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1999 ANNUAL REMEDIAL ACTION GROUND-WATER MONITORING REPORT ORMET CORPORATION SUPERFUND SITE HANNIBAL, OHIO

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BACKGROUND/INTRODUCTION

Under the terms of a Consent Decree entered on December 18, 1995 between the United States Environmental Protection Agency (USEPA) and the Ormet Primary Aluminum Corporation for the Ormet Corporation Superfund Site, Ormet has undertaken Remedial Action (RA) at the site consisting of the following:

- Containment of the plume in the alluvial aquifer through continued pumping of the interceptor wells and Ormet Ranney well and treatment of ground water pumped by the interceptor wells using ferrous salt precipitation;

- Installation and operation of a soil flushing system in the Former Spent Potliner Storage Area (FSPSA);

- Capping of the former construction material scrap dump (CMSD) with a multi-layer cap, including construction of a TSCA-compliant cell within the CMSD for disposal of backwater area sediment containing PCBs;

- Installation of a drain system around the toe of the former CMSD to collect seeps, with treatment of the collected seep water using activated carbon followed by treatment at the ground-water treatment plant;

- Excavation of carbon material from the former carbon runoff and deposition area and disposal of the material in the former CMSD;

- Excavation of sediment from the former Outfall 004 backwater area and disposal of the sediment in the CMSD; and

- Relocation of the Outfall 004 channel.

Areas of the site that were subject to remedial action are shown in Figure 1.

Remedial construction was initiated in April 1997 and was certified as being complete in August 1998. During the period from August1998 through October 1998, the FSPSA soil flushing system was operated on a trial basis, with flushing occurring for a period of approximately three hours per day. Beginning in April 1999, the soil flushing system began full operation (i.e., flushing for eight hours per day).

As specified in the Statement of Work (SOW) attached to the Consent Decree, Ormet began a program of routine ground-water monitoring in conjunction with the completion of remedial construction. The purpose of ground-water monitoring is to document/evaluate changes in ground-water conditions beneath the site associated with the remedial actions. To provide a baseline characterization of ground-water conditions immediately prior to remedial activities, a sitewide ground-water monitoring event was conducted during May 5 to 9, 1997. Routine ground-water monitoring was initiated in May 1998. Ground- water monitoring activities have been conducted in accordance with the Remedial Action Ground-Water Monitoring Plan (Revision 1 - April 28, 1997), which was submitted to the USEPA during Remedial Design.

SUMMARY OF GROUND-WATER MONITORING PROGRAM

The current system of ground-water monitoring wells and piezometers at the Ormet site is shown in Figure 1. Under the RA Ground-Water Monitoring Plan, monitoring is to be conducted three times per year (approximately once every four months). During 1999, ground-water monitoring events were conducted, during January 12 to14, May 17 to 20, and September 7 and 8.

Each monitoring event included measurement of water-level elevations at all MW- and TH-series monitoring wells, PPB-series piezometers monitoring the alluvial aquifer, and at the Ohio River pool measuring point RP-1. Water-level elevation data collected in conjunction with the 1999 monitoring events are provided in Tables 1, 2, and 3, respectively.

During each monitoring event, ground-water samples were collected from the following wells located within and downgradient of the FSPSA:

MW - 2	MW - 31
MW - 5	MW - 32
MW - 16	MW - 35
MW - 18	MW - 36
MW - 28	MW - 37

Each monitoring event also included sampling of monitoring well MW-12, located immediately downgradient of the CMSD. These wells were identified in the RA Ground-Water Monitoring Plan as Points of Compliance, as required under Section II.6. of the Consent Decree SOW.

The RA Ground-Water Monitoring Plan specifies that one monitoring event each year is to be an expanded monitoring event which includes sampling of selected wells not hydraulically downgradient from any of the potential source areas at the site (i.e., background wells) and additional wells located within the plume outside of the FSPSA. These wells include the following:

MW-1	MW-29S & D
MW-7 (background)	MW-30
MW-8	MW-34S & D
MW-10	MW-39S & D
MW-11	MW-40S & D
MW-15	MW-41 (background)
MW-17	MW-42S & D
MW-19 (background)	

Water Sampling Log forms for each of the monitoring events conducted during 1999 are provided in Appendix A.

The primary purpose of the annual expanded monitoring event is to collect data to facilitate preparation of plume isopleth maps. Based on the isopleth maps, estimates of contaminant mass-in-place and the total area of the aquifer exceeding cleanup goals for selected indicator parameters were made and compared with estimates based on historical monitoring results as a means of assessing the progress of the remediation program. The expanded monitoring event to characterize baseline conditions at the start of remedial construction in 1997 was conducted in May. To enable more direct comparison of the associated estimates of contaminant mass-in-place and aquifer area exceeding cleanup goals, subsequent expanded monitoring events have also been conducted during May.

Ground-water samples from all monitoring wells were analyzed for constituents for which cleanup goals were specified in the Record of Decision (ROD) for the site; i.e., arsenic, beryllium, cyanide, manganese, vanadium, and fluoride. Samples were also analyzed for pH, specific conductance, and sodium, which are additional indicators of the plume in the alluvial aquifer. Tetrachlorothene (PCE) was analyzed in samples from the MW-2, MW-5, MW-18, MW-30, and MW-31 monitoring wells, in which PCE was detected during the Remedial Investigation (RI). Ground-water analyses were performed by Kemron Environmental Services, Inc. (Kemron) of

Marietta, OH. Kemron also provided analytical services during the RI, for treatability testing performed during Remedial Design, and during remedial construction. Methods used by Kemron to analyze ground-water samples from the RA monitoring events were as shown below.

Analytical Parameter	Analytical Method	Ground-Water Clean-Up Goal (ug/L)	Reporting Limit (ug/L)
Arsenic	SW846/6010A-trace ICP	10*	4
Beryllium	SW846/6010A-trace ICP	4	0.5
Manganese	SW846/6010A	230*	10
Vanadium	SW846/6010A	260	10
Cyanide (total)	SW846/9010A	N/A	10
Cyanide (amenable)	SW846/9010A	200	10
Fluoride	EPA 340.2	4000	100
Tetrachloroethene	SW846/8260A	5	5
pH	EPA 150.1	N/A	N/A
Specific Conductance	EPA 120.1	N/A	N/A
Sodium	SW846/6010A	N/A	500

N/A - Not Applicable

* - Final determination of cleanup goals for arsenic and manganese are pending. The USEPA and Ormet negotiated a Consent Decree and associated Statement of Work for implementation of the ROD. Because arsenic and manganese are common ground-water constituents in the Ohio River Valley and can occur naturally at concentrations above the cleanup goals presented in the ROD, the SOW specified that as part of the Remedial Design process, Ormet would conduct a statistical evaluation to determine background levels of arsenic and manganese in the alluvial aquifer. The resulting background levels would then be considered for use as cleanup goals in place of the levels presented in the ROD. The results of the statistical analyses, which were presented to USEPA in the August 28, 1996 HydroSystems Management, Inc. report titled, "Statistical Analyses of Background Levels of Manganese and Arsenic in Ground Water", indicated background levels of 40 ug/L for arsenic and 9,780 ug/L for manganese.

Laboratory analytical reports for the 1999 monitoring events are provided in Appendix B. The analytical results are summarized in Table 4. For purposes of comparison, Table 4 also includes historical results for the parameters and wells being monitored. Analytical results for the 1999

monitoring events were validated by applying principles and concepts of the USEPA National Functional Guidelines. A data validation summary report is provided in Appendix C.

RESULTS OF 1999 REMEDIAL ACTION GROUND-WATER MONITORING

GROUND-WATER FLOW

Water-level elevation data collected during the 1999 monitoring events (Tables 1 through 3) were used to construct the water table contour maps shown in Figures 2, 3, and 4. The ground-water elevation contours and associated ground-water flow patterns shown in Figures 2 through 4 are consistent with those previously mapped, indicating that the ground-water pumping component of the site remedy is effective in containing the plume in the alluvial aquifer beneath the Ormet Reduction Mill property and extracting contaminated ground water for treatment at Ormet's ground-water treatment plant. Ground-water flow in the alluvial aquifer is generally from northeast to southwest, toward the Ormet Reduction Mill Ranney well and interceptor wells. Current pumping maintains the water table at an elevation that is below the pool elevation of the Ohio River, and a hydraulic potential does not exist for the natural discharge of ground water from the alluvial aquifer to the Ohio River along the river/plant boundary. The ground-water elevation contour maps for the 1999 monitoring events indicate that the operation of the FSPSA soil flushing system has had no discernable effect on ground-water flow patterns beneath that area of the site.

Pumping by the Ormet Reduction Mill Ranney well and the Ormet Rolling Mill Ranney well (located approximately 2000 feet west of the Reduction Mill Ranney well) have created large cones of influence around each pumping center, which converge to form a gently rounded ground-water divide, situated roughly parallel to and west of the fenceline separating the two plants. A ground-water divide is a high point, or ridge, in the surface of the water table. The ground-water divide creates a hydraulic barrier, such that ground water on the west side of the divide flows toward the Rolling Mill Ranney well, and ground water on the east side flows toward the Reduction Mill Ranney well and interceptor well. By this condition, a hydraulic potential does not exist for ground water beneath the Reduction Mill to flow toward the Rolling Mill Ranney well.

GROUND-WATER QUALITY

Time vs. Concentration Trends

To evaluate changes in plume concentrations within the alluvial aquifer beneath the Ormet site, concentration versus time graphs were prepared for each monitoring parameter for which a cleanup goal was established in the ROD, with each parameter being graphed separately for each of the compliance point wells identified in the RA Ground-Water Monitoring Plan (see Appendix D). Analytical results for sodium have also been graphed, because it is an additional indicator of overall water quality in the plume. The graphs show the analytical results for the 1999 monitoring events, along with previous data. Summaries of time versus concentration trends and comparisons of the latest reported concentrations versus cleanup goals or background concentrations for the compliance wells are provided in the following tables. Possible time versus concentration trends were evaluated primarily with regard to the more recent results (e.g., 1995 or later).

SUMMARY OF TIME VS. CONCENTRATION TRENDS

	TOTAL CN	AMEN. CN	As	Be	Mn	V	F	Na
Wells within FSPSA								
MW - 32	⇓⇑	–	⇓⇑	–	⇑	⇑	⇓⇑	⇓⇑
MW - 35	⇑	⇑	⇓	–	--	–	⇓	--
MW - 36	--	--	⇑	⇓	--	--	⇓	⇓
MW - 37	--	--	⇓	--	⇓	--	⇓	⇓
Downgradient Edge of FSPSA								
MW - 16	⇑	⇑	--	–	⇑	–	--	--
MW - 18	⇑	⇑	--	--	--	--	--	⇓
MW - 28	⇓	⇓	--	--	--	--	--	--
MW - 31	⇑	--	⇑	⇑	⇑	⇑	⇑	⇑
Mid - Plant Area								
MW - 2	⇑	--	--	⇓	–	⇓	⇓	⇓
MW - 5	⇓⇑	--	--	--	--	--	--	--
Downgradient of CMSD								
MW - 12	--	–	–	–	⇑	–	⇓	–

Total CN - Total Cyanide; Amen. CN - Amenable Cyanide; As - Arsenic; Be - Beryllium; Mn - Manganese; V - Vanadium; F - Fluoride; Na - Sodium

⇑ - Trend of increasing concentration. ⇓ - Trend of decreasing concentration. -- No apparent trend.

Combinations of symbols indicate changes in trends.

COMPARISON OF LATEST REPORTED CONCENTRATION VERSUS CLEANUP GOALS/BACKGROUND

	AMEN. CN	As	Be	Mn	V	F
Wells within FSPSA						
MW - 32			*	+	*	
MW - 35		+	*	+	*	
MW - 36			*	+	*	
MW - 37		*	*	+	*	
Downgradient Edge of FSPSA						
MW - 16		*	*	+	*	
MW - 18			*	+	*	
MW - 28	*	*	*	*	*	*
MW - 31			*	+	*	
Mid-Plant Area						
MW - 2			*	+	*	
MW - 5	*	*	*	*	*	
Downgradient of CMSD						
MW - 12	*	*	*	+	*	*

Amen. CN - Amenable Cyanide; As - Arsenic; Be - Beryllium; Mn - Manganese; V - Vanadium; F - Fluoride
* - Latest result at or below ROD Cleanup Goal.
+ - Latest result above Cleanup Goal, but below background.
Blanks indicate latest result is above cleanup goal. For arsenic, a blank indicates latest result is above background.

Discussions of the time versus concentrations trends for each parameter for which a cleanup goal has been established are provided in the following sections.

Cyanide (Amenable to Chlorination)

The cleanup goal for cyanide established in the ROD (0.2 mg/L) is the Safe Drinking Water Act Maximum Contaminant Level (MCL) for cyanide amenable to chlorination. Cyanide amenable to chlorination is that portion of total cyanide which is weakly bound in cyanide complexes or is in the form of free (non-complexed) cyanide. Cyanide amenable to chlorination is a more reactive form of cyanide than the more strongly bound metal-cyanide complexes (e.g., iron cyanide). The form of cyanide occurring in the ground water beneath the Ormet site appears to be predominantly the stable cyanide complexes, which exhibit relatively low toxicity. This interpretation is supported by the relative concentrations of total versus amenable or free cyanide reported in ground-water samples from the site; i.e., the concentration of amenable or free cyanide is typically much lower than the total cyanide concentration in a sample. Also, the area of the alluvial aquifer containing concentrations of amenable cyanide above the cleanup goal is smaller than the area of aquifer containing total cyanide at levels above 0.2 mg/L. This comparison is further discussed later in this report.

Analyses for amenable cyanide tend to be subject to a higher degree of variability than other plume indicators, such as total cyanide and fluoride. Consequently, concentration versus time graphs for amenable cyanide are somewhat erratic and exhibit less consistent trends. For this reason, the long-term concentration trends for amenable cyanide at a given monitoring well are more significant than fluctuations observed from one monitoring event to the next.

Concentration versus time graphs for amenable cyanide are presented in Appendix D-1. At three of the eleven compliance point wells, the most recently reported amenable cyanide concentration was below the clean-up goal of 0.2 mg/L. At three of the wells (MW-16, MW-18, and MW-35), amenable cyanide concentrations exhibit an upward trend.

Fluoride

Of the main plume indicators, fluoride is less prone to analytical variability than cyanide, and is potentially a more reliable indicator of changes in overall plume quality. Concentration versus time graphs for fluoride for each of the compliance wells are provided in Appendix D-2.

The most recent result for fluoride was below the cleanup goal of 4 mg/L at two of the eleven compliance point wells, MW-12 and MW-28, and a downward concentration trend was observed at five of the compliance wells (MW-2, MW-12, MW-35, MW-36, and MW-37). The only compliance wells in which the concentration of fluoride exhibits an increasing trend are MW-31 and MW-32. MW-31 is about 100 feet downgradient of the soil flushing area. At MW-32, the concentration of fluoride, which was 12 mg/L to 13 mg/L during the previous three monitoring events, increased to 120 mg/L during the September 1999 monitoring event. As shown on the ground-water contour maps for the 1999 monitoring events, (Figures 2, 3, and 4), the MW-32 monitoring well is located near the downgradient edge of the FSPSA soil flushing area. Increases in concentrations of fluoride at MW-31 and MW-32 are believed to reflect increased leaching of residual spent potliner materials in the soil of the FSPSA as a result of soil flushing.

Arsenic

Concentration versus time graphs for arsenic for each of the compliance point wells are provided in Appendix D- 3. At five of the eleven compliance point wells, MW-2, MW-5, MW-16, MW-35, and MW-37, the concentrations of arsenic reported during recent sampling events are substantially lower than levels reported during the Phase I RI. For two of these wells (MW-35 and MW-37), the data exhibit a continuing downward trend. Data for the MW-31 and MW-36 wells show an increasing trend. At MW-32, arsenic, which had been below detection (<0.004 mg/L) during the previous four monitoring events, increased to 0.057 mg/L during the September 1999 monitoring event. As discussed above for fluoride, the MW-31 and MW-32 wells are near the downgradient edge of the FSPSA soil flushing area, and MW-36 is within the soil flushing area.

Increases in concentrations of arsenic at these wells are believed to reflect increased leaching of residual spent potliner materials in the soil of the FSPSA as a result of soil flushing.

As discussed earlier in this report, the final cleanup goal for arsenic is pending. In the ROD, the cleanup goal for arsenic was set at 0.010 mg/L. The MCL for arsenic is 0.050 mg/L. Because arsenic is a common constituent of ground water in the Ohio River Valley for which naturally-occurring concentrations can exceed the cleanup goal presented in the ROD, the SOW specified that as part of the Remedial Design process, Ormet would conduct a statistical evaluation to determine the background level of arsenic in the alluvial aquifer. The resulting background level would then be considered for use as the cleanup goal in place of the level presented in the ROD. The results of the statistical analyses, which were presented to USEPA in the August 28, 1996 HydroSystems Management, Inc. report titled, "Statistical Analyses of Background Levels of Manganese and Arsenic in Ground Water", indicated a background level of 0.040 mg/L for arsenic. At five of the compliance wells (MW-5, MW-12, MW-16, MW-28, and MW-37), the most recent results are below the 0.010 mg/L cleanup goal presented in the ROD. At MW-35, the most recent result is below the background value of 0.040 mg/L.

Beryllium

Concentration versus time graphs for beryllium are provided in Appendix D-4. The cleanup goal for beryllium established in the ROD was the MCL, 0.004 mg/L. Beryllium was reported above the MCL only in samples collected during the Phase I RI (June/July 1988) and only at two wells: MW-18 and MW-37. Since the Phase I RI, beryllium has been consistently below the MCL in all samples analyzed, including samples from all of the compliance point monitoring wells during each of the 1999 monitoring events. At the MW-31 well, which is just downgradient of the FSPSA soil flushing area, data collected since July 1996 suggest an increasing trend, but the values for the 1999 monitoring events (0.011 mg/L to 0.0014 mg/L) are still below the MCL.

Manganese

Concentration versus time graphs for manganese are provided in Appendix D-5. Manganese results for MW-12, MW-16, MW-31, and MW-32 show slight increasing trends during more recent monitoring events. As discussed above for other monitoring parameters, the MW-16, MW-31, and MW-32 wells are located near the downgradient edge or just downgradient from the FSPSA soil flushing area. Increases in manganese concentrations at these wells are believed to reflect increased leaching of residual spent potliner materials in the soil of the FSPSA as a result of soil flushing.

As discussed for arsenic, the final cleanup goal for manganese is pending. In the ROD, the cleanup goal for manganese was set at 0.230 mg/L. Because manganese is a common constituent of ground-water in the Ohio River Valley for which naturally-occurring concentrations can be well above the cleanup goal presented in the ROD, the SOW specified that as part of the remedial Design process, Ormet would conduct a statistical evaluation to determine the background level of manganese in the alluvial aquifer. The resulting background level would then be considered for use as the cleanup goal in place of the level presented in the ROD. The results of the statistical analyses, which were presented to USEPA in the August 28, 1996 HydroSystems Management, Inc. report titled, "Statistical Analyses of Background Levels of Manganese and Arsenic in Ground Water", indicated a background level of 9,780 ug/L for manganese.

At MW-5 and MW-28, the most recent results for manganese are below the 0.230 mg/L cleanup goal presented in the ROD. Manganese concentrations were below the background level in all of the compliance wells during each of the 1999 monitoring events.

Vanadium

Concentration versus time graphs for vanadium are provided in Appendix D-6. The cleanup goal for vanadium established in the ROD was 0.260 mg/L. As with beryllium, vanadium was reported at or above the cleanup goal only in samples collected during the Phase I RI (June/July

1988) and only at two wells: MW-2 and MW-37. Since the Phase I RI, vanadium has been consistently below the cleanup goal in all samples analyzed, including samples from all of the compliance point monitoring wells during all of the 1999 monitoring events.

Tetrachloroethene (PCE)

Under the RA Ground-Water Monitoring Plan, analyses for tetrachloroethene (PCE) were performed on samples from five of the compliance wells where PCE was detected during the RI, MW-2, MW-5, MW-18, MW-30, and MW-31. A graph showing PCE concentrations versus time for these five wells is provided as Appendix D-7. Since the Phase I RI, PCE concentrations have shown a decline at MW-2, MW-5, and MW-31; PCE levels have increased at MW-30. The cleanup goal for PCE is the MCL of 0.005 mg/L. The most recent results for PCE were at or below the MCL (also the detection limit) at MW-2, MW-5, and MW-31, indicating a decrease in the area of the aquifer affected by PCE.

Contaminant Mass-in-Place

In accordance with Section II.3.C. of the Consent Decree SOW, data from the May 1999 expanded routine monitoring event were used to estimate the masses of fluoride and cyanide (the primary plume indicators) in the alluvial aquifer as a means of evaluating the progress of the remediation. The procedure used for estimating the mass-in-place was as described in the RD Work Plan and the HydroSystems Management, Inc. (HMI) report titled, "Estimation of Dissolved Contaminant Mass in the Alluvial Aquifer, Ormet Primary Aluminum Corporation Superfund Site, Hannibal, Ohio" (August 28, 1996) that was submitted to the USEPA in conjunction with the 30% RD submittal. The approach used for estimation of contaminant mass-in-place is based on methods described in "Methods for Monitoring Pump-and-Treat Performance" (USEPA, July 1994). Results of the mass-in-place estimates for fluoride and cyanide are summarized in Table 5. For comparison, Table 5 also includes fluoride and cyanide mass-in-place estimates based on previous monitoring events. The mass-in-place estimates are based on the fluoride and total cyanide isopleth maps shown

in Figures 5 and 6. Data and supporting calculations for the May 1999 mass-in-place estimates are provided in Appendix E. Data and supporting calculations for the previous mass-in-place estimates have been submitted to the USEPA in prior reports.

Based on the estimates presented in Table 5, the mass of fluoride in the alluvial aquifer declined substantially during the period from June 1988 through January 1995. During this period, the estimated mass of fluoride in the alluvial aquifer declined approximately 67% (85,702 lbs. to 28,168 lbs.). The fluoride mass-in-place estimates since 1995 have shown relatively little variation. Using the data for the May 1999 monitoring event, the fluoride mass-in-place estimate was about 29,000 pounds.

With regard to cyanide, the mass-in-place estimates decreased for each monitoring event for which such estimates were made from 1988 to 1998. However, the estimated cyanide mass-in-place for the May 1999 monitoring event (5,566 pounds) is more than twice the estimate for May 1998 (2,597 pounds).

To assess the extent to which cyanide and fluoride continue to leach from soil in the FSPSA, the masses of fluoride and cyanide removed from the aquifer through pumping of the interceptor wells and Ranney well for the period between the two most recent expanded monitoring events (i.e., May 1998 through May 1999) were calculated and compared to the estimated masses in the aquifer. The masses of cyanide and fluoride removed through pumping of the interceptor wells were calculated using daily analytical and flow data for the influent to Ormet's ground-water treatment plant, which receives the water pumped by the interceptor wells. The masses of cyanide and fluoride removed through pumping of the Reduction Mill Ranney well were calculated using quarterly analytical data and daily flow data collected by Ormet for NPDES reporting purposes.

During the period from May 1998 to May 1999, approximately 29,500 pounds of fluoride and approximately 3,250 pounds of cyanide (total) were removed from the alluvial aquifer by the interceptor wells and Ranney well. During the same period, the estimated mass of fluoride in the

aquifer increased by approximately 5,000 pounds and the estimated mass of cyanide more than doubled (approximately 2,600 pounds to nearly 5,600 pounds). As discussed in the ROD and the remedial design documents for the Ormet site, the purpose of soil flushing in the FSPSA is to accelerate the rate at which contaminants are leached from the source area soils and subsequently removed from the aquifer and treated. Increases in the mass-in-place estimates despite the substantial masses of fluoride and total cyanide removed through pumping of the interceptor and Ranney wells suggest that soil flushing in the FSPSA, which was conducted part-time from August through October 1998 and full-time from April through October 1999, is increasing the rate at which leaching of residual spent potliner material occurs in the FSPSA. Over time, as the leachable material in the soils in the FSPSA is depleted, the removal of fluoride and cyanide mass from the aquifer through pumping of the interceptor and Ranney wells is expected to again result in decreases in the contaminant mass-in-place.

Aquifer Area Above Cleanup Goals

As a further check of the progress of the remediation, the approximate areas of the aquifer containing fluoride and cyanide at concentrations above their respective cleanup goals were estimated using analytical results from the May 1999 sampling event. The results are summarized in Table 5. The estimates of aquifer areas above the cleanup goal are based on the fluoride and amenable cyanide isopleth maps shown in Figures 5 and 7, respectively. For comparison, Table 5 also includes estimates of the aquifer areas above the fluoride and cyanide cleanup goals prepared for previous monitoring events. These estimates are based on plume isopleth maps submitted to the USEPA in previous reports.

The area of the alluvial aquifer containing fluoride above the cleanup goal increased slightly between 1988 (approximately 43 acres) and 1995 (approximately 48 acres). Since 1995, the area above the cleanup goal for fluoride has decreased about 27%, to approximately 35 acres.

The area of the aquifer with concentrations of amenable cyanide above the cleanup goal of 0.2 mg/L shows a substantially greater degree of variability than for fluoride. As discussed previously, analyses for amenable cyanide tend to be subject to a higher degree of variability than other plume indicators, such as total cyanide and fluoride. For these reasons, trends in the area of the aquifer with amenable cyanide above its cleanup goal tend to be less consistent and should be regarded in a long-term context. The area of the aquifer exceeding the cleanup goal for amenable cyanide that was calculated using data from the 1999 expanded monitoring event was 27.5 acres, compared to 10.5 acres in 1998.

As discussed previously in this report, analytical results for total cyanide and cyanide amenable to chlorination indicate that the form of cyanide occurring in the ground water beneath the Ormet site is predominantly the stable, cyanide complexes. This interpretation is supported by a comparison of the area of the alluvial aquifer with total cyanide concentrations above 0.2 mg/L to the area of the aquifer with amenable cyanide concentrations above 0.2 mg/L. As shown in Figure 8, the area of the aquifer with amenable cyanide above 0.2 mg/L is substantially less than the area with total cyanide above 0.2 mg/L.

SUMMARY/CONCLUSIONS

- Pumping of Ranney well and interceptor wells continues to provide containment of the plume beneath the Ormet property and removes contaminant mass from the alluvial aquifer.

- Operation of the soil flushing system had no discernable effect on ground-water flow patterns beneath the FSPSA, and the flow of ground water continues to be from the river to the aquifer.

- Analytical results for the 1999 monitoring events indicate increases in concentrations of several parameters (e.g., cyanide, fluoride, arsenic) at wells near the downgradient edge of the FSPSA soil flushing area (including MW-31, MW-32, and, to some degree, MW-16), suggesting increased leaching of residual spent potliner materials in the soil of the FSPSA as a result of soil flushing.

- Pumping of the interceptor wells and Ranney well removed approximately 29,500 pounds of fluoride and approximately 3,250 pounds of cyanide from the alluvial aquifer during the period May 1998 to May 1999.

- During the same period, the estimated mass of fluoride in the aquifer increased by about 5,000 pounds (21%) and the mass of cyanide in the aquifer more than doubled (from 2,597 pounds to 5,566 pounds).

- Increases in the mass-in-place estimates, despite the masses of fluoride and cyanide removed from the aquifer by pumping, suggest that soil flushing in the FSPSA is effective in accelerating the rate at which leaching of residual spent potliner material occurs in the FSPSA.

- Over time, as the leachable material in the soils in the FSPSA is depleted, the removal of fluoride and cyanide mass from the aquifer through pumping of the interceptor and Ranney wells is expected to result in decreases in the contaminant mass-in-place.

- The estimated area of the alluvial aquifer with fluoride concentrations above the cleanup goal set forth in the ROD has decreased by approximately 27% since 1995 (48 acres to 35 acres).

- The estimated area of the aquifer with amenable cyanide concentrations above the cleanup goal set forth in the ROD was 27.5 acres in 1999, compared to 10.5 acres in 1998.

- Reductions in the area of the plume in the alluvial aquifer and the contaminant mass-in-place were occurring prior to the completion of Remedial Construction and full-time operation of the FSPSA soil flushing system. These improvements in site conditions are attributable to operational changes and remedial activities undertaken by Ormet prior to the Superfund project, including pumping of wells that intercept the plume, which has been ongoing since 1972, and discontinued use of the disposal ponds and the potliner storage area.

TABLES

TABLE 1
WATER-LEVEL ELEVATION DATA
ORMET CORPORATION
HANNIBAL, OHIO
DATE: January 12, 1999

WATER-LEVEL MEASURING POINT	MEASURING POINT ELEVATION (ft. MSL)	DEPTH TO WATER (feet)	GROUND-WATER ELEVATION (ft. MSL)
MW-1	668.07	55.18	612.89
MW-2	668.12	57.52	610.60
MW-3	645.17	29.73	615.44
MW-4	661.07	57.93	603.14
MW-5	668.16	63.88	604.28
MW-7	667.94	59.53	608.41
MW-8	667.71	69.13	598.58
MW-9	666.59	66.69	599.90
MW-10	667.16	68.72	598.44
MW-11	667.31	63.64	603.67
MW-12	636.73	23.00	613.73
MW-13	661.44	41.87	619.57
MW-14	653.59	37.74	615.85
MW-15	657.31	37.67	619.64
MW-16	662.72	48.72	614.00
MW-17	655.03	Unaccessible	655.03
MW-18	660.91	40.44	620.47
MW-19	662.03	41.50	620.53
MW-20	632.33	12.04	620.29
MW-21s	664.02	63.40	600.62
MW-21d	663.60	62.99	600.61
MW-22s	667.47	67.50	599.97
MW-22d	667.21	67.28	599.93
MW-23s	663.18	62.64	600.54
MW-23d	663.41	62.88	600.53
MW-24s	667.88	68.82	599.06
MW-24d	667.75	68.73	599.02
MW-25	667.73	65.38	602.35
MW-26s	665.54	66.09	599.45
MW-26d	665.59	66.21	599.38
MW-27	667.86	66.26	601.60
MW-28	663.27	23.50	639.77
MW-29s	653.40	39.78	613.62
MW-29d	653.07	39.39	613.68
MW-30	667.58	49.71	617.87
MW-31	661.59	46.76	614.83
MW-32	656.66	39.90	616.76
MW-34s	655.67	37.47	618.20
MW-34d	654.67	35.56	619.11
MW-35	661.90	36.77	625.13
MW-36	655.14	38.16	616.98
MW-37	661.14	22.28	638.86
MW-38	666.64	21.40	645.24
MW-39s	657.30	40.89	616.41
MW-39d	657.18	40.61	616.57
MW-40s	662.22	51.44	610.78
MW-40d	661.95	51.26	610.69
MW-41	637.67	13.48	624.19
MW-42s	654.37	39.81	614.56
MW-42d	654.34	39.68	614.66
MW-44s	662.01	51.55	610.46
MW-44d	661.76	52.06	609.70

TABLE 1 (CONT.)
WATER-LEVEL ELEVATION DATA
ORMET CORPORATION
HANNIBAL, OHIO
DATE: January 12, 1999

WATER-LEVEL MEASURING POINT	MEASURING POINT ELEVATION (ft. MSL)	DEPTH TO WATER (feet)	GROUND-WATER ELEVATION (ft. MSL)
PPB-01*	663.24	21.74	641.50
PPB-02s*	663.14	17.46	645.68
PPB-02d+	662.78	43.17	619.61
PPB-04+	661.57	45.31	616.26
PPB-05*	661.62	21.64	639.98
PPB-06+	663.04	47.38	615.66
PPB-07*	661.71	Not Found	661.71
PPB-09+	664.30	43.39	620.91
PPB-10*	663.45	16.52	646.93
PPB-14*	660.64	Dry	660.64
TH-3	667.81	58.45	609.36
TH-10	658.17	38.18	619.99
TH-11	659.08	37.38	621.70
TH-15	663.62	64.28	599.34
TH-16	664.62	64.08	600.54
TH-17	663.93	63.34	600.59
RP-1	643.17	18.90	624.27
RP-2	643.05	19.25	623.80

NOTE.

All MW-series wells are measured from the top of the PVC casing.

All TH-series wells are measured from the top of steel casing.

River pool (RP) measuring points are located on the walkway below the dry scrubbers.

** - Designates a perched zone piezometer*

+ - Designates an alluvial aquifer piezometer.

99-T1 123

TABLE 2
WATER-LEVEL ELEVATION DATA
ORMET CORPORATION
HANNIBAL, OHIO
DATE: May 17, 1999

WATER-LEVEL MEASURING POINT	MEASURING POINT ELEVATION (ft. MSL)	DEPTH TO WATER (feet)	GROUND-WATER ELEVATION (ft. MSL)
MW-1	668.07	55.34	612.73
MW-2	668.12	58.24	609.88
MW-3	645.17	29.63	615.54
MW-4	661.07	59.79	601.28
MW-5	668.16	65.48	602.68
MW-7	667.94	60.38	607.56
MW-8	667.71	71.95	595.76
MW-9	666.59	69.16	597.43
MW-10	667.16	71.46	595.70
MW-11	667.31	65.35	601.96
MW-12	636.73	23.53	613.20
MW-13	661.44	41.98	619.46
MW-14	653.59	38.17	615.42
MW-15	657.31	37.76	619.55
MW-16	662.72	49.20	613.52
MW-17	655.03	37.59	617.44
MW-18	660.91	40.14	620.77
MW-19	662.03	41.61	620.42
MW-20	632.33	12.10	620.23
MW-21s	664.02	65.79	598.23
MW-21d	663.60	65.39	598.21
MW-22s	667.47	69.82	597.65
MW-22d	667.21	69.60	597.61
MW-23s	663.18	64.57	598.61
MW-23d	663.41	64.96	598.45
MW-24s	667.88	71.36	596.52
MW-24d	667.75	71.28	596.47
MW-25	667.73	65.91	601.82
MW-26s	665.54	68.49	597.05
MW-26d	665.59	68.61	596.98
MW-27	667.86	67.37	600.49
MW-28	663.27	22.16	641.11
MW-29s	653.40	40.30	613.10
MW-29d	653.07	39.90	613.17
MW-30	667.58	49.45	618.13
MW-31	661.59	47.15	614.44
MW-32	656.66	40.12	616.54
MW-34s	655.67	37.65	618.02
MW-34d	654.67	35.73	618.94
MW-35	661.90	36.37	625.53
MW-36	655.14	38.09	617.05
MW-37	661.14	21.23	639.91
MW-38	666.64	20.64	646.00
MW-39s	657.30	41.23	616.07
MW-39d	657.18	40.90	616.28
MW-40s	662.22	52.38	609.84
MW-40d	661.95	52.00	609.95
MW-41	637.67	13.34	624.33
MW-42s	654.37	40.22	614.15
MW-42d	654.34	40.09	614.25
MW-44s	662.01	52.36	609.65
MW-44d	661.76	52.89	608.87

TABLE 2 (CONT.)
WATER-LEVEL ELEVATION DATA
ORMET CORPORATION
HANNIBAL, OHIO
DATE: May 17, 1999

WATER-LEVEL MEASURING POINT	MEASURING POINT ELEVATION (ft. MSL)	DEPTH TO WATER (feet)	GROUND-WATER ELEVATION (ft. MSL)
PPB-01*	663.24	19.04	644.20
PPB-02s*	663.14	17.55	645.59
PPB-02d+	662.78	43.32	619.46
PPB-04+	661.57	45.63	615.94
PPB-05*	661.62	18.64	642.98
PPB-06+	663.04	47.58	615.46
PPB-07*	661.71	Not Found	--
PPB-09+	664.30	43.50	620.80
PPB-10*	663.45	14.10	649.35
PPB-14*	660.64	Dry	--
TH-3	667.81	59.34	608.47
TH-10	658.17	38.17	620.00
TH-11	659.08	37.02	622.06
TH-15	663.62	66.84	596.78
TH-16	664.62	66.58	598.04
TH-17	663.93	65.58	598.35
RP-1	643.17	18.78	624.39
RP-2	643.05	19.11	623.94

NOTE:

All MW-series wells are measured from the top of the PVC casing.

All TH-series wells are measured from the top of steel casing.

River pool (RP) measuring points are located on the walkway below the dry scrubbers.

* - Designates a perched zone piezometer

+ - Designates an alluvial aquifer piezometer.

99-T2.123

TABLE 3
WATER-LEVEL ELEVATION DATA
ORMET CORPORATION
HANNIBAL, OHIO
DATE: September 7, 1999

WATER-LEVEL MEASURING POINT	MEASURING POINT ELEVATION (ft. MSL)	DEPTH TO WATER (feet)	GROUND-WATER ELEVATION (ft. MSL)
MW-1	668.07	54.84	613.23
MW-2	668.12	57.30	610.82
MW-3	645.17	29.25	615.92
MW-4	661.07	58.54	602.53
MW-5	668.16	64.35	603.81
MW-7	667.94	60.16	607.78
MW-8	667.71	70.64	597.07
MW-9	666.59	69.14	597.45
MW-10	667.16	70.59	596.57
MW-11	667.31	64.19	603.12
MW-12	636.73	22.52	614.21
MW-13	661.44	41.31	620.13
MW-14	653.59	37.24	616.35
MW-15	657.31	36.95	620.36
MW-16	662.72	48.20	614.52
MW-17	655.03	Under Water	--
MW-18	660.91	39.76	621.15
MW-19	662.03	41.02	621.01
MW-20	632.33	11.62	620.71
MW-21s	664.02	66.26	597.76
MW-21d	663.60	65.85	597.75
MW-22s	667.47	69.92	597.55
MW-22d	667.21	69.69	597.52
MW-23s	663.18	65.22	597.96
MW-23d	663.41	65.57	597.84
MW-24s	667.88	70.85	597.03
MW-24d	667.75	70.74	597.01
MW-25	667.73	65.62	602.11
MW-26s	665.54	68.24	597.30
MW-26d	665.59	68.36	597.23
MW-27	667.86	66.94	600.92
MW-28	663.27	21.46	641.81
MW-29s	653.40	39.31	614.09
MW-29d	653.07	38.92	614.15
MW-30	667.58	49.09	618.49
MW-31	661.59	46.16	615.43
MW-32	656.66	38.88	617.78
MW-34s	655.67	36.76	618.91
MW-34d	654.67	34.89	619.78
MW-35	661.90	35.94	625.96
MW-36	655.14	37.00	618.14
MW-37	661.14	20.11	641.03
MW-38	666.64	20.39	646.25
MW-39s	657.30	40.25	617.05
MW-39d	657.18	39.97	617.21
MW-40s	662.22	51.20	611.02
MW-40d	661.95	51.01	610.94
MW-41	637.67	13.33	624.34
MW-42s	654.37	39.26	615.11
MW-42d	654.34	39.14	615.20
MW-44s	662.01	51.33	610.68
MW-44d	661.76	51.82	609.94

TABLE 3 (CONT.)
WATER-LEVEL ELEVATION DATA
ORMET CORPORATION
HANNIBAL, OHIO
DATE: September 7, 1999

WATER-LEVEL MEASURING POINT	MEASURING POINT ELEVATION (ft. MSL)	DEPTH TO WATER (feet)	GROUND-WATER ELEVATION (ft. MSL)
PPB-01*	663.24	20.29	642.95
PPB-02s*	663.14	17.73	645.41
PPB-02d+	662.78	42.62	620.16
PPB-04+	661.57	44.64	616.93
PPB-05*	661.62	20.16	641.46
PPB-06+	663.04	46.78	616.26
PPB-07*	661.71	Not Found	--
PPB-09+	664.30	42.96	621.34
PPB-10*	663.45	15.23	648.22
PPB-14*	660.64	Dry	--
TH-3	667.81	58.30	609.51
TH-10	658.17	37.32	620.85
TH-11	659.08	36.64	622.44
TH-15	663.62	66.42	597.20
TH-16	664.62	66.91	597.71
TH-17	663.93	66.10	597.83
RP-1	643.17	19.06	624.11
RP-2	643.05	18.80	624.25

NOTE:

All MW-series wells are measured from the top of the PVC casing.

All TH-series wells are measured from the top of steel casing.

River pool (RP) measuring points are located on the walkway below the dry scrubbers.

* - Designates a perched zone piezometer

+ - Designates an alluvial aquifer piezometer.

99-T3.123

TABLE 4
SUMMARY OF ANALYTICAL RESULTS FOR REMEDIAL ACTION
GROUND-WATER MONITORING WELLS AND PARAMETERS

ORMET CORPORATION
HANNIBAL, OHIO

	pH (lab)	pH (field)	Specific Conductance (lab)	Specific Conductance (field)	Cyanide Total	Cyanide Free	Cyanide Amenable	Fluoride	Arsenic	Beryllium	Iron	Manganese	Sodium	Vanadium	Tetrachloroethene
MW-1															
12/83	6.4	6.0	270	210	0.018	0.014		0.1			0.04	0.65	14.2		
2/84	6.1	6.1	270	215	0.04			0.1			0.01	0.54	14.9		
9/84	6.1	5.7	195	210	<0.01	<0.01		<0.2			0.02	0.33	13.8		
5/85	6.4	6.0	200	210	0.13	0.13		<0.2			0.04	0.15	16.2		
6/88	6.2	6.4	670	540	<0.01		<0.01	0.2	0.0024	<0.0015	6.21	0.379	20.3	0.006	
1/95	6.2	4.7	370	550	0.02		<0.01	0.1	<0.004	<0.01	<0.04	0.39	21	<0.01	
5/97	5.9	6.32	470	365	<0.01			0.1	<0.004	<0.0005		0.13	19	<0.01	
5/98	6.01	5.65	480	505	<0.01			0.20	<0.004	<0.0005		0.10	20	<0.01	
MW-2															
12/83	10.3	10.3	6,000	6,000	56.0	0.27		400			55.2	1.98	1,950		
2/84	10.3	10.3	7,752	2,750	48.0			420			58	2.46	2,290		
9/84	10.5	9.9	6,308	6,900	40.8	0.095		480			59.3	2.1	2,460		
5/85	10.4	10.4	13,200	5,800	95	0.10		400			54.0	1.74	2150		
10/85	10.5		7,100		140	12		390		<0.01	54.0	1.82	2,060		
7/88	10.4	10.4	6,200	6,000	22		12	330	0.394	<0.0015	34.2	1.00	1,450	0.251	0.011
2/90	10.34	10.2	4,800	3,900	36.2		29.6	200			31.0		1,200		
1/95	10.0	9.6	2,400	>2,000	7.1		<0.01	93	0.085	<0.01	8.6	0.82	520	0.09	
5/97	10.1	10.07	2,100	1,865	17		<1.0	63	0.092	0.001		1	470	0.06	0.008
5/98	9.98	10.24	1,900	1,880	13		<0.01	68	0.082	0.001		0.93	450	0.06	0.0053
9/98	9.96	9.96	1,900	1,991	21		0.30	69	0.086	0.00089		0.90	440	0.051	<0.005
1/99	9.98	10.27	2,000	2,000	21		5.3	65	0.085	0.00064		1.1	440	0.054	<0.005
1/99 (DUP)	9.98	10.27	1,900	2,000	22		<0.1	66	0.087	0.00064		1.0	440	0.053	<0.005
5/99	10.1	9.94	1,900	1,940	25		3.5	67	0.095	0.00088		0.96	400	0.046	<0.005
9/99	9.88	10.60	1,600	1,830	22		2.6	59	0.077	<0.0005		0.85	430	0.032	<0.005
9/99 (DUP)	9.88	10.60	1,900	1,830	22		2.5	60	0.079	<0.0005		0.95	460	0.039	<0.005
MW-5															
12/83	9.7	9.5	3,058	2,825	18.8	0.064		130			17.5	1.61	880		
2/84	9.6	9.6	3,636	2,700	14.5			120			18.0	1.39	1,030		
9/84	9.8	9.3	2,278	3,100	4.94	0.032		140			19.4	1.7	850		
5/85	9.8	9.9	4,800	2,400	25.0	0.037		91			15.8	1.01	710		
10/85	9.8		2,550		22.0	2.0		70		<0.01	13.0	0.93	650		
7/88	9.5	9.6	2,000	2,050	5.5		0.10	90	0.076	<0.0015	7.05	0.514	449	0.025	0.012
1/95	8.6	8.5	1,500	1,250	3.1		<0.01	32	0.008	<0.01	1.3	0.27	270	<0.01	
5/97	9.0	9.2	1,500	1,318	3.5		<0.25	16	0.015	<0.0005		0.4	310	<0.01	<0.005
5/98	8.83	8.84	1,400	1,340	2.1		<0.01	18	0.007	<0.0005		0.17	300	<0.01	<0.005
5/98 (DUP)	8.83	8.84	1,400	1,340	1.3		<0.01	18	0.007	<0.0005		0.18	300	<0.01	<0.005
9/98	8.92	8.66	1,200	1,219	2.0		0.02	18	0.0089	<0.0005		0.16	240	<0.01	<0.005
1/99	8.95	8.93	1,100	1,175	1.8		0.14	17	0.0086	<0.0005		0.16	240	<0.01	<0.005
5/99	8.97	8.60	1,200	1,260	1.9		<0.01	16	0.0094	<0.0005		0.27	250	<0.01	<0.005
5/99 (DUP)	8.97	8.60	1,200	1,260	2.2		2.2	16	0.0097	<0.0005		0.25	240	<0.01	<0.005
9/99	8.78	9.10	1,100	1,030	2.4		0.10	17	0.0074	<0.0005		0.23	230	<0.01	<0.005

Note: All results in mg/L unless otherwise noted.

TABLE 4 (CONT.)
SUMMARY OF ANALYTICAL RESULTS FOR REMEDIAL ACTION
GROUND-WATER MONITORING WELLS AND PARAMETERS

ORMET CORPORATION
HANNIBAL, OHIO

	pH (lab)	pH (field)	Specific Conductance (lab)	Specific Conductance (field)	Cyanide Total	Cyanide Free	Cyanide Amenable	Fluoride	Arsenic	Beryllium	Iron	Manganese	Sodium	Vanadium	Tetrachloroethene
MW-7															
12/83	6.8	6.2	613	700	0.019	0.020		0.1			1.01	7.88	49.0		
2/84	5.9	5.9	581	750	<0.01			0.1			9.0	4.72	49.2		
9/84	5.8	5.7	410	680	<0.01	<0.01		<0.2			11.6	4.65	58.0		
5/85	6.1	5.6	720	890	0.023	0.021		<0.2			24.7	3.70	61.0		
6/88	5.7	5.8	740	760	0.02		0.01	0.2	0.012	<0.0015	17.6	3.05	64.2	0.0032	
1/95	5.5	5.3	850	1,500	<0.01		<0.01	0.2	0.040	<0.01	22	2.3	72	<0.01	
5/97	5.6	6.04	790	670	<0.01			0.10	0.038	<0.0005		2.2	89	<0.01	
5/97 (DUP)	5.7		800	670	<0.01			0.20	0.038	<0.0005		2.2	84	<0.01	
5/98	5.71	5.69	770	900	<0.01			0.20	0.051	<0.0005		2.2	78	<0.01	
5/99	5.81	6.00	780	700	<0.01			0.16	0.042	<0.0005		2.0	78	<0.01	
MW-8															
12/83	9.5	9.2	820	700	0.32	0.017		18			0.20	0.01	202		
2/84	9.5	9.5	820	700	0.14			18			0.23	0.04	199		
9/84	9.5	9.0	661	800	0.35	0.013		22			1.00	0.04	216		
5/85	9.2	9.2	830	550	0.11	0.024		7.9			0.21	0.01	151		
5/86	8.8		550		0.04						<0.01	<0.01	111		
6/88	8.4	8.3	560	550	0.06		<0.01	2.8	0.0018	<0.0015	0.044	0.023	67.8	<0.0026	<0.005
1/95	7.8	7.8	610	930	0.09		<0.01	3.1	<0.004	<0.01	<0.04	0.08	50	<0.01	
5/97	7.8	8.02	560	442	0.040		<0.01	2.2	<0.004	<0.0005		0.12	44	<0.01	
5/98	7.81	7.60	490	514	0.02		<0.01	2.3	<0.004	<0.0005		0.14	30	<0.01	
5/99	8.00	8.10	530	455	0.028		0.028	2.4	<0.004	<0.0005		0.15	34	<0.01	
MW-10															
12/83	7.7	7.6	1,205	1,280	1.36	0.083		6.9			0.60	0.26	195		
2/84	7.6	7.5	820	800	0.79			5.5			0.30	0.26	106		
9/84	7.6	6.5	547	675	0.22	0.14		4.3			0.13	0.34	88		
5/85	7.7	7.0	800	710	0.33	0.060		2.9			0.07	0.05	53		
6/88	7.3	7.2	770	750	<0.01		<0.01	2.1	0.0038	<0.0015	0.081	<0.001	28.7	<0.0026	
1/95	7.0	6.8	800	560	0.02		0.02	0.5	<0.004	<0.01	<0.04	<0.01	26	<0.01	
5/97	7.2	7.4	670	510	<0.01			0.70	<0.004	<0.0005		<0.01	25	<0.01	
5/98	7.22	7.23	970	1,110	0.15		0.01	0.60	<0.008	<0.0005		<0.01	120	<0.01	
5/99	7.40	7.32	750	545	<0.01			0.41	<0.004	<0.0005		0.012	30	<0.01	
MW-11															
12/83	9.6	9.4	980	825	0.52	0.021		33			0.48	0.06	238		
2/84	9.6	9.5	962	775	0.25			27			7.9	0.37	232		
9/84	9.7	9.1	656	800	0.20	0.015		22			4.90	0.21	213		
5/85	9.4	9.5	750	650	0.30	0.026		13			2.68	0.13	181		
6/88	8.5	8.4	570	565	0.12		<0.01	4.9	0.0043	<0.0015	0.071	0.227	78.5	<0.0026	<0.005
1/95	7.6	7.9	540	680	0.02		<0.01	2.3	<0.004	<0.01	<0.04	0.40	30	<0.01	
5/97	7.8	7.64	530	404	0.09		<0.01	1.8	<0.004	<0.0005		0.42	33	<0.01	
5/98	7.84	7.57	490	507	0.02		<0.01	1.7	<0.004	<0.0005		0.45	31	<0.01	
5/98 (DUP)	7.85	7.57	500	507	0.02		<0.01	1.7	<0.004	<0.0005		0.43	29	<0.01	
5/99	8.07	8.39	490	425	0.024		0.011	1.7	<0.004	<0.0005		0.45	28	<0.01	

Notes: All results in mg/L unless otherwise noted.

TABLE 4 (CONT.)
SUMMARY OF ANALYTICAL RESULTS FOR REMEDIAL ACTION
GROUND-WATER MONITORING WELLS AND PARAMETERS

ORMET CORPORATION
HANNIBAL, OHIO

	pH (lab)	pH (field)	Specific Conductance (lab)	Specific Conductance (field)	Cyanide Total	Cyanide Free	Cyanide Amenable	Fluoride	Arsenic	Beryllium	Iron	Manganese	Sodium	Vanadium	Tetrachloroethene
MW-12															
12/83	7.5	7.3	476	400	0.074	0.021		2.1			<0.01	0.94	24.3		
2/84	7.5	7.2	476	385	0.02			2.0			0.02	0.71	23.8		
9/84	7.7	6.3	366	375	<0.01	<0.01		2.2			<0.01	0.61	29.0		
5/85	7.7	7.4	540	390	0.024	0.022		1.6			<0.01	1.00	27.7		
5/86	7.5		494		<0.01						<0.01	1.23	27		
6/88	7.2	7.5	510	515	<0.01		<0.01	1.3	<0.0015	<0.0015	0.066	1.09	24.4	<0.0026	<0.005
1/95	7.4	7.6	530	350	<0.01		<0.01	1.1	<0.004	<0.01	<0.04	1.5	23	<0.01	
5/97	7.5	7.7	540	422	<0.01			0.90	<0.004	<0.0005		1.7	19	<0.01	
5/98	7.43	7.43	470	550	<0.01			0.80	<0.008	<0.0005		1.9	23	<0.01	
9/98	7.57	7.38	470	481	<0.01			0.92	<0.004	<0.0005		1.6	20	<0.01	
1/99	7.53	7.04	470	440	<0.01			0.89	<0.004	<0.0005		1.8	22	<0.01	
5/99	7.42	7.39	630	515	0.026		0.026	0.73	<0.004	<0.0005		2.5	29	<0.01	
9/99	7.54	7.25	530	565	0.017		0.012	0.68	<0.004	<0.0005		1.9	27	<0.01	
MW-15															
12/83	6.9	6.7	568	435	0.44	0.018		0.1			0.14	0.03	28.8		
2/84	6.9	6.7	550	435	0.51			0.1			0.13	<0.01	29.4		
5/85	7.4	6.8	590	445	0.44	0.034		0.3			0.18	<0.01	32.5		
5/86	7.1		550		0.39						0.15	<0.01	34		
7/88	7.0/7.1	7.1/7.1	610/630	600/600	0.43/0.32		0.10/<0.01	0.2/0.2	0.0045	0.0025	10.8	0.117	34.4	0.0059	<0.005
1/95	7.0	7.1	720	420	0.49		0.12	1.4	<0.004	<0.01	0.26	<0.01	45	<0.01	
7/96	6.8	7.07	570	613	1.0	<0.020		2.1	<0.004	<0.0005		<0.01		<0.01	
5/97	7.4	7.44	800	731	2.8		0.20	11	<0.004	<0.0005		0.02	140	<0.01	
5/97 (DUP)	7.4	7.44	800	731	3.3		0.40	8.9	<0.004	<0.0005		0.05	140	<0.01	
5/98	6.99	6.78	610	625	0.49		0.02	0.40	<0.004	<0.0005		<0.01	40	<0.01	
5/99	7.49	7.70	980	785	8.5		<0.01	15	<0.004	<0.0005		0.017	150	<0.01	
MW-16															
12/83	9.8	9.9	2,092	1,800	7.35	0.034		110			12.4	0.91	530		
2/84	9.7	9.7	2,049	1,550	5.5			98			13.9	1.41	570		
9/84	9.8	9.2	1,390	10,500	2.11	<0.01		80			9.5	0.5	475		
5/85	9.4	9.0	2,300	1,400	10.0	0.11		72			10.3	1.09	443		
10/85	8.4		1,540		3.9	0.0		30		<0.01	2.10	0.41	186		
7/88	9.4	9.7	1,400	1,410	4.6		<0.01	61	0.063	<0.0015	6.57	0.22	300	0.018	0.006
1/95	7.7	9.0	850	930	1.4		0.13	7.9	<0.004	<0.01	0.52	1.1	81	<0.01	
7/96	7.3	7.75	990	941	1.6	<0.020		7.9	<0.004	<0.0005		1		<0.01	
5/97	7.6	7.6	980	801	1.3		0.3	11	<0.004	<0.0005		0.43	130	<0.01	
5/98	7.72	7.70	750	760	2.0		0.40	11	<0.004	<0.0005		1.2	80	<0.01	
9/98	7.70	7.50	860	790	1.4		1.4	9.5	<0.004	<0.0005		1.3	75	<0.01	
1/99	7.70	7.12	740	665	1.4		<0.04	9.8	<0.004	<0.0005		1.5	85	<0.01	
5/99	7.88	7.90	750	600	2.8		0.16	9.0	<0.004	<0.0005		1.5	82	<0.01	
9/99	7.62	8.15	730	745	2.9		0.88	8.2	<0.004	<0.0005		1.7	78	<0.01	

Note: All results in mg/L unless otherwise noted.

