ANNUAL PERFORMANCE MONITORING REPORT

CIRCUITRON SUPERFUND SITE EAST FARMINGDALE, NEW YORK

Prepared for
USACE, New York

Contract No. DACW41-00-R-0010
Delivery Order No. 002

December 2002

URS

201 Willowbrook Boulevard
Wayne, New Jersey 07470
973-785-0700

Project 19683807.66051

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This is the first Annual Performance Monitoring Report for the Circuitron Corporation Superfund Site located in East Farmingdale, New York (Figure 1-1). This report presents an assessment of ground water data collected to date for the period January 1999 to August 2002, in accordance with the selected remedy for the site as described in the Record of Decision (ROD) (USEPA, 1992) for Operable Unit Two (OU-2). Hereafter, subsequent annual reports will be prepared on a regular schedule incorporating new performance monitoring data. Each annual report will assess the relevant data collected to date for the entire performance monitoring period.

This section of the report provides background information for the site, including a description of the extraction well system, the network of performance monitoring wells, and the monitoring schedule. Section 2 introduces the technical approach for the performance monitoring evaluation. Section 3 provides an assessment of the ground water flow patterns for the site with respect to the Predicted Zone of Capture for the OU-2 remedy. Section 4 is an evaluation of the ground water quality data for the site. Section 5 presents conclusions and recommendations.

1.1 BACKGROUND

Based on the results of the Focused Feasibility Study (FFS) for OU-2 completed by Roy F. Weston (Radian, 1999), elevated levels of both organic and inorganic constituents were detected in the Upper Glacial Aquifer below and near the Circuitron site. The Upper Glacial Aquifer is described as the water table aquifer that extends to a depth of 70 to 80 feet below the ground surface at the site and overlies the Magothy Aquifer. Specifically, elevated levels (exceeding the NYSDEC Ground Water Quality Standards) of 1,1,1-trichloroethane, 1,1-dichloroethene, chromium and copper were detected in the ground water in the upper portions (less than 40 feet below the ground surface) of the Upper Glacial Aquifer. These detections were attributed to the Circuitron facility (see Figure 1-2). Similar constituents were also detected at elevated levels in the deeper portions (greater than 60 feet below ground surface) of the Upper Glacial Aquifer and in the underlying Magothy Aquifer in wells located onsite as well as upgradient and downgradient of the site. These detections are believed to be the result of off-site sources other than Circuitron (Weston, 1994). After the FFS was completed, a Record of Decision (ROD) for OU-2 was signed on September 30, 1994. The selected remedy consists of the removal of organics and inorganics from the ground water within the upper portion of the Upper Glacial Aquifer via air stripping and metal precipitation, respectively, and reinjection of the treated ground water. Ground water extraction for treatment from the deeper portion of the Upper Glacial Aquifer was not included as part of the OU-2 remedy for the site. The major components of the OU2 include the following:

- Extraction of the site-related ground water contaminant plume present in the upper 40 feet (top portion) of the saturated Upper Glacial Aquifer,
- Treatment, via precipitation and air stripping, of contaminated ground water to drinking water standards,

- Reinjection of the treated ground water into the Upper Glacial Aquifer via an infiltration gallery, and
- Disposal of treatment residuals at a RCRA Subtitle C Facility.

1.2 GROUND WATER EXTRACTION SYSTEM

For the OU-2 remedy, ground water flow and contaminant transport modeling was performed (Radian, 1999) to assist in the design of a treatment system. Specifically, modeling was used to determine the placement and pumping rates of proposed extraction wells and to evaluate the operating time of the ground water pump and treatment system and other design issues. Several scenarios of ground water placement and pumping were considered for the OU-2 remedy design. The selected design consists of three extraction wells pumping at a total rate of 80 gallons per minute (gpm), a treatment system, and reinjecting treated ground water into a trench located at the northern end of the site. Using this design, the model predicted that a ground water capture zone that would form and individual volatile organic compound (VOC) levels would be reduced to below cleanup levels within 3.0 to 4.5 years of operation.

The ground water extraction system consists of three (3) extraction wells (RW-1, RW-2, and RW-3) each equipped with a submersible well pump and tubing that discharges ground water to an onsite treatment plant. The extraction wells are positioned to pump ground water from three source areas identified during the remedial investigation to accomplish ground water capture around the subject site area. Each well is constructed with a 15-feet long ASTM–A-304 Stainless Steel Screen connected to ASTM-A-304 Schedule 40 Stainless Steel Riser. The bottom of the well screens for RW-1, RW-2, and RW-3 were installed at depths of 56 feet, 56 feet, and 54 feet below ground surface (bgs), respectively. The extraction well locations are depicted in Figure 1-1.

Each extraction well is pumped intermittently based on the water levels in the extraction well, in the equalization tank, and in the building sump inside the ground water treatment plant (GWTP) building.

The design total flow rate of the three extraction wells is 80 gpm, where RW-1, RW-2, and RW-3 are pumped individually at 30 gpm, 20 gpm, and 30 gpm, respectively. The system began operation on June 28, 2000.

1.3 GROUND WATER MONITORING SYSTEM

Currently, there is a network of 19 monitoring wells located at and around the Circuitron site that are used for ground water monitoring of the OU-2 remedy. Of the 19 wells, 12 wells are screened within the upper portion of the Upper Glacial Aquifer. The remaining 7 are screened within the deeper portions of the Upper Glacial Aquifer and the underlying Magothy Aquifer. For the performance monitoring period June 2000 to August 2002, water level data and ground water quality data were collected from each well in the network. Water levels were measured monthly from each well in the network and ground water samples were collected quarterly for VOC and semi-annually for inorganic analyses. These data are used to assess the performance of the treatment system that are discussed in Sections 3 and 4 of this report.

The success of the OU-2 remedy for the subject site is dependent on the effectiveness of the ground water treatment plant (GWTP) in containing and capturing site-related contaminants in the ground water within in the upper portion of the Upper Glacial (shallow) Aquifer in the area of the site.

This performance evaluation assesses changes in the chemical constituent concentrations and positions relative to the predicted zone of capture using hydraulic and water quality data collected during the performance monitoring period January 1999 to August 2002. Isoconcentration maps, ground water contour and flow maps, and geochemical time-series graphs are used to assess the effectiveness of the GWTP in remediating the shallow aquifer. Since the deeper portions of the Upper Glacial Aquifier/Magothy (deep) Aquifer are being monitored for changes in ground water chemistry over time, time-series graphs were also prepared for wells screened within this zone. However, the overall effectiveness of the success of the GWTP is based solely on the shallow aquifer results, as described in the ROD. Each is described below.

2.1 GROUND WATER CONTOUR AND FLOW MAPS

Ground water contour maps were prepared for the shallow aquifer beneath the site. The overall ground water flow pattern under pumping conditions is compared to the baseline flow pattern for changes resulting from pumping and to the predicted zone of capture for actual ground water capture. This assessment is presented in Section 3. The effectiveness of the GWTP will be determined by ground water flow paths within the Predicted Zone of Capture flowing toward one of the three extraction wells. If this condition exists, then at a minimum any part of a plume configuration located within the capture zone is being captured for treatment.

2.2 ISOCONCENTRATION MAPS

Generalized isoconcentration maps using the August 2002 round of data for various volatile organic compounds and inorganic analytes were prepared for the shallow aquifer. Only detections of VOCs and metals that were exceedances (including "J" (estimated), but excluding "B" (nondetected) qualified values) were mapped for a given well. Previous data has already been submitted to the USEPA as part of the O&M Monthly Progress Reports for the site. Isoconcentration maps were prepared for the following contaminants as previously reported in the monthly progress reports:

- 1,1,1-Trichloroethane,
- Tetrachloroethene,
- Trichloroethene,
- Chromium,
- Iron, and
- Manganese.

Each map is a generalized depiction of the August 2002 ground water plume configuration that will be used in conjunction with the Predicted Zone of Capture and the flow path depicted under pumping conditions to show that the GWTP is effectively remediating the plume. This evaluation is presented in Section 4.2 of this report.

2.3 GEOCHEMICAL TIME-SERIES GRAPHS

Geochemical time-series graphs provide an effective technique for monitoring the levels of a contaminant and trends at a given well over time. Time-series graphs were prepared by plotting contaminant concentration levels versus time for both the shallow and deep aquifer wells having multiple exceedances of NYSDEC Ground Water Quality Standards during the performance monitoring period.

Since the deeper aquifer wells are included in the performance monitoring program to monitored for changes in ground water chemistry over time, time-series graphs were also prepared for wells screened within this zone. The results of for each aquifer are discussed, however the assessment of the OU-2 remedy is solely based on the shallow aquifer results.

For wells that had both multiple exceedances and undetected levels of a contaminant, one half of the ground water criteria value for that contaminant was used to prepare the times-series graph. Even though the convention for non-detections is to use one half the MDL for that contaminant, using half of the ground water criteria value is a more conservative approach. Geochemical time-series graphs were constructed for the following contaminants:

- 1,1,1-Trichloroethane,
- 1,1-Dichloroethane,
- 1,1-Dichloroethene,
- Tetrachloroethene,
- Chromium,
- Iron, and
- Manganese.

During the performance monitoring period, multiple exceedances of acetone and methylene chloride were observed in numerous wells. Since these constituents were also detected in the associated method blanks, they were considered to be laboratory artifacts and were not evaluated using time-series graphs.

Each time-series plot discussed in Section 4.3 is evaluated for changes in concentrations over time. The effectiveness of the GWTP is evaluated based on the occurrence of decreasing trends for each contaminant with the shallow aquifer wells.

Prior to the full-scale operation of the GWTP in June 2000, water levels measurements from each accessible monitoring well were collected in January 1999. These data were used to establish baseline conditions of ground water flow within the upper portion of the Upper Glacial Aquifer under non-pumping conditions. Once the GWTP began fully operating, water level measurements were collected at a minimum once per month from each accessible monitoring well. These data represent ground water flow under pumping conditions.

Since the GWTP was designed to remediate the upper portion of the Upper Glacial Aquifer, the evaluation of the ground water flow pattern will be limited to this zone and does not include the deeper zone where flow patterns are unaffected by pumping. Therefore, to evaluate ground water flow patterns within the upper portion of the Upper Glacial Aquifer, ground water contour maps were prepared to depict hydraulic gradients and flow patterns under pumping and non-pumping conditions. In addition, ground water flow patterns for August 2002 are compared to the Predicted Zone of Capture from the ground water modeling (Radian, 1999). Each is discussed below.

3.1 BASELINE CONDITIONS

The baseline ground water flow pattern represents hydraulic conditions prior to operating the GWTP. Figure 3-1 depicts the overall ground water contours and flow pattern within the upper portion of the Upper Glacial Aquifer for January 1999. The overall ground water flow is to the south/southeast with a uniform hydraulic gradient of approximately 0.002 ft/ft.

3.2 PUMPING CONDITIONS

Figure 3-2 depicts the ground water contour map and the overall flow pattern within the upper portion of the Upper Glacial Aquifer under pumping conditions. The data used to prepare this map were collected in August 2002, while the system was fully operational. The overall ground water flow pattern is to the south with a bidirectional flow component on either side of a north-south line connecting the three recovery wells. West of this line, flow is predominantly to the southeast. East of this line, flow is to the southwest. The effects of pumping ground water are evident as ground water contours are partially wrapped around each recovery well. Any ground water flow path to a recovery well indicates capture by that recovery well. The overall hydraulic gradients were variable ranging between 0.002 and 0.005 ft/ft. The effects of recharging ground water are not apparent since increased local ground water heads beneath and surrounding the Northern Reinjection Trench were not evident, as could be expected.

3.3 PREDICTED ZONE OF CAPTURE VS GROUND WATER FLOW PATTERN

Ground water flow and contaminant transport modeling was performed by Radian International in 1999 to assist in the design of a OU-2 extraction system. Using the selected design for the OU-2 remedy, the model predicted that a ground water capture zone would form as a result of pumping ground water for treatment. Ground water contaminants within the Predicted Zone of Capture would be captured and contaminant levels would eventually be reduced to below cleanup levels within 3.0 to 4.5 years of operation (Radian, 1999).

Figure 3-1 depicts the Predicted Zone of Capture within the upper portion of the Upper Glacial Aquifer for a total pumping rate of 80 gpm. Figure 3-4 depicts the ground water contours and flow paths from August 2002, superimposed on the Predicted Zone of Capture for the upper portion of the Upper Glacial Aquifer. This figure depicts complete capture by the GWTP since each flow path within the Predicted Zone of Capture is flowing towards one of the recovery wells. The Actual Zone of Capture (based upon the August 2002) water level data is also depicted in Figure 3-4. The Actual Zone of Capture is depicted to be slightly larger than the Predicted Zone of Capture due to portions of the flow paths near wells MW-7S and MW-16. They extended beyond the Predicted Zone of Capture.

During the period from June 2000 to August 2002 when the OU-2 remedy was operating, ground water samples were collected from up to 19 monitoring wells at the site. These data presented in Appendix A were used to evaluate changes in the plume configurations and contaminant concentrations in the ground water as a result of operating the GWTP. This section discusses the spatial distribution of constituents detected in the shallow ground water as confirmed NYSDEC Ground Water Quality Standard exceedances, and using isoconcentrations maps and time-series graphs. Since 6 deep wells are also included in the Performance Monitoring program, times-series graphs were also prepared for the aquifer to show any trends in these wells over time. Since the GWTP was designed to only remediate the shallow aquifer, trends in the deep wells are assessed in terms of being affected by operating the GWTP. Each is discussed below.

4.1 CONFIRMED EXCEEDANCES IN WELLS OUTSIDE THE PREDICTED ZONE OF CAPTURE

A confirmed MCL exceedance occurred when two or more exceedances were detected for a given constituent during the Performance Monitoring period. Wells identified with confirmed exceedances outside of the Predicted Zone of Capture are useful in assessing the need to change the operation of the GWTP to achieve a more effective capture zone. Any recommendations to change the operation of the GWTP will not be based on a single exceedance. Single exceedances may be anomalous and therefore are considered unreliable for this evaluation.

Of the shallow monitoring wells with exceedances during the Performance Monitoring period, four wells (MW-7S, MW-16, MW-18, and MW-19S) had confirmed exceedances that lie outside of the Predicted Zone of Capture. Summary of the exceedances are noted below:

- MW-18 and MW-19S had a confirmed exceedance of methylene chloride;
- MW-7S, MW-16, MW-18 and MW-19S had a confirmed exceedance of iron;
- MW-16 and MW-19S had a confirmed exceedance of manganese; and
- MW-19S had a confirmed exceedance of Chromium.

Table 4-1 summarizes the organic and inorganic exceedances in each well located outside the Predicted Zone of Capture and highlights the confirmed exceedances relative to the applicable NYSDEC Ground Water Quality Standards.

4.2 GENERALIZED ISOCONCENTRATION MAPS

Generalized isoconcentrations maps of organic and inorganic MCL exceedances for the August 2002 sampling event were prepared for wells screened within the shallow zone of the Upper Glacial Aquifer. In general, the isoconcentration maps were prepared for the same list of constituents as were reported in the most recent O&M Monthly Progress Report. Generalized isoconcentration maps are presented in Appendix A and are discussed below.

4.2.1 VOC Exceedances in Shallow Wells

1,1,1-Trichloroethane was detected as an exceedance in two wells within the upper portion of the Upper Glacial Aquifer (MW-13 and MW-17). Each well is located within the Predicted Zone of Capture. Figure 4-1 depicts the generalized 1,1,1-trichloroethane plume configuration relative to the Predicted Zone of Capture. No other organic exceedances were detected either within or outside of the Predicted Zone of Capture for the August 2002 event.

4.2.2 Inorganic Exceedances in Shallow Wells

Numerous inorganics were detected as MCL exceedances in nine wells MW-1S, MW-3S, MW-13, MW-14, MW-15, MW-16, MW-17, MW-18, and MW-19S within the upper portion of the Upper Glacial Aquifer. Each well is located within the Predicted Zone of Capture, with two exceptions (MW-19S and MW-16). Well MW-19S, located outside and downgradient of the Predicted Zone of Capture, had exceedances for iron, manganese, and chromium. Well MW-16, located outside the western edge of the Predicted Zone of Capture, had exceedances for arsenic, iron, lead, manganese. Figure 4-2 depicts the generalized iron, manganese, and chromium plume configurations relative to the Predicted Zone of Capture. An isoconcentration map of arsenic was not prepared for MW-16 because it was a one- time exceedance for this well and therefore was not confirmed.

4.3 GEOCHEMICAL TIME-SERIES GRAPHS

Geochemical time-series graphs provide an effective technique for monitoring contaminant trends at a given well over time. Time-series graphs were prepared by plotting contaminant concentration levels against time in wells numerous exceedances during the performance monitoring period. Each graph covers a period that extends from June 2000 though the August 2002. Time-series graphs and the associated data are presented in Appendix B. A this time, a quantitative evaluation of the time-series graphs was considered unnecessary to evaluate the trends in each well; therefore, each constituent or analyte is discussed qualitatively below.

<u>**1,1,1-Trichloroethane Time-Series Graphs**</u>

Shallow Wells

A time-series graph was constructed for 1,1,1-trichloroethane in 7 shallow monitoring wells (MW-3S, MW-4S, MW-6S, MW-13, MW-14, MW-17, MW-19S). Each well was located within the Predicted Zone of Capture, with one exception. MW-19S is located outside of the predicted zone of capture approximately 150 feet downgradient of RW-3. In summary, the 1,1,1-trichloroethane time-series graph depicts the following:

- Of the seven wells having levels that exceeded the NYSDEC ground water quality standard for 1,1,1-trichloroethane of 5 µg/L at or near the beginning of the operation of the GWTP, only two wells (MW-3S and MW-19S) have levels that are below the standard as of August 2001.

- Elevated levels of 1,1,1-trichlorethane are still detected in wells MW-4S, MW-6S, MW-13, MW-14, and MW-17.
- A decreasing trend in six of the seven wells is depicted.
- A slightly increasing trend in MW-6S is depicted.

Deep Wells

A time-series graph was constructed for 1,1,1-trichloroethane in 5 deep monitoring wells (MW-1D, MW-4D, MW-6D, MW-7D, and MW-19D). In summary, the 1,1,1-trichloroethane time-series graph depicts the following:

- Of the five deep wells having levels that exceeded the NYSDEC ground water quality standard for 1,1,1-trichloroethane of 5 μg/L at or near the beginning of the operation of the GWTP, one well (MW-7D) has levels that are below the standard as of July 2001.
- Elevated levels of 1,1,1-trichlorethane are still being detected in wells MW-1D, MW-4D, MW-6D, MW-7D, and MW-19D.
- A decreasing concentration trend in four of the five wells is depicted.
- A slightly increasing trend for MW-19D is depicted.

<u>**1,1-Dichloroethane Time-Series Graph**</u>

Shallow Wells

A time-series graph was constructed for 1,1-dichloroethane in 3 shallow monitoring wells (MW-4S, MW-13, and MW-19S). Each well was located within the Predicted Zone of Capture, with the exception of MW-19S. In summary, the 1,1-dichloroethane time-series graph depicts the following:

- Since the October 2001 sampling event, no exceedances of 1,1-dichloroethane were observed in each of the three wells.
- A decreasing trend is depicted in each of the three wells since operation of the GWTP began.

Deep Wells

A time-series graph was constructed for 1,1-dichloroethane in 1 deep monitoring well (MW-7D). In summary, the 1,1-dichloroethane time-series graph depicts the following:

- A decreasing trend is depicted for MW-7D.
- 1,1-Dichloroethane was not an exceedance during the August 2002 sampling event.

1,1-Dichloroethene Time-Series Graph

Shallow Wells

A time-series graph was constructed for 1,1-dichloroethene in 2 monitoring wells (MW-4S and MW-13). Each well was located within the Predicted Zone of Capture.

In summary the time- series graph for 1,1-dichloroethene is as follows:

- A decreasing trend in each of the two wells was depicted.
- Since the February 2001 sampling event, no exceedances of 1,1-dichloroethene were observed in either well.

Deep Wells

A time-series graph was constructed for 1,1-dichloroethene in 3 deep monitoring wells (MW-1D, MW-4D and MW-19D). In summary the time- series graph for 1,1-dichloroethene is as follows:

- Each deep well has an exceedance of the NYSDEC ground water quality standard for 1,1-dichloroethene of 5 μg/L as of August 2002.
- A slight increasing trend is depicted in wells MW-1D and MW-19D.
- A decreasing trend is depicted in well MW-4D.

Tetrachloroethene Time-Series Graph

Shallow Wells

A time-series graph was constructed for tetrachloroethene for 2 shallow monitoring wells (MW-4S and MW-17). Each well was located within the Predicted Zone of Capture. In summary the time- series graph for tetrachloroethene is as follows:

- A decreasing trend is depicted for each well.
- For the entire performance monitoring period, exceedances of tetrachloroethene have been observed in well MW-4S.
- Tetrachloroethene was not an exceedance in well MW-17 in August 2002.

Deep Wells

A time-series graph was constructed for tetrachloroethene for 3 deep monitoring wells (MW-1D, MW-4S, and MW-19D). In summary the time- series graph for tetrachloroethene is as follows:

- An increasing trend is depicted for well MW-19D.
- A decreasing mixed is depicted for the MW-4D.
- No trend is depicted for MW-1D
- For the entire performance monitoring period, exceedances of tetrachloroethene have been observed in well MW-19D.

- For the entire performance monitoring period, levels of tetrachloroethene in well MW-1D have fluctuated between exceedances and nonexceedances.
- Since the October 2001 sampling event, exceedances of tetrachloroethene were not observed in well MW-4D.

Chromium Time-Series Graph

Shallow Wells

A time-series graph was constructed for chromium in 7 monitoring wells (MW-3S, MW-4S, MW-6S, MW-13, MW-14, MW-17, and MW-19S. Of these wells only MW-4S and MW-19S) had exceedances for chromium during the performance period. MW-19S is the only well outside of the predicted zone of capture.

- A slightly decreasing trend is depicted in wells MW-3S, MW-4S, MW-6S, and MW-17
- A slightly increasing trend is depicted in wells MW-13, MW-14, and MW-19S
- No exceedance of chromium was observed in well MW-4S during August 2002.
- A chromium exceedance was observed in well MW-19S during August 2002.

Deep Wells

A time-series graph was constructed for chromium in 7 monitoring wells (MW-1D, MW-3D, MW-4D, MW-5D, MW-6D, MW-7D, and MW-19D. Of these wells, MW-1D, MW-3D, MW-6D, and MW-19D had exceedances for chromium during the performance period.

- A slightly decreasing trend is depicted in wells MW-1D and MW-5D
- A slightly increasing trend is depicted in wells MW-3D, MW-4D, MW-6D, MW-7D, and MW-19D
- No exceedances of chromium were observed in wells MW-3D, MW-4D, MW-5D, and MW-7D during August 2002.
- Chromium exceedances were observed in wells MW-1D, MW-6D, and MW-19D during August 2002.

Manganese Time-Series Graph

Shallow Wells

A time-series graph was constructed for manganese in 5 monitoring wells (MW-1S, MW-14, MW-15, MW-16, and MW-19S). Each well is located within the predicted zone of capture with the exception of MW-19S.

- A slightly decreasing is depicted for four of the wells.
- A steady trend is depicted for MW-1S.
- As of August 2002, exceedances of manganese are still observed in each well.

Deep Wells

A time-series graph was constructed for manganese in 7 monitoring wells (MW-1D, MW-3D, MW-4D, MW-5D, MW-6D, MW-7D, and MW-19D. Of these wells, MW-3D, MW-5D, and MW-19D had exceedances for manganese during the performance period.

- A slightly decreasing trend is depicted in wells MW-1D, MW-3D, and MW-6D
- A slightly increasing trend is depicted in wells MW-4D, MW-5D, MW-7D, and MW-19D
- No exceedances of manganese were observed in wells MW-1D, MW-3D, MW-4D, MW-6D, and MW-7D during August 2002.
- Manganese exceedances were observed in wells MW-5D and MW-19D during August 2002.

Iron Time-Series Graph

Shallow Wells

A time-series graph was constructed for iron in 7 monitoring wells (MW-3S, MW-4S, MW-6S, MW-13, MW-14, MW-17, and MW-19S). Each well is located within the predicted zone of capture with the exception of MW-19S.

- A slightly decreasing trend is depicted for four wells (MW-3S, MW-4S, MW-13, and MW-17.
- A slightly increasing trend is depicted for one well (MW-6S).
- No trend is depicted in two wells (MW-14 and MW-19).
- As of August 2002, exceedances of manganese are still observed in five wells (MW-3S, MW-13, MW-14, MW-17, MW-19S)

Deep Wells

A time-series graph was constructed for iron in 7 monitoring wells (MW-1D, MW-3D, MW-4D, MW-5D, MW-6D, MW-7D, and MW-19D. Each well had exceedances for iron during the performance period.

- A slightly decreasing trend is depicted in wells MW-1D, MW-4D, MW-5D, MW-6D, and MW-7D
- A slightly increasing trend is depicted in wells MW-3D and MW-19D
- No exceedance of iron was observed in well MW-7D during August 2002.
- Iron exceedances were observed in the remaining 6 wells during August 2002.

