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August 1, 2005

Reference No. 3978

Mr. Jeff Gore
UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY
77 West Jackson
Chicago, Illinois 60604

Ms. Eileen Kramer
WISCONSIN DEPARTMENT OF
NATURAL RESOURCES
1300 W. Clairemont, Box 4001
Eau Claire, Wisconsin 54702

Dear Mr. Gore and Ms. Kramer:

Re: 2004 Annual Monitoring Report
Wausau Water Supply NPL Site

On behalf of the Wausau Water Supply PRP Group, Conestoga-Rovers & Associates (CRA) is pleased to submit the 2004 Annual Monitoring Report for the Wausau Water Supply NPL Site. This Report has been prepared as required by the Groundwater Monitoring Plan for the Wausau Water Supply NPL Site.

Please call me at (651) 639-0913 if you have any questions or comments.

Sincerely,

CONESTOGA-ROVERS & ASSOCIATES

Jason Twaddle

JT/jla/41
Enc.

c.c.: Dave Erickson; City of Wausau
Terry Kopplin; Marathon Electric
Jim Cherwinka: Wausau Chemical

2004 ANNUAL MONITORING REPORT

WAUSAU WATER SUPPLY NPL SITE
WAUSAU, WISCONSIN

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2004 ANNUAL MONITORING REPORT

WAUSAU WATER SUPPLY NPL SITE
WAUSAU, WISCONSIN

Prepared by:
Conestoga-Rovers & Associates

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1.0 INTRODUCTION

Conestoga-Rovers and Associates (CRA) has prepared this 2004 Annual Monitoring Report (Report) for the Wausau Water Supply NPL Site (Site) in Wausau, Wisconsin, on behalf of the Wausau Potential Responsible Party (PRP) Group. This Report presents the results of groundwater and extraction well monitoring at the Site during 2004. This Report also presents operational data for the remediation systems.

1.1 HISTORY

The Wausau PRP Group initiated remedial action at the Site in the early 1990s in accordance with the September 29, 1990, Record of Decision (ROD) and the Consent Decree (CD) entered with the court on January 24, 1991. The final remedial action at the Site consisted of two soil vapor extraction (SVE) systems to address the source areas and groundwater extraction and treatment utilizing existing municipal production wells and an extraction well. Figure 1.1 provides the Site location and Figure 1.2 provides a Site plan.

Source area remediation was accomplished by the installation of SVE Systems at Marathon Electric (West Bank) and Wausau Chemical (East Bank) in January 1994. Off-gas treatment was provided by vapor phase carbon. The SVE system at Marathon Electric operated until April 1996, when the West Bank source remediation was approved as complete. The East Bank SVE system was modified in 1996 and continued to operate. In January 2001 the East Bank system was shut down while evaluation for final closure occurred.

Groundwater remediation is provided through two existing municipal production wells (CW3 and CW6) and one extraction well installed at Marathon Electric (EW1). Air strippers at the Wausau water treatment plant treat water from the municipal supply wells. Water from EW1 is also treated by air stripping (over riprap on the riverbank) before being discharged to the Wisconsin River.

The pumping rates for the three extraction wells were originally defined in the CD. In the Groundwater Flow Model report (CRA, May 1993), CRA established a range of pumping rates that would maintain capture of the groundwater plume. Then, in an August 4, 1995 letter, the United States Environmental Protection Agency (USEPA) approved the optimum pumping configuration range from that report for the three extraction wells. Those pumping rates are:

- CW3: 65 hours per week at 1,200 gallons per minute (gpm) to 100 hours per week at 1,100 gpm;
- CW6: 85 hours to 100 hours per week at 1,400 gpm; and
- EW1: 800 to 900 gpm continuously.

Additional groundwater remediation was provided by an extraction system operated by Wausau Chemical between 1985 and 1996 as an interim remediation measure. The extraction system at Wausau Chemical consisted of a series of shallow wells at the south end of the Wausau Chemical property. Groundwater was treated by air stripping. This system was not part of the ROD or the CD and operation ceased in 1996.

Historically, groundwater monitoring was conducted according to the Monitoring Program Plan (CRA, 1994). The Monitoring Program Plan consisted of a complex system of monthly, quarterly, semiannual, and annual monitoring. In June 2000, the Groundwater Monitoring Plan replaced the Monitoring Program Plan as the approved groundwater-monitoring program. The Groundwater Monitoring Plan consists of annual monitoring well sampling and quarterly sampling of EW1.

The Groundwater Monitoring Plan requires an annual report on the activities occurring the previous calendar year. This Report fulfills that requirement.

1.2 BACKGROUND

Groundwater monitoring at this Site is a combination of hydraulic and water quality monitoring designed to verify that the groundwater extraction wells are containing the contaminant plume and that groundwater quality is improving because of source remediation and volatile organic compound (VOC) removal from the aquifer.

Groundwater remediation at a site like Wausau is a long-term process that cannot be readily measured on a short-term basis using water quality data alone. Because of the time necessary to achieve groundwater remediation, containment of contaminated groundwater is the primary measurable and achievable short-term objective.

Actual remediation of the groundwater is a slower process that is more difficult to measure using field data on a short-term basis. Accordingly, water quality data is measured annually on a long-term basis to show the downward trend of VOC concentrations in groundwater. Significant VOC reductions are measured over a period of years.

For the purpose of evaluation, groundwater monitoring at Wausau has been divided into two areas, the East Bank and the West Bank of the Wisconsin River, corresponding to the two original source areas. The river forms a natural hydraulic division of the Site. There are three active groundwater extraction wells designed to contain and remove VOC contaminated groundwater. Two of the extraction wells are on the West Bank, (CW6 and EW1) and one is on the East Bank (CW3) (Figure 1.2).

1.3 SITE GEOLOGY

The Site is underlain by glacial outwash and alluvial sediments, which have filled in the preglacial stream valley in which the Wisconsin River now flows. This alluvial aquifer ranges from 0 to 160 feet thick and has an irregular base and lateral boundaries. The relatively impermeable bedrock that underlies the aquifer and forms its lateral boundaries within the preglacial valley defines the boundaries of the aquifer. Six production wells in the Site area provide drinking water for the City of Wausau. These wells are screened in the glacial outwash and alluvial sand and gravel deposits that underlie and are adjacent to the Wisconsin River.

1.4 GROUNDWATER CLEANUP STANDARDS

The Groundwater Monitoring Plan was developed to monitor compliance with cleanup standards for the groundwater at the Site. The groundwater cleanup standards for the Site are the United States Environmental Protection Agency (USEPA) maximum drinking water contaminant levels (MCLs). The MCLs for the primary VOC contaminants of concern at the Site are:

- Trichloroethylene (TCE) 5 μg/L;
- Tetrachloroethylene (PCE) 5 μg/L;
- cis-1,2-Dichloroethylene (DCE) 70 μg/L; and
- Vinyl chloride 2 μg/L.

2.0 2004 MONITORING

Groundwater monitoring, which included water level measurements and water sampling, was conducted in October in accordance with the Groundwater Monitoring Plan. Monitoring of EW1 was completed quarterly in January, April, July, and October in accordance with the Groundwater Monitoring Plan.

There have been a few minor changes to the Groundwater Monitoring Plan. Two wells (WC2 and W51A) were not monitored because they were abandoned in 2000 due to damage, as discussed in the 2000 Annual Monitoring Report. The Groundwater Monitoring Plan had water levels measured at both wells and a sample collected at WC2. The other change was elimination of bis(2-ethylhexyl)phthalate analysis at C4S and W53A, originally implemented, and approved by the USEPA and Wisconsin Department of Natural Resources (WDNR), in 2003. The basis for this change is discussed in the 2002 Annual Monitoring Report.

2.1 WATER LEVEL MONITORING

Table 2.1 presents the groundwater elevation data measured on October 11-12, 2004. Water table contours based on these measurements are presented on Figure 2.1. Field staff measured water levels on the East Bank on October 11, 2004, while CW3 was running. CW3 was shut-off and CW6 was turned on the afternoon of October 11, 2004, after water levels were measured in the East Bank wells. West Bank water levels were then measured on October 12, 2004, after CW6 had been running overnight. Water levels in the City production wells were measured on both days with the assistance of the City staff.

The East Bank and West Bank contours are consistent with flow patterns observed in previous years. The flow patterns are controlled by the operation of EW1 and the City production wells. Under natural conditions, groundwater would flow toward and discharge to the Wisconsin River and its tributary, Bos Creek. Under existing conditions however, groundwater flows toward EW1 and the production wells. The operation of EW1 has created groundwater flow divides between the west and east City well fields and has isolated the former landfill source of contaminated groundwater from the production wells.

2.2 GROUNDWATER SAMPLING

Annual groundwater samples were collected on October 12-13, 2004, according to the Groundwater Monitoring Plan. Monitoring well samples were analyzed according to EPA Method 8260 for the Site specific VOC list presented in Table 2.2. A groundwater-sampling summary, which includes field parameters, is shown on Table 2.3.

Groundwater sampling was conducted according to the Quality Assurance Project Plan (QAPP), February 1994, as amended by a June 11, 1999, letter to the USEPA. Severn Trent Laboratories (STL) in Chicago, Illinois analyzed all samples. Laboratory results are being submitted electronically in the Region V Electronic Data Deliverable (EDD) format for inclusion in the Region V EPA database. Copies of Data Quality Validation memorandums for 2004 data are included in Appendix A.

2.3 EXTRACTION WELL EW1 SAMPLING

The monitoring program for EW1 was designed to measure long-term water quality improvement in the groundwater and to measure the treatment of the groundwater extracted by EW1. This data is also used to measure the contaminant levels discharged to the Wisconsin River from the EW1 treatment system. The discharge should meet the substantive requirements of the Wisconsin Pollutant Discharge Elimination System (WPDES).

Influent and Effluent samples were collected from EW1 quarterly in January, April, July, and October according to the Groundwater Monitoring Plan. Both the influent and effluent samples were analyzed using EPA Method 8260 for the Site specific VOCs (Table 2.2).