TABLE 4 (CONT.)
SUMMARY OF ANALYTICAL RESULTS FOR REMEDIAL ACTION
GROUND-WATER MONITORING WELLS AND PARAMETERS

ORMET CORPORATION
HANNIBAL, OHIO

	pH (lab)	pH (field)	Specific Conductance (lab)	Specific Conductance (field)	Cyanide Total	Cyanide Free	Cyanide Amenable	Fluoride	Arsenic	Beryllium	Iron	Manganese	Sodium	Vanadium	Tetrachloroethene
MW-17															
12/83	7.9	7.6	613	475	0.99	0.021		5.6			0.44	1.38	78		
2/84	7.6	7.4	581	470	1.03			4.4			0.39	1.77	52		
9/84	8.0	6.7	485	550	0.17	<0.01		9.1			0.28	1.27	99		
5/85	7.9	7.9	610	470	0.76	0.045		4.1			0.28	1.80	45.3		
10/85	7.9		564		0.56	0.43		4.2		<0.01	6.80	1.93	43.4		
6/88	7.7	7.5	590	475	1.3		0.46	5.2	0.0054	<0.0015	0.973	1.72	39.7	<0.0026	<0.005
2/90	7.7	7.55	680	640	0.582		<0.005	4.1			18		40		
1/95	7.5	7.7	710	420	0.64		<0.01	3.9	<0.004	<0.01	0.26	1.9	36	<0.01	
5/97	7.5	7.67	870	488	0.54		<0.01	3.1	<0.004	<0.0005		1.9	30	<0.01	
5/98	7.6	7.40	570	580	0.72		0.09	3.4	<0.004	<0.0005		1.8	34	<0.01	
5/99	7.50	7.40	550	470	0.46		0.46	3.2	<0.004	<0.0005		1.8	31	<0.01	
5/99 (DUP)	7.37	7.40	550	470	0.49		0.49	3.2	<0.004	<0.0005		1.8	30	<0.01	
MW-18															
12/83	9.9	10.0	10,526	8,750	110.0	0.45		460			58.7	0.26	3,150		
2/84	9.8	9.8	9,615	7,500	52.0			350			61	0.50	2,750		
9/84	10.1	9.5	9,111	10,000	194	0.19		690			103	0.3	4,130		
5/85	9.8	9.9		7,000	35.2	0.091		410			64.2	0.35	2,540		
10/85	9.9		6,300		120	12		350		<0.01	71.4	1.06	1,940		
7/88	10.0	10.1	9,700	10,000	29		25	820	0.159	0.0071	144	1.75	2,640	0.191	0.022
2/90	10.0	10.1	8,000	11,400	67.0		10.5	710			110		3,500		
1/95	9.6	11.1	5,900	>2,000	15		6.6	290	0.062	<0.01	56	0.22	1,500	0.02	
7/96	9.1	8.67	4,300	4,200	7.2	<0.020		180	0.065	0.0006	56	0.19	1,500	0.01	0.006
5/97	9.7	9.58	4,000	4,110	8.7		<0.50	200	0.078	0.0009		0.29	1,100	0.02	
5/98	9.76	10.06	4200	4,300	9.8		0.40	260	0.094	0.0014		0.49	1100	0.05	0.024
9/98	9.70	9.88	3,600	3,590	5.9		<0.01	210	0.085	0.00084		0.29	800	0.022	0.014
1/99	9.67	10.04	3,600	3,450	79		3.0	210	0.088	0.00063		0.29	830	0.028	0.0219
5/99	9.72	9.80	3,000	3,000	95		81	370	0.088	0.0014		0.92	650	0.045	0.017
9/99	9.62	10.26	3,000	2,870	90		14	170	0.074	<0.0005		0.24	700	0.011	0.016
MW-19															
12/83	7.2	7.1	581	435	0.068	0.013		0.3			<0.01	0.54	22.9		
2/84	7.1	6.8	575	405	0.04			0.5			0.05	0.26	20.2		
9/84	7.2	6.3	451	460	0.01	<0.01		0.4			0.02	0.04	23.5		
5/85	7.6	7.0	640	460	0.019	0.014		0.5			0.12	0.02	23.6		
7/88	7.3	7.3	630	600	<0.01		<0.01	0.5	0.0067	<0.0015	17.6	0.23	32.2	0.015	<0.005
2/90	7.3	7.27	520	560	0.2		<0.005	0.7					21.0		
1/95	7.3	7.2	630	410	<0.01		<0.01	1.0	<0.004	<0.01	0.09	<0.01	24	<0.01	
5/97	7.4	7.5	520	431	<0.01		<0.01	2.0	<0.004	<0.0005		<0.01	18	<0.01	
5/98	7.23	6.95	560	575	<0.01			1.4	<0.008	<0.0005		<0.01	23	<0.01	
5/99	7.47	7.40	570	460	<0.01			1.3	<0.004	<0.0005		<0.01	22	<0.01	

Note: All results in mg/L unless otherwise noted.

TABLE 4 (CONT.)
SUMMARY OF ANALYTICAL RESULTS FOR REMEDIAL ACTION
GROUND-WATER MONITORING WELLS AND PARAMETERS

ORMET CORPORATION
HANNIBAL, OHIO

	pH (lab)	pH (field)	Specific Conductance (lab)	Specific Conductance (field)	Cyanide Total	Cyanide Free	Cyanide Amenable	Fluoride	Arsenic	Beryllium	Iron	Manganese	Sodium	Vanadium	Tetrachloroethene
MW-28															
5/86	5.5		382		0.89	0.08		<0.1			0.36	0.02	41		
6/88	5.7	5.8	640	665	7.4		0.6	<0.1	<0.0015	<0.0015	2.41	0.035	83.3	<0.0026	<0.005
1/95	6.2	7.4	500	700	0.74		0.26	2.7	<0.004	<0.01	0.38	0.02	79	<0.01	
7/96	5.7	5.92	440	429	0.26	<0.020		0.50	<0.004	<0.0005		0.01		<0.01	
5/97	5.6	6.4	590	453	0.11		<0.02	0.2	<0.004	<0.0005		0.01	62	<0.01	
5/98	5.74	5.32	500	550	0.12		<0.01	0.20	<0.004	<0.0005		0.01	65	<0.01	
9/98	5.81	5.28	540	527	0.11		0.11	0.27	<0.004	<0.0005		0.011	64	<0.01	
9/98 (DUP)	5.83	5.28	540	527	0.11		0.11	0.24	<0.004	<0.0005		0.01	65	<0.01	
1/99	5.72	5.17	470	450	0.087		0.027	0.38	<0.004	<0.0005		0.013	67	<0.01	
5/99	5.72	5.43	460	405	0.13		0.13	0.35	<0.004	<0.0005		0.011	70	<0.01	
9/99	5.95	6.15	480	480	0.12		0.016	0.26	<0.004	<0.0005		<0.01	57	<0.01	
MW-29S															
5/86	8.4		2,350		1.5	0.02		28			0.64	0.08	590		
6/88	9.0	9.0	1,100	1,090	0.99		0.37	44	0.0052	<0.0015	1.52	0.094	224	0.0044	<0.005
1/95	8.3	10.0	2,900	1,750	0.79		0.07	56	<0.004	<0.01	0.37	0.12	590	<0.01	
5/97	8.3	8.43	2,200	1,735	0.6		<0.1	44	<0.004	<0.0005		0.14	410	<0.01	
5/98	8.64	8.70	1,700	1,665	0.18		<0.01	26	<0.004	<0.0005		0.09	370	<0.01	
5/99	8.35	8.37	1,300	1,090	0.22		0.021	16	<0.004	<0.0005		0.30	230	<0.01	
MW-29D															
5/86	8.6		648		0.31	0.01		9.7			0.18	0.26	139		
6/88	8.1	8.0	590	570	0.25		<0.01	4.2	0.002	<0.0015	0.082	1.16	60.4	<0.0026	<0.005
1/95	7.5	8.9	650	770	0.22		0.03	3.7	<0.004	<0.01	0.09	2.0	33	<0.01	
5/97	7.7	7.9	600	479	0.18		<0.02	3.3	<0.004	<0.0005		2	31	<0.01	
5/98	7.65	7.53	550	560	0.17		<0.01	3.5	<0.004	<0.0005		1.8	28	<0.01	
5/99	7.82	7.60	550	465	0.19		0.19	3.4	<0.004	<0.0005		1.8	28	<0.01	
MW-30															
5/86	6.6		342		0.01	<0.01		0.5			<0.01	2.10	20		
6/88	6.3	6.3	340	400	0.01		<0.01	<0.1	0.0018	<0.0015	4.42	0.753	18.7	0.0044	0.005
1/95	6.2	6.0	430	570	0.01		<0.01	<0.1	<0.004	<0.01	0.78	0.60	19	<0.01	
5/97	6.2	6.47	420	334	<0.01			<0.1	<0.004	<0.005		0.6	18	<0.01	0.012
5/98	6.19	5.70	390	418	<0.01			0.10	<0.004	<0.0005		0.68	21	<0.01	0.013
5/99	6.43	6.10	400	390	0.016		0.013	0.19	<0.004	<0.0005		0.71	21	<0.01	0.02
MW-31															
5/86	9.1		1,250		12	1.5		46			84.5	3.67	380		
6/88	10.2	10.5	3,400	3,500	39		<0.01	140	0.046	<0.0015	20.3	1.93	703	0.184	0.040
2/90	10.0	9.95	2,300	2,700	4.80		3.94	110			49		660		
1/95	9.6	10.4	1,900	1,600	7.1		<0.01	89	0.027	<0.01	4.6	0.66	420	<0.02	
7/96	9.5	9.52	2,300	2,100	12	<0.020		91	0.042	0.0007		0.62		0.04	0.041
5/97	9.9	9.69	2,500	2,100	12		<0.50	110	0.04	0.0007		0.68	480	0.05	0.028
5/97 (DUP)	9.9	9.69	2,500	2,100	6.2			93	0.038	0.0008		0.74	480	0.05	0.029
5/98	9.63	9.80	2,400	2,350	9.3		<0.01	100	0.036	0.0013		1.1	490	0.04	0.022
9/98	9.67	9.86	2,600	2,520	9.8		<0.01	120	0.044	0.0014		1.1	620	0.045	0.017
9/98 (DUP)	9.67	9.86	2,700	2,520	9.5		<0.01	130	0.045	0.0013		1.1	600	0.043	0.020
1/99	9.72	9.97	2,500	2,240	22		0.63	120	0.047	0.0012		1.3	620	0.065	0.019
5/99	9.91	10.02	2,600	2,510	29		6.5	130	0.06	0.0014		1.2	600	0.07	0.034
9/99	9.83	10.03	2,600	2,810	30		4.3	150	0.063	0.0011		1.6	750	0.088	<0.005

All results in mg/l, unless otherwise noted.

TABLE 4 (CONT.)
SUMMARY OF ANALYTICAL RESULTS FOR REMEDIAL ACTION
GROUND-WATER MONITORING WELLS AND PARAMETERS

ORMET CORPORATION
HANNIBAL, OHIO

	pH (lab)	pH (field)	Specific Conductance (lab)	Specific Conductance (field)	Cyanide Total	Cyanide Free	Cyanide Amenable	Fluoride	Arsenic	Beryllium	Iron	Manganese	Sodium	Vanadium	Tetrachloroethene
MW-32															
5/86	10.5		6430		97	18		369			27.4	0.69	2120		
7/88	9.2	9.3	890	1,040	7.2		0.30	39	0.014	<0.0015	4.05	0.513	234	0.024	<0.005
1/95	9.4	9.4	1,300	630	12		3.6	47	0.014	<0.01	2.7	0.37	230	0.03	
7/96	8.6	8.89	1,000	1,038	6.9	<0.020		29	0.011	<0.0005		0.84		0.01	
5/97	8.7	8.71	930	697	4.4		1.3	19	0.008	<0.0005		1.1	110	<0.01	
5/98	8.03	8.10	630	697	2.5		0.34	7.7	<0.004	<0.0005		1.9	61	<0.01	
5/98 (DUP)	8.05	8.10	690	697	2.5		0.09	8.0	<0.004	<0.0005		2.0	68	<0.01	
9/98	8.30	8.26	760	760	4.5		1.0	13	<0.004	<0.0005		1.8	78	<0.01	
1/99	8.39	8.00	710	650	3.1		<0.02	13	<0.004	<0.0005		1.7	77	<0.01	
1/99 (DUP)	8.39	8.00	720	650	3.7		<0.02	13	<0.004	<0.0005		1.7	76	<0.01	
5/99	8.38	8.50	690	555	4.4		0.59	12	<0.004	<0.0005		2.0	78	<0.01	
9/99	9.84	10.01	2,200	2,300	18		1.8	120	0.057	0.0014		2.2	520	0.093	
MW-34S															
5/86	7.4		668		0.13	<0.01		9.4			0.07	0.42	64		
7/88	7.2	7.2	690	670	40		38	7.3	0.0087	<0.0015	14.6	0.416	33.1	0.018	<0.005
2/90	7.4	6.93	690	740	0.113		0.26	6.5			21		49		
1/95	7.2	7.1	700	430	0.03		<0.01	7.3	<0.004	<0.01	0.18	0.01	35	<0.01	
5/97	7.4	7.43	710	579	0.18		0.04	8.1	<0.004	<0.0005		0.04	69	<0.01	
5/98	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
5/99	7.34	7.55	650	505	0.19		<0.01	6.8	<0.004	<0.0005		0.014	46	<0.01	
MW-34D															
5/86	7.3		602		0.05	<0.01		10.2			0.02	0.55	42		
7/88	7.4	7.4	560	580	0.07		<0.01	4.4	0.0031	<0.0015	0.538	0.762	32.4	<0.0026	<0.005
1/95	7.3	7.4	640	400	0.07		0.07	4.2	<0.004	<0.01	<0.04	0.82	34	<0.01	
5/97	7.4	7.43	630	492	0.05		<0.01	3.6	<0.004	<0.0005		0.79	31	<0.01	
5/98	7.37	7.23	590	595	0.09		0.01	3.9	<0.004	<0.0005		0.68	35	<0.01	
5/99	7.40	7.52	470	475	0.062		<0.01	3.6	<0.004	<0.0005		0.72	29	<0.01	
MW-35															
5/86	10.2		6,430		240	38		358			125	1.76	2,070		
7/88	10.2	10.4	6,100	6,150	43		41	400	0.147	0.002	56.5	0.337	1,630	0.053	<0.005
2/90	9.6	9.7	1,500	1,540	8.0		<0.005	71			20		350		
1/95	9.5	9.7	1,200	562	16		<0.01	35	0.018	<0.01	11	0.43	220	<0.01	
7/96	9.5	9.5	1,700	1,851	6.0	0.040		71	0.028	0.0006		0.5		0.03	
5/97	9.4	9.47	1,000	900	16		<1.0	40	0.02	0.0006		0.68	220	0.02	
5/98	8.93	9.10	710	766	15		2.9	27	0.012	<0.0005		0.92	140	0.01	
9/98	8.97	8.90	550	778	16		0.99	26	0.01	<0.0005		0.88	130	<0.01	
1/99	9.28	9.15	820	925	23		2.9	40	0.019	<0.0005		0.81	190	0.016	
5/99	9.35	9.70	830	870	28		10	38	0.013	<0.0005		0.86	160	0.015	
9/99	9.18	9.60	790	930	18		2.0	34	0.012	<0.0005		0.53	170	0.05	

Note: All results in mg/L unless otherwise noted.

TABLE 4 (CONT.)
SUMMARY OF ANALYTICAL RESULTS FOR REMEDIAL ACTION
GROUND-WATER MONITORING WELLS AND PARAMETERS

ORMET CORPORATION
HANNIBAL, OHIO

	pH (lab)	pH (field)	Specific Conductance (lab)	Specific Conductance (field)	Cyanide Total	Cyanide Free	Cyanide Amenable	Fluoride	Arsenic	Beryllium	Iron	Manganese	Sodium	Vanadium	Tetrachloroethene
MW-36															
5/86	9.7		2,700		25	1.4		97			39.5	1.13	760		
7/88	8.9	9.6	940	1,255	8.6		1.3	18	0.0078	<0.0015	3.52	0.332	161	0.0063	<0.005
1/95	9.8	9.7	3,500	1,350	18		<0.01	160	0.034	<0.01	8.7	0.83	770	0.07	
7/96	9.6	9.55	3,300	3,280	8.1	<0.020		160	0.058	0.0021		0.67		0.07	
5/97	9.8	9.64	3,600	3,290	9.2		3.5	180	0.084	0.0035		1.7	850	0.1	
5/98	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
9/98	9.90	10.10	4,500	4,380	6.5		0.03	230	0.11	0.0036		1.4	990	0.074	
1/99	9.76	10.20	3,500	3,300	41		1.2	190	0.076	0.0036		1.5	820	0.072	
5/99	10.10	10.40	2,500	2,260	19		4.4	150	0.12	0.0019		1.3	600	0.12	
9/99	10.10	10.10	1,800	1,790	6.2		0.69	93	0.059	0.00055		1.2	420	0.067	
9/99 (DUP)	10.10	10.10	1,800	1,790	6.3		<0.5	96	0.061	0.00062		1.2	450	0.07	
MW-37															
5/86	10.1		7,340		97	8.2		890			498	46.3	1,800		
7/88	9.9	9.8	5,600	5,500	0.30		<0.01	1000	0.169	0.035	115	15.4	1,470	0.369	<0.005
2/90	9.6	9.65	2,700	3,100	4.6		22.7	360			1000		970		
1/95	9.1	9.2	1,200	970	18		<0.01	87	0.033	<0.01	8.5	0.58	280	0.01	
7/96	9.1	8.89	570	832	14	<0.020		45	0.042	0.0005		0.51		0.03	
5/97	9.2	9.07	1,100	846	13		1.7	53	0.027	<0.0005		0.56	210	0.02	
5/98	8.57	8.30	530	505	6.4		<0.01	6.8	0.018	<0.0005		0.28	120	0.02	
9/98	8.90	8.26	670	682	15		5.5	52	0.020	<0.0005		0.53	140	0.017	
1/99	9.02	9.25	660	750	19		<0.10	25	0.02	<0.0005		0.68	140	0.029	
5/99	9.39	9.45	610	540	11		3.6	22	0.023	<0.0005		0.23	130	0.016	
9/99	8.78	8.91	760	753	7.9		0.91	31	0.01	<0.0005		0.33	170	<0.01	
MW-39S															
5/86	9.5		8,360		11	2.9		244			25.0	1.35	2780		
6/88	9.3	9.1	3,500	2,550	3.8		0.10	110	0.016	<0.0015	36.6	1.63	826	0.053	<0.005
1/95	8.9	8.7	2,700	900	0.64		<0.01	59	<0.004	<0.01	0.36	0.22	520	<0.01	
5/97	8.9	9.2	5,500	5,500	3.6		<0.2	150	0.009	<0.0005		0.15	1300	<0.01	
5/98	9.04	9.09	4,000	4,000	2.3		<0.01	98	0.009	<0.0005		0.11	700	<0.01	
5/99	9.05	9.30	4,300	3,620	3.4		0.24	120	0.0096	<0.0005		0.12	950	<0.01	
5/99 (DUP)	9.05	9.30	4,200	3,620	3.6		0.89	120	0.009	<0.0005		0.11	1,100	<0.01	
MW-39D															
5/86	8.1		627		0.21	0.02		7.4			0.14	0.54	103		
6/88	7.9	7.8	590	595	0.17		0.03	6.1	0.0021	<0.0015	0.36	0.681	53.9	<0.0026	<0.005
1/95	7.5	7.6	630	410	0.07		<0.01	3.9	<0.004	<0.01	0.06	0.87	36	<0.01	
5/97	7.5	7.66	630	457	0.06		0.06	3.8	<0.004	<0.0005		0.87	32	<0.01	
5/98	7.52	7.35	590	560	0.04		<0.01	3.6	<0.004	<0.0005		0.77	34	<0.01	
5/99	7.59	7.64	540	447	0.037		<0.01	3.4	<0.004	<0.0005		0.87	33	<0.01	
MW-40S															
5/86	8.9		2,550		1.7	0.03		28			12.8	0.49	650		
6/88	9.2	9.2	2,100	2,200	1.5		<0.01	5.9	0.018	<0.0015	1.89	0.139	445	0.0056	<0.005
1/95	7.9	7.9	2,500	1,600	0.87		<0.01	40	<0.004	<0.01	0.36	0.33	470	<0.01	
5/97	7.9	8.07	1,900	1,417	0.72		0.40	21	<0.004	<0.0005		0.66	380	<0.01	
5/98	8.2	8.18	1,400	1,335	0.36		<0.01	39	<0.004	<0.0005		0.13	270	<0.01	
5/99	8.50	8.83	1,300	1,100	0.32		<0.01	30	<0.004	<0.0005		0.11	250	<0.01	

NS = Not sampled. Well damaged during remedial construction.

TABLE 4 (CONT.)
SUMMARY OF ANALYTICAL RESULTS FOR REMEDIAL ACTION
GROUND-WATER MONITORING WELLS AND PARAMETERS

ORMET CORPORATION
HANNIBAL, OHIO

	pH (lab)	pH (field)	Specific Conductance (lab)	Specific Conductance (field)	Cyanide Total	Cyanide Free	Cyanide Amenable	Fluoride	Arsenic	Beryllium	Iron	Manganese	Sodium	Vanadium	Tetrachloroethene
MW-40D															
5/86	9.4		1,120		7.4	0.06		20			11.7	0.62	280		
6/88	9.4	9.4	1,200	1,290	7.0		<0.01	36	0.018	<0.0015	7.81	0.454	258	0.012	<0.005
1/95	7.6	7.7	2,000	1,375	0.70		<0.01	16	<0.004	<0.01	0.29	0.74	340	<0.01	
5/97	7.6	7.9	1,800	1,350	0.59		<0.1	7.6	<0.004	<0.0005		1.3	340	<0.01	
5/98	7.85	7.73	1,300	1,250	0.49		0.47	19	<0.004	<0.0005		0.36	250	<0.01	
5/99	7.99	8.25	920	745	0.16		0.16	12	<0.004	<0.0005		0.42	150	<0.01	
MW-41															
1/95	6.6	8.2	490	600	0.04		0.02	0.2	0.017	<0.01	8.9	1.3	22	<0.01	
5/97	6.8	6.98	490	357	<0.01			0.20	0.022	<0.0005		1.6	21	<0.01	
5/98	6.67	6.74	420	449	<0.01			0.30	0.016	<0.0005		1.3	21	<0.01	
5/99	6.79	6.80	420	370	<0.01			0.33	0.014	<0.0005		1.1	20	<0.01	
MW-42S															
6/88	8.0	8.4	930	870	0.70		0.25	14.0	0.002	<0.0015	0.232	0.237	143	0.0027	<0.005
2/90	8.4	8.25	2,100	2,400	0.266		0.079	35.0			0.88		520		
1/95	8.2	8.4	1,600	765	0.45		<0.01	22	<0.004	<0.01	0.2	0.35	280	<0.01	
5/97	8.2	8.57	1,700	1,350	0.56		<0.02	29	<0.004	<0.0005		0.33	300	<0.01	
5/98	8.26	8.46	1,400	1,460	0.52		<0.01	27	<0.004	<0.0005		0.37	270	<0.01	
5/99	8.19	8.54	1,500	1,100	0.54		0.033	26	<0.004	<0.0005		0.49	260	<0.01	
MW-42D															
6/88	7.9	8.1	550	600	0.16		<0.01	6.0	0.0028	<0.0015	1.11	0.636	68.6	0.0028	<0.005
1/95	7.5	7.7	640	410	0.04		<0.01	3.6	<0.004	<0.01	0.08	1.5	31	<0.01	
5/97	7.6	7.99	580	468	0.04		<0.01	3.2	<0.004	<0.0005		1.3	27	<0.01	
5/98	7.54	7.64	550	535	0.07		0.01	3.3	<0.008	<0.0005		1.2	26	<0.01	
5/99	7.56	7.83	530	435	0.03		<0.01	3.4	<0.004	<0.0005		1.3	26	<0.01	

Note: All results in mg/L unless otherwise noted.

99-T4.123
ADD NEW TO: HM03-01/DATA-SUM.123

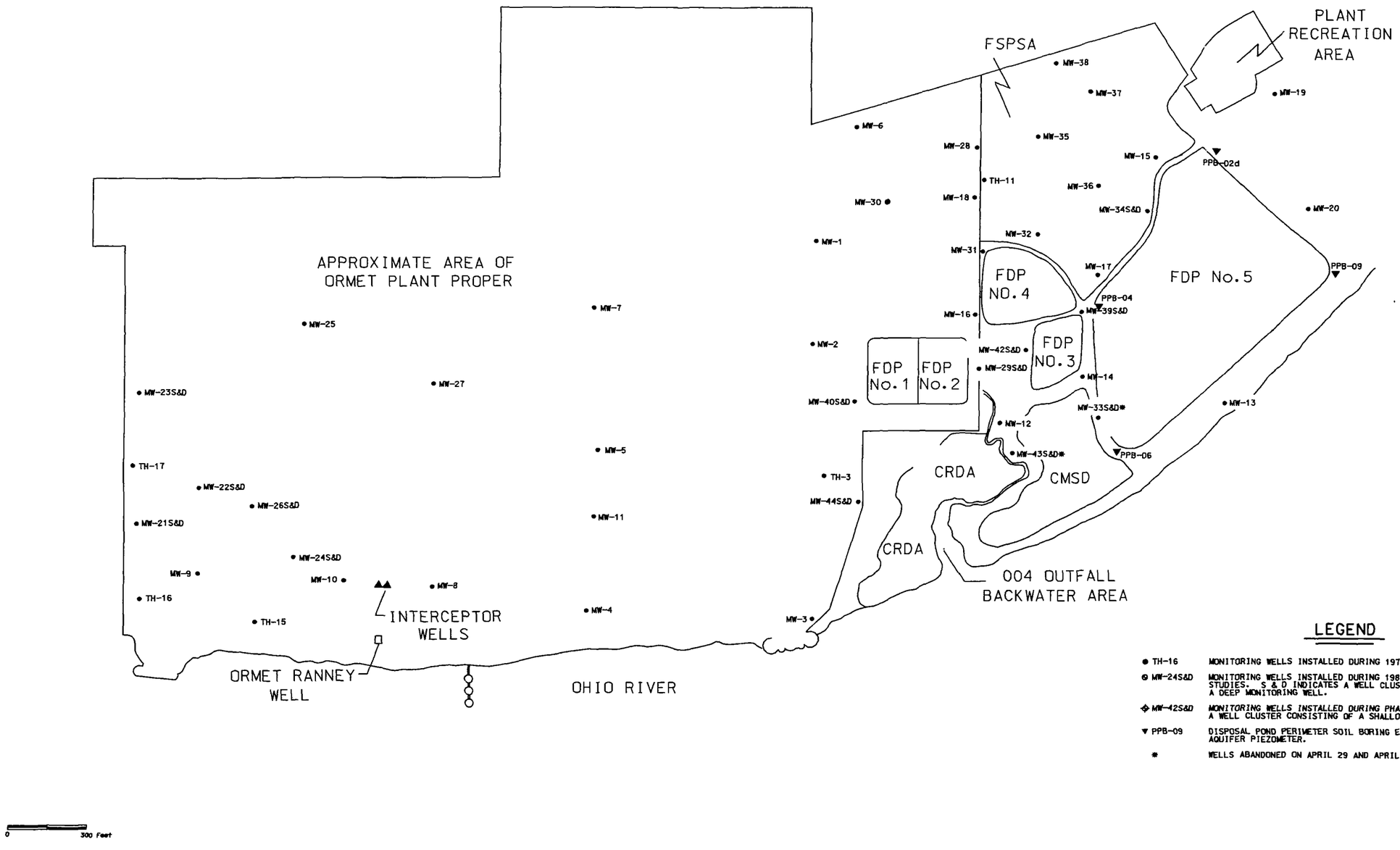
TABLE 5
SUMMARY OF ESTIMATED AQUIFER AREAS ABOVE CLEANUP GOALS
AND CONTAMINANT MASS-IN-PLACE
ORMET CORPORATION
HANNIBAL REDUCTION DIVISION
HANNIBAL, OHIO

Sampling Date	Estimated Area of Aquifer Above 4 mg/L Fluoride	% Change	Estimated Area of Aquifer Above 0.2 mg/L Amenable CN	% Change
6/88	43.3 a.		24.5 a.	
1/95	48.4 a.	+11.6	5.9 a.	-75.8
5/97	43.7 a.	-9.7	21.3 a.	+259
5/98	36.9 a.	-15.6	10.5 a.	-50.6
5/99	35.2 a.	-4.5	27.5 a.	+161

Sampling Date	Estimated Fluoride Mass-in-Place	% Change	Estimated Total CN Mass-in-Place	% Change
6/88	85,702 lbs.		6,821 lbs.	
1/95	28,168 lbs.	-67.1	4,271 lbs.	-37.4
5/97	29,033 lbs.	+3.1	2,943 lbs.	-31.1
5/98	23,888 lbs.	-17.7	2,597 lbs.	-11.8
5/99	29,008 lbs.	+21.4	5,566 lbs.	+114

99-5 123

FIGURES



LEGEND

● TH-16	MONITORING WELLS INSTALLED DURING 1972 FRED KLAIR & ASSOC. STUDY.
● MW-24S&D	MONITORING WELLS INSTALLED DURING 1983 & 1986 GERAGHTY & MILLER, INC. STUDIES. S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
◆ MW-42S&D	MONITORING WELLS INSTALLED DURING PHASE I RI (TASK 3-E). S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
▼ PPB-09	DISPOSAL POND PERIMETER SOIL BORING EQUIPPED WITH ALLUVIAL AQUIFER PIEZOMETER.
*	WELLS ABANDONED ON APRIL 29 AND APRIL 30, 1997.

HMI Environmental Consulting Services

HydroSystems Management, Inc.
Glass Works Center - Suite 109
331 S. Main Street
Washington, Pennsylvania 15301

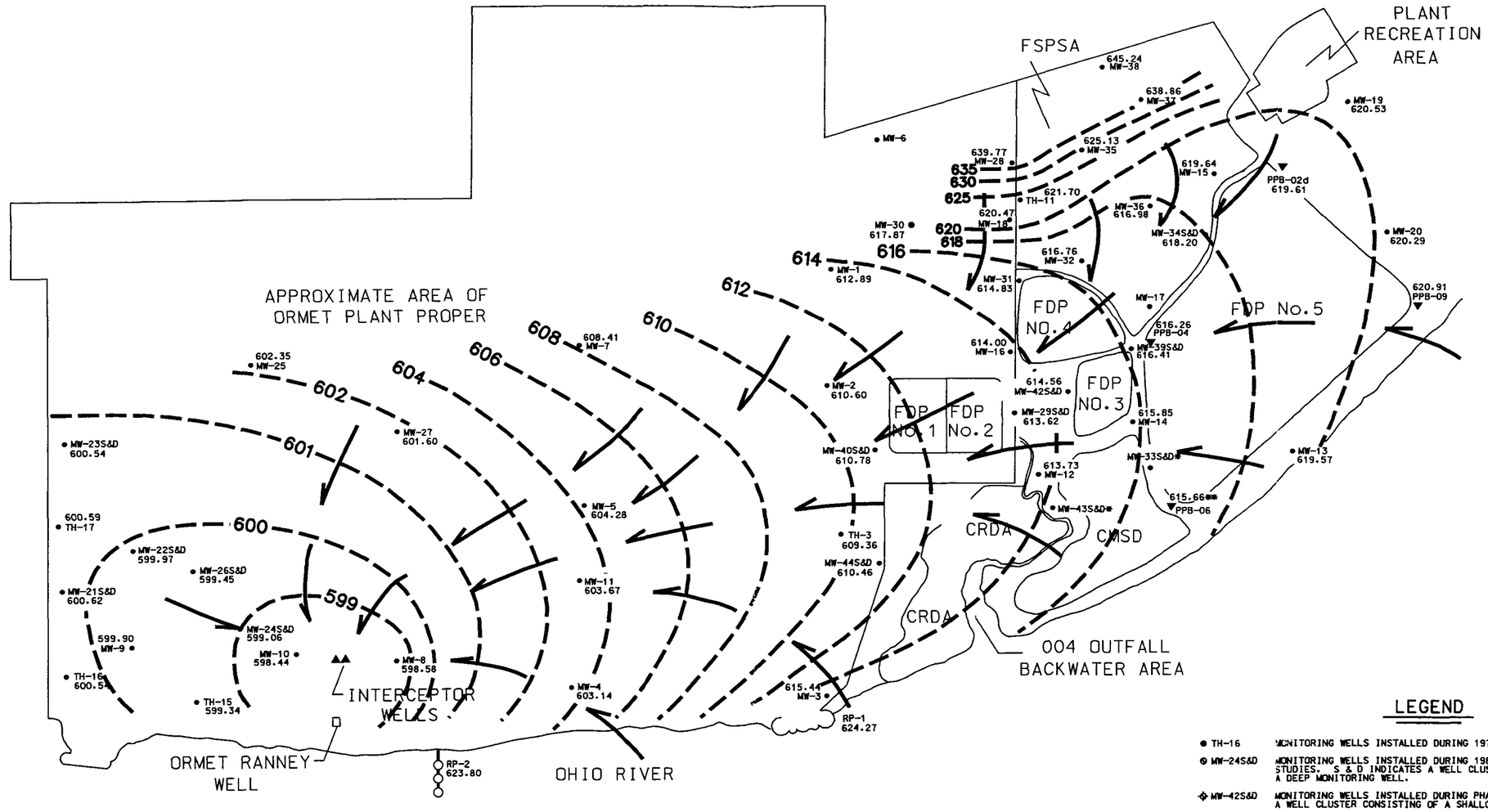
PROJECT NO.: HM00301	FILE NO:
DRAWING: CD71097A	PLOT SIZE: 1"=300'
DRAFTED BY: SJP\EDA	DATE: 7/10/97
CHECKED BY:	DATE:
APPROVED BY:	DATE:
REVISION NO.:	DATE:

BASE MAP

ORMET CORPORATION

HANNIBAL OHIO

FIGURE 1



LEGEND

● TH-16	MONITORING WELLS INSTALLED DURING 1972 FRED KLAER & ASSOC. STUDY.
⊗ MW-24S&D	MONITORING WELLS INSTALLED DURING 1983 & 1986 GERAGHTY & MILLER, INC. STUDIES. S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
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▼ PPB-09	DISPOSAL POND PERIMETER SOIL BORING EQUIPPED WITH ALLUVIAL AQUIFER PIEZOMETER.
*	WELLS ABANDONED ON APRIL 29 AND APRIL 30, 1997.
**	CASING DAMAGED DURING REMEDIAL CONSTRUCTION WATER-LEVEL ELEVATION CONSIDERED APPROXIMATE
—602—	GROUND-WATER ELEVATION CONTOUR LINE (FEET MSL)
⟨	GENERAL DIRECTION OF GROUND-WATER FLOW

HMI Environmental Consulting Services

HydroSystems Management, Inc.
Glass Works Center - Suite 109
331 S. Main Street
Washington, Pennsylvania 15301

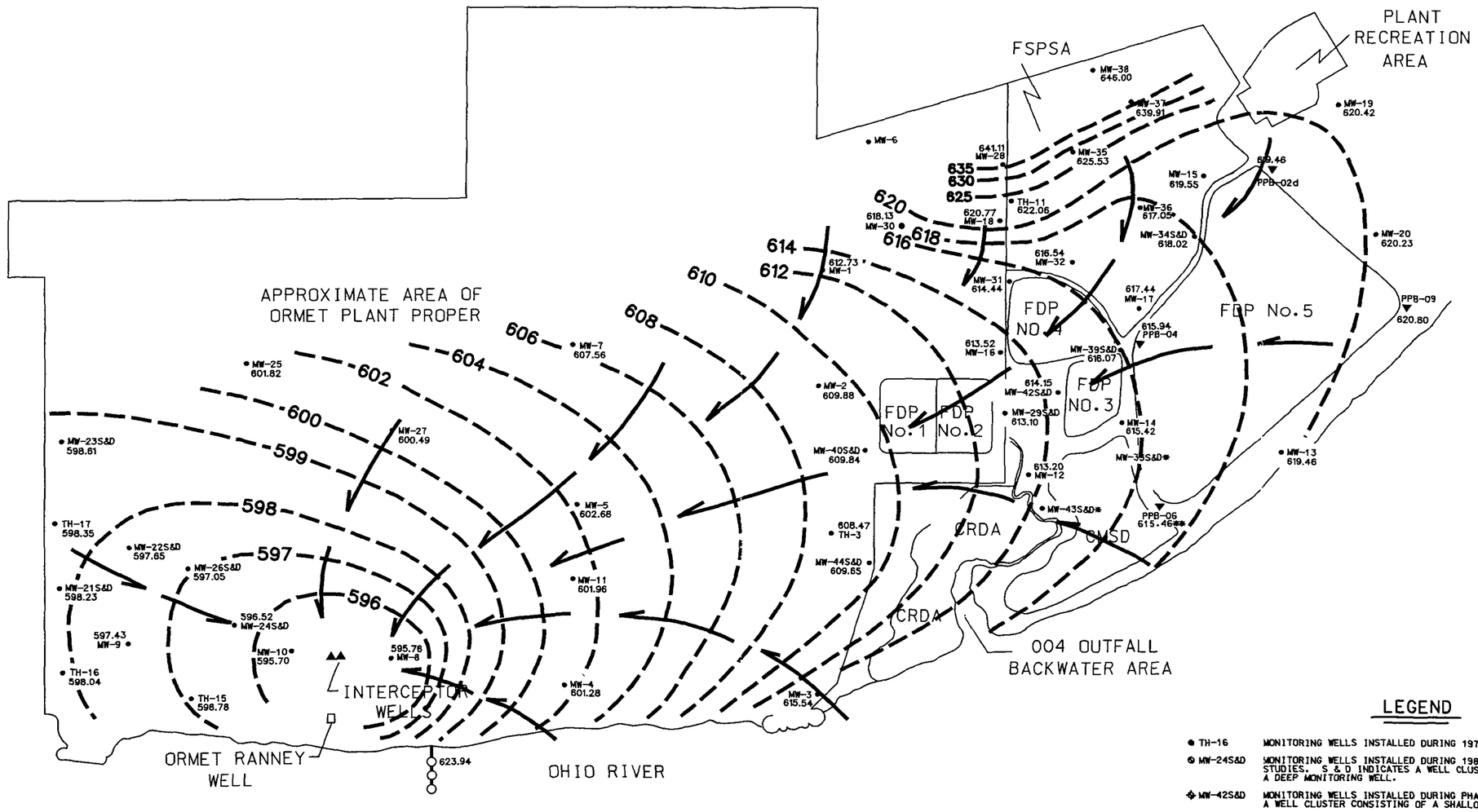
PROJECT NO.: HM00301	FILE NO:
DRAWING: C020199A	PLOT SIZE: 1"=300'
DRAFTED BY: JAW\EDA	DATE: 2/1/99
CHECKED BY:	DATE:
APPROVED BY:	DATE:
REVISION NO.:	DATE:

GROUND-WATER ELEVATION CONTOUR MAP (BASED ON DATA COLLECTED JANUARY 12, 1999)

ORMET CORPORATION

HANNIBAL OHIO

FIGURE 2



LEGEND

● TH-16	MONITORING WELLS INSTALLED DURING 1972 FRED KLAER & ASSOC. STUDY.
⊗ MW-24S&D	MONITORING WELLS INSTALLED DURING 1983 & 1986 GERAGHTY & MILLER, INC. STUDIES. S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
◆ MW-42S&D	MONITORING WELLS INSTALLED DURING PHASE I RI (TASK 3-E). S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
▼ PPB-09	DISPOSAL POND PERIMETER SOIL BORING EQUIPPED WITH ALLUVIAL AQUIFER PIEZOMETER.
*	WELLS ABANDONED ON APRIL 29 AND APRIL 30, 1997.
**	CASING DAMAGED DURING REMEDIAL CONSTRUCTION WATER-LEVEL ELEVATION CONSIDERED APPROXIMATE
—602—	GROUND-WATER ELEVATION CONTOUR LINE (FEET, MSL)
→	GENERAL DIRECTION OF GROUND-WATER FLOW

HMI Environmental Consulting Services

HydroSystems Management, Inc.
Glass Works Center - Suite 109
331 S. Main Street
Washington, Pennsylvania 15301

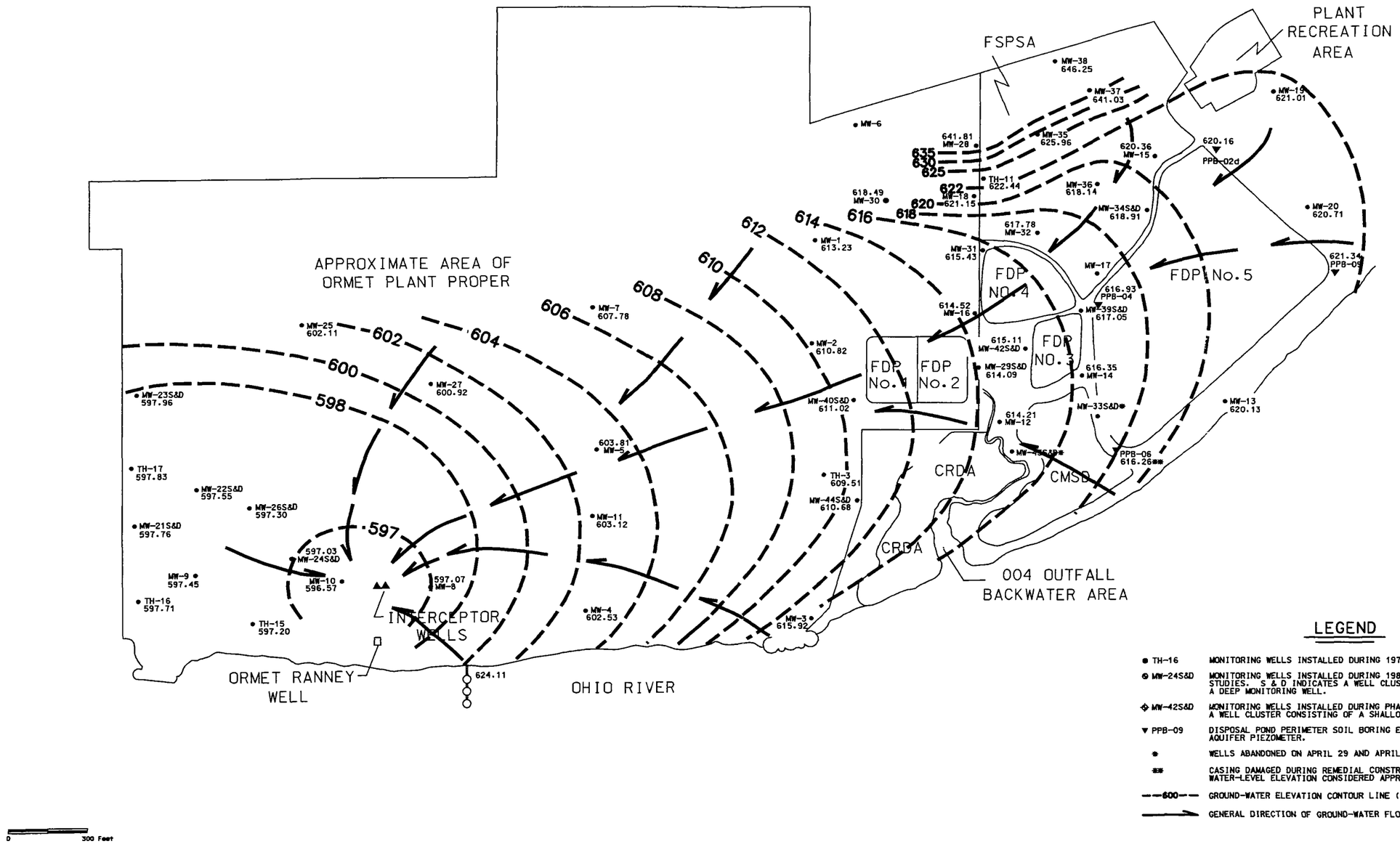
PROJECT NO.: HM00301	FILE NO:
DRAWING: C081199A	PLOT SIZE: 1"=300'
DRAFTED BY: JAW\EDA	DATE: 7/10/97
CHECKED BY:	DATE:
APPROVED BY:	DATE:
REVISION NO.:	DATE:

GROUND-WATER ELEVATION CONTOUR MAP (BASED ON DATA COLLECTED MAY 17, 1999)

ORMET CORPORATION

HANNIBAL OHIO

FIGURE 3



LEGEND

● TH-16	MONITORING WELLS INSTALLED DURING 1972 FRED KLAER & ASSOC. STUDY.
⊗ MW-24S&D	MONITORING WELLS INSTALLED DURING 1983 & 1986 GERAGHTY & MILLER, INC. STUDIES. S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
⊕ MW-42S&D	MONITORING WELLS INSTALLED DURING PHASE I RI (TASK 3-E). S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
▼ PPB-09	DISPOSAL POND PERIMETER SOIL BORING EQUIPPED WITH ALLUVIAL AQUIFER PIEZOMETER.
*	WELLS ABANDONED ON APRIL 29 AND APRIL 30, 1997.
**	CASING DAMAGED DURING REMEDIAL CONSTRUCTION WATER-LEVEL ELEVATION CONSIDERED APPROXIMATE
—600—	GROUND-WATER ELEVATION CONTOUR LINE (FEET, MSL)
⟶	GENERAL DIRECTION OF GROUND-WATER FLOW

HMI Environmental Consulting Services

HydroSystems Management, Inc.
Glass Works Center - Suite 109
331 S. Main Street
Washington, Pennsylvania 15301

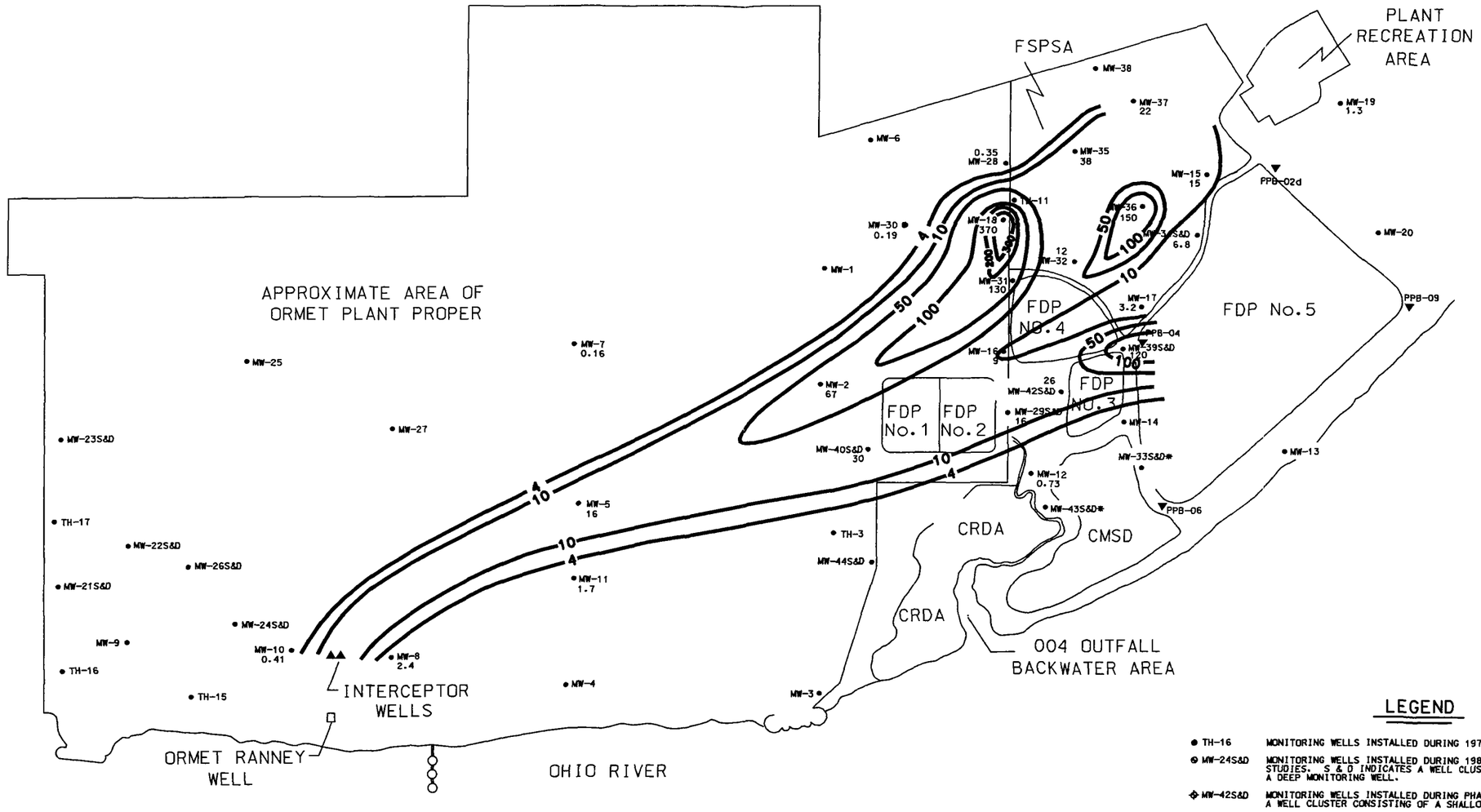
PROJECT NO.: HM00301	FILE NO:
DRAWING: C091799A	PLOT SIZE: 1"=300'
DRAFTED BY: SJP\EDA	DATE: 7/10/97
CHECKED BY:	DATE:
APPROVED BY:	DATE:
REVISION NO.:	DATE:

GROUND-WATER ELEVATION CONTOUR MAP (BASED ON DATA COLLECTED SEPTEMBER 7, 1999)

ORMET CORPORATION

HANNIBAL OHIO

FIGURE 4



LEGEND

● TH-16	MONITORING WELLS INSTALLED DURING 1972 FRED KLAER & ASSOC. STUDY.
⊗ MW-24S&D	MONITORING WELLS INSTALLED DURING 1983 & 1986 GERAGHTY & MILLER, INC. STUDIES. S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
◆ MW-42S&D	MONITORING WELLS INSTALLED DURING PHASE I RI (TASK 3-E). S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
▼ PPB-09	DISPOSAL POND PERIMETER SOIL BORING EQUIPPED WITH ALLUVIAL AQUIFER PIEZOMETER.
*	WELLS ABANDONED ON APRIL 29 AND APRIL 30, 1997.
—10—	FLUORIDE CONCENTRATION CONTOUR (mg/L)

