/28/09 20:06	
Methylene chloride	ug/L	ND	1.0	09/28/09 20:06	
n-Butylbenzene	ug/L	ND	1.0	09/28/09 20:06	
n-Propylbenzene	ug/L	ND	1.0	09/28/09 20:06	
Naphthalene	ug/L	ND	10.0	09/28/09 20:06	
p-Isopropyltoluene	ug/L	ND	1.0	09/28/09 20:06	
sec-Butylbenzene	ug/L	ND	1.0	09/28/09 20:06	
Styrene	ug/L	ND	1.0	09/28/09 20:06	
tert-Butylbenzene	ug/L	ND	1.0	09/28/09 20:06	
Tetrachloroethene	ug/L	ND	1.0	09/28/09 20:06	
Toluene	ug/L	ND	1.0	09/28/09 20:06	
trans-1,2-Dichloroethene	ug/L	ND	1.0	09/28/09 20:06	
trans-1,3-Dichloropropene	ug/L	ND	1.0	09/28/09 20:06	
Trichloroethene	ug/L	ND	1.0	09/28/09 20:06	
Trichlorofluoromethane	ug/L	ND	1.0	09/28/09 20:06	
Vinyl chloride	ug/L	ND	1.0	09/28/09 20:06	
Xylene (Total)	ug/L	ND	3.0	09/28/09 20:06	
1,2-Dichloroethane-d4 (S)	%	105	81-121	09/28/09 20:06	
4-Bromofluorobenzene (S)	%	102	87-115	09/28/09 20:06	
Dibromofluoromethane (S)	%	104	87-113	09/28/09 20:06	
Toluene-d8 (S)	%	106	89-111	09/28/09 20:06	

LABORATORY CONTROL SAMPLE: 548227

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	10	7.6	76	75-121	
1,1,1-Trichloroethane	ug/L	10	8.8	88	73-120	
1,1,2,2-Tetrachloroethane	ug/L	10	10	100	73-128	
1,1,2-Trichloroethane	ug/L	10	10.4	104	83-125	
1,1-Dichloroethane	ug/L	10	9.8	98	79-115	
1,1-Dichloroethene	ug/L	10	10.2	102	76-122	
1,1-Dichloropropene	ug/L	10	10.5	105	80-119	
1,2,3-Trichlorobenzene	ug/L	10	9.5	95	70-138	
1,2,3-Trichloropropane	ug/L	10	10.3	103	74-129	
1,2,4-Trichlorobenzene	ug/L	10	9.0	90	72-131	
1,2,4-Trimethylbenzene	ug/L	10	9.2	92	78-123	
1,2-Dibromo-3-chloropropane	ug/L	10	8.9	89	61-139	
1,2-Dibromoethane (EDB)	ug/L	10	10	100	80-124	
1,2-Dichlorobenzene	ug/L	10	9.4	94	82-113	
1,2-Dichloroethane	ug/L	10	10.9	109	78-118	

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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: Kansas Waste Water
Pace Project No.: 6066709