Chromium vs. Turbidity Time-Series Graph

Time-series graph were constructed for five shallow and deep well pairs to assess any relationship between chromium levels to turbidity field measurements. The well pairs include MW-1S/MW-1D, MW-3S/MW-3D, MW-4S/MW-4D, MW-6S/MW-6D, and

MW-19S/MW-19D. The time-series graphs are presented in Appendix C. In summary they depict the following:

- No correlation is depicted between the chromium concentrations and turbidity measurements in wells MW-1S, MW-3S, MW-4S, and MW-4D.
- A partial correlation is depicted between the chromium concentrations and turbidity measurements in wells MW-6S, MW-19S, and MW-1D.
- A strong correlation is depicted between the chromium concentrations and turbidity measurements in wells MW-3D, MW-6D, and MW-19D.

This section presents a summary the findings and conclusions for this Annual Performance Evaluation in terms of ground water flow and ground water quality. Each is discussed below.

5.1 GROUND WATER FLOW

Compared to the baseline ground water flow pattern, the overall ground water flow pattern and gradients under pumping conditions for the upper portion of the Upper Glacial Aquifer has changed as a result of the GWTP. Ground water flow paths within the predicted zone of capture are flowing toward one of the three extraction wells and; therefore, shallow ground water located within the Predicted Zone of Capture is being captured for treatment. The ground water contours also indicate that the Actual Zone of Capture may extend beyond the Predicted Zone of Capture to include wells MW-16 and MW-7S.

5.2 GROUND WATER QUALITY

Elevated levels of the following contaminants are still being observed in the shallow wells located both within and outside the Predicted Zone of Capture:

- 1,1,1-Trichloroethane,
- Tetrachloroethene,
- Trichloroethene,
- Chromium,
- Iron, and
- Manganese.

One shallow well MW-19S located outside of the predicted zone of capture had consistent organic exceedances for during the performance monitoring period. Two shallow wells MW-16 and MW-19S located outside of the predicted zone of capture had consistent inorganic exceedances for iron and manganese during the performance monitoring period. Iron and manganese exceedances were consistently detected during the monitoring period in wells located both inside and outside the Predicted Zone of Capture. Based on historical data (Weston, 1994) for the site, these detections believed to be indigenous to the area and likely represent background conditions.

Chromium exceedances were detected inconsistently in one shallow well MW-19S located outside of the Predicted Zone of Capture and consistently in one shallow well MW-4S located inside the Predicted Zone of Capture during the performance monitoring period. In comparison to shallow well detections, the chromium levels detected in seven deep wells (MW-1D, MW-3D, MW-4D, MW-6D, MW-7D, and MW-19D) were generally higher. These results suggest that the detections in the shallow wells are site-related while those in deep wells may be from an off-site source.

Despite continued exceedances in wells as of August 2002, the time-series graphs indicate the numerous wells have decreased concentrations over time. Overall, organic concentrations have decreased in a majority of the shallow wells at the site during the performance monitoring period. These decreases are attributable to the successful operation of the GWTP.

In contrast, inorganic concentrations have decreased slightly or have shown relatively little change in numerous shallow wells at the site during the performance monitoring period. This may be due in part to elevated inorganic levels being indigenous to the area as is believed to be the case for iron and manganese. However, elevated turbidity levels may also be affecting inorganic levels as is the case for the chromium concentrations is some of the wells. Therefore the effectiveness of the GWTP in remediating the inorganics in the shallow aquifer is unclear at this time. The organic and inorganic exceedances detected in the deep wells have not decreased over time and are believed to be unrelated to the site either as from an upgradient, off-site source or as background conditions.

Continued operation of the GWTP under the current pumping conditions and performance monitoring is recommended for the Circuitron site for the following reasons:

- Organic and inorganic MCL exceedances are still being observed in the shallow monitoring wells at the site.
- The effectiveness, if any, of the GWTP in remediating the inorganics from the ground water is uncertain at this time.

Radian International, July 13, 1999, Final Report OU#2 Ground Water Investigation Report, Circuitron Corporation, East Farmingdale, New York.

URS Corporation, September 6, 2000, Operation and Maintenance Manual, Groundwater Treatment System, Circuitron Corporation, East Farmingdale, New York.

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TABLES

Table 3.1
Summary of Ground Water Elevations
for August 2002
Circuitron Corporation Superfund Site

Well ID	Easting	Northing	Top of Inner Casing Reference Elevation (ft-msl)	Depth to Water[(a)] (ft-bgs)	Ground Water Elevation (ft-msl)
MW-1S	1145191.1395	213157.4522	86.82	33.80	53.02
MW-1D	1145200.5141	213156.8693	86.94	33.90	53.04
MW-3S	1145410.4339	212933.0337	88.15	35.30	52.85
MW-3D	1145411.2450	212924.7554	88.37	35.80	52.57
MW-4S	1145196.1723	212880.5551	86.71	33.30	53.41
MW-4D	1145205.0573	212881.7610	86.79	33.80	52.99
MW-5S	1145417.216	212746.7536	NA	NM	NA
MW-5D	1145417.9081	212757.5194	86.75	34.40	52.35
MW-6S	1145203.7380	212757.7764	86.09	33.60	52.49
MW-6D	1145192.2976	212575.7764	86.19	33.90	52.29
MW-7S	1145663.6576	212517.2975	89.51	36.30	53.21
MW-7D	1145685.3999	212521.5576	90.06	37.80	52.26
MW-13	1145238.0000	212763.0000	85.35	33.50	51.85
MW-14	1145287.0000	212179.0000	85.28	34.50	50.78
MW-15	1145077.9473	212857.7582	84.45	31.85	52.60
MW-16	1145032.7702	212544.9619	84.60	32.40	52.20
MW-17	1145374.6340	212522.8607	87.68	35.60	52.08
MW-18	1145198.8637	211773.5779	87.60	36.60	51.00
MW-19S	1145396.0000	211710.0000	87.70	38.10	49.60
MW-19D	1145416.0000	211722.0000	87.70	38.10	49.60

(a) - Depth to water measurements collected under pumping conditions.
NA - not applicable
NM - no measurement

Table 4-1 Confirmed NYSDEC GQS Exceedances in Performance Monitoring Wells Located Outside of the Predicted Zone of Capture

Parameters		MW-7S							
		06/20/2000	10/17/2000	01/31/2001	04/24/2001	08/01/2001	10/24/2001	01/30/2002	08/08/2002
Volatiles (µg/L)	**NYSDEC GQS (µg/L)**								
Methylene Chloride	5	ND	ND	2.0 JB	ND	ND	**11.0 B**	---	ND
Total Metals (µg/L)									
Iron	300	***912 J***	NS	***498***	NS	ND	NS	---	***1290***
Manganese	300	245	NS	155	NS	1.4	NS	---	ND
Chromium	50	***57.3***	NS	49.4 J	NS	ND	NS	---	ND

An unconfirmed NYSDEC GQS Exceedance is designated as a **bolded** concentration and occurs when only one exceedance for a given constituent has occurred during the Performance Monitoring Period.
A confirmed NYSDEC GQS Exceedance is designated as **bolded**, *italicized*, and underlined concentration and occurs when there are two or more exceedances for a given constituent during the Performance Monitoring Period.
--- Well was dry during the sampling event
NS - not sampled
ND - undetected

Table 4-1 Confirmed NYSDEC GQS Exceedances in Performance Monitoring Wells Located Outside of the Predicted Zone of Capture

Parameters		MW-16							
		06/20/2000	10/10/2000	01/31/2001	04/26/2001	08/02/2001	10/25/2001	02/05/2002	08/06/2002
Volatiles (µg/L)	**NYSDEC GQS (µg/L)**								
Methylene Chloride	5	ND	ND	ND	ND	ND	1.0 JB	ND	ND
Total Metals (µg/L)									
Iron	300	***33700 J***	NS	***25200***	NS	***25400 J***	NS	***24600 J***	***58400***
Manganese	300	***524***	NS	***426***	NS	***430***	NS	***363***	***438***
Chromium	50	6.9	NS	3.6 J	NS	ND	NS	4.4	43.6

An unconfirmed NYSDEC GQS Exceedance is designated as a **bolded** concentration and occurs when only one exceedance for a given constituent has occurred during the Performance Monitoring Period.

A confirmed NYSDEC GQS Exceedance is designated as **bolded**, *italicized*, and underlined concentration and occurs when there are two or more exceedances for a given constituent during the Performance Monitoring Period.

--- Well was dry during the sampling event

NS - not sampled

ND - undetected

Table 4-1 Confirmed NYSDEC GQS Exceedances in Performance Monitoring Wells Located Outside of the Predicted Zone of Capture

Parameters		MW-18							
		06/22/2000	10/18/2000	02/06/2001	05/01/2001	08/08/2001	10/29/2001	02/05/2002	08/07/2002
Volatiles (µg/L)	**NYSDEC GQS (µg/L)**								
Methylene Chloride	5	ND	ND	2.0 JB	***<u>7.0</u>***	ND	***<u>10.0B</u>***	ND	ND
Total Metals (µg/L)									
Iron	300	***<u>9060</u>***	NS	***<u>13500</u>***	NS	***<u>905</u>***	NS	***<u>1170 J</u>***	***<u>1100</u>***
Manganese	300	164	NS	269	NS	15.4	NS	16.6	23.4
Chromium	50	31.2	NS	**80**	NS	3.2 J	NS	5.3	6.7

An unconfirmed NYSDEC GQS Exceedance is designated as a **bolded** concentration and occurs when only one exceedance for a given constituent has occurred during the Performance Monitoring Period.

A confirmed NYSDEC GQS Exceedance is designated as **bolded**, *italicized* , and <u>underlined</u> concentration and occurs when there are two or more exceedances for a given constituent during the Performance Monitoring Period.

--- Well was dry during the sampling event

NS - not sampled

ND - undetected

Table 4-1 Confirmed NYSDEC GQS Exceedances in Performance Monitoring Wells Located Outside of the Predicted Zone of Capture

Parameters		MW-19S							
		06/21/2000	10/17/2000	02/06/2001	05/02/2001	08/08/2001	10/25/2001	02/05/2002	08/08/2002
Volatiles (µg/L)	**NYSDEC GQS (µg/L)**								
Methylene Chloride	5	ND	***14 .0B***	***12 .0B***	***6.0***	ND	***9 .0B***	ND	ND
Total Metals (µg/L)									
Iron	300	***21600***	NS	***29400***	NS	***15400***	NS	***26000 J***	***18600***
Manganese	300	***2100***	NS	***1050***	NS	***786***	NS	***966***	***683***
Chromium	50	***96.6***	NS	36.5	NS	ND	NS	40.2	***121***

An unconfirmed NYSDEC GQS Exceedance is designated as a **bolded** concentration and occurs when only one exceedance for a given constituent has occurred during the Performance Monitoring Period.

A confirmed NYSDEC GQS Exceedance is designated as **bolded**, *italicized*, and underlined concentration and occurs when there are two or more exceedances for a given constituent during the Performance Monitoring Period.

--- Well was dry during the sampling event

NS - not sampled

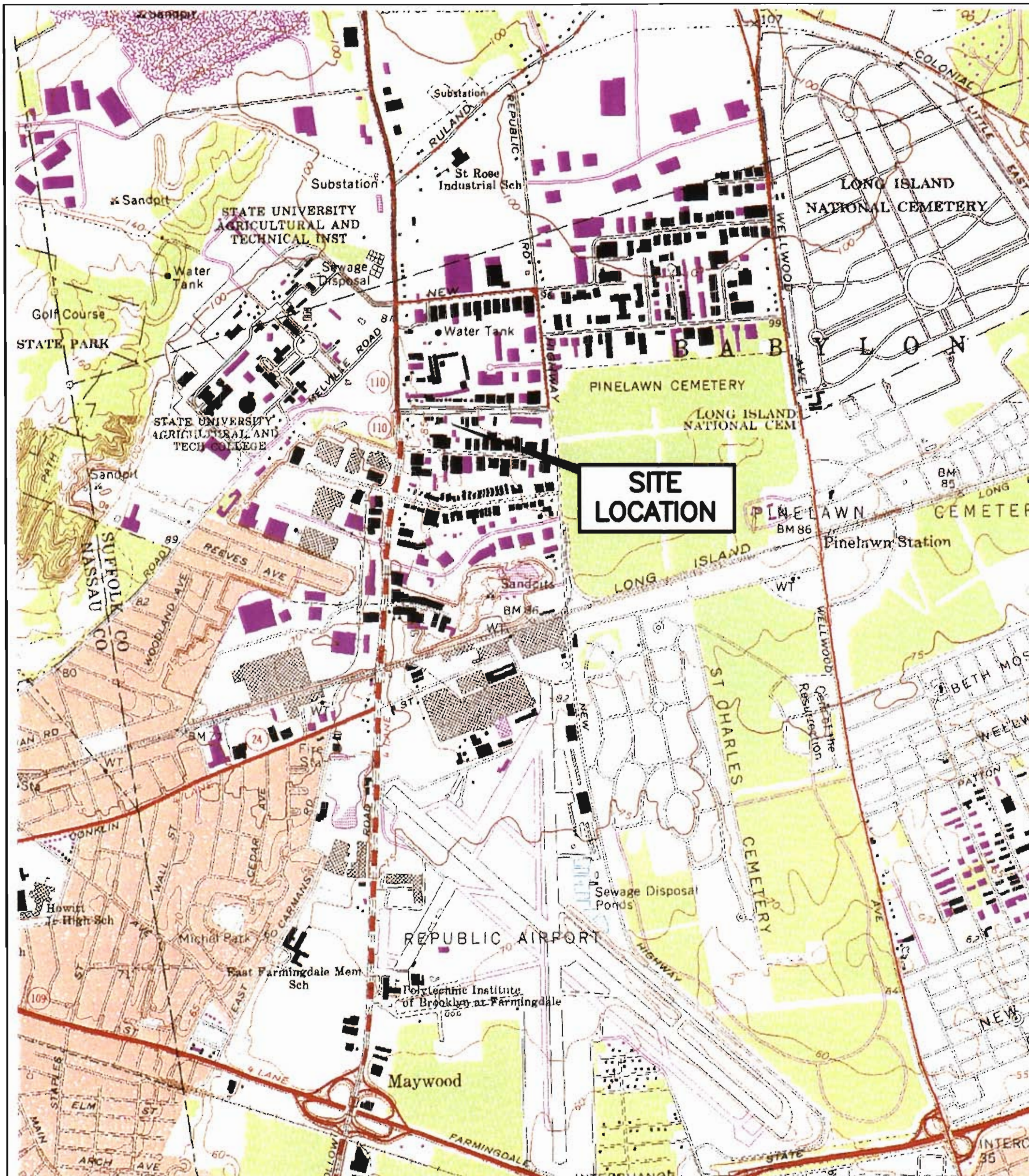
ND - undetected

Table 4-2
Summary of Chromium Detections and Turbidity Measurements in Ground Water and Plant Influent for the Period from June 2000 to August 2002 Circuitron Corporation Superfund Site

Well No.	Well Depth (ft.-bgs)	Jun-00 Chromium (µg/L)	Jun-00 Turbidity (NTU)	Jan-01 Chromium (µg/L)	Jan-01 Turbidity (NTU)	Jul-01 Chromium (µg/L)	Jul-01 Turbidity (NTU)	Jan-02 Chromium (µg/L)	Jan-02 Turbidity (NTU)	Aug-02 Chromium (µg/L)	Aug-02 Turbidity (NTU)
MW-1S	35	25.0	229	25.0	27	25.0	0.1	25.0	33	25.0	0
MW-1D	100	567	36	255	580	25.0	0	55.7	35	153	0
MW-3S	38	25.0	57	25.0	47	25.0	0	25.0	13	25.0	10
MW-3D	100	86	23	25.0	2	25.0	0	212	114	51	4
MW-4S	34	674	311	114	0	1110	0	90.8	15	NS	NS
MW-4D	100	25.0	11.8	25.0	0	25.0	0	25.0	4	25.0	1
MW-5D	100	159	0	25.0	11	25.0	0.1	25.0	2	25.0	0
MW-6S	34	458	0	78	0	25.0	0	836	26	NS	NS
MW-6D	100	57	0	157	0	25.0	0.1	378	27	479	73
MW-7S	37	25.0	0	25.0	190	25.0	0	NS	NS	NS	NS
MW-7D	200	25.0	0	25.0	10	25.0	0	25.0	19	25.0	0
MW-13	42	25.0	200	25.0	0	25.0	0.1	25.0	23	25.0	110
MW-14	43	25.0	75	25.0	0	25.0	0	25.0	26	25.0	0
MW-15	40	25.0	0	25.0	190	25.0	0.1	25.0	19	25.0	0
MW-16	40	25.0	133	25.0	47	25.0	0	25.0	26	25.0	97
MW-17	40	25.0	16	25.0	35	25.0	0.1	25.0	18	25.0	0
MW-18	40	25.0	247	80	0	25.0	0	25.0	16	25.0	0
MW-19S	45	97	65	25.0	0	25.0	0.1	25.0	62	121	0
MW-19D	85		238	25.0	0	25.0	0.1	86.4	659	56	250
Plant Influent	55**	25.0	NS	25.0	NS	25.0	NS	25.0	NS	25.0	NS

**: Depth of Extraction Wells
NS: Not Sampled

FIGURES



0 2000 4000

SCALE (FEET)

N

MAP SOURCE:

U.S.G.S. 7.5 MINUTE SERIES QUADRANGLES OF HUNTINGTON, N.Y., DATED 1967, PHOTOREVISED 1979 AND AMITYVILLE, N.Y. DATED 1969, PHOTOREVISED 1979.

SITE LOCATION MAP.
CIRCUITRON CORPORATION SUPERFUND SITE
EAST FARMINGDALE, NEW YORK

URS
WAYNE, NEW JERSEY

DR. BY	JL	SCALE	AS SHOWN	DWG. NO. 83807010		PROJ. NO. 19683807	
CK'D. BY	BB		DATE	DEC 17, 2002	FIG. NO.	1-1	

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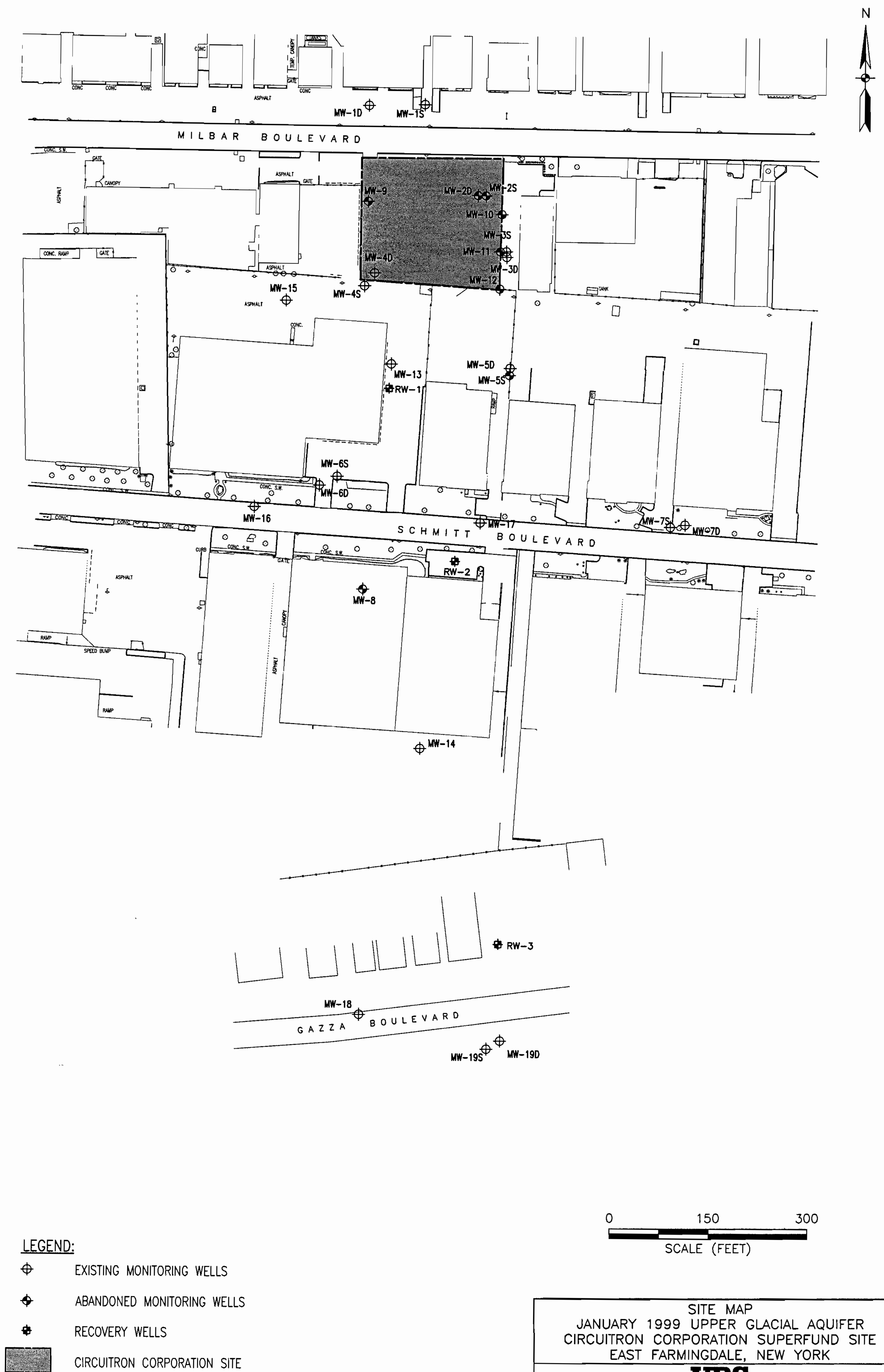

SITE MAP
JANUARY 1999 UPPER GLACIAL AQUIFER
CIRCUITRON CORPORATION SUPERFUND SITE
EAST FARMINGDALE, NEW YORK

URS
WAYNE, NEW JERSEY

DR. BY	ET	SCALE	AS SHOWN	DWG. NO. 83807009	PROJ. NO. 19683807
CK'D. BY	BB	DATE	DEC. 5, 2002	FIG. NO.	1-2

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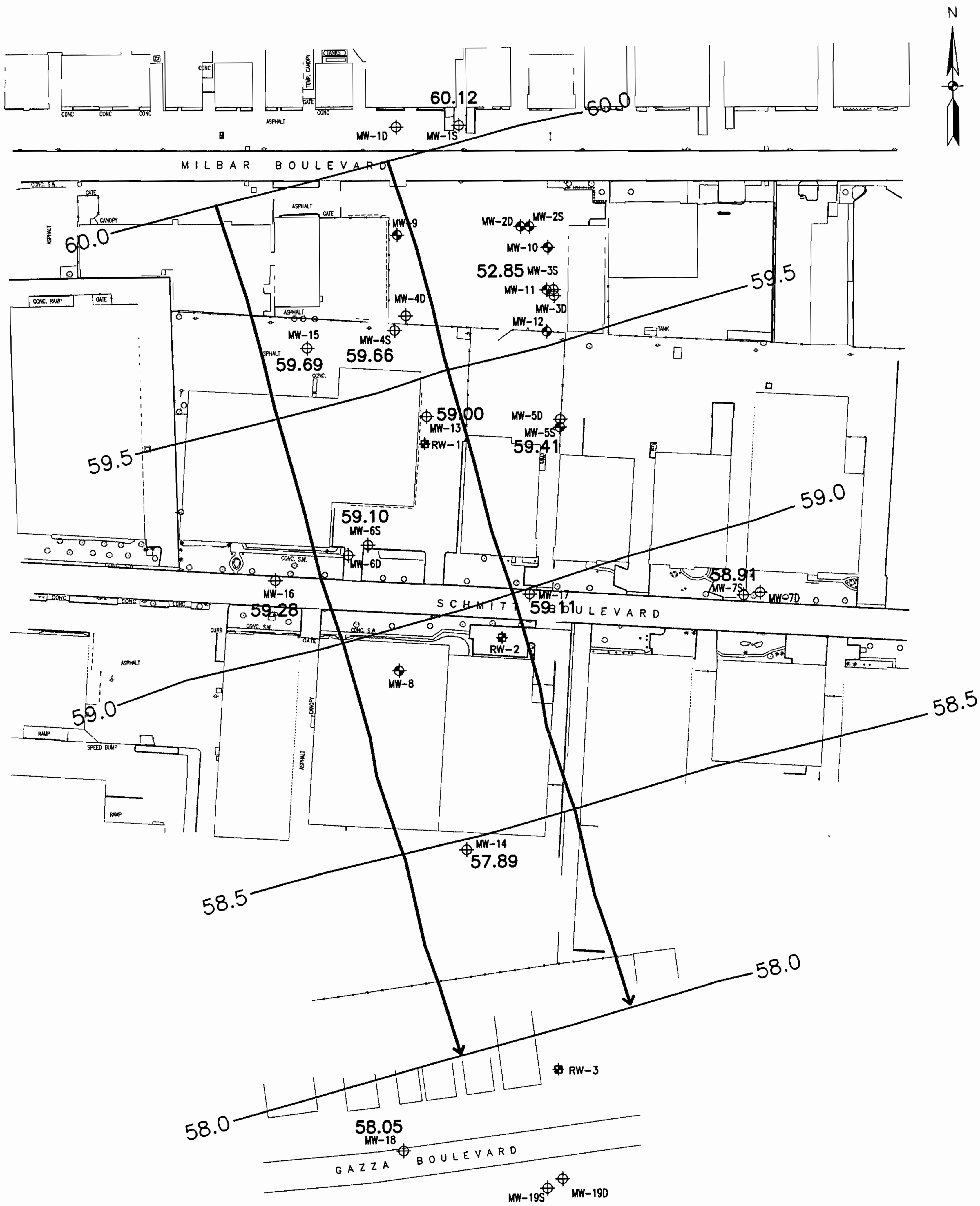