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HydroSystems Management, Inc.
Glass Works Center - Suite 109
331 S. Main Street
Washington, Pennsylvania 15301

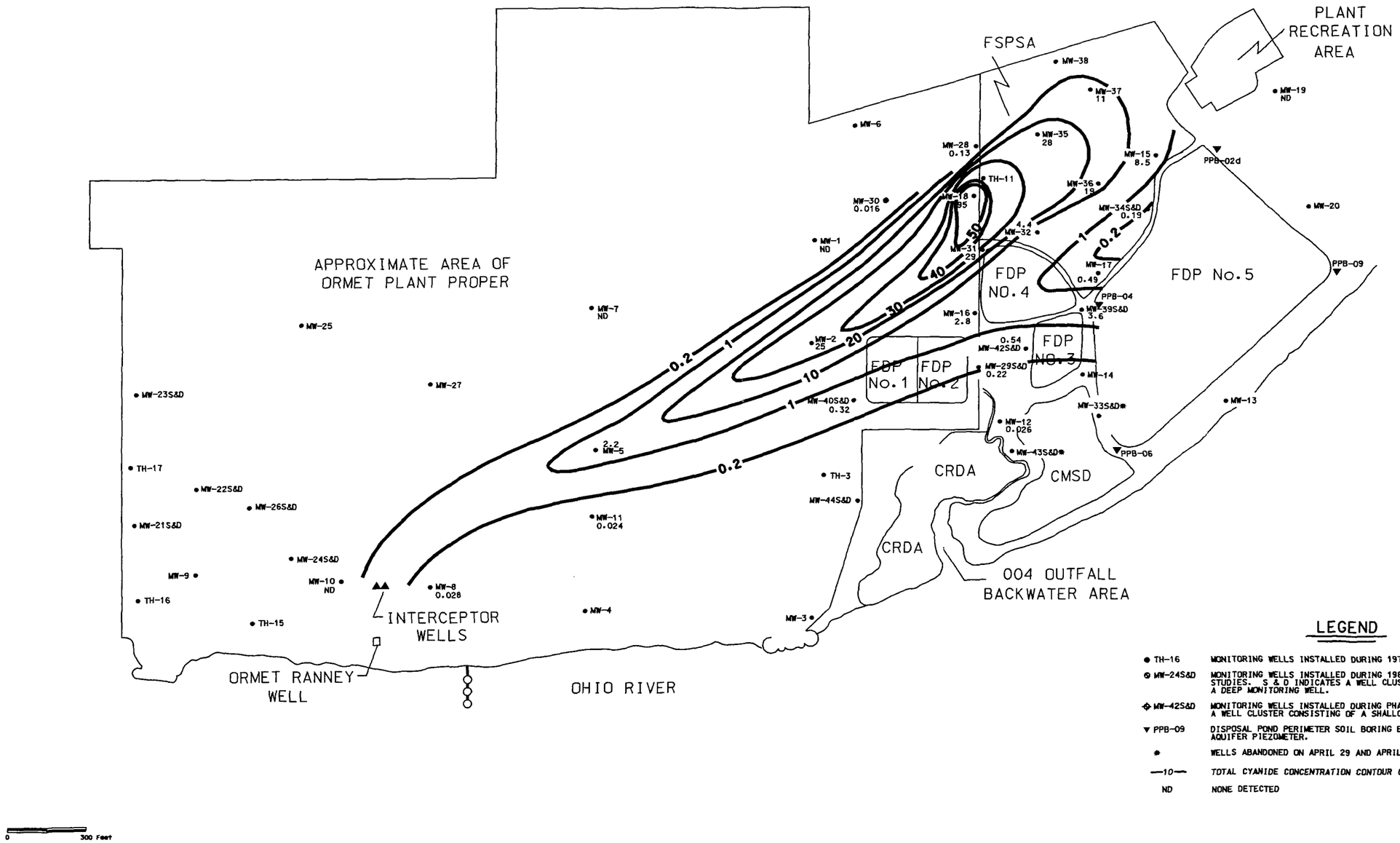
PROJECT NO.: HM00301	FILE NO:
DRAWING: C061199B	PLOT SIZE: 1"=300'
DRAFTED BY: JAW\EDA	DATE: 7/10/97
CHECKED BY:	DATE:
APPROVED BY:	DATE:
REVISION NO.:	DATE:

FLUORIDE ISOPLETH MAP FOR THE ALLUVIAL AQUIFER (BASED ON SAMPLES COLLECTED MAY 18-20, 1999)

ORMET CORPORATION

HANNIBAL OHIO

FIGURE 5



LEGEND

● TH-16	MONITORING WELLS INSTALLED DURING 1972 FRED KLAER & ASSOC. STUDY.
⊙ MW-24S&D	MONITORING WELLS INSTALLED DURING 1983 & 1986 GERAGHTY & MILLER, INC. STUDIES. S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
◈ MW-42S&D	MONITORING WELLS INSTALLED DURING PHASE I RI (TASK 3-E). S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
▼ PPB-09	DISPOSAL POND PERIMETER SOIL BORING EQUIPPED WITH ALLUVIAL AQUIFER PIEZOMETER.
*	WELLS ABANDONED ON APRIL 29 AND APRIL 30, 1997.
—10—	TOTAL CYANIDE CONCENTRATION CONTOUR (mg/L)
ND	NONE DETECTED

HMI
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HydroSystems Management, Inc.
Glass Works Center - Suite 109
331 S. Main Street
Washington, Pennsylvania 15301

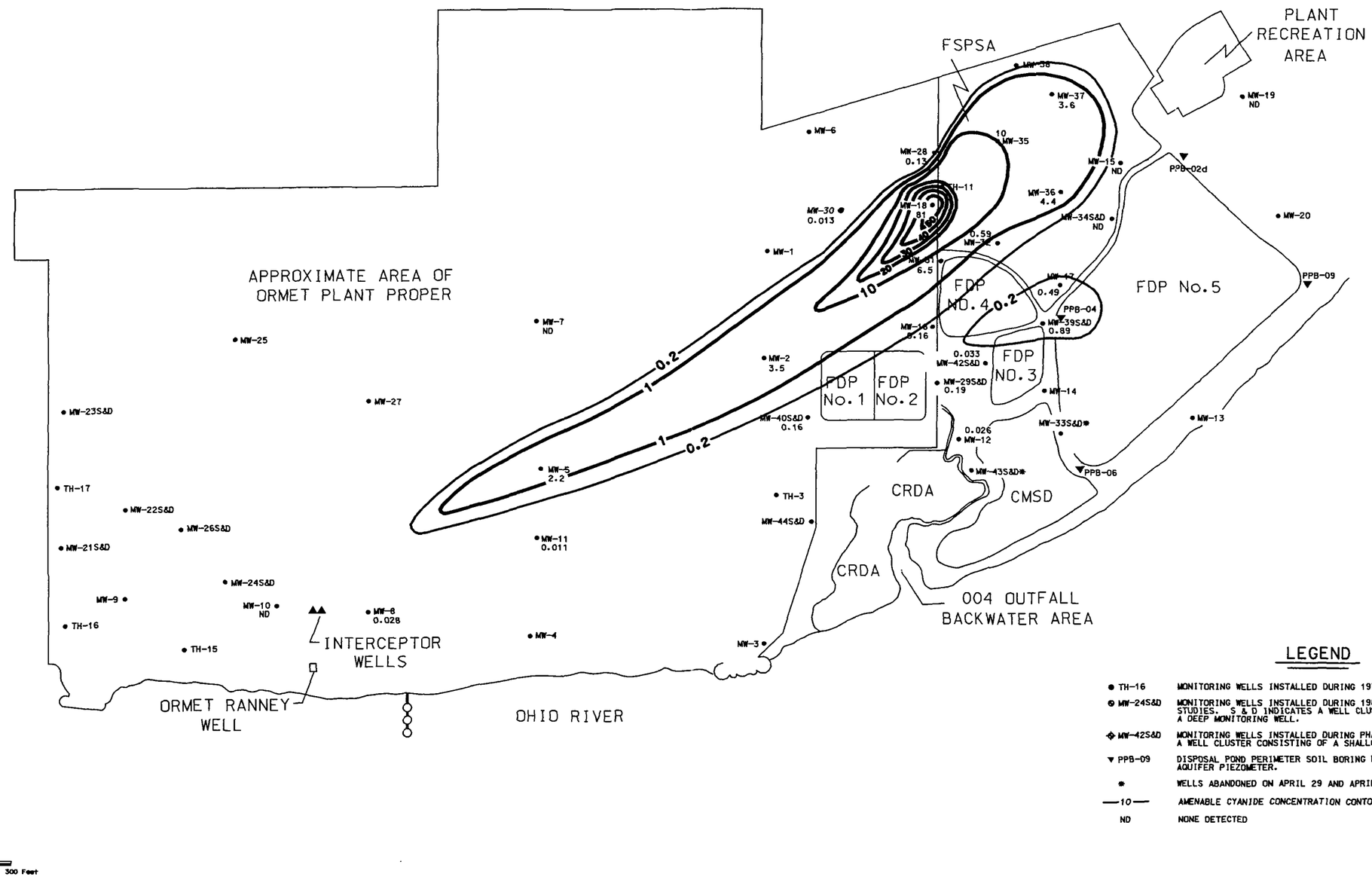
PROJECT NO.: HM00301	FILE NO:
DRAWING: C061199C	PLOT SIZE: 1"=300'
DRAFTED BY: JAW\EDA	DATE: 7/10/97
CHECKED BY:	DATE:
APPROVED BY:	DATE:
REVISION NO.:	DATE:

TOTAL CYANIDE ISOPLETH MAP FOR THE ALLUVIAL AQUIFER (BASED ON SAMPLES COLLECTED MAY 18-20, 1999)

ORMET CORPORATION

HANNIBAL OHIO

FIGURE 6



LEGEND

● TH-16	MONITORING WELLS INSTALLED DURING 1972 FRED KLAER & ASSOC. STUDY.
⊗ MW-24S&D	MONITORING WELLS INSTALLED DURING 1983 & 1986 GERAGHTY & MILLER, INC. STUDIES. S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
✧ MW-42S&D	MONITORING WELLS INSTALLED DURING PHASE I RI (TASK 3-E). S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
▼ PPB-09	DISPOSAL POND PERIMETER SOIL BORING EQUIPPED WITH ALLUVIAL AQUIFER PIEZOMETER.
*	WELLS ABANDONED ON APRIL 29 AND APRIL 30, 1997.
—10—	AMENABLE CYANIDE CONCENTRATION CONTOUR (mg/L)
ND	NONE DETECTED

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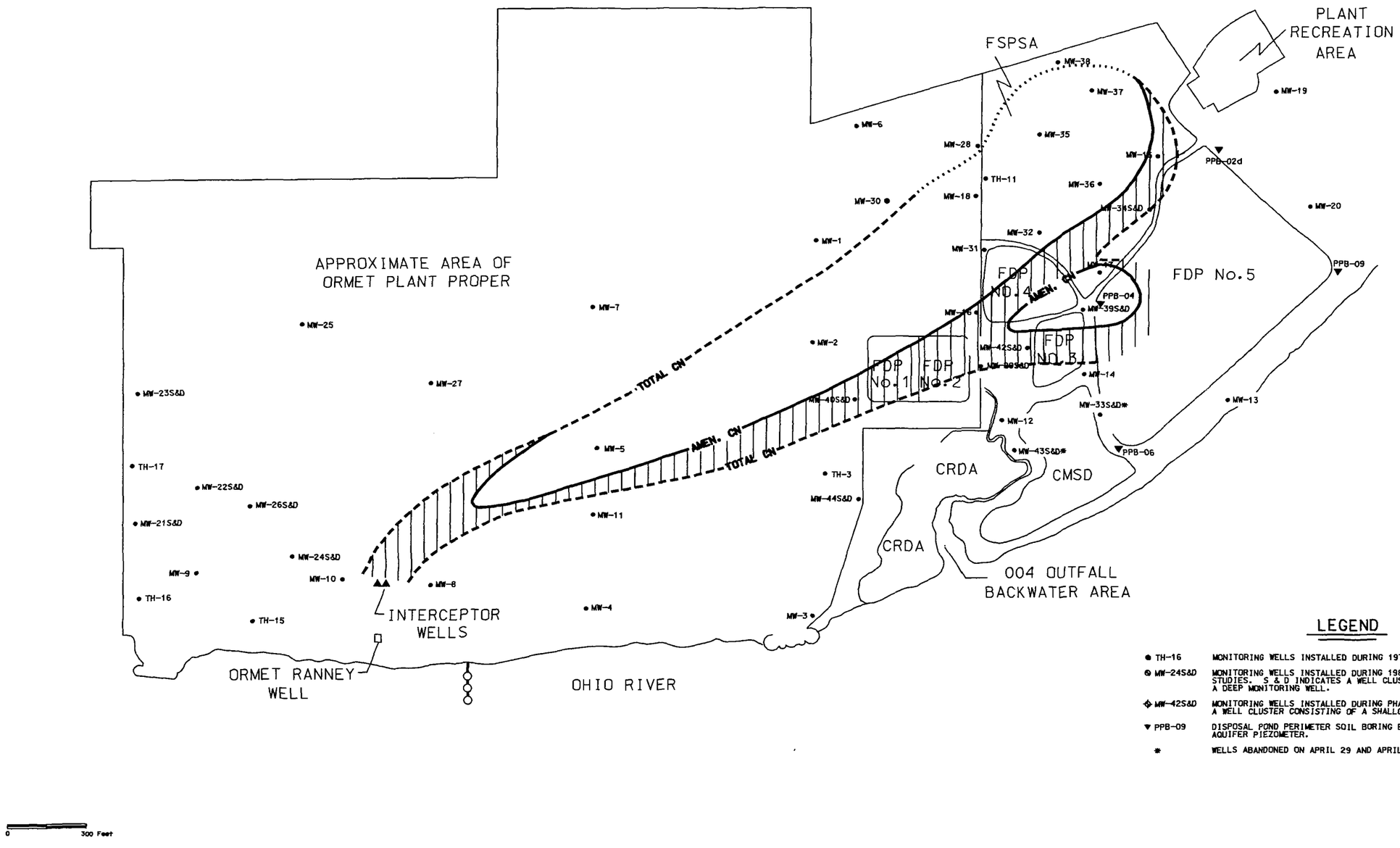
PROJECT NO.: HM00301	FILE NO:
DRAWING: C0611990	PLOT SIZE: 1"=300'
DRAFTED BY: JAW\EDA	DATE: 7/10/97
CHECKED BY:	DATE:
APPROVED BY:	DATE:
REVISION NO.:	DATE:

AMENABLE CYANIDE ISOPLETH MAP FOR THE ALLUVIAL AQUIFER (BASED ON SAMPLES COLLECTED MAY 18-20, 1999)

ORMET CORPORATION

HANNIBAL OHIO

FIGURE 7



LEGEND

● TH-16	MONITORING WELLS INSTALLED DURING 1972 FRED KLAER & ASSOC. STUDY.
● MW-24S&D	MONITORING WELLS INSTALLED DURING 1983 & 1986 GERAGHTY & MILLER, INC. STUDIES. S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
◆ MW-42S&D	MONITORING WELLS INSTALLED DURING PHASE I RI (TASK 3-E). S & D INDICATES A WELL CLUSTER CONSISTING OF A SHALLOW AND A DEEP MONITORING WELL.
▼ PPB-09	DISPOSAL POND PERIMETER SOIL BORING EQUIPPED WITH ALLUVIAL AQUIFER PIEZOMETER.
*	WELLS ABANDONED ON APRIL 29 AND APRIL 30, 1997.

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Glass Works Center - Suite 109
331 S. Main Street
Washington, Pennsylvania 15301

PROJECT NO.: HM00301	FILE NO:
DRAWING: C061199E	PLOT SIZE: 1"=300'
DRAFTED BY: JAW\EDA	DATE: 7/10/97
CHECKED BY:	DATE:
APPROVED BY:	DATE:
REVISION NO.:	DATE:

1999 COMPARISON OF TOTAL VS. AMENABLE CYANIDE DISTRIBUTION IN GROUND WATER (BASED ON 0.2 mg/L CONCENTRATION CONTOURS)

ORMET CORPORATION

HANNIBAL OHIO

FIGURE 8

APPENDIX A

APPENDIX A

WATER SAMPLING LOG FORMS

Appendix A-1	Water Sampling Log Forms for January 1999 Monitoring Event
Appendix A-2	Water Sampling Log Forms for May 1999 Monitoring Event
Appendix A-3	Water Sampling Log Forms for September 1999 Monitoring Event

APPENDIX A-1

WATER SAMPLING LOG FORMS FOR JANUARY 1999 MONITORING EVENT

HMI
Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.08
Site Location: Hannibal, Ohio
Sampling Date: 1/13/99 Weather: Lt Rain 40°

Sample ID: MW-5
Replicate ID:
Time Sampling Began: 0825
Time Sampling Completed: 0855

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 91.88
Depth to Water Below MP (DTW): 63.88
Water Column (WC) in Well [TD-DTW]: 28.00
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 4.48 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): (13.45)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color/Turbidity	LT Brown / Stained			Odor: None				
Well Volumes (gal.):	4.5	9	13.5	final				
pH (s.u.):	8.91	8.91	8.92	8.93				
Sp. Cond. (µmhos/cm):	1130	1170	1185	1175				
Temperature (°C):	13	13	13	13				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description From Lab X or HMI ___	Preservative preserved by: Lab X or HMI ___
Diss. As, Be, Mn, Na, V	500 mL Plastic	HNO_3 - field filtered
Cn-total ; Cn-amenable	250 mL Glass	NAOH
pH, SpCond, F	250 mL Plastic	4°C
PCE	2x 40 mL Glass	HCL

Sampling Personnel: J Campbell, S Menosky
Comments: Color does not filter out

HMI
Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.08
Site Location: Hannibal, Ohio
Sampling Date: 1/13/99 Weather: Rain 40°

Sample ID: MW-2
Replicate ID: MW-2d
Time Sampling Began: 0910
Time Sampling Completed: 0945

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 85.23
Depth to Water Below MP (DTW): 57.52
Water Column (WC) in Well [TD-DTW]: 27.71
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 4.43 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): (13.3)

GALLONS PER FOOT (gpf)			
1¼" = 0.08	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.28	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color/Turbidity	Brown-black - Stained + cloudy			Odor:				
Well Volumes (gal.):	4.5	9	13.5	final				
pH (s.u.):	10.26	10.27	10.27	10.27				
Sp. Cond. (µmhos/cm):	1960	2000	2000	2000				
Temperature (°C):	13	13	13	13				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description From Lab X or HMI ___	Preservative preserved by: Lab X or HMI ___
Diss. As, Be, Mn, Na, V	500 mL Plastic	HNO_3 - field filtered
Cn-total ; Cn-amenable	250 mL Glass	NAOH
pH, SpCond, F	250 mL Plastic	4°C
PCE	2x 40 mL Glass	HCL

Sampling Personnel: J Campbell, S Menosky
Comments: Color does not filter out

HMI
Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.08
Site Location: Hannibal, Ohio
Sampling Date: 1/13/99 Weather: Lt Rain 40°

Sample ID: MW-18
Replicate ID:
Time Sampling Began: 1000
Time Sampling Completed: 1020

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 57.00
Depth to Water Below MP (DTW): 40.44
Water Column (WC) in Well [TD-DTW]: 16.56
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 2.64 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: (8)
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color/Turbidity	Dark brown-black stained + Turbid			Odor:				
Well Volumes (gal.):	3	6	8	final				
pH (s.u.):	10.02	10.03	10.04	10.04				
Sp. Cond. (µmhos/cm):	3520	3500	3500	3450				
Temperature (°C):	13.5	13.5	13.5	13.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description From Lab X or HMI ___	Preservative preserved by: Lab X or HMI ___
Diss. As, Be, Mn, Na, V	500 mL Plastic	HNO_3 - field filtered
Cn-total ; Cn-amenable	250 mL Glass	NAOH
pH, SpCond, F	250 mL Plastic	4°C
PCE	2x 40 mL Glass	HCL

Sampling Personnel: J Campbell, S Menosky
Comments: Color does not filter out

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WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.08
Site Location: Hannibal, Ohio
Sampling Date: 1/13/99 Weather: Lt Rain 40's

Sample ID: MW-31
Replicate ID:
Time Sampling Began: 1030
Time Sampling Completed: 1055

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 67.51
Depth to Water Below MP (DTW): 46.76
Water Column (WC) in Well [TD-DTW]: 20.75
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 3.32 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): (10)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color/Turbidity: Dark brown-black, v stained				Odor:				
Well Volumes (gal.):	3.5	7	10	final				
pH (s.u.):	9.84	9.94	9.97	9.97				
Sp. Cond. (µmhos/cm):	2180	2240	2250	2240				
Temperature (°C):	12.5	12.5	12.5	12.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss. As, Be, Mn, Na, V	500 mL Plastic	HNO_3 - field filtered
Cn-total; Cn-amenable	250 mL Glass	NAOH
pH, SpCond, F	250 mL Plastic	4°C
PCE	2x 40 mL Glass	HCL

Sampling Personnel: J Campbell, S Menosky
Comments: Color does not filter out, Collected field Blank @ 1110

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.08
Site Location: Hannibal, Ohio
Sampling Date: 1/13/99 Weather: Rain 36°

Sample ID: MW-28
Replicate ID:
Time Sampling Began: 1310
Time Sampling Completed: 1330

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 46.06
Depth to Water Below MP (DTW): 23.50
Water Column (WC) in Well [TD-DTW]: 22.56
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 3.6 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: 11
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color/Turbidity	Brown / v Cloudy			Odor:				
Well Volumes (gal.):	3.5	7.5	11	final				
pH (s.u.):	5.26	5.18	5.16	5.17				
Sp. Cond. (µmhos/cm):	440	444	450	450				
Temperature (°C):	14.5	14	14	14				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss. As, Be, Mn, Na, V	500 mL Plastic	HNO_3 - field filtered
Cn-total ; Cn-amenable	250 mL Glass	NAOH
pH, SpCond, F	250 mL. Plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments:

HM07-07WS-LOG.WK3

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HMC03.08
Site Location: Hannibal, Ohio
Sampling Date: 1/13/99 Weather: Rain 34°

Sample ID: MW-16
Replicate ID:
Time Sampling Began: 1330
Time Sampling Completed: 1410

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 83.11
Depth to Water Below MP (DTW): 48.72
Water Column (WC) in Well [TD-DTW]: 34.39
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 5.5 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 16.5

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color/Turbidity	Brown / Stained + cloudy			Odor:				
Well Volumes (gal.):	5.5	11	16.5	final				
pH (s.u.):	6.80	7.05	7.10	7.12				
Sp. Cond. (µmhos/cm):	655	660	665	665				
Temperature (°C):	13.5	13.5	13.5	13.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss. As, Be, Mn, Na, V	500 mL Plastic	HNO_3 - field filtered
Cn-total ; Cn-amenable	250 mL Glass	NAOH
pH, SpCond, F	250 mL Plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments: Color filtered out

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.08
Site Location: Hannibal, Ohio
Sampling Date: 1/13/99 Weather: Rain / 33°

Sample ID: MW-12
Replicate ID:
Time Sampling Began: 1425
Time Sampling Completed: 1455

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 68.24
Depth to Water Below MP (DTW): 23.00
Water Column (WC) in Well [TD-DTW]: 45.24
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 7.23 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): (22)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color/Turbidity	None / Clear			Odor:				
Well Volumes (gal.):	7.5	15	22	final				
pH (s.u.):	7.17	7.05	7.05	7.04				
Sp. Cond. (µmhos/cm):	445	445	445	440				
Temperature (°C):	14	14	14	14				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss. As, Be, Mn, Na, V	500 mL Plastic	HNO_3 - field filtered
Cn-total ; Cn-amenable	250 mL Glass	NAOH
pH, SpCond, F	250 mL Plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments:

HM07-07MW-LOG.WK3

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.08
Site Location: Hannibal, Ohio
Sampling Date: 1/13/99 Weather: Rain 33°

Sample ID: MW-32
Replicate ID: MW-32d
Time Sampling Began: 1508
Time Sampling Completed: 1545

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 57.18
Depth to Water Below MP (DTW): 39.90
Water Column (WC) in Well [TD-DTW]: 17.28
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 2.76 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 8.3

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color/Turbidity	Brown-black / stained + cloudy			Odor:				
Well Volumes (gal.):	3	6	8.5	final				
pH (s.u.):	7.77	7.90	7.95	8.00				
Sp. Cond. (µmhos/cm):	620	640	645	650				
Temperature (°C):	14	14	14	14				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss. As, Be, Mn, Na, V	500 mL Plastic	HNO_3 - field filtered
Cn-total ; Cn-amenable	250 mL Glass	NAOH
pH, SpCond, F	250 mL Plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments: most of color filters out; 2 filters

HM87-07WB-LOG.WK3

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.08
Site Location: Hannibal, Ohio
Sampling Date: 1/14/99 Weather: Rain 30°

Sample ID: MW-35
Replicate ID:
Time Sampling Began: 0825
Time Sampling Completed: 0905

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 46.70
Depth to Water Below MP (DTW): 36.77
Water Column (WC) in Well [TD-DTW]: 9.93
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 1.6 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): (4.8)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color/Turbidity	Brown-black / Stained			Odor:				
Well Volumes (gal.):	2	3.5	5	6	final			
pH (s.u.):	6.50	7.80	9.00	9.10	9.15			
Sp. Cond. (µmhos/cm):	350	500	900	920	925			
Temperature (°C):	13.5	13.5	13.5	13.5	13.5			
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss. As, Be, Mn, Na, V	500 mL Plastic	HNO_3 - field filtered
Cn-total ; Cn-amenable	250 mL Glass	NAOH
pH, SpCond, F	250 mL Plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments: Well goes dry after 2 gal but keeps recovering
Color does not filter out

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.08
Site Location: Hannibal, Ohio
Sampling Date: 1/14/99 Weather: Rain 35

Sample ID: MW-37
Replicate ID:
Time Sampling Began: 0915
Time Sampling Completed: 0945

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 36.98
Depth to Water Below MP (DTW): 22.28
Water Column (WC) in Well [TD-DTW]: 14.70
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 2.35 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): (7.1)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color/Turbidity: Brown / Stained + Turbid				Odor:				
Well Volumes (gal.):	2.5	5	7.5	final				
pH (s.u.):	9.25	9.30	9.25	9.25				
Sp. Cond. (µmhos/cm):	725	730	735	750				
Temperature (°C):	14	14	14	14				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss. As, Be, Mn, Na, V	500 mL Plastic	HNO_3 - field filtered
Cn-total ; Cn-amenable	250 mL Glass	NAOH
pH, SpCond, F	250 mL Plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments: Very hard to filter 2-filters

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.08
Site Location: Hannibal, Ohio
Sampling Date: 1/14/99 Weather: Rain 30°

Sample ID: MW-36
Replicate ID:
Time Sampling Began: 1000
Time Sampling Completed: 1030

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 54.50
Depth to Water Below MP (DTW): 38.16
Water Column (WC) in Well [TD-DTW]: 16.34
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 2.61 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): (7.9)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color/Turbidity	Black / Stained + Cloudy			Odor:				
Well Volumes (gal.):	3	6	8	final				
pH (s.u.):	10.30	10.25	10.20	10.20				
Sp. Cond. (µmhos/cm):	3,340	3,340	3,380	3,300				
Temperature (°C):	14	14	14	14				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss. As, Be, Mn, Na, V	500 mL Plastic	HNO_3 - field filtered
Cn-total ; Cn-amenable	250 mL Glass	NAOH
pH, SpCond, F	250 mL Plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments: color does not filter out; 2-filters

APPENDIX A-2

WATER SAMPLING LOG FORMS FOR MAY 1999 MONITORING EVENT

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/18/99 Weather: Sunny 60°

Sample ID: MW-5
Replicate ID: MW-5d
Time Sampling Began: 0750
Time Sampling Completed: 0825

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 91.88
Depth to Water Below MP (DTW): 65.48
Water Column (WC) in Well [TD-DTW]: 26.40
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 4.22 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: 13
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.28	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: yellow-brown Odor: Turbidity: None / stained

Well Volumes (gal.):	4.5	9	13	final				
pH (s.u.):	8.67	8.60	8.61	8.60				
Sp. Cond. (µmhos/cm):	1,240	1,255	1,255	1,260				
Temperature (°C):	13.5	13.5	13.5	13.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C
Tetrachloroethene (PCE)	2 x 40 mL Glass	HCL

Sampling Personnel: J Campbell, S Menosky
Comments: Color does not filter out

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/18/99 Weather: Sunny 60's

Sample ID: MW-2
Replicate ID:
Time Sampling Began: 0835
Time Sampling Completed: 0900

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 85.23
Depth to Water Below MP (DTW): 58.24
Water Column (WC) in Well [TD-DTW]: 26.99
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 4.32 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: 13
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1½" = 0.08	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Dark brown-black Odor: wispy sheen Turbidity: Stained, Sl. Cloudy

Well Volumes (gal.):	4.5	9	13	final				
pH (s.u.):	9.90	9.94	9.94	9.94				
Sp. Cond. (µmhos/cm):	1,900	1,930	1940	1,940				
Temperature (°C):	14	14	14	14				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3-field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C
Tetrachloroethene (PCE)	2x40 mL Glass	HCL

Sampling Personnel: J Campbell, S Menosky
Comments: Color does not filter out

HMI
Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/18/99 Weather: Sunny 60's

Sample ID: MW-18
Replicate ID:
Time Sampling Began: 0910
Time Sampling Completed: 0935

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 57.00
Depth to Water Below MP (DTW): 40.14
Water Column (WC) in Well [TD-DTW]: 16.86
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 2.70

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 8.5
= Well Casing Volume (WCV)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.28	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Dark brown-black Odor: Sl. wispy sheen Turbidity: Stained + Turbid

Well Volumes (gal.):	3	6	8.5	final				
pH (s.u.):	9.80	9.80	9.80	9.80				
Sp. Cond. (µmhos/cm):	3100	3070	3070	3000				
Temperature (°C):	14	14	14	14				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description From Lab X or HMI ___	Preservative preserved by: Lab X or HMI ___
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3-field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C
Tetrachloroethene (PCE)	2×40 mL Glass	HCL

Sampling Personnel: J Campbell, S Menosky

Comments: Color does not filter out; well drys to ½ bailers after 5 gallons wispy sheen when at bottom of well with sediments

HMI
Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/18/99 Weather: Sunny 70°

Sample ID: MW-30
Replicate ID:
Time Sampling Began: 0950
Time Sampling Completed: 1012

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 60.41
Depth to Water Below MP (DTW): 49.45
Water Column (WC) in Well [TD-DTW]: 10.96
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 1.75 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 5.5

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Tan Odor: Turbidity: Cloudy

Well Volumes (gal.):	2	4	5.5	final				
pH (s.u.):	6.15	6.11	6.10	6.10				
Sp. Cond. (µmhos/cm):	420	405	400	390				
Temperature (°C):	14	14	14	14				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3-field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C
Tetrachloroethene (PCE)	2 x 40 mL Glass	HCL

Sampling Personnel: J Campbell, S Menosky
Comments: Color filters out

HMI
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WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/18/99 Weather: Sunny 70°

Sample ID: MW-31
Replicate ID:
Time Sampling Began: 1025
Time Sampling Completed: 1050

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 67.51
Depth to Water Below MP (DTW): 47.15
Water Column (WC) in Well [TD-DTW]: 20.36
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 3.25 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 10

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.28	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Dark brown-black Odor: Turbidity: stained

Well Volumes (gal.):	3.5	6.5	10	final				
pH (s.u.):	9.91	10.0	10.01	10.02				
Sp. Cond. (µmhos/cm):	2380	2520	2510	2510				
Temperature (°C):	14	14	14	14				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description From Lab X or HMI ___	Preservative preserved by: Lab X or HMI ___
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3-field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C
Tetrachloroethene (PCE)	2×40 mL Glass	HCL

Sampling Personnel: J Campbell, S Menosky
Comments: Color does not filter out; Collect Field Blank @ 1100

HMI
Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/18/99 Weather: Sunny 85

Sample ID: MW-35
Replicate ID:
Time Sampling Began: 1300
Time Sampling Completed: 1335

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 46.70
Depth to Water Below MP (DTW): 36.37
Water Column (WC) in Well [TD-DTW]: 10.33
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 1.65 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: 8
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Brown-black Odor: Turbidity: Stained + Turbid

Well Volumes (gal.):	2	3.5	5	6	7	8	final	
pH (s.u.):	8.32	8.81	9.23	9.40	9.70	9.70	9.70	
Sp. Cond. (µmhos/cm):	456	530	632	720	885	820	870	
Temperature (°C):	15	15	15	15	15	15	15	
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments: Color does not filter out; well drys after 3+ gallons

HMI
Environmental Consulting Services

WATER SAMPLING LOG

Project Name:	Ormet	Sample ID:	MW-37
Project Number:	HM003.11	Replicate ID:	
Site Location:	Hannibal, Ohio	Time Sampling Began:	1345
Sampling Date:	5/18/99 Weather: Sunny 85	Time Sampling Completed:	1406

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC

MP Elevation:

Diameter of Well Casing: 2"

Total Sounded Depth of Well Below MP (TD): 36.98

Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 8

Depth to Water Below MP (DTW): 21.23

Water Column (WC) in Well [TD-DTW]: 15.75

Gallons per foot (GPF); from chart: 0.16

Gallons in Well [WC x GPF]: 2.52 = Well Casing Volume (WCV)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Brown Odor: Turbidity: Turbid + Stained

Well Volumes (gal.):	3	5.5	8	final				
pH (s.u.):	9.46	9.46	9.44	9.45				
Sp. Cond. (µmhos/cm):	560	550	540	540				
Temperature (°C):	14	14	14	14				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description From Lab X or HMI ___	Preservative preserved by: Lab X or HMI ___
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3-field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments: Lt brown color after filtering; hard to filter

HMI
Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/18/99 Weather: Sunny 90°

Sample ID: MW-32
Replicate ID:
Time Sampling Began: 1415
Time Sampling Completed: 1436

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 57.18
Depth to Water Below MP (DTW): 40.12
Water Column (WC) in Well [TD-DTW]: 17.06
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 2.73 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 8.5

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Dark brown-black Odor: Turbidity: Stained

Well Volumes (gal.):	3	6	8.5	final				
pH (s.u.):	8.32	8.45	8.47	8.50				
Sp. Cond. (µmhos/cm):	532	546	555	555				
Temperature (°C):	15	15	15	15				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3-field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments: Lt brown color after filtering

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/18/99 Weather: Sunny 90°

Sample ID: MW-36
Replicate ID:
Time Sampling Began: 1445
Time Sampling Completed: 1500

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 52.08
Depth to Water Below MP (DTW): 38.09
Water Column (WC) in Well [TD-DTW]: 13.99
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 2.24 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: 7
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.28	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Dark brown-black Odor: Turbidity: Stained

Well Volumes (gal.):	2.5	5	7	final				
pH (s.u.):	10.5	10.4	10.4	10.4				
Sp. Cond. (µmhos/cm):	2110	2200	2240	2260				
Temperature (°C):	14.5	14.5	14.5	14.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments: Color does not filter out; hard to filter

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/18/99 Weather: Sunny 90°

Sample ID: MW-15
Replicate ID:
Time Sampling Began: 1505
Time Sampling Completed: 1525

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 57.86
Depth to Water Below MP (DTW): 37.76
Water Column (WC) in Well [TD-DTW]: 20.10
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 3.22 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: 13
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Dark brown-black Odor: Turbidity: Stained

Well Volumes (gal.):	3.5	7	10	13	final			
pH (s.u.):	7.70	7.70	7.70	7.70	7.70			
Sp. Cond. (µmhos/cm):	1090	915	780	780	785			
Temperature (°C):	14.5	14.5	14.5	14.5	14.5			
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments: Color does not filter out

HMI
Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/19/99 Weather: Sunny 50's

Sample ID: MW-28
Replicate ID:
Time Sampling Began: 0720
Time Sampling Completed: 0743

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 46.06
Depth to Water Below MP (DTW): 22.16
Water Column (WC) in Well [TD-DTW]: 23.90
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 3.82

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.):
= Well Casing Volume (WCV)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Lt Brown Odor: Turbidity: Cloudy

Well Volumes (gal.):	4	8	11.5	final				
pH (s.u.):	5.42	5.41	5.41	5.43				
Sp. Cond. (µmhos/cm):	410	411	413	405				
Temperature (°C):	12.5	12.5	12.5	12.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description From Lab X or HMI ___	Preservative preserved by: Lab X or HMI ___
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/19/99 Weather: Sunny 50's

Sample ID: MW-17
Replicate ID: MW-17d
Time Sampling Began: 0755
Time Sampling Completed: 0830

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 77.91
Depth to Water Below MP (DTW): 37.59
Water Column (WC) in Well [TD-DTW]: 40.32
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 6.45 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 19.5

GALLONS PER FOOT (gpf)			
1¼" = 0.08	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.28	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Brown Odor: Turbidity: V Cloudy - turbid

Well Volumes (gal.):	6.5	13	19.5	final				
pH (s.u.):	7.27	7.35	7.37	7.40				
Sp. Cond. (µmhos/cm):	466	475	470	470				
Temperature (°C):	12	12	12	12				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/19/99 Weather: Overcast 50's

Sample ID: MW-12
Replicate ID:
Time Sampling Began: 0840
Time Sampling Completed: 0910

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 68.24
Depth to Water Below MP (DTW): 23.53
Water Column (WC) in Well [TD-DTW]: 44.71
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 7.15 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 21.5

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: None Odor: Turbidity: Clear

Well Volumes (gal.):	7.5	14.5	21.5	final				
pH (s.u.):	7.30	7.35	7.35	7.39				
Sp. Cond. (µmhos/cm):	515	515	515	515				
Temperature (°C):	13.5	13.5	13.5	13.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/19/99 Weather: Overcast 50's

Sample ID: MW-39d
Replicate ID:
Time Sampling Began: 0942
Time Sampling Completed: 1010

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 80.21
Depth to Water Below MP (DTW): 40.90
Water Column (WC) in Well [TD-DTW]: 39.31
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 6.3 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: 19
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.28	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Tan Odor: Turbidity: Cloudy

Well Volumes (gal.):	6.5	13	19	final				
pH (s.u.):	7.67	7.63	7.61	7.64				
Sp. Cond. (µmhos/cm):	453	450	448	447				
Temperature (°C):	13.5	13.5	13.5	13.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/19/99 Weather: Overcast 50's

Sample ID: MW-39s
Replicate ID: MW-45
Time Sampling Began: 1012
Time Sampling Completed: 1030

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 60.23
Depth to Water Below MP (DTW): 41.23
Water Column (WC) in Well [TD-DTW]: 19.00
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 3.04 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: 9.5
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Yellow-brown Odor: Turbidity: Stained

Well Volumes (gal.):	3.5	6.5	9.5	final				
pH (s.u.):	9.27	9.28	9.28	9.30				
Sp. Cond. (µmhos/cm):	3640	3560	3600	3620				
Temperature (°C):	14	14	14	14				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments: Color does not filter out

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WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/19/99 Weather: Overcast 50's

Sample ID: MW-34d
Replicate ID:
Time Sampling Began: 1045
Time Sampling Completed: 1112

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 68.24
Depth to Water Below MP (DTW): 35.73
Water Column (WC) in Well [TD-DTW]: 32.51
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 5.2 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 16

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Brown Odor: Turbidity: Cloudy

Well Volumes (gal.):	5.5	11	16	final				
pH (s.u.):	7.54	7.54	7.52	7.52				
Sp. Cond. (µmhos/cm):	515	480	475	475				
Temperature (°C):	13.5	13.5	13.5	13.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/19/99 Weather: Sunny 70°

Sample ID: MW-41
Replicate ID:
Time Sampling Began: 1330
Time Sampling Completed: 1355

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 62.26
Depth to Water Below MP (DTW): 13.34
Water Column (WC) in Well [TD-DTW]: 48.92
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 7.83 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 23.5

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Tan Odor: Turbidity: Cloudy

Well Volumes (gal.):	8	16	23.5	Final				
pH (s.u.):	6.60	6.75	6.80	6.80				
Sp. Cond. (µmhos/cm):	367	375	370	370				
Temperature (°C):	13.5	13.5	13.5	13.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments:

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WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/19/99 Weather: Sunny 70's

Sample ID: MW-34s
Replicate ID:
Time Sampling Began: 1405
Time Sampling Completed: 1420

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 49.35
Depth to Water Below MP (DTW): 37.65
Water Column (WC) in Well [TD-DTW]: 11.75
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 1.87 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: 6
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Dark brown Odor: Turbidity: Stained + Turbid

Well Volumes (gal.):	2	4	6	final				
pH (s.u.):	7.52	7.51	7.52	7.55				
Sp. Cond. (µmhos/cm):	500	495	500	505				
Temperature (°C):	13	13	13	13				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments:

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WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/19/99 Weather: Sunny 70's

Sample ID: MW-42d
Replicate ID:
Time Sampling Began: 1435
Time Sampling Completed: 1515

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 85.10
Depth to Water Below MP (DTW): 40.09
Water Column (WC) in Well [TD-DTW]: 45.01
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 7.2

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 22
= Well Casing Volume (WCV)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Very Lt Tan Odor: Turbidity: Very Sl. Cloudy

Well Volumes (gal.):	7.5	15	22	final				
pH (s.u.):	8.07	7.83	7.80	7.83				
Sp. Cond. (µmhos/cm):	432	437	435	435				
Temperature (°C):	15	15	15	15				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description From Lab X or HMI ___	Preservative preserved by: Lab X or HMI ___
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3-field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments:

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WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/19/99 Weather: Sunny 70's

Sample ID: MW-42s
Replicate ID:
Time Sampling Began: 1525
Time Sampling Completed: 1540

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 52.30
Depth to Water Below MP (DTW): 40.22
Water Column (WC) in Well [TD-DTW]: 12.08
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 1.93 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: 6
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Tan Odor: Turbidity: Stained

Well Volumes (gal.):	2	4	6	final				
pH (s.u.):	8.50	8.52	8.52	8.54				
Sp. Cond. (µmhos/cm):	988	1090	1090	1100				
Temperature (°C):	14.5	14.5	14.5	14.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments:

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WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/20/99 Weather: foggy 40's

Sample ID: MW-29d
Replicate ID:
Time Sampling Began: 0745
Time Sampling Completed: 0819

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 81.98
Depth to Water Below MP (DTW): 39.90
Water Column (WC) in Well [TD-DTW]: 42.08
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 6.73 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 20.5

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: None Odor: Turbidity: Clear

Well Volumes (gal.):	7	14	20.5	final				
pH (s.u.):	7.51	7.57	7.60	7.60				
Sp. Cond. (µmhos/cm):	465	465	465	465				
Temperature (°C):	13	13	13	13				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/20/99 Weather: Overcast 40's

Sample ID: MW-29s
Replicate ID:
Time Sampling Began: 0820
Time Sampling Completed: 0840

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 61.35
Depth to Water Below MP (DTW): 40.30
Water Column (WC) in Well [TD-DTW]: 21.05
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 3.37 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 10.5

GALLONS PER FOOT (gpf)			
1½" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1¼" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: None Odor: Turbidity: Clear

Well Volumes (gal.):	3.5	7	10.5	final				
pH (s.u.):	8.32	8.37	8.37	8.37				
Sp. Cond. (µmhos/cm):	1015	1075	1080	1090				
Temperature (°C):	13.5	13.5	13.5	13.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/20/99 Weather: Sunny 50's

Sample ID: MW-16
Replicate ID:
Time Sampling Began: 0855
Time Sampling Completed: 0925

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 83.11
Depth to Water Below MP (DTW): 49.20
Water Column (WC) in Well [TD-DTW]: 33.91
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 5.42 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 16.5

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Brown Odor: Turbidity: Stained + Sl Cloudy

Well Volumes (gal.):	5.5	11	16.5	final				
pH (s.u.):	7.88	7.87	7.90	7.90				
Sp. Cond. (µmhos/cm):	615	600	600	600				
Temperature (°C):	13.5	13.5	13.5	13.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments: Color filters out

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/20/99 Weather: Sunny 60's

Sample ID: MW-8
Replicate ID:
Time Sampling Began: 0950
Time Sampling Completed: 1022

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 99.78
Depth to Water Below MP (DTW): 71.95
Water Column (WC) in Well [TD-DTW]: 27.83
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 4.45 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 13.5

GALLONS PER FOOT (gpf)			
1½" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: None Odor: Turbidity: Almost Clear

Well Volumes (gal.):	4.5	9	13.5	final				
pH (s.u.):	812	810	810	810				
Sp. Cond. (µmhos/cm):	450	460	455	455				
Temperature (°C):	14	14	14	14				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/20/99 Weather: Sunny 65°

Sample ID: MW-10
Replicate ID:
Time Sampling Began: 1030
Time Sampling Completed: 1105

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 100.72
Depth to Water Below MP (DTW): 71.46
Water Column (WC) in Well [TD-DTW]: 29.26
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 4.7 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: 14.5
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Brown Odor: Turbidity: V. Cloudy - Turbid

Well Volumes (gal.):	5	10	14.5	final				
pH (s.u.):	7.42	7.33	7.33	7.32				
Sp. Cond. (µmhos/cm):	550	550	545	545				
Temperature (°C):	15.5	15.5	15.5	15.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments:

HMI
Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/20/99 Weather: Sunny 70

Sample ID: MW-19
Replicate ID:
Time Sampling Began: 1125
Time Sampling Completed: 1145

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 65.20
Depth to Water Below MP (DTW): 41.61
Water Column (WC) in Well [TD-DTW]: 23.59
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 3.77 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: 11.5
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Brown Odor: Turbidity: Turbid

Well Volumes (gal.):	4	8	11.5	final				
pH (s.u.):	7.25	7.35	7.36	7.40				
Sp. Cond. (µmhos/cm):	465	460	460	460				
Temperature (°C):	12.5	12.5	12.5	12.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/20/99 Weather: Sunny 70's

Sample ID: MW-40d
Replicate ID:
Time Sampling Began: 1305
Time Sampling Completed: 1345

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 90.40
Depth to Water Below MP (DTW): 52.00
Water Column (WC) in Well [TD-DTW]: 38.40
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 6.14 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged: 18.5
(3 WCVs, 5 WCVs, etc.)