LABORATORY CONTROL SAMPLE: 548227

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2-Dichloroethene (Total)	ug/L	20	21.5	107	79-120	
1,2-Dichloropropane	ug/L	10	10.9	109	83-117	
1,3,5-Trimethylbenzene	ug/L	10	9.3	93	79-116	
1,3-Dichlorobenzene	ug/L	10	9.1	91	82-112	
1,3-Dichloropropane	ug/L	10	10.4	104	82-121	
1,4-Dichlorobenzene	ug/L	10	9.1	91	81-111	
2,2-Dichloropropane	ug/L	10	6.3	63	55-139	
2-Butanone (MEK)	ug/L	25	29.6	119	61-136	
2-Chlorotoluene	ug/L	10	9.1	91	81-115	
2-Hexanone	ug/L	25	27.8	111	65-137	
4-Chlorotoluene	ug/L	10	9.2	92	81-111	
4-Methyl-2-pentanone (MIBK)	ug/L	25	32.1	129	65-133	
Acetone	ug/L	25	27.7	111	58-126	
Benzene	ug/L	10	10.8	108	81-114	
Bromobenzene	ug/L	10	9.3	93	84-113	
Bromochloromethane	ug/L	10	11.2	112	79-120	
Bromodichloromethane	ug/L	10	10.0	100	75-119	
Bromoform	ug/L	10	6.8	68	66-132	
Bromomethane	ug/L	10	5.8	58	58-151	
Carbon disulfide	ug/L	10	10.9	109	49-148	
Carbon tetrachloride	ug/L	10	7.4	74	62-137	
Chlorobenzene	ug/L	10	9.9	99	81-113	
Chloroethane	ug/L	10	12.4	124	65-119	L3
Chloroform	ug/L	10	10.4	104	76-118	
Chloromethane	ug/L	10	9.6	96	40-132	
cis-1,2-Dichloroethene	ug/L	10	10.8	108	80-119	
cis-1,3-Dichloropropene	ug/L	10	9.5	95	75-122	
Dibromochloromethane	ug/L	10	8.4	84	72-124	
Dibromomethane	ug/L	10	11.0	110	79-121	
Dichlorodifluoromethane	ug/L	10	8.1	81	11-156	
Ethylbenzene	ug/L	10	9.6	96	82-115	
Hexachloro-1,3-butadiene	ug/L	10	8.3	83	72-139	
Isopropylbenzene (Cumene)	ug/L	10	8.4	84	69-103	
Methyl-tert-butyl ether	ug/L	10	9.4	94	65-113	
Methylene chloride	ug/L	10	10.0	100	76-124	
n-Butylbenzene	ug/L	10	9.1	91	77-121	
n-Propylbenzene	ug/L	10	8.9	89	79-116	
Naphthalene	ug/L	10	10.6	106	66-132	
p-Isopropyltoluene	ug/L	10	8.8	88	77-114	
sec-Butylbenzene	ug/L	10	9.1	91	80-119	
Styrene	ug/L	10	10.1	101	81-115	
tert-Butylbenzene	ug/L	10	9.2	92	77-121	
Tetrachloroethene	ug/L	10	9.2	92	73-122	
Toluene	ug/L	10	10.6	106	82-114	
trans-1,2-Dichloroethene	ug/L	10	10.7	107	75-122	
trans-1,3-Dichloropropene	ug/L	10	6.5	65	66-114	L2
Trichloroethene	ug/L	10	10.6	106	78-119	
Trichlorofluoromethane	ug/L	10	9.7	97	71-120	

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(913)599-5665

QUALITY CONTROL DATA

Project: Kansas Waste Water
Pace Project No.: 6066709

LABORATORY CONTROL SAMPLE: 548227

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Vinyl chloride	ug/L	10	9.2	92	67-139	
Xylene (Total)	ug/L	30	26.9	90	81-116	
1,2-Dichloroethane-d4 (S)	%			104	81-121	
4-Bromofluorobenzene (S)	%			101	87-115	
Dibromofluoromethane (S)	%			105	87-113	
Toluene-d8 (S)	%			105	89-111	

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QUALITY CONTROL DATA

Project: Kansas Waste Water
Pace Project No.: 6066709

QC Batch: OEXT/19948 Analysis Method: EPA 504.1
QC Batch Method: EPA 504.1 Analysis Description: GCS 504 EDB DBCP
Associated Lab Samples: 6066709001, 6066709002, 6066709003, 6066709004, 6066709005

METHOD BLANK: 548830 Matrix: Water
Associated Lab Samples: 6066709001, 6066709002, 6066709003, 6066709004, 6066709005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2-Dibromoethane (EDB)	ug/L	ND	0.050	10/09/09 15:13	

LABORATORY CONTROL SAMPLE & LCSD: 548831 548832

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,2-Dibromoethane (EDB)	ug/L	.25	0.29	0.30	117	121	70-130	4	20	

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QUALIFIERS

Project: Kansas Waste Water
Pace Project No.: 6066709

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

U - Indicates the compound was analyzed for, but not detected.

BATCH QUALIFIERS

Batch: MSV/23759

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

ANALYTE QUALIFIERS

L2 Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results for this analyte in associated samples may be biased low.

L3 Analyte recovery in the laboratory control sample (LCS) exceeded QC limits. Analyte presence below reporting limits in associated samples. Results unaffected by high bias.

M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

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Appendix E:

Data Summary for Verification VOCs Analyses by TestAmerica

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

May 8, 2009

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

Re: Laboratory Project No. 21005
Case: MORRILL; SDG: 131388

Dear Mr. Dennis:

Enclosed are analytical results for samples that were received by TestAmerica Burlington on April 24th, 2009. Laboratory identification numbers were assigned, and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 04/24/09 ETR No: 131388		
793440	MRRILLINGER-W-27665	04/22/09	WATER
793441	MRMW4S-W-27656	04/23/09	WATER
793442	MRMW10S-W-27662	04/23/09	WATER
793443	MRQCTB-W-27671	04/23/09	WATER
793444	VHBLK01	04/24/09	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.