January, April, and July samples were analyzed by STL in North Canton, Ohio, and October samples were analyzed by STL in Chicago, Illinois. Laboratory results are being submitted electronically in the Region V EDD format for inclusion in the Region V EPA database. Copies of the Data Quality Validation memorandums for the 2004 data are included in Appendix A.

3.0 OPERATION AND MAINTENANCE

Operation and maintenance activities reported in this section, cover EW1, the city production wells, the groundwater monitoring wells, and the East Bank SVE system.

3.1 EXTRACTION WELL (EW1)

The West Bank extraction well (EW1) at Marathon Electric ran with only one shutdown in 2004. Approximately 437,992,000 gallons of water were extracted and treated during the year. The extraction well pumped at a flow rate of 838 gallons per minute averaged over the entire year. Table 3.1 summarizes EW1 operational data for 2004, including the number of gallons pumped and flow rate.

The only shutdown occurred at the end of June. The pump was inadvertently turned off on June 25 when the power was turned off in the electrical lab at Marathon Electric. The automatic sensor in the well failed to notify the maintenance department that the pump was off. Sampling personnel discovered the pump was not running on July 6 and turned the pump back on. The automatic sensor was repaired.

Other than the accidental shutdown at the end of June, EW1 operated continuously in 2004 without any problems. If the 11 days of downtime is excluded, the average pumping rate for the year was 863 gpm.

3.2 CITY PRODUCTION WELLS

Both CW3 and CW6 operated as required in 2004 without any major shutdowns or repairs. The City of Wausau did complete maintenance work on CW9; however, it is not part of the remediation system. CW9 was shut down in September to clean iron and bacteria from the well screen.

Table 3.2 presents pumping data for all six City wells. While only CW3 and CW6 are part of the remediation system, data for all six City wells is presented, as has been done historically. The table shows, by month, the number of hours each well was operated, the number of gallons pumped from each well, and the average pumping rate while the pump was operating.

CW3 and CW6 operated on alternate schedules at rates that exceeded the operating requirements established in the Groundwater Flow Model report. CW3 operated for at least 290 hours each month at pumping rates greater than 1,500 gpm, exceeding the

requirements of 65 hours per week at 1,200 gpm. CW6 operated for at least 384 hours each month at pumping rates greater than 1,600 gpm, exceeding the pumping requirements of 85 hours per week at 1,400 gpm.

3.3 EAST BANK SVE SYSTEM

The East Bank SVE system (at Wausau Chemical) has been shut off since January 10, 2001, because of inefficient removal rates. A March 8, 2002, letter report recommended permanent closure of the East Bank source area remediation system based on soil sample results from the two "hot spots", a statistical analysis, and continued decrease in the groundwater VOC concentrations.

In 2002, the WDNR and the USEPA requested quarterly groundwater sampling at select wells in the vicinity of Wausau Chemical to verify that there was no significant contamination in the soil still contributing to the groundwater plume. Monitoring wells WC3B and WC5A were sampled in January, April, July, and October 2003. The results of these sampling events were reported in a March 5, 2004, letter report that requested permanent closure.

Discussions since that time have resulted in a tentative agreement for permanent closure of the East Bank source area. The WDNR has requested a deed restriction be placed on the property as a condition for permanent closure. Wausau Chemical, WDNR, and EPA are negotiating the language for the deed restriction. Permanent closure is expected in 2005.

3.4 MONITORING WELL MAINTENANCE

There was no monitoring well maintenance completed in 2004. Recently, the flush mount for W53 was found damaged. This will be repaired in the spring of 2005. Also, the homeowner where MW3A is located has asked if that well can be converted to a flush mount. The well is located in his front yard. The well will be converted to a flush mount in the spring of 2005.

4.0 EVALUATION OF GROUNDWATER DATA

The objectives of groundwater monitoring at the Wausau Site are to monitor the containment of the contaminant plume and the long-term improvement in groundwater quality.

Table 4.1 presents the laboratory results for monitoring well samples collected during 2004. The data indicate that, in general, the plume is stable or decreasing. Total chlorinated VOC data, included in Table 4.1 and presented on Figure 4.1, illustrates the plume configuration based on the October 2004 data.

4.1 WEST BANK

The primary VOC found on the West Bank is trichloroethene (TCE). The degradation product cis-1,2-dichloroethene (C12DCE) was detected at a few locations with relatively low concentrations. Vinyl chloride was detected in one well on the West Bank. Monitoring wells with TCE concentrations greater than the MCL of 5 $\mu g/L$ include R2D, R3D, R4D, EW1, W55, and CW6 (see Table 4.1). Monitoring well C4S had a vinyl chloride concentration of 1.7 $\mu g/L$, which is less than the MCL of 2 $\mu g/L$.

In the portion of the plume north of extraction well EW1, chlorinated volatile organic compounds (CVOCs) are located in the deeper portions of the aquifer. All of the wells that exceeded the MCL for TCE were in the deeper portion of the aquifer north of EW1. In the southern portion of the plume, in the vicinity of the old landfill, CVOCs are located in the shallower portions of the aquifer at relatively lower concentrations.

Overall, the West Bank plume remained fairly stable in 2004. Most of the monitoring wells on the West Bank had total CVOC concentrations in 2004 comparable to the 2003 concentrations.

The 2001, 2002, and 2003 Annual Monitoring Reports discuss the probable migration of the high concentration slug of CVOCs that is currently in the vicinity of R3D. The slug of CVOCs began in the vicinity of R2D, near the flow divide between EW1 and CW6 in 1993, and has been slowly moving towards EW1. It appears that there may be evidence that it is now approaching R4D (Figure 4.1). Historical data for these three wells is shown below:

	Total CVOCs (µg/L)		
Year	R2D	R3D	R4D
1993	3635	4	1016
1994	2130	11	1019
1995	152	5	720
1996	1600	2	540
1997	720	5	65/65
1998	320	580	52/58
1999	110	1200	33
2000	45	1800	58
2001	17	1500	13/13
2002	15	1200	36
2003	10	980	39/37
2004	11	899	51

As shown above, concentrations in R3D continued to decrease in 2004 and have decreased by half from 1,800 µg/L in 2000 to 899 µg/L in 2004, suggesting that the center of this CVOC slug has moved past R3D. During approximately the same time period, the CVOC concentration in R4D has increased from a low concentration of 13 µg/L in 2001, to 51 µg/L in 2004. Continuation of these opposite trends at R3D and R4D indicate that the West Bank aquifer is remediating.

However, CVOC concentrations at W52, which is between R3D and R4D, have remained steady at less than 2 µg/L since 2000. The path that CVOCs travel in an aquifer is not necessarily a straight line, but follow preferential pathways. While these three wells are all screened in the deeper portion of the aquifer, their screens are at different elevations. The bottom of W52 is at an elevation of 1,092 feet, 17 feet higher than the bottom of R3D (1,075 feet) and 9 feet higher than R4D (1,083 feet). It is possible that higher concentration portions of the plume are passing under or around W52.

In the far north portion of the plume, within the capture area of City production well CW6, the total CVOC concentration in CW6 and W55 have been fairly consistent since 2001 (Figure 4.1). There has been a slight decrease at CW6 from 15 µg/L to 9 µg/L during this time period. This area of the plume appears to be stable.

In the southern portion of the West Bank plume under the old landfill, it appears that the plume is naturally attenuating. At W53A, the degradation product C12DCE (18 µg/L) was found at a higher concentration than TCE (2.8 µg/L). Historically, the

concentration of C12DCE at W53A has been equivalent to or greater than the TCE concentration. In 2004, the TCE concentration at W53A decreased to below the MCL, from 13 μg/L in 2003. At C4S, vinyl chloride was the only parameter detected, which is also consistent with historical data.

4.2 EAST BANK

While tetrachloroethene (PCE) was the original contaminant on the East Bank, the presence of TCE, C12DCE, and vinyl chloride at concentrations that equal or exceed the PCE concentration in most wells indicates an active natural biodegradation process (see Table 4.1). For example, at CW3, the East Bank extraction well, the concentrations of PCE, TCE and C12DCE were 2.8 μg/L, 2.0 μg/L, and 2.4 μg/L respectively in 2004. Vinyl chloride was detected in four East Bank wells, with two wells exceeding the MCL of 2 μg/L (E37A at 7.8 μg/L and WW6 at 4.8 μg/L). The vinyl chloride concentration in both of these wells was nearly equal to the PCE, TCE, and C12DCE combined.

Three wells had PCE concentrations that exceeded the MCL of 5 μg/L and one well had a TCE concentration that exceeded the MCL of 5 μg/L. The highest concentration was 12 μg/L for PCE at E23A. Wells E22A and WC5A also had PCE concentrations above the MCL. The island well, IWD, was the only well to exceed the MCL for TCE at a concentration of 8.9 μg/L. TCE was the only parameter detected at IWD.

The overall size of the East Bank plume and total CVOC concentrations within the plume were relatively steady from 2003 to 2004 (Figure 4.1). While the plume size and concentrations have decreased historically, the current concentrations may be such that remediation will proceed at a slower rate. The monitoring wells that had decreased CVOC concentrations from 2002 to 2003 had CVOC concentrations that remained relatively constant from 2003 to 2004. Total CVOC concentrations in 2002, 2003, and 2004 for key East Bank wells are shown below:

	Total CVOCs (μg/L)		
Well	*2002*	*2003*	*2004*
CW3	7.7	7.7	7.2
WW6	23.6	10.6	10.1
E23A	7.3	15.6	15.2
E37A	8.5	3.4	16.4
E22A	11.7	10	9.2
WC5A	11.4	5.6	10.1
WC3B	32.7	3.1	10.2
E24A	2.8	1.2	2.6

While the data above shows some shifting of contaminants within the plume, overall the data show a stable plume. The highest CVOC concentration at an individual well in 2003 was 15.6 $\mu g/L$ and the highest CVOC concentration in 2004 was 16.4 $\mu g/L$.

The only well that had a significant increase in CVOC concentration was E37A, which is on the downgradient side of the plume. However, the increase at this well is almost entirely due to the degradation products vinyl chloride, C12DCE, and TCE. The PCE concentration in E37A has remained relatively constant at 4 $\mu g/L$, 2.7 $\mu g/L$, and 3.9 $\mu g/L$ in 2002, 2003, and 2004, respectively. The increase in CVOCs at E37A is probably due to ongoing flushing of the aquifer.