GALLONS PER FOOT (gpf)			
1¼" = 0.08	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: None Odor: Turbidity: Clear

Well Volumes (gal.):	6.5	13.5	18.5	final				
pH (s.u.):	8.04	8.23	8.25	8.25				
Sp. Cond. (µmhos/cm):	760	745	750	745				
Temperature (°C):	16	16	16	16				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/20/99 Weather: Sunny 70's

Sample ID: MW-40s
Replicate ID:
Time Sampling Began: 1348
Time Sampling Completed: 1405

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 70.40
Depth to Water Below MP (DTW): 52.38
Water Column (WC) in Well [TD-DTW]: 18.02
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 2.88 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 9

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.28	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Brown Odor: Turbidity: Cloudy

Well Volumes (gal.):	3	6	9	final				
pH (s.u.):	8.85	8.83	8.83	8.83				
Sp. Cond. (µmhos/cm):	1040	1080	1090	1100				
Temperature (°C):	15	15	15	15				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments:

HMI
Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/20/99 Weather: Sunny 70's

Sample ID: MW-11
Replicate ID:
Time Sampling Began: 1415
Time Sampling Completed: 1445

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 97.35
Depth to Water Below MP (DTW): 65.35
Water Column (WC) in Well [TD-DTW]: 32.00
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 5.12 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 15.5

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: None Odor: Turbidity: Clear

Well Volumes (gal.):	5.5	10.5	15.5	final				
pH (s.u.):	8.33	8.36	8.37	8.39				
Sp. Cond. (µmhos/cm):	433	425	425	425				
Temperature (°C):	15.5	15.5	15.5	15.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet
Project Number: HM003.11
Site Location: Hannibal, Ohio
Sampling Date: 5/20/99 Weather: Sunny 70's

Sample ID: MW-7
Replicate ID:
Time Sampling Began: 1455
Time Sampling Completed: 1515

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 79.70
Depth to Water Below MP (DTW): 60.38
Water Column (WC) in Well [TD-DTW]: 19.32
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 3.1 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.): 9.5

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Brown Odor: Turbidity: Turbid

Well Volumes (gal.):	3.5	6.5	9.5	final				
pH (s.u.):	5.96	5.90	5.95	6.00				
Sp. Cond. (µmhos/cm):	720	720	715	700				
Temperature (°C):	41	41	41	41				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 mL plastic	HNO_3 - field filtered (1 micron)
Cn total + Cn amenable	250 mL plastic	NAOH
pH, sp. Cond, F	250 mL plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments: Water very warm

APPENDIX A-3

WATER SAMPLING LOG FORMS FOR SEPTEMBER 1999
MONITORING EVENT

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet - Reduction Division
Project Number: HM003.11
Site Location: Hannibal Ohio
Sampling Date: 9/8/99 Weather: Overcast 70's

Sample ID: MW-2
Replicate ID: MW-2d
Time Sampling Began: 0805
Time Sampling Completed: 0840

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 82.25
Depth to Water Below MP (DTW): 57.30
Water Column (WC) in Well [TD-DTW]: 24.95
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 4 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.):

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Brown-black Odor: — Turbidity: V Stained

Well Volumes (gal.):	4	8	12	final				
pH (s.u.):	10.38	10.50	10.55	10.60				
Sp. Cond. (µmhos/cm):	1835	1826	1820	1830				
Temperature (°C):	14.5	14.5	14.5	14.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 ml Plastic	HNO_3 - 1 micron field filtered
Cyanide (Total + Amenable)	250 mL Amber Glass	NAOH
pH, Sp Cond, Fluoride	250 ml Plastic	4°C
PCE	2x 40ml Glass	HCL

Sampling Personnel: J Campbell, S Menosky

Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet - Reduction Division
Project Number: HM003.11
Site Location: Hannibal Ohio
Sampling Date: 9/8/99 Weather: Overcast 70's

Sample ID: MW-5
Replicate ID:
Time Sampling Began: 0725
Time Sampling Completed: 0755

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 92.00
Depth to Water Below MP (DTW): 64.35
Water Column (WC) in Well [TD-DTW]: 27.65
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 4.42 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.):

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Amber Odor: — Turbidity: Stained

Well Volumes (gal.):	4.5	9	13.5	final				
pH (s.u.):	8.82	8.98	9.05	9.10				
Sp. Cond. (µmhos/cm):	1025	1035	1040	1030				
Temperature (°C):	14.5	14.5	14.5	14.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 ml Plastic	HNO_3 - 1 micron field filtered
Cyanide (Total + Amenable)	250 ml Amber Glass	NAOH
pH, Sp Cond, Fluoride	250 ml Plastic	4°C
PCE	2x 40 ml Glass	HCL

Sampling Personnel: J Campbell, S Menosky
Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet - Reduction Division
Project Number: HM003.11
Site Location: Hannibal Ohio
Sampling Date: 9/8/99 Weather: Overcast 70's

Sample ID: MW-18
Replicate ID:
Time Sampling Began: 0918
Time Sampling Completed: 0946

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 61.16
Depth to Water Below MP (DTW): 39.76
Water Column (WC) in Well [TD-DTW]: 21.40
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 3.4 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.):

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Brown Odor: Sheen Turbidity: Turbid + Stained

Well Volumes (gal.):	3.5	7	10.5	final				
pH (s.u.):	10.16	10.25		10.26				
Sp. Cond. (µmhos/cm):	2,850	2850		2870				
Temperature (°C):	14.5	14.5		14.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 ml Plastic	HNO_3 - 1 micron field filtered
Cyanide (Total + Amenable)	250 ml Amber Glass	NAOH
pH, Sp Cond, Fluoride	250 ml Plastic	4°C
PCE	2x 40ml Glass	HCL

Sampling Personnel: J Campbell, S Menosky
Comments: 7 gallons well dry, very hard to filter

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet - Reduction Division
Project Number: HM003.11
Site Location: Hannibal Ohio
Sampling Date: 9/8/99 Weather: Sunny 80's

Sample ID: MW-31
Replicate ID:
Time Sampling Began: 1405
Time Sampling Completed: 1430

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 67.58
Depth to Water Below MP (DTW): 46.16
Water Column (WC) in Well [TD-DTW]: 21.42
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 3.42 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.):

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Black Odor: Turbidity: stained

Well Volumes (gal.):	3.5	7	10.5	final				
pH (s.u.):	9.91	9.96	10	10.03				
Sp. Cond. (µmhos/cm):	2,700	2800	2790	2810				
Temperature (°C):	15	15	15	15				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 ml Plastic	HNO_3 - 1 micron field filtered
Cyanide (Total + Amenable)	250 ml Amber Glass	NAOH
pH, Sp Cond, Fluoride	250ml Plastic	4°C
PCE	2x 40ml Glass	HCL

Sampling Personnel: J Campbell, S Menosky
Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet - Reduction Division
Project Number: HM003.11
Site Location: Hannibal Ohio
Sampling Date: 9/8/99 Weather: Sunny 80°

Sample ID: MW-12
Replicate ID:
Time Sampling Began: 1106
Time Sampling Completed: 1138

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 68.42
Depth to Water Below MP (DTW): 22.52
Water Column (WC) in Well [TD-DTW]: 45.90
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 7.3 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.):

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: None Odor: Turbidity: Clear

Well Volumes (gal.):	7.5	15	22	final				
pH (s.u.):	6.78	7.11	7.2	7.25				
Sp. Cond. (µmhos/cm):	560	560	560	568				
Temperature (°C):	16	16	15.5	15.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 ml Plastic	HNO_3 - 1 micron field filtered
Cyanide (Total + Amenable)	250 mL Amber Glass	NAOH
pH, Sp Cond, Fluoride	250 ml Plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet - Reduction Division
Project Number: HM003.11
Site Location: Hannibal Ohio
Sampling Date: 9/8/99 Weather: Overcast 70's

Sample ID: MW-16
Replicate ID:
Time Sampling Began: 0845
Time Sampling Completed: 0913

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 83.12
Depth to Water Below MP (DTW): 48.20
Water Column (WC) in Well [TD-DTW]: 34.92
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 5.6 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.):

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Brown Odor: Turbidity: Stained

Well Volumes (gal.):	6	12	17	final				
pH (s.u.):	7.41	8.10	8.12	8.15				
Sp. Cond. (µmhos/cm):	741	740	735	745				
Temperature (°C):	14	14	13.5	13.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description From Lab X or HMI ___	Preservative preserved by: Lab X or HMI ___
Diss As, Be, Mn, Na, V	500 ml Plastic	HNO_3 - 1 micron field filtered
Cyanide (Total + Amenable)	250 ml Amber Glass	NAOH
pH, Sp Cond, Fluoride	250 ml Plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments: Color filters out

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet - Reduction Division
Project Number: HM003.11
Site Location: Hannibal Ohio
Sampling Date: 9/8/99 Weather: Overcast

Sample ID: MW-28
Replicate ID:
Time Sampling Began: 1005
Time Sampling Completed: 1018

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 46.20
Depth to Water Below MP (DTW): 21.46
Water Column (WC) in Well [TD-DTW]: 24.74
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 4 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.):

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Brown Odor: Turbidity: Cloudy - v Cloudy

Well Volumes (gal.):	4	8	12	final				
pH (s.u.):	5.97	6.07	6.12	6.15				
Sp. Cond. (µmhos/cm):	475	485	485	490				
Temperature (°C):	15	15	15	15				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 ml Plastic	HNO_3 - 1 micron field filtered
Cyanide (Total + Amenable)	250 ml Amber Glass	NAOH
pH, Sp Cond, Fluoride	250 ml Plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet - Reduction Division
Project Number: HM003.11
Site Location: Hannibal Ohio
Sampling Date: 9/8/99 Weather: Sunny 80

Sample ID: MW-32
Replicate ID:
Time Sampling Began: 1340
Time Sampling Completed: 1355

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 57.36
Depth to Water Below MP (DTW): 38.88
Water Column (WC) in Well [TD-DTW]: 18.48
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 3 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.):

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Dark brown black Odor: — Turbidity: stained

Well Volumes (gal.):	3	6	9					
pH (s.u.):	9.89	10	10	10.01				
Sp. Cond. (µmhos/cm):	2,200	2,400	2,300	2,300				
Temperature (°C):	15	15	15	15				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 ml Plastic	HNO_3 - 1 micron field filtered
Cyanide (Total + Amenable)	250 ml Amber Glass	NAOH
pH, Sp Cond, Fluoride	250 ml Plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet - Reduction Division
Project Number: HM003.11
Site Location: Hannibal Ohio
Sampling Date: 9/8/99 Weather: Sunny 70's

Sample ID: MW-35
Replicate ID:
Time Sampling Began: 1022
Time Sampling Completed: 1040

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 46.94
Depth to Water Below MP (DTW): 35.94
Water Column (WC) in Well [TD-DTW]: 11.00
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 1.76 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.):

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Black Odor: Turbidity: V Stained + Turbid

Well Volumes (gal.):	2	4 (dry)	5.5	final				
pH (s.u.):	9.65	9.40		9.60				
Sp. Cond. (µmhos/cm):	590	605		930				
Temperature (°C):	15	15		15				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 ml Plastic	HNO_3 - 1 micron field filtered
Cyanide (Total + Amenable)	250 ml Amber Glass	NAOH
pH, Sp Cond, Fluoride	250 ml Plastic	4°C

Sampling Personnel: J Campbell, S Menosky

Comments: Well Dry after 4.0 gallons; sample upon recovery
Color does not filter out completely; but to an Amber color

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet - Reduction Division
Project Number: HM003.11
Site Location: Hannibal Ohio
Sampling Date: 9/8/99 Weather: Sunny 80

Sample ID: MW-36
Replicate ID: MW-36d
Time Sampling Began: 1315
Time Sampling Completed: 1332

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 52.08
Depth to Water Below MP (DTW): 37.00
Water Column (WC) in Well [TD-DTW]: 15.08
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 2.4 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.):

GALLONS PER FOOT (gpf)			
1½" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Dark brown black Odor: Turbidity: Stained

Well Volumes (gal.):	2.5	5	7.5	final				
pH (s.u.):	9.92	10	10.05	10.1				
Sp. Cond. (µmhos/cm):	1775	1785	1780	1790				
Temperature (°C):	16	15.5	15.5	15.5				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 ml Plastic	HNO_3 - 1 micron field filtered
Cyanide (Total + Amenable)	250 mL Amber Glass	NAOH
pH, Sp Cond, Fluoride	250 ml Plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments:

HMI Environmental Consulting Services

WATER SAMPLING LOG

Project Name: Ormet - Reduction Division
Project Number: HM003.11
Site Location: Hannibal Ohio
Sampling Date: 9/8/99 Weather: Sunny 70's

Sample ID: MW-37
Replicate ID:
Time Sampling Began: 1045
Time Sampling Completed: 1100

EVACUATION DATA

Description of Measuring Point (MP): Top of PVC
MP Elevation:
Total Sounded Depth of Well Below MP (TD): 36.90
Depth to Water Below MP (DTW): 20.11
Water Column (WC) in Well [TD-DTW]: 16.79
Gallons per foot (GPF); from chart: 0.16
Gallons in Well [WC x GPF]: 2.7 = Well Casing Volume (WCV)

Diameter of Well Casing: 2"
Gallons to be Purged (3 WCVs, 5 WCVs, etc.):

GALLONS PER FOOT (gpf)			
1¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
1½" = 0.09	2½" = 0.26	3½" = 0.50	6" = 1.47

Evacuation Method and Material: Disposable bailer with polypropylene rope

SAMPLING DATA AND FIELD PARAMETERS

Color: Dark Brown Odor: — Turbidity: Stained + Turbid

Well Volumes (gal.):	3	5.5	8	final				
pH (s.u.):	8.22	8.38	8.39	8.91				
Sp. Cond. (µmhos/cm):	752	740	730	753				
Temperature (°C):	16	16	16	16				
Turbidity (N.T.U):								

Sampling Method and Material(s): Disposable bailer with polypropylene rope

Parameters to be Analyzed	Container Description (From Lab X or HMI ___)	Preservative (preserved by: Lab X or HMI ___)
Diss As, Be, Mn, Na, V	500 ml Plastic	HNO_3 - 1 micron field filtered
Cyanide (Total + Amenable)	250 ml Amber Glass	NAOH
pH, Sp Cond, Fluoride	250 ml Plastic	4°C

Sampling Personnel: J Campbell, S Menosky
Comments: Color does not filter out

APPENDIX B

APPENDIX B

LABORATORY ANALYTICAL REPORTS

Appendix B-1 Laboratory Analytical Report for January 1999 Monitoring Event

Appendix B-2 Laboratory Analytical Report for May 1999 Monitoring Event

Appendix B-3 Laboratory Analytical Report for September 1999 Monitoring Event

APPENDIX B-1

LABORATORY ANALYTICAL REPORT FOR JANUARY 1999 MONITORING EVENT

KEMRON Environmental Services
109 Starlite Park
Marietta, Ohio 45750
Phone: (740) 373-4071

Ormet Corporation
Hydrosystems Management Inc.
331 S. Main Street, Suite 109
Washington, PA 15301
Attention: Bob Fargo

PO Number:
Account Number: ORMET-086

Login #: L9901159
Report Date: 01/25/99
Work ID: HM003.08/ORMET/HANIBAL OH
Date Received: 01/13/99

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
L9901159-01	FIELD BLANK	L9901159-02	TRIP BLANK
L9901159-03	MW-2	L9901159-04	MW-2D
L9901159-05	MW-5	L9901159-06	MW-18
L9901159-07	MW-31	L9901159-08	MW-16
L9901159-09	MW-28	L9901159-10	MW-12
L9901159-11	MW-32	L9901159-12	MW-32D

All results on solids/sludges are reported on a dry weight basis, where applicable, unless otherwise specified. This report shall not be reproduced, except in full, without the written approval of KEMRON.

NYSDOH ELAP ID: 10861

Certified By
Dennis S. Tepe

KEMRON ENVIRONMENTAL SERVICES

Login #L9901159
January 25, 1999 02:21 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9901159-01
Client Sample ID: FIELD BLANK
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/13/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L		ND	0.01	1	N/A	SJM	01/15/99	14:00	9010B\9014
Specific Conductance.....	umho/cm	1.2		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L		ND	0.10	1	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	5.05			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	SLP	01/14/99	22:01	6010B
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	SLP	01/14/99	22:01	6010B
Manganese, Dissolved.....	mg/L		ND	0.01	1	N/A	SLP	01/14/99	22:01	6010B
Sodium, Dissolved.....	mg/L	1.1		0.50	1	R-2	SLP	01/18/99	22:15	6010B
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	SLP	01/14/99	22:01	6010B

Product: 826-SPE-VO - Special List - 8260

Lab Sample ID: L9901159-01
Client Sample ID: FIELD BLANK
Site/Work ID: HM003.08/ORMET/HANIBAL OH
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 01/13/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 01/18/99 Time: 12:26

Instrument: HPMS8
Analyst: JLH
Lab File ID: 8M6152

Method: 8260B
Run ID: R58547
Batch : WG51471

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	97.2	(86 - 118%)
1,2-Dichloroethane-d4.....	92.9	(76 - 114%)
Toluene-d8.....	102	(88 - 110%)
p-Bromofluorobenzene.....	107	(86 - 115%)

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-SPE-VO - Special List - 8260

Lab Sample ID: L9901159-02
Client Sample ID: TRIP BLANK
Site/Work ID: HM003.08/ORMET/HANIBAL OH
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 01/13/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 01/18/99 Time: 13:02

Instrument: HPMS8
Analyst: JLH
Lab File ID: 8M6153

Method: 8260B
Run ID: R58547
Batch : WG51471

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	98.7	(86 - 118%)
1,2-Dichloroethane-d4.....	93.6	(76 - 114%)
Toluene-d8.....	100	(88 - 110%)
p-Bromofluorobenzene.....	108	(86 - 115%)

Lab Sample ID: L9901159-03
Client Sample ID: MW-2
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/13/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	21		1.0	100	N/A	SJM	01/15/99	14:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	5.3		0.10	10	N/A	SJM	01/20/99	11:00	335.1
Specific Conductance.....	umho/cm	2000		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L	65		1.0	10	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	9.98			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L	0.085		0.004	1	N/A	SLP	01/14/99	22:23	6010B
Beryllium, Dissolved.....	mg/L	0.00064		0.0005	1	N/A	SLP	01/14/99	22:23	6010B
Manganese, Dissolved.....	mg/L	1.1		0.01	1	N/A	SLP	01/14/99	22:23	6010B
Sodium, Dissolved.....	mg/L	440		0.50	1	R-2	SLP	01/18/99	22:22	6010B
Vanadium, Dissolved.....	mg/L	0.054		0.01	1	N/A	SLP	01/14/99	22:23	6010B

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-SPE-VO - Special List - 8260

Lab Sample ID: L9901159-03
Client Sample ID: MW-2
Site/Work ID: HM003.08/ORMET/HANIBAL OH
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 01/13/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 01/18/99 Time: 13:39

Instrument: HPMS8
Analyst: JLH
Lab File ID: 8M6154

Method: 8260B
Run ID: R58547
Batch : WG51471

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	96.9	(86 - 118%)
1,2-Dichloroethane-d4.....	94.6	(76 - 114%)
Toluene-d8.....	101	(88 - 110%)
p-Bromofluorobenzene.....	108	(86 - 115%)

Lab Sample ID: L9901159-04
Client Sample ID: MW-2D
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/13/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	22		1.0	100	N/A	SJM	01/15/99	14:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L		ND	0.10	10	N/A	SJM	01/20/99	11:00	335.1
Specific Conductance.....	umho/cm	1900		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L	66		1.0	10	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	9.98			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L	0.087		0.004	1	N/A	SLP	01/14/99	22:27	6010B
Beryllium, Dissolved.....	mg/L	0.00064		0.0005	1	N/A	SLP	01/14/99	22:27	6010B
Manganese, Dissolved.....	mg/L	1.0		0.01	1	N/A	SLP	01/14/99	22:27	6010B
Sodium, Dissolved.....	mg/L	440		0.50	1	R-2	SLP	01/18/99	23:02	6010B
Vanadium, Dissolved.....	mg/L	0.053		0.01	1	N/A	SLP	01/14/99	22:27	6010B

RL = Reporting Limit

Login #L9901159
January 25, 1999 02:21 pm

KEMRON ENVIRONMENTAL SERVICES

Product: 826-SPE-VO - Special List - 8260

Lab Sample ID: L9901159-04
Client Sample ID: MW-2D
Site/Work ID: HM003.08/ORMET/HANIBAL OH
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 01/13/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 01/18/99 Time: 14:15

Instrument: HPMS8
Analyst: JLH
Lab File ID: 8M6155

Method: 8260B
Run ID: R58547
Batch : WG51471

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	97.0	(86 - 118%)
1,2-Dichloroethane-d4.....	94.9	(76 - 114%)
Toluene-d8.....	101	(88 - 110%)
p-Bromofluorobenzene.....	108	(86 - 115%)

Lab Sample ID: L9901159-05
Client Sample ID: MW-5
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/13/99 N/A
COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	1.8		0.10	10	N/A	SJM	01/15/99	14:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.14		0.02	2	N/A	SJM	01/20/99	11:00	335.1
Specific Conductance.....	umho/cm	1100		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L	17		0.20	2	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	8.95			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L	0.0086		0.004	1	N/A	SLP	01/14/99	22:32	6010B
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	SLP	01/14/99	22:32	6010B
Manganese, Dissolved.....	mg/L	0.16		0.01	1	N/A	SLP	01/14/99	22:32	6010B
Sodium, Dissolved.....	mg/L	240		0.50	1	R-2	SLP	01/18/99	23:05	6010B
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	SLP	01/14/99	22:32	6010B

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-SPE-VO - Special List - 8260

Lab Sample ID: L9901159-05
Client Sample ID: MW-5
Site/Work ID: HM003.08/ORMET/HANIBAL OH
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 01/13/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 01/18/99 Time: 14:51

Instrument: HPMS8
Analyst: JLH
Lab File ID: 8M6156

Method: 8260B
Run ID: R58547
Batch : WG51471

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	96.3	(86 - 118%)
1,2-Dichloroethane-d4.....	95.2	(76 - 114%)
Toluene-d8.....	101	(88 - 110%)
p-Bromofluorobenzene.....	108	(86 - 115%)

Lab Sample ID: L9901159-06
Client Sample ID: MW-18
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/13/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	79		2.5	250	N/A	SJM	01/15/99	14:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	3.0		0.50	50	N/A	SJM	01/20/99	11:00	335.1
Specific Conductance.....	umho/cm	3600		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L	210		5.0	50	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	9.67			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L	0.088		0.004	1	N/A	SLP	01/14/99	22:36	6010B
Beryllium, Dissolved.....	mg/L	0.00063		0.0005	1	N/A	SLP	01/14/99	22:36	6010B
Manganese, Dissolved.....	mg/L	0.29		0.01	1	N/A	SLP	01/14/99	22:36	6010B
Sodium, Dissolved.....	mg/L	830		0.50	1	R-2	SLP	01/18/99	23:09	6010B
Vanadium, Dissolved.....	mg/L	0.028		0.01	1	N/A	SLP	01/14/99	22:36	6010B

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-SPE-VO - Special List - 8260

Lab Sample ID: L9901159-06
Client Sample ID: MW-18
Site/Work ID: HM003.08/ORMET/HANIBAL OH
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 01/13/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 01/18/99 Time: 15:27

Instrument: HPMS8
Analyst: JLH
Lab File ID: 8M6157

Method: 8260B
Run ID: R58547
Batch : WG51471

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L	21.9		5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	96.7	(86 - 118%)
1,2-Dichloroethane-d4.....	95.4	(76 - 114%)
Toluene-d8.....	101	(88 - 110%)
p-Bromofluorobenzene.....	109	(86 - 115%)

Lab Sample ID: L9901159-07
Client Sample ID: MW-31
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/13/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	22		1.0	100	N/A	SJM	01/15/99	14:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.63		0.10	10	N/A	SJM	01/20/99	11:00	335.1
Specific Conductance.....	umho/cm	2500		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L	120		2.5	25	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	9.72			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L	0.047		0.004	1	N/A	SLP	01/14/99	23:17	6010B
Beryllium, Dissolved.....	mg/L	0.0012		0.0005	1	N/A	SLP	01/14/99	23:17	6010B
Manganese, Dissolved.....	mg/L	1.3		0.01	1	N/A	SLP	01/14/99	23:17	6010B
Sodium, Dissolved.....	mg/L	620		0.50	1	R-2	SLP	01/18/99	23:12	6010B
Vanadium, Dissolved.....	mg/L	0.065		0.01	1	N/A	SLP	01/14/99	23:17	6010B

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-SPE-VO - Special List - 8260

Lab Sample ID: L9901159-07
Client Sample ID: MW-31
Site/Work ID: HM003.08/ORMET/HANIBAL OH
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 01/13/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 01/18/99 Time: 16:03

Instrument: HPMS8
Analyst: JLH
Lab File ID: 8M6158

Method: 8260B
Run ID: R58547
Batch : WG51471

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L	19.0		5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	96.8	(86 - 118%)
1,2-Dichloroethane-d4.....	95.8	(76 - 114%)
Toluene-d8.....	101	(88 - 110%)
p-Bromofluorobenzene.....	108	(86 - 115%)

Lab Sample ID: L9901159-08
Client Sample ID: MW-16
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/13/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	1.4		0.08	8	N/A	SJM	01/15/99	14:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L		ND	0.04	4	N/A	SJM	01/20/99	11:00	335.1
Specific Conductance.....	umho/cm	740		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L	9.8		0.10	1	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	7.70			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	SLP	01/14/99	21:47	6010B
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	SLP	01/14/99	21:47	6010B
Manganese, Dissolved.....	mg/L	1.5		0.01	1	N/A	SLP	01/14/99	21:47	6010B
Sodium, Dissolved.....	mg/L	85		0.50	1	R-2	SLP	01/18/99	22:05	6010B
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	SLP	01/14/99	21:47	6010B

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9901159-09
Client Sample ID: MW-28
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/13/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.087		0.01	1	N/A	SJM	01/15/99	14:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.027		0.01	1	N/A	SJM	01/20/99	11:00	335.1
Specific Conductance.....	umho/cm	470		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L	0.38		0.10	1	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	5.72			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	SLP	01/14/99	22:45	6010B
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	SLP	01/14/99	22:45	6010B
Manganese, Dissolved.....	mg/L	0.013		0.01	1	N/A	SLP	01/14/99	22:45	6010B
Sodium, Dissolved.....	mg/L	67		0.50	1	R-2	SLP	01/18/99	23:15	6010B
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	SLP	01/14/99	22:45	6010B

Lab Sample ID: L9901159-10
Client Sample ID: MW-12
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/13/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L		ND	0.01	1	N/A	SJM	01/15/99	14:00	9010B\9014
Specific Conductance.....	umho/cm	470		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L	0.89		0.10	1	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	7.53			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	SLP	01/14/99	21:38	6010B
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	SLP	01/14/99	21:38	6010B
Manganese, Dissolved.....	mg/L	1.8		0.01	1	N/A	SLP	01/14/99	21:38	6010B
Sodium, Dissolved.....	mg/L	22		0.50	1	R-2	SLP	01/18/99	21:58	6010B
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	SLP	01/14/99	21:38	6010B

RL = Reporting Limit

Login #L9901159
January 25, 1999 02:21 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9901159-11
Client Sample ID: MW-32
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/13/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	3.1		0.20	20	N/A	SJM	01/15/99	14:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L		ND	0.02	2	N/A	SJM	01/20/99	11:00	335.1
Specific Conductance.....	umho/cm	710		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L	13		0.50	5	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	8.39			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	SLP	01/14/99	22:50	6010B
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	SLP	01/14/99	22:50	6010B
Manganese, Dissolved.....	mg/L	1.7		0.01	1	N/A	SLP	01/14/99	22:50	6010B
Sodium, Dissolved.....	mg/L	77		0.50	1	R-2	SLP	01/18/99	23:18	6010B
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	SLP	01/14/99	22:50	6010B

Lab Sample ID: L9901159-12
Client Sample ID: MW-32D
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/13/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	3.7		0.20	20	N/A	SJM	01/15/99	14:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L		ND	0.02	2	N/A	SJM	01/20/99	11:00	335.1
Specific Conductance.....	umho/cm	720		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L	13		0.50	5	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	8.39			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	SLP	01/14/99	22:54	6010B
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	SLP	01/14/99	22:54	6010B
Manganese, Dissolved.....	mg/L	1.7		0.01	1	N/A	SLP	01/14/99	22:54	6010B
Sodium, Dissolved.....	mg/L	76		0.50	1	R-2	SLP	01/18/99	23:22	6010B
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	SLP	01/14/99	22:54	6010B

RL = Reporting Limit

HMI
Environmental Consulting Services

CHAIN-OF-CUSTODY RECORD

Project Number: HM003.08
Project Name/Location: Ormet / Hanibal, Ohio
Laboratory: Kemron
Sampling Personnel: J Campbell / S Menosky

Sample ID	Date/Time	Sample Code	40 mL Glass Tetrachloroethene (PCE)	HCL	250 mL Amber Glass Total Cn + Amenable Cn	NAOH	250 mL Plastic pH, Sp Cond, F	500 mL Plastic Diss As, Be, Mn, Na, V HNO3-field filtered						TOTAL
Field Blank	1-13-99	L	2		1		1	1						5
Trip Blank	↓	↓	2											2
MW-2			2		1		1	1						5
MW-2d			2		1		1	1						5
MW-5			2		1		1	1						5
MW-18			2		1		1	1						5
MW-31			2		1		1	1						5
MW-16					1		1	1						3
MW-28					1		1	1						3
MW-12					1		1	1						3
MW-32					1		1	1						3
MW-32d					1		1	1						3

Sample Code: L = Liquid; S = Solid; A = Air

Total Number of Containers: 47

Relinquished by: [signature]	Organization: HMI	Date: 1-13-99	Time: 1615	Seal Intact?
Received by: [signature]	Organization: KEMRON	Date: 1-13-99	Time: 1615	(Yes) No NA
Relinquished by: [signature]	Organization: Kemron	Date: 1-13-99	Time: 1725	Seal Intact?
Received by: [signature]	Organization: Kemron	Date: 1-13-99	Time: 1725	(Yes) No NA

REMARKS: TRI-Annual GW Sampling: Analyze for Total Cn and if detected then analyze for Amenable Cn; Refer to LTO for methods + detection limits

DELIVERY METHOD: In Person [ ] Common Carrier [ ] Lab Courier [Kemron] Other [ ]

KEMRON Environmental Services
109 Starlite Park
Marietta, Ohio 45750
Phone: (740) 373-4071

Ormet Corporation
Hydrosystems Management Inc.
331 S. Main Street, Suite 109
Washington, PA 15301
Attention: Bob Fargo

PO Number:
Account Number: ORMET-086

Login #: L9901174
Report Date: 01/26/99
Work ID: HM003.08/ORMET/HANIBAL OH
Date Received: 01/14/99

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
L9901174-01	MW-35	L9901174-02	MW-36
L9901174-03	MW-37		

All results on solids/sludges are reported on a dry weight basis, where applicable, unless otherwise specified. This report shall not be reproduced, except in full, without the written approval of KEMRON.

NYSDOH ELAP ID: 10861

Maren M Beery

Certified By
Maren M. Beery

KEMRON ENVIRONMENTAL SERVICES

Login #L9901174
January 26, 1999 01:47 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9901174-01
Client Sample ID: MW-35
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/14/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	23		1.0	100	N/A	SJM	01/15/99	14:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	2.9		0.10	10	N/A	SJM	01/20/99	11:00	335.1
Specific Conductance.....	umho/cm	820		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L	40		1.0	10	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	9.28			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L	0.019		0.004	1	N/A	SLP	01/18/99	19:28	6010B
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	SLP	01/18/99	19:28	6010B
Manganese, Dissolved.....	mg/L	0.81		0.01	1	N/A	SLP	01/18/99	19:28	6010B
Sodium, Dissolved.....	mg/L	190		0.50	1	R-2	SLP	01/25/99	22:21	6010B
Vanadium, Dissolved.....	mg/L	0.016		0.01	1	N/A	SLP	01/18/99	19:28	6010B

Lab Sample ID: L9901174-02
Client Sample ID: MW-36
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/14/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	41		2.5	250	N/A	SJM	01/15/99	14:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	1.2		0.25	25	N/A	SJM	01/20/99	11:00	335.1
Specific Conductance.....	umho/cm	3500		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L	190		2.5	25	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	9.76			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L	0.076		0.004	1	N/A	SLP	01/18/99	19:33	6010B
Beryllium, Dissolved.....	mg/L	0.0036		0.0005	1	N/A	SLP	01/18/99	19:33	6010B
Manganese, Dissolved.....	mg/L	1.5		0.01	1	N/A	SLP	01/18/99	19:33	6010B
Sodium, Dissolved.....	mg/L	820		0.50	1	R-2	SLP	01/25/99	22:27	6010B
Vanadium, Dissolved.....	mg/L	0.072		0.01	1	N/A	SLP	01/18/99	19:33	6010B

RL = Reporting Limit

Login #L9901174
January 26, 1999 01:47 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9901174-03
Client Sample ID: MW-37
Site/Work ID: HM003.08/ORMET/HANIBAL OH

Matrix: Water
Collected: 01/14/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	19		1.0	100	N/A	SJM	01/15/99	14:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L		ND	0.10	10	N/A	SJM	01/20/99	11:00	335.1
Specific Conductance.....	umho/cm	660		1.0	1	N/A	DLP	01/19/99	11:25	120.1
Fluoride.....	mg/L	25		1.0	10	N/A	DIH	01/15/99	13:15	SM4500-F-C
pH	S.U.	9.02			1	N/A	DLN	01/18/99		150.1
Arsenic, Dissolved.....	mg/L	0.02		0.004	1	N/A	SLP	01/18/99	19:14	6010B
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	SLP	01/18/99	19:14	6010B
Manganese, Dissolved.....	mg/L	0.68		0.01	1	N/A	SLP	01/18/99	19:14	6010B
Sodium, Dissolved.....	mg/L	140		0.50	1	R-2	SLP	01/25/99	22:11	6010B
Vanadium, Dissolved.....	mg/L	0.029		0.01	1	N/A	SLP	01/18/99	19:14	6010B

RL = Reporting Limit

HMI
Environmental Consulting Services

CHAIN-OF-CUSTODY RECORD

Project Number	Project Name/Location	Laboratory
HM003.08	Ormet / Hanibal Ohio	Kemron

Sampling Personnel: J Campbell / S Menosky

Sample ID	Date/Time	Sample Code	250 mL Amber Glass Total Cn + Amenable Cn NAOH	250 mL Plastic pH, Spc, F	500 mL Plastic Diss As, Ba, Mn, Na, V Field Filtered-HNO3							TOTAL
MW-35	1-14-99	L	1	1	1							3
MW-36	↓	L	1	1	1							3
MW-37	↓	L	1	1	1							3

Sample Code: L = Liquid; S = Solid; A = Air

Total Number of Containers: 9

Relinquished by:	[signature]	Organization: HMI	Date: 1-14-99	Time: 1100	Seal Intact?	
Received by:	[signature]	Organization: Kemron	Date: 1-14-99	Time: 1100	(Yes) No NA	
Relinquished by:	[signature]	Organization: Kemron	Date: 1-14-99	Time: 1255	Seal Intact?	
Received by:	[signature]	Organization: Kemron	Date: 1-14-99	Time: 1255	(Yes) No NA	

REMARKS: Tri-Annual GW Sampling: Analyze for Total Cn and if detected then analyze for Amenable Cn. Refer to LTO for Methods and detection limits
C/o Sealed Samples Intact Cooler temp 6° (NS)

DELIVERY METHOD: In Person [ ] Common Carrier [ ] Lab Courier [Kemron] Other [ ]

APPENDIX B-2

LABORATORY ANALYTICAL REPORT FOR MAY 1999 MONITORING EVENT

KEMRON Environmental Services
109 Starlite Park
Marietta, Ohio 45750
Phone: (740) 373-4071

Ormet Corporation
Hydrosystems Management Inc.
331 S. Main Street, Suite 109
Washington, PA 15301
Attention: Bob Fargo

PO Number:
Account Number: ORMET-086

Login #: L9905454
Report Date: 06/01/99
Work ID: HM003.11/ORMET
Date Received: 05/20/99

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
L9905454-01	MW-29S	L9905454-02	MW-29D
L9905454-03	MW-16	L9905454-04	MW-8
L9905454-05	MW-10	L9905454-06	MW-19
L9905454-07	MW-7	L9905454-08	MW-11
L9905454-09	MW-40S	L9905454-10	MW-40D

All results on solids/sludges are reported on a dry weight basis, where applicable, unless otherwise specified. This report shall not be reproduced, except in full, without the written approval of KEMRON.

NYSDOH ELAP ID: 10861

Certified By
Deanna Hesson

KEMRON
ENVIRONMENTAL SERVICES

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905454-01
Client Sample ID: MW-29S
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/20/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.22		0.02	2	N/A	DLN	05/25/99	08:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.021		0.01	1	N/A	DLN	05/26/99	17:00	335.1
Specific Conductance.....	umho/cm	1300		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	16		0.50	5	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	8.35			1	N/A	SMW	05/21/99	16:30	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	ALC	05/26/99	17:40	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	05/26/99	17:40	6010B
Manganese, Dissolved.....	mg/L	0.30		0.01	1	N/A	ALC	05/26/99	17:40	6010B/3005A
Sodium, Dissolved.....	mg/L	230		0.50	1	R-2	JYH	05/27/99	12:53	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	05/26/99	17:40	6010B\3005

Lab Sample ID: L9905454-02
Client Sample ID: MW-29D
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/20/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.19		0.01	1	N/A	DLN	05/25/99	08:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.19		0.01	1	N/A	DLN	05/26/99	17:00	335.1
Specific Conductance.....	umho/cm	550		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	3.4		0.10	1	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	7.82			1	N/A	SMW	05/21/99	16:30	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	ALC	05/26/99	17:40	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	05/26/99	17:40	6010B
Manganese, Dissolved.....	mg/L	1.8		0.01	1	N/A	ALC	05/26/99	17:40	6010B/3005A
Sodium, Dissolved.....	mg/L	28		0.50	1	R-2	JYH	05/27/99	13:18	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	05/26/99	17:40	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905454-03
Client Sample ID: MW-16
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/20/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	2.8		0.25	25	N/A	DLN	05/25/99	08:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.16		0.01	1	N/A	DLN	05/26/99	17:00	335.1
Specific Conductance.....	umho/cm	750		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	9.0		0.20	2	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	7.88			1	N/A	SMW	05/21/99	16:30	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	ALC	05/26/99	17:40	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	05/26/99	17:40	6010B
Manganese, Dissolved.....	mg/L	1.5		0.01	1	N/A	ALC	05/26/99	17:40	6010B/3005A
Sodium, Dissolved.....	mg/L	82		0.50	1	R-2	JYH	05/27/99	13:21	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	05/26/99	17:40	6010B\3005

Lab Sample ID: L9905454-04
Client Sample ID: MW-8
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/20/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.028		0.01	1	N/A	SJM	05/28/99	14:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.028		0.01	1	N/A	SJM	05/28/99	14:00	335.1
Specific Conductance.....	umho/cm	530		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	2.4		0.10	1	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	8.00			1	N/A	SMW	05/21/99	16:30	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	ALC	05/26/99	17:40	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	05/26/99	17:40	6010B
Manganese, Dissolved.....	mg/L	0.15		0.01	1	N/A	ALC	05/26/99	17:40	6010B/3005A
Sodium, Dissolved.....	mg/L	34		0.50	1	R-2	JYH	05/27/99	13:25	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	05/26/99	17:40	6010B\3005

RL = Reporting Limit

Login #L9905454
June 1, 1999 03:02 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905454-05
Client Sample ID: MW-10
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/20/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L		ND	0.01	1	N/A	DLN	05/25/99	08:00	9010B\9014
Specific Conductance.....	umho/cm	750		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	0.41		0.10	1	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	7.40			1	N/A	SMW	05/21/99	16:30	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	ALC	05/26/99	17:40	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	05/26/99	17:40	6010B
Manganese, Dissolved.....	mg/L	0.012		0.01	1	N/A	ALC	05/26/99	17:40	6010B/3005A
Sodium, Dissolved.....	mg/L	30		0.50	1	R-2	JYH	05/27/99	13:28	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	05/26/99	17:40	6010B\3005

Lab Sample ID: L9905454-06
Client Sample ID: MW-19
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/20/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L		ND	0.01	1	N/A	DLN	05/25/99	08:00	9010B\9014
Specific Conductance.....	umho/cm	570		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	1.3		0.10	1	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	7.47			1	N/A	SMW	05/21/99	16:30	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	ALC	05/26/99	17:40	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	05/26/99	17:40	6010B
Manganese, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	05/26/99	17:40	6010B/3005A
Sodium, Dissolved.....	mg/L	22		0.50	1	R-2	JYH	05/27/99	13:32	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	05/26/99	17:40	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905454-07
Client Sample ID: MW-7
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/20/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L		ND	0.01	1	N/A	DLN	05/25/99	08:00	9010B\9014
Specific Conductance.....	umho/cm	780		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	0.16		0.10	1	N/A	DLN	05/21/99	15:30	SM4500-F-C
pH	S.U.	5.81			1	N/A	SMW	05/21/99	16:30	150.1
Arsenic, Dissolved.....	mg/L	0.042		0.004	1	N/A	ALC	05/26/99	17:40	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	05/26/99	17:40	6010B
Manganese, Dissolved.....	mg/L	2.0		0.01	1	N/A	ALC	05/26/99	17:40	6010B/3005A
Sodium, Dissolved.....	mg/L	78		0.50	1	R-2	JYH	05/27/99	13:35	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	05/26/99	17:40	6010B\3005

Lab Sample ID: L9905454-08
Client Sample ID: MW-11
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/20/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.024		0.01	1	N/A	DLN	05/25/99	08:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.011		0.01	1	N/A	DLN	05/26/99	17:00	335.1
Specific Conductance.....	umho/cm	490		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	1.7		0.10	1	N/A	DLN	05/21/99	15:30	SM4500-F-C
pH	S.U.	8.07			1	N/A	SMW	05/21/99	16:30	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	ALC	05/26/99	17:40	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	05/26/99	17:40	6010B
Manganese, Dissolved.....	mg/L	0.45		0.01	1	N/A	ALC	05/26/99	17:40	6010B/3005A
Sodium, Dissolved.....	mg/L	28		0.50	1	R-2	JYH	05/27/99	13:39	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	05/26/99	17:40	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905454-09
Client Sample ID: MW-40S
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/20/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.32		0.02	2	N/A	DLN	05/25/99	08:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L		ND	0.01	1	N/A	DLN	05/26/99	17:00	335.1
Specific Conductance.....	umho/cm	1300		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	30		0.50	5	N/A	DLN	05/21/99	15:30	SM4500-F-C
pH	S.U.	8.50			1	N/A	SMW	05/21/99	16:30	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	ALC	05/26/99	17:40	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	05/26/99	17:40	6010B
Manganese, Dissolved.....	mg/L	0.11		0.01	1	N/A	ALC	05/26/99	17:40	6010B/3005A
Sodium, Dissolved.....	mg/L	250		0.50	1	R-2	JYH	05/27/99	13:47	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	05/26/99	17:40	6010B\3005

Lab Sample ID: L9905454-10
Client Sample ID: MW-40D
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/20/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.16		0.01	1	N/A	DLN	05/25/99	08:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.16		0.01	1	N/A	DLN	05/26/99	17:00	335.1
Specific Conductance.....	umho/cm	920		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	12		0.20	2	N/A	DLN	05/21/99	15:30	SM4500-F-C
pH	S.U.	7.99			1	N/A	SMW	05/21/99	16:30	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	ALC	05/26/99	17:40	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	05/26/99	17:40	6010B
Manganese, Dissolved.....	mg/L	0.42		0.01	1	N/A	ALC	05/26/99	17:40	6010B/3005A
Sodium, Dissolved.....	mg/L	150		0.50	1	R-2	JYH	05/27/99	13:46	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	05/26/99	17:40	6010B\3005

RL = Reporting Limit

HMI
Environmental Consulting Services

CHAIN-OF-CUSTODY RECORD

Project Number: HM003.11
Project Name/Location: Kemron/Hannibal Ohio
Laboratory: Kemron
Sampling Personnel: J Campbell, S Menosky

Container Description/ Number of Containers

Sample ID	Date/Time	Sample Code	500 mL Plastic Diss As, Be, Mn, Na, V HNO3-field-filtered	250 mL Plastic Cn (Total + Amenable) NAOH	250 mL Plastic pH, Sp Cond, F 4°C							TOTAL
MW-29s	5-20-99	L	1	1	1							3
MW-29d	↓	↓	1	1	1							3
MW-16			1	1	1							3
MW-8			1	1	1							3
MW-10			1	1	1							3
MW-19			1	1	1							3
MW-7			1	1	1							3
MW-11			1	1	1							3
MW-40s			1	1	1							3
MW-40d			1	1	1							3

Sample Code: L = Liquid; S = Solid; A = Air

Total Number of Containers: 30

Relinquished by:	Organization: HMI	Date: 5-20-99	Time: 1640	Seal Intact?		
Received by:	Organization: KEMRON	Date: 520-99	Time: 1640	Yes	No	NA
Relinquished by:	Organization: KEMRON	Date: 5-20-99	Time: 1755	Seal Intact?		
Received by: Blanda Gregory	Organization: Kemron	Date: 5-20-99	Time: 1755	Yes	No	NA

REMARKS: Only run Amenable Cn if Total Cn is detected
Samples intact
Cooler temp 7.0
Samples stored in locked cooler overnight

DELIVERY METHOD: In Person [ ] Common Carrier [ ] Lab Courier [Kemron] Other [ ]

KEMRON Environmental Services
109 Starlite Park
Marietta, Ohio 45750
Phone: (740) 373-4071

Ormet Corporation
Hydrosystems Management Inc.
331 S. Main Street, Suite 109
Washington, PA 15301
Attention: Bob Fargo

PO Number:
Account Number: ORMET-086

Login #: L9905414
Report Date: 06/02/99
Work ID: HM003.11/ORMET
Date Received: 05/19/99

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
L9905414-01	MW-28	L9905414-02	MW-7D
L9905414-03	MW-7	L9905414-04	MW-12
L9905414-05	MW-39D	L9905414-06	MW-39S
L9905414-07	MW-45	L9905414-08	MW-34D
L9905414-09	MW-34S	L9905414-10	MW-41
L9905414-11	MW-42S	L9905414-12	MW-42D

All results on solids/sludges are reported on a dry weight basis, where applicable, unless otherwise specified. This report shall not be reproduced, except in full, without the written approval of KEMRON.

NYSDOH ELAP ID: 10861

Deanna Hesson

Certified By
Deanna Hesson

KEMRON ENVIRONMENTAL SERVICES

Login #L9905414
June 2, 1999 03:37 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905414-01
Client Sample ID: MW-28
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/19/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.13		0.01	1	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.13		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	460		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	0.35		0.10	1	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	5.72			1	N/A	SMW	05/20/99	16:00	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	KHA	05/25/99	13:43	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/25/99	13:43	6010B
Manganese, Dissolved.....	mg/L	0.011		0.01	1	N/A	KHA	05/25/99	13:43	6010B/3005A
Sodium, Dissolved.....	mg/L	70		0.50	1	R-2	JYH	05/27/99	11:26	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/25/99	13:43	6010B\3005

Lab Sample ID: L9905414-02
Client Sample ID: MW-7D
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/19/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.49		0.05	5	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.49		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	550		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	3.2		0.10	1	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	7.37			1	N/A	SMW	05/20/99	16:00	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	KHA	05/25/99	13:48	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/25/99	13:48	6010B
Manganese, Dissolved.....	mg/L	1.8		0.01	1	N/A	KHA	05/25/99	13:48	6010B/3005A
Sodium, Dissolved.....	mg/L	30		0.50	1	R-2	JYH	05/27/99	11:47	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/25/99	13:48	6010B\3005

RL = Reporting Limit

Login #L9905414
June 2, 1999 03:37 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905414-03
Client Sample ID: MW-7
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/19/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.46		0.05	5	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.46		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	550		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	3.2		0.10	1	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	7.50			1	N/A	SMW	05/20/99	16:00	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	KHA	05/25/99	13:52	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/25/99	13:52	6010B
Manganese, Dissolved.....	mg/L	1.8		0.01	1	N/A	KHA	05/25/99	13:52	6010B/3005A
Sodium, Dissolved.....	mg/L	31		0.50	1	R-2	JYH	05/27/99	11:50	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/25/99	13:52	6010B\3005

Lab Sample ID: L9905414-04
Client Sample ID: MW-12
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/19/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.026		0.01	1	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.026		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	630		1.0	1	N/A	JCR	05/24/99	14:00	120.1
Fluoride.....	mg/L	0.73		0.10	1	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	7.42			1	N/A	SMW	05/20/99	16:00	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	KHA	05/25/99	13:57	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/25/99	13:57	6010B
Manganese, Dissolved.....	mg/L	2.5		0.01	1	N/A	KHA	05/25/99	13:57	6010B/3005A
Sodium, Dissolved.....	mg/L	29		0.50	1	R-2	JYH	05/27/99	11:54	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/25/99	13:57	6010B\3005

RL = Reporting Limit

Login #L9905414
June 2, 1999 03:37 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905414-05
Client Sample ID: MW-39D
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/19/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.037		0.01	1	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L		ND	0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	540		1.0	1	N/A	JCR	06/02/99	11:30	120.1
Fluoride.....	mg/L	3.4		0.10	1	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	7.59			1	N/A	SMW	05/20/99	16:00	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	KHA	05/25/99	14:01	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/25/99	14:01	6010B
Manganese, Dissolved.....	mg/L	0.87		0.01	1	N/A	KHA	05/25/99	14:01	6010B/3005A
Sodium, Dissolved.....	mg/L	33		0.50	1	R-2	JYH	05/27/99	11:57	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/25/99	14:01	6010B\3005

Lab Sample ID: L9905414-06
Client Sample ID: MW-39S
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/19/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	3.4		0.10	10	N/A	DLN	05/25/99	08:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.24		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	4300		1.0	1	N/A	JCR	06/02/99	11:30	120.1
Fluoride.....	mg/L	120		2.5	25	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	9.05			1	N/A	SMW	05/20/99	16:00	150.1
Arsenic, Dissolved.....	mg/L	0.0096		0.004	1	N/A	KHA	05/25/99	14:06	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/25/99	14:06	6010B
Manganese, Dissolved.....	mg/L	0.12		0.01	1	N/A	KHA	05/25/99	14:06	6010B/3005A
Sodium, Dissolved.....	mg/L	950		5.0	10	R-2	JYH	05/27/99	13:50	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/25/99	14:06	6010B\3005

RL = Reporting Limit

Login #L9905414
June 2, 1999 03:37 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905414-07
Client Sample ID: MW-45
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/19/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	3.6		0.50	50	N/A	DLN	05/25/99	08:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.89		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	4200		1.0	1	N/A	JCR	06/02/99	11:30	120.1
Fluoride.....	mg/L	120		2.5	25	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	9.05			1	N/A	SMW	05/20/99	16:00	150.1
Arsenic, Dissolved.....	mg/L	0.009		0.004	1	N/A	KHA	05/25/99	14:10	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/25/99	14:10	6010B
Manganese, Dissolved.....	mg/L	0.11		0.01	1	N/A	KHA	05/25/99	14:10	6010B/3005A
Sodium, Dissolved.....	mg/L	1100		50	100	R-2	JYH	05/27/99	15:12	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/25/99	14:10	6010B\3005

Lab Sample ID: L9905414-08
Client Sample ID: MW-34D
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/19/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.062		0.01	1	N/A	DLN	05/25/99	08:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L		ND	0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	470		1.0	1	N/A	JCR	06/02/99	11:30	120.1
Fluoride.....	mg/L	3.6		0.10	1	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	7.40			1	N/A	SMW	05/20/99	16:00	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	KHA	05/25/99	14:14	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/25/99	14:14	6010B
Manganese, Dissolved.....	mg/L	0.72		0.01	1	N/A	KHA	05/25/99	14:14	6010B/3005A
Sodium, Dissolved.....	mg/L	29		0.50	1	R-2	JYH	05/27/99	12:08	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/25/99	14:14	6010B\3005

RL = Reporting Limit

Login #L9905414
June 2, 1999 03:37 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905414-09
Client Sample ID: MW-34S
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/19/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.19		0.01	1	N/A	DLN	05/25/99	08:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L		ND	0.01	1	N/A	DLN	05/26/99	17:00	335.1
Specific Conductance.....	umho/cm	650		1.0	1	N/A	JCR	06/02/99	11:30	120.1
Fluoride.....	mg/L	6.8		0.10	1	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	7.34			1	N/A	SMW	05/20/99	16:00	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	KHA	05/25/99	14:18	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/25/99	14:18	6010B
Manganese, Dissolved.....	mg/L	0.014		0.01	1	N/A	KHA	05/25/99	14:18	6010B/3005A
Sodium, Dissolved.....	mg/L	46		0.50	1	R-2	JYH	05/27/99	12:12	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/25/99	14:18	6010B\3005

Lab Sample ID: L9905414-10
Client Sample ID: MW-41
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/19/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L		ND	0.01	1	N/A	DLN	05/25/99	08:00	9010B\9014
Specific Conductance.....	umho/cm	420		1.0	1	N/A	JCR	06/02/99	11:30	120.1
Fluoride.....	mg/L	0.33		0.10	1	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	6.79			1	N/A	SMW	05/20/99	16:00	150.1
Arsenic, Dissolved.....	mg/L	0.014		0.004	1	N/A	KHA	05/25/99	14:31	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/25/99	14:31	6010B
Manganese, Dissolved.....	mg/L	1.1		0.01	1	N/A	KHA	05/25/99	14:31	6010B/3005A
Sodium, Dissolved.....	mg/L	20		0.50	1	R-2	JYH	05/27/99	12:15	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/25/99	14:31	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905414-11
Client Sample ID: MW-42S
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/19/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.54		0.02	2	N/A	DLN	05/25/99	08:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.033		0.01	1	N/A	DLN	05/26/99	17:00	335.1
Specific Conductance.....	umho/cm	1500		1.0	1	N/A	JCR	06/02/99	11:30	120.1
Fluoride.....	mg/L	26		0.50	5	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	8.19			1	N/A	SMW	05/20/99	16:00	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	KHA	05/25/99	14:36	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/25/99	14:36	6010B
Manganese, Dissolved.....	mg/L	0.49		0.01	1	N/A	KHA	05/25/99	14:36	6010B/3005A
Sodium, Dissolved.....	mg/L	260		0.50	1	R-2	JYH	05/27/99	21:19	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/25/99	14:36	6010B\3005

Lab Sample ID: L9905414-12
Client Sample ID: MW-42D
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/19/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.03		0.01	1	N/A	DLN	05/25/99	08:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L		ND	0.01	1	N/A	DLN	05/26/99	17:00	335.1
Specific Conductance.....	umho/cm	530		1.0	1	N/A	JCR	06/02/99	11:30	120.1
Fluoride.....	mg/L	3.4		0.10	1	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	7.56			1	N/A	SMW	05/20/99	16:00	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	KHA	05/25/99	14:40	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/25/99	14:40	6010B
Manganese, Dissolved.....	mg/L	1.3		0.01	1	N/A	KHA	05/25/99	14:40	6010B/3005A
Sodium, Dissolved.....	mg/L	26		0.50	1	R-2	JYH	05/27/99	12:32	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/25/99	14:40	6010B\3005

RL = Reporting Limit

HMI
Environmental Consulting Services

CHAIN-OF-CUSTODY RECORD

Project Number	Project Name/Location	Laboratory	Sampling Personnel
HM003.11	Ormet / Hannibal Ohio	Kemron	J Campbell, S Menosky

Sample ID	Date/Time	Sample Code	500 mL Plastic Diss As, Be, Mn, NA	HNO3-field filtered	250 mL Plastic Cn (total + Amenable) NAOH	250 mL Plastic pH, Sp Cond, F 4°C							TOTAL
MW-28	5-19-99	L	1		1	1							3
MW-7d			1		1	1							3
MW-7			1		1	1							3
MW-12			1		1	1							3
MW-39d			1		1	1							3
MW-39s			1		1	1							3
MW-45			1		1	1							3
MW-34d			1		1	1							3
MW-34s			1		1	1							3
MW-41			1		1	1							3
MW-42s			1		1	1							3
MW-42d			1		1	1							3

Sample Code: L = Liquid; S = Solid; A = Air

Total Number of Containers: 36

Relinquished by: [signature]	Organization: HMI	Date: 5/19/99	Time: 1650	Seal Intact?		
Received by: Jack Greene	Organization: Kemron	Date: 5/19/99	Time: 1650	Yes	No	NA
Relinquished by: Jack Greene	Organization: Kemron	Date: 5/19/99	Time: 1755	Seal Intact?		
Received by: Blanda Wiegand	Organization: Kemron	Date: 5/19/99	Time: 1755	Yes	No	NA

REMARKS: Only run Amenable Cn if Total Cn is detected

cooler temp 5.0

DELIVERY METHOD: In Person [ ] Common Carrier [ ] Lab Courier [Kemron] Other [ ]

KEMRON Environmental Services
109 Starlite Park
Marietta, Ohio 45750
Phone: (740) 373-4071

Ormet Corporation
Hydrosystems Management Inc.
331 S. Main Street, Suite 109
Washington, PA 15301
Attention: Bob Fargo

PO Number:
Account Number: ORMET-086

Login #: L9905367
Report Date: 06/02/99
Work ID: HM003.11/ORMET
Date Received: 05/18/99

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
L9905367-01	MW-5D	L9905367-02	MW-5
L9905367-03	MW-2	L9905367-04	MW-18
L9905367-05	MW-30	L9905367-06	MW-31
L9905367-07	FIELD BLANK	L9905367-08	MW-35
L9905367-09	MW-37	L9905367-10	MW-32
L9905367-11	MW-36	L9905367-12	MW-15
L9905367-13	TRIP BLANK		

All results on solids/sludges are reported on a dry weight basis, where applicable, unless otherwise specified. This report shall not be reproduced, except in full, without the written approval of KEMRON.