LEGEND:

- EXISTING MONITORING WELLS
- ABANDONED MONITORING WELLS
- RECOVERY WELLS
- 58.5 58.5 GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION

0 150 300
SCALE (FEET)

GROUND WATER CONTOUR MAP JANUARY 1999 UPPER GLACIAL AQUIFER CIRCUITRON CORPORATION SUPERFUND SITE EAST FARMINGDALE, NEW YORK					
URS WAYNE, NEW JERSEY					
DR. BY	ET	SCALE	AS SHOWN	DWG. NO. 83807003	PROJ. NO. 19683807
CK'D. BY	BB	DATE	DEC. 5, 2002	FIG. NO.	3-1

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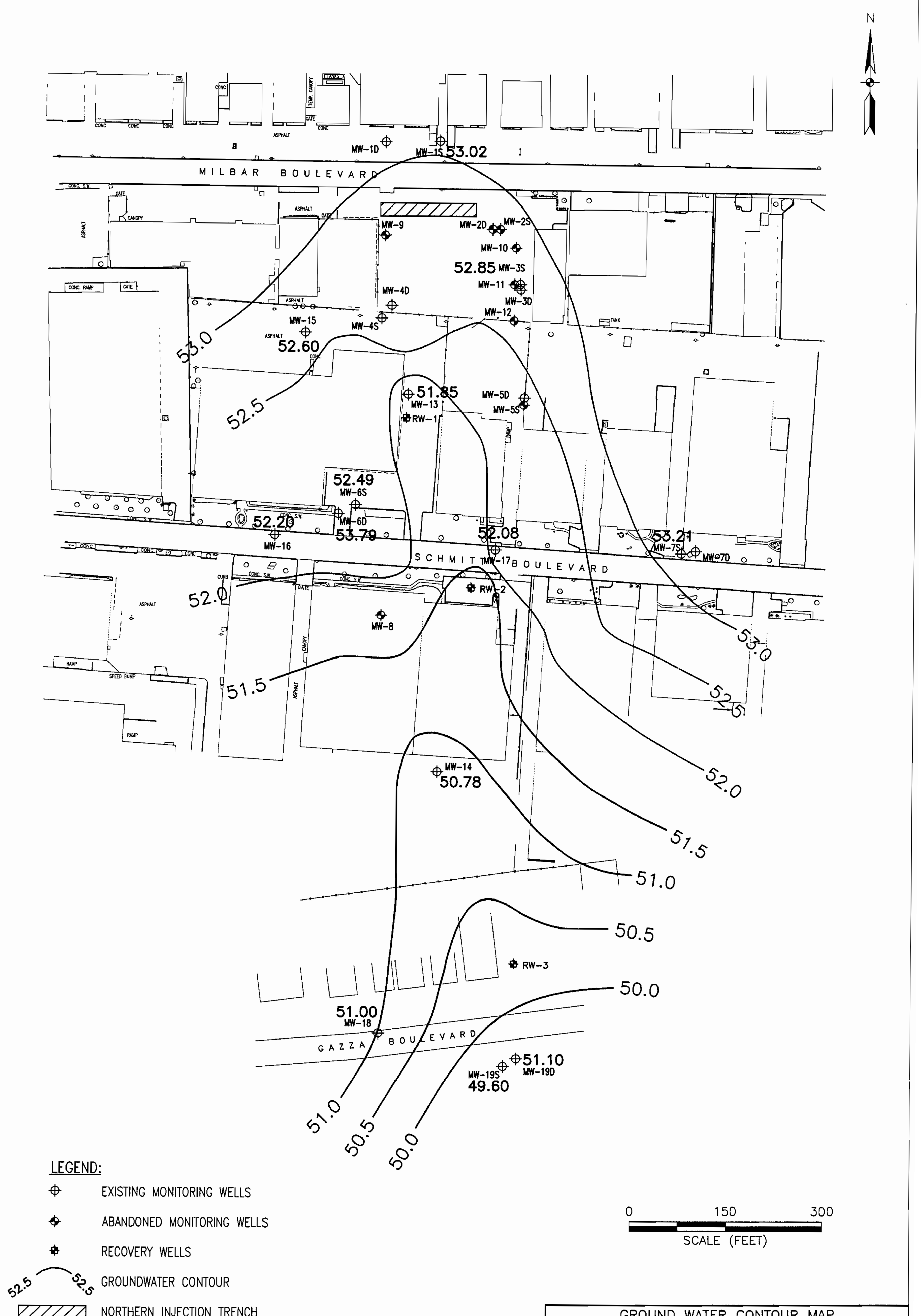

GROUND WATER CONTOUR MAP FOR THE UPPER GLACIAL AQUIFER CIRCUITRON CORPORATION SUPERFUND SITE EAST FARMINGDALE, NEW YORK					
URS WAYNE, NEW JERSEY					
DR. BY	ET	SCALE	AS SHOWN	DWG. NO. 83807002	PROJ. NO. 19683807
CK'D. BY	BB	DATE	DEC. 5, 2002	FIG. NO.	3-2

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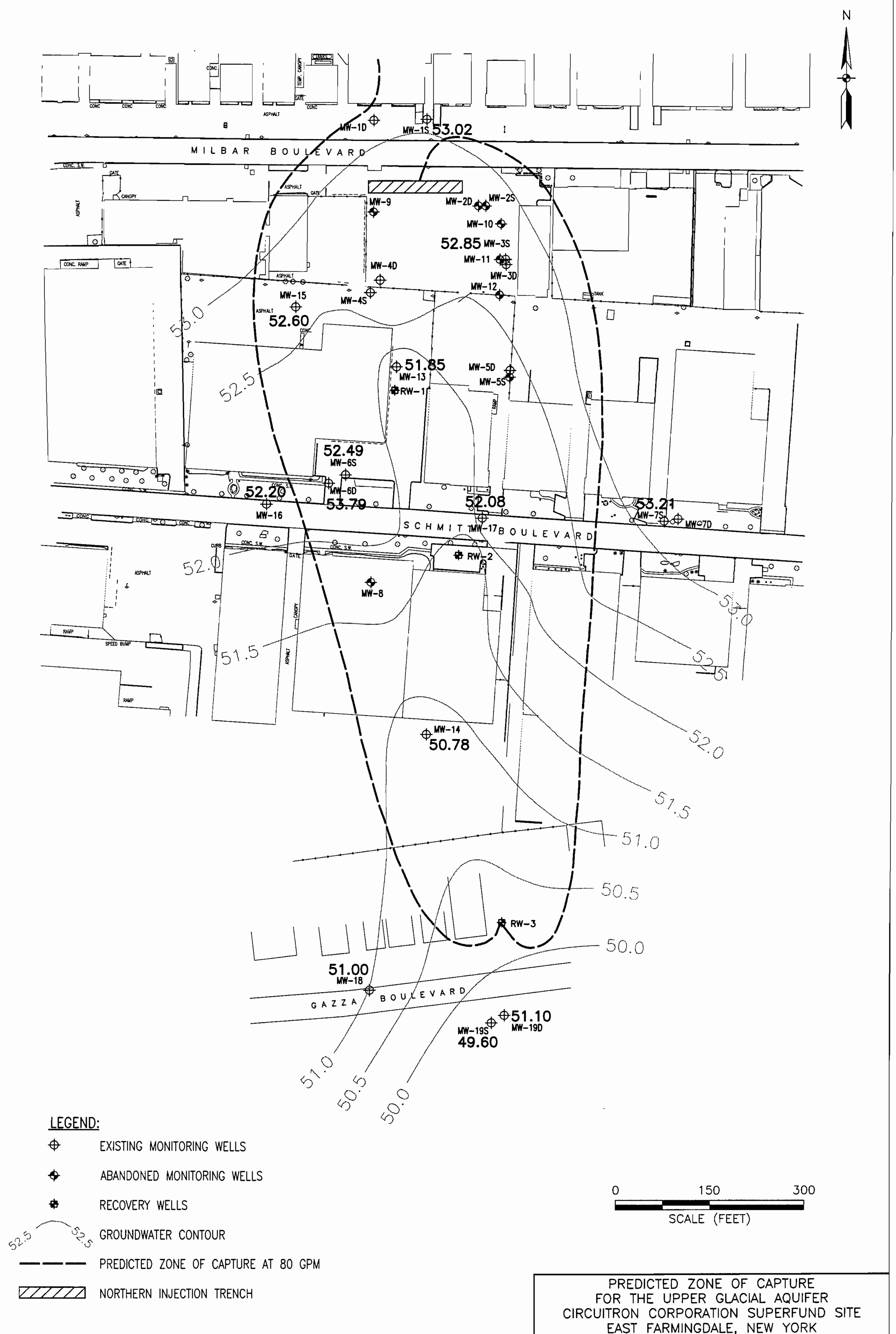

PREDICTED ZONE OF CAPTURE
FOR THE UPPER GLACIAL AQUIFER
CIRCUITRON CORPORATION SUPERFUND SITE
EAST FARMINGDALE, NEW YORK

URS
WAYNE, NEW JERSEY

DR. BY	ET	SCALE	AS SHOWN	DWG. NO. 83807001		PROJ. NO. 19683807	
CK'D. BY	BB	DATE	DEC. 5, 2002	FIG. NO.	3-3		

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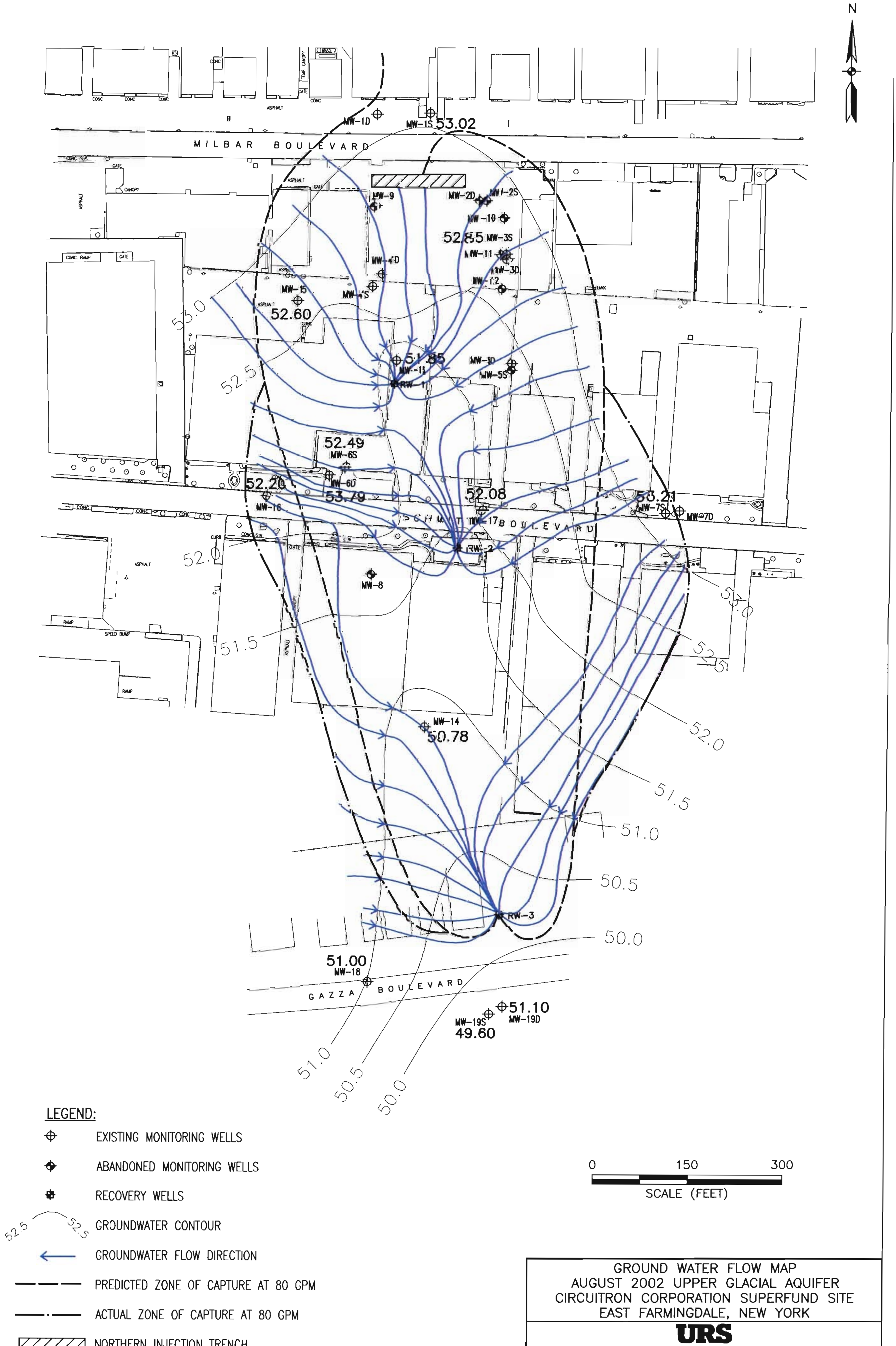

GROUND WATER FLOW MAP AUGUST 2002 UPPER GLACIAL AQUIFER CIRCUITRON CORPORATION SUPERFUND SITE EAST FARMINGDALE, NEW YORK							
URS WAYNE, NEW JERSEY							
DR. BY	ET	SCALE	AS SHOWN	DWG. NO. 83807004		PROJ. NO. 19683807	
CK'D. BY	BB		DATE	DEC. 5, 2002		FIG. NO.	3-4

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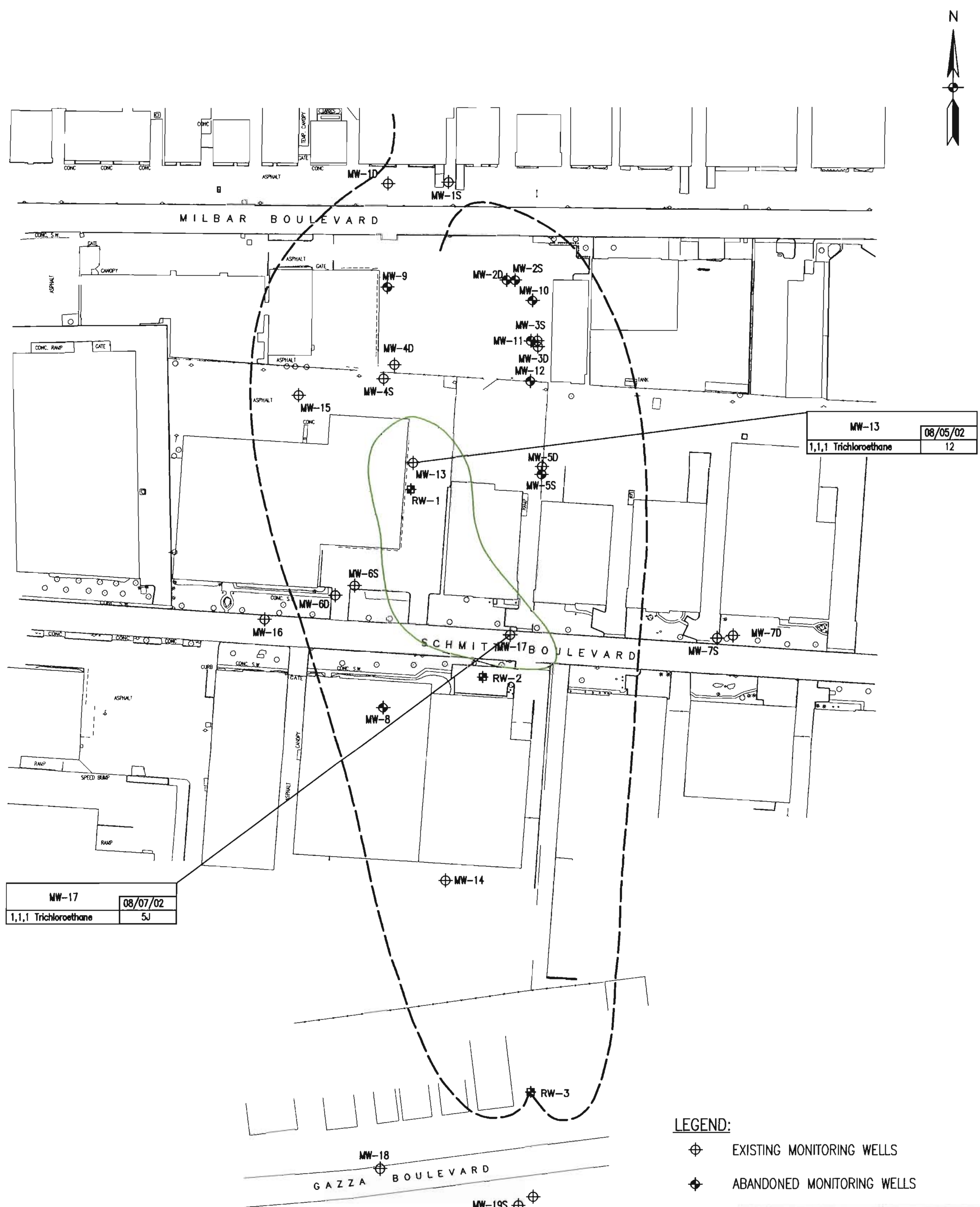

MW-13	08/05/02
1,1,1 Trichloroethane	12

MW-17	08/07/02
1,1,1 Trichloroethane	5J

LEGEND:

- EXISTING MONITORING WELLS
- ABANDONED MONITORING WELLS
- RECOVERY WELLS
- 1,1,1 TRICHLOROETHANE
- TETRACHLOROETHENE
- TRICHLOROETHENE
- PREDICTED ZONE OF CAPTURE AT 80 GPM

0 150 300
SCALE (FEET)

NY Water Quality Criteria

Volatiles	(μg/L)
1,1 Dichloroethane	5
1,1 Dichloroethene	5
1,1,1 Trichloroethane	5
1,2 Dichloroethene (total)	5
Chloroform	7
Methylene Chloride	5
Tetrachloroethene	5
Toluene	5
Trichloroethene	5

Notes:
All values are in μg/L
Only those compounds detected above the NY Water Quality Criteria are displayed.
D: Results are reported for the diluted samples
J: Associated value is an estimated quantity
B: The Compound was detected in the blank sample
E: Compound was detected beyond the calibration range and was subsequently analyzed at a dilution
NY Water Quality Criteria: NYSDEC Regulation for Surface Waters and Groundwater, Section 703.5 (August 1999)

VOC CONSTITUENT PLUME
AUGUST 2002 IN THE UPPER GLACIAL AQUIFER
CIRCUITRON CORPORATION SUPERFUND SITE
EAST FARMINGDALE, NEW YORK

URS
WAYNE, NEW JERSEY

DR. BY	ET	SCALE	AS SHOWN	DWG. NO. 83807005	PROJ. NO. 19683807
CK'D. BY	BB	DATE	DEC. 5, 2002	FIG. NO.	4-1

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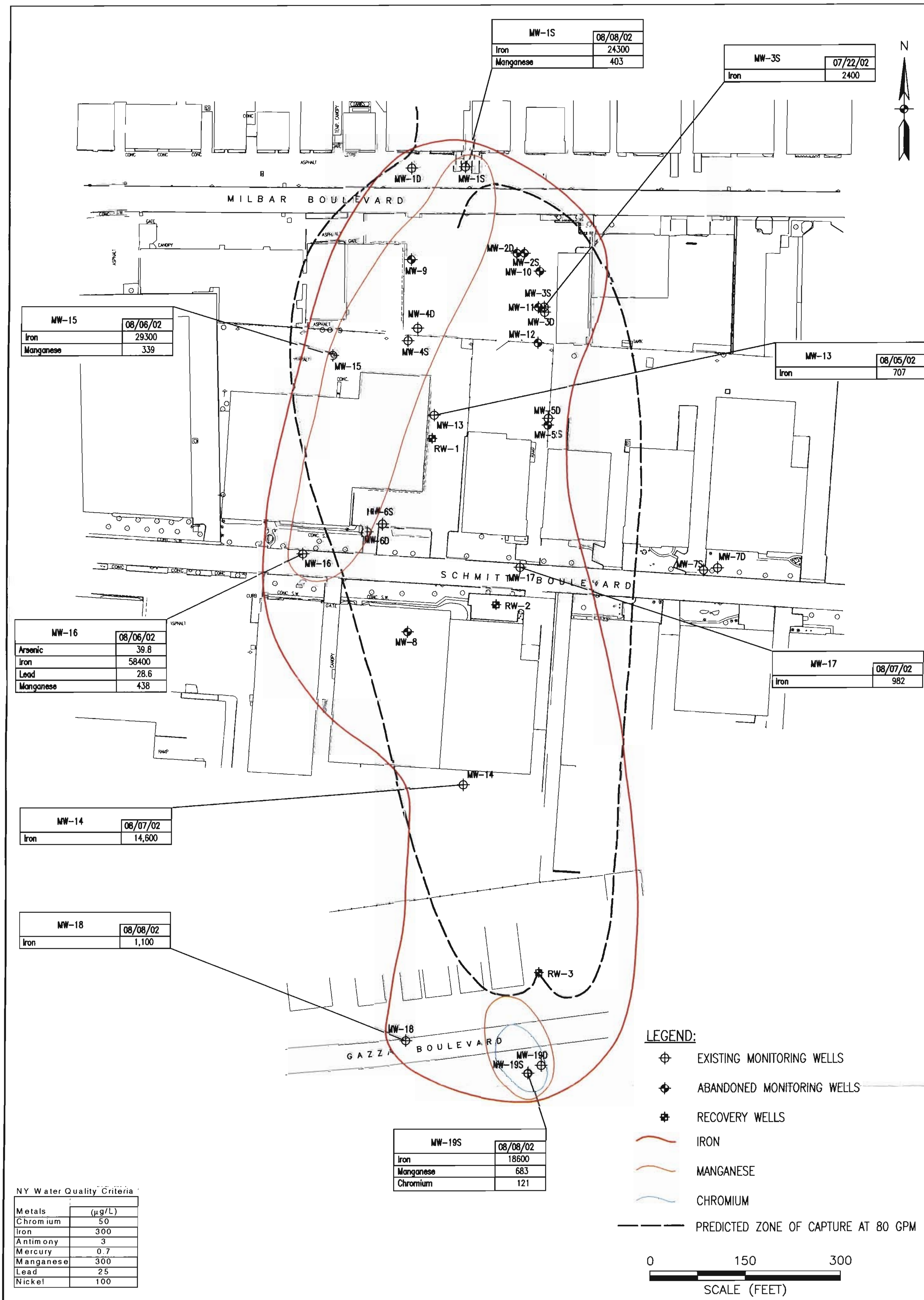

NY Water Quality Criteria

Metals	(µg/L)
Chromium	50
Iron	300
Antimony	3
Mercury	0.7
Manganese	300
Lead	25
Nickel	100

Notes:
All values are in µg/L
Only those compounds detected above the NY Water Quality Criteria are displayed.
D: Results are reported for the diluted samples
J: Associated value is an estimated quantity
B: The Compound was detected in the blank sample
E: Compound was detected beyond the calibration range and was subsequently analyzed at a dilution
NY Water Quality Criteria: NYSDEC Regulation for Surface Waters and Groundwater, Section 703.5 (August 1999)

TOTAL METALS PLUMES
IN THE UPPER GLACIAL AQUIFER–AUGUST 2002
CIRCUITRON CORPORATION SUPERFUND SITE
EAST FARMINGDALE, NEW YORK

URS
WAYNE, NEW JERSEY

DR. BY	ET	SCALE	AS SHOWN	DWG. NO. 83807006	PROJ. NO. 19683807
CK'D. BY	BB	DATE	DEC. 5, 2002	FIG. NO.	4-2

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APPENDIX A

MW-1S

Sampling Date	06/14/2000	10/12/2000	01/29/2001	05/01/2001	07/30/2001	10/23/2001	01/30/2002	08/08/2002
Volatiles (µg/L)								
Methylene Chloride	5 B		2 JB	< 5	4 J	4 JB	**8 B**	< 5
Toluene	<5							< 5
Chloroform	<5							< 5
1,1 Dichloroethane	<5	< 5	< 5	< 5	5 J	< 5	< 5	< 5
1,1,1 Trichloroethane	<5	< 5	< 5	< 5	**15**	< 5	< 5	<5
Tetrachloroethene	<5	< 5	< 5	< 5	**8**	< 5	< 5	< 5
Trichloroethene	<5	< 5	< 5	< 5	**12**	< 5	< 5	< 5
1,2 Dichloroethene (Total)	<5	< 5		< 5	2 J	< 5	< 5	< 5
1,1 Dichloroethene	<5	< 5	< 5	< 5	**10**	< 5	< 5	< 5
1,1,2 Trichloroethane								< 5
Chloromethane								< 5
Acetone	11 B		3 JB	< 10				< 5
Turbidity (NTU)	**229**		**27**	0	0.1		**33.1**	0
Total Metals (µg/L)								
Iron	**19400**		**31200**		**22000**		**20000**	**24300**
Manganese	**393**		**559**		**429**		**366**	**403**
Arsenic	12.1		18.5		8.2		6.0	11.1
Beryllium	<0.10		0.37 J		< 0.20		< 0.10	< 0.22
Chromium	2.2		2.2 J		1.2		3.3	<3.1
Copper	7.3		1.9		1.3		3.3	<0.30
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.10
Nickel	2.2		2.2		< 1.2		3.0	<4.1
Lead	<2.3 UJ		< 2.1		< 2.6		2.5	< 1.7
Antimony	<2.2		< 2.3		2.2 J		< 1.9	< 2.2