There was a slight increase in total CVOCs at WC3B, the well nearest the source; however, all individual parameters were below the MCLs (see table 4.1).

Concentrations at the edge of the plume have remained constant. As shown above, the CVOC concentration at E24A has remained between 1.2 $\mu g/L$ and 2.8 $\mu g/L$. CVOC concentrations at MW10A and MW10B have been below the detection limit since 2001.

The island well, IWD, has had an increasing TCE concentration since 2000, when no CVOCs were detected. The TCE concentration in 2004 was 8.9 $\mu g/L$. IWD has always been considered an East Bank well because it is closer to the East Bank of the river; however, the contaminant profile is not consistent with other wells on the East Bank. PCE has never been detected in IWD and C12DCE has only occasionally been detected below the reporting limit. This contaminant profile is more consistent with the West Bank plume, even though there is a hydraulic divide below the river. Furthermore, sampling at E21, which is between IWD and CW3, was discontinued in 2000 because CVOCs were consistently not being detected. There could be a very low concentration remnant of the plume that is in a relatively stagnant area between EW1 and CW3. It would be moving slowly toward one side or the other, depending on the pumping rates and pumping patterns of EW1 and CW3.

The data indicate that CW3 continues to effectively capture the East Bank plume and is effective at remediating the groundwater on the East Bank.

The concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX) at monitoring well FVD5 were about the same in 2004 and 2003, consistent with historical data. The BTEX parameters found in this well are independent of the Wausau NPL site remediation process. During 2004, a third party conducted an investigation at the former Wausau Energy property where FVD5 is located.

4.3 EW1

The influent and effluent laboratory results for EW1 are presented in Table 4.2. TCE was the primary VOC detected. C12DCE was detected in samples from most sampling events, but its concentration was less than 1 μg/L.

Influent concentrations of TCE remained steady between 10 μg/L and 14 μg/L. The effluent concentrations indicate that the EW1 treatment system removes 50 percent or more of the VOCs in the extracted groundwater.

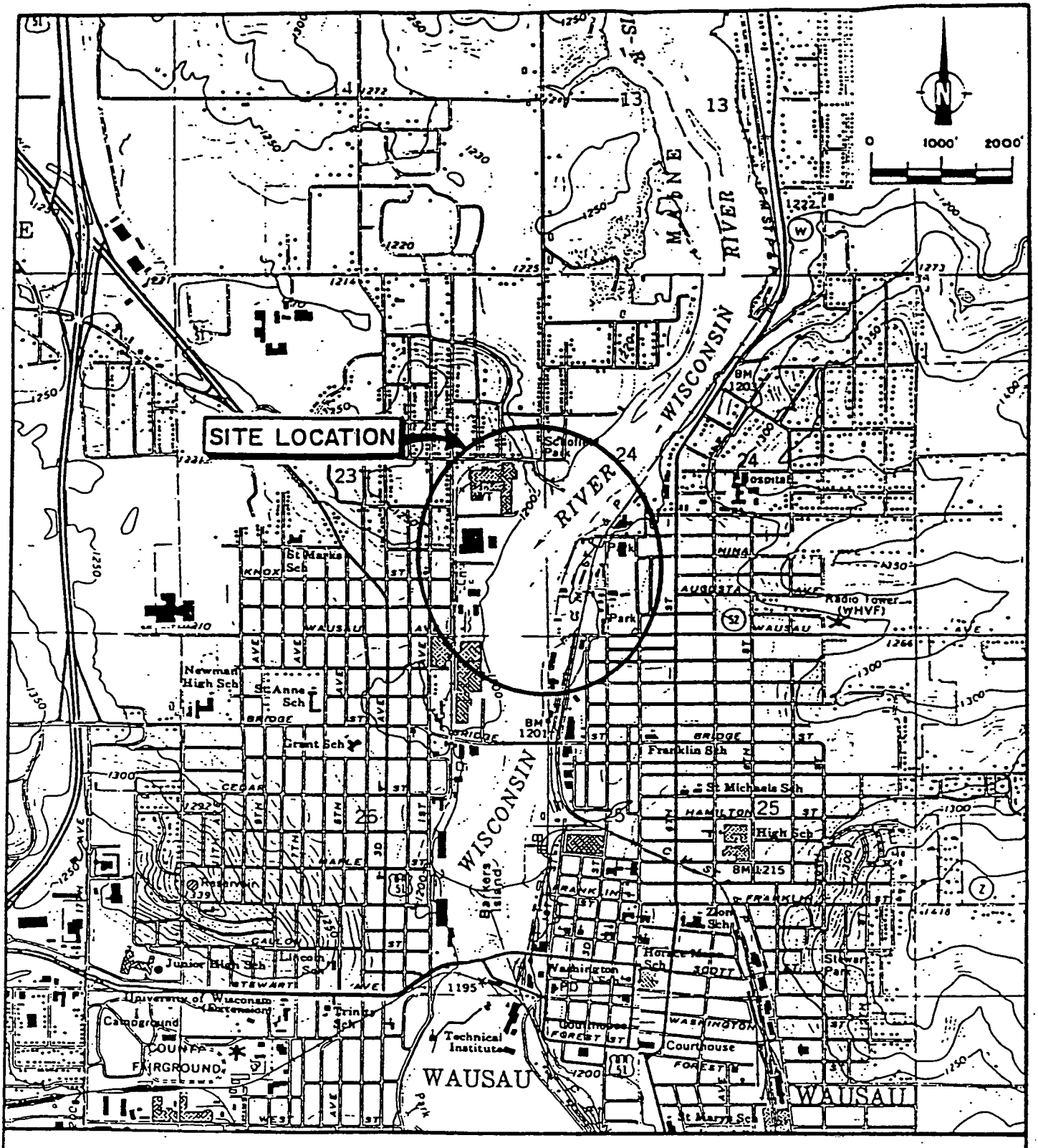
The results of the effluent samples were compared to surface water discharge limits for discharge to the Wisconsin River, as calculated by the WDNR. Those discharge limits were presented in the Remedial Action Plan, Groundwater Extraction, Treatment, and Discharge System, Marathon Electric Manufacturing Co., Wausau, Wisconsin. None of the discharge limits were exceeded during 2004. Results of quarterly EW1 influent and effluent sampling are also reported quarterly for the purpose of the WPDES.

4.4 HYDRAULIC CAPTURE

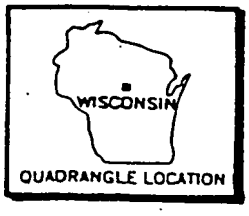
Horizontal and vertical capture of the contaminant plume is demonstrated on Figure 2.1. The water table contours indicate that groundwater flow in the contaminated portions of the Site is toward the three extraction wells - CW3, CW6, and EW1, which is supported by the analytical data as discussed in Sections 4.1 and 4.2. At nested well locations, the water table elevations for shallow and deep wells are similar, indicating horizontal flow and hydraulic containment of the shallow and deeper portions of the aquifer. Figure 4.1 also demonstrates that hydraulic containment of the contaminants has been maintained.

5.0 CONCLUSIONS AND RECOMMENDATIONS

- The Marathon Electric extraction well (EW1) and the two City production wells (CW3 and CW6) continue to capture the CVOC plume as evidenced by analysis of the hydraulic data and the chemical data.
- The East Bank CVOC plume has decreased in size and concentration historically and remained fairly stable in 2004 with some shifting of contaminants within the plume. There is significant evidence of natural attenuation of the East Bank plume.
- Six West Bank wells had TCE concentrations greater than the MCL of 5μg/L - R2D, R3D, R4D, EW1, W55, and CW6.
- Wausau Chemical, WDNR, and EPA have reached a tentative agreement for permanent closure of the East Bank SVE system and are negotiating a deed restriction for the property.
- The CVOC plume on the West Bank remained fairly stable in size and concentrations within the plume. The high concentration slug of CVOCs near R3D continued to move towards EW1. There is evidence of natural attenuation in the area of the plume under the old landfill. The plume is shallower and less concentrated here than it is north of EW1.
- Three East Bank wells had a PCE concentration greater than the MCL of 5 μg/L - WC5A, E22A, and E23A. Two East Bank wells had a vinyl chloride concentration greater then the MCL of 2 μg/L - WW6 and E37A. Well IWD had a TCE concentration greater than the MCL of 5 μg/L.
- EW1 removed approximately 437,992,000 gallons of water in 2004 at a pumping rate of 838 gallons per minute averaged over the entire year. The pump was inadvertently shut down for 11 days in June and July when the power was shut off in a building that shares power.
- The EW1 treatment system removed approximately 50 percent of the VOCs from the extracted groundwater. The effluent concentrations from the treatment system were well below the discharge limits.
- The City production wells operated as scheduled and within the requirements established in the Groundwater Flow Model Report.
- Monitoring in 2004 should continue as described in the Groundwater Monitoring Plan with slight modifications discussed in previous reports. WC2 and W51A were eliminated from the monitoring schedule because of abandonment as described in the 2000 Annual Monitoring Report. Analysis of bis(2-ethylhexyl)phthalate was eliminated as recommended in the 2002 Annual Monitoring Report.