NYSDOH ELAP ID: 10861

Dennis S. Tepe

Certified By
Dennis S. Tepe

KEMRON ENVIRONMENTAL SERVICES

Login #L9905367
June 2, 1999 12:28 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905367-01
Client Sample ID: MW-5D
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/18/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	2.2		0.10	10	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	2.2		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	1200		1.0	1	N/A	JCR	05/20/99	10:35	120.1
Fluoride.....	mg/L	16		0.20	2	N/A	DLN	05/21/99	10:30	SM4500-F-C
pH	S.U.	8.97			1	N/A	DLN	05/19/99	14:30	150.1
Arsenic, Dissolved.....	mg/L	0.0097		0.004	1	N/A	KHA	05/26/99	14:35	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/26/99	14:35	6010B
Manganese, Dissolved.....	mg/L	0.25		0.01	1	N/A	KHA	05/26/99	14:35	6010B/3005A
Sodium, Dissolved.....	mg/L	240		0.50	1	R-2	SLP	05/26/99	22:04	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/26/99	14:35	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9905367-01
Client Sample ID: MW-5D
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 05/18/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 05/26/99 Time: 18:31

Instrument: HPMS9
Analyst: SLT
Lab File ID: 9M03040

Method: 8260B
Run ID: R66454
Batch : WG58316

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	99.3	(86 - 118%)
1,2-Dichloroethane-d4.....	94.2	(80 - 120%)
Toluene-d8.....	94.8	(88 - 110%)
4-Bromofluorobenzene.....	97.0	(86 - 115%)

RL = Reporting Limit

Login #L9905367
June 2, 1999 12:28 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905367-02
Client Sample ID: MW-5
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/18/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	1.9		0.10	10	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L		ND	0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	1200		1.0	1	N/A	JCR	05/20/99	10:35	120.1
Fluoride.....	mg/L	16		0.20	2	N/A	DLN	05/21/99	10:30	SM4500-F-C
pH	S.U.	8.97			1	N/A	DLN	05/19/99	14:30	150.1
Arsenic, Dissolved.....	mg/L	0.0094		0.004	1	N/A	KHA	05/26/99	14:39	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/26/99	14:39	6010B
Manganese, Dissolved.....	mg/L	0.27		0.01	1	N/A	KHA	05/26/99	14:39	6010B/3005A
Sodium, Dissolved.....	mg/L	250		0.50	1	R-2	SLP	05/26/99	22:18	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/26/99	14:39	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9905367-02
Client Sample ID: MW-5
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 05/18/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 05/26/99 Time: 19:05

Instrument: HPMS9
Analyst: SLT
Lab File ID: 9M03041

Method: 8260B
Run ID: R66454
Batch : WG58316

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	100	(86 - 118%)
1,2-Dichloroethane-d4.....	95.0	(80 - 120%)
Toluene-d8.....	94.6	(88 - 110%)
4-Bromofluorobenzene.....	98.4	(86 - 115%)

RL = Reporting Limit

Login #L9905367
June 2, 1999 12:28 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905367-03
Client Sample ID: MW-2
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/18/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	25		1.0	100	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	3.5		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	1900		1.0	1	N/A	JCR	05/20/99	10:35	120.1
Fluoride.....	mg/L	67		2.5	25	N/A	DLN	05/21/99	10:30	SM4500-F-C
pH	S.U.	10.1			1	N/A	DLN	05/19/99	14:30	150.1
Arsenic, Dissolved.....	mg/L	0.095		0.004	1	N/A	KHA	05/26/99	14:52	6010B\3005
Beryllium, Dissolved.....	mg/L	0.00088		0.0005	1	N/A	KHA	05/26/99	14:52	6010B
Manganese, Dissolved.....	mg/L	0.96		0.01	1	N/A	KHA	05/26/99	14:52	6010B/3005A
Sodium, Dissolved.....	mg/L	400		0.50	1	R-2	SLP	05/26/99	22:21	6010B/3005A
Vanadium, Dissolved.....	mg/L	0.046		0.01	1	N/A	KHA	05/26/99	14:52	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9905367-03
Client Sample ID: MW-2
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 05/18/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 05/26/99 Time: 19:38

Instrument: HPMS9
Analyst: SLT
Lab File ID: 9M03042

Method: 8260B
Run ID: R66454
Batch : WG58316

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	99.4	(86 - 118%)
1,2-Dichloroethane-d4.....	95.4	(80 - 120%)
Toluene-d8.....	94.0	(88 - 110%)
4-Bromofluorobenzene.....	98.1	(86 - 115%)

RL = Reporting Limit

Login #L9905367
June 2, 1999 12:28 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905367-04
Client Sample ID: MW-18
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/18/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	95		5.0	500	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	81		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	3000		1.0	1	N/A	JCR	05/20/99	10:35	120.1
Fluoride.....	mg/L	370		10	100	N/A	DLN	05/21/99	10:30	SM4500-F-C
pH	S.U.	9.72			1	N/A	DLN	05/19/99	14:30	150.1
Arsenic, Dissolved.....	mg/L	0.088		0.004	1	N/A	KHA	05/26/99	14:56	6010B\3005
Beryllium, Dissolved.....	mg/L	0.0014		0.0005	1	N/A	KHA	05/26/99	14:56	6010B
Manganese, Dissolved.....	mg/L	0.92		0.01	1	N/A	KHA	05/26/99	14:56	6010B/3005A
Sodium, Dissolved.....	mg/L	650		1.0	2	R-2	SLP	05/26/99	23:15	6010B/3005A
Vanadium, Dissolved.....	mg/L	0.045		0.01	1	N/A	KHA	05/26/99	14:56	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9905367-04
Client Sample ID: MW-18
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 05/18/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 05/26/99 Time: 20:11

Instrument: HPMS9
Analyst: SLT
Lab File ID: 9M03043

Method: 8260B
Run ID: R66454
Batch : WG58316

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L	17		5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	99.9	(86 - 118%)
1,2-Dichloroethane-d4.....	96.7	(80 - 120%)
Toluene-d8.....	94.4	(88 - 110%)
4-Bromofluorobenzene.....	97.2	(86 - 115%)

RL = Reporting Limit

Login #L9905367
June 2, 1999 12:28 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905367-05
Client Sample ID: MW-30
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/18/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.016		0.01	1	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.013		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	400		1.0	1	N/A	JCR	05/20/99	10:35	120.1
Fluoride.....	mg/L	0.19		0.10	1	N/A	DLN	05/21/99	10:30	SM4500-F-C
pH	S.U.	6.43			1	N/A	DLN	05/19/99	14:30	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	KHA	05/26/99	14:22	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/26/99	14:22	6010B
Manganese, Dissolved.....	mg/L	0.71		0.01	1	N/A	KHA	05/26/99	14:22	6010B/3005A
Sodium, Dissolved.....	mg/L	21		0.50	1	R-2	SLP	05/26/99	21:46	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/26/99	14:22	6010B\3005

5x Blank amount

-0.19

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9905367-05
Client Sample ID: MW-30
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 05/18/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 05/26/99 Time: 20:45

Instrument: HPMS9
Analyst: SLT
Lab File ID: 9M03044

Method: 8260B
Run ID: R66454
Batch : WG58316

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L	20		5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	100	(86 - 118%)
1,2-Dichloroethane-d4.....	96.8	(80 - 120%)
Toluene-d8.....	94.0	(88 - 110%)
4-Bromofluorobenzene.....	97.9	(86 - 115%)

RL = Reporting Limit

Login #L9905367
June 2, 1999 12:28 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905367-06
Client Sample ID: MW-31
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/18/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	29		1.0	100	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	6.5		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	2600		1.0	1	N/A	JCR	05/20/99	10:35	120.1
Fluoride.....	mg/L	130		2.5	25	N/A	DLN	05/21/99	10:30	SM4500-F-C
pH	S.U.	9.91			1	N/A	DLN	05/19/99	14:30	150.1
Arsenic, Dissolved.....	mg/L	0.06		0.004	1	N/A	KHA	05/26/99	15:01	6010B\3005
Beryllium, Dissolved.....	mg/L	0.0014		0.0005	1	N/A	KHA	05/26/99	15:01	6010B
Manganese, Dissolved.....	mg/L	1.2		0.01	1	N/A	KHA	05/26/99	15:01	6010B/3005A
Sodium, Dissolved.....	mg/L	600		1.0	2	R-2	SLP	05/26/99	23:18	6010B/3005A
Vanadium, Dissolved.....	mg/L	0.07		0.01	1	N/A	KHA	05/26/99	15:01	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9905367-06
Client Sample ID: MW-31
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 05/18/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 05/27/99 Time: 01:07

Instrument: HPMS9
Analyst: SLT
Lab File ID: 9M03052

Method: 8260B
Run ID: R66562
Batch : WG58324

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L	34		5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	102	(86 - 118%)
1,2-Dichloroethane-d4.....	98.8	(80 - 120%)
Toluene-d8.....	94.0	(88 - 110%)
4-Bromofluorobenzene.....	98.8	(86 - 115%)

RL = Reporting Limit

Login #L9905367
June 2, 1999 12:28 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905367-07
Client Sample ID: FIELD BLANK
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/18/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L		ND	0.01	1	N/A	SJM	05/24/99	13:00	9010B\9014
Specific Conductance.....	umho/cm		ND	1.0	1	N/A	JCR	05/20/99	10:35	120.1
Fluoride.....	mg/L		ND	0.10	1	N/A	DLN	05/21/99	10:30	SM4500-F-C
pH	S.U.	6.15			1	N/A	DLN	05/19/99	14:30	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	KHA	05/26/99	15:05	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/26/99	15:05	6010B
Manganese, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/26/99	15:05	6010B/3005A
Sodium, Dissolved.....	mg/L		ND	0.50	1	R-2	SLP	05/26/99	22:32	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/26/99	15:05	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9905367-07
Client Sample ID: FIELD BLANK
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 05/18/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 05/26/99 Time: 23:59

Instrument: HPMS9
Analyst: SLT
Lab File ID: 9M03050

Method: 8260B
Run ID: R66561
Batch : WG58324

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	100	(86 - 118%)
1,2-Dichloroethane-d4.....	96.9	(80 - 120%)
Toluene-d8.....	94.1	(88 - 110%)
4-Bromofluorobenzene.....	96.5	(86 - 115%)

RL = Reporting Limit

Login #L9905367
June 2, 1999 12:28 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905367-08
Client Sample ID: MW-35
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/18/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	28		1.0	100	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	10		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	830		1.0	1	N/A	JCR	05/20/99	10:35	120.1
Fluoride.....	mg/L	38		1.0	10	N/A	DLN	05/21/99	10:30	SM4500-F-C
pH	S.U.	9.35			1	N/A	DLN	05/19/99	14:30	150.1
Arsenic, Dissolved.....	mg/L	0.013		0.004	1	N/A	KHA	05/26/99	15:09	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/26/99	15:09	6010B
Manganese, Dissolved.....	mg/L	0.86		0.01	1	N/A	KHA	05/26/99	15:09	6010B/3005A
Sodium, Dissolved.....	mg/L	160		0.50	1	R-2	SLP	05/26/99	22:36	6010B/3005A
Vanadium, Dissolved.....	mg/L	0.015		0.01	1	N/A	KHA	05/26/99	15:09	6010B\3005

RL = Reporting Limit

Login #L9905367
June 2, 1999 12:28 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905367-09
Client Sample ID: MW-37
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/18/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	11		1.0	100	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	3.6		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	610		1.0	1	N/A	JCR	05/20/99	10:35	120.1
Fluoride.....	mg/L	22		1.0	10	N/A	DLN	05/21/99	10:30	SM4500-F-C
pH	S.U.	9.39			1	N/A	DLN	05/19/99	14:30	150.1
Arsenic, Dissolved.....	mg/L	0.023		0.004	1	N/A	KHA	05/26/99	15:14	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/26/99	15:14	6010B
Manganese, Dissolved.....	mg/L	0.23		0.01	1	N/A	KHA	05/26/99	15:14	6010B/3005A
Sodium, Dissolved.....	mg/L	130		0.50	1	R-2	SLP	05/26/99		6010B/3005A
Vanadium, Dissolved.....	mg/L	0.016		0.01	1	N/A	KHA	05/26/99	15:14	6010B\3005

RL = Reporting Limit

Login #L9905367
June 2, 1999 12:28 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905367-10
Client Sample ID: MW-32
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/18/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	4.4		0.20	20	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.59		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	690		1.0	1	N/A	JCR	05/20/99	10:35	120.1
Fluoride.....	mg/L	12		0.50	5	N/A	DLN	05/21/99	10:30	SM4500-F-C
pH	S.U.	8.38			1	N/A	DLN	05/19/99	14:30	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	KHA	05/26/99	15:18	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/26/99	15:18	6010B
Manganese, Dissolved.....	mg/L	2.0		0.01	1	N/A	KHA	05/26/99	15:18	6010B/3005A
Sodium, Dissolved.....	mg/L	78		0.50	1	R-2	SLP	05/26/99	22:43	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/26/99	15:18	6010B\3005

RL = Reporting Limit

Login #L9905367
June 2, 1999 12:28 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905367-11
Client Sample ID: MW-36
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/18/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	19		1.0	100	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	4.4		0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	2500		1.0	1	N/A	JCR	05/20/99	10:35	120.1
Fluoride.....	mg/L	150		2.5	25	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	10.1			1	N/A	DLN	05/19/99	14:30	150.1
Arsenic, Dissolved.....	mg/L	0.12		0.004	1	N/A	KHA	05/26/99	15:23	6010B\3005
Beryllium, Dissolved.....	mg/L	0.0019		0.0005	1	N/A	KHA	05/26/99	15:23	6010B
Manganese, Dissolved.....	mg/L	1.3		0.01	1	N/A	KHA	05/26/99	15:23	6010B/3005A
Sodium, Dissolved.....	mg/L	600		1.0	2	R-2	SLP	05/26/99	23:22	6010B/3005A
Vanadium, Dissolved.....	mg/L	0.12		0.01	1	N/A	KHA	05/26/99	15:23	6010B\3005

RL = Reporting Limit

Login #L9905367
June 2, 1999 12:28 pm

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9905367-12
Client Sample ID: MW-15
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 05/18/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	8.5		0.25	25	N/A	SJM	05/24/99	13:00	9010B\9014
Cyanide, Amenable to Cl.....	mg/L		ND	0.01	1	N/A	DLN	05/27/99	13:00	335.1
Specific Conductance.....	umho/cm	980		1.0	1	N/A	JCR	05/20/99	10:35	120.1
Fluoride.....	mg/L	15		0.20	2	N/A	DLN	05/21/99	13:35	SM4500-F-C
pH	S.U.	7.49			1	N/A	DLN	05/19/99	14:30	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	KHA	05/26/99	15:27	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	KHA	05/26/99	15:27	6010B
Manganese, Dissolved.....	mg/L	0.017		0.01	1	N/A	KHA	05/26/99	15:27	6010B/3005A
Sodium, Dissolved.....	mg/L	150		0.50	1	R-2	SLP	05/26/99	22:50	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	KHA	05/26/99	15:27	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9905367-13
Client Sample ID: TRIP BLANK
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 05/18/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 05/27/99 Time: 00:33

Instrument: HPMS9
Analyst: SLT
Lab File ID: 9M03051

Method: 8260B
Run ID: R66562
Batch : WG58324

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	102	(86 - 118%)
1,2-Dichloroethane-d4.....	98.3	(80 - 120%)
Toluene-d8.....	93.7	(88 - 110%)
4-Bromofluorobenzene.....	96.9	(86 - 115%)

RL = Reporting Limit

HMI
Environmental Consulting Services

CHAIN-OF-CUSTODY RECORD

Project Number: HM003.11
Project Name/Location: Ormet / Hannibal Ohio
Laboratory: Kemron
Sampling Personnel: J Campbell, S Menosky

Sample ID	Date/Time	Sample Code	500 mL Plastic Diss As, Be, Mn, Na, V HNO3-field filtered	250 mL Plastic Cn (total + Amenable) NAOH	250 mL Plastic pH, Sp. Cond, F 4°C	40 mL Glass Tetrachloroethene (PCE) 4°C HCL						TOTAL
MW-5d	5-18-99	L	1	1	1	2						5
MW-5			1	1	1	2						5
MW-2			1	1	1	2						5
MW-18			1	1	1	2						5
MW-30			1	1	1	2						5
MW-31			1	1	1	2						5
Field Blank			1	1	1	2						5
Trip Blank						2						2
MW-35			1	1	1							3
MW-37			1	1	1							3
MW-32			1	1	1							3
MW-36			1	1	1							3
MW-15			1	1	1							3

Sample Code: L = Liquid; S = Solid; A = Air

Total Number of Containers: 52

Relinquished by: [signature]	Organization: HMI	Date: 5-18-99	Time: 1640	Seal Intact?		
Received by: [signature]	Organization: KEMRON	Date: 5-18-99	Time: 1640	Yes	No	NA
Relinquished by: [signature]	Organization: KEMRON	Date: 5-18-99	Time: 1750	Seal Intact?		
Received by: [signature]	Organization: KEMRON	Date: 5-19-99	Time: 0800	Yes	No	NA

REMARKS: Only Run Amenable Cn if Total Cn is detected ; Samples in 2 coolers samples intact, cooler temp 4.0, samples stored in locked cooler overnight

DELIVERY METHOD: In Person [ ] Common Carrier [ ] Lab Courier [Kemron] Other [ ]

APPENDIX B-3

LABORATORY ANALYTICAL REPORT FOR SEPTEMBER 1999 MONITORING EVENT

KEMRON Environmental Services
109 Starlite Park
Marietta, Ohio 45750
Phone: (740) 373-4071

Ormet Corporation
Hydrosystems Management Inc.
331 S. Main Street, Suite 109
Washington, PA 15301
Attention: Bob Fargo

PO Number: HRDS55078
Account Number: ORMET-086
Invoice Number: 544121

Login #: L9909171
Report Date: 09/24/99
Work ID: HM003.11/ORMET
Date Received: 09/08/99

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
L9909171-01	TRIP BLANK	L9909171-02	FIELD BLANK
L9909171-03	MW-2	L9909171-04	MW-2D
L9909171-05	MW-5	L9909171-06	MW-18
L9909171-07	MW-31	L9909171-08	MW-12
L9909171-09	MW-16	L9909171-10	MW-28
L9909171-11	MW-32	L9909171-12	MW-35
L9909171-13	MW-36	L9909171-14	MW-36D
L9909171-15	MW-37		

REVISED REPORT

All results on solids/sludges are reported on a dry weight basis, where applicable, unless otherwise specified. This report shall not be reproduced, except in full, without the written approval of KEMRON.

NYSDOH ELAP ID: 10861

Dennis S. Tepe

Certified By
Dennis S. Tepe

KEMRON ENVIRONMENTAL SERVICES

Login #L9909171
September 24, 1999 10:18 am

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9909171-01
Client Sample ID: TRIP BLANK
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 09/08/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 09/14/99 Time: 20:38

Instrument: HPMS8
Analyst: MES
Lab File ID: 8M0726

Method: 8260B
Run ID: R73630
Batch : WG65052

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	93.1	(86 - 118%)
1,2-Dichloroethane-d4.....	90.6	(80 - 120%)
Toluene-d8.....	105	(88 - 110%)
4-Bromofluorobenzene.....	105	(86 - 115%)

Lab Sample ID: L9909171-02
Client Sample ID: FIELD BLANK
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L		ND	0.01	1	N/A	JWR	09/14/99	09:30	9010B\9014
Specific Conductance.....	umho/cm	1.0		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L		ND	0.10	1	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	6.82			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	ALC	09/15/99	19:05	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	09/15/99	19:05	6010
Manganese, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	09/15/99	19:05	6010B/3005A
Sodium, Dissolved.....	mg/L		ND	0.50	1	R-2	SLP	09/16/99	13:00	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	09/15/99	19:05	6010B\3005

RL = Reporting Limit

Login #L9909171
September 24, 1999 10:18 am

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9909171-02
Client Sample ID: FIELD BLANK
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 09/08/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 09/14/99 Time: 21:07

Instrument: HPMS8
Analyst: MES
Lab File ID: 8M0727

Method: 8260B
Run ID: R73630
Batch : WG65052

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	94.0	(86 - 118%)
1,2-Dichloroethane-d4.....	91.6	(80 - 120%)
Toluene-d8.....	106	(88 - 110%)
4-Bromofluorobenzene.....	106	(86 - 115%)

Lab Sample ID: L9909171-03
Client Sample ID: MW-2
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	22		1.0	100	N/A	JWR	09/14/99	09:30	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	2.6		1.0	100	N/A	DLN	09/16/99	08:00	335.1
Specific Conductance.....	umho/cm	1600		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L	59		1.0	10	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	9.88			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L	0.077		0.004	1	N/A	ALC	09/15/99	19:10	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	09/15/99	19:10	6010
Manganese, Dissolved.....	mg/L	0.85		0.01	1	N/A	ALC	09/15/99	19:10	6010B/3005A
Sodium, Dissolved.....	mg/L	430		0.50	1	R-2	SLP	09/16/99	13:03	6010B/3005A
Vanadium, Dissolved.....	mg/L	0.032		0.01	1	N/A	ALC	09/15/99	19:10	6010B\3005

RL = Reporting Limit

Login #L9909171
September 24, 1999 10:18 am

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9909171-03
Client Sample ID: MW-2
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 09/08/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 09/14/99 Time: 17:12

Instrument: HPMS8
Analyst: MES
Lab File ID: 8M0719

Method: 8260B
Run ID: R73630
Batch : WG65052

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	94.9	(86 - 118%)
1,2-Dichloroethane-d4.....	92.0	(80 - 120%)
Toluene-d8.....	104	(88 - 110%)
4-Bromofluorobenzene.....	105	(86 - 115%)

Lab Sample ID: L9909171-04
Client Sample ID: MW-2D
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	22		1.0	100	N/A	JWR	09/14/99	09:30	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	2.5		1.0	100	N/A	DLN	09/16/99	08:00	335.1
Specific Conductance.....	umho/cm	1900		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L	60		1.0	10	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	9.88			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L	0.079		0.004	1	N/A	ALC	09/15/99	19:10	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	09/15/99	19:14	6010
Manganese, Dissolved.....	mg/L	0.95		0.01	1	N/A	ALC	09/15/99	19:14	6010B/3005A
Sodium, Dissolved.....	mg/L	460		0.50	1	R-2	SLP	09/16/99	13:07	6010B/3005A
Vanadium, Dissolved.....	mg/L	0.039		0.01	1	N/A	ALC	09/15/99	19:14	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9909171-04
Client Sample ID: MW-2D
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 09/08/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 09/14/99 Time: 16:42

Instrument: HPMS8
Analyst: MES
Lab File ID: 8M0718

Method: 8260B
Run ID: R73630
Batch : WG65052

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	96.3	(86 - 118%)
1,2-Dichloroethane-d4.....	92.9	(80 - 120%)
Toluene-d8.....	104	(88 - 110%)
4-Bromofluorobenzene.....	104	(86 - 115%)

Lab Sample ID: L9909171-05
Client Sample ID: MW-5
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	2.4		0.10	10	N/A	JWR	09/14/99	09:30	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.10		0.10	10	N/A	DLN	09/16/99	08:00	335.1
Specific Conductance.....	umho/cm	1100		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L	17		0.20	2	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	8.78			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L	0.0074		0.004	1	N/A	ALC	09/15/99	19:18	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	09/15/99	19:18	6010
Manganese, Dissolved.....	mg/L	0.23		0.01	1	N/A	ALC	09/15/99	19:18	6010B/3005A
Sodium, Dissolved.....	mg/L	230		0.50	1	R-2	SLP	09/16/99	13:10	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	09/15/99	19:18	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9909171-05
Client Sample ID: MW-5
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 09/08/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 09/14/99 Time: 21:37

Instrument: HPMS8
Analyst: MES
Lab File ID: 8M0728

Method: 8260B
Run ID: R73630
Batch : WG65052

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	92.8	(86 - 118%)
1,2-Dichloroethane-d4.....	91.1	(80 - 120%)
Toluene-d8.....	105	(88 - 110%)
4-Bromofluorobenzene.....	105	(86 - 115%)

Lab Sample ID: L9909171-06
Client Sample ID: MW-18
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	90		5.0	500	N/A	JWR	09/14/99	09:30	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	14		5.0	500	N/A	DLN	09/16/99	08:00	335.1
Specific Conductance.....	umho/cm	3000		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L	170		2.5	25	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	9.62			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L	0.074		0.004	1	N/A	ALC	09/15/99	19:23	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	09/15/99	19:23	6010
Manganese, Dissolved.....	mg/L	0.24		0.01	1	N/A	ALC	09/15/99	19:23	6010B/3005A
Sodium, Dissolved.....	mg/L	700		0.50	1	R-2	SLP	09/16/99	13:14	6010B/3005A
Vanadium, Dissolved.....	mg/L	0.011		0.01	1	N/A	ALC	09/15/99	19:23	6010B\3005

RL = Reporting Limit

Login #L9909171
September 24, 1999 10:18 am

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9909171-06
Client Sample ID: MW-18
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 09/08/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 09/14/99 Time: 22:07

Instrument: HPMS8
Analyst: MES
Lab File ID: 8M0729

Method: 8260B
Run ID: R73630
Batch : WG65052

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L	16		5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	93.0	(86 - 118%)
1,2-Dichloroethane-d4.....	92.2	(80 - 120%)
Toluene-d8.....	104	(88 - 110%)
4-Bromofluorobenzene.....	106	(86 - 115%)

Lab Sample ID: L9909171-07
Client Sample ID: MW-31
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	30		1.0	100	N/A	JWR	09/14/99	09:30	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	4.3		1.0	100	N/A	DLN	09/16/99	08:00	335.1
Specific Conductance.....	umho/cm	2600		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L	150		2.5	25	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	9.83			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L	0.063		0.004	1	N/A	ALC	09/15/99	19:27	6010B\3005
Beryllium, Dissolved.....	mg/L	0.0011		0.0005	1	N/A	ALC	09/15/99	19:27	6010
Manganese, Dissolved.....	mg/L	1.6		0.01	1	N/A	ALC	09/15/99	19:27	6010B/3005A
Sodium, Dissolved.....	mg/L	750		0.50	1	R-2	SLP	09/16/99	13:17	6010B/3005A
Vanadium, Dissolved.....	mg/L	0.088		0.01	1	N/A	ALC	09/15/99	19:27	6010B\3005

RL = Reporting Limit

Login #L9909171
September 24, 1999 10:18 am

KEMRON ENVIRONMENTAL SERVICES

Product: 826-TETRACHLOROETHEN - Volatile Organics

Lab Sample ID: L9909171-07
Client Sample ID: MW-31
Site/Work ID: HM003.11/ORMET
Matrix: Water

Dil. Type: N/A
COC Info: N/A
Date Collected: 09/08/99

Sample Weight: N/A
Extract Volume: N/A
% Solid: N/A

TCLP Extract Date: N/A
Extract Date: N/A
Analysis Date: 09/16/99 Time: 15:57

Instrument: HPMS10
Analyst: JLH
Lab File ID: 10M189

Method: 8260B
Run ID: R73770
Batch : WG65206

CAS #	Compound	Units	Result	Qualifiers	RL	Dilution
127-18-4	Tetrachloroethene.....	ug/L		ND	5.0	1

SURROGATES- In Percent Recovery:

Dibromofluoromethane.....	104	(86 - 118%)
1,2-Dichloroethane-d4.....	99.2	(80 - 120%)
Toluene-d8.....	105	(88 - 110%)
4-Bromofluorobenzene.....	109	(86 - 115%)

Lab Sample ID: L9909171-08
Client Sample ID: MW-12
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.017		0.01	1	N/A	JWR	09/14/99	09:30	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.012		0.01	1	N/A	DLN	09/16/99	08:00	335.1
Specific Conductance.....	umho/cm	530		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L	0.68		0.10	1	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	7.54			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	ALC	09/15/99	19:31	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	09/15/99	19:31	6010
Manganese, Dissolved.....	mg/L	1.9		0.01	1	N/A	ALC	09/15/99	19:31	6010B/3005A
Sodium, Dissolved.....	mg/L	27		0.50	1	R-2	SLP	09/16/99	13:21	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	09/15/99	19:31	6010B\3005

RL = Reporting Limit

Login #L9909171
September 24, 1999 10:18 am

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9909171-09
Client Sample ID: MW-16
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	2.9		0.10	10	N/A	JWR	09/14/99	09:30	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.88		0.10	10	N/A	DLN	09/16/99	08:00	335.1
Specific Conductance.....	umho/cm	730		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L	8.2		0.20	2	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	7.62			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	ALC	09/15/99	19:45	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	09/15/99	19:45	6010
Manganese, Dissolved.....	mg/L	1.7		0.01	1	N/A	ALC	09/15/99	19:45	6010B/3005A
Sodium, Dissolved.....	mg/L	78		0.50	1	R-2	SLP	09/16/99	13:24	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	09/15/99	19:45	6010B\3005

Lab Sample ID: L9909171-10
Client Sample ID: MW-28
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	0.12		0.01	1	N/A	JWR	09/14/99	09:30	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.016		0.01	1	N/A	DLN	09/16/99	08:00	335.1
Specific Conductance.....	umho/cm	480		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L	0.26		0.10	1	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	5.95			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L		ND	0.004	1	N/A	ALC	09/15/99	18:52	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	09/15/99	18:52	6010
Manganese, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	09/15/99	18:52	6010B/3005A
Sodium, Dissolved.....	mg/L	57		0.50	1	R-2	SLP	09/14/99	12:58	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	09/15/99	18:52	6010B\3005

RL = Reporting Limit

Login #L9909171
September 24, 1999 10:57 am

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9909171-11
Client Sample ID: MW-32
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	18		0.50	50	N/A	JWR	09/14/99	09:30	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	1.8		0.50	50	N/A	DLN	09/16/99	08:00	335.1
Specific Conductance.....	umho/cm	2200		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L	120		2.5	25	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	9.84			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L	0.057		0.004	1	N/A	ALC	09/15/99	19:49	6010B\3005
Beryllium, Dissolved.....	mg/L	0.0014		0.0005	1	N/A	ALC	09/15/99	19:49	6010
Manganese, Dissolved.....	mg/L	2.2		0.01	1	N/A	ALC	09/15/99	19:49	6010B/3005A
Sodium, Dissolved.....	mg/L	520		0.50	1	R-2	SLP	09/16/99	13:28	6010B/3005A
Vanadium, Dissolved.....	mg/L	0.093		0.01	1	N/A	ALC	09/15/99	19:49	6010B\3005

Lab Sample ID: L9909171-12
Client Sample ID: MW-35
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	18		1.0	100	N/A	JWR	09/14/99	09:30	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	2.0		1.0	100	N/A	DLN	09/16/99	08:00	335.1
Specific Conductance.....	umho/cm	790		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L	34		1.0	10	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	9.18			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L	0.012		0.004	1	N/A	ALC	09/15/99	19:53	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	09/15/99	19:53	6010
Manganese, Dissolved.....	mg/L	0.53		0.01	1	N/A	ALC	09/15/99	19:53	6010B/3005A
Sodium, Dissolved.....	mg/L	170		0.50	1	R-2	SLP	09/16/99	13:32	6010B/3005A
Vanadium, Dissolved.....	mg/L	0.05		0.01	1	N/A	ALC	09/15/99	19:53	6010B\3005

RL = Reporting Limit

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9909171-13
Client Sample ID: MW-36
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	6.2		0.40	40	N/A	JWR	09/14/99	09:30	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.69		0.50	50	N/A	DLN	09/16/99	08:00	335.1
Specific Conductance.....	umho/cm	1800		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L	93		2.5	25	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	10.1			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L	0.059		0.004	1	N/A	ALC	09/15/99	19:58	6010B\3005
Beryllium, Dissolved.....	mg/L	0.00055		0.0005	1	N/A	ALC	09/15/99	19:58	6010
Manganese, Dissolved.....	mg/L	1.2		0.01	1	N/A	ALC	09/15/99	19:58	6010B/3005A
Sodium, Dissolved.....	mg/L	420		0.50	1	R-2	SLP	09/16/99	13:42	6010B/3005A
Vanadium, Dissolved.....	mg/L	0.067		0.01	1	N/A	ALC	09/15/99	19:58	6010B\3005

Lab Sample ID: L9909171-14
Client Sample ID: MW-36D
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	6.3		0.40	40	N/A	JWR	09/14/99	09:30	9010B\9014
Cyanide, Amenable to Cl.....	mg/L		ND	0.50	50	N/A	DLN	09/16/99	08:00	335.1
Specific Conductance.....	umho/cm	1800		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L	96		2.5	25	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	10.1			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L	0.061		0.004	1	N/A	ALC	09/15/99	20:02	6010B\3005
Beryllium, Dissolved.....	mg/L	0.00062		0.0005	1	N/A	ALC	09/15/99	20:02	6010
Manganese, Dissolved.....	mg/L	1.2		0.01	1	N/A	ALC	09/15/99	20:02	6010B/3005A
Sodium, Dissolved.....	mg/L	450		0.50	1	R-2	SLP	09/16/99	13:46	6010B/3005A
Vanadium, Dissolved.....	mg/L	0.07		0.01	1	N/A	ALC	09/15/99	20:02	6010B\3005

RL = Reporting Limit

Login #L9909171
September 24, 1999 10:18 am

KEMRON ENVIRONMENTAL SERVICES

Lab Sample ID: L9909171-15
Client Sample ID: MW-37
Site/Work ID: HM003.11/ORMET

Matrix: Water
Collected: 09/08/99 N/A

COC Info: N/A

Analyte	Units	Result	Qualifiers	RL	Dil	Type	Analyst	Analysis Date	Time	Method
Cyanide, Total.....	mg/L	7.9		0.50	50	N/A	JWR	09/14/99	09:30	9010B\9014
Cyanide, Amenable to Cl.....	mg/L	0.91		0.50	50	N/A	DLN	09/16/99	08:00	335.1
Specific Conductance.....	umho/cm	760		1.0	1	N/A	SMW	09/14/99	14:00	120.1
Fluoride.....	mg/L	31		1.0	10	N/A	DLN	09/14/99	10:30	SM4500-F-C
pH	S.U.	8.78			1	N/A	SMW	09/09/99	16:46	150.1
Arsenic, Dissolved.....	mg/L	0.01		0.004	1	N/A	ALC	09/15/99	20:07	6010B\3005
Beryllium, Dissolved.....	mg/L		ND	0.0005	1	N/A	ALC	09/15/99	20:07	6010
Manganese, Dissolved.....	mg/L	0.33		0.01	1	N/A	ALC	09/15/99	20:07	6010B/3005A
Sodium, Dissolved.....	mg/L	170		0.50	1	R-2	SLP	09/16/99	13:49	6010B/3005A
Vanadium, Dissolved.....	mg/L		ND	0.01	1	N/A	ALC	09/15/99	20:07	6010B\3005

RL = Reporting Limit

HMI Keduction Division

Environmental Consulting Services

CHAIN-OF-CUSTODY RECORD

Project Number	Project Name/Location	Laboratory	Sampling Personnel
Hm003.11	Ormet / Hannibal Ohio	Kemron	J Campbell / S Menosky

Container Description/ Number of Containers

Sample ID	Date/Time	Sample Code	40 mL Glass Tetrachloroethene (PCE) HCL	500 mL Plastic Diss As, Be, Mn, Na, V HNO_3-field filtered	250 mL Amber Glass Cn (amenable + Total) NAOH	250 mL Plastic pH, Cond, Fluoride 4°C						TOTAL
Trip Blank	9/8/99	L	2									2
Field Blank	↓	↓	2	1	1	1						5
MW-2			2	1	1	1						5
MW-2d			2	1	1	1						5
MW-5			2	1	1	1						5
MW-18			2	1	1	1						5
MW-31			2	1	1	1						5
MW-12				1	1	1						3
MW-16				1	1	1						3
MW-28				1	1	1						3
MW-32				1	1	1						3
MW-35				1	1	1						3
MW-36				1	1	1						3
MW-36d				1	1	1						3
MW-37	↓	↓		1	1	1						3

Sample Code: L = Liquid; S = Solid; A = Air

Total Number of Containers: 56

Relinquished by: [signature]	Organization: HMI	Date: 9/8/99	Time: 1448	Seal Intact?
Received by: [signature]	Organization: KEMRON	Date: 9/8/99	Time: 1448	(Yes) No NA
Relinquished by: [signature]	Organization: KEMRON	Date: 9/8/99	Time: 1620	Seal Intact?
Received by: TRACY Baldwin	Organization: Kemron	Date: 9/8/99	Time: 1620	(Yes) No NA

REMARKS: Run Total Cn first and if detected then run for amenable Cn

Samples in 2 Coolers

DELIVERY METHOD: In Person [ ] Common Carrier [ ] Lab Courier Kemron Other [ ]

APPENDIX C

DATA VALIDATION SUMMARY REPORT FOR 1999 MONITORING EVENTS

APPENDIX C
DATA VALIDATION SUMMARY REPORT
1999 REMEDIAL ACTION GROUND-WATER MONITORING

ORMET CORPORATION
HANNIBAL, OHIO

Under the Remedial Action Ground-Water Monitoring Plan for the Ormet Corporation site, ground-water samples were collected in January, May and September. The samples were analyzed by Kemron Environmental Services of Marietta, Ohio using SW-846 and EPA protocols. Validation of the analytical results was conducted by applying principals and concepts of the USEPA National Functional Guidelines. The validation process included review of holding times, blank results, surrogate and matrix spike recoveries, and laboratory control sample results. Based on the validation review, only one sample result from the 1999 analytical data warranted qualification. For the May sampling event, the fluoride result for the MW-30 monitoring well was originally reported as 0.19 mg/L. Fluoride was also detected in an associated laboratory method blank at 0.044 mg/L. In accordance with the 5X rule, the result for the MW-30 sample was entered in the database as <0.19 mg/L.

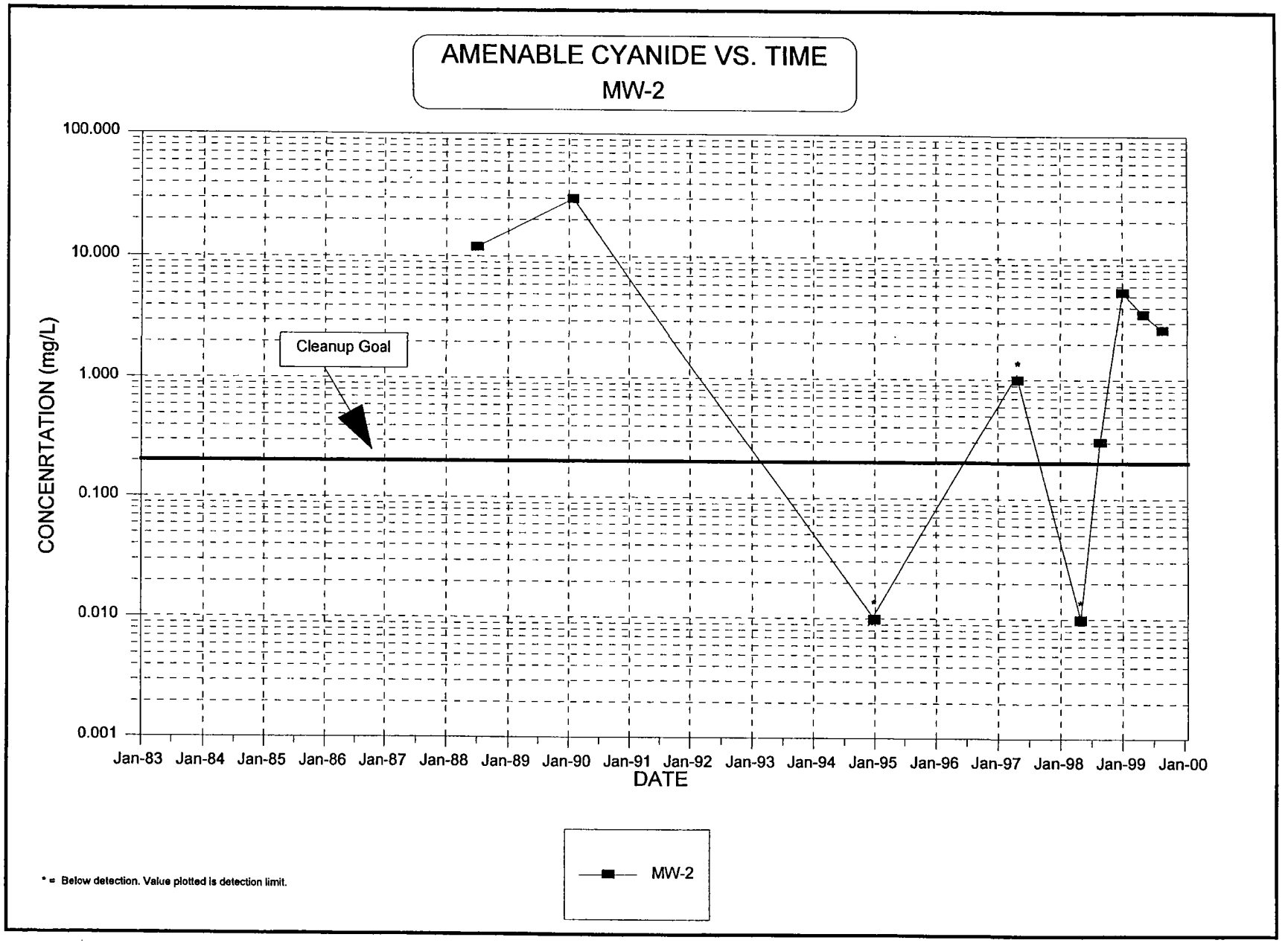
APPENDIX D

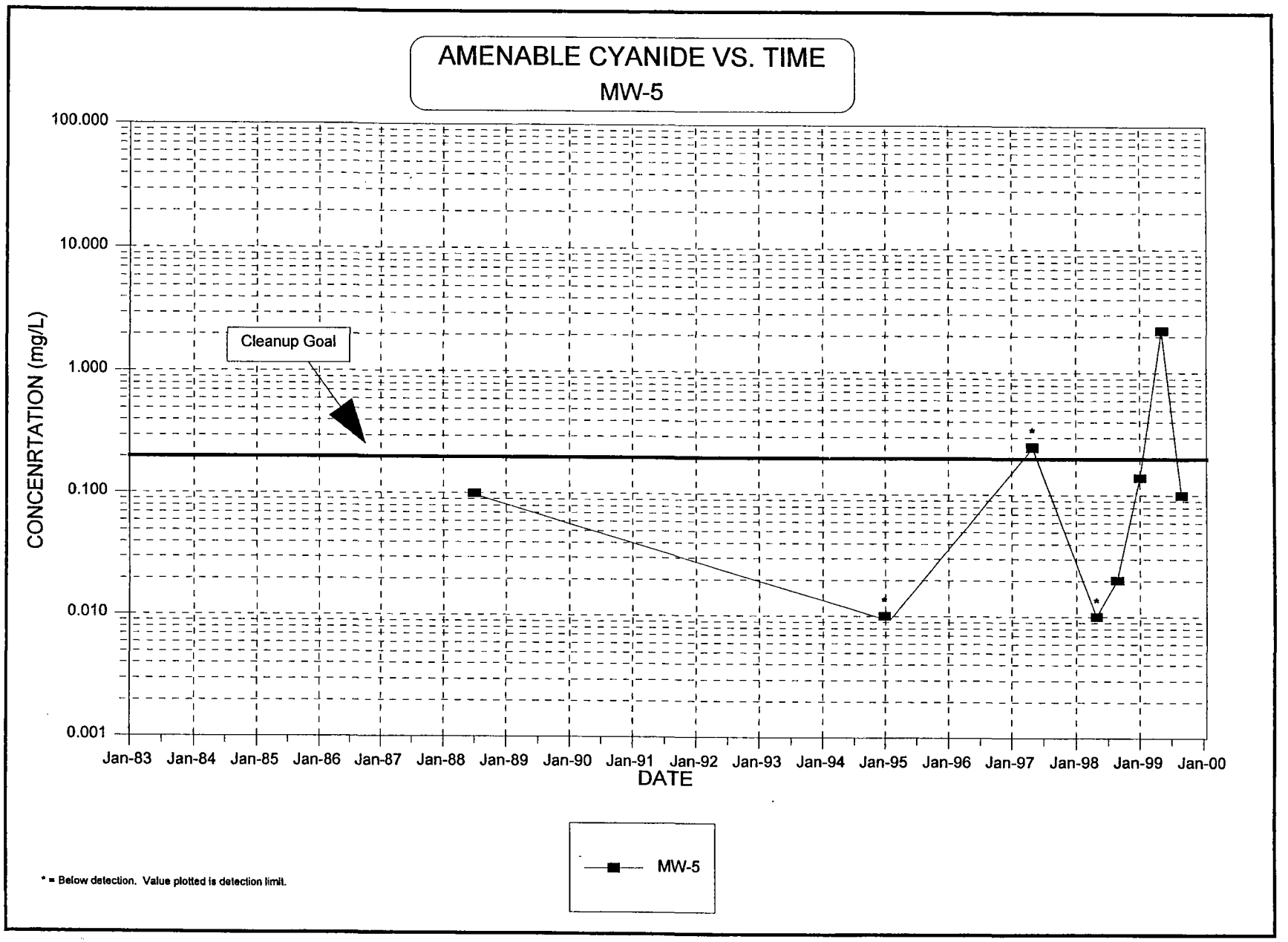
CONCENTRATION VS. TIME GRAPHS FOR REMEDIAL ACTION MONITORING PARAMETERS

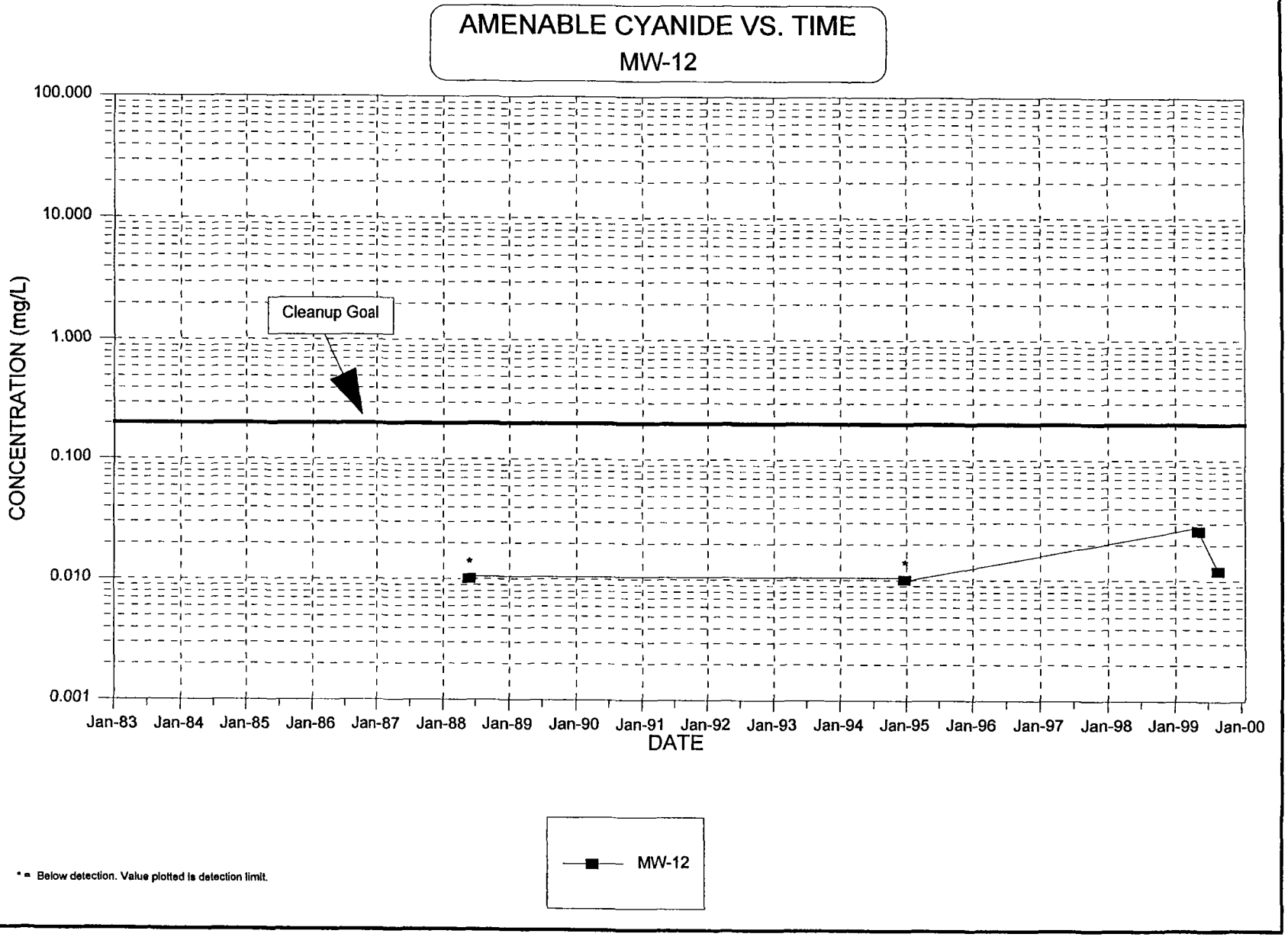
Appendix D-1	Cyanide Amenable to Chlorination
Appendix D-2	Fluoride
Appendix D-3	Arsenic
Appendix D-4	Beryllium
Appendix D-5	Manganese
Appendix D-6	Vanadium
Appendix D-7	Tetrachloroethene
Appendix D-8	Sodium

APPENDIX D-1

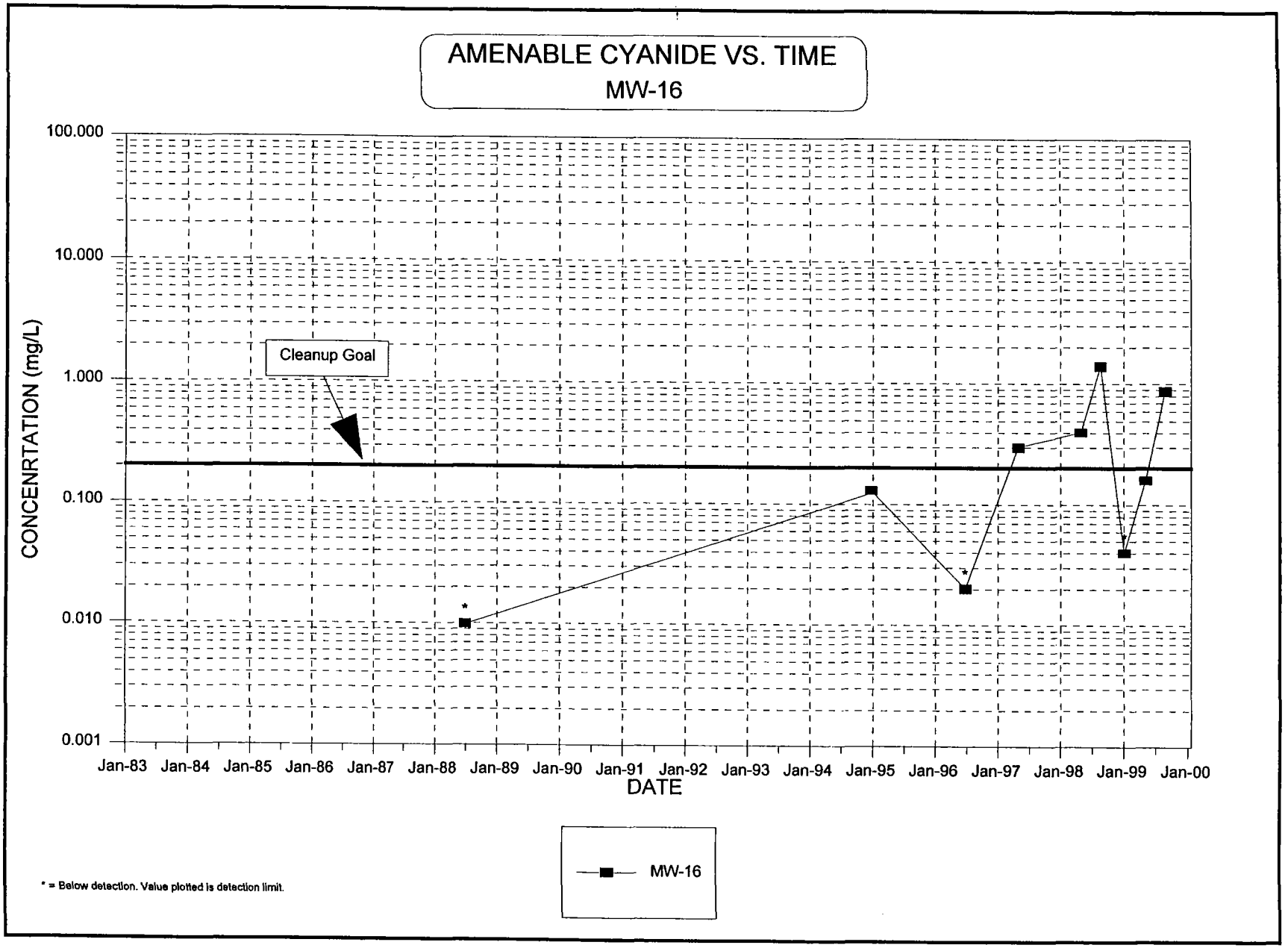
CYANIDE AMENABLE TO CHLORINATION

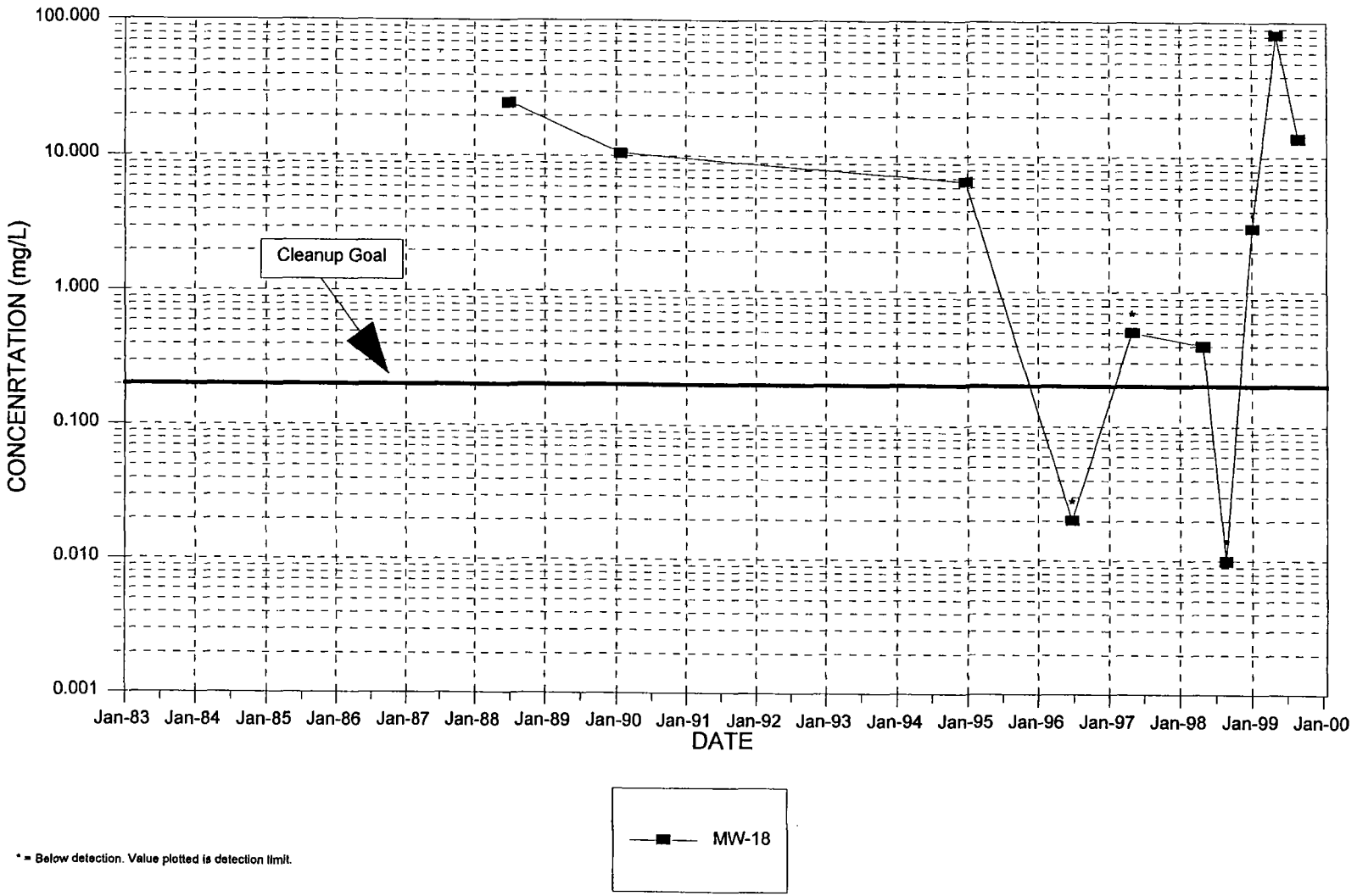

AMENABLE CYANIDE VS. TIME
MW-2
100.000
10.000
1.000
0.100
0.010
0.001
CONCENRTATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-2
* = Below detection. Value plotted is detection limit.