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

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 sample. 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. 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 recoveries of 2-butanone-d_5 and 2-hexanone-d_5 were elevated in the analysis of samples MRRILLINGER-W-27665, MRMW4S-W-27656, and MRMW10S-W-27662. Additionally, the derived recovery of 1,2-dichloropropane-d_6 was low in the analysis of sample MRRILLINGER-W-27665 (78 percent). Matrix spike and matrix spike duplicate analyses were not performed on the samples in this sample set. A trace concentration of acetone was identified in the analysis of the method blank associated with the analytical work. The concentration level in that analysis was below the established reporting limit, and the acquisition did meet the technical acceptance criteria for an acceptable method blank analysis. The analysis of the storage blank associated with the sample set was free of target analyte contamination. Present in the storage blank and method blank analyses was a non-target constituent that represented a compound that is related to 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 percent difference criterion in the continuing calibration check acquisition. The response for each target analyte met the 50.0 percent difference criterion in the closing calibration check acquisition.

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

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

of the data in this test report and any associated electronic deliverables is authorized by the Laboratory Director's designee as verified by the following signature.

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

Sincerely,

Kirk F. Young
Project Manager

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

Argonne NATIONAL LABORATORY

6196

MATRIX: Water	**ARGONNE NATIONAL LABORATORY CHAIN OF CUSTODY RECORD***	Shipping Container:
RECEIVING LAB: Test America		Shipping Info:
PROJECT/SITE: Morrill KS		Field Contact (Name & Temporary Phone): Bob Sedivy (402) 465 9021
SAMPLER(S) (Signature)		

DATE OF COLLECTION	SAMPLE ID NUMBER(S)	Number of containers	ANALYSIS: VOC									REMARKS
April 22, 2009	MRRillinger-W-27665	2	2									2x40 mL for VOC
April 23, 2009	MRMW45-W-27656	2	2									2x40 mL for VOC
" "	MRMW105-W-27662	2	2									2x40 mL for VOC
April 23, 2009	MRQCTB-W-27671	1	1									1x40 mL for VOC

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
	4-23-09	1716					

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time	Remarks
			[illegible]	4/24/09	1020	Temp 1.4

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 Science Division, 9700 S. Cass Avenue, Argonne, IL 60439

EVS-160 (6-07)

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.

MRRILLINGER

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MORRILL Mod. Ref No.: SDG No.: 131388

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 793440

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 793440

Level: (TRACE/LOW/MED) TRACE Date Received: 04/24/2009

% Moisture: not dec. Date Analyzed: 04/27/2009

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	0.21	J
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	2.2	
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.

MRRILLINGER

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MORRILL Mod. Ref No.: SDG No.: 131388

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 793440

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 793440

Level: (TRACE/LOW/MED) TRACE Date Received: 04/24/2009

% Moisture: not dec. Date Analyzed: 04/27/2009

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.
MRMW4S27656

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MORRILL Mod. Ref No.: SDG No.: 131388

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 793441

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 793441

Level: (TRACE/LOW/MED) TRACE Date Received: 04/24/2009

% Moisture: not dec. Date Analyzed: 04/27/2009

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	0.20	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.

MRMW4S27656

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MORRILL Mod. Ref No.: SDG No.: 131388

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 793441

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 793441

Level: (TRACE/LOW/MED) TRACE Date Received: 04/24/2009

% Moisture: not dec. Date Analyzed: 04/27/2009

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.
MRMW10S27662

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MORRILL Mod. Ref No.: SDG No.: 131388

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 793442

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 793442

Level: (TRACE/LOW/MED) TRACE Date Received: 04/24/2009

% Moisture: not dec. Date Analyzed: 04/27/2009

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.

MRMW10S27662

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MORRILL Mod. Ref No.: SDG No.: 131388

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 793442

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 793442

Level: (TRACE/LOW/MED) TRACE Date Received: 04/24/2009

% Moisture: not dec. Date Analyzed: 04/27/2009

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.
MRQCTB27671

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MORRILL Mod. Ref No.: SDG No.: 131388

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 793443

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 793443

Level: (TRACE/LOW/MED) TRACE Date Received: 04/24/2009

% Moisture: not dec. Date Analyzed: 04/27/2009

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	4.7	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	1.0	J
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.