MW-1D

Sampling Date	06/14/2000	10/12/2000	01/29/2001	05/01/2001	07/30/2001	10/23/2001	01/30/2002	08/08/2002
Volatiles (µg/L)								
Methylene Chloride	4 JB		4 JB	< 5	**7 J**	5 B	**10 B**	< 5
Toluene	<5							< 5
Chloroform	<5							< 5
1,1 Dichloroethane	5 J	**5 J**	4 J	4 J	< 5	4 J	4 J	4J
1,1,1 Trichloroethane	**16**	**14**	**13**	**13**	< 5	**16**	**14**	**12**
Tetrachloroethene	5 J	**6**	4 J	5	< 5	5	**6**	5
Trichloroethene	**13**	**15**	**10**	**10**	< 5	**11**	**11**	**12**
1,2 Dichloroethene (Total)	1 J	2 J		1 J	< 5	1 J	1 J	2J
1,1 Dichloroethene	**9**	**10**	**7**	**8**	< 5	**10**	**11**	**10**
1,1,2 Trichloroethane								< 5
Chloromethane								< 5
Acetone	8 JB		3 JB	< 10				< 5
Turbidity (NTU)	**35.5**		**580**	0	0.0		**34.7**	0
Total Metals (µg/L)								
Iron	**3020**		**1110**		**302**		**456**	**1170**
Manganese	211		177		138		149	160
Arsenic	<3.2		< 2.4		< 2.3		< 3.0	< 2.5
Beryllium	0.14		0.14 J		< 0.20		< 0.10	< 0.24
Chromium	**567**		**255 J**		34.9		**55.7**	**153**
Copper	16.6		13.4		5.9		7.2	4.9
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.10
Nickel	52		88.2		16.0		10.8	38.3
Lead	7.6 UJ		< 2.1		< 2.6		4.0	< 2.2
Antimony	<2.2		< 2.3		< 1.9		< 1.9	< 2.2

MW-3S

Sampling Date	06/13/2000	10/19/2000	01/31/2001	04/30/2001	07/31/2001	10/22/2001	01/29/2002	07/22/2002
Volatiles (µg/L)								
Methylene Chloride	5 B	< 5	< 5	< 5	4 J	5 JB	3 J	< 5
Toluene	<5							< 5
Chloroform	<5	< 5						< 5
1,1 Dichloroethane	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,1 Trichloroethane	4 J	**10**	5	**7**	4 J	3 J	3 J	5J
Tetrachloroethene	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trichloroethene	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2 Dichloroethene (Total)	<5				< 5	< 5	< 5	< 5
1,1 Dichloroethene	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2 Trichloroethane		< 5						< 5
Chloromethane				< 10				< 5
Acetone	11 B	3 JB	< 10	< 10				< 5
Turbidity (NTU)	**57.4**		**47**	4	0.0		**13.3**	**10.0**
Total Metals (µg/L)								
Iron	**4460**		**3160**		**885**		**1290**	**2400**
Manganese	56.8		100		36.7		33.7	79.9
Arsenic	3.4		< 3.4		< 2.3		< 3.0	< 2.5
Beryllium	0.15		< 0.10		< 0.20		< 0.10	<0.22
Chromium	10.5		11.7 J		1.6		9.7	27.2
Copper	68.6		34.2		10.6		28.0	27.0
Mercury	<0.10		< 0.10		< 0.10		< 0.10	0.27
Nickel	12.4		19.4		4.4		10.6	23
Lead	11.6 J		< 2.1		< 2.6		< 2.2	5.0
Antimony	<2.2		< 2.3		< 1.9		< 1.9	**< 3.1**

MW-3D

Sampling Date	06/13/2000	10/19/2000	01/30/2001	04/30/2001	07/31/2001	10/22/2001	01/29/2002	07/22/2002
Volatiles (µg/L)								
Methylene Chloride	5 JB	< 5	4 JB	< 5	5 J	4 JB	**7**	< 5
Toluene	<5							< 5
Chloroform	<5	1 J						< 5
1,1 Dichloroethane	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,1 Trichloroethane	<5	1 J	1 J	< 5	< 5	1 J	1 J	1J
Tetrachloroethene	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trichloroethene	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2 Dichloroethene (Total)	<5				< 5	< 5	< 5	< 5
1,1 Dichloroethene	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2 Trichloroethane		< 5						< 5
Chloromethane				< 10				< 5
Acetone	<10	< 10	2 JB	4 J				< 5
Turbidity (NTU)	**23.3**		2	**21**	0.0		**114**	4
Total Metals (µg/L)								
Iron	**600**		176		105		**962**	**1080**
Manganese	144		**418**		269		197	206
Arsenic	<3.2		< 2.4		< 2.3		< 3.0	<3.6
Beryllium	<0.10		0.15 J		< 0.20		< 0.10	< 0.1
Chromium	**86.1**		7.1 J		2.3		**212**	**50.9**
Copper	10.3		3.9		3.2		17.9	14.9
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.10
Nickel	58.1		12.6		8.2		32.8	23
Lead	7.9 J		3.9		< 2.6		11.0	10.6
Antimony	<2.2		< 2.3		2.1 J		< 1.9	<2.5

MW-4S

Sampling Date	06/13/2000	10/11/2000	02/06/2001	04/30/2001	07/31/2001	10/22/2001	01/29/2002	08/08/2002
Volatiles (µg/L)		**10 X Dilution**	5 X Dilution	**2 X Dilution**		**2 X Dilution**	**2 X Dilution**	
Methylene Chloride	**6 B**		**41 BD**	< 10	< 5	**28 BD**	4 JBD	< 5
Toluene	<5		ND					< 5
Chloroform	<5		ND					< 5
1,1 Dichloroethane	**13**	**14 JD**	**7 JD**	**7 JD**	2 J	2 JD	4 JD	< 5
1,1,1 Trichloroethane	**900 E**	**860 D**	**630D**	**260 D**	**80**	**280 D**	**320 D**	5
Tetrachloroethene	**13**	**19 JD**	**14 JD**	**12 D**	**11**	**15 D**	**14 D**	< 5
Trichloroethene	<5	< 50	ND	< 10	< 5	< 10	< 10	< 5
1,2 Dichloroethene (Total)	<5	< 50	ND		< 5	< 10	< 10	< 5
1,1 Dichloroethene	**42**	**22 JD**	ND	< 5	< 5	3 JD	5 JD	< 5
1,1,2 Trichloroethane								< 5
Chloromethane				< 20				< 5
Acetone	8 JB		28 JBD	< 20				< 5
Turbidity (NTU)	**311**		0	**12**	0.0		**15.1**	NS
Total Metals (µg/L)								
Iron	**3720**		**632**		**3740**		**430**	**1290**
Manganese	97		15.3		37.3		5.3	<300
Arsenic	<3.2		3.0		< 2.3		< 3.0	< 25
Beryllium	<0.10		0.15		< 0.20		< 0.10	< 3.0
Chromium	**674**		**114**		**1110**		**90.8**	<50
Copper	35.1		14.9		35.2		11.0	<200
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.7
Nickel	28.3		9.4		83.7		15.4	<100
Lead	4.1 J		< 2.1		< 2.6		< 2.2	< 15
Antimony	<2.2		< 2.3		2.3 J		2.1	< 3.0

MW-4D

Sampling Date	06/14/2000	10/11/2000	02/06/2001	04/30/2001	07/31/2001	10/22/2001	01/29/2002	07/25/2002
Volatiles (µg/L)								
Methylene Chloride	3 JB		**7 JB**	< 5	< 5	4 JB	**6**	< 5J
Toluene	<5		< 5					< 5J
Chloroform	<5		< 5					< 5
1,1 Dichloroethane	**7**	**5**	4 J	2 J	4 J	3 J	4 J	4J
1,1,1 Trichloroethane	**26**	**20**	**13**	**23**	**11**	**12**	**12**	13J
Tetrachloroethene	**8**	**6**	4 J	< 5	5 J	3 J	3 J	2J
Trichloroethene	**24**	**17**	**11**	3 J	**11**	**9**	**10**	**8J**
1,2 Dichloroethene (Total)	2 J	1 J	1 J		2 J	1 J	< 5	1J
1,1 Dichloroethene	**14**	**8**	**6**	**6**	**8**	**6**	**8**	**9J**
1,1,2 Trichloroethane								< 5
Chloromethane				10				< 5
Acetone	7 JB		3 JB	6 J				< 5
Turbidity (NTU)	**11.8**		0	**18**	0.0		3.6	1.0
Total Metals (µg/L)								
Iron	**1190**		**827**		**1080**		**333**	**429**
Manganese	118		96.5		137		120	116
Arsenic	<3.2		< 2.4		< 2.3		< 3.0	< 2.5
Beryllium	0.1		0.24		< 0.20		< 0.10	< 0.25
Chromium	4.1		6.6		1.4		7.9	19.9
Copper	3.9		5.5		3.1		6.8	6.4
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.10
Nickel	12		7.3		5.6		10.9	11.8
Lead	6.2		2.4		< 2.6		< 2.2	< 2.7
Antimony	<2.2		< 2.3		< 1.9		< 1.9	< 2.4

MW-5D

Sampling Date	06/19/2000	10/18/2000	01/31/2001	05/01/2001	08/07/2001	10/30/2001	02/06/2002	08/07/2002
Volatiles (µg/L)								
Methylene Chloride	<5	**16 B**	< 5	< 5		**8 B**	< 5	< 5
Toluene	<5					< 5		< 5
Chloroform	<5	< 5					< 5	< 5
1,1 Dichloroethane	3J	3 J	2 J	2 J	1 J	< 5	< 5	< 5
1,1,1 Trichloroethane	3 J	3 J	1 J	2 J	1 J	< 5	< 5	<5
Tetrachloroethene	1 J	2 J	< 5	1 J	1 J	< 5	< 5	< 5
Trichloroethene	2 J	3 J	< 5	1 J	1 J		< 5	< 5
1,2 Dichloroethene (Total)	<5		< 5	< 5			< 5	< 5
1,1 Dichloroethene	2 J	3 J	1 J	1 J			< 5	< 5
1,1,2 Trichloroethane		< 5	< 5		< 5	< 5		< 5
Chloromethane								< 5
Chlorobenzene	<5		< 5					< 5
Carbon Disulfide							< 5	
Acetone	<10	< 10	< 10	< 10			< 5	
Turbidity (NTU)	0		**11**	0	0.1		2	0
Total Metals (µg/L)								
Iron	**2130 J**		**713**		236		245 J	**344**
Manganese	**529**		**465**		**628**		**575**	**690**
Arsenic	<3.2		< 3.4		3.9 UJ		< 3.0	< 2.5
Beryllium	<0.10		< 0.10		< 0.20		< 0.10	< 0.17
Chromium	31.8		16.2 J		2.6 J		16.1	34.2
Copper	59.5		50.6		47.9		45.4	28.5J
Mercury	<0.10		< 0.10		< 0.10		< 0.10	0.11
Nickel	33		13.2		4.6		11.5	<5.4
Lead	9.4		2.6		< 2.4		3.8	< 2.0
Antimony	<2.2		< 2.3		2.3 UJ		< 1.9	< 2.2

MW-6S

Sampling Date	06/20/2000	10/11/2000	02/06/2001	04/25/2001	08/01/2001	10/24/2001	01/30/2002	08/08/2002
Volatiles (µg/L)		**5 X Dilution**						
Methylene Chloride	<5		3 JB	< 5	3 J	**14 B**	**9 B**	< 5
Toluene	<5					< 5		< 5
Chloroform	<5			< 5				< 5
1,1 Dichloroethane	<5	< 25	2 J	1 J	1 J	< 5	< 5	< 5
1,1,1 Trichloroethane	**15**	**360 D**	**110**	**85**	**110**	**92**	**54**	5
Tetrachloroethene	<5	< 25	1 J		< 5	< 5	< 5	< 5
Trichloroethene	<5	< 25	< 5	< 5	< 5	< 5	< 5	< 5
1,2 Dichloroethene (Total)	<5	< 25		< 5	< 5	< 5	< 5	< 5
1,1 Dichloroethene	<5	**14 JD**	< 5	< 5	< 5	1 J	1 J	< 5
1,1,2 Trichloroethane								< 5
Chloromethane								< 5
Chlorobenzene	<5							< 5
2-Butanone	<10							
Acetone	<10		3 JB	3 J				
Turbidity (NTU)	0		0	0	0.0		**25.5**	NS
Total Metals (µg/L)								
Iron	**899 J**		**463**		37.3 J		**4760**	**1290**
Manganese	16.7		53.4		28.7		14.9	<300
Arsenic	<3.2		< 2.4		< 2.3		< 3.0	< 25
Beryllium	<0.10		0.27		< 0.20		< 0.10	< 3.0
Chromium	**159**		**77.7**		3.9		**836**	<50
Copper	9.7		6.5		3.0		9.8	<200
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.7
Nickel	7.9		17.4		7.6		20.6	<100
Lead	<2.3		< 2.1		< 2.6		< 2.2	< 15
Antimony	<2.2		< 2.3		< 1.9		**3.4**	< 3.0

MW-6D

Sampling Date	06/20/2000	10/11/2000	02/06/2001	04/25/2001	08/01/2001	10/24/2001	02/05/2002	08/05/2002
Volatiles (µg/L)								
Methylene Chloride	<5		**13 B**	< 5	3 J	**15 B**	< 5	< 5
Toluene	<5					< 5		< 5
Chloroform	<5			< 5				5J
1,1 Dichloroethane	4 J	3 J	< 5	2 J	2 J	2 J	2 J	4J
1,1,1 Trichloroethane	**10**	**8**	5	**5 J**	4 J	5	5	**9**
Tetrachloroethene	3 J	3 J	3 J		4 J	2 J	2 J	4J
Trichloroethene	**8**	**6**	5	4 J	4 J	4 J	4 J	**7**
1,2 Dichloroethene (Total)	<5	< 5		< 5	< 5	< 5		1J
1,1 Dichloroethene	5 J	4 J	3 J	3 J	3 J	3 J	4 J	**7**
1,1,2 Trichloroethane								< 5
Chloromethane								< 5
Chlorobenzene	<5							< 5
2-Butanone	<10							
Acetone	<10		6 JB	< 5				
Turbidity (NTU)	0		0	**6**	0.1		**27.0**	**73**
Total Metals (µg/L)								
Iron	**3670 J**		**534**		180 J		**1480 J**	**870**
Manganese	243		146		79.4		110	130
Arsenic	<3.2		< 2.4		< 2.3		4.2 J	< 2.5
Beryllium	<0.10		0.24		< 0.20		< 0.10	< 0.16
Chromium	**458**		**157**		23.1		**378**	**479**
Copper	19.3		9.7		8.8		28.8	15.1
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.10
Nickel	**449**		**121**		67.3		**110**	**133**
Lead	2.6		2.5		< 2.6		5.7	5.2
Antimony	<2.2		<2.3		< 1.9		2.0	< 2.2

MW-7S

Sampling Date	06/20/2000	10/17/2000	01/31/2001	04/24/2001	08/01/2001	10/24/2001	01/30/2002	08/08/2002
Volatiles (µg/L)								
Methylene Chloride	<5	< 5	2 JB	< 5	< 5	**11 B**	---	< 5
Toluene	<5					< 5	---	< 5
Chloroform	<5	< 5		< 5			---	< 5
1,1 Dichloroethane	<5	< 5	< 5	< 5	< 5	< 5	---	< 5
1,1,1 Trichloroethane	<5	< 5	< 5	< 5	< 5	< 5	---	5
Tetrachloroethene	<5	< 5	< 5		< 5	< 5	---	< 5
Trichloroethene	<5	< 5	< 5	< 5	< 5	< 5	---	< 5
1,2 Dichloroethene (Total)	<5	< 5		< 5	< 5	< 5	---	< 5
1,1 Dichloroethene	<5	< 5	< 5	< 5	< 5	< 5	---	< 5
1,1,2 Trichloroethane							---	< 5
Chloromethane		< 10					---	< 5
Chlorobenzene	<5						---	< 5
2-Butanone	<10						---	
Acetone	<10	< 10	< 10	< 5			---	
Turbidity (NTU)	0		**190**	0	0.0		---	NS
Total Metals (µg/L)								
Iron	**912 J**		**498**		< 15.7		---	**1290**
Manganese	245		155		1.4		---	<300
Arsenic	<3.2		< 3.4		< 2.3		---	< 25
Beryllium	<0.10		< 0.10		< 0.20		---	< 3.0
Chromium	**57.3**		49.4 J		< 0.90		---	<50
Copper	15		10.1		3.0		---	<200
Mercury	<0.10		< 0.10		< 0.10		---	< 0.7
Nickel	22.5		9.7		1.5		---	<100
Lead	<2.3		< 2.1		< 2.6		---	< 15
Antimony	<2.2		< 2.3		< 1.9		---	< 3.0

Note

--- Well was dry during the sampling event

MW-7D

Sampling Date	06/20/2000	10/17/2000	01/29/2001	04/25/2001	08/01/2001	10/24/2001	01/30/2002	07/24/2002
Volatiles (µg/L)								
Methylene Chloride	<5	< 5	4 JB	< 5	1 J	**11 B**	**8 B**	< 5
Toluene	<5		< 5			< 5		< 5J
Chloroform	<5	< 5		2 J				< 5
1,1 Dichloroethane	**8**	**8**	**8**	2 J	**8**	**8**	7	5J
1,1,1 Trichloroethane	**7**	**5 J**	3 J	**15**	2 J	2 J	2 J	3J
Tetrachloroethene	4 J	**5 J**	3 J		3 J	3 J	3 J	2J
Trichloroethene	5	**6**	4 JB	**5 J**	3 J	3 J	3 J	3J
1,2 Dichloroethene (Total)	2 J	3 J	2 J	1 J	3 J	2 J	2 J	2J
1,1 Dichloroethene	4 J	5	3 J	**11**	3	3 J	3 J	4J
1,1,2 Trichloroethane								< 5
Chloromethane		3 J						< 5
Chlorobenzene	<5		< 5					< 5
2-Butanone	<10							< 5
Acetone	<10	< 10	2 JB	< 5				< 5
Turbidity (NTU)	0		**10**	**10**	0.0		**19.3**	0
Total Metals (µg/L)								
Iron	**544 J**		94.2		209 J		86.0	**306**
Manganese	47.4		61.4		69.3		62.1	60.9
Arsenic	<3.2		< 2.4		< 2.3		< 3.0	< 2.5
Beryllium	<0.10		0.25 J		< 0.20		< 0.10	< 0.23
Chromium	19.9		2.7 J		7.1		3.3	18.6
Copper	13.7		3.1		4.6		5.8	13.2
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.10
Nickel	13.8		3.1		3.7		6.5	17.3
Lead	2.8		< 2.1		< 2.6		< 2.2	< 1.7
Antimony	<2.2		< 2.3		< 1.9		< 1.9	< 2.2

MW-13

Sampling Date	06/14/2000	10/10/2000	02/01/2001	04/26/2001	08/07/2001	10/23/2001	02/04/2002	08/05/2002
Volatiles (µg/L)		**5 X Dilution**						
Methylene Chloride	4 JB		1 JB	< 5		**14 B**	1 JB	< 5
Toluene	<5		< 5					< 5
Chloroform	<5		< 5					< 5
1,1 Dichloroethane	**14**	**40 D**	**9**	**8**	**7**	2 J	< 5	3J
1,1,1 Trichloroethane	**120**	**350 D**	**110**	**34**	**34**	**15**	**34**	12
Tetrachloroethene	<5		< 5		< 5	< 5	< 5	< 5
Trichloroethene	<5		< 5		< 5	< 5	< 5	< 5
1,2 Dichloroethene (Total)	<5	< 25	< 5	< 5		< 5		< 5
1,1 Dichloroethene	**8**	**7 JD**	2 J			< 5	< 5	< 5
1,1,2 Trichloroethane					< 5			< 5
Chloromethane				**1 J**				< 5
Acetone	8 JB		2 JB	4 J				< 5
Turbidity (NTU)	**200**		0	0	0.1		**22.5**	**110**
Total Metals (µg/L)								
Iron	**17200**		**687**		**634**		**2050 J**	**<14.5**
Manganese	**365**		54.9		17.3		26.6	32.1
Arsenic	4.3		<3.4		4.7 J		4.1 J	< 2.5
Beryllium	<0.10		< 0.10		< 0.20		0.12	< 0.1
Chromium	6.3		2.3 J		1.5 J		3.5	<0.52
Copper	12.7		5.6		3.1		10.2	1.8
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.10
Nickel	12.2		7.2		4.7		6.7	3.2
Lead	5.2		< 2.1		< 2.4		< 2.2	< 1.7
Antimony	<2.2		< 2.3		2.3 J		< 1.9	< 2.2

MW-14

Sampling Date	06/21/2000	10/18/2000	02/01/2001	04/26/2001	08/02/2001	10/25/2001	01/30/2002	08/07/2002
Volatiles (µg/L)								
Methylene Chloride	<5	< 5	< 5	**5 J**	< 5	**9 B**	4JB	< 5
Toluene	<5		< 5					< 5
Chloroform	<5	< 5	< 5			< 5		< 5
1,1 Dichloroethane	4J	2 J	1 J	2 J	2 J	< 5	2 J	< 5
1,1,1 Trichloroethane	**21**	**8**	**15**	**5 J**	**12**	**6**	**15**	1J
Tetrachloroethene	2J	< 5	< 5		< 5	< 5	< 5	< 5
Trichloroethene	1J	< 5	< 5		< 5	< 5	< 5	< 5
1,2 Dichloroethene (Total)	1J		< 5	1 J	< 5	< 5	< 5	< 5
1,1 Dichloroethene	1J	< 5	< 5		< 5	< 5	< 5	< 5
1,1,2 Trichloroethane		< 5						< 5
Chloromethane				< 5				< 5
Carbon Disulfide	<5							< 5
Chlorobenzene	<5							
2-Butanone						< 10		
Acetone	<10	< 10	1 JB	< 5				
Turbidity (NTU)	**75**		0	0	0		**25.7**	0
Total Metals (µg/L)								
Iron	**14100**		**7870**		**6830 J**		**12200**	**14600**
Manganese	**1090**		217		**421**		**374**	221
Arsenic	<3.2		< 3.4		< 2.3		< 3.0	< 2.5
Beryllium	<0.10		< 0.10		< 0.20		< 0.10	< 0.22
Chromium	3.1		2.6 J		< 0.90		3.3	<3.6
Copper	3.2		2.3		0.87		3.0	1.5
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.10
Nickel	6.5		2.9		3.6		5.5	<3.8
Lead	2.8		< 2.1		< 2.6		< 2.2	< 1.7
Antimony	<2.2		< 2.3		< 1.9		< 1.9	< 2.2

MW-15

Sampling Date	06/19/2000	10/10/2000	02/01/2001	04/26/2001	08/07/2001	10/23/2001	02/04/2002	08/06/2002
Volatiles (µg/L)								
Methylene Chloride	<5		< 5	**5 J**		5 B	2 JB	< 5
Toluene	<5							< 5
Chloroform	<5							< 5
1,1 Dichloroethane	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,1 Trichloroethane	<5	< 5	< 5	< 5	< 5	< 5	< 5	5
Tetrachloroethene	**11**		**9**		< 5	< 5	< 5	< 5
Trichloroethene	**14**		4 J		< 5	< 5	< 5	< 5
1,2 Dichloroethene (Total)	**42**	1 J	**18**	**24**		< 5	< 5	< 5
1,1 Dichloroethene	<5	< 5	< 5			< 5	< 5	< 5
1,1,2 Trichloroethane			< 5		< 5			< 5
Chloromethane				< 5				< 5
Chlorobenzene	1 J		1J					< 5
Acetone	<10		< 10	< 5				
Turbidity (NTU)	0		**190**	0	0.1		**19.4**	0
Total Metals (µg/L)								
Iron	**39100 J**		**36400**		**27800**		**19800 J**	**29300**
Manganese	**405**		**417**		**344**		199	**339**
Arsenic	10.6		6.4		6.9 J		4.9	2.5
Beryllium	0.21		< 0.10		< 0.20		< 0.10	< 0.13
Chromium	19.5		4.4 J		1.4 UJ		2.4	<2.7
Copper	9.7		8.9		< 0.50		3.8	1.3
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.10
Nickel	13		4.8		2.7		3.1	<1.6
Lead	4.6		4.6		< 2.4		2.9	< 1.7
Antimony	<3.2		< 2.3		2.3 UJ		< 1.9	< 2.2