AMENABLE CYANIDE VS. TIME
MW-5
100.000
10.000
1.000
0.100
0.010
0.001
CONCENRTATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-5
* = Below detection. Value plotted is detection limit.

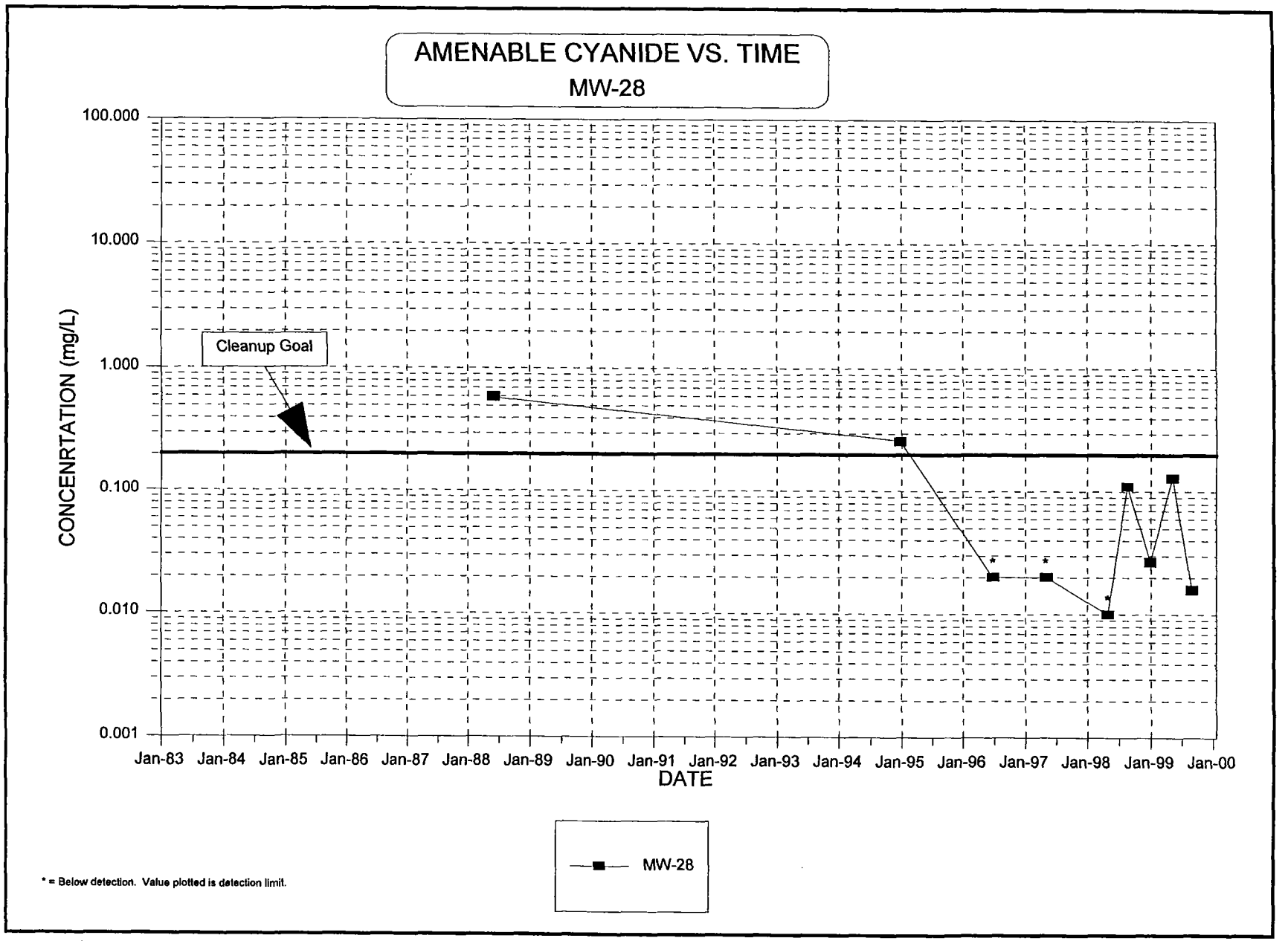


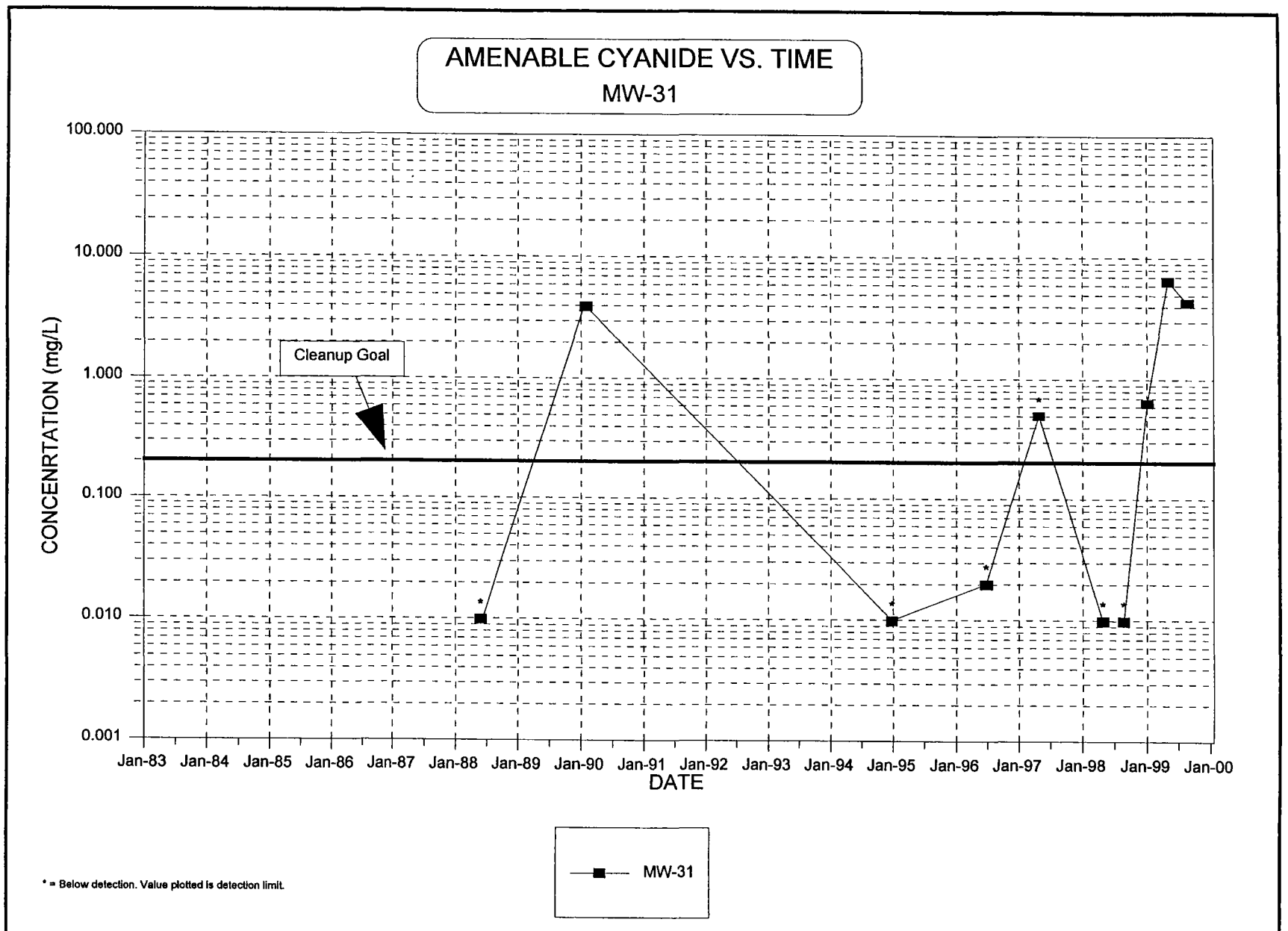
* = Below detection. Value plotted is detection limit.

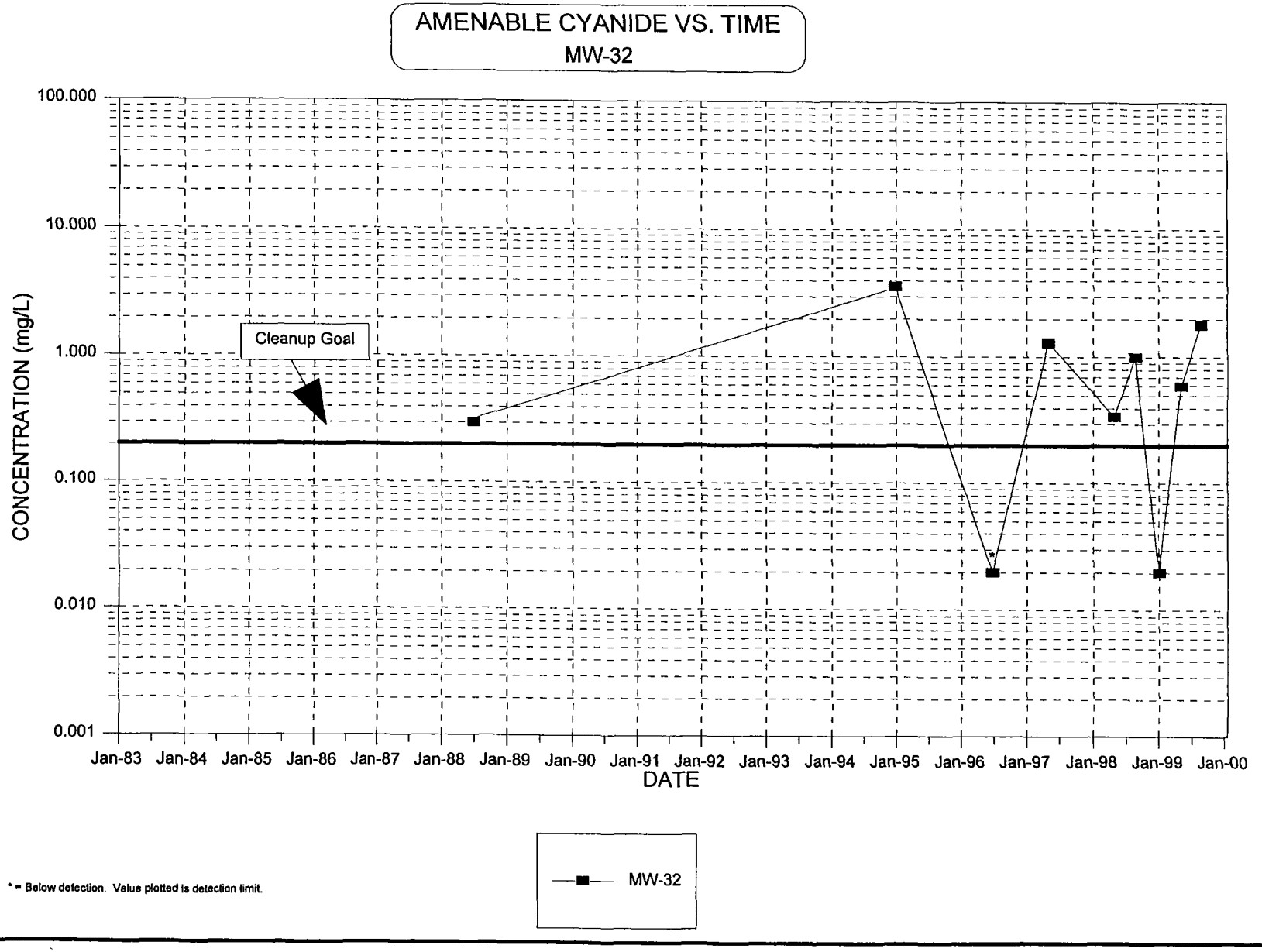

AMENABLE CYANIDE VS. TIME
MW-16
100.000
10.000
1.000
0.100
0.010
0.001
CONCENRTATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-16
* = Below detection. Value plotted is detection limit.



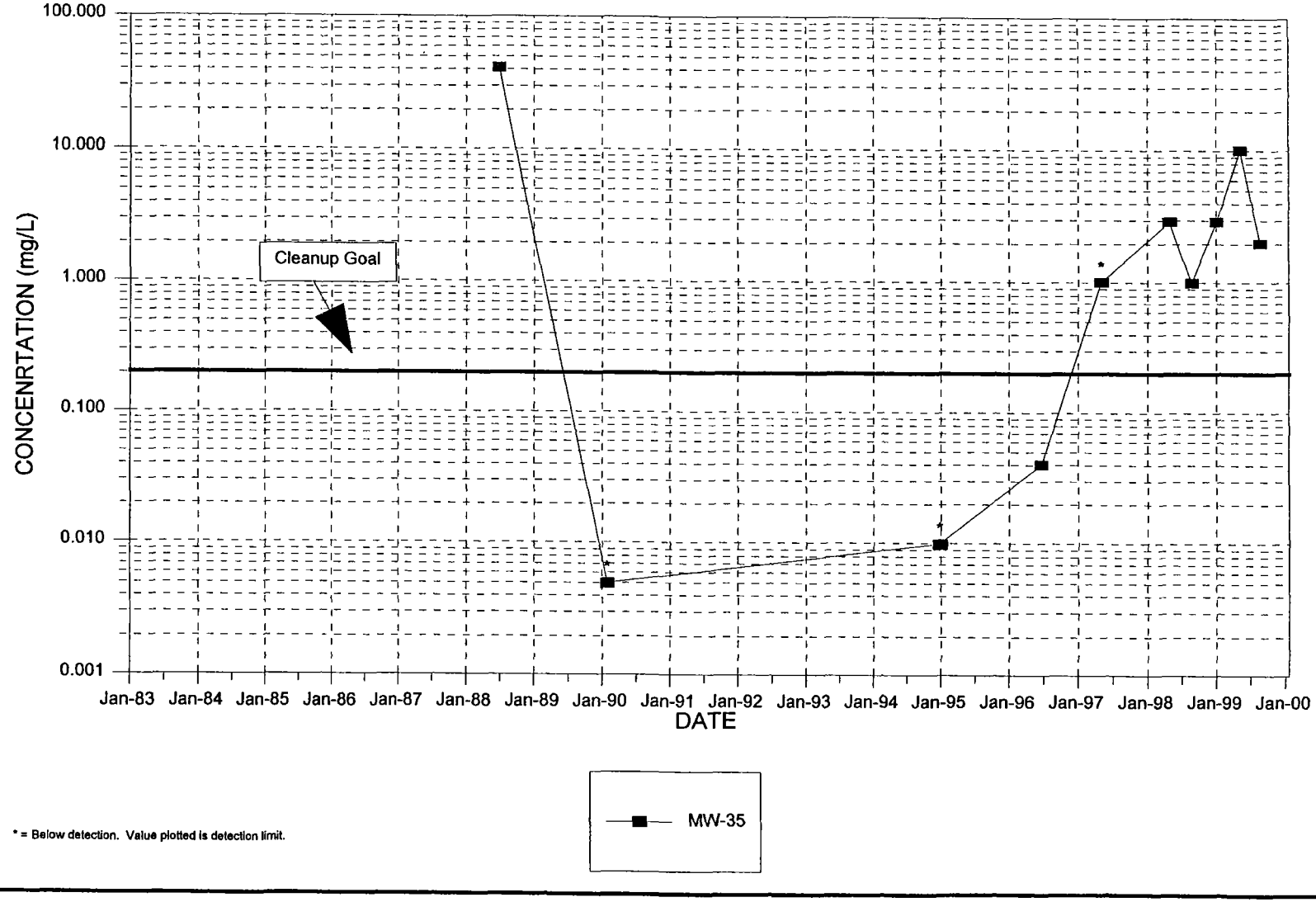
* = Below detection. Value plotted is detection limit.


AMENABLE CYANIDE VS. TIME
MW-28
100.000
10.000
1.000
0.100
0.010
0.001
CONCENRTATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-28
* = Below detection. Value plotted is detection limit.

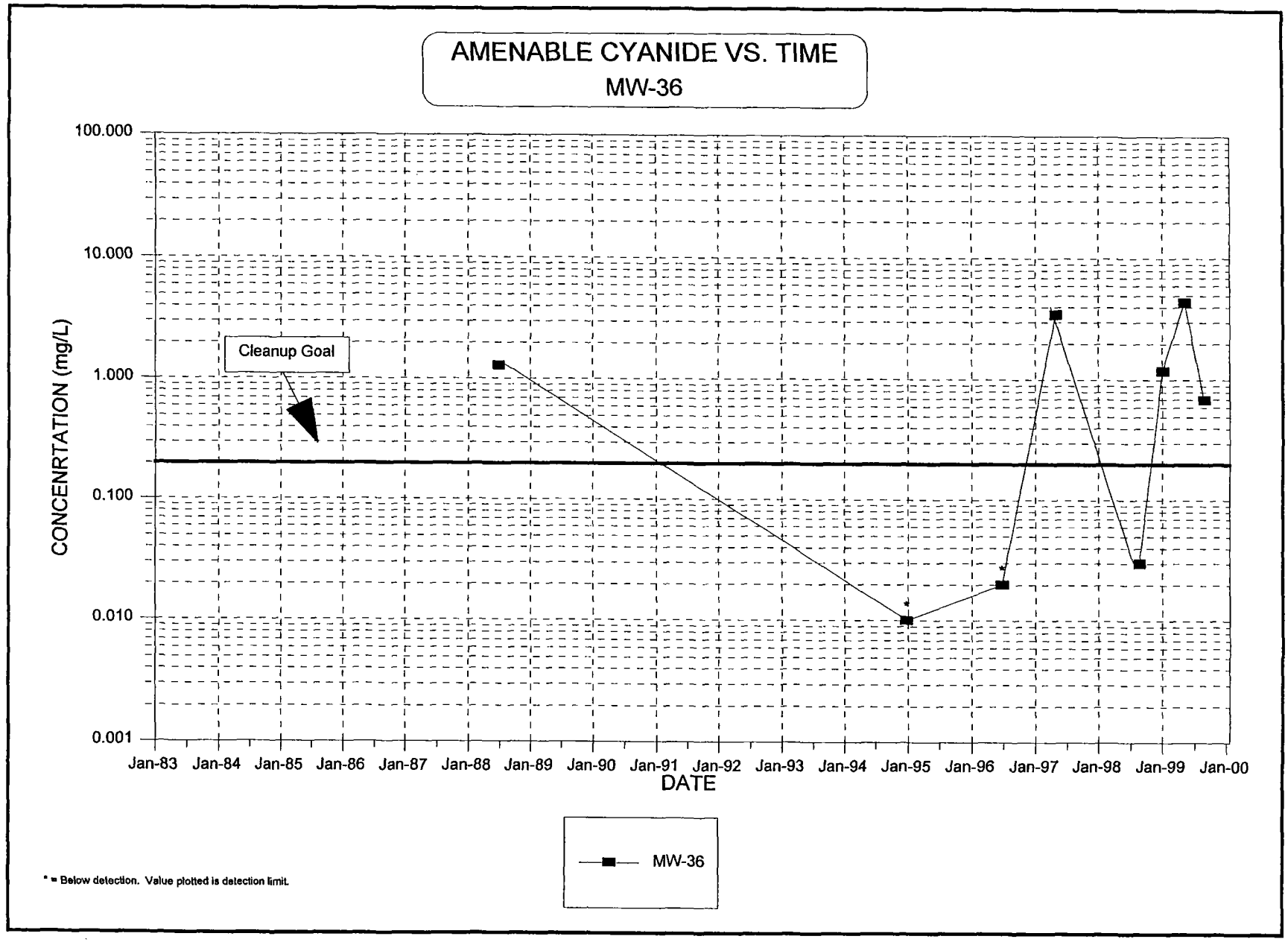

AMENABLE CYANIDE VS. TIME
MW-31
100.000
10.000
1.000
0.100
0.010
0.001
CONCENRTATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-31
* = Below detection. Value plotted is detection limit.

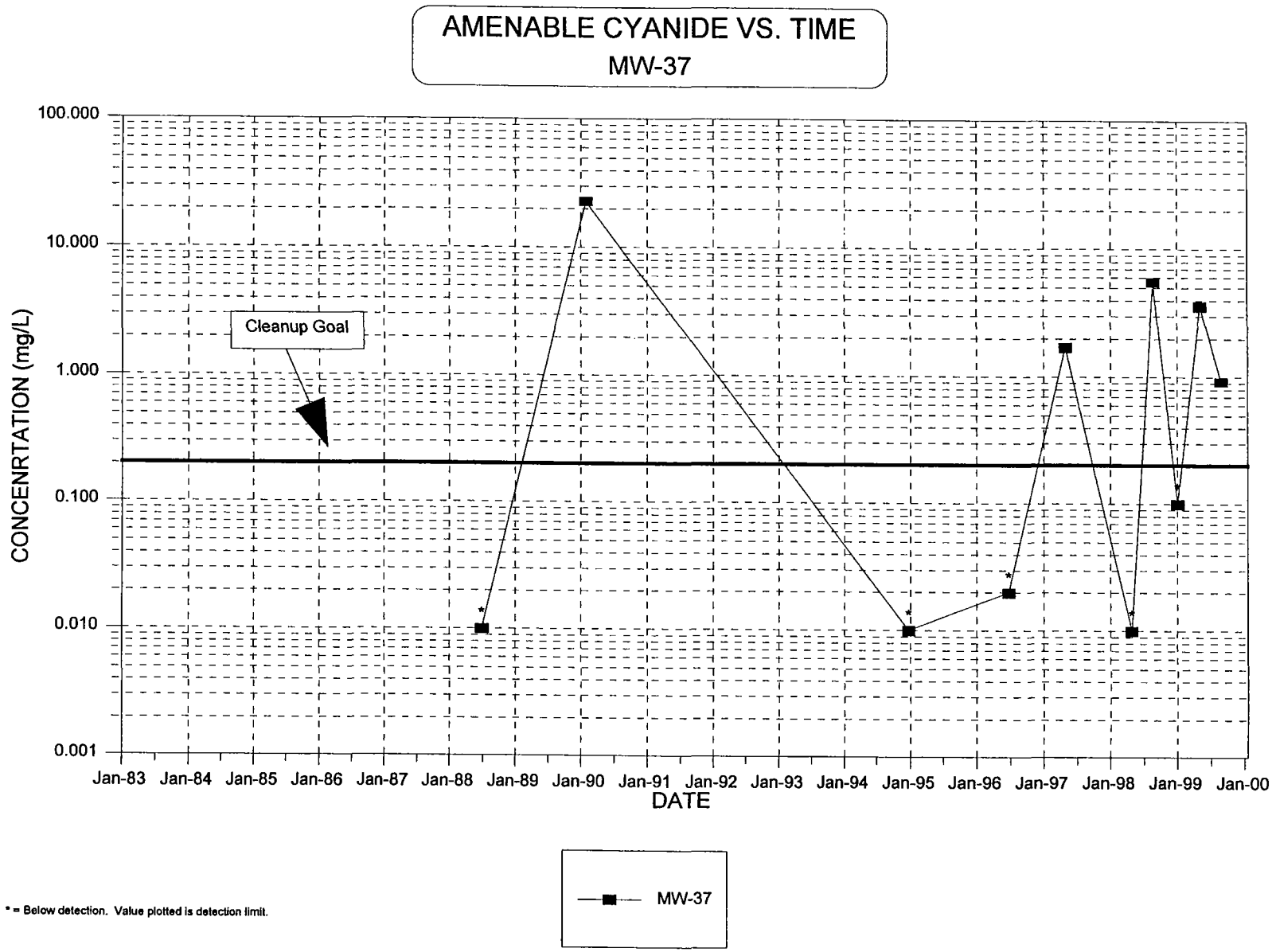


* = Below detection. Value plotted is detection limit.



* = Below detection. Value plotted is detection limit.

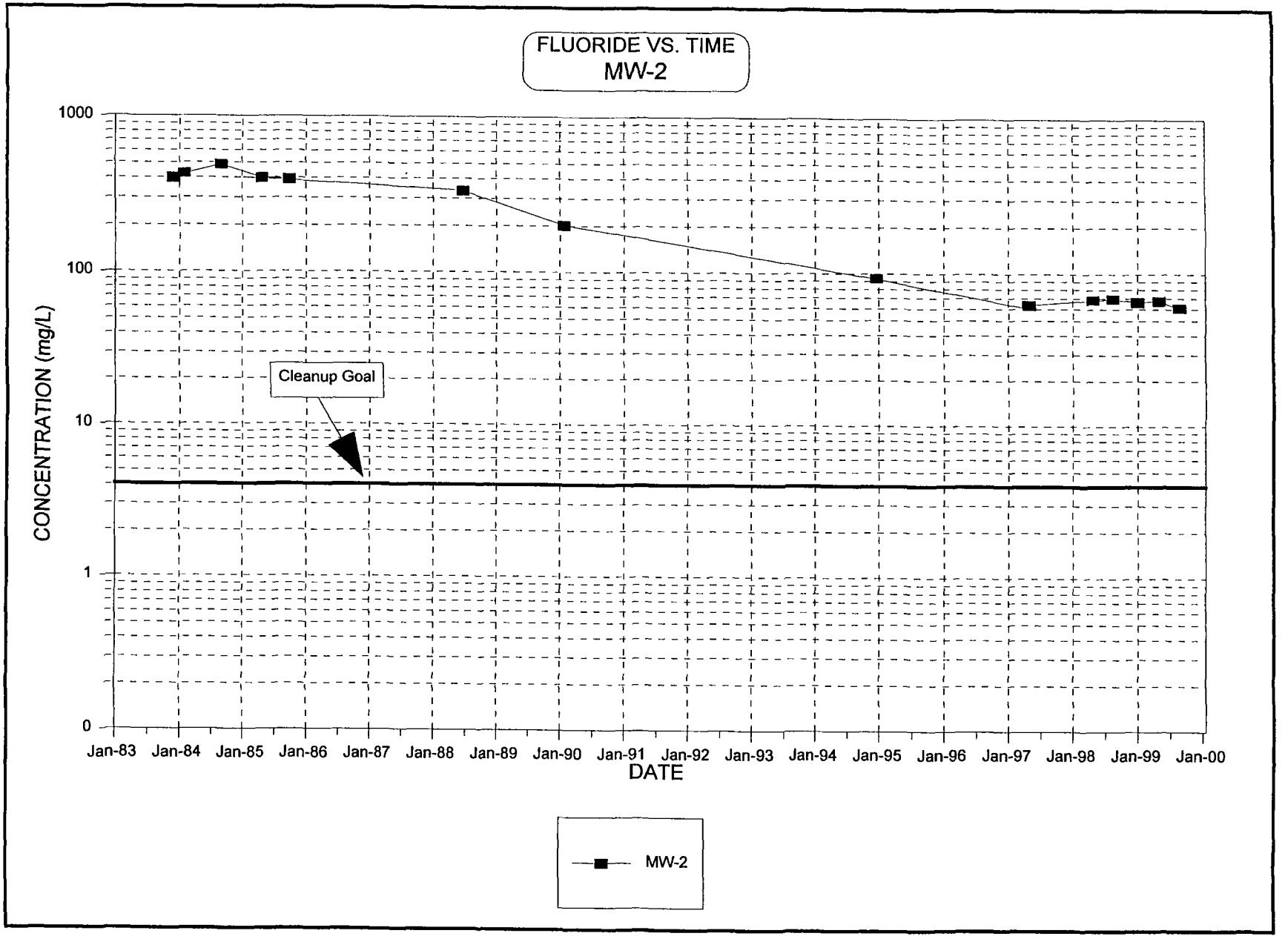

AMENABLE CYANIDE VS. TIME
MW-36
100.000
10.000
1.000
0.100
0.010
0.001
CONCENRTATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-36
* = Below detection. Value plotted is detection limit.

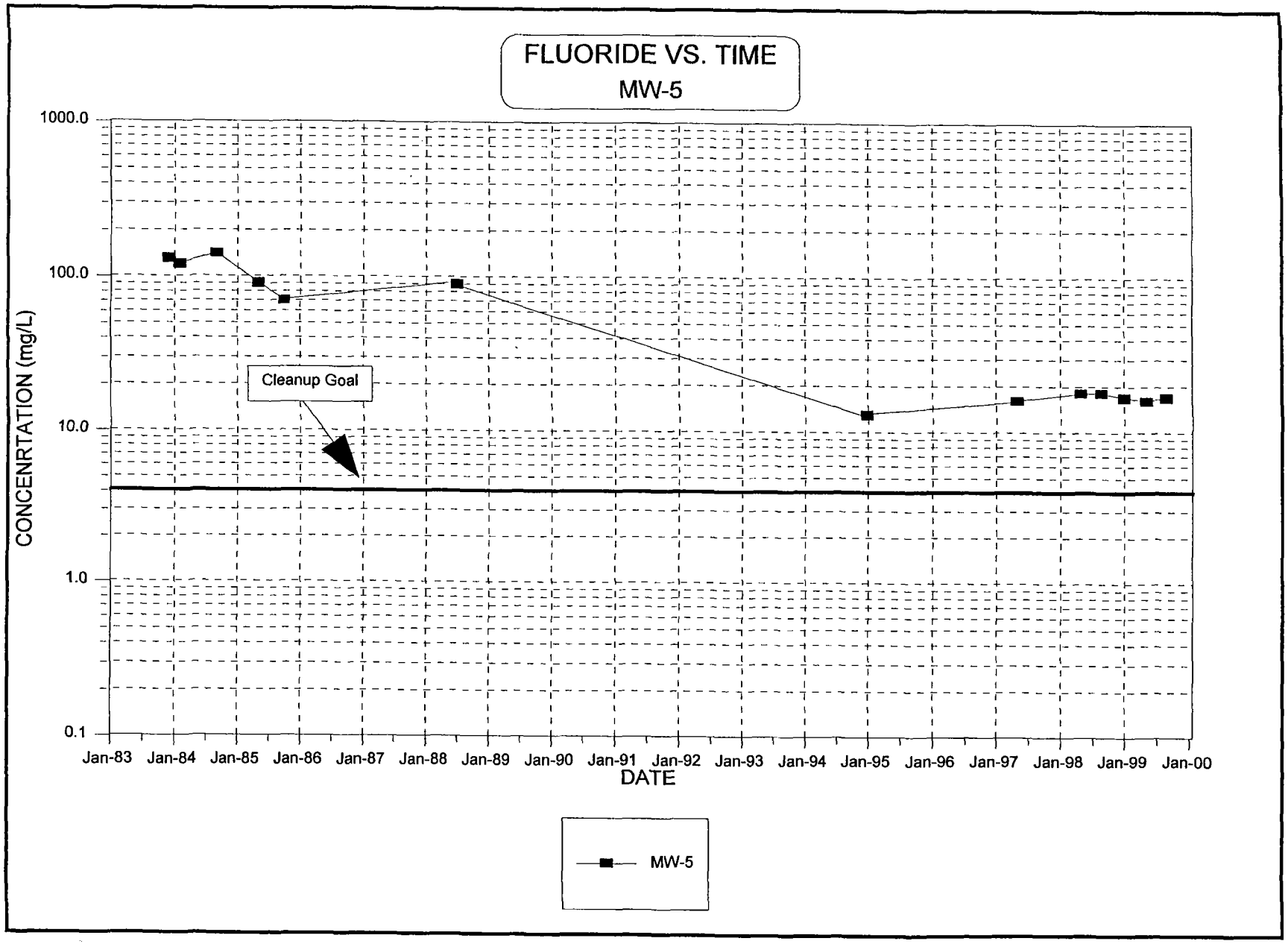


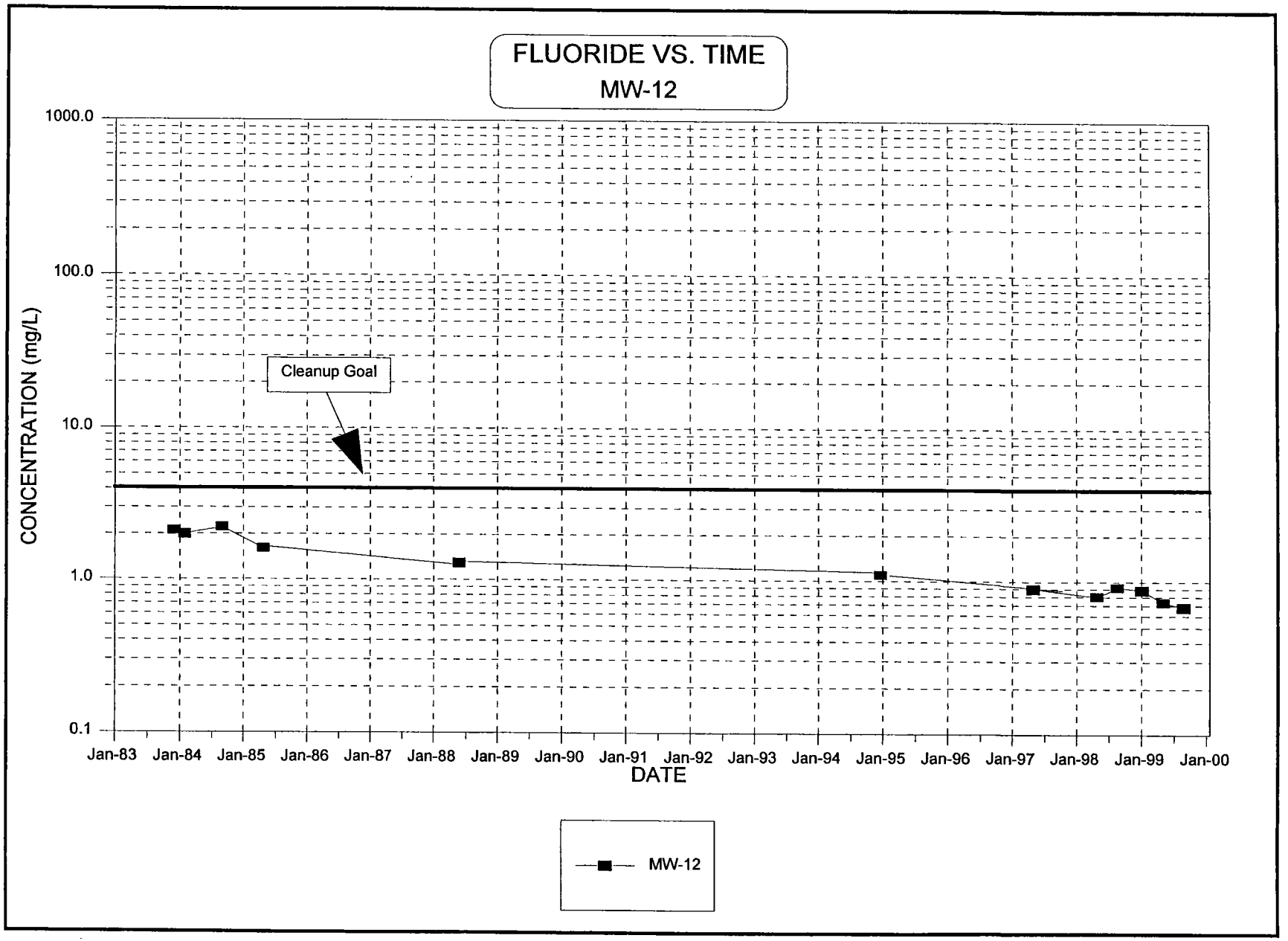
* = Below detection. Value plotted is detection limit.

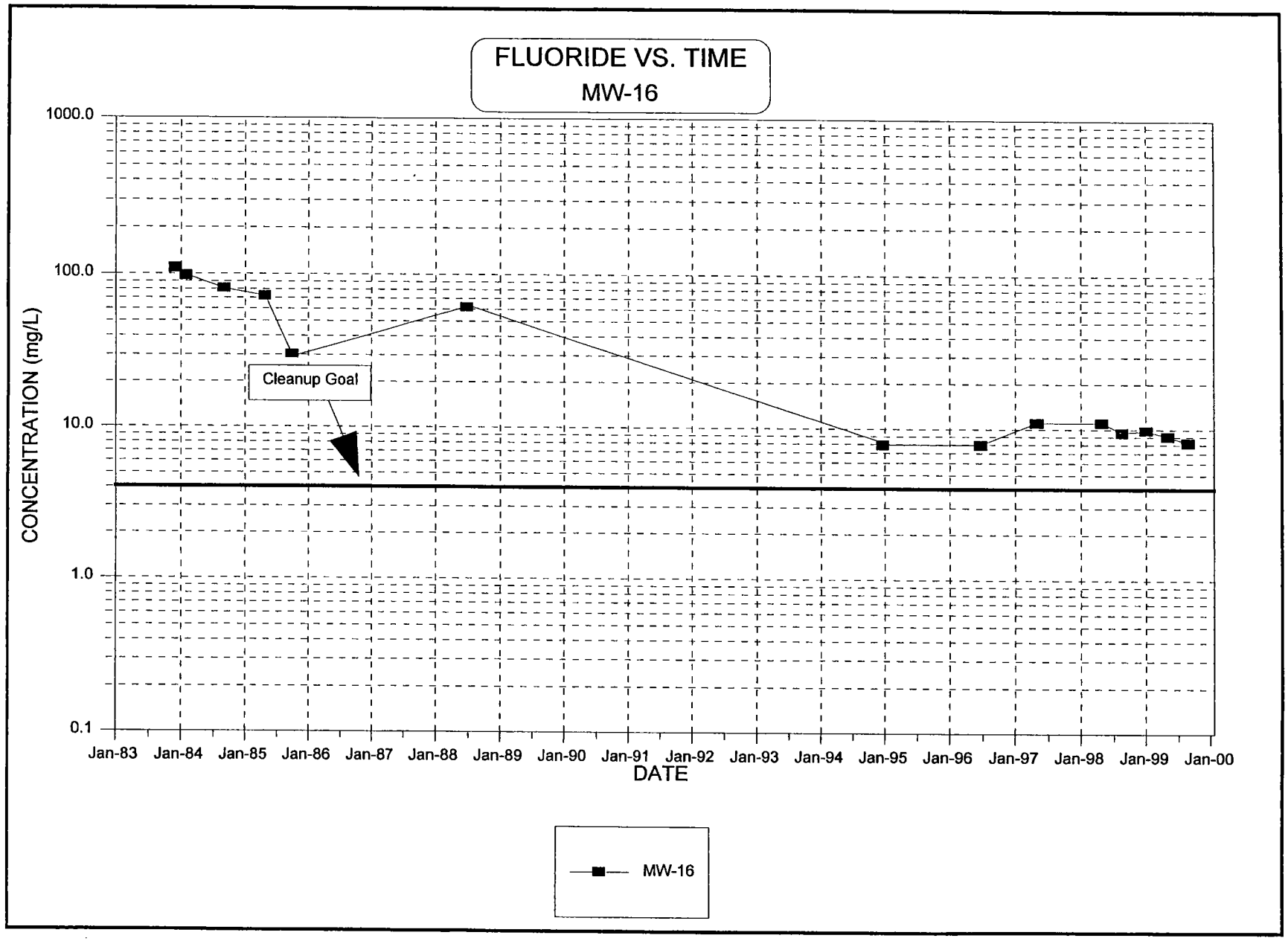
APPENDIX D-2

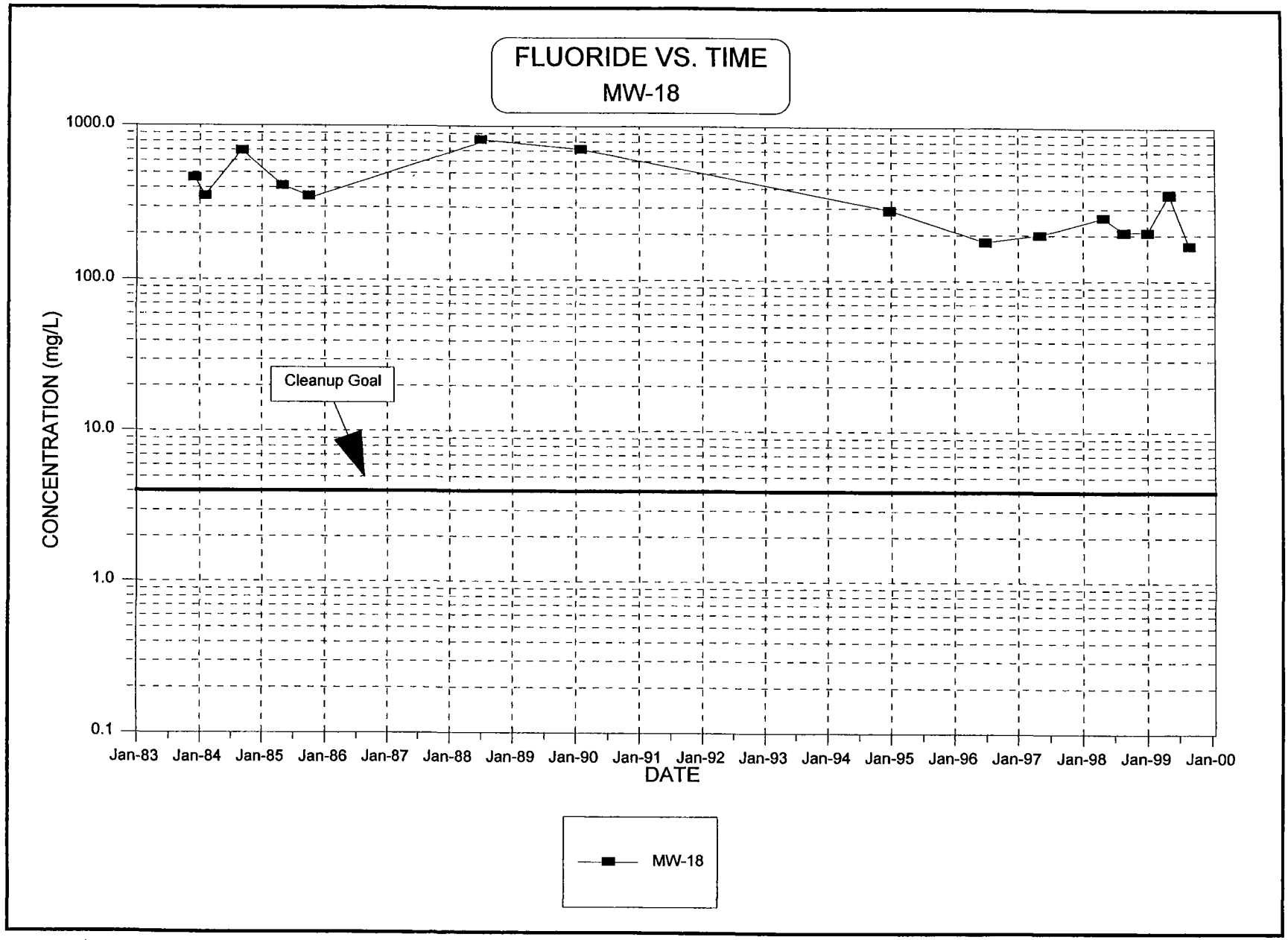
FLUORIDE

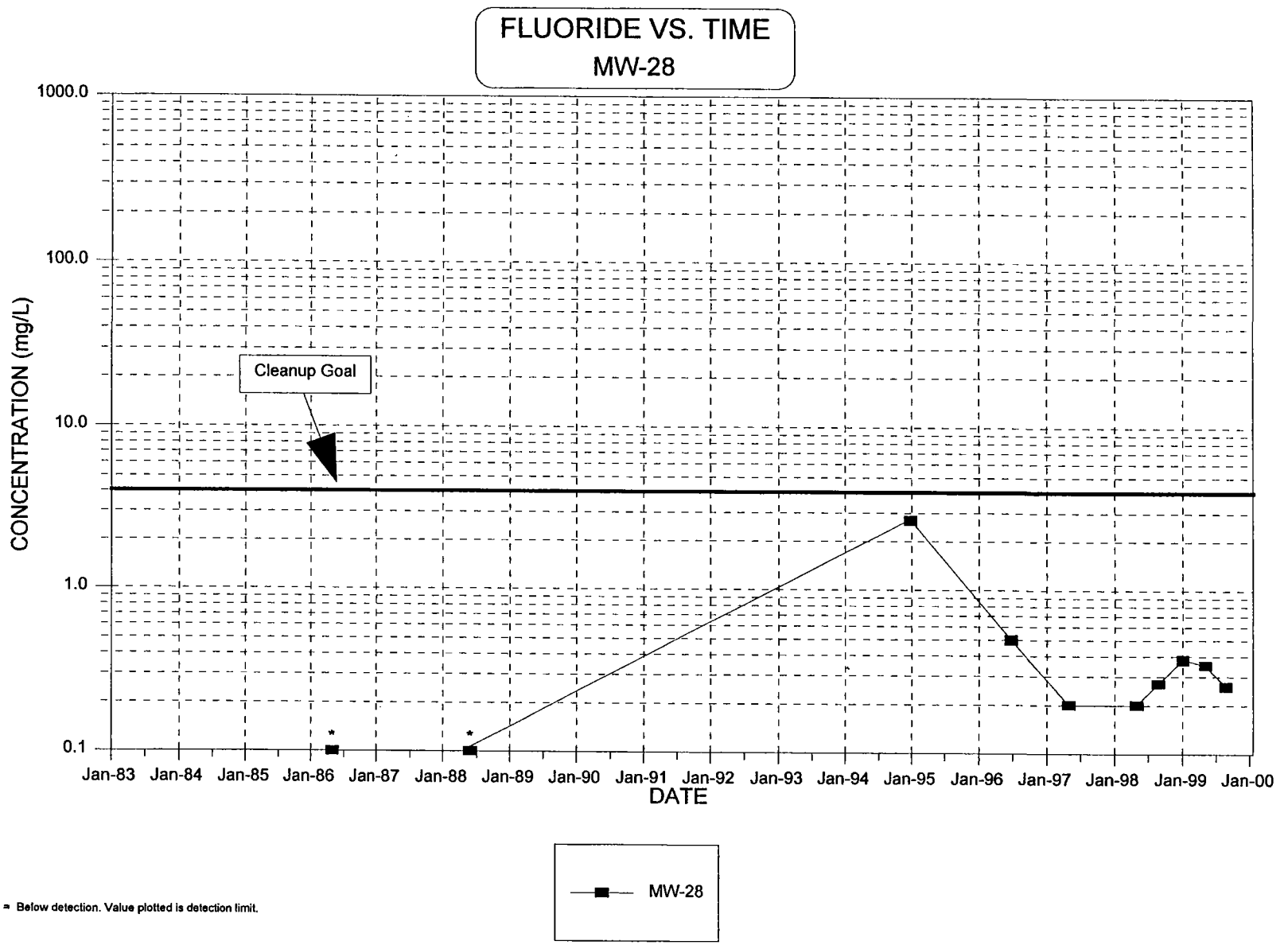

FLUORIDE VS. TIME
MW-2
CONCENTRATION (mg/L)
1000
100
10
1
0
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-2


FLUORIDE VS. TIME
MW-5
1000.0
100.0
10.0
1.0
0.1
CONCENRTATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-5

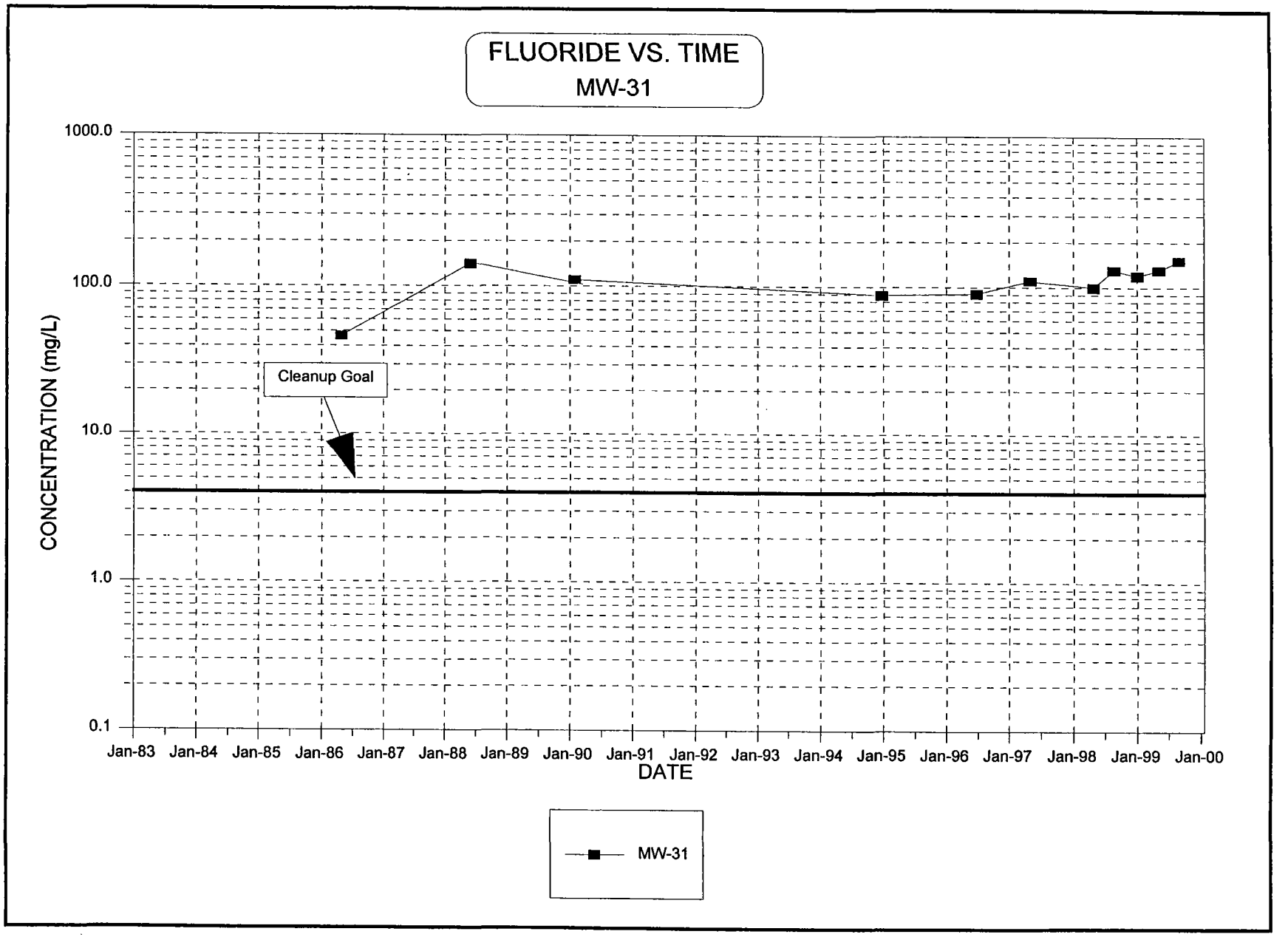

FLUORIDE VS. TIME
MW-12
CONCENTRATION (mg/L)
1000.0
100.0
10.0
1.0
0.1
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-12