MRQCTB27671

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MORRILL Mod. Ref No.: SDG No.: 131388

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 793443

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 793443

Level: (TRACE/LOW/MED) TRACE Date Received: 04/24/2009

% Moisture: not dec. Date Analyzed: 04/27/2009

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.: MORRILL Mod. Ref No.: SDG No.: 131388

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 793444

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 793444

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

% Moisture: not dec. Date Analyzed: 04/27/2009

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.: MORRILL Mod. Ref No.: SDG No.: 131388

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 793444

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 793444

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

% Moisture: not dec. Date Analyzed: 04/27/2009

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

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THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

September 22, 2009

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

Re: Laboratory Project No. 21005
Case: MERRILL; SDG: 133407

Dear Mr. Dennis:

Enclosed are analytical results for samples that were received by TestAmerica Burlington on September 4th, 2009. Laboratory identification numbers were assigned, and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 09/04/09 ETR No: 133407		
805575	MRMW1D-W-29943	09/03/09	WATER
805576	MRMW3S-W-29945	09/03/09	WATER
805577	MRMW8S-W-29950	09/03/09	WATER
805578	MRQCTB-W-29960	09/03/09	WATER
805579	VHBLK01	09/04/09	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.

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THE LEADER IN ENVIRONMENTAL TESTING

An additional, dilution analysis was performed on sample MRMW3S-W-29945 in order to provide quantification within the range of calibrated instrument response. Both sets of results for the analysis of sample MRMW3S-W-29945 are included in this submittal. Each of the analyses associated with the sample set exhibited an acceptable internal standard performance. There was an acceptable recovery of each deuterated monitoring compound (DMC) in the analysis of each 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 recoveries of 2-butanone-d_5 and 2-hexanone-d_5 were elevated in the analysis of samples MRMW1D-W-29943, MRMW3S-W-29945, and MRMW8S-W-29950, as they were in the dilution analysis of sample MRMW3S-W-29945. Matrix spike and matrix spike duplicate analyses were not performed on the samples in this sample set. A trace concentration of acetone was identified in the analysis of one of the method blanks associated with the analytical work, identified as VBLKX5. The concentration level in that analysis was below the established reporting limit, and the analysis did meet the technical acceptance criteria for a compliant method blank analysis. A trace concentration of acetone was identified in the analysis of the storage blank associated with the analytical work. The concentration level in that analysis was below the established reporting limit, and the analysis did meet the technical acceptance criteria for a compliant storage blank analysis. Present in the method 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 response for each target analyte met the percent difference criterion in each continuing calibration check acquisition. The response for each target analyte met the 50.0 percent difference criterion in each 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.

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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

MATRIX: Water
RECEIVING LAB: Test America
PROJECT/SITE: Morrill, KS
SAMPLER(S) (Signature): Matt Mill

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
9-3-09	MRMW1D-W-29943	2	2									2x 40ml for VOC to Test Am.
	MRMW3S-W-29945	2	2									
	MRMW8S-W-29950	2	2									
9-3-09	MRRCTB-W-29960	2	2									2x 40ml for VOC to Test Am.

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
Matt Mill	9-3	17:59					

Relinquished by (Signature)	Date	Time	Received for Laboratory by	Date	Time	Remarks
			Chris Kolb	9/4/09	1025	

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)

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Sample Data Summary – SOM01.2 Volatiles – Trace

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

EPA SAMPLE NO.

MW1DW29943

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MERRILL Mod. Ref No.: SDG No.: 133407

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 805575

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 805575

Level: (TRACE/LOW/MED) TRACE Date Received: 09/04/2009

% Moisture: not dec. Date Analyzed: 09/08/2009

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.
MW1DW29943

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MERRILL Mod. Ref No.: SDG No.: 133407

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 805575

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 805575

Level: (TRACE/LOW/MED) TRACE Date Received: 09/04/2009

% Moisture: not dec. Date Analyzed: 09/08/2009

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.
MW3SW29945

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MERRILL Mod. Ref No.: SDG No.: 133407

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 805576

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 805576

Level: (TRACE/LOW/MED) TRACE Date Received: 09/04/2009

% Moisture: not dec. Date Analyzed: 09/08/2009

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	0.98	
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	24	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.
MW3SW29945

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MERRILL Mod. Ref No.: SDG No.: 133407

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 805576

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 805576

Level: (TRACE/LOW/MED) TRACE Date Received: 09/04/2009

% Moisture: not dec. Date Analyzed: 09/08/2009

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.