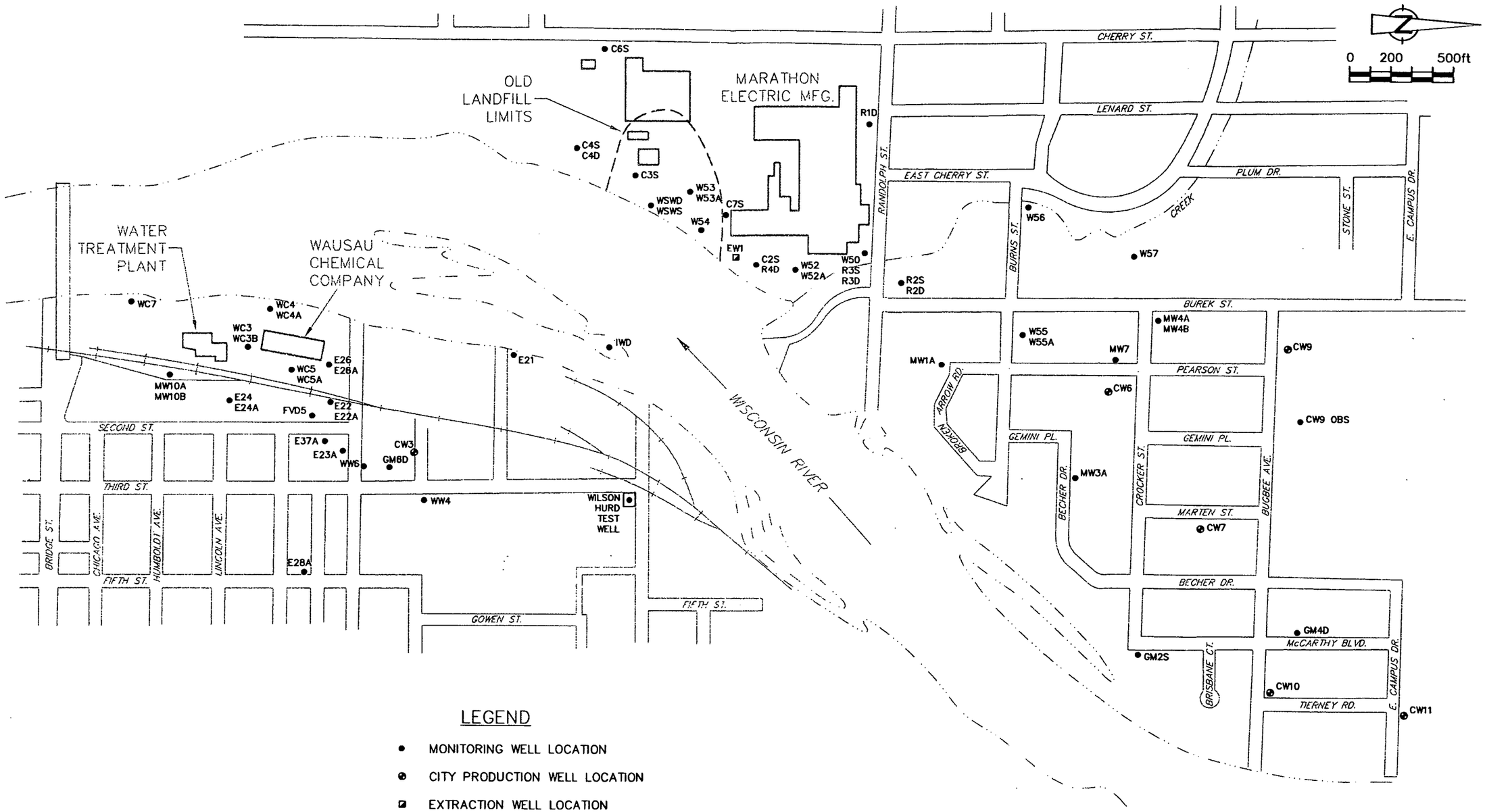
SOURCE: U.S.G.S. WAUSAU WEST QUADRANGLE MAP.



CRA

figure 1.1

SITE LOCATION
WAUSAU WATER SUPPLY NPL SITE
Wausau, Wisconsin



LEGEND

- MONITORING WELL LOCATION
- CITY PRODUCTION WELL LOCATION
- EXTRACTION WELL LOCATION
- INDUSTRIAL WELL LOCATION

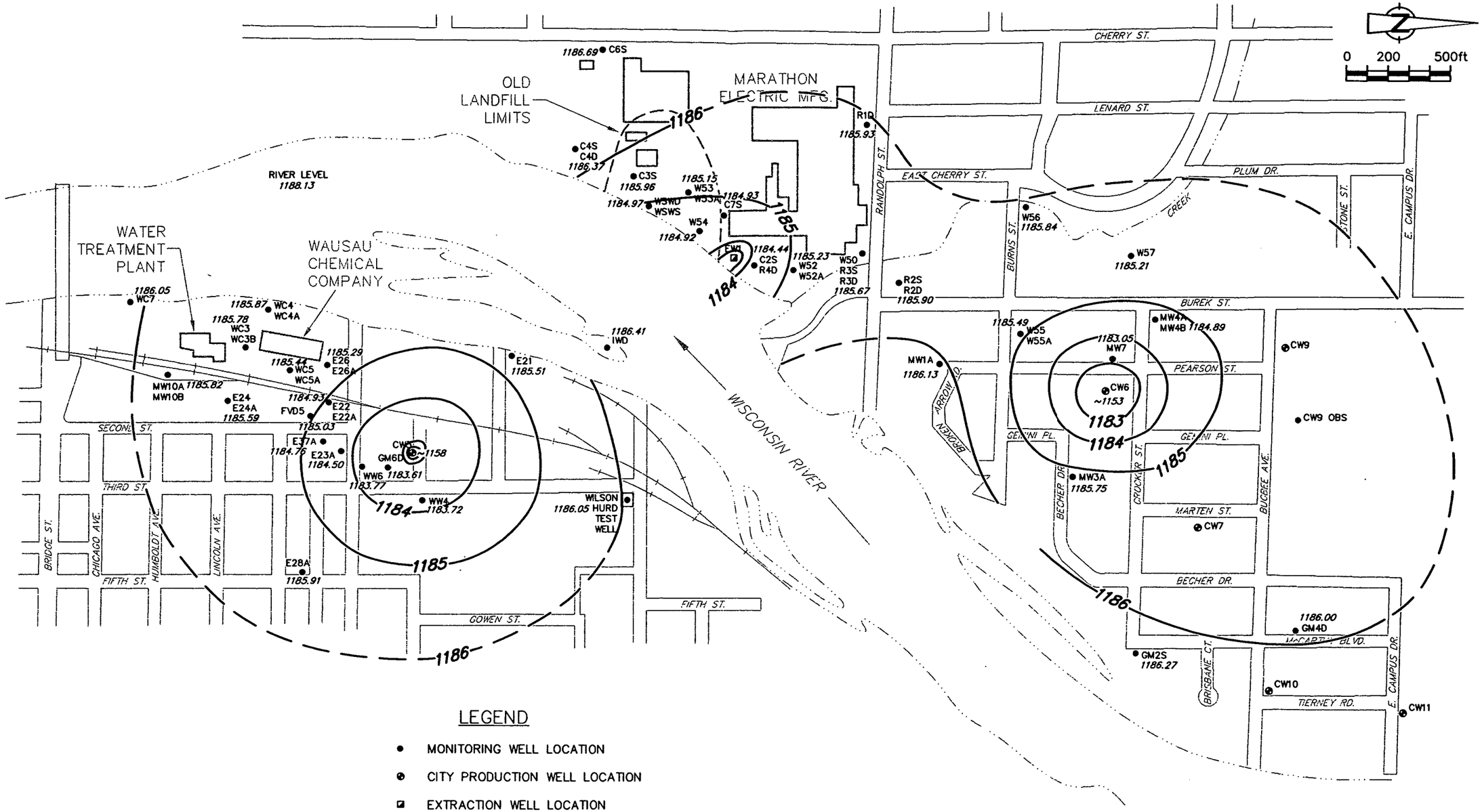
SOURCE: RMT INC. FIGURE 1, 5/14/87.

CRA

03978-00(023)GN-SP001 MAR 15/2005

figure 1.2

SITE PLAN
WAUSAU WATER SUPPLY NPL SITE
Wausau, Wisconsin



LEGEND

- MONITORING WELL LOCATION
- CITY PRODUCTION WELL LOCATION
- EXTRACTION WELL LOCATION
- INDUSTRIAL WELL LOCATION
- *1186.27* GROUNDWATER ELEVATION IN FEET AMSL
- GROUNDWATER CONTOUR

NOTE: EAST BANK WATER LEVELS MEASURED ON OCTOBER 11, 2004
WEST BANK WATER LEVELS MEASURED ON OCTOBER 12, 2004

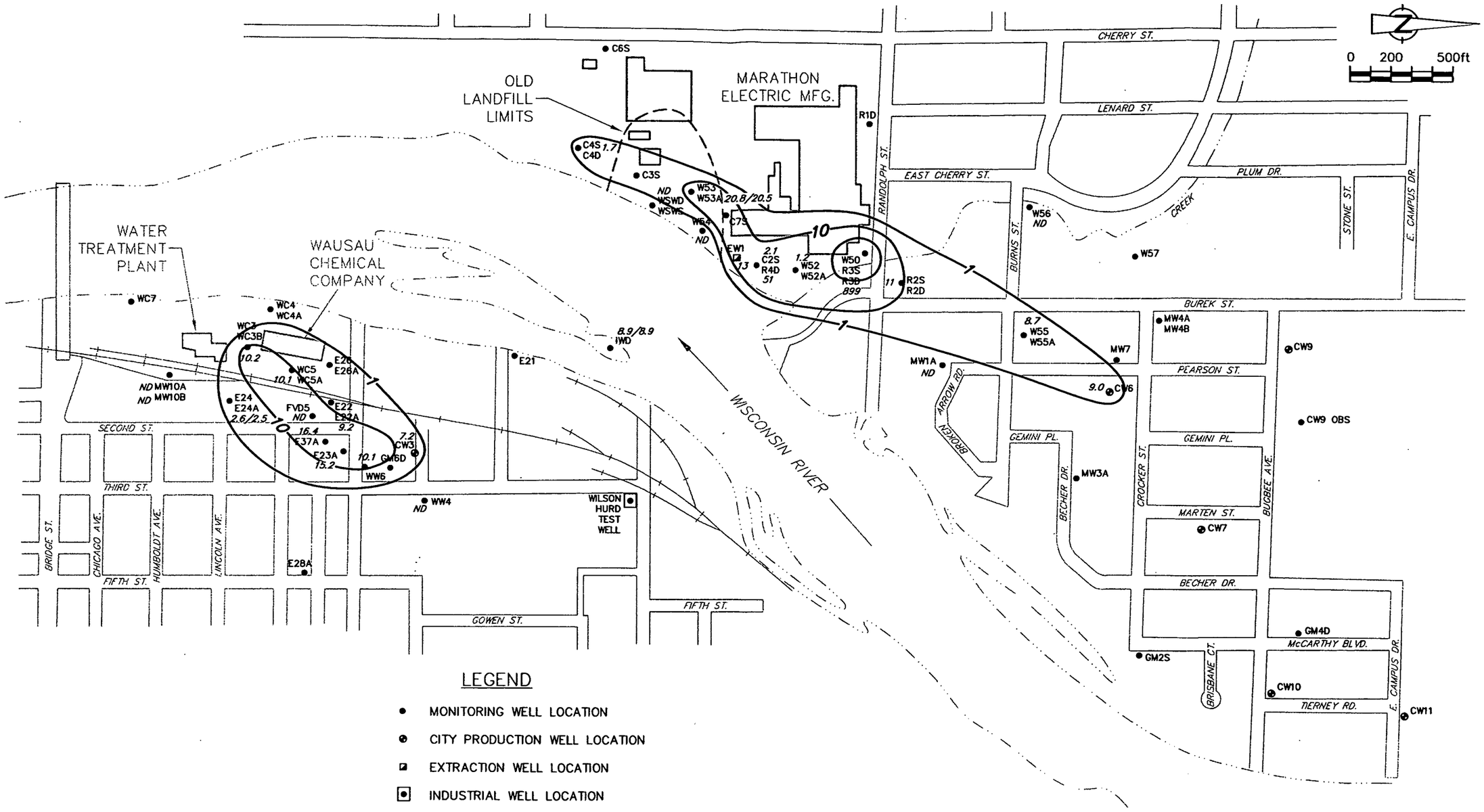
SOURCE: RMT INC. FIGURE 1, 5/14/87.