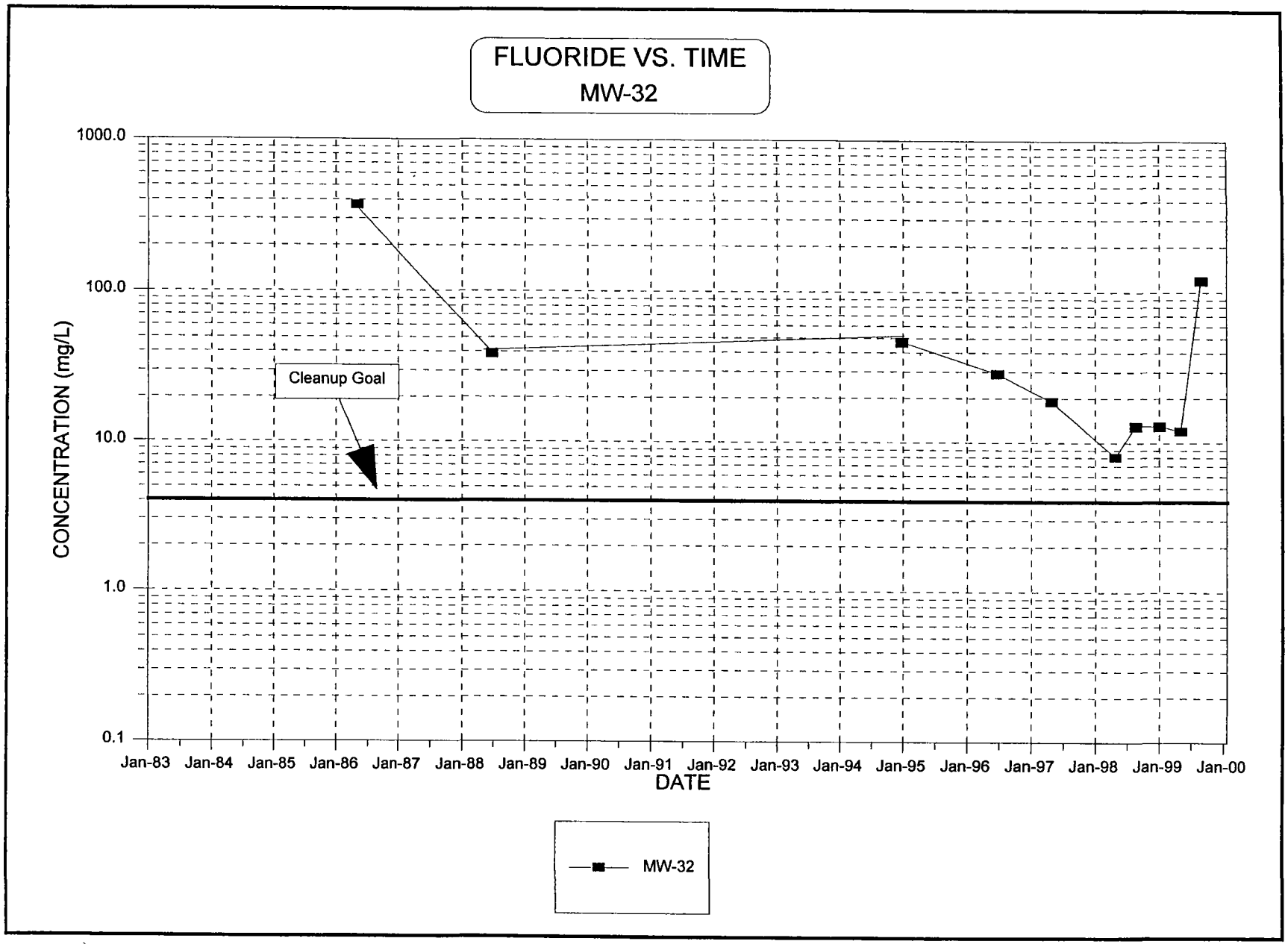

FLUORIDE VS. TIME
MW-16
CONCENTRATION (mg/L)
1000.0
100.0
10.0
1.0
0.1
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-16

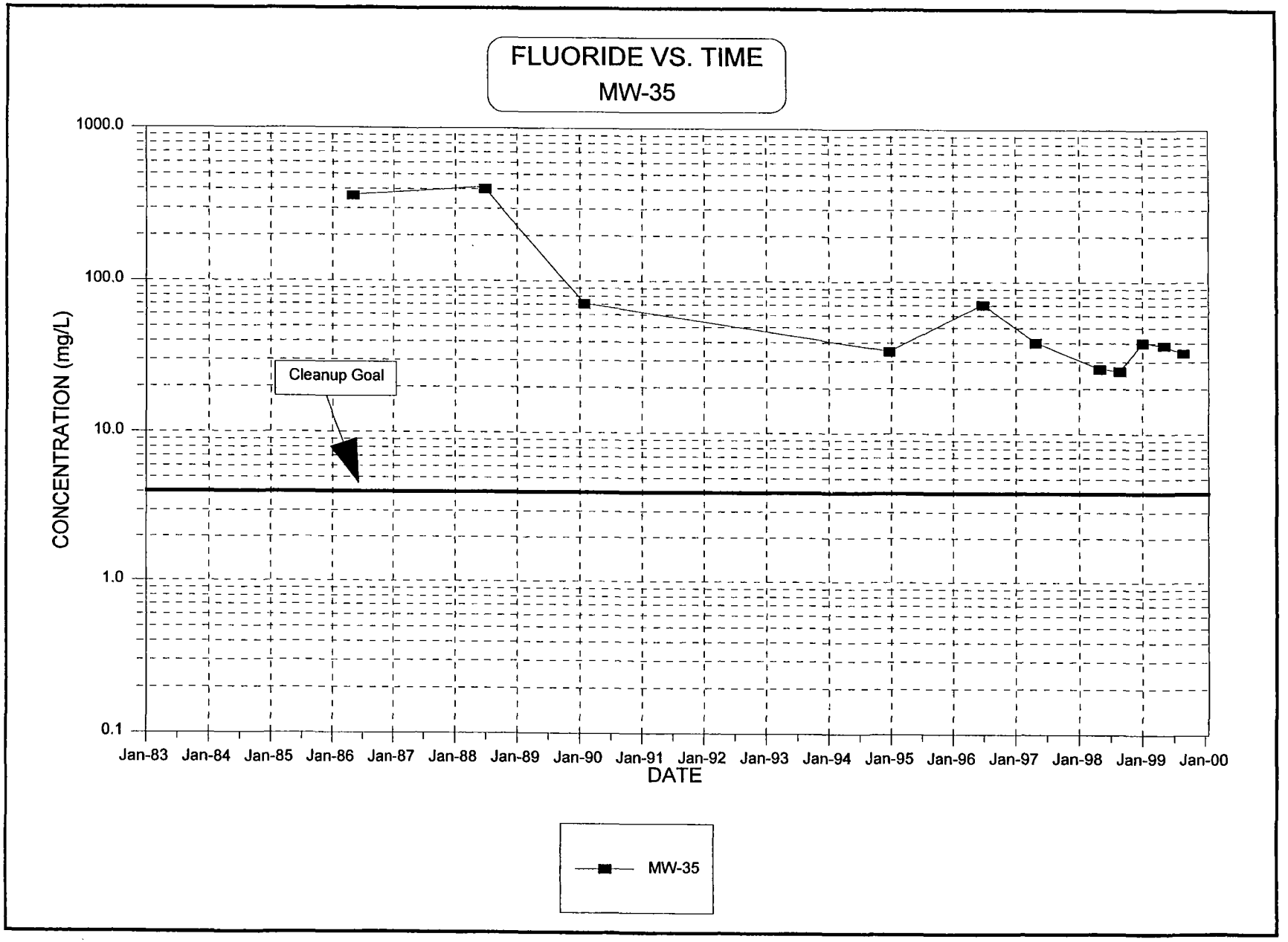

FLUORIDE VS. TIME
MW-18
1000.0
100.0
10.0
1.0
0.1
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-18

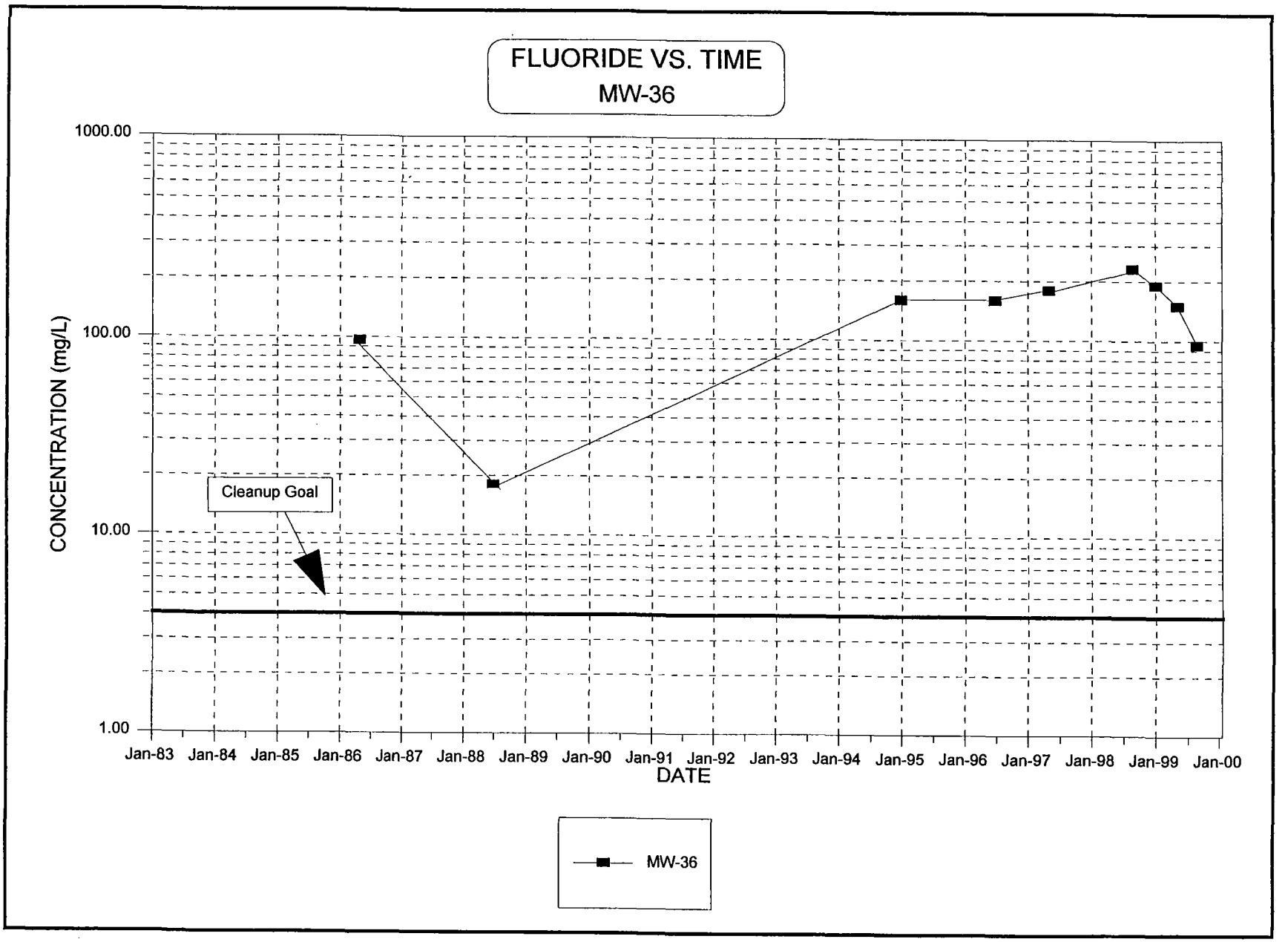


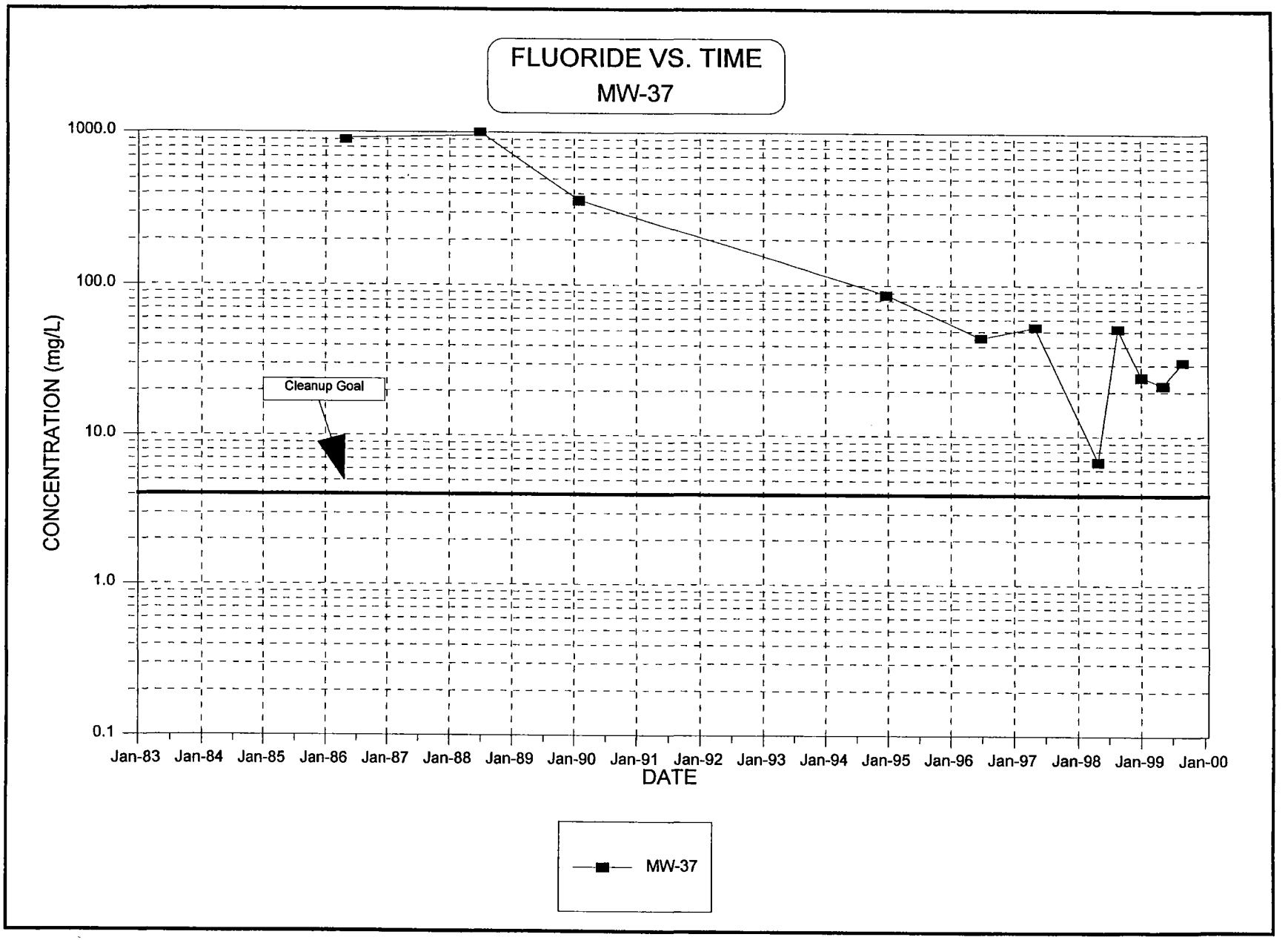
* = Below detection. Value plotted is detection limit.


FLUORIDE VS. TIME
MW-31
1000.0
100.0
10.0
1.0
0.1
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-31


FLUORIDE VS. TIME
MW-32
1000.0
100.0
10.0
1.0
0.1
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-32

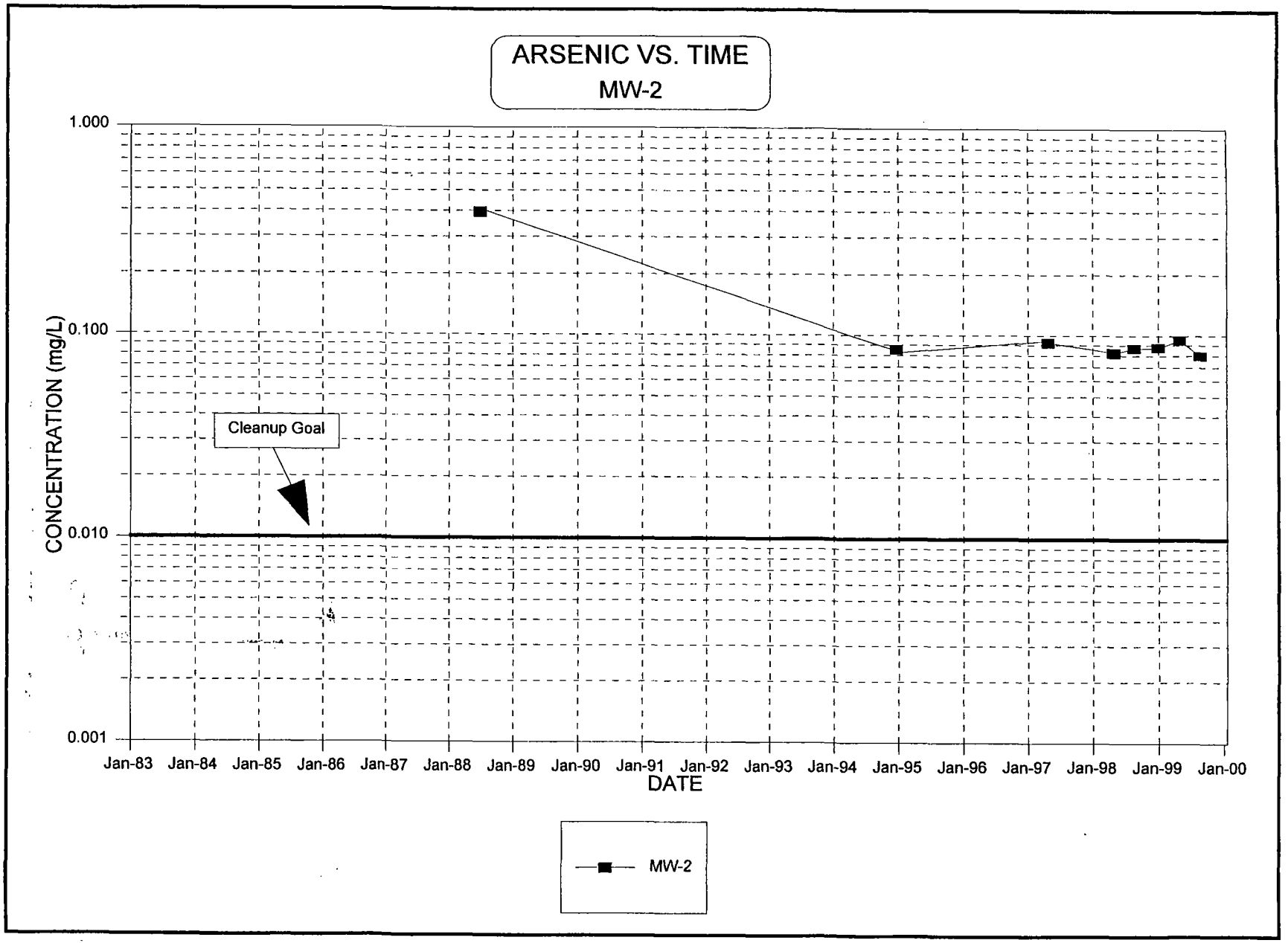

FLUORIDE VS. TIME
MW-35
1000.0
100.0
10.0
1.0
0.1
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-35

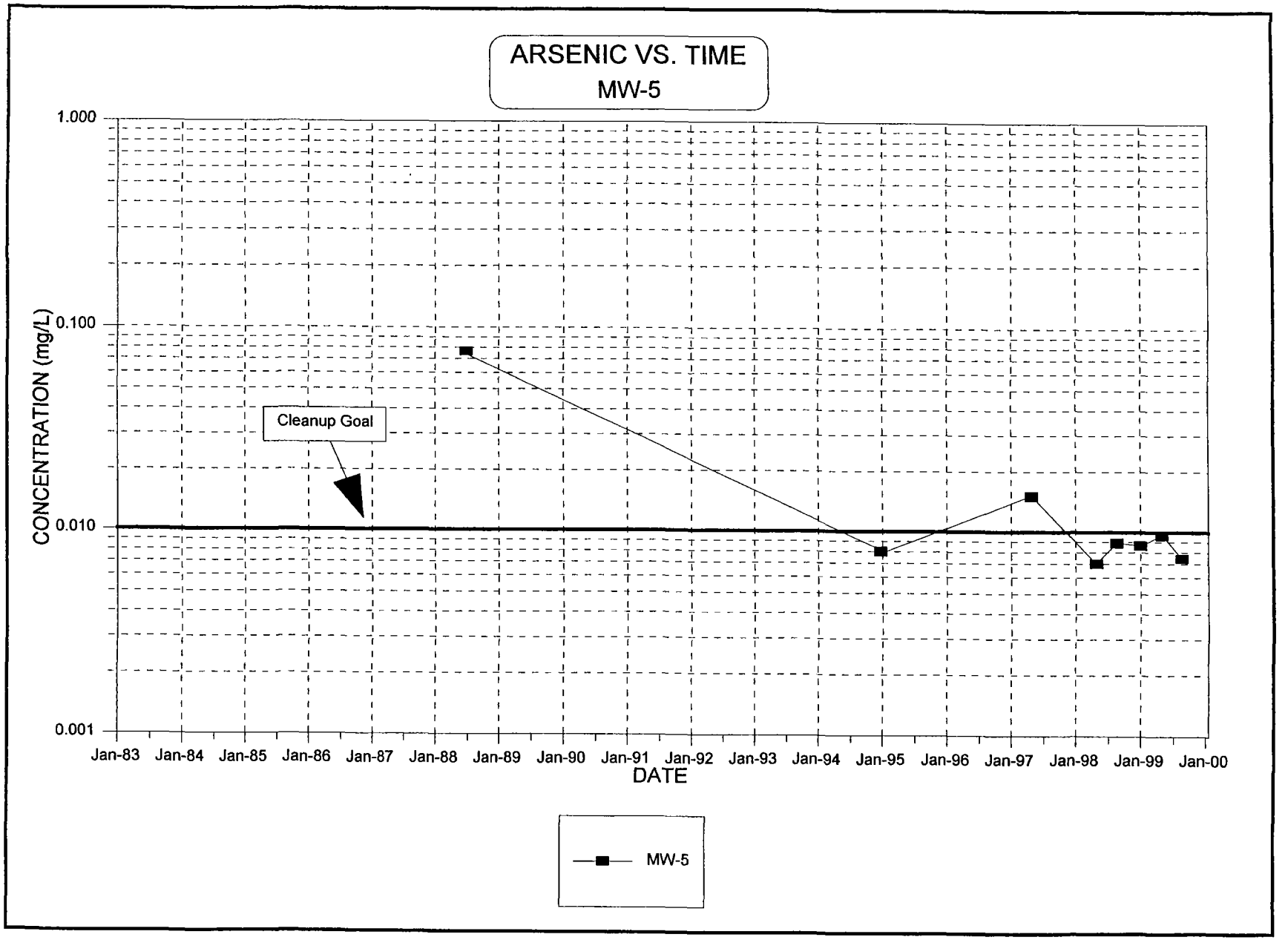

FLUORIDE VS. TIME
MW-36
1000.00
100.00
10.00
1.00
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-36

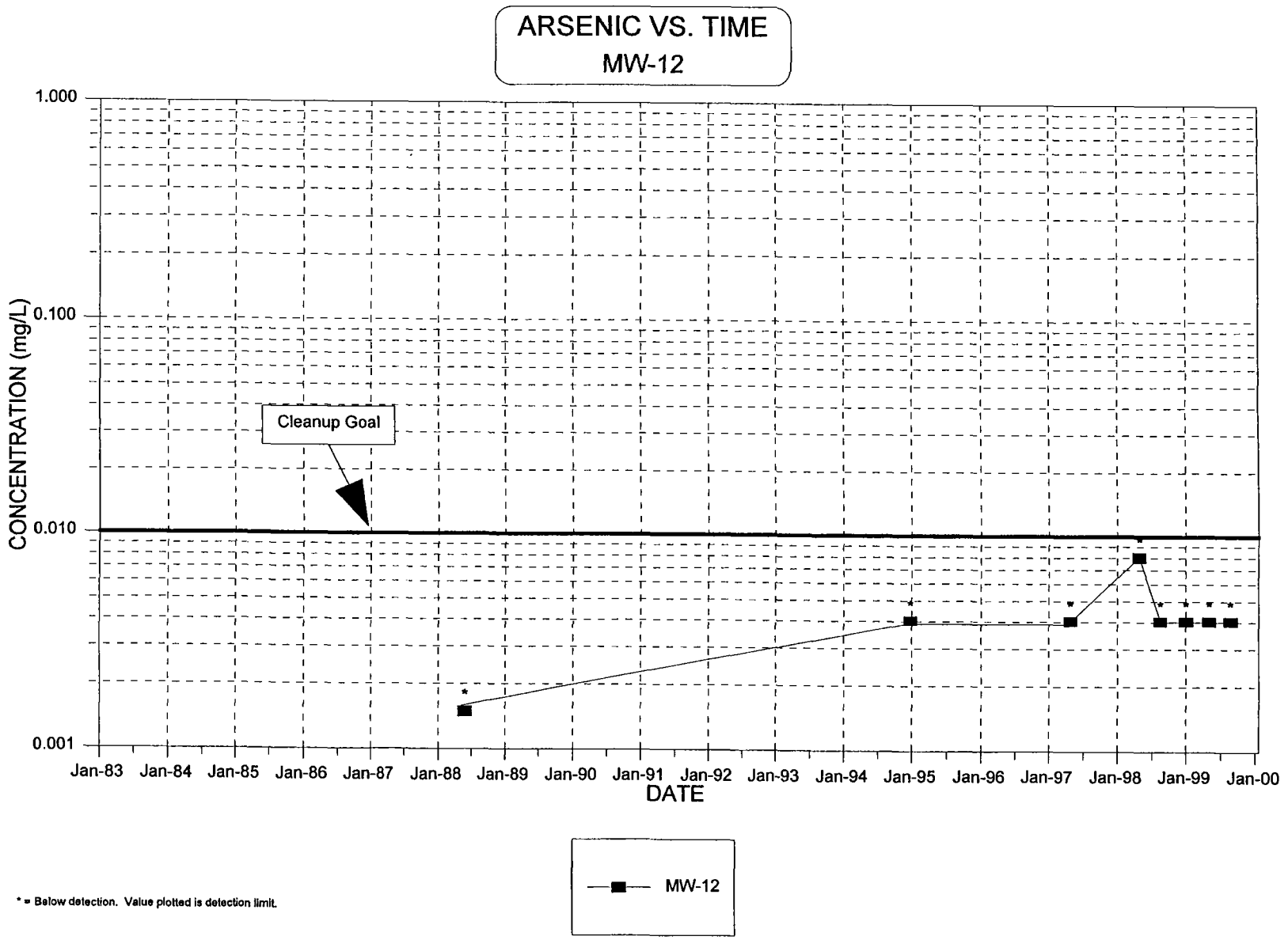

FLUORIDE VS. TIME
MW-37
1000.0
100.0
10.0
1.0
0.1
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-37

APPENDIX D-3

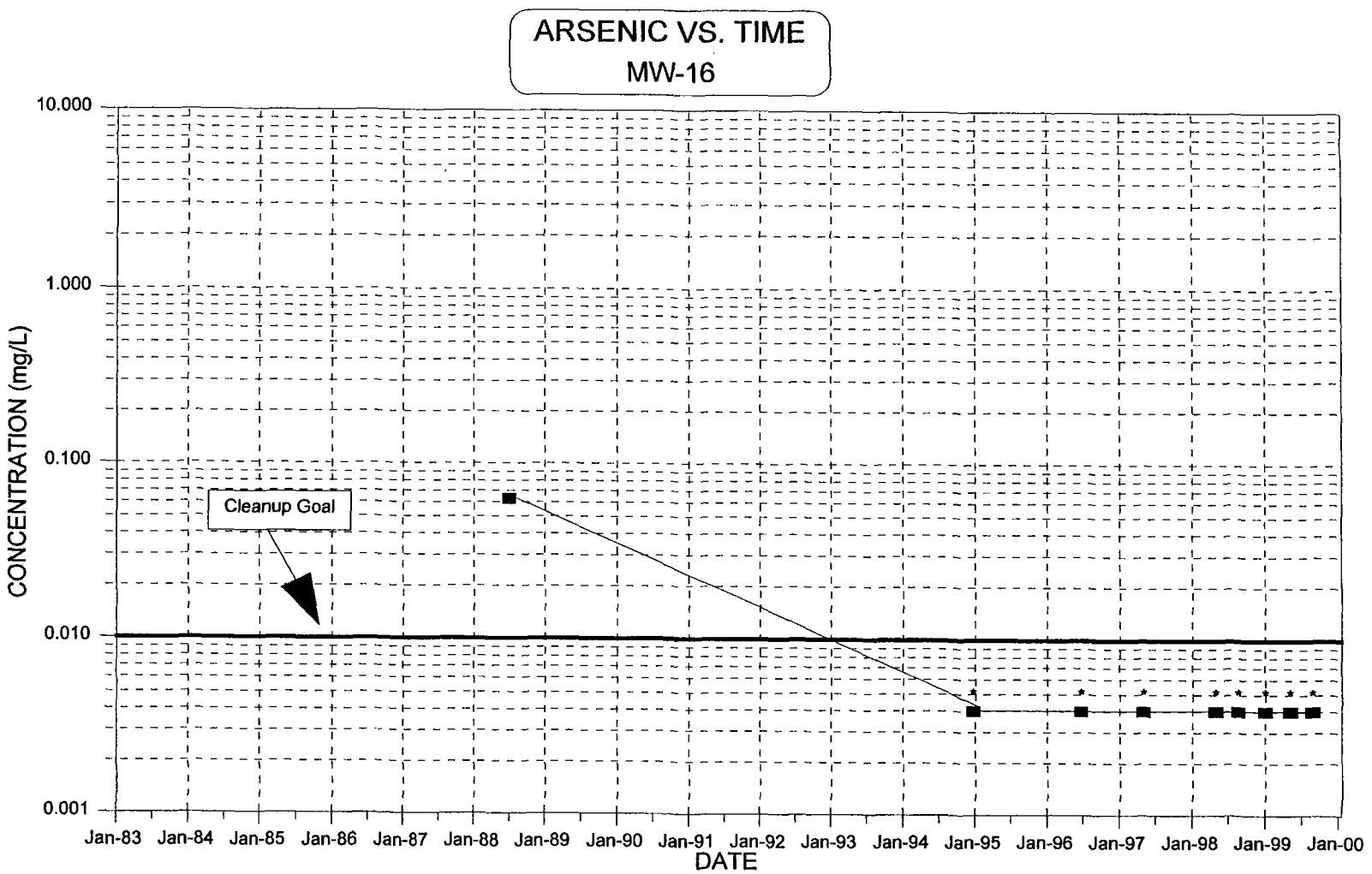
ARSENIC


ARSENIC VS. TIME
MW-2
1.000
0.100
0.010
0.001
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-2

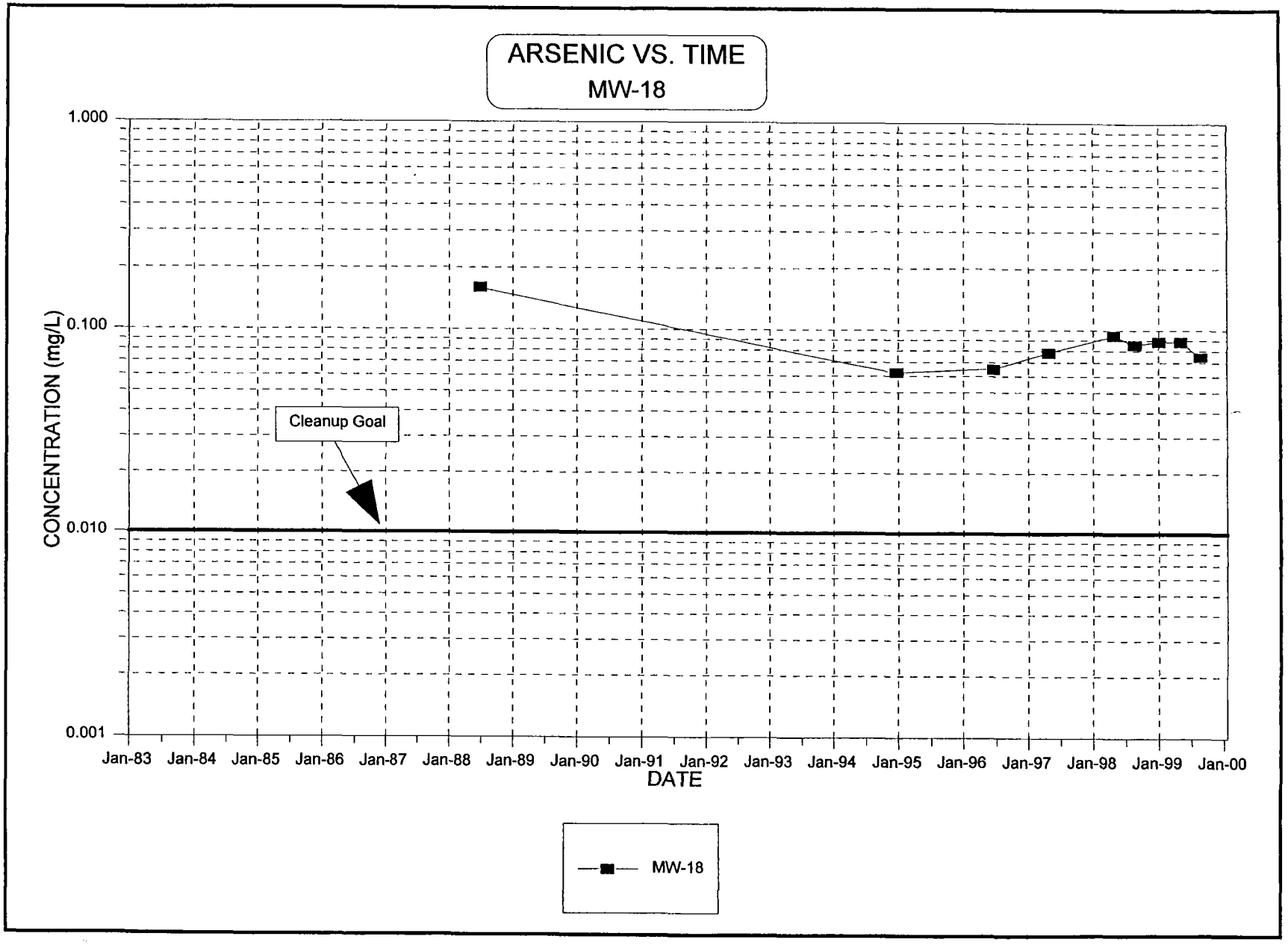

ARSENIC VS. TIME
MW-5
1.000
0.100
0.010
0.001
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-5

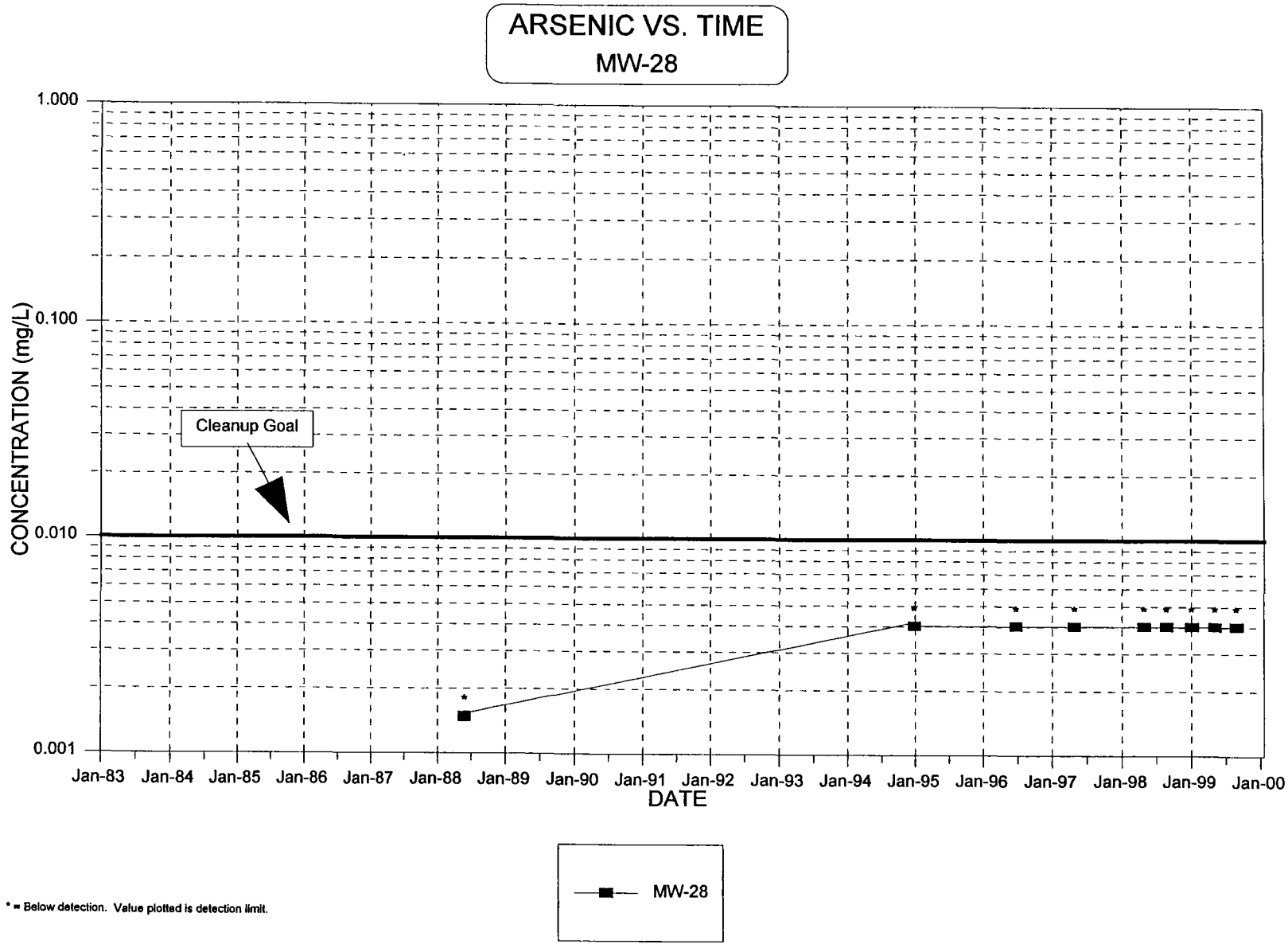


* = Below detection. Value plotted is detection limit.

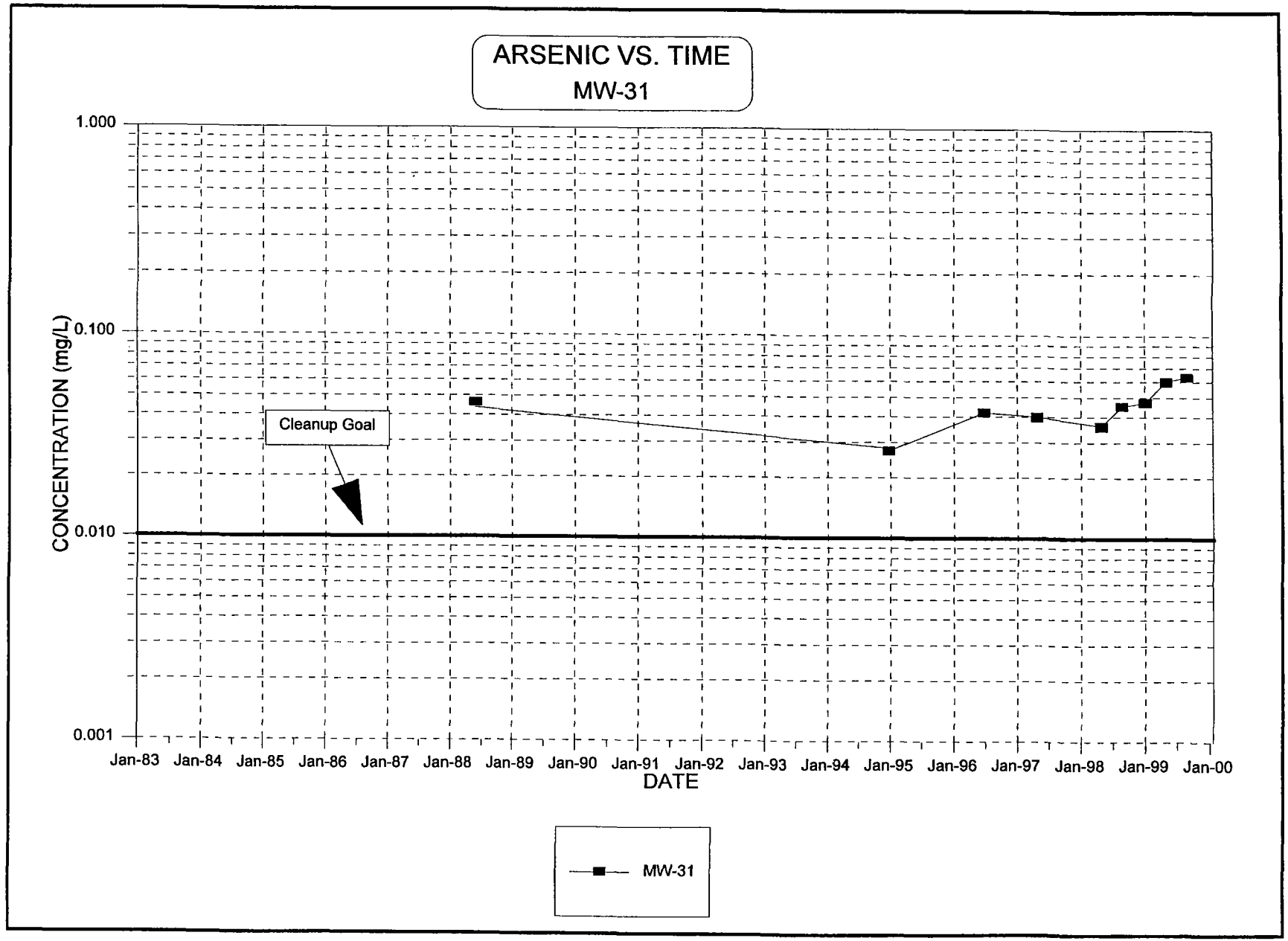


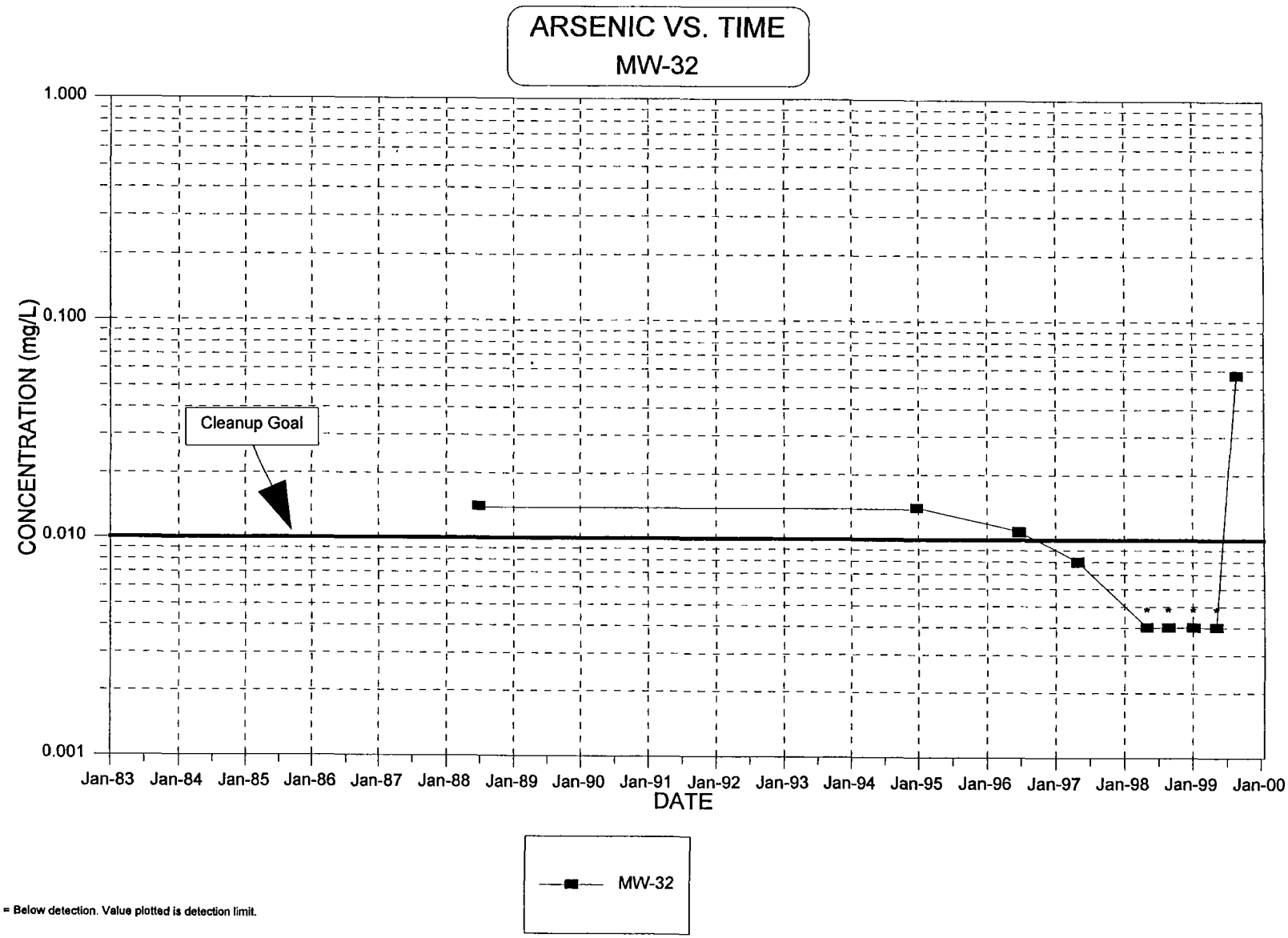
* = Below detection. Value plotted is detection limit.


ARSENIC VS. TIME
MW-18
1.000
0.100
0.010
0.001
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-18

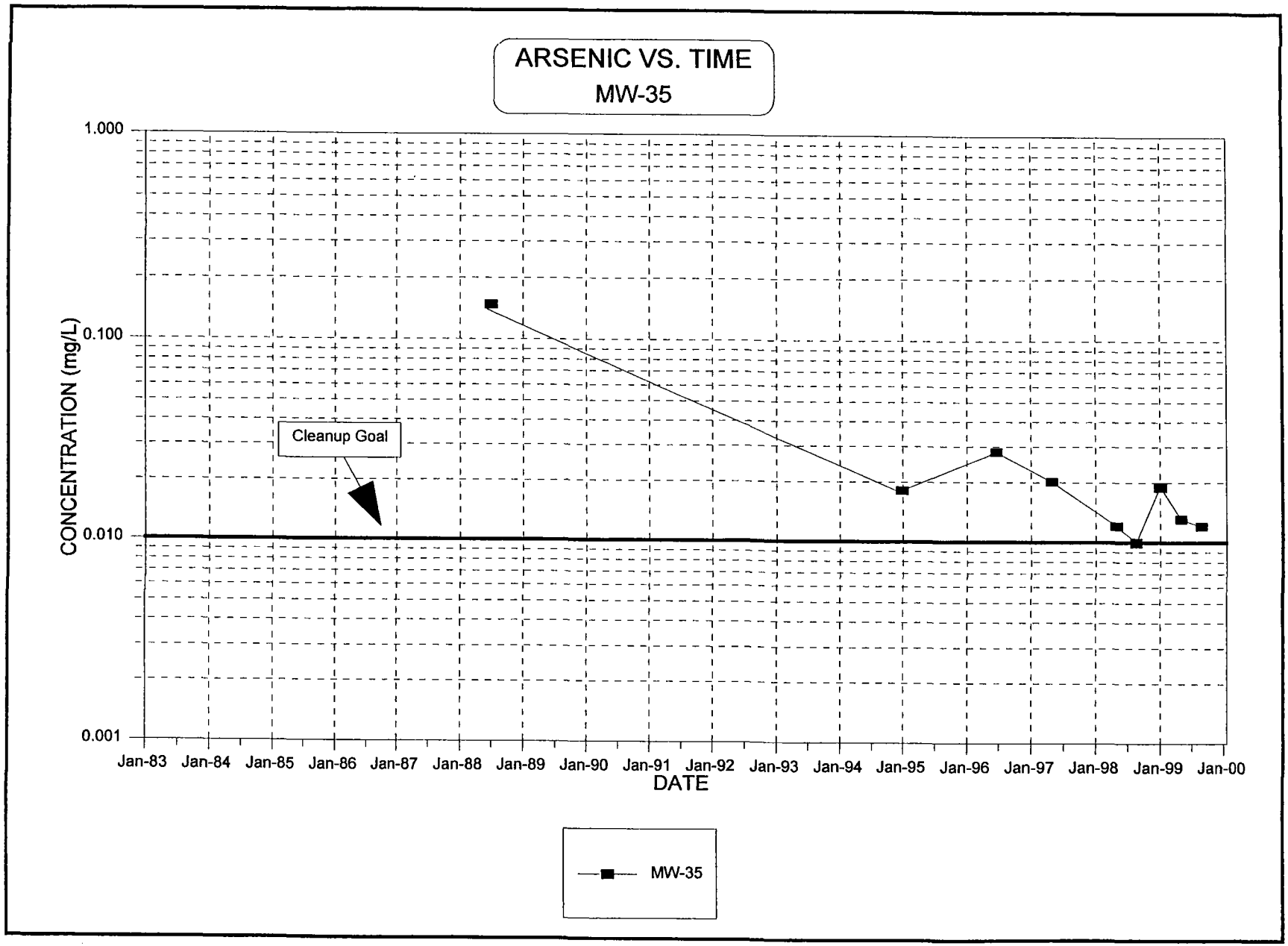


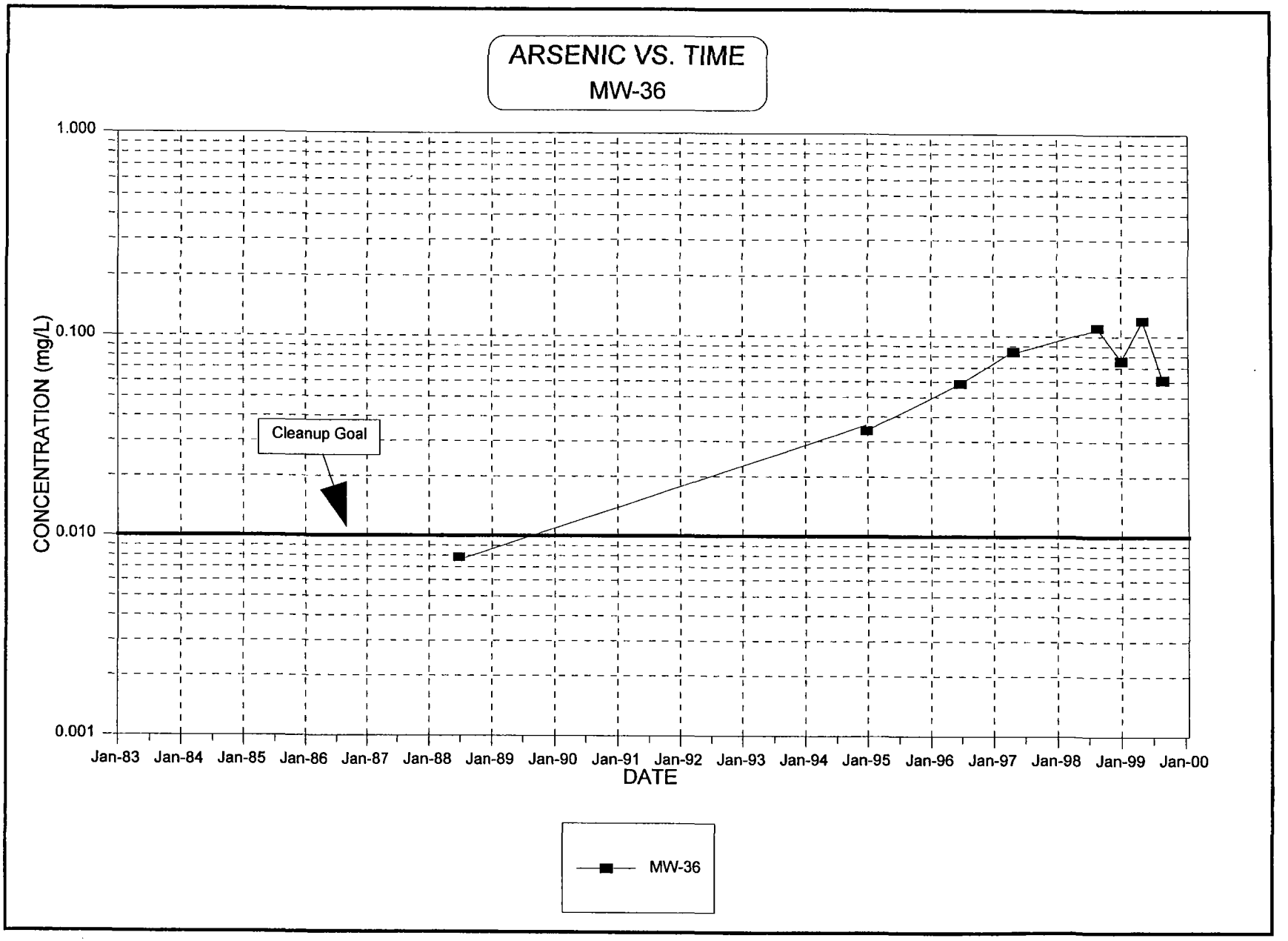
* = Below detection. Value plotted is detection limit.