MW3SW29945DL

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MERRILL Mod. Ref No.: SDG No.: 133407

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 805576D1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 805576D

Level: (TRACE/LOW/MED) TRACE Date Received: 09/04/2009

% Moisture: not dec. Date Analyzed: 09/08/2009

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.8

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	0.90	U
74-87-3	Chloromethane	0.90	U
75-01-4	Vinyl chloride	0.90	U
74-83-9	Bromomethane	0.90	U
75-00-3	Chloroethane	0.90	U
75-69-4	Trichlorofluoromethane	0.90	U
75-35-4	1,1-Dichloroethene	0.90	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.90	U
67-64-1	Acetone	9.0	U
75-15-0	Carbon disulfide	0.90	U
79-20-9	Methyl acetate	0.90	U
75-09-2	Methylene chloride	0.90	U
156-60-5	trans-1,2-Dichloroethene	0.90	U
1634-04-4	Methyl tert-butyl ether	0.90	U
75-34-3	1,1-Dichloroethane	0.90	U
156-59-2	cis-1,2-Dichloroethene	0.90	U
78-93-3	2-Butanone	9.0	U
74-97-5	Bromochloromethane	0.90	U
67-66-3	Chloroform	1.0	D
71-55-6	1,1,1-Trichloroethane	0.90	U
110-82-7	Cyclohexane	0.90	U
56-23-5	Carbon tetrachloride	24	D
71-43-2	Benzene	0.90	U
107-06-2	1,2-Dichloroethane	0.90	U

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

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

EPA SAMPLE NO.
MW3SW29945DL

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MERRILL Mod. Ref No.: SDG No.: 133407

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 805576D1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 805576D

Level: (TRACE/LOW/MED) TRACE Date Received: 09/04/2009

% Moisture: not dec. Date Analyzed: 09/08/2009

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.8

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	0.90	U
108-87-2	Methylcyclohexane	0.90	U
78-87-5	1,2-Dichloropropane	0.90	U
75-27-4	Bromodichloromethane	0.90	U
10061-01-5	cis-1,3-Dichloropropene	0.90	U
108-10-1	4-Methyl-2-pentanone	9.0	U
108-88-3	Toluene	0.90	U
10061-02-6	trans-1,3-Dichloropropene	0.90	U
79-00-5	1,1,2-Trichloroethane	0.90	U
127-18-4	Tetrachloroethene	0.90	U
591-78-6	2-Hexanone	9.0	U
124-48-1	Dibromochloromethane	0.90	U
106-93-4	1,2-Dibromoethane	0.90	U
108-90-7	Chlorobenzene	0.90	U
100-41-4	Ethylbenzene	0.90	U
95-47-6	o-Xylene	0.90	U
179601-23-1	m,p-Xylene	0.90	U
100-42-5	Styrene	0.90	U
75-25-2	Bromoform	0.90	U
98-82-8	Isopropylbenzene	0.90	U
79-34-5	1,1,2,2-Tetrachloroethane	0.90	U
541-73-1	1,3-Dichlorobenzene	0.90	U
106-46-7	1,4-Dichlorobenzene	0.90	U
95-50-1	1,2-Dichlorobenzene	0.90	U
96-12-8	1,2-Dibromo-3-chloropropane	0.90	U
120-82-1	1,2,4-Trichlorobenzene	0.90	U
87-61-6	1,2,3-Trichlorobenzene	0.90	U

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

EPA SAMPLE NO.

MW8SW29950

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MERRILL Mod. Ref No.: SDG No.: 133407

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 805577

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 805577I2

Level: (TRACE/LOW/MED) TRACE Date Received: 09/04/2009

% Moisture: not dec. Date Analyzed: 09/08/2009

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	1.4	
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.

MW8SW29950

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MERRILL Mod. Ref No.: SDG No.: 133407

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 805577

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 805577I2

Level: (TRACE/LOW/MED) TRACE Date Received: 09/04/2009

% Moisture: not dec. Date Analyzed: 09/08/2009

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.

QCTBW29960

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MERRILL Mod. Ref No.: SDG No.: 133407

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 805578

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 805578

Level: (TRACE/LOW/MED) TRACE Date Received: 09/04/2009

% Moisture: not dec. Date Analyzed: 09/08/2009

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	6.8	
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	
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	0.20	J

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

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

EPA SAMPLE NO.

QCTBW29960

Lab Name: TESTAMERICA BURLINGTON Contract: 8E-00302

Lab Code: STLV Case No.: MERRILL Mod. Ref No.: SDG No.: 133407

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 805578

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 805578

Level: (TRACE/LOW/MED) TRACE Date Received: 09/04/2009

% Moisture: not dec. Date Analyzed: 09/08/2009

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	0.45	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	0.37	J
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	2.1	
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.: MERRILL Mod. Ref No.: SDG No.: 133407

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 805579

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 805579I2

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

% Moisture: not dec. Date Analyzed: 09/08/2009

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	1.1	JB
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	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.: MERRILL Mod. Ref No.: SDG No.: 133407

Matrix: (SOIL/SED/WATER) Water Lab Sample ID: 805579

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 805579I2

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

% Moisture: not dec. Date Analyzed: 09/08/2009

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

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