MW-16

Sampling Date	06/20/2000	10/10/2000	01/31/2001	04/26/2001	08/02/2001	10/25/2001	02/05/2002	08/06/2002
Volatiles (µg/L)								
Methylene Chloride	<5		< 5	< 5	< 5	1 JB	< 5	< 5
Toluene	<5							< 5
Chloroform	<5					< 5		< 5
1,1 Dichloroethane	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,1 Trichloroethane	<5	< 5	< 5	< 5	< 5	< 5	3 J	5
Tetrachloroethene	<5		< 5		< 5	< 5	< 5	< 5
Trichloroethene	<5		< 5		< 5	< 5	< 5	< 5
1,2 Dichloroethene (Total)	<5	< 5		< 5	< 5	< 5		< 5
1,1 Dichloroethene	<5	< 5	< 5		< 5	< 5	< 5	< 5
1,1,2 Trichloroethane	<5							< 5
Chloromethane				< 10				< 5
Chlorobenzene	<5							< 5
2-Butanone	<10					< 10		
Acetone	<10		< 10	< 5				
Turbidity (NTU)	**133**		**47**	0	0.0		**26.4**	**97**
Total Metals (µg/L)								
Iron	**33700 J**		**25200**		**25400 J**		**24600 J**	**58400**
Manganese	**524**		**426**		**430**		**363**	**438**
Arsenic	17.2		10.4		5.7		10.3 J	**39.8**
Beryllium	<0.10		< 0.10		< 0.20		< 0.10	< 1.3
Chromium	6.9		3.6 J		< 0.90		4.4	43.6
Copper	11.8		7.2		0.89		7.2	54.7
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.10
Nickel	5.2		2.7		1.9		4.1	<23.4
Lead	3.9		< 2.1		< 2.6		2.7	**28.6**
Antimony	<2.2		< 2.3		< 1.9		< 1.9	< 2.2

MW-17

Sampling Date	06/19/2000	10/18/2000	01/31/2001	04/25/2001	08/07/2001	10/29/2001	02/06/2002	08/08/2002
Volatiles (µg/L)								
Methylene Chloride	<5	< 5	< 5	< 5		**9 B**	**1** JB	< 5
Toluene	<5					< 5		< 5
Chloroform	<5	< 5		< 5			< 5	< 5
1,1 Dichloroethane	5	**7**	3 J	2 J	1 J	1 J	2 J	3J
1,1,1 Trichloroethane	**39**	**58**	**33**	**9**	**12**	**19**	**22**	5J
Tetrachloroethene	<5	3 J	1 J		1 <	1 J	1 J	< 5
Trichloroethene	<5	< 5	< 5	< 5	< 5		< 5	< 5
1,2 Dichloroethene (Total)	<5		< 5	< 5			< 5	< 5
1,1 Dichloroethene	<5	< 5	< 5	< 5			< 5	< 5
1,1,2 Trichloroethane		3 J	< 5		1 J	**2 J**		< 5
Chloromethane								< 5
Chlorobenzene	<5		< 5					< 5
Carbon Disulfide							< 5	
Acetone	<10	< 10	< 5	< 5		< 5	< 5	
Turbidity (NTU)	15.9		**35**	**10**	0.1		**18**	0
Total Metals (µg/L)								
Iron	**16900 J**		**1600**		**409**		**662 J**	**982**
Manganese	**386**		73.8		176		108	53.7
Arsenic	6.5		< 3.4		3.9 UJ		< 3.0	< 2.5
Beryllium	0.26		< 0.10		< 0.20		< 0.10	< 0.26
Chromium	25.9		7.6 J		2.6 J		2.8	4.8
Copper	79.1		42.6		29.2		18.5	20.1
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.10
Nickel	61.9		47.4		49.5		22.7	<14.2
Lead	**20.1**		< 2.1		< 2.4		2.3	< 1.7
Antimony	2.5		< 2.3		2.3 UJ		< 1.9	< 2.2

MW-18

Sampling Date	06/22/2000	10/18/2000	02/06/2001	05/01/2001	08/08/2001	10/29/2001	02/05/2002	08/07/2002
Volatiles (µg/L)								
Methylene Chloride	<5	< 5	2 JB	**7**		**10 B**	< 5	< 5
Toluene	<5		2 J			< 5		< 5
Chloroform	<5	< 5		< 5	< 5			< 5
1,1 Dichloroethane	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,1 Trichloroethane	<5	< 5	< 5	< 5	< 5	< 5	< 5	<5
Tetrachloroethene	<5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trichloroethene	<5	< 5	1 J	< 5	< 5		< 5	< 5
1,2 Dichloroethene (Total)	<5		< 5	< 5	< 5			< 5
1,1 Dichloroethene	<5	< 5	< 5	< 5	< 5		< 5	< 5
1,1,2 Trichloroethane		< 5				< 5		< 5
Chloromethane								< 5
Carbon Disulfide	<5							< 5
Chlorobenzene	<5		1 J					
Acetone	<10	< 10	7 JB	6 J				
Turbidity (NTU)	**247**		0	0	0		**16.4**	0
Total Metals (µg/L)								
Iron	**9060**		**13500**		**905**		**1170 J**	**1100**
Manganese	164		269		15.4		16.6	23.4
Arsenic	6.1		8.1		3.9 UJ		< 3.0	< 2.5
Beryllium	0.1		0.55		< 0.20		< 0.10	< 0.26
Chromium	31.2		**80**		3.2 J		5.3	6.7
Copper	9.7		13.6		0.52		3.4	0.55
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.10
Nickel	16.4		46.6		2.9		4.8	<4.8
Lead	4.2		7.5		< 2.4		< 2.2	< 1.9
Antimony	<2.2		< 2.3		2.3 UJ		< 1.9	< 2.2

MW-19S

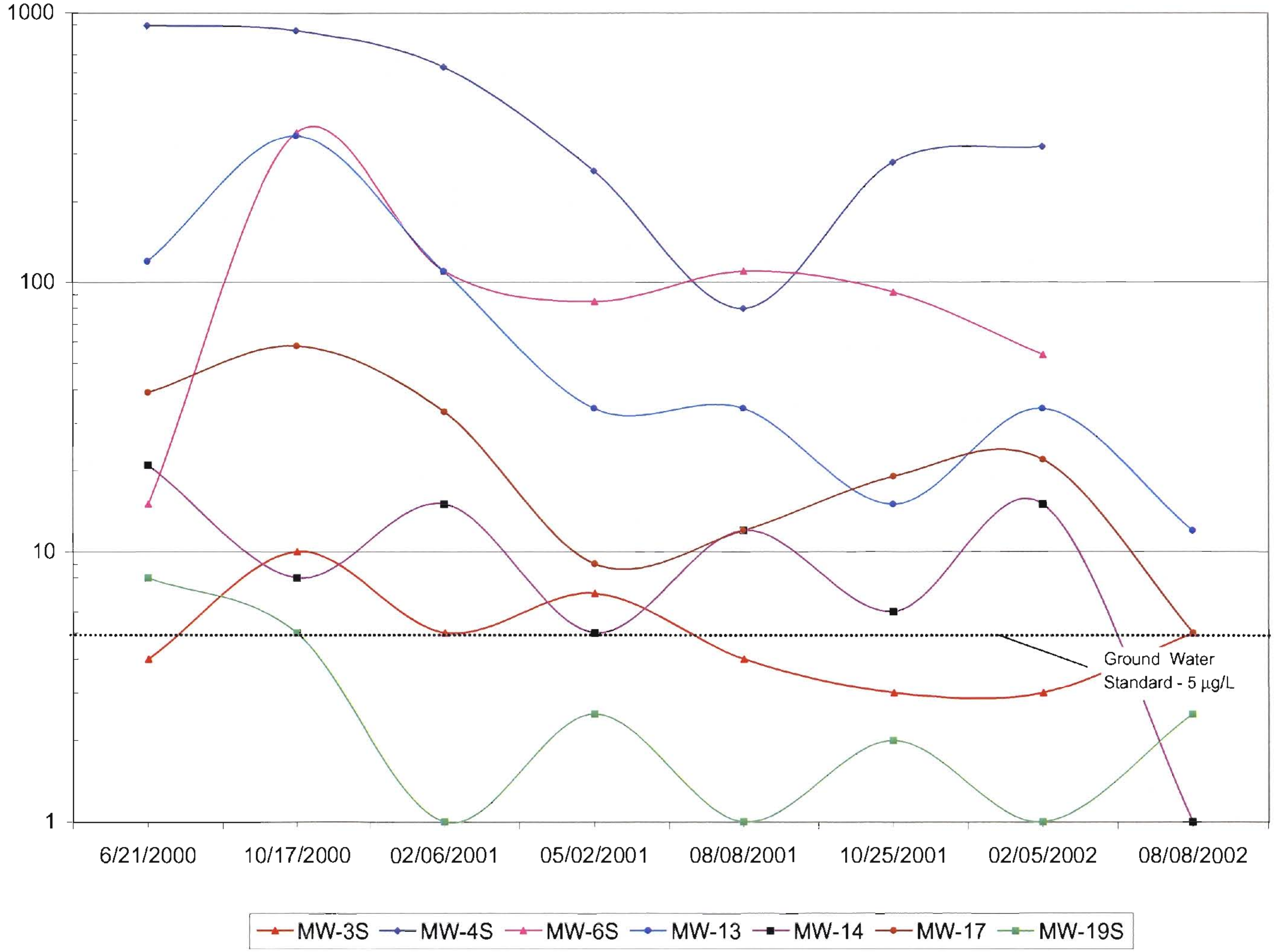
Sampling Date	06/21/2000	10/17/2000	02/06/2001	05/02/2001	08/08/2001	10/25/2001	02/05/2002	08/08/2002
Volatiles (µg/L)								
Methylene Chloride	<5	**14 B**	**12 B**	**6**		**9 B**	< 5	< 5
Toluene	<5		< 5					< 5
Chloroform	<5	< 5		< 5	< 5	< 5		< 5
1,1 Dichloroethane	**6**	4 J	3 J	4 J	5 J	3 J	3 J	3J
1,1,1 Trichloroethane	**8**	**5 J**	1 J	< 5	1 J	2 J	1 J	5
Tetrachloroethene	<5	2 J	< 5	< 5	< 5	< 5	< 5	< 5
Trichloroethene	<5	2 J	< 5	< 5	2 J	< 5	< 5	< 5
1,2 Dichloroethene (Total)	<5	1 J	< 5	2 J	2 J	1 J		2J
1,1 Dichloroethene	1J	2 J	1 J	2 J	3 J	1 J	1 J	< 5
1,1,2 Trichloroethane								< 5
Chloromethane		< 10						< 5
Carbon Disulfide	<5							< 5
Chlorobenzene	2J		< 5					
2-Butanone						< 10		
Acetone	<10	4 J	4 JB	< 10				
Turbidity (NTU)	**64.9**		0	0	0.1		**62**	0
Total Metals (µg/L)								
Iron	**21600**		**29400**		**15400**		**26000 J**	**18600**
Manganese	**2100**		**1050**		**786**		**966**	**683**
Arsenic	4.1		4.7		3.9 UJ		5.1 J	< 2.5
Beryllium	0.37		0.60		< 0.20		0.16	< 0.61
Chromium	**96.6**		36.5		1.4 UJ		40.2	**121**
Copper	109		13.7		< 0.50		16.4	6.3
Mercury	0.34		0.34		< 0.10		**0.76**	0.14
Nickel	66.9		26.7		3.9		29.1	86.8
Lead	**34**		4.6		< 2.4		6.3	< 1.75
Antimony	<2.2		< 2.3		2.3 UJ		< 1.9	< 2.2

MW-19D

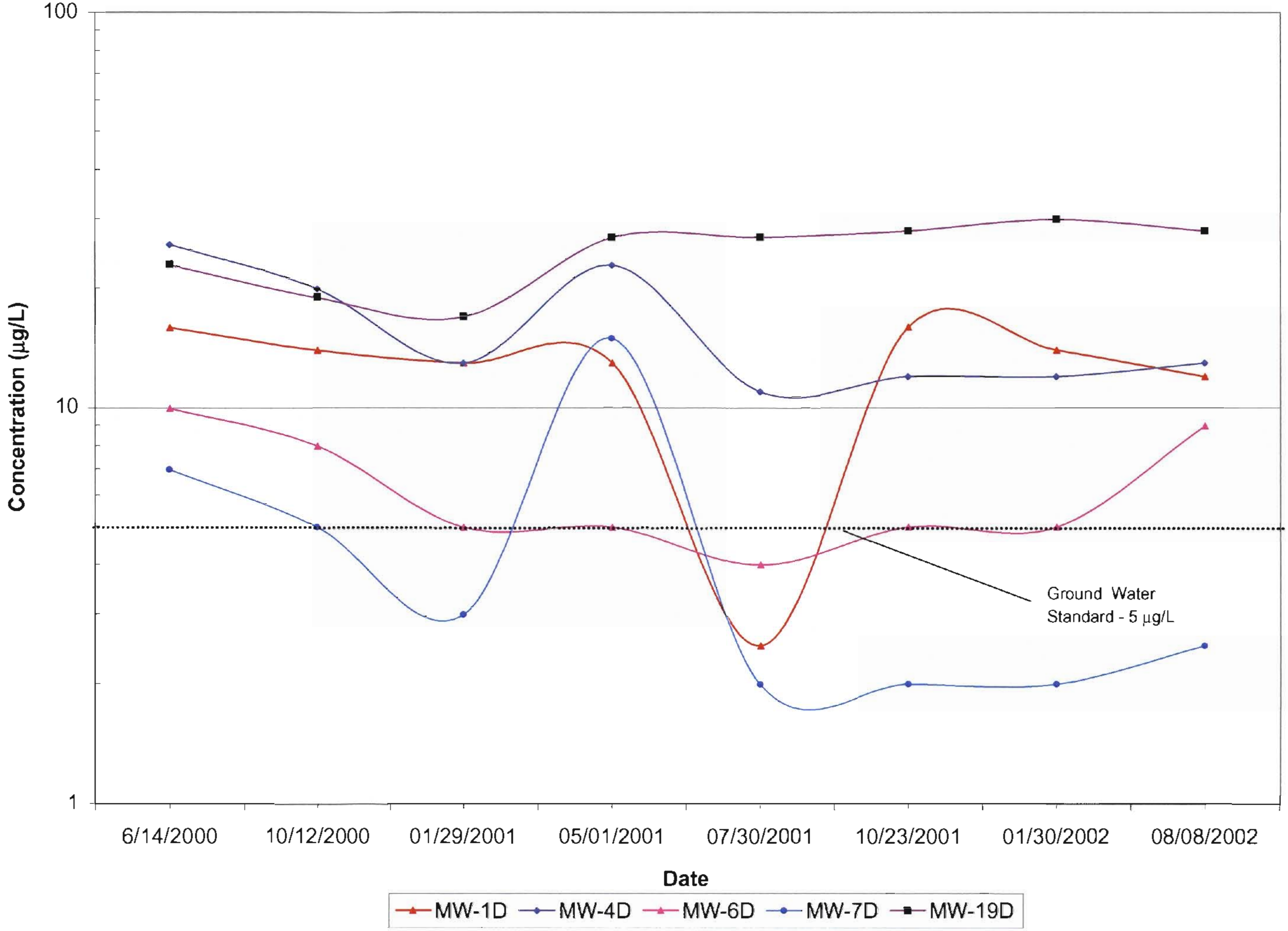
Sampling Date	06/21/2000	10/17/2000	02/07/2001	05/02/2001	08/08/2001	10/25/2001	02/05/2002	08/08/2002
Volatiles (µg/L)								
Methylene Chloride	<5	**13 B**	**12 B**	**6**		**9 B**	< 5	< 5
Toluene	2J		< 5					< 5
Chloroform	2J	2 J		5 J	7	7	**10**	**14**
1,1 Dichloroethane	3J	4 J	4 J	4 J	4 J	4 J	3 J	4J
1,1,1 Trichloroethane	**23**	**19**	**17**	**27**	**27**	**28**	**30**	**28**
Tetrachloroethene	**46**	**47**	**50**	**55**	**65**	**62**	**77**	**62**
Trichloroethene	**40**	**34**	**37**	**36**	**46**	**43**	**55**	**57**
1,2 Dichloroethene (Total)	3J	**6**	< 5	**7**	**8**	**8**	**8**	**10**
1,1 Dichloroethene	**14**	**14**	**12**	**18**	**19**	**19**	**23**	**24**
1,1,2 Trichloroethane								< 5
Chloromethane		< 10						< 5
Carbon Disulfide	<5						< 5	< 5
Chlorobenzene	<5		< 5					
2-Butanone						4 J		
Acetone	<10	< 10	4 JB	< 10			8 JB	
Turbidity (NTU)	**238**		0	**230**	0.1		**659**	**250**
Total Metals (µg/L)								
Iron	**7240**		**15000**		**4730**		**27300 J**	**18900**
Manganese	**557**		**646**		295		**568**	**429**
Arsenic	<3.2		10.4		5.4 J		12.5 J	7.8
Beryllium	0.3		1.1		< 0.20		0.47	2.6
Chromium	43.9		47.4		49.5 J		**86.4**	**55.7**
Copper	14.2		26.1		7.8		38.2	21.0
Mercury	<0.10		< 0.10		< 0.10		< 0.10	< 0.10
Nickel	32		32.9		36.0		59.1	35.7
Lead	10.3		**18.0**		3.8		**22.7**	**16.3**
Antimony	<2.2		< 2.3		2.3 UJ		< 1.9	< 2.2

APPENDIX B

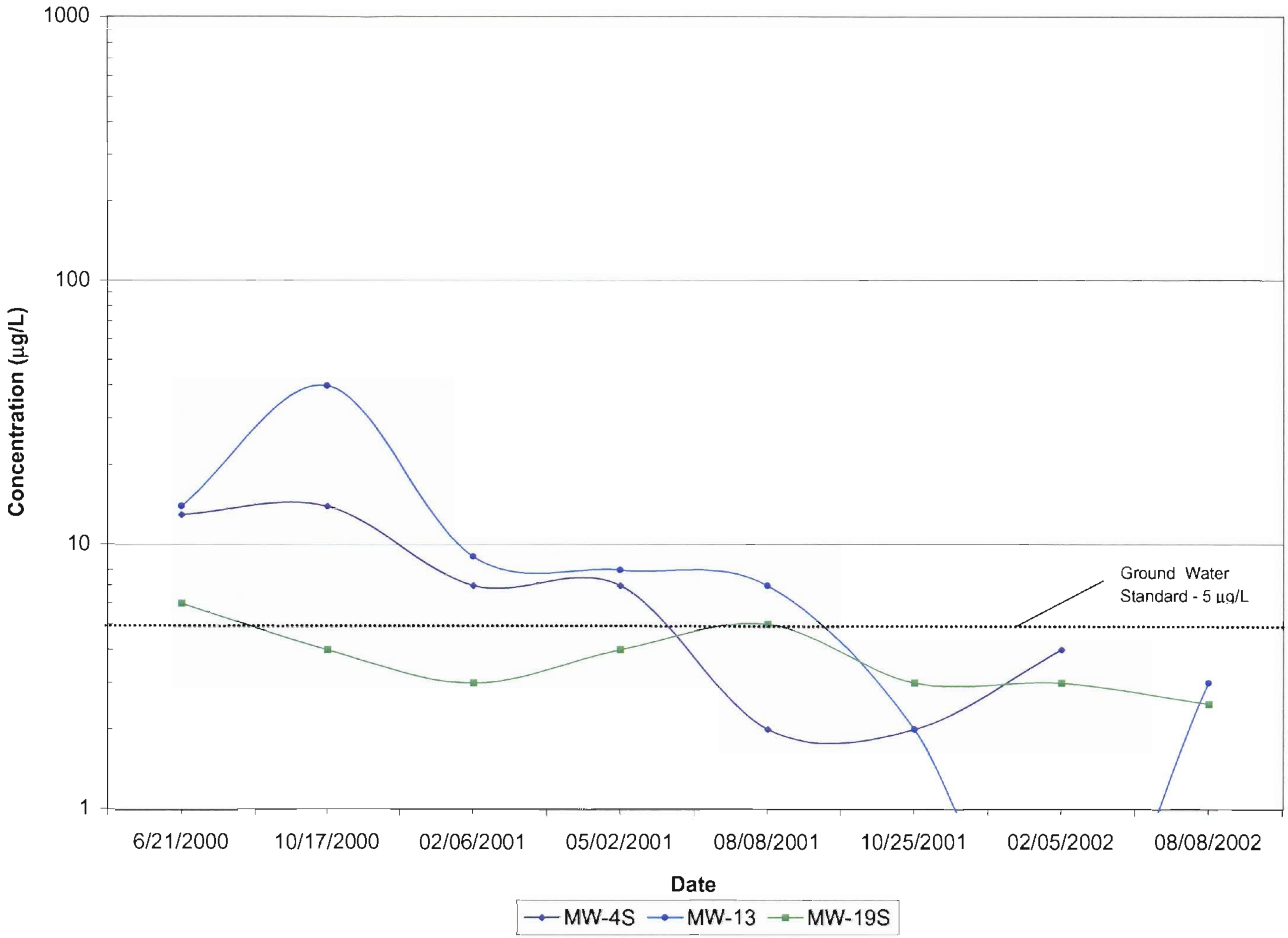
CIRCUITRON CORPORATION SUPERFUND SITE
1,1,1-Trichloroethane Time-Series Graph



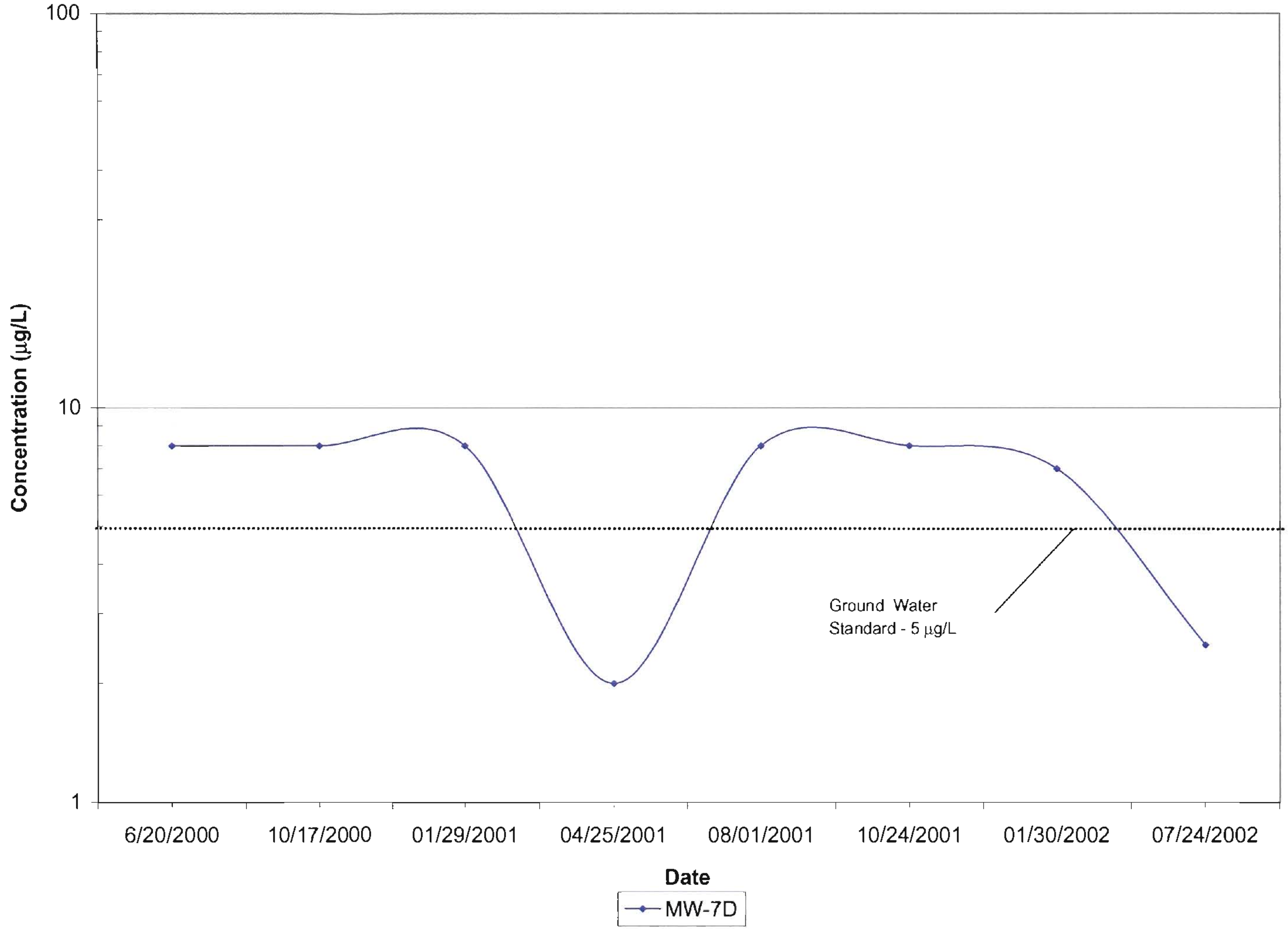
CIRCUITRON CORPORATION SUPERFUND SITE
1,1,1-Trichloroethane Time-Series Graph