CRA

figure 2.1

WATER TABLE CONTOURS (10/11–12/04)
WAUSAU WATER SUPPLY NPL SITE
Wausau, Wisconsin

03978-00(023)GN-SP002 APR 04/2005



LEGEND

- MONITORING WELL LOCATION
- CITY PRODUCTION WELL LOCATION
- EXTRACTION WELL LOCATION
- INDUSTRIAL WELL LOCATION
- 13 TOTAL CHLORINATED VOC CONCENTRATION IN ug/L
- TOTAL CHLORINATED VOC CONTOUR
- ND NOT DETECTED

WHERE NO VALUE IS SHOWN, WELL WAS NOT SAMPLED

SOURCE: RMT INC. FIGURE 1, 5/14/87.

figure 4.1

TOTAL CHLORINATED VOCs IN GROUNDWATER (OCTOBER 2004)
WAUSAU WATER SUPPLY NPL SITE
Wausau, Wisconsin

CRA

03978-00(023)GN-SP003 MAR 15/2005

TABLE 2.1

GROUNDWATER ELEVATIONS - 2004
WAUSAU WATER SUPPLY NPL SITE

	Reference Elevation	*Water Level 10/11-12/2004*	*Water Table Elevation 10/11-12/2004*
East Bank			
CW3	1202.15	44/18	1158/1184 [2]
E21	1197.51	12.00	1185.51
E22	1195.47	10.54	1184.93
E22A	1195.88	10.95	1184.93
E23A	1197.61	13.11	1184.50
E24	1210.01	24.42	1185.59
E24A	1211.07	25.51	1185.56
E26	1199.02	13.73	1185.29
E26A	1199.13	13.79	1185.34
E28A	1211.60	25.69	1185.91
E37A	1197.84	13.08	1184.76
FVD5	1198.89	13.86	1185.03
GM6D	1198.57	14.96	1183.61
W. HURD	1200.23	14.18	1186.05
IWD	1192.10 [1]	5.69	1186.41
MW10A	1210.67	24.85	1185.82
MW10B	1210.37	24.57	1185.80
WC3	1198.26	12.48	1185.78
WC3B	1198.04	12.28	1185.76
WC4	1196.74	10.87	1185.87
WC4A	1196.57	10.67	1185.90
WC5	1196.62	11.18	1185.44
WC5A	1196.66	11.20	1185.46
WC7	1196.77	10.72	1186.05
WW4	1202.23	18.51	1183.72
WW6	1200.53	16.76	1183.77

Notes:

Elevations relative to National Geodetic Vertical Datum.

[1] All reference elevations based on 2003 survey data except IWD, which was last surveyed in 1993.

[2] The two data points for the City wells represent measurements on October 11, when CW3 was running, and October 12, when CW6 was running.

TABLE 2.1

GROUNDWATER ELEVATIONS - 2004
WAUSAU WATER SUPPLY NPL SITE

	Reference Elevation	*Water Level 10/11-12/2004*	*Water Table Elevation 10/11-12/2004*
West Bank			
EW1	NA	NA	NA
CW6	1220.33	47/67	1173/1153 [2]
CW7	1224.14	40/39	1184/1185 [2]
CW9	1226.16	42/41	1184/1185 [2]
CW9 OBS	1224.24	NA	NA
CW10	1218.49	33/34	1185/1184 [2]
CW11	1216.51	33/33	1184/1184 [2]
C2S	1219.05	34.61	1184.44
C3S	1220.58	34.62	1185.96
C4S	1216.70	30.35	1186.35
C4D	1216.16	29.79	1186.37
C6S	1221.58	34.89	1186.69
C7S	1220.87	35.94	1184.93
GM2S	1211.78	25.51	1186.27
GM4D	1216.35	30.35	1186.00
MW1A	1215.69	29.56	1186.13
MW3A	1223.13	37.38	1185.75
MW4A	1215.48	30.65	1184.83
MW4B	1215.10	30.21	1184.89
MW7	1218.53	35.48	1183.05
R1D	1222.24	36.31	1185.93
R2S	1209.70	23.21	1186.49
R2D	1209.42	23.52	1185.90
R3S	1215.17	NA	NA
R3D	1215.42	29.75	1185.67
R4D	1218.90	39.17	1179.73
W50	1215.54	29.76	1185.78
W52	1219.16	33.93	1185.23
W52A	1218.95	33.40	1185.55
W53	1216.67	31.52	1185.15
W53A	1216.90	31.80	1185.10
W54	1216.19	31.27	1184.92
W55	1217.04	31.55	1185.49
W55A	1217.31	31.51	1185.80
W56	1200.01	14.17	1185.84
W57	1205.17	19.96	1185.21
WSWS	1193.04	6.00	1187.04
WSWD	1193.02	8.05	1184.97

Notes:

Elevations relative to National Geodetic Vertical Datum.

[1] All reference elevations based on 2003 survey data except IWD, which was last surveyed in 1993.

[2] The two data points for the City wells represent measurements on October 11, when CW3 was running, and October 12, when CW6 was running.

TABLE 2.2

SITE SPECIFIC VOC LIST
WAUSAU WATER SUPPLY NPL SITE

Acetone

Benzene

Carbon tetrachloride

Chloroform

1,1-Dichloroethene

cis-1,2-Dichloroethene

Ethylbenzene

Methylene chloride

Tetrachloroethene

Toluene

1,1,2-Trichloroethane

Trichloroethene

Vinyl chloride

Xylenes

TABLE 2.3

GROUNDWATER SAMPLING SUMMARY
WAUSAU WATER SUPPLY NLP SITE

Well	*Time*	*pH*	*Conductivity (us)*	*Temperature (°C)*	*Water Clarity*	*Gallons Removed*	*Sample ID Number*	*QA/QC*
MW10A	9:00	7.08	144	11.3	Clear	10.0	W-041013-DS-20	
		7.10	143	11.2	Clear	20.0		
		7.10	143	11.0	Clear	28.0		
MW10B	8:55	7.09	209	10.0	Clear	3.0	W-041013-DS-21	
		6.90	210	10.2	Clear	6.0		
		6.89	209	10.3	Clear	9.0		
		6.87	209	10.2	Clear	12.0		
E24A	9:54	6.60	210	9.7	Clear -Fe	2.5	W-041013-DS-23	
		6.50	200	9.7	Clear - Fe	5.0	W-041013-DS-24	Duplicate
		6.50	199	9.8	Clear - Fe	7.5		
FVD 5[1]	11:20	NT	NT See note below	NT	Strong petroluem odor	4.0	W-041013-DS-29	
E37A	10:20	6.58	276	12.1	Slightly Cloudy	2.0	W-041013-DS-25	Rinsate
		6.56	275	12.1	Slightly Cloudy	4.5	W-041013-DS-26	
		6.56	275	12.1	Slightly Cloudy	6.0		
E23A	11:10	6.49	433	10.4	Cloudy	1.5	W-041013-DS-28	
		6.49	433	10.3	Cloudy	3.0		
		6.49	433	10.4	Cloudy	4.5		
WW4	9:24	6.30	412	9.0	Clear	4.0	W-041013-DS-22	
		6.30	416	9.0	Clear	8.0		
		6.30	416	9.1	Clear	12.0		

TABLE 2.3

GROUNDWATER SAMPLING SUMMARY
WAUSAU WATER SUPPLY NLP SITE

Well	*Time*	*pH*	*Conductivity (us)*	*Temperature (°C)*	*Water Clarity*	*Gallons Removed*	*Sample ID Number*	*QA/QC*
WW6	12:24	6.96	186	10.0	Clear	4.0	W-041013-DS-32	
		6.93	187	9.8	Clear	8.0		
		6.95	187	9.9	Clear	12.0		
E22A	12:11	6.60	320	11.4	Silty - Fe	2.0	W-041013-DS-31	
		6.30	315	11.3	Silty - Fe	4.0		
		6.30	315	11.2	Silty - Fe	6.0		
WC5A	11:50	6.75	210	13.9	Clear	1.5	W-041013-DS-30	MS/MSD
		6.70	207	12.5	Clear	3.0		
		6.75	206	12.8	Clear	4.5		
WC3B	10:45	6.80	241	11.9	Silty	2.5	W-041013-DS-27	
		6.78	235	11.6	Silty	5.0		
		6.75	230	11.4	Silty	7.5		
MW1A	14:41	9.53	157	10.1	Cloudy	2.0	W-041012-DS-11	
		9.73	157	9.9	Cloudy	4.0		
		9.72	159	9.9	Cloudy	6.0		
W55	14:24	7.08	181	9.7	Clear	2.0	W-041012-DS-10	
		7.22	175	9.7	Clear	4.0		
		7.23	175	9.6	Clear	6.0		
		7.25	175	9.6	Clear	8.0		
W56	16:55	6.80	413	8.7	Clear	9.0	W-041012-DS-15	
		6.70	413	8.7	Clear	18.0		
		6.60	413	8.7	Clear	27.0		