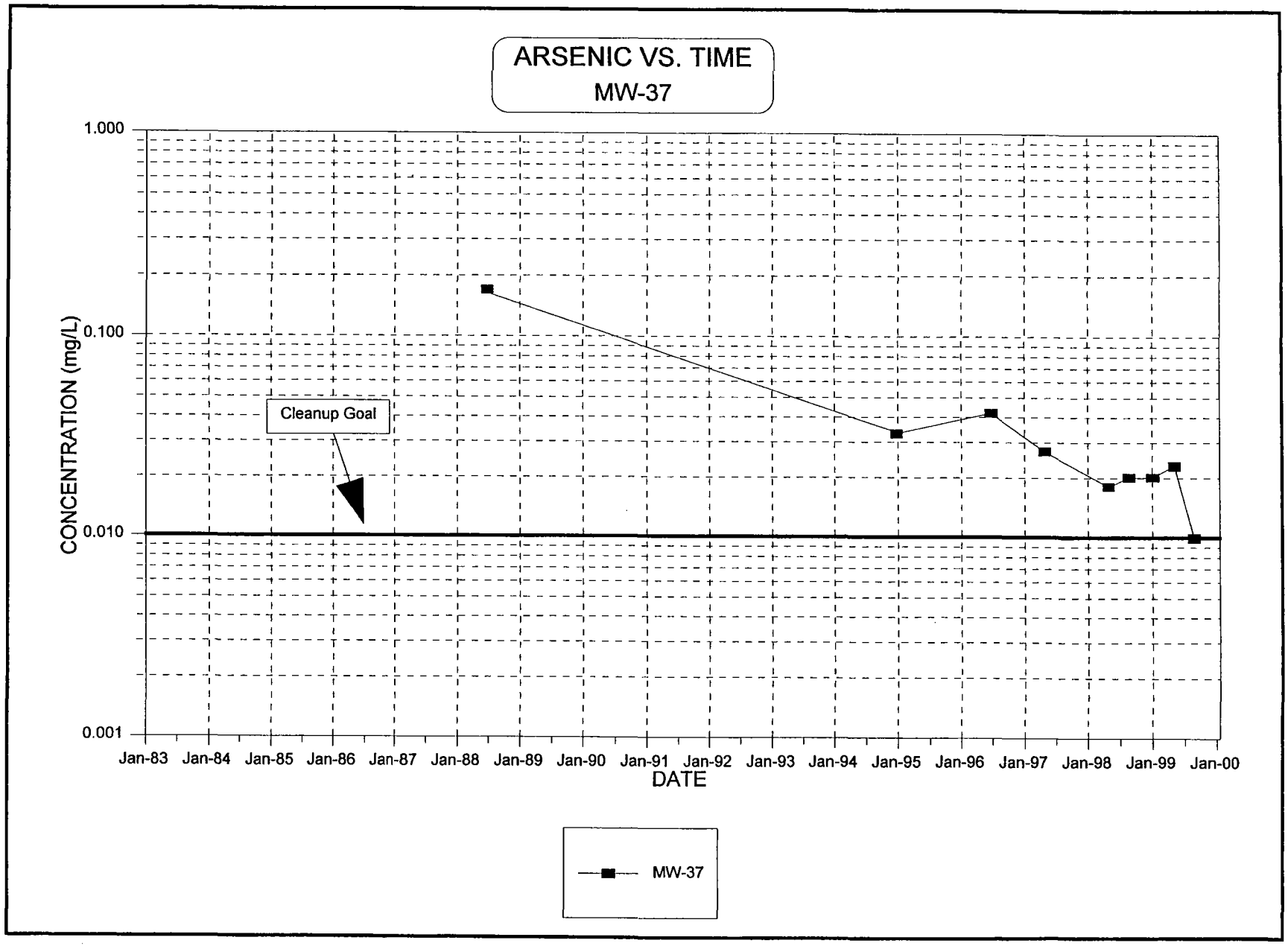

ARSENIC VS. TIME
MW-31
1.000
0.100
0.010
0.001
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-31



* = Below detection. Value plotted is detection limit.

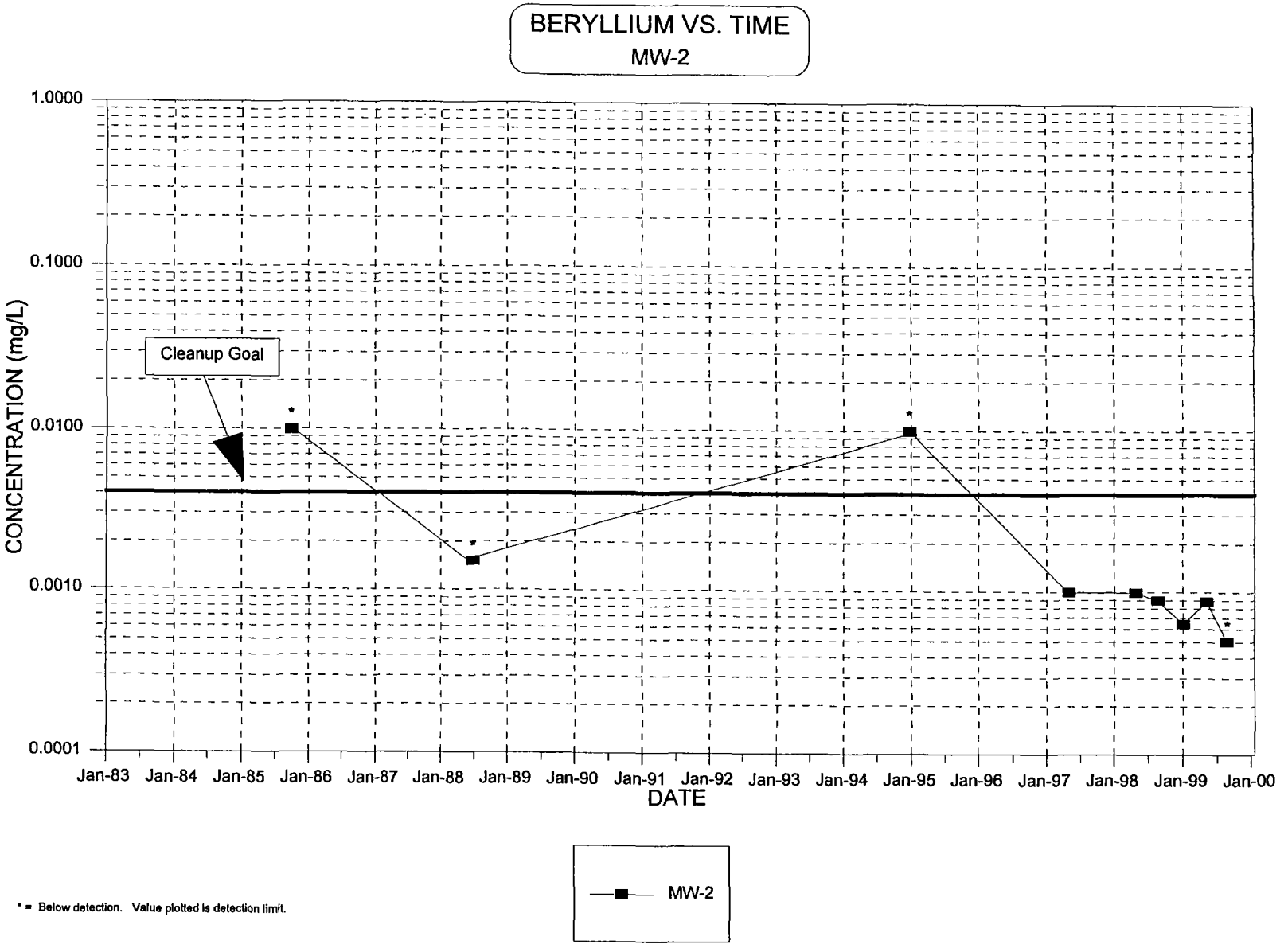

ARSENIC VS. TIME
MW-35
1.000
0.100
0.010
0.001
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-35


ARSENIC VS. TIME
MW-36
1.000
0.100
0.010
0.001
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-36

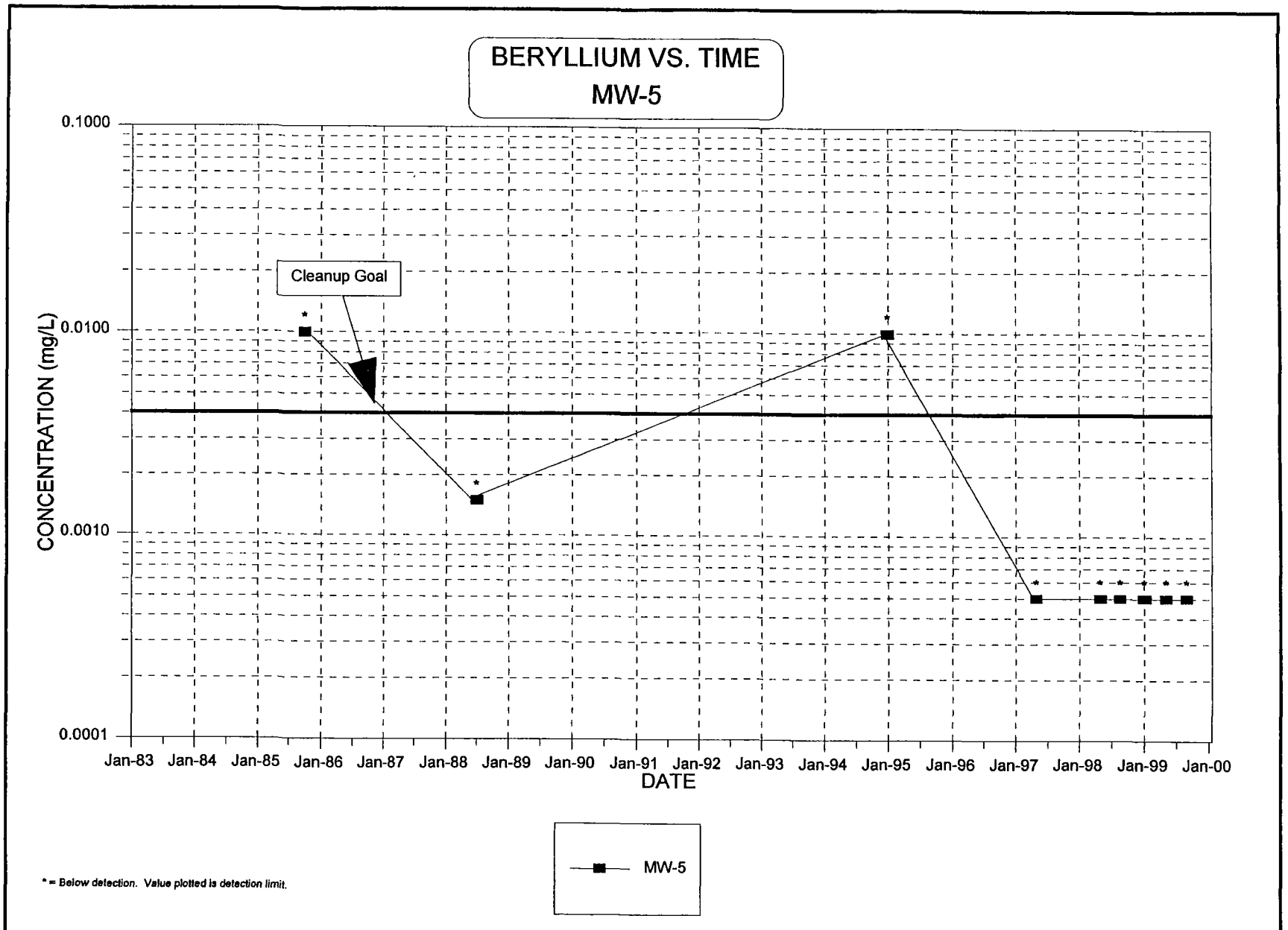

ARSENIC VS. TIME
MW-37
1.000
0.100
0.010
0.001
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-37

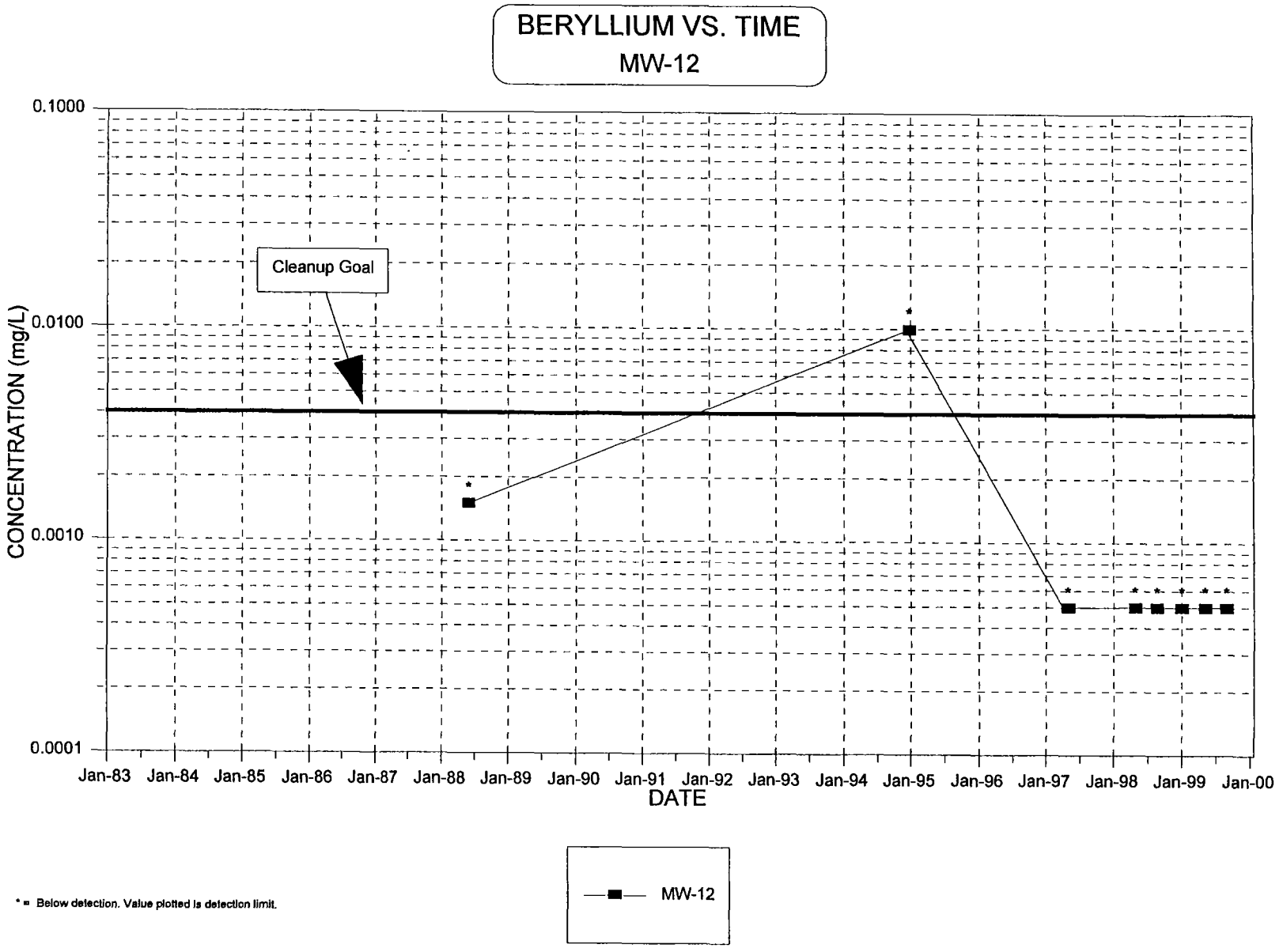
APPENDIX D-4

BERYLLIUM

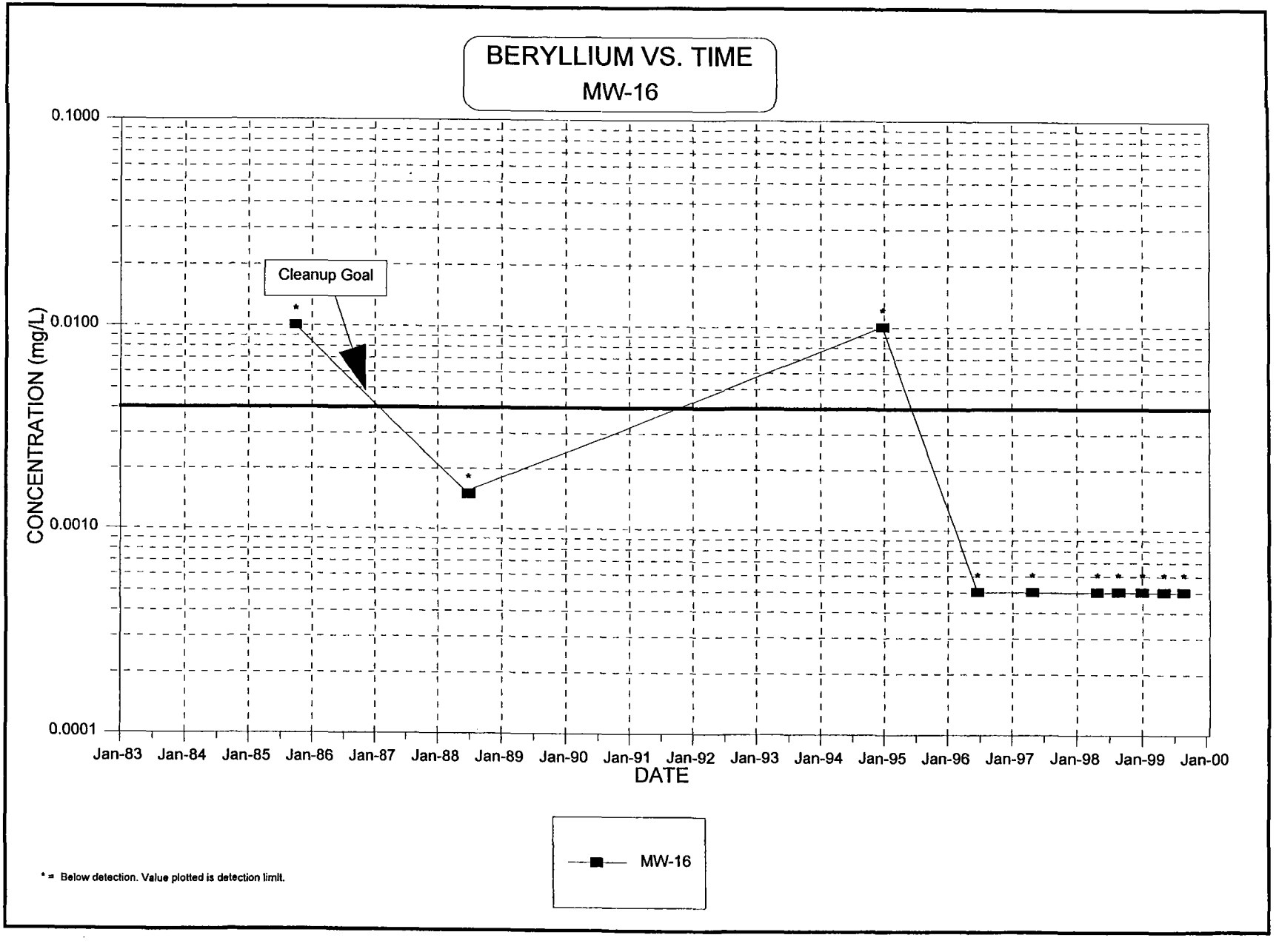


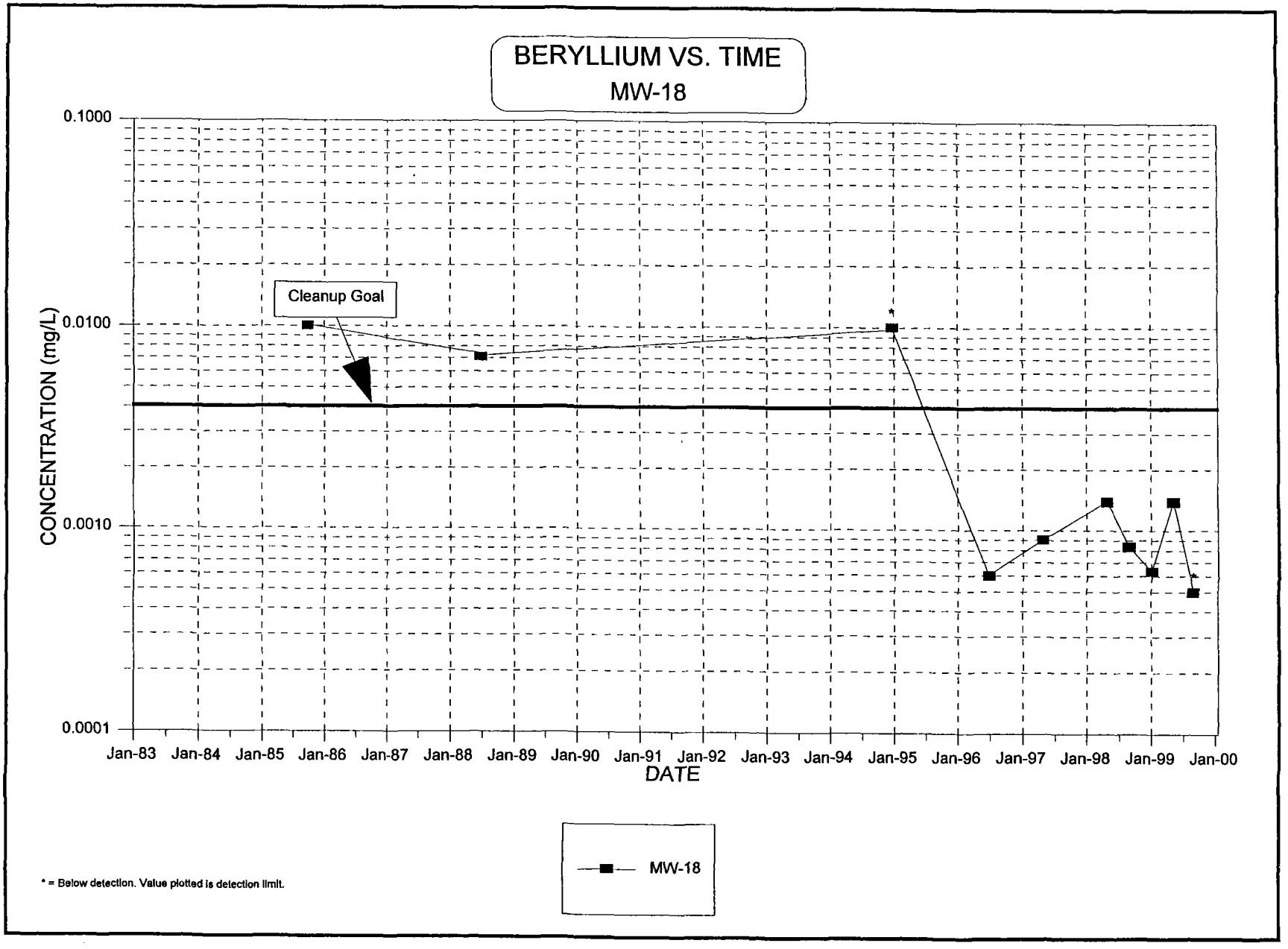
* = Below detection. Value plotted is detection limit.

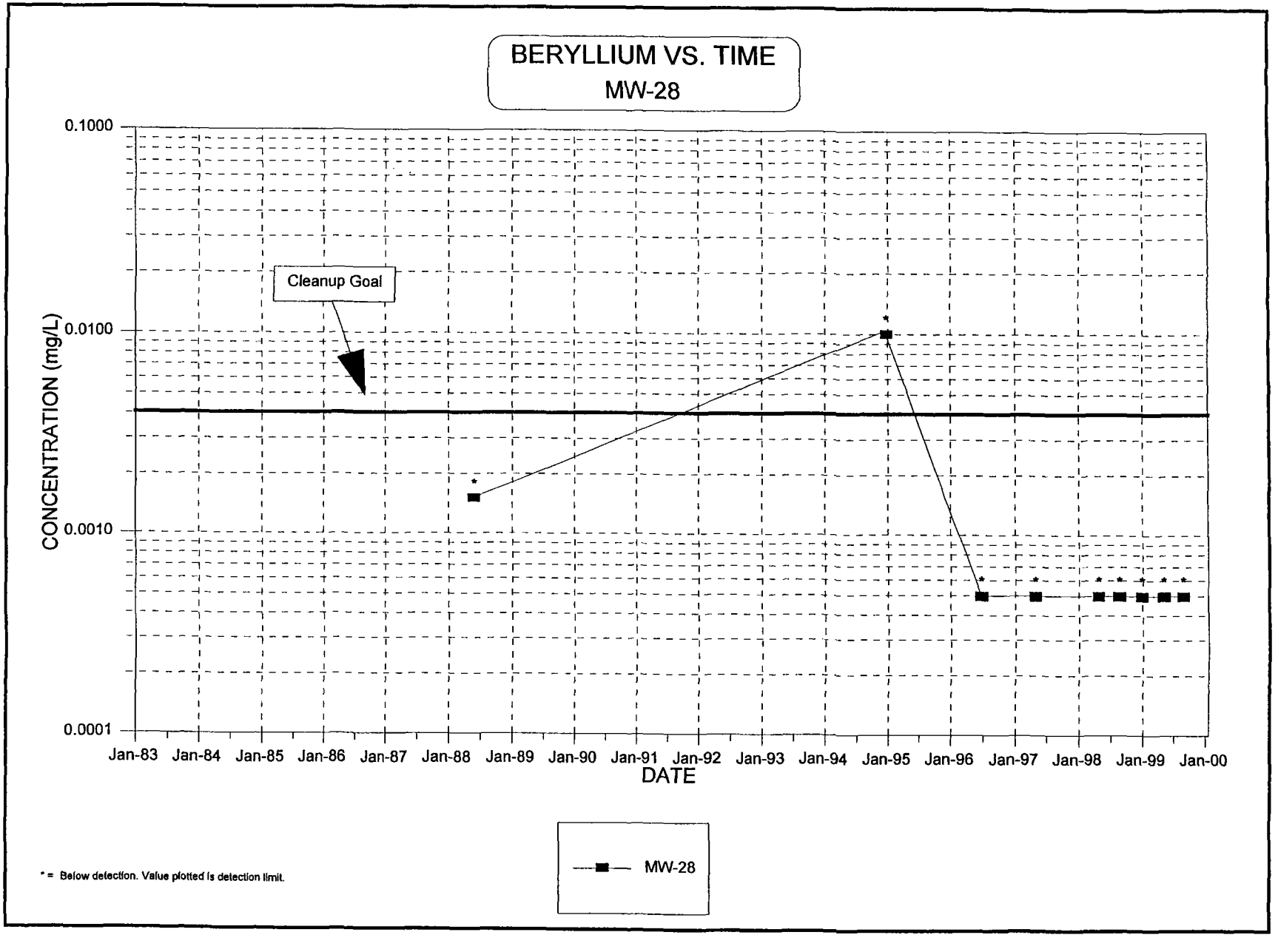

BERYLLIUM VS. TIME
MW-5
0.1000
0.0100
0.0010
0.0001
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-5
* = Below detection. Value plotted is detection limit.

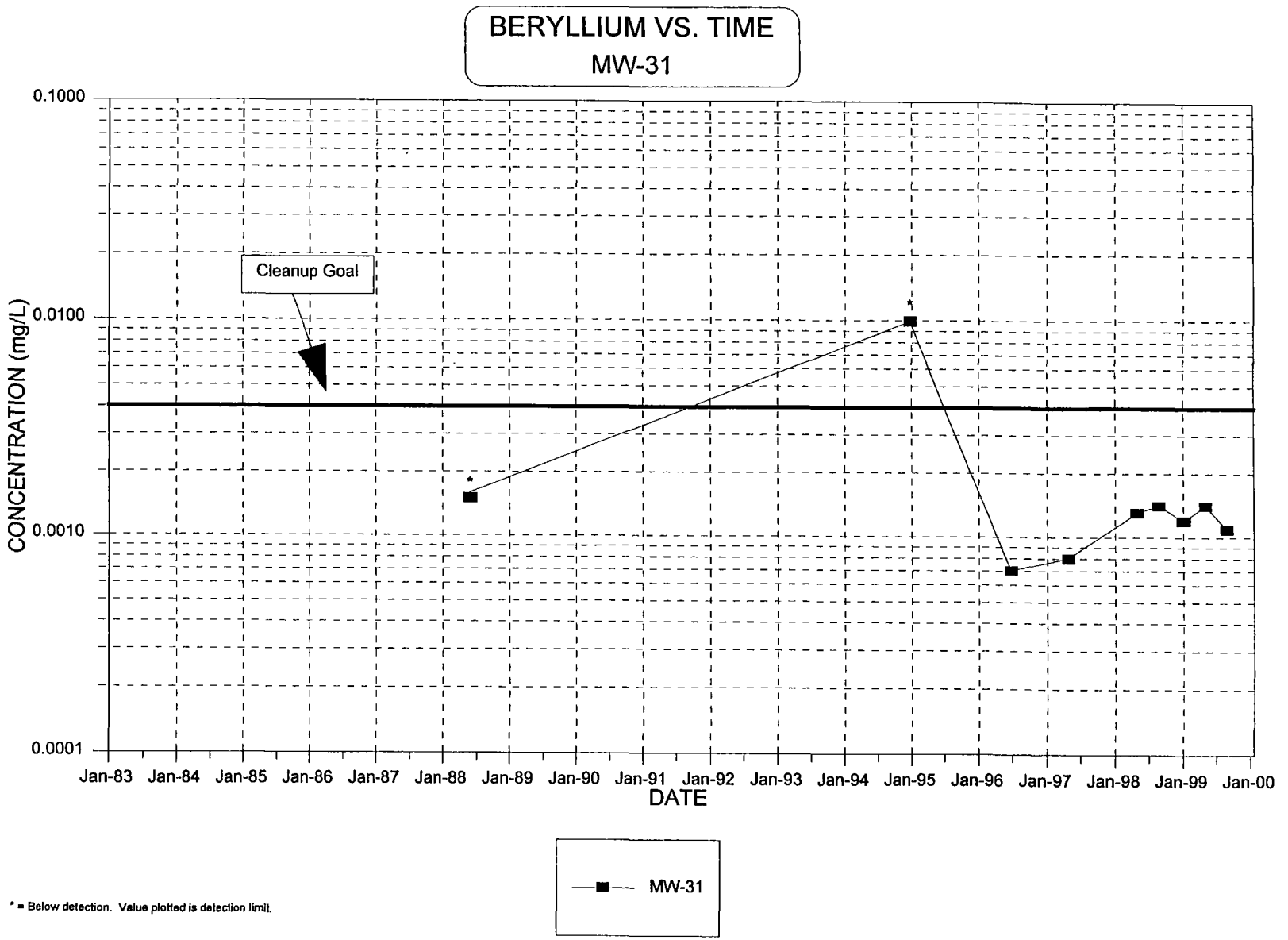


* = Below detection. Value plotted is detection limit.

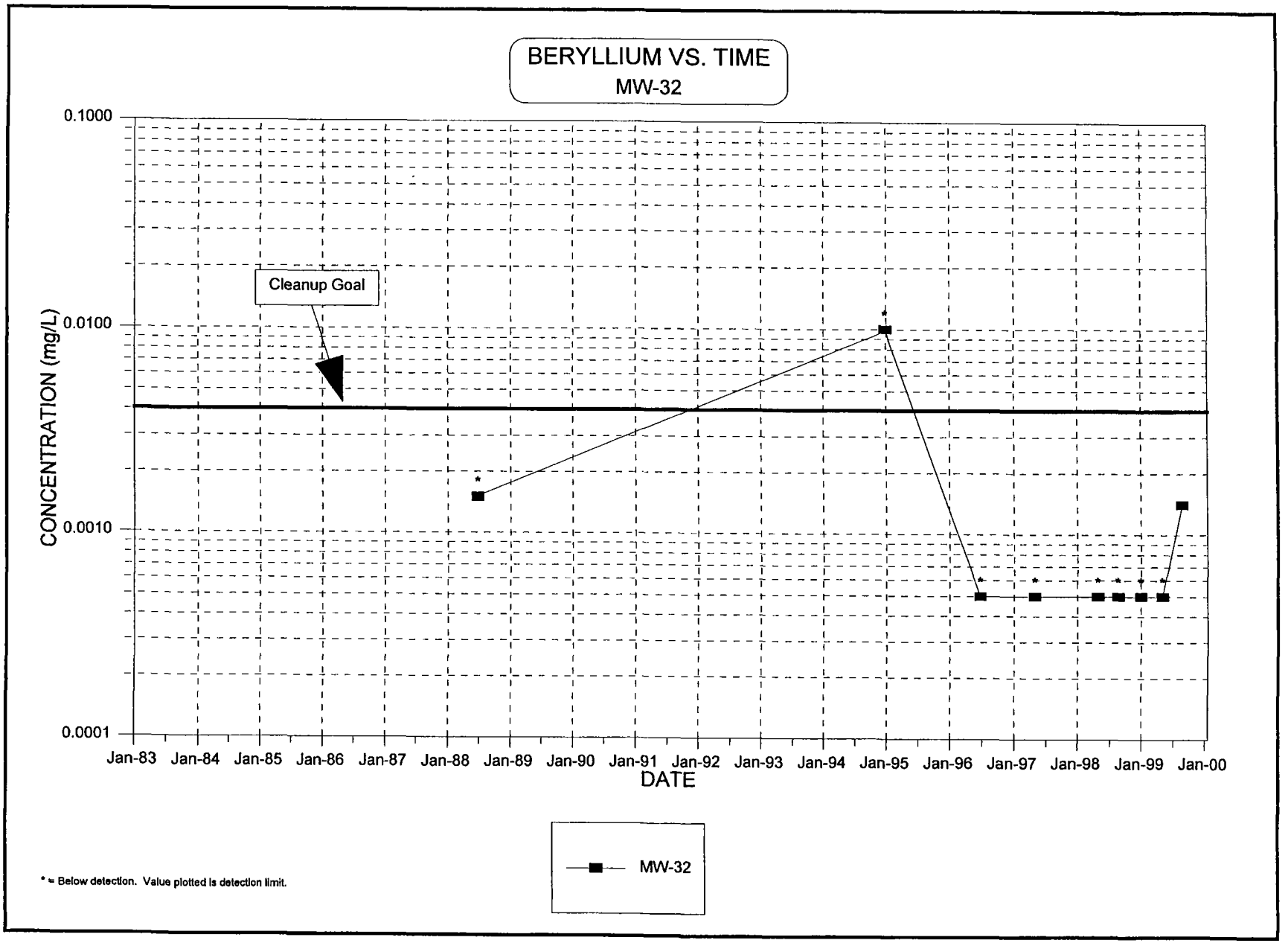

BERYLLIUM VS. TIME
MW-16
0.1000
0.0100
0.0010
0.0001
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-16
* = Below detection. Value plotted is detection limit.

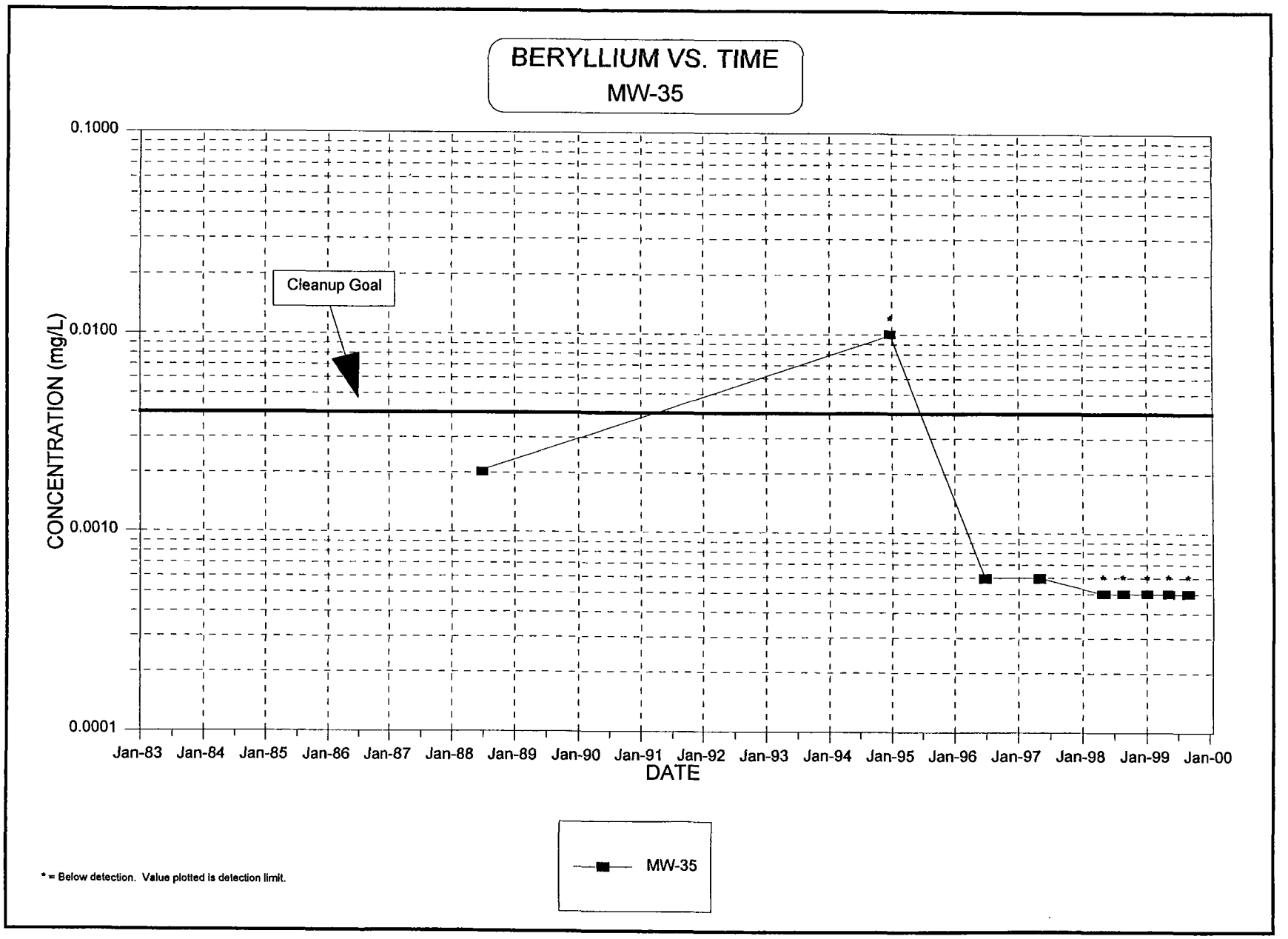

BERYLLIUM VS. TIME
MW-18
0.1000
0.0100
0.0010
0.0001
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-18
* = Below detection. Value plotted is detection limit.

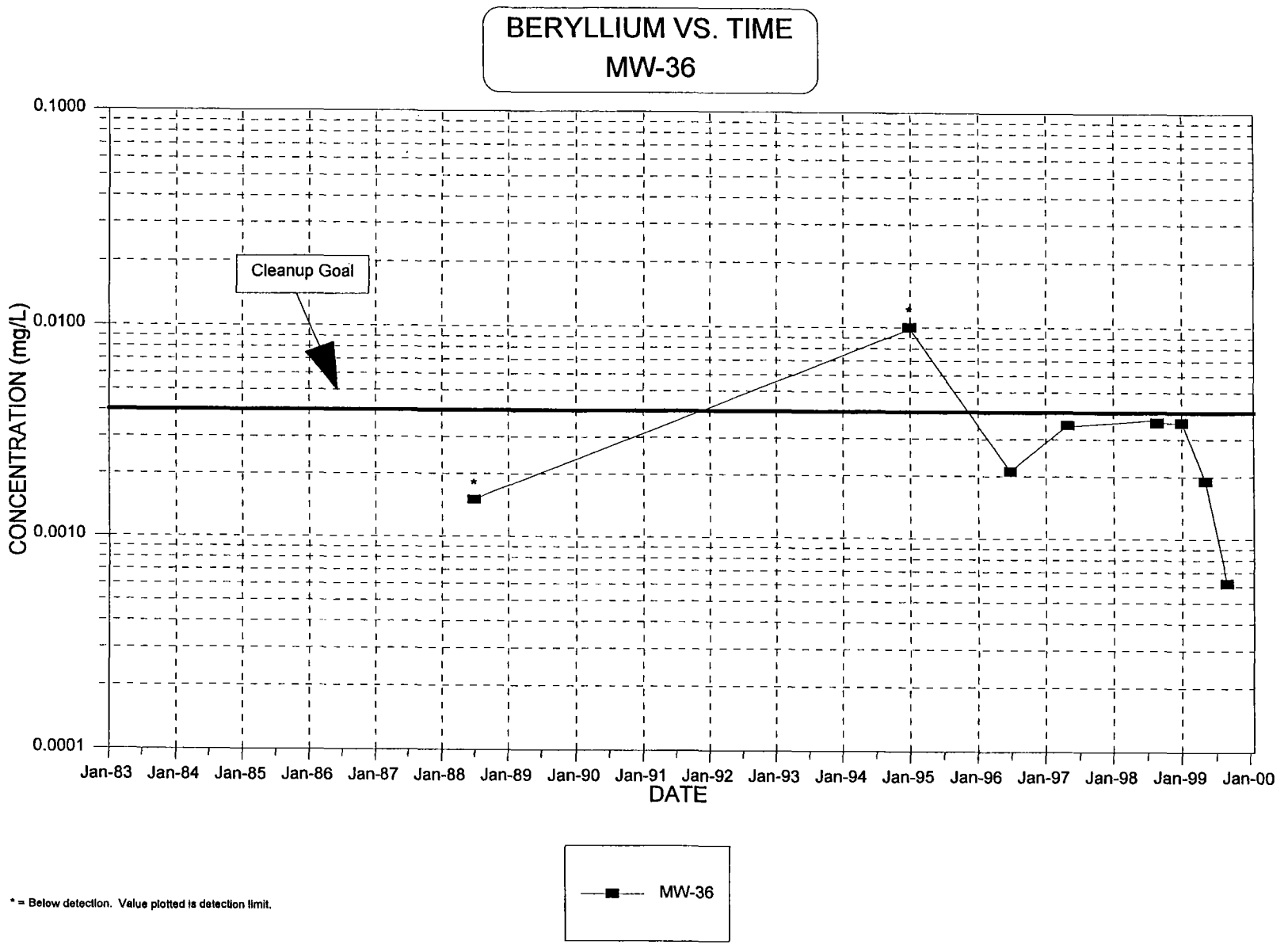

BERYLLIUM VS. TIME
MW-28
0.1000
0.0100
0.0010
0.0001
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-28
* = Below detection. Value plotted is detection limit.



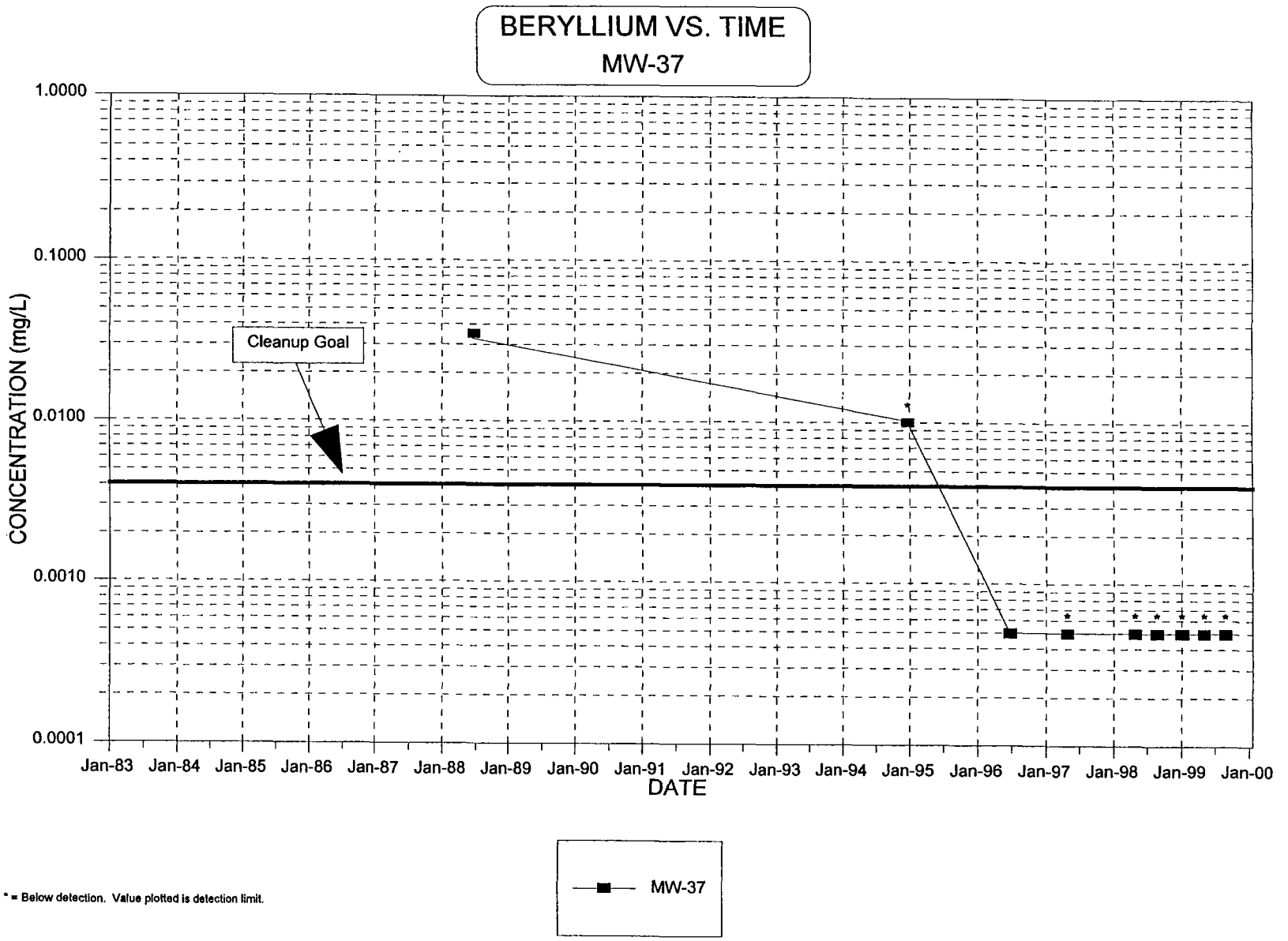
* = Below detection. Value plotted is detection limit.


BERYLLIUM VS. TIME
MW-32
0.1000
0.0100
0.0010
0.0001
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-32
* = Below detection. Value plotted is detection limit.


BERYLLIUM VS. TIME
MW-35
0.1000
0.0100
0.0010
0.0001
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-35
* = Below detection. Value plotted is detection limit.



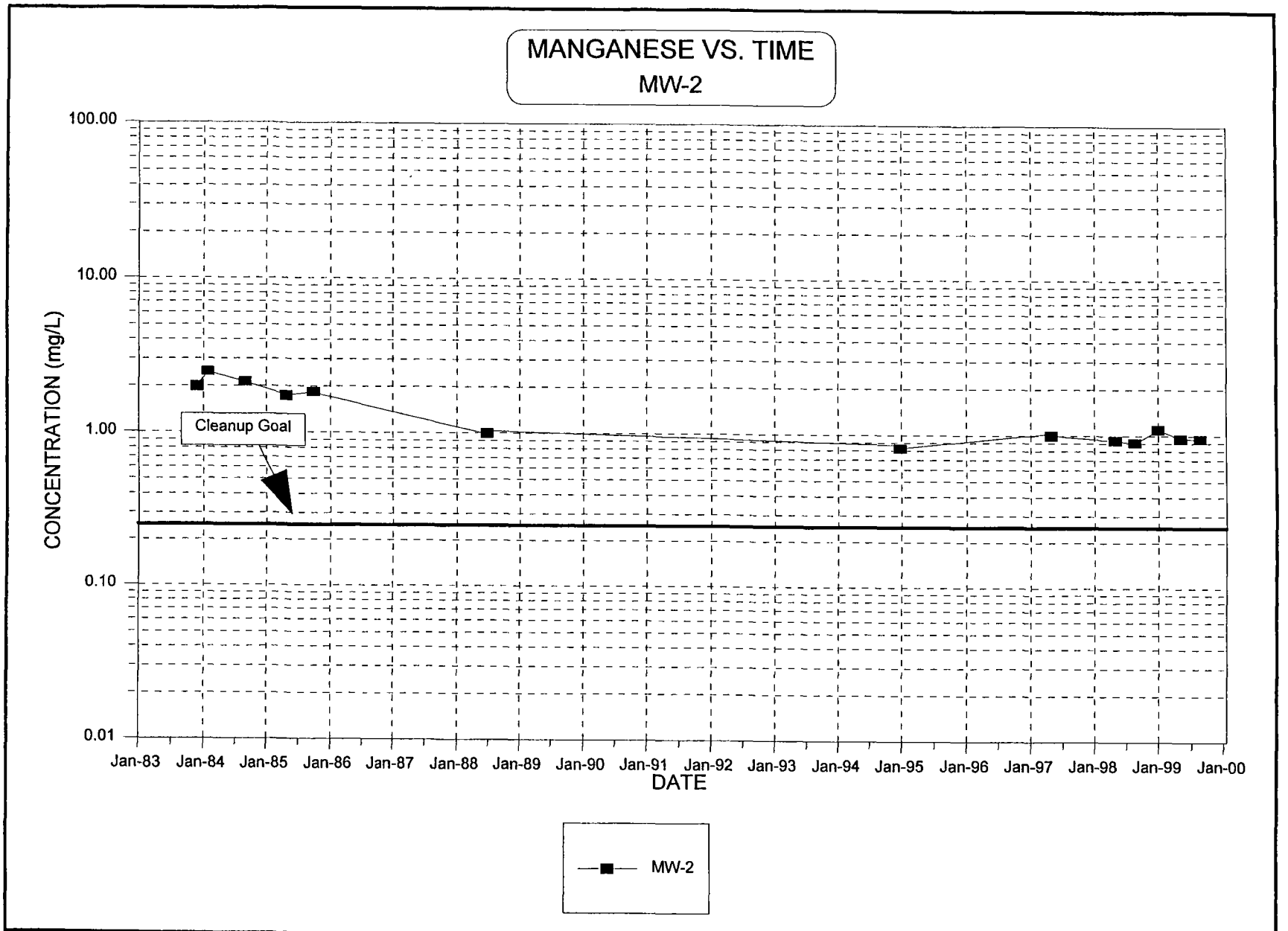
* = Below detection. Value plotted is detection limit.