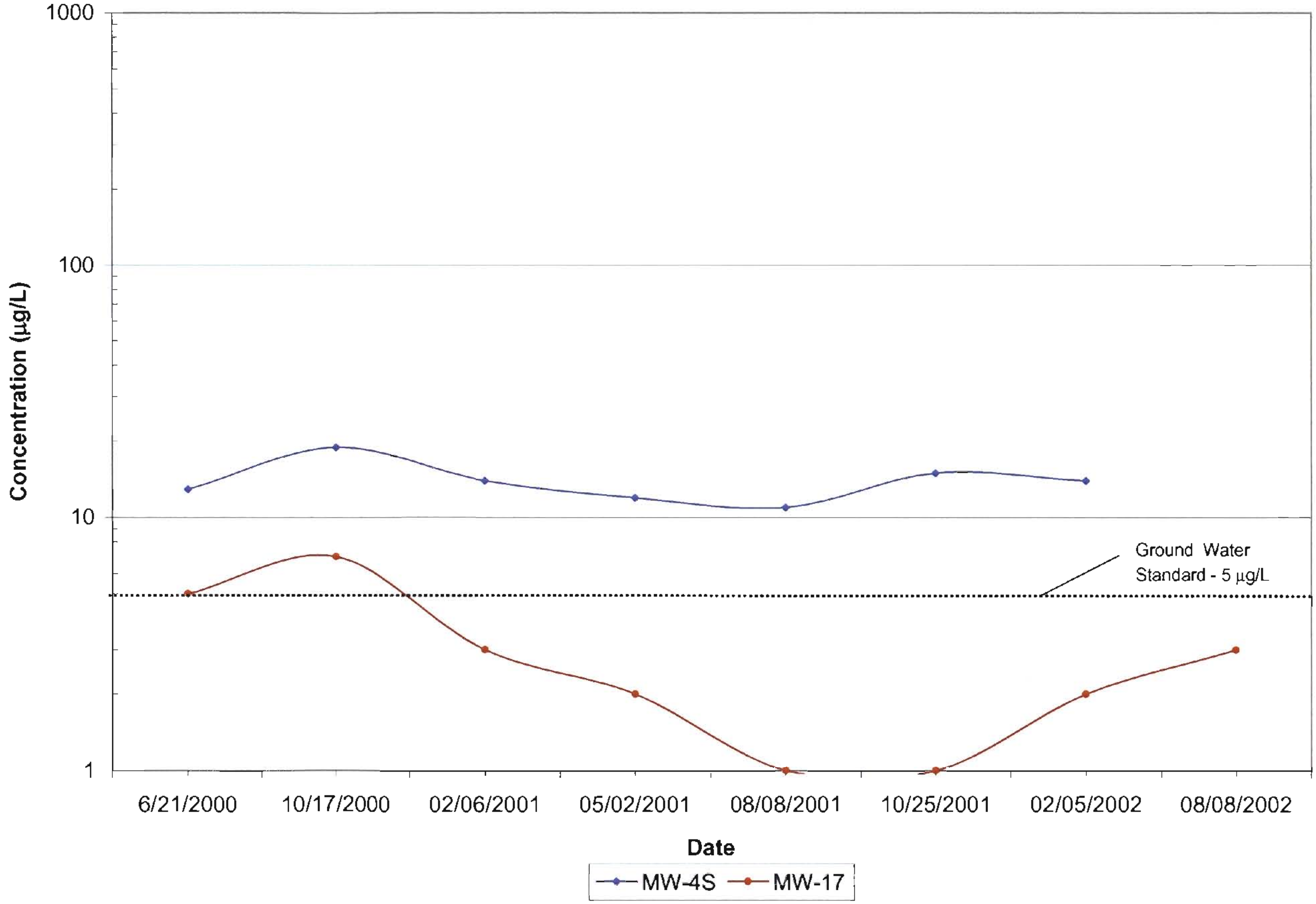
CIRCUITRON CORPORATION SUPERFUND SITE
1,1-Dichloroethane Time-Series Graph



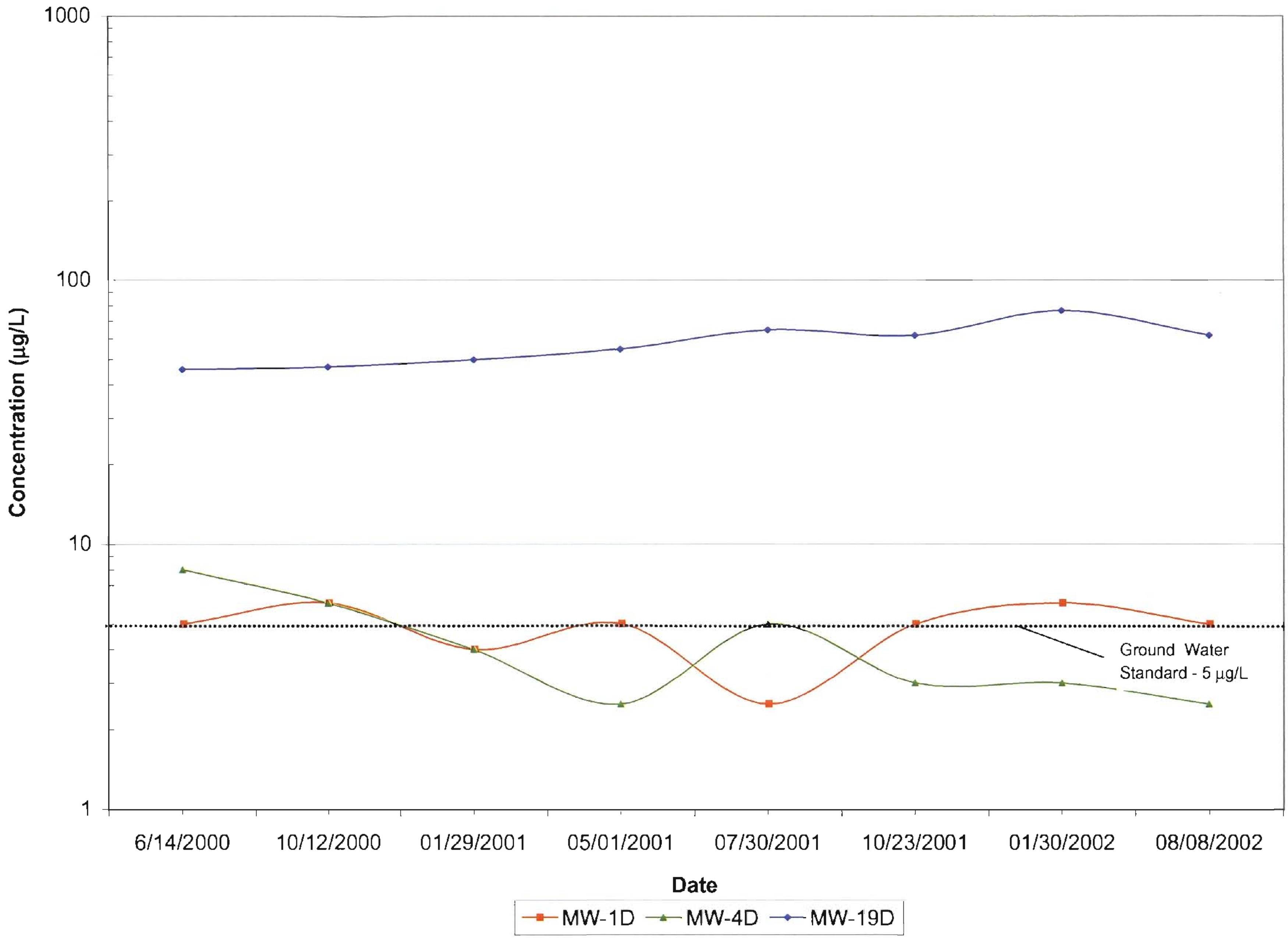
CIRCUITRON CORPORATION SUPERFUND SITE
1,1-Dichloroethane Time-Series Graph



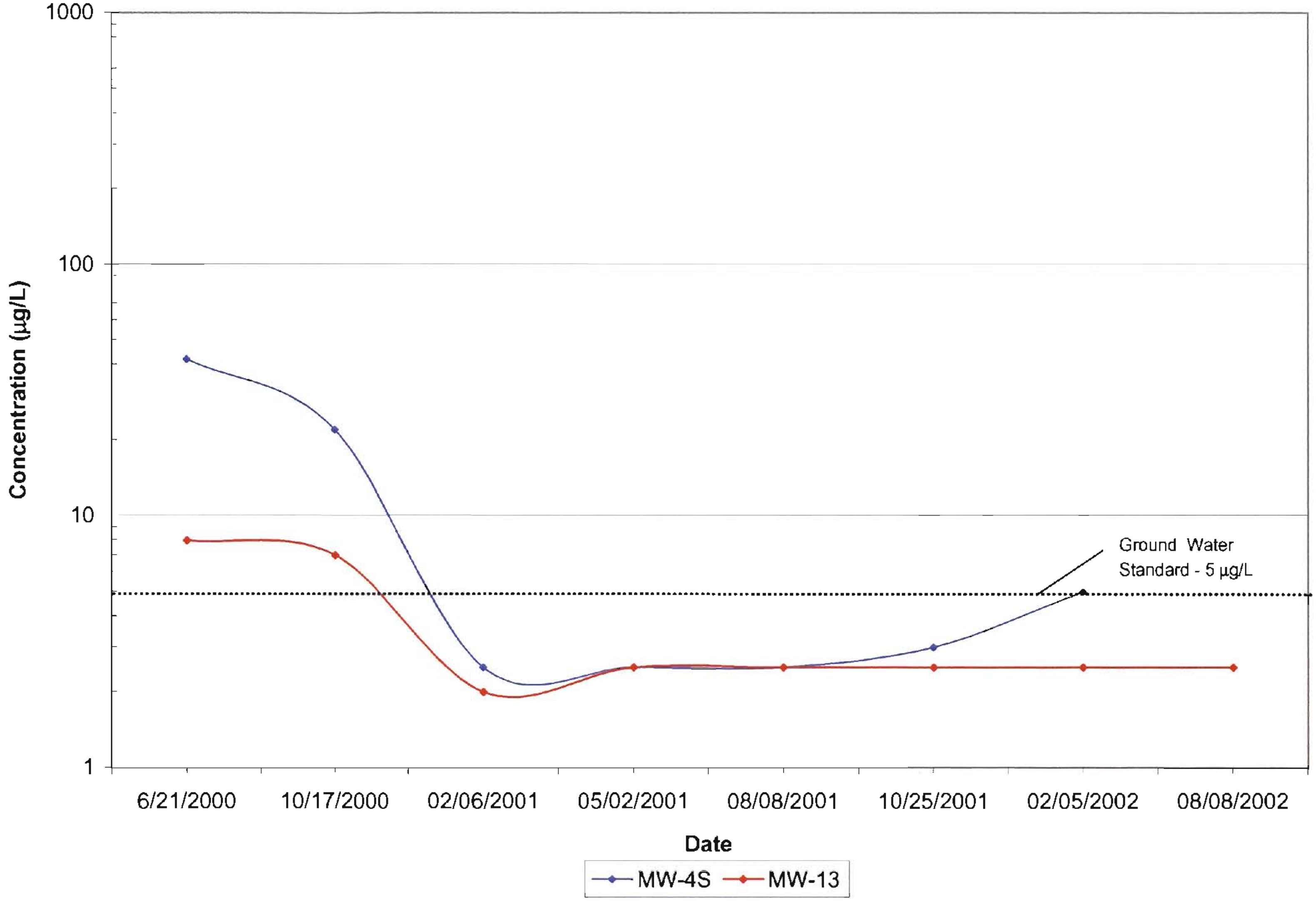
CIRCUITRON CORPORATION SUPERFUND SITE
Tetrachloroethene Time-Series Graph

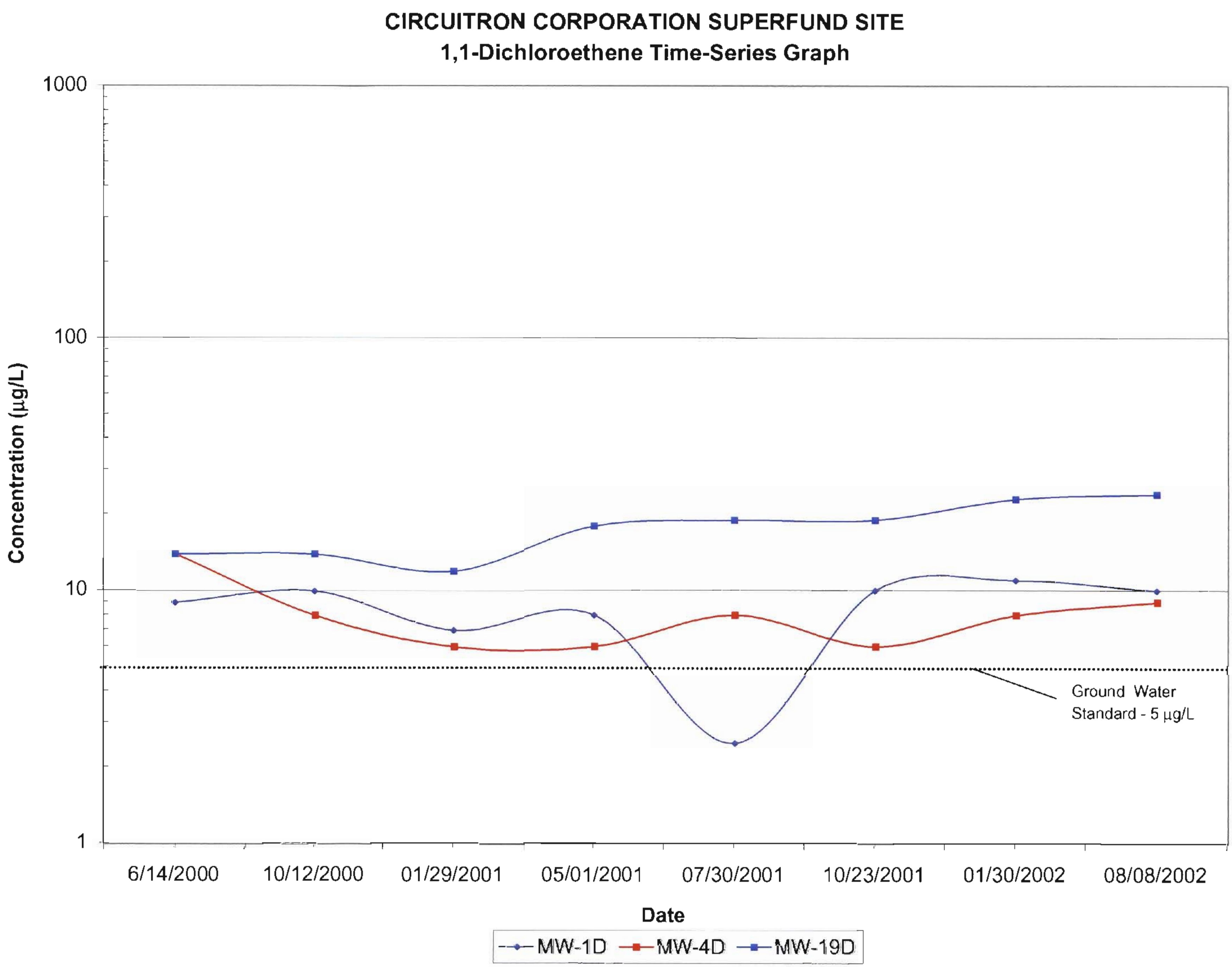


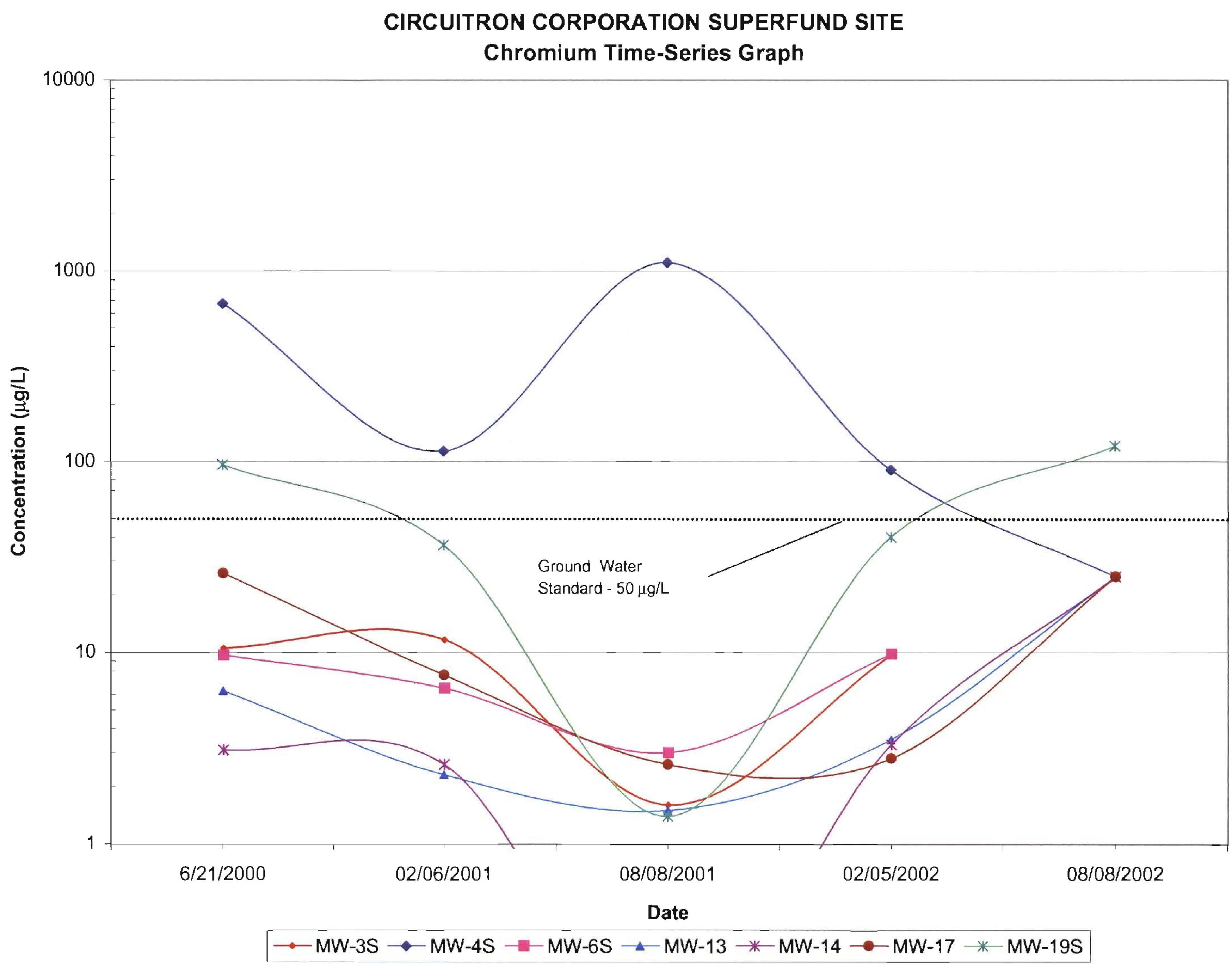
CIRCUITRON CORPORATION SUPERFUND SITE
Tetrachloroethene Time-Series Graph

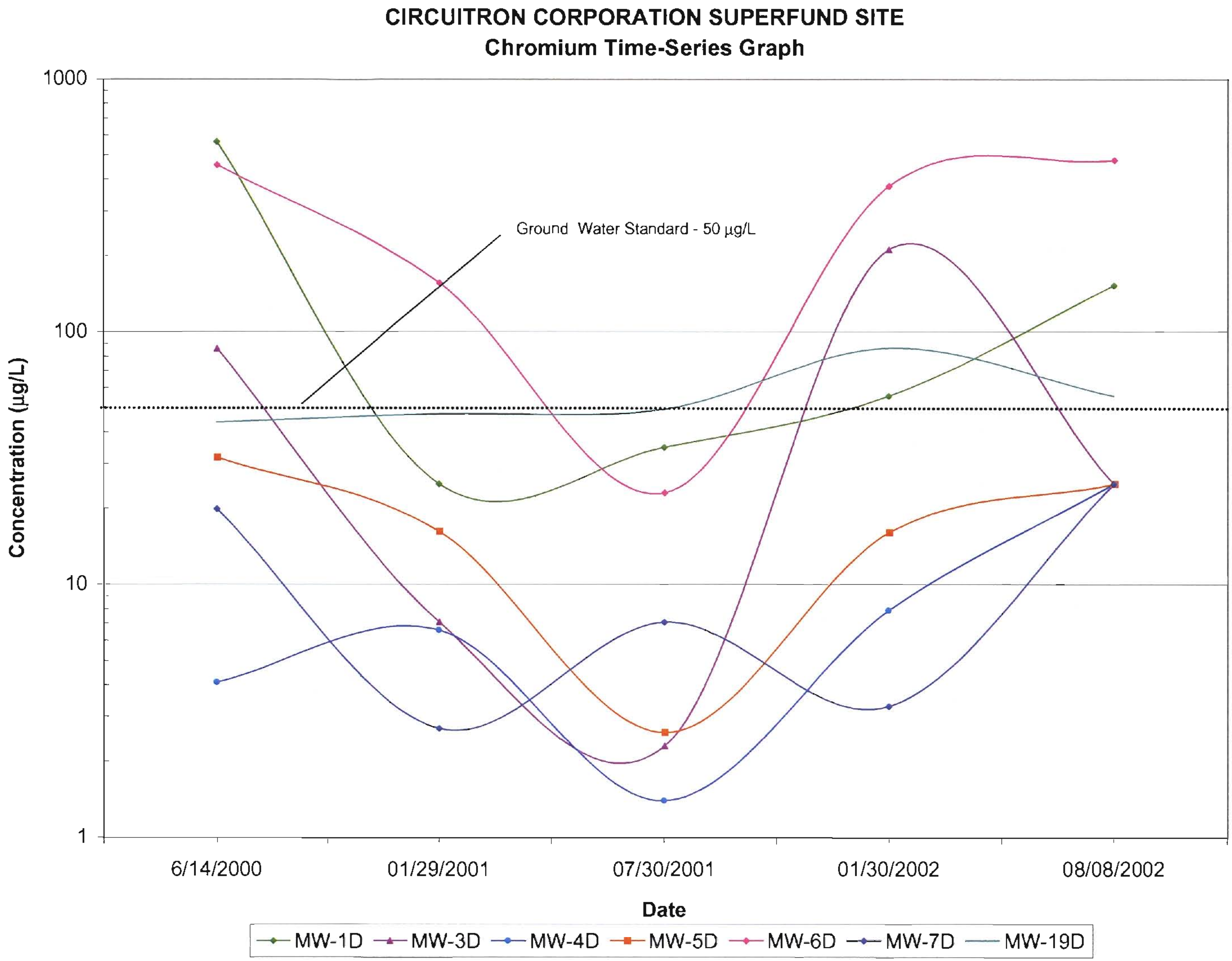


CIRCUITRON CORPORATION SUPERFUND SITE
1,1-Dichloroethene Time-Series Graph

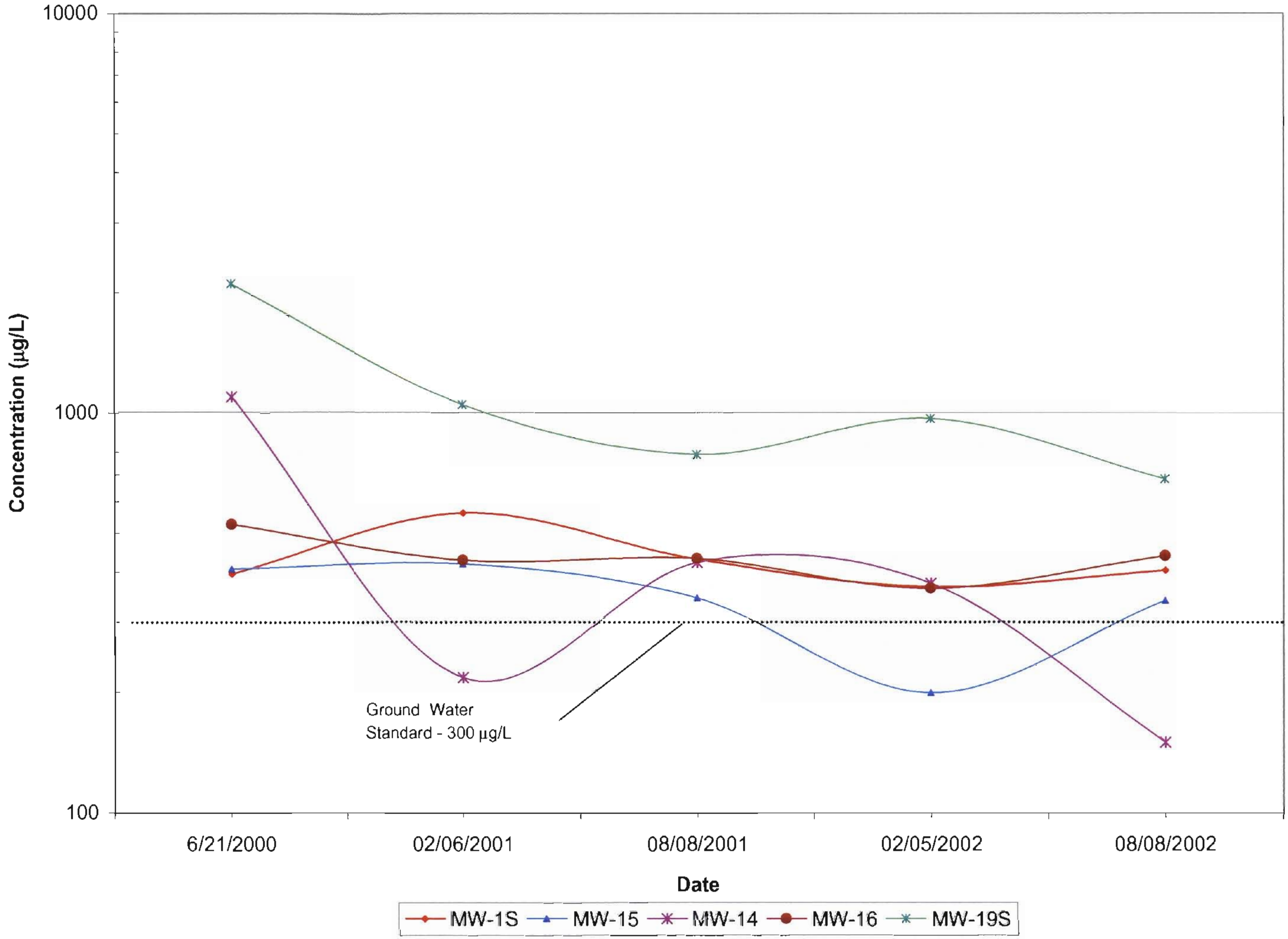



CIRCUITRON CORPORATION SUPERFUND SITE
1,1-Dichloroethene Time-Series Graph
Concentration (µg/L)
1000
100
10
1
6/14/2000
10/12/2000
01/29/2001
05/01/2001
07/30/2001
10/23/2001
01/30/2002
08/08/2002
Date
Ground Water
Standard - 5 µg/L
MW-1D
MW-4D
MW-19D