TABLE 2.3

GROUNDWATER SAMPLING SUMMARY
WAUSAU WATER SUPPLY NLP SITE

Well	*Time*	*pH*	*Conductivity (us)*	*Temperature (°C)*	*Water Clarity*	*Gallons Removed*	*Sample ID Number*	*QA/QC*
R2D	14:10	7.30	150	10.4	Clear	2.0	W-041012-DS-09	MS/MSD
		7.20	150	10.0	Clear	4.0		
		7.20	150	9.7	Clear	6.0		
R3D	17:37	6.70	184	8.6	Clear	17.5	W-041012-DS-16	Rinsate
		6.70	184	8.6	Clear	35.0	W-041012-DS-17	
		6.70	184	8.6	Clear	52.5		
C2S	12:18	6.14	298	12.6	Clear	2.0	W-041012-DS-07	
		6.17	308	12.4	Clear	4.0		
		6.15	310	12.4	Clear	6.0		
W52	13:49	7.90	157	12.2	Silty	2.0	W-041012-DS-08	
		6.60	145	10.7	Silty	4.0		
		6.70	148	10.8	Silty	6.0		
		6.70	146	10.7	Silty	8.0		
W54	11:40	6.55	157	9.9	Clear	2.0	W-041012-DS-05	
		6.58	156	9.9	Clear	4.0		
		6.59	157	10.0	Clear	6.0		
W53A	11:16	6.79	241	12.6	Clear	2.0	W-041012-DS-03	
		6.81	243	12.4	Clear	4.0	W-041012-DS-04	Duplicate
		6.87	247	12.5	Clear	6.0		
City Well #6	7:20	7.25	200	9.9	Clear	Grab 1,666 gpm	W-041013-DS-18	

TABLE 2.3

GROUNDWATER SAMPLING SUMMARY
WAUSAU WATER SUPPLY NLP SITE

Well	*Time*	*pH*	*Conductivity (us)*	*Temperature (°C)*	*Water Clarity*	*Gallons Removed*	*Sample ID Number*	*QA/QC*
City Well #3	7:00	7.80	301	11.0	Clear	Grab 1,874 gpm	W-041013-DS-19	
IWD	16:00	7.30	130	9.9	Silty	2.0	W-041012-DS-13	
		7.70	130	9.9	Silty	4.0	W-041012-DS-14	Duplicate
		7.70	131	9.9	Silty	6.0		
WSWD	16:00	7.88	156	12.1	Clear	2.0	W-041012-DS-12	
		7.85	156	12.0	Clear	4.0		
		7.81	156	11.9	Clear	6.0		
C4S	10:45	6.45	959	11.9	Slightly Cloudy	1.0	W-041012-DS-01	Rinsate
		6.48	945	11.9	Slightly Cloudy	2.0	W-041012-DS-02	
		6.49	942	11.9	Slightly Cloudy	3.0		
R4D	12:06	6.54	169	10.5	Clear	2.0	W-041012-DS-06	
		6.56	171	10.4	Clear	4.0		
		6.60	170	10.3	Clear	6.0		

Notes:
(1) FVD5 has strong petroleum like odor in well. Therefore, field parameters not taken to minimizing risk of damaging the equipment.
All monitoring well locations were collected for Site VOCs.

TABLE 3.1

EXTRACTION WELL (EW1) PUMPING RATES - 2004
MARATHON ELECTRIC
WAUSAU WATER SUPPLY NPL SITE

Date	*Elapsed Time (minutes)*	*Meter Reading*	*Total Flow*[1] *(gallons)*	*Flow Rate*[1] *(gpm)*
01/07/04		795,796,000		
02/03/04	38,940	828,035,000	32,239,000	828
02/27/04	34,670	857,950,000	29,915,000	863
04/02/04	50,170	902,192,000	44,242,000	882
05/05/04	47,720	946,573,000	44,381,000	930
05/27/04	31,680	974,420,000	27,847,000	879
07/06/04	57,460	11,416,000	36,996,000	644[2]
08/09/04	49,105	50,187,000	38,771,000	790
09/01/04	32,985	76,874,000	26,687,000	809
10/01/04	43,070	113,522,000	36,648,000	851
11/08/04	54,905	166,419,000	52,897,000	963
11/30/04	31,555	194,930,000	28,511,000	904
01/04/05	50,405	233,788,000	38,858,000	771
2004 Total	522,665		**437,992,000**	**838**
Flow rate while pump was running (excluding downtimes)				863

Notes:

[1] The total flows and the average flow rates shown are for the period preceeding the date.

[2] The pump was shut off from 11:00 pm June 25 until 8:00 am July 6. The power was turned off at the ele tripping the pump switch. When power was restored June 25, the pump was inadvertantly left off.

TABLE 3.2

CITY WELL PUMPING DATA - 2004
WAUSAU WATER SUPPLY NPL SITE

Month		*Well #3*	*Well #6*	*Well #7*	*Well #9* [4]	*Well #10*	*Well #11*
	Hours [1]	332.5	401.2	351.9	93.3	150.2	143.3
January	Gallons [2]	35.570	39.469	33.900	4.442	24.920	22.768
	gpm [3]	1783	1640	1606	793	2765	2648
	Hours	311.6	381.7	266.6	123.4	147.1	135.4
February	Gallons	32.847	37.748	29.172	5.528	24.369	21.482
	gpm	1757	1648	1824	747	2761	2644
	Hours	284.9	457.6	243.9	117.8	168.9	175.3
March	Gallons	30.134	45.447	26.709	5.290	24.523	27.130
	gpm	1763	1655	1825	748	2420	2579
	Hours	305.3	410.4	240.1	61.4	150.7	130.2
April	Gallons	32.231	41.192	26.765	2.957	25.266	20.513
	gpm	1760	1673	1858	803	2794	2626
	Hours	357.5	377.8	299.6	117.0	106.7	187.6
May	Gallons	37.169	37.364	33.375	4.708	18.115	28.597
	gpm	1733	1648	1857	671	2830	2541
	Hours	269.7	413.6	302.6	222.0	199.3	170.0
June	Gallons	28.137	40.862	32.920	7.678	27.572	29.720
	gpm	1739	1647	1813	576	2306	2914
	Hours	355.8	383.9	397.1	525.2	229.3	180.9
July	Gallons	38.864	38.268	42.992	17.536	30.901	27.491
	gpm	1820	1661	1804	556	2246	2533
	Hours	317.1	421.3	295.7	304.5	275.6	156.3
August	Gallons	35.268	40.995	31.813	10.221	41.672	24.100
	gpm	1854	1622	1793	559	2520	2570
	Hours	316.0	400.3	355.4	7.7	234.8	225.4
September	Gallons	35.379	38.603	38.054	0.286	36.048	34.336
	gpm	1866	1607	1785	619	2559	2539
	Hours	362.8	305.9	309.6	90.2	148.0	132.6
October	Gallons	41.054	29.809	35.046	5.390	23.464	21.317
	gpm	1886	1624	1887	996	2642	2679
	Hours	290.7	424.7	191.9	60.8	165.9	119.2
November	Gallons	27.200	40.863	21.587	3.665	25.987	18.106
	gpm	1559	1604	1875	1005	2611	2532
	Hours	328.4	411.2	242.0	45.3	151.2	127.9
December	Gallons	30.601	39.869	27.693	2.698	25.040	19.711
	gpm	1553	1616	1907	993	2760	2569
Average gpm:		1759	1637	1812	663	2568	2612

Notes:

[1] Hours indicates total hours pumped per month.

[2] Gallons indicates millions of gallons pumped per month.

[3] gpm indicates the average flow rate for the month.

[4] Well No. 9 was shut down in September to clean the well screen.

TABLE 4.1

MONITORING WELL ANALYTICAL RESULTS - 2004 (µg/L)
WAUSAU WATER SUPPLY NPL SITE

Location	MCL		Acetone --	Benzene 5	Ethylbenzene 700	Toluene 1000	Xylenes (total) 10000	Carbon tetrachloride 5	Chloroform --	1,1-Dichloroethene 7	Methylene chloride --	1,1,2-Trichloroethane 5	Tetrachloroethene 5	Trichloroethene 5	cis-1,2-Dichloroethene 70	Vinyl chloride 2	Total CVOCs --
East Bank																	
CW3	10/13/04		< 5	< 1	< 1	1.5	< 1	< 1	< 1	< 1	< 1	< 1	2.8	2	2.4	< 1	7.2
E22A	10/13/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	7.6	0.88 J	1.6	0.69 J	9.2
E23A	10/13/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	12	1.2	2	< 1	15.2
E24A	10/13/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2.6	< 1	< 1	< 1	2.6
E24A	10/13/04	D	6.2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2.5	< 1	< 1	< 1	2.5
E37A	10/13/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	3.9	1.1	3.6	7.8	16.4
FVD5	10/13/04		< 5	130	270	30	1300	< 1	< 1	< 1	< 1	< 1	0.97 J	< 1	0.54 J	< 1	ND
IWD	10/12/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	8.9	< 1	< 1	8.9
IWD	10/12/04	D	5.1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 U	< 1	< 1	8.9	< 1	< 1	8.9
MW10A	10/13/04		5.4	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1.3 U	< 1	< 1	< 1	< 1	< 1	ND
MW10B	10/13/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	ND
WC3B	10/13/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2.3	1.8	4.9	1.2	10.2
WC5A	10/13/04		< 5	< 1	< 1	< 1	2	< 1	< 1	< 1	< 1	< 1	9	1.1	0.52 J	< 1	10.1
WW4	10/13/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	ND
WW6	10/13/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2.8	0.75 J	2.5	4.8	10.1

Notes:

MCL - Maximum Contaminant Levels for drinking water published by the United States Environmental Protection Agency

Total CVOCs - Total chlorinated VOCs (does not include estimated values)

D - Duplicate Sample

U - Estimated detection limit

J - Estimated value, value is below the reporting limit

ND - All CVOCs are less than the reporting limit.