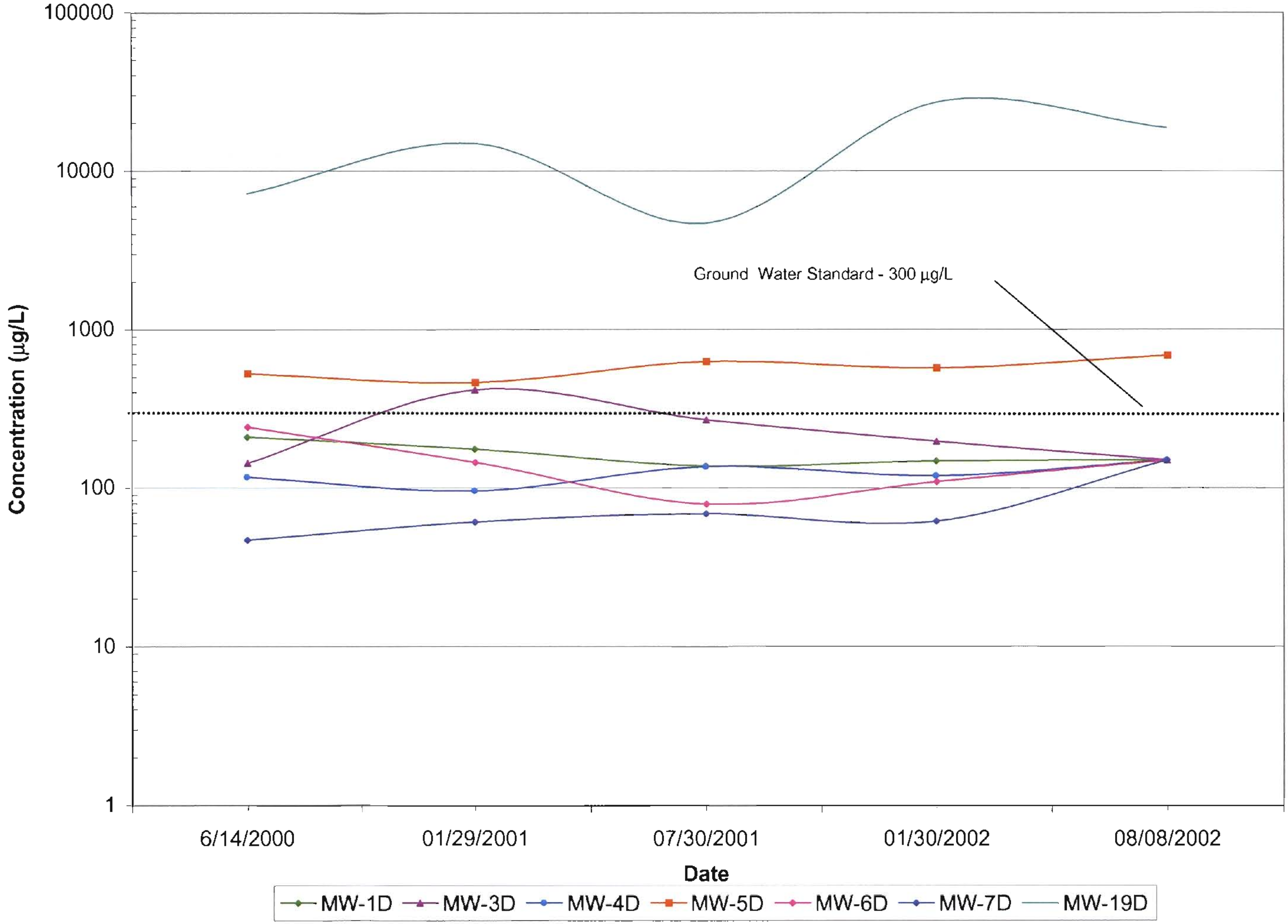

CIRCUITRON CORPORATION SUPERFUND SITE
Chromium Time-Series Graph
10000
1000
100
10
1
Concentration (µg/L)
Ground Water
Standard - 50 µg/L
6/21/2000
02/06/2001
08/08/2001
02/05/2002
08/08/2002
Date
MW-3S
MW-4S
MW-6S
MW-13
MW-14
MW-17
MW-19S

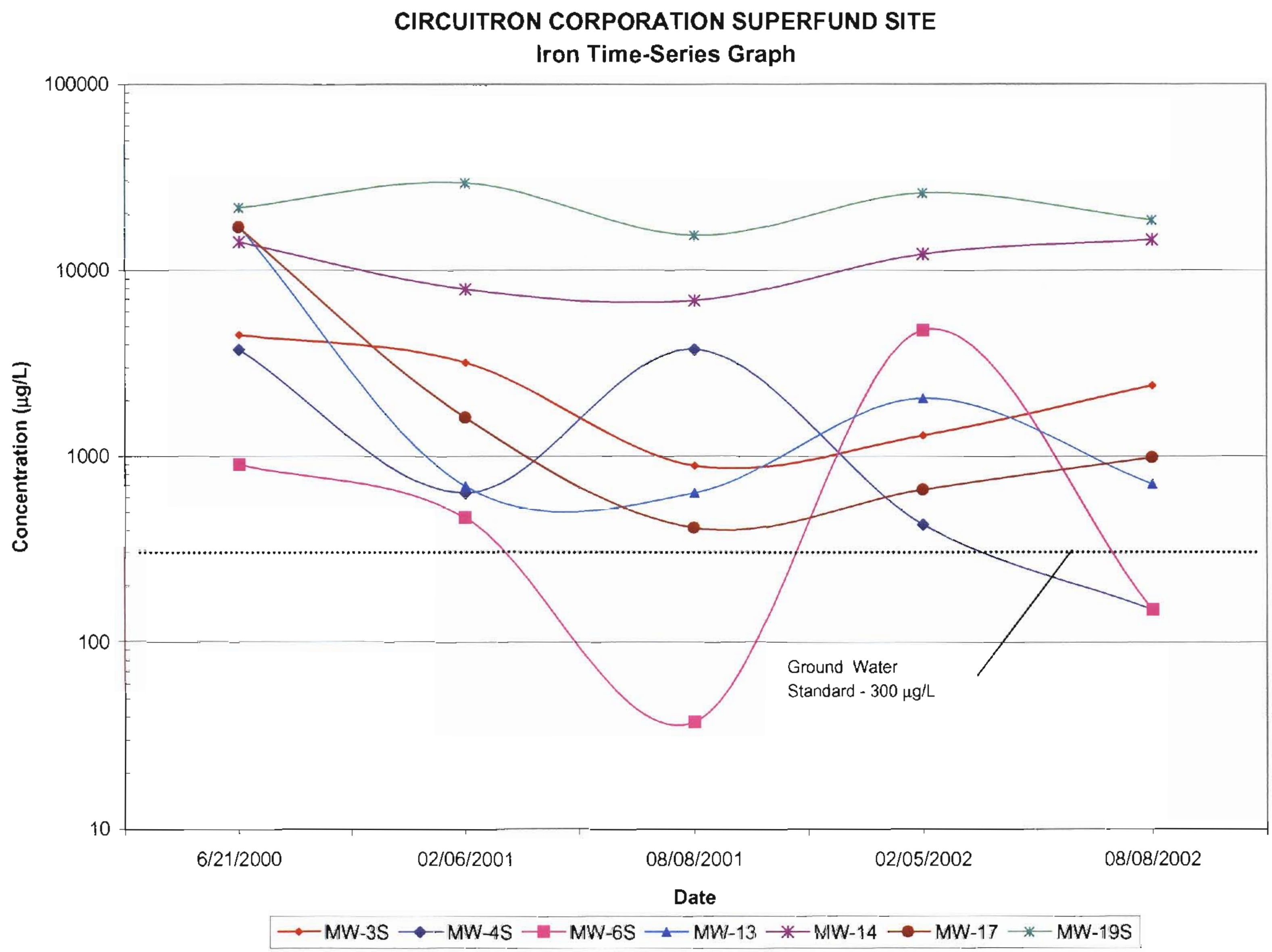

CIRCUITRON CORPORATION SUPERFUND SITE
Chromium Time-Series Graph
Ground Water Standard - 50 µg/L
Concentration (µg/L)
1000
100
10
1
6/14/2000
01/29/2001
07/30/2001
01/30/2002
08/08/2002
Date
MW-1D
MW-3D
MW-4D
MW-5D
MW-6D
MW-7D
MW-19D

CIRCUITRON CORPORATION SUPERFUND SITE
Manganese Time-Series Graph

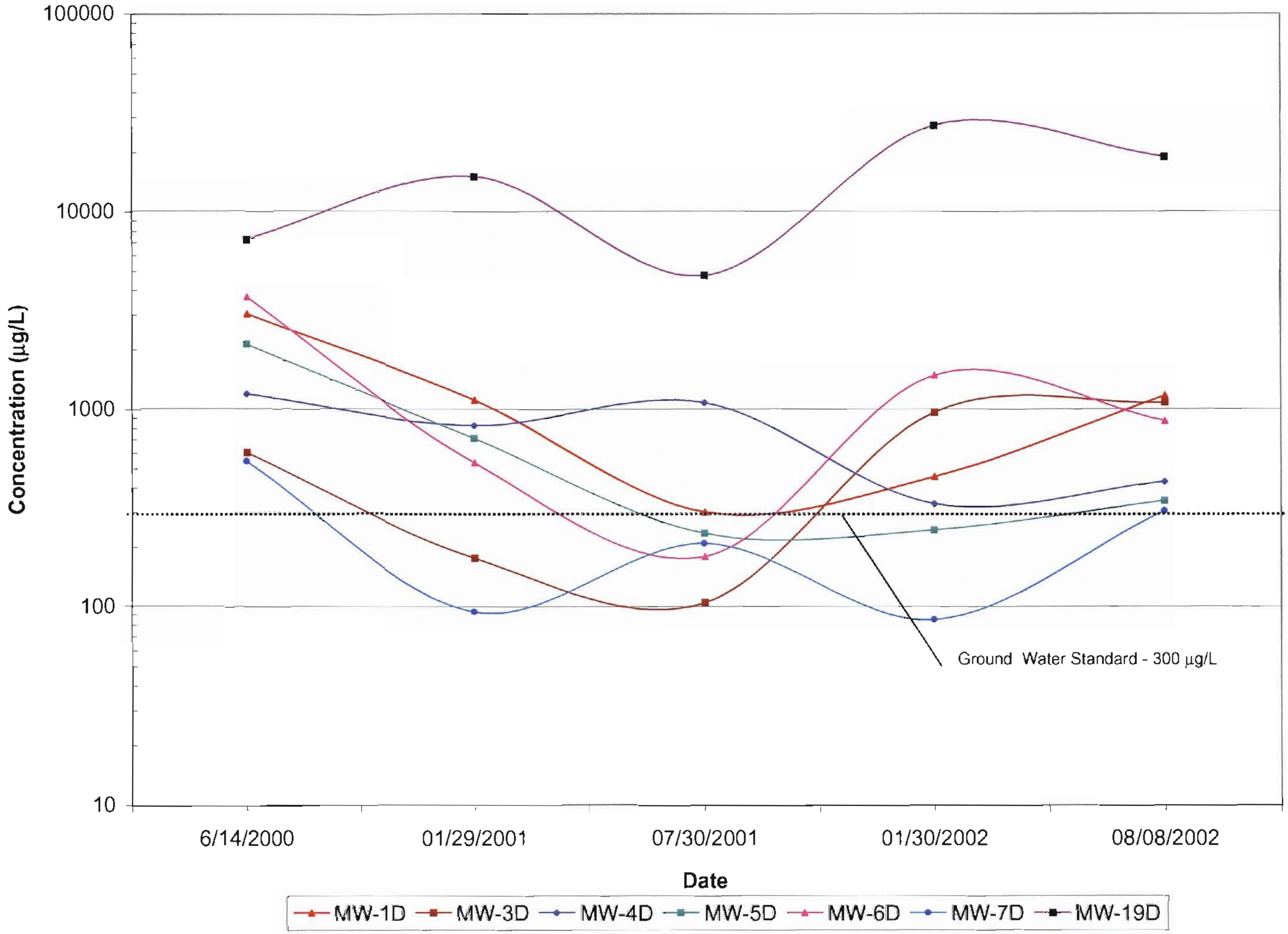


CIRCUITRON CORPORATION SUPERFUND SITE
Manganese Time-Series Graph



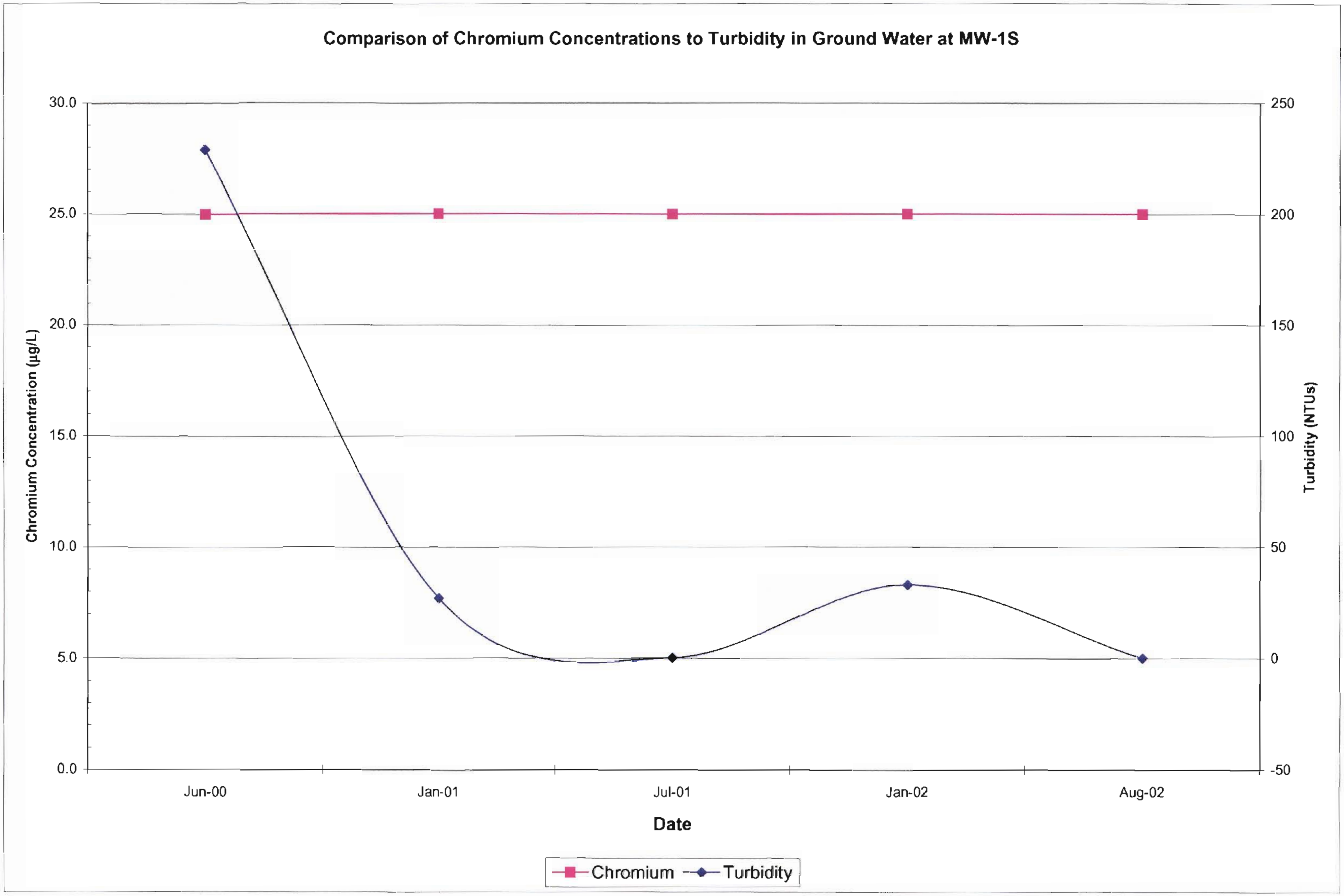

CIRCUITRON CORPORATION SUPERFUND SITE
Iron Time-Series Graph
Concentration (µg/L)
100000
10000
1000
100
10
Ground Water
Standard - 300 µg/L
6/21/2000
02/06/2001
08/08/2001
02/05/2002
08/08/2002
Date
MW-3S
MW-4S
MW-6S
MW-13
MW-14
MW-17
MW-19S