Shaded values exceed the MCL.

TABLE 4.1

MONITORING WELL ANALYTICAL RESULTS - 2004 (µg/L)
WAUSAU WATER SUPPLY NPL SITE

Location	*MCL*		Acetone --	Benzene 5	Ethylbenzene 700	Toluene 1000	Xylenes (total) 10000	Carbon tetrachloride 5	Chloroform --	1,1-Dichloroethene 7	Methylene chloride --	1,1,2-Trichloroethane 5	Tetrachloroethene 5	Trichloroethene 5	cis-1,2-Dichloroethene 70	Vinyl chloride 2	Total CVOCs --
West Bank																	
C2S	10/12/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2.1	< 1	< 1	2.1
C4S	10/12/04		12	1.2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1.7	1.7
CW6	10/13/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1.1 U	< 1	< 1	9	< 1	< 1	9
MW1A	10/12/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	ND
R2D	10/12/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 U	< 1	< 1	11	< 1	< 1	11
R3D	10/12/04		< 10	< 2	< 2	< 2	< 2	< 2	< 2	1 J	< 2	< 2	< 2	890	8.9	< 2	898.9
R4D	10/12/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	49	2	< 1	51
W52	10/12/04		8.3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1.2	< 1	< 1	1.2
W53A	10/12/04		2.1 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2.8	18	< 1	20.8
W53A	10/12/04	D	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2.5	18	< 1	20.5
W54	10/12/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	ND
W55	10/12/04		3.8 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1.1 U	< 1	< 1	8.7	< 1	< 1	8.7
W56	10/12/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	ND
WSWD	10/12/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 U	< 1	< 1	< 1	< 1	< 1	ND

Notes:

MCL - Maximum Contaminant Levels for drinking water published by the United States Environmental Protection Agency

Total CVOCs - Total chlorinated VOCs (does not include estimated values)

D - Duplicate Sample

U - Estimated detection limit

J - Estimated value, value is below the reporting limit

ND - All CVOCs are less than the reporting limit.

Shaded values exceed the MCL.

TABLE 4.2

EW1 ANALYTICAL RESULTS - 2004 (µg/L)
WAUSAU WATER SUPPLY NPL SITE

Location	*MCL*		Acetone --	Benzene 5	Ethylbenzene 700	Toluene 1000	Xylenes (total) 10000	Carbon tetrachloride 5	Chloroform --	1,1-Dichloroethene 7	Methylene chloride --	1,1,2-Trichloroethane 5	Tetrachloroethene 5	Trichloroethene 5	cis-1,2-Dichloroethene 70	Vinyl chloride 2
Effluent	1/7/04		< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	6.8	0.3 J	< 1
Effluent	4/2/04		< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	6.1	0.3 J	< 1
Effluent	7/6/04		< 10 U	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	6.4	0.3 J	< 1
Effluent	10/13/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	6.4	< 1	< 1
Influent	1/7/04		< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	14	0.6	< 1
Influent	4/2/04		< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	10	0.5 J	< 1
Influent	7/6/04		< 10 U	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	11	0.5 J	< 1
Influent	10/13/04		< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	13	< 1	< 1

Notes:
MCL - Maximum Contaminant Levels for drinking water published by the United States Environmental Protection Agency
U - Estimated detection limit
J - Estimated value, value is below the reporting limit

APPENDIX A

2004 DATA QUALITY VALIDATION MEMORANDUMS

CONESTOGA-ROVERS & ASSOCIATES

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MEMORANDUM

TO: Jason Twaddle; CRA

REF. NO.: 3978-10

FROM: Ruth Mickle

DATE: April 20, 2004

C.C.: Analytical Data File

RE: **Data Quality Assessment**
January 7, 2004, Sampling Event
Wausau Superfund Site - Wausau, Wisconsin (COC 155742)

The following details a data quality assessment for water samples collected on January 7, 2004, at the Wausau Superfund Site in Wausau, Wisconsin. The samples identified as W040107WM-434 and W040107WM-435 were analyzed for volatile organic compounds (VOC).[1] The analyses were performed by Severn Trent Laboratories (STL) in North Canton, Ohio. The quality assurance criteria were established in the Quality Assurance Project Plan (QAPP).[2]

HOLDING TIME PERIOD & SAMPLE PRESERVATION

The holding time period for the VOC analysis is 14 days from sample collection to analysis. On the basis of sample collection dates on the chain-of-custody form and the analytical report provided by STL, the analyses were completed within the specified holding time period. The samples should also be preserved to a pH less than 2. Both samples were found to have pH values less than 2.

METHOD BLANK SAMPLE

Contamination of the samples contributed by laboratory conditions or procedures was monitored by the concurrent preparation and analysis of a method blank sample. The method blank sample was free of target analytes.

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1 VOC Method 8260B was derived from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW 846, 3rd edition, November 1986 and updates.

2 Application of relevant quality assurance criteria was consistent with "National Functional Guidelines for Organic Data Review", October 1999.

SURROGATE COMPOUND
PERCENT RECOVERIES (SURROGATE RECOVERIES)

Individual sample performance for VOC analyses was monitored by surrogate recoveries. The surrogate recoveries were within acceptance criteria, indicating that individual sample performance was adequate.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) RESULTS

To assess the long-term accuracy and precision of the analytical method on various matrices, matrix spike percent recoveries and relative percent difference (RPD) of the spike recoveries were determined for the analyses. Since the MS/MSD spike samples were non-project samples, no evaluation of project samples was made based on matrix spike results.

LABORATORY CONTROL
SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE (LCS/LCSD)

Overall performance for the analyses was monitored by means of a LCS/LCSD. The LCS/LCSD recovery results were within acceptance criteria. The RPD results for 1,1-dichloroethene, trichloroethene, benzene and chlorobenzene were just outside the RPD limit of 20. However, since all spike recoveries were within control limits, no data qualification was required based on LCS results.

FIELD QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) SAMPLES

There were no field QA/QC samples associated with the sampling event.

OVERALL ASSESSMENT

The data were found to exhibit acceptable levels of accuracy and precision pertaining to the above criteria, and may be used without qualification.

RLM/ma/57

CONESTOGA-ROVERS & ASSOCIATES

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MEMORANDUM

TO: Jason Twaddle

REF. NO.: 3978-10

FROM: Ruth Mickle for

DATE: May 10, 2004

C.C.: Analytical Data File

RE: **Data Quality Assessment**
April 2, 2004, Sampling Event
Wausau Superfund Site - Wausau, Wisconsin (COC 154830)

The following details a data quality assessment for water samples collected on April 2, 2004, at the Wausau Superfund Site in Wausau, Wisconsin. The samples identified as W040402MT-436 and W040402MT-437 were analyzed for volatile organic compounds (VOCs).[1] The analyses were performed by Severn Trent Laboratories (STL) in North Canton, Ohio. The quality assurance criteria were established in the Quality Assurance Project Plan (QAPP).[2]

HOLDING TIME PERIOD

The holding time period for the VOC analysis is 14 days from sample collection to analysis. On the basis of sample collection dates on the chain-of-custody form and the analytical report provided by STL, the analyses were completed within the specified holding time period.

METHOD BLANK SAMPLE

Contamination of the samples contributed by laboratory conditions or procedures was monitored by the concurrent preparation and analysis of a method blank sample. The method blank sample was free of target analytes.

1 VOC Method 8260B was derived from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW 846, Third Edition, November 1986 and updates.

2 Application of relevant quality assurance criteria was consistent with "National Functional Guidelines for Organic Data Review", October 1999.

SURROGATE COMPOUND PERCENT RECOVERIES (SURROGATE RECOVERIES)

Individual sample performance for VOC analyses was monitored by surrogate recoveries. The surrogate recoveries were within acceptance criteria, indicating that individual sample performance was adequate.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) RESULTS

To assess the long-term accuracy and precision of the analytical method on various matrices, matrix spike percent recoveries and relative percent difference (RPD) of the spike recoveries were determined for the analyses. Since the MS/MSD spike samples were non-project samples, no evaluation of project samples was made based on matrix spike results.

LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE (LCS/LCSD)

Overall performance for the analyses was monitored by means of a LCS/LCSD. The LCS/LCSD recovery and RPD results were within acceptance criteria.

FIELD QUALITY ASSURANCE/ QUALITY CONTROL (QA/QC) SAMPLES

The field QA/QC for the sampling event consisted of a trip blank sample.

To evaluate the possibility of contamination arising from sample transport, the environment, and/or shipping, a trip blank sample was submitted to the laboratory for VOC analysis. The trip blank sample yielded a low-level detection of methylene chloride (0.30 μg/L); since the associated sample results were nondetect for methylene chloride, no data qualification was required.

OVERALL ASSESSMENT

The data were found to exhibit acceptable levels of accuracy and precision pertaining to the above criteria, and may be used without qualification.

RLM/jla/58

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MEMORANDUM

TO: Jason Twaddle

REF. NO.: 3978-10

FROM: Ruth L. Mickle

DATE: August 23, 2004

C.C.: Analytical Data File

RE: **Data Quality Assessment**
July 6, 2004, Sampling Event
Wausau Superfund Site - Wausau, Wisconsin (COC 170382)

The following details a data quality assessment for groundwater samples collected July 6, 2004, at the Wausau Superfund Site in Wausau, Wisconsin. The samples identified as W-040706MT-438 and W-040706MT-439 were analyzed for volatile organic compounds (VOCs).[1] The analyses were performed by Severn Trent Laboratories (STL) in North Canton, Ohio. The quality assurance criteria were defined by the quality assurance project plan (QAPP).[2]

HOLDING TIME PERIOD

The holding time period for VOC analyses is 14 days from sample collection to completion of analyses.

On the basis of the sample collection date on the chain-of-custody form and the analytical report provided by STL, the analyses were completed within the specified holding time period.

SURROGATE COMPOUND PERCENT RECOVERIES (SURROGATE RECOVERIES)

Individual sample performance for VOC analyses was monitored using surrogate recoveries. The surrogate recoveries were within acceptance criteria.

1 VOC method 8260B was derived from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and updates.

2 Application of quality assurance criteria was consistent with "National Functional Guidelines for Organic Data Review", October 1999.

METHOD BLANK SAMPLES

Contamination of samples contributed by laboratory conditions or procedures was monitored by the concurrent preparation and analyses of method blank samples. One VOC blank (batch 4197185) yielded an acetone detection (0.96 µg/L). The associated acetone detection (0.84 µg/L) for sample W-040706MT-438 should be qualified as nondetect (10U) based on the method blank results.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE (LCS/LCSD)

Overall performance of the analyses was monitored by means of LCS/LCSD data. The LCS recovery and RPD data for the analyses were within control limits criteria, indicating that overall performance was adequate.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) RESULTS

To assess the long-term accuracy and precision of the analytical method on various matrices, matrix spike percent recoveries and relative percent difference (RPD) of the spike recoveries were determined for the analyses. Since the MS/MSD spike samples were non-project samples, no evaluation of project samples was made based on matrix spike results.

FIELD QUALITY ASSURANCE/ QUALITY CONTROL (QA/QC) SAMPLES

The field QA/QC associated with the sampling event consisted of one trip blank sample.

To evaluate the possibility of contamination arising from sample transport, the environment, and/or shipping, a trip blank sample was submitted to the laboratory for VOC analysis. The trip blank yielded acetone (1.2 µg/L) and methylene chloride (0.94 µg/L) detections. The associated acetone detection (0.94 µg/L) for sample W-040706MT-439 should be qualified as nondetect (10U) based on the trip blank results. The acetone detection for sample W-040706MT-438 was previously qualified based on method blank results. There were no associated methylene chloride detections in the project samples.

OVERALL ASSESSMENT

The data were found to exhibit acceptable levels of accuracy and precision and may be used with the qualifications noted.

RLM/jla/59

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MEMORANDUM

TO: Jason Twaddle

REF. NO.: 3978-10

FROM: Ruth Mickle

DATE: January 4, 2005

C.C.: Analytical Data File

RE: **Data Quality Assessment and Validation**
October 13, 2004, Sampling Event
Wausau Superfund Site - Wausau, Wisconsin (COC 4521)

The following details a data quality assessment and validation for water samples collected October 13, 2004, at the Wausau Superfund Site in Wausau, Wisconsin. The samples identified as W-041013-DS-33 and W-041013-DS-34 were analyzed for Site list volatile organic compounds (VOCs).[1] The analyses were performed by Severn Trent Laboratories (STL) in Chicago, Illinois. The quality assurance criteria were established in the Quality Assurance Project Plan (QAPP).[2]

HOLDING TIME PERIODS

The holding time period for VOC analyses is 14 days from sample collection to analysis.

On the basis of sample collection dates on the chain-of-custody form and the analytical report provided by STL, the analyses were completed within the specified holding time period.

METHOD BLANK SAMPLE

Contamination of the samples contributed by laboratory conditions or procedures was monitored by the concurrent preparation and analyses of a method blank sample. The method blank sample was free of target analytes.

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1 VOC Method 8260B was derived from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW 846, Third Edition, November 1986 and updates.

2 Application of relevant quality assurance criteria was consistent with "National Functional Guidelines for Organic Data Review", October 1999.

SURROGATE COMPOUND PERCENT RECOVERIES (SURROGATE RECOVERIES)

Individual sample performance for the analyses was monitored by surrogate recoveries. The surrogate recoveries were within acceptance criteria, indicating that individual sample performance was adequate.

LABORATORY CONTROL SAMPLE (LCS)

Overall performance for the analyses was monitored by means of a LCS. The percent recoveries were within acceptance criteria.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) RESULTS

To assess the long-term accuracy and precision of the analytical method on various matrices, matrix spike percent recoveries and relative percent difference (RPD) of the spike recoveries were determined for the analyses. Since the percent recovery and RPD data were generated for non-project samples, no assessment of project results was made based on MS/MSD results.

FIELD QUALITY ASSURANCE/ QUALITY CONTROL (QA/QC) SAMPLE

The field QA/QC associated with the sampling event consisted of one trip blank sample.

To evaluate the possibility of contamination arising from sample transport, the environment, and/or shipping, one trip blank sample was submitted to the laboratory for VOC analysis. The trip blank yielded a methylene chloride detection (3.3 μg/L). Since the associated sample results were nondetect for this parameter, no data qualification was required.

OVERALL ASSESSMENT

The data were found to exhibit acceptable levels of accuracy and precision pertaining to the above criteria, and may be used without qualification.

RLM/jla/61

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MEMORANDUM

TO: Jason Twaddle

REF. NO.: 3978

FROM: Ruth Mickle

DATE: January 4, 2005

C.C.: Analytical Data File

RE: **Data Quality Assessment and Validation**
October 12-13, 2004, Sampling Event
Wausau Superfund Site - Wausau, Wisconsin (COC 4602, 4604)

The following details a data quality assessment and validation for water samples collected October 12-13, 2004, at the Wausau Superfund Site in Wausau, Wisconsin. The samples identified in Table 1 were analyzed for Site list volatile organic compounds (VOCs).[1] The analyses were performed by Severn Trent Laboratories (STL) in Chicago, Illinois. The quality assurance criteria were established in the Quality Assurance Project Plan (QAPP).[2]

HOLDING TIME PERIODS

The holding time period for VOC analyses is 14 days from sample collection to analysis.

On the basis of sample collection dates on the chain-of-custody forms and the analytical reports provided by STL, the analyses were completed within the specified holding time periods.

METHOD BLANK SAMPLES

Contamination of the samples contributed by laboratory conditions or procedures was monitored by the concurrent preparation and analyses of method blank samples. The method blank samples were free of target analytes.

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1 VOC Method 8260B was derived from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW 846, Third Edition, November 1986 and updates.

2 Application of relevant quality assurance criteria was consistent with "National Functional Guidelines for Organic Data Review", October 1999.

SURROGATE COMPOUND PERCENT RECOVERIES (SURROGATE RECOVERIES)

Individual sample performance for the analyses was monitored by surrogate recoveries. The surrogate recoveries were within acceptance criteria, indicating that individual sample performance was adequate.

LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE (LCS/LCSD)

Overall performance for the analyses was monitored by means of a LCS/LCSD. The percent recoveries were within acceptance criteria.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) RESULTS

To assess the long-term accuracy and precision of the analytical method on various matrices, matrix spike percent recoveries and relative percent difference (RPD) of the spike recoveries were determined for the analyses. The percent recovery and RPD data for project samples were within acceptance criteria.

FIELD QUALITY ASSURANCE/ QUALITY CONTROL (QA/QC) SAMPLES

The field QA/QC associated with the sampling event consisted of one trip blank sample, three rinsate blanks, and three field duplicate sets.

To evaluate the possibility of contamination arising from sample transport, the environment, and/or shipping, one trip blank sample was submitted to the laboratory for VOC analysis. The trip blank yielded a methylene chloride detection (2.6 μg/L). The associated methylene chloride data for samples identified in Table 2 should be qualified as nondetect (U).

As a check for cleanliness of sampling equipment, rinsate blanks were collected as authentic samples for labeling and submission to the lab. The rinsate samples were identified as W-041012-DS-01, W-041012-DS-16 and W-041013-DS-25. One rinsate blank sample (W-041012-DS-16) yielded an acetone detection (6.2 μg/L). However, since the associated sample data was reported as nondetect for acetone, no data qualification was required. The remaining rinsate blanks were free of target analytes.

Overall precision for the sampling event was monitored using field duplicate samples: W-041012-DS-03/W-041012-DS-04, W-041012-DS-13/W-041012-DS-14, and W-041013-DS-23/W-041013-DS-24. The relative percent difference (RPD) values for positive parameter results were found to be acceptable (RPD values less than or equal to 25 where both results are 5+ times the reporting limit), indicating an adequate level of precision was achieved.

OVERALL ASSESSMENT

The data were found to exhibit acceptable levels of accuracy and precision pertaining to the above criteria, and may be used with the qualifications noted in Table 2.

RLM/jla/62
Enc.

TABLE 1

SAMPLE IDENTIFICATION NUMBERS
WAUSAU SUPERFUND SITE
OCTOBER 12-13, 2004 SAMPLING EVENT

W-041012-DS-01	W-041012-DS-17
W-041012-DS-02	W-041013-DS-18
W-041012-DS-03	W-041013-DS-19
W-041012-DS-04	W-041013-DS-20
W-041012-DS-05	W-041013-DS-21
W-041012-DS-06	W-041013-DS-22
W-041012-DS-07	W-041013-DS-23
W-041012-DS-08	W-041013-DS-24
W-041012-DS-09	W-041013-DS-25
W-041012-DS-10	W-041013-DS-26
W-041012-DS-11	W-041013-DS-27
W-041012-DS-12	W-041013-DS-28
W-041012-DS-13	W-041013-DS-29
W-041012-DS-14	W-041013-DS-30
W-041012-DS-15	W-041013-DS-31
W-041012-DS-16	W-041013-DS-32

TABLE 2

RESULTS QUALIFIED BASED ON TRIP BLANK DATA
WAUSAU SUPERFUND SITE
OCTOBER 12-13, 2004 SAMPLING EVENT

Blank ID	*Parameter*	*Blank Contamination* (µg/L)	*Associated Samples*	*Qualifier*[1]
Trip Blank	Methylene Chloride	2.6	W-041012-DS-09	1.0U
			W-041012-DS-10	1.1U
			W-041012-DS-12	1.0U
			W-041012-DS-14	1.0U
			W-041013-DS-18	1.1U
			W-041013-DS-21	1.3U

Note:

[1] Sample result should be qualified as:

U -The analyte was analyze for, but not detected above the reported sample quantitation limit.