CIRCUITRON CORPORATION SUPERFUND SITE
Iron Time-Series Graph

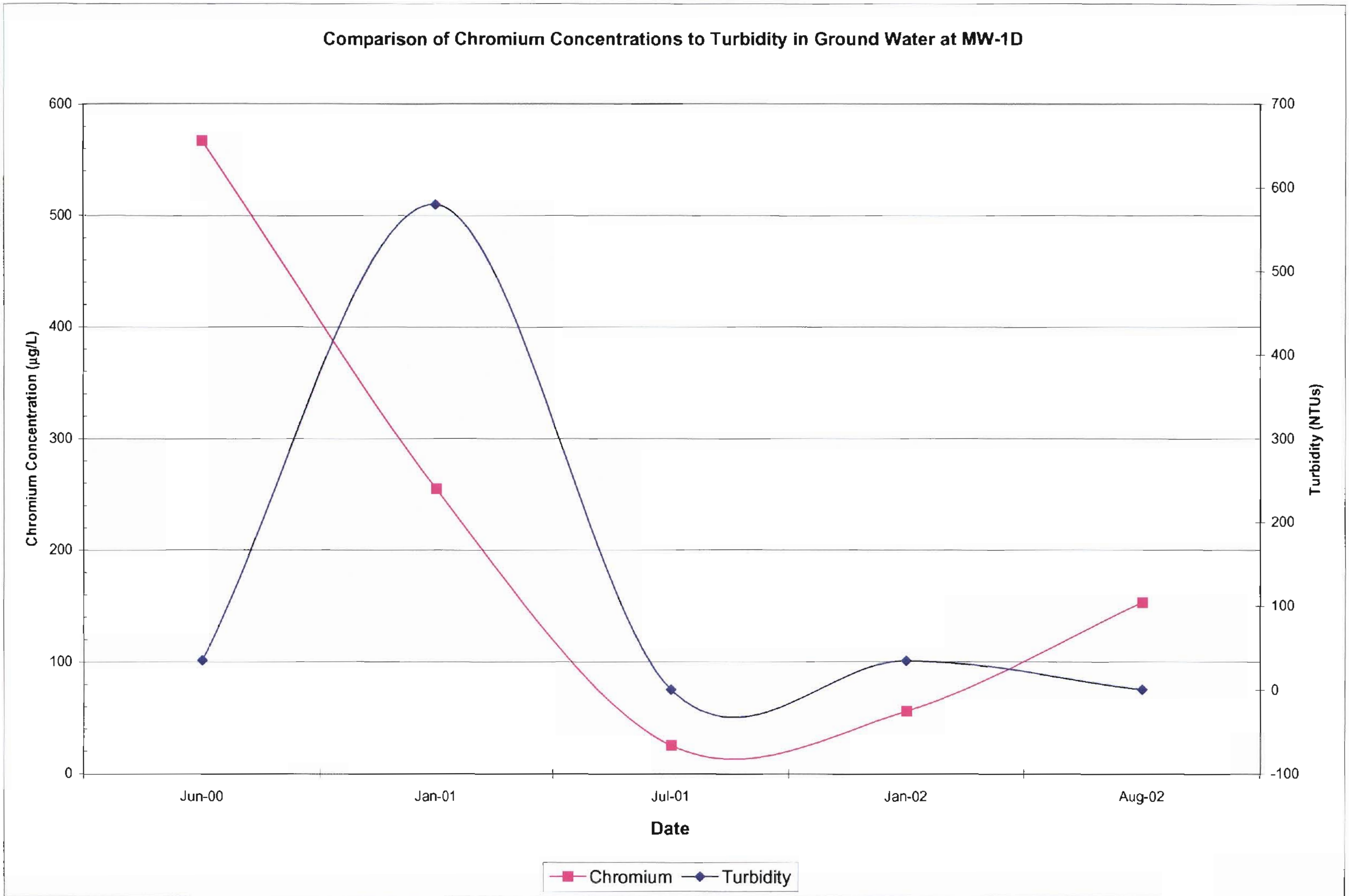


APPENDIX C

Appendix C
Time-Series Graphs for Chromium and Turbidity

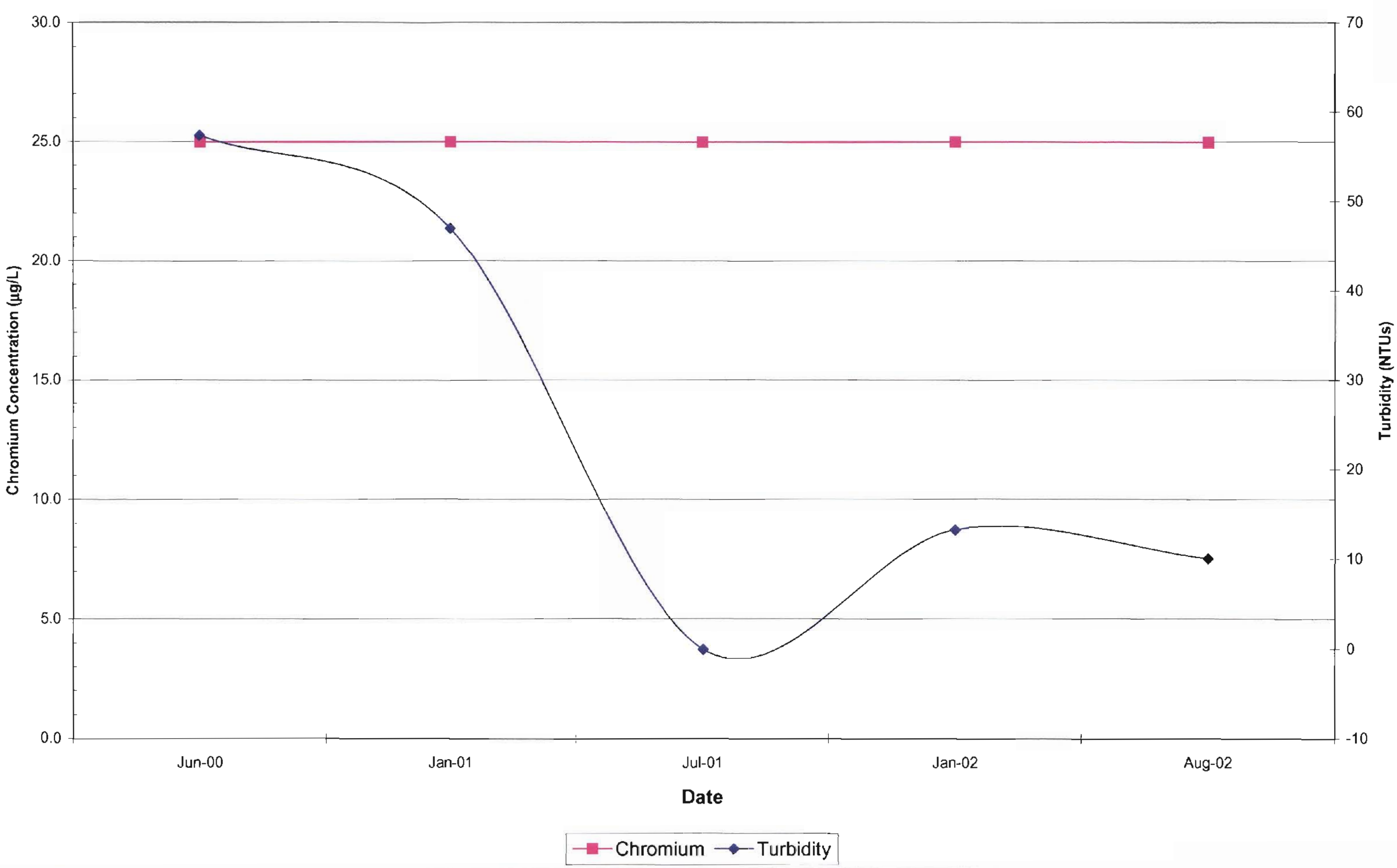


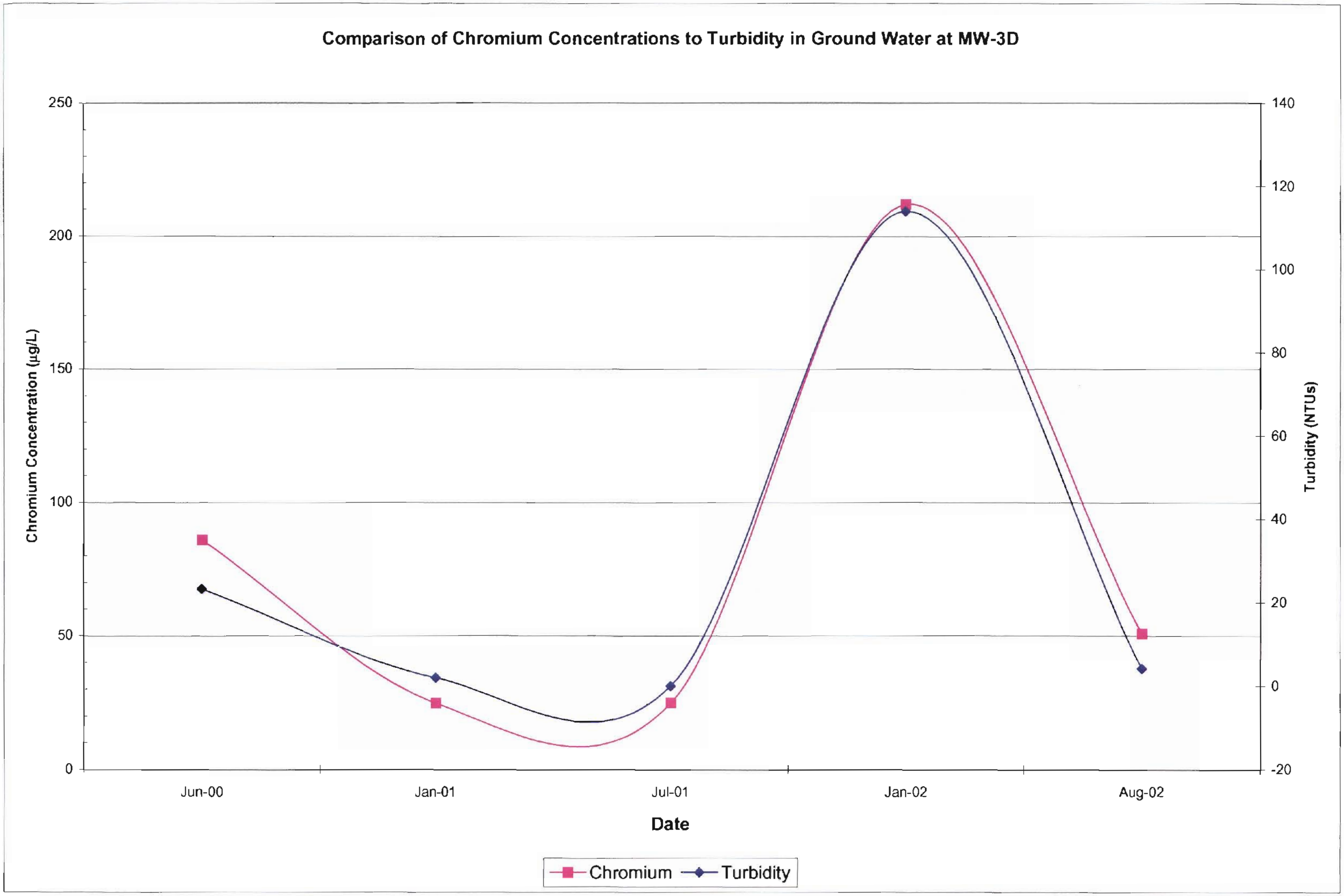
Comparison of Chromium Concentrations to Turbidity in Ground Water at MW-1S
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Chromium Concentration (µg/L)
250
200
150
100
50
0
-50
Turbidity (NTUs)
Jun-00
Jan-01
Jul-01
Jan-02
Aug-02
Date
Chromium
Turbidity

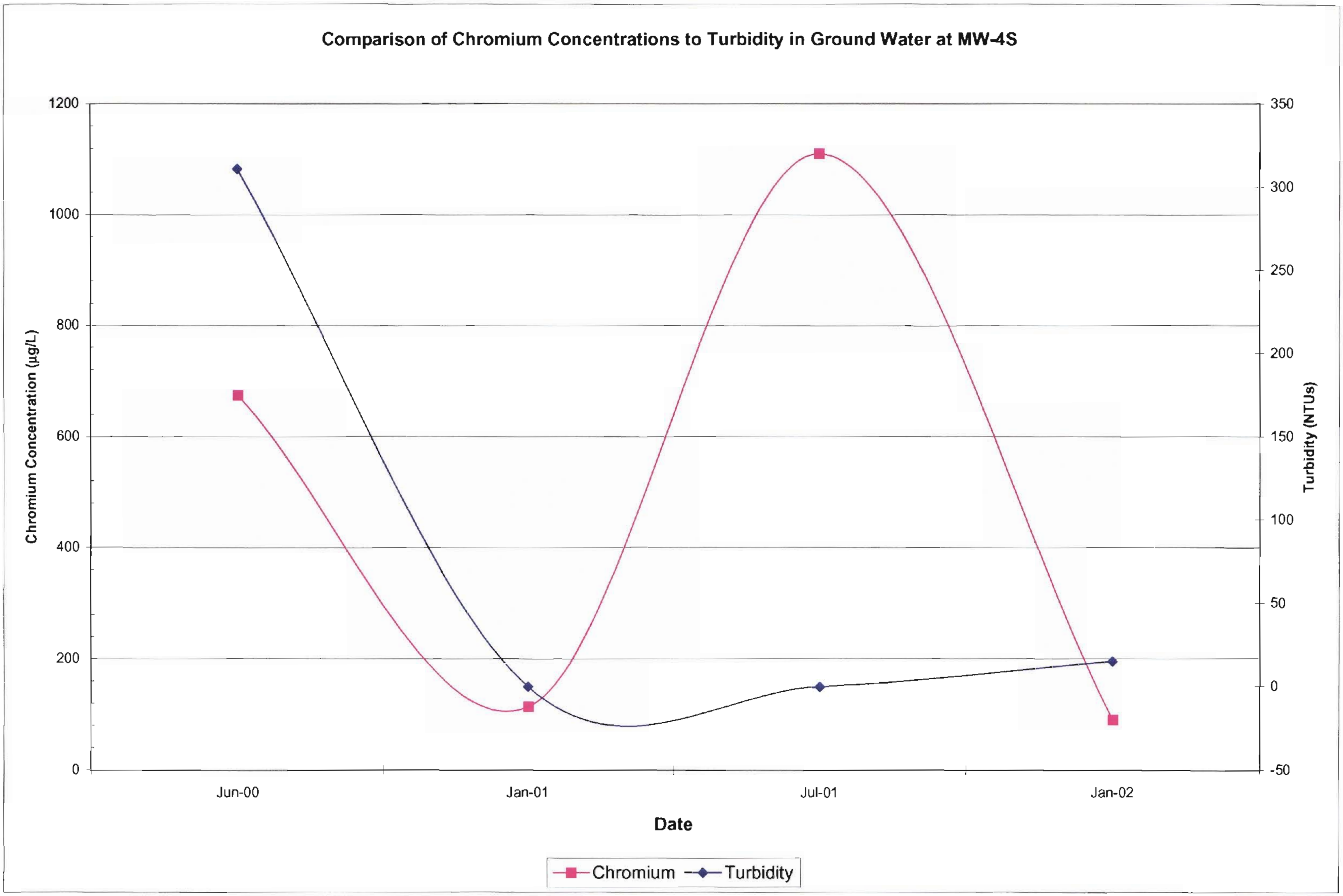


Comparison of Chromium Concentrations to Turbidity in Ground Water at MW-1D
Chromium Concentration (µg/L)
Turbidity (NTUs)
Date
Jun-00
Jan-01
Jul-01
Jan-02
Aug-02
Chromium
Turbidity

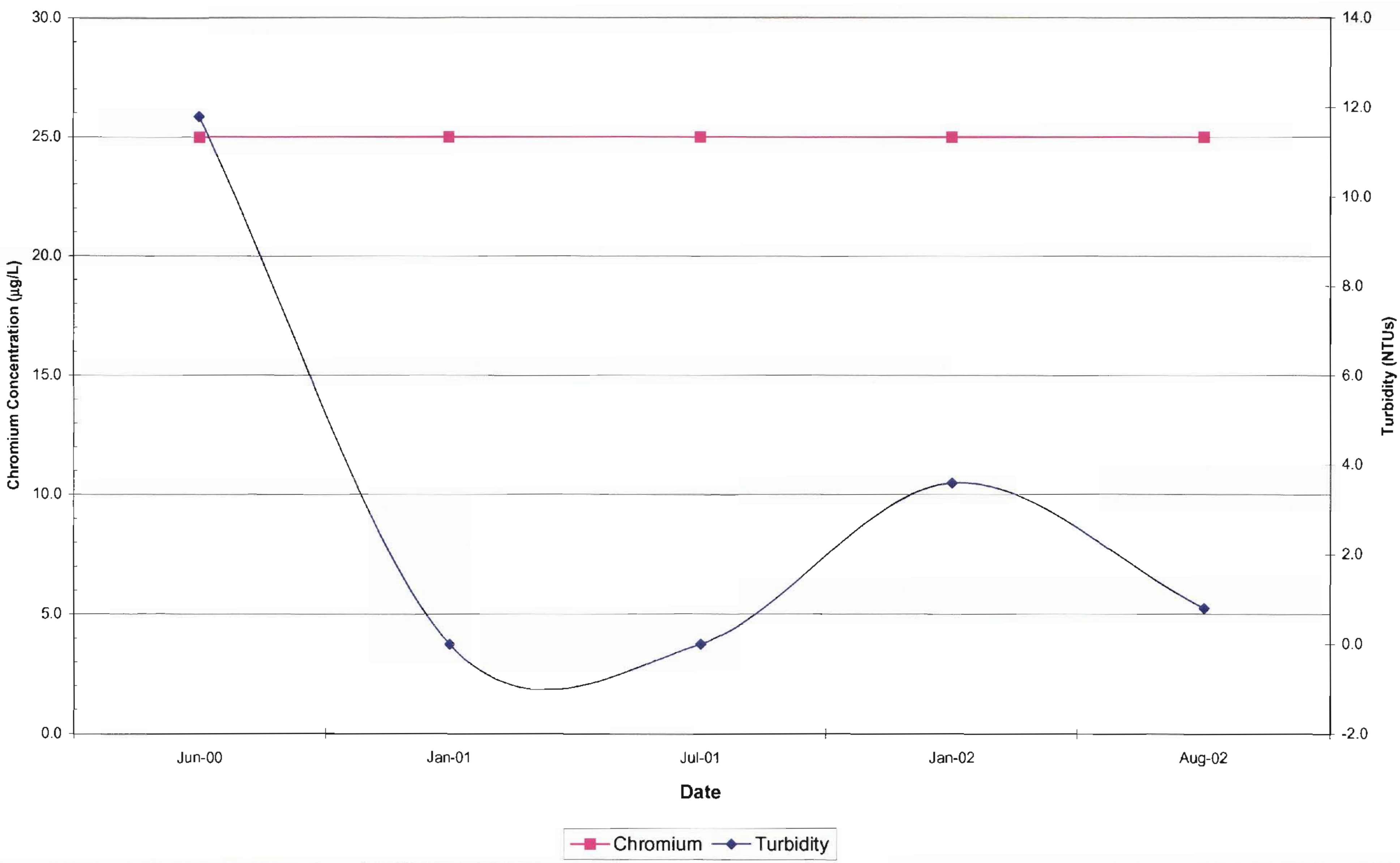
Comparison of Chromium Concentrations to Turbidity in Ground Water at MW-3S

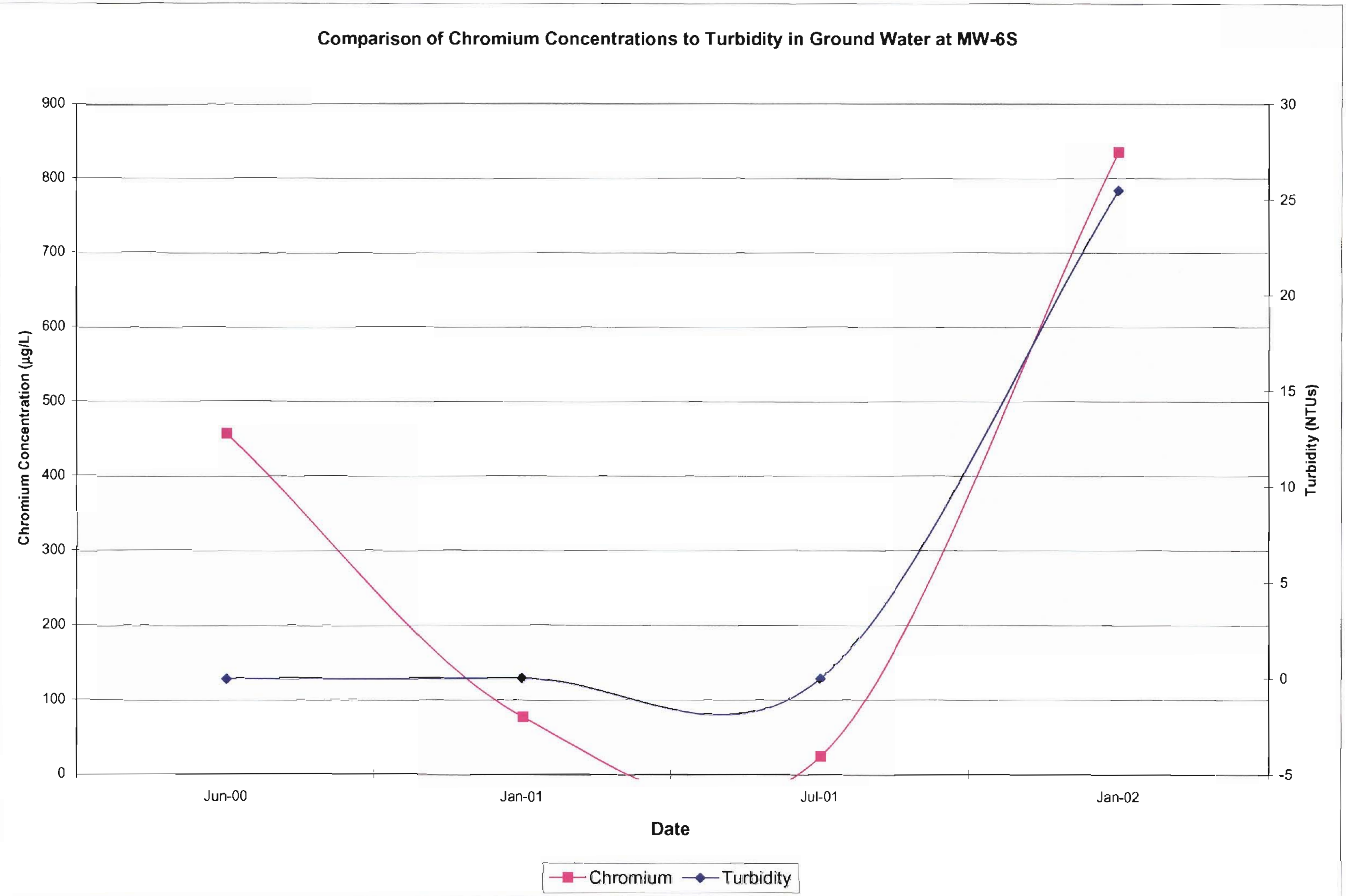


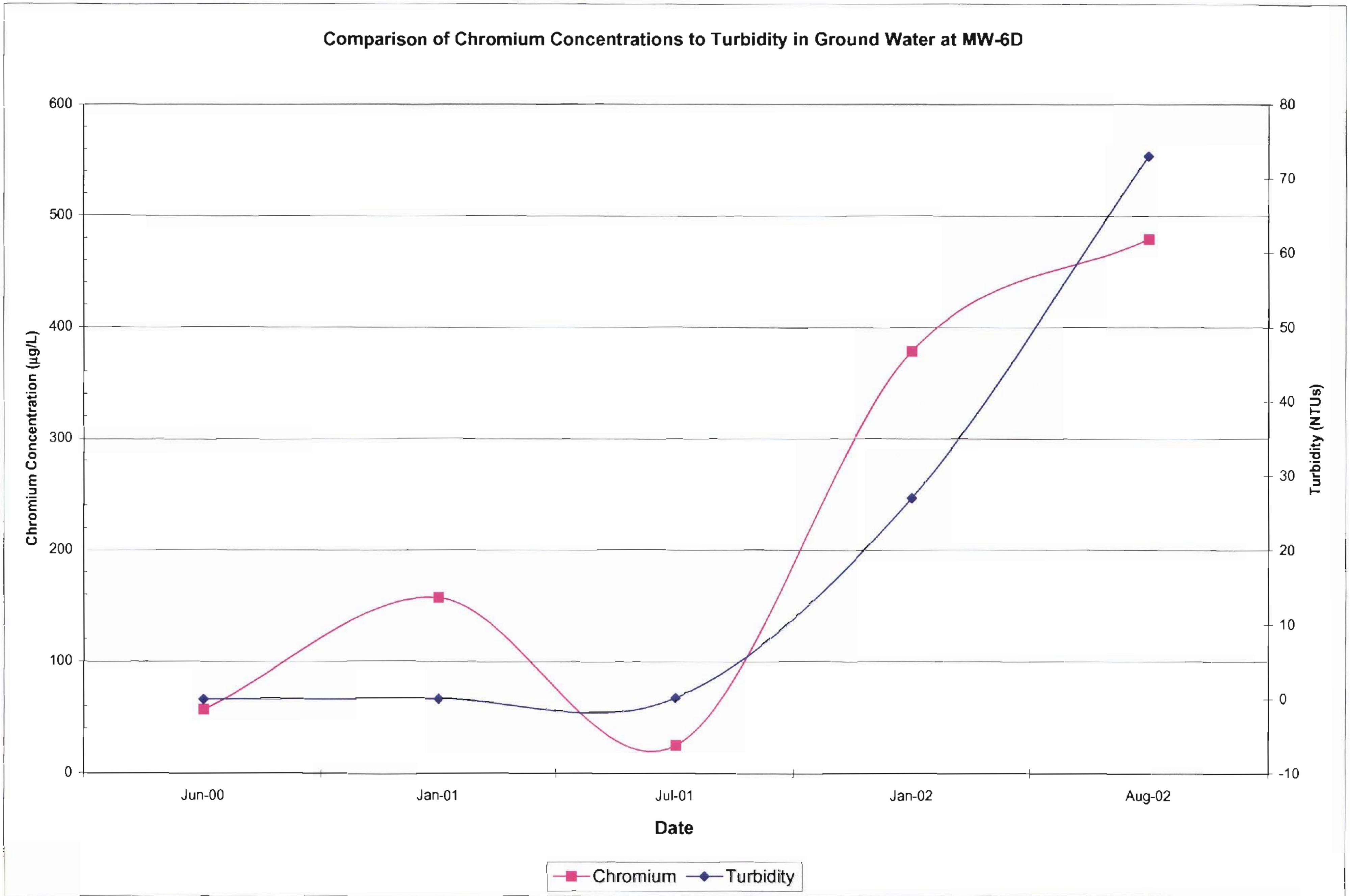

Comparison of Chromium Concentrations to Turbidity in Ground Water at MW-3D
Chromium Concentration (µg/L)
250
200
150
100
50
0
Turbidity (NTUs)
140
120
100
80
60
40
20
0
-20
Jun-00
Jan-01
Jul-01
Jan-02
Aug-02
Date
Chromium
Turbidity


Comparison of Chromium Concentrations to Turbidity in Ground Water at MW-4S
Chromium Concentration (µg/L)
1200
1000
800
600
400
200
0
Turbidity (NTUs)
350
300
250
200
150
100
50
0
-50
Jun-00
Jan-01
Jul-01
Jan-02
Date
Chromium
Turbidity

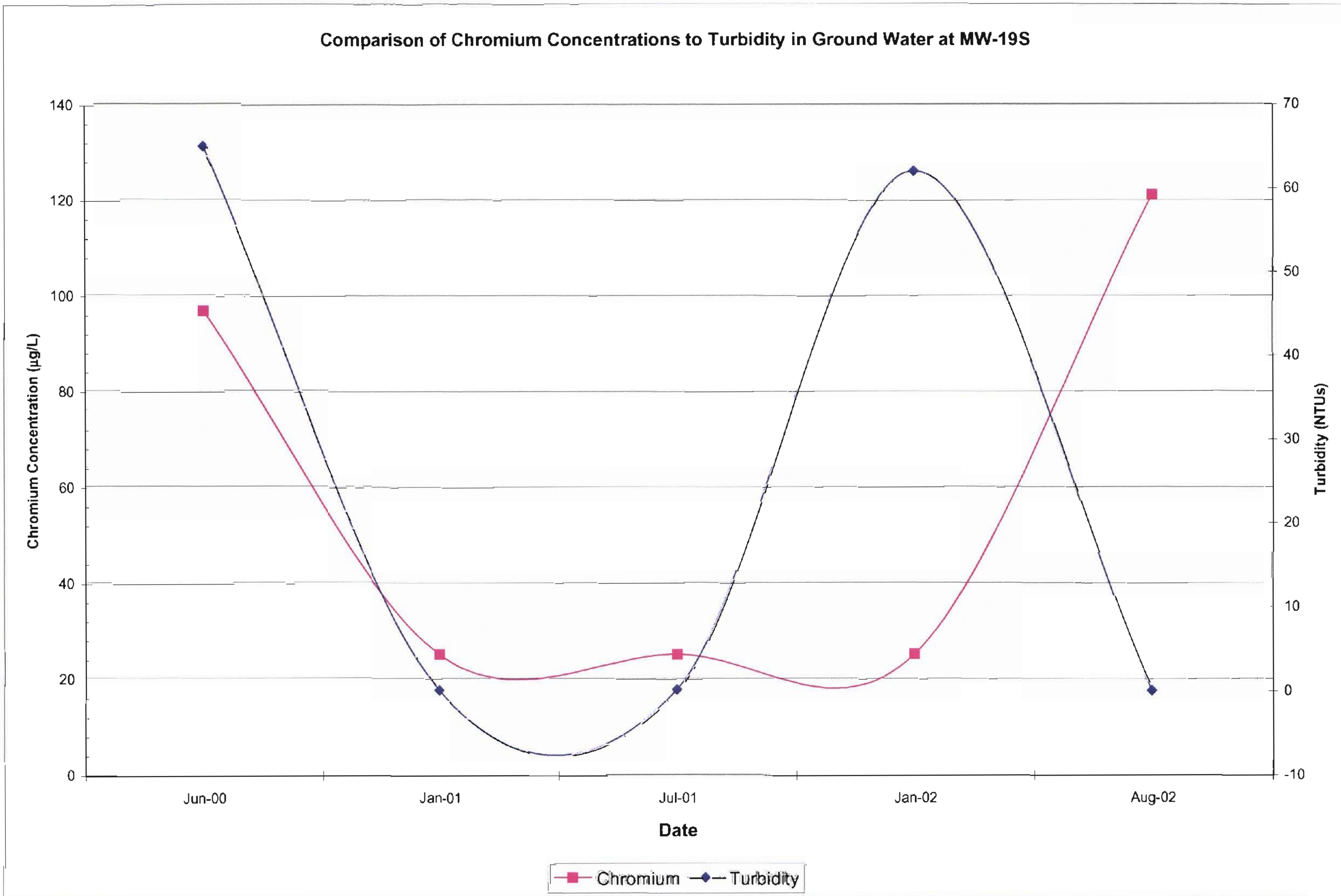
Comparison of Chromium Concentrations to Turbidity in Ground Water at MW-4D




Comparison of Chromium Concentrations to Turbidity in Ground Water at MW-6S
Chromium Concentration (µg/L)
900
800
700
600
500
400
300
200
100
0
Turbidity (NTUs)
30
25
20
15
10
5
0
-5
Jun-00
Jan-01
Jul-01
Jan-02
Date
Chromium
Turbidity



Comparison of Chromium Concentrations to Turbidity in Ground Water at MW-6D
Chromium Concentration (µg/L)
600
500
400
300
200
100
0
Turbidity (NTUs)
80
70
60
50
40
30
20
10
0
-10
Jun-00
Jan-01
Jul-01
Jan-02
Aug-02
Date
Chromium
Turbidity


Comparison of Chromium Concentrations to Turbidity in Ground Water at MW-19S
Chromium Concentration (µg/L)
140
120
100
80
60
40
20
0
Turbidity (NTUs)
70
60
50
40
30
20
10
0
-10
Jun-00
Jan-01
Jul-01
Jan-02
Aug-02
Date
Chromium
Turbidity

Comparison of Chromium Concentrations to Turbidity in Ground Water at MW-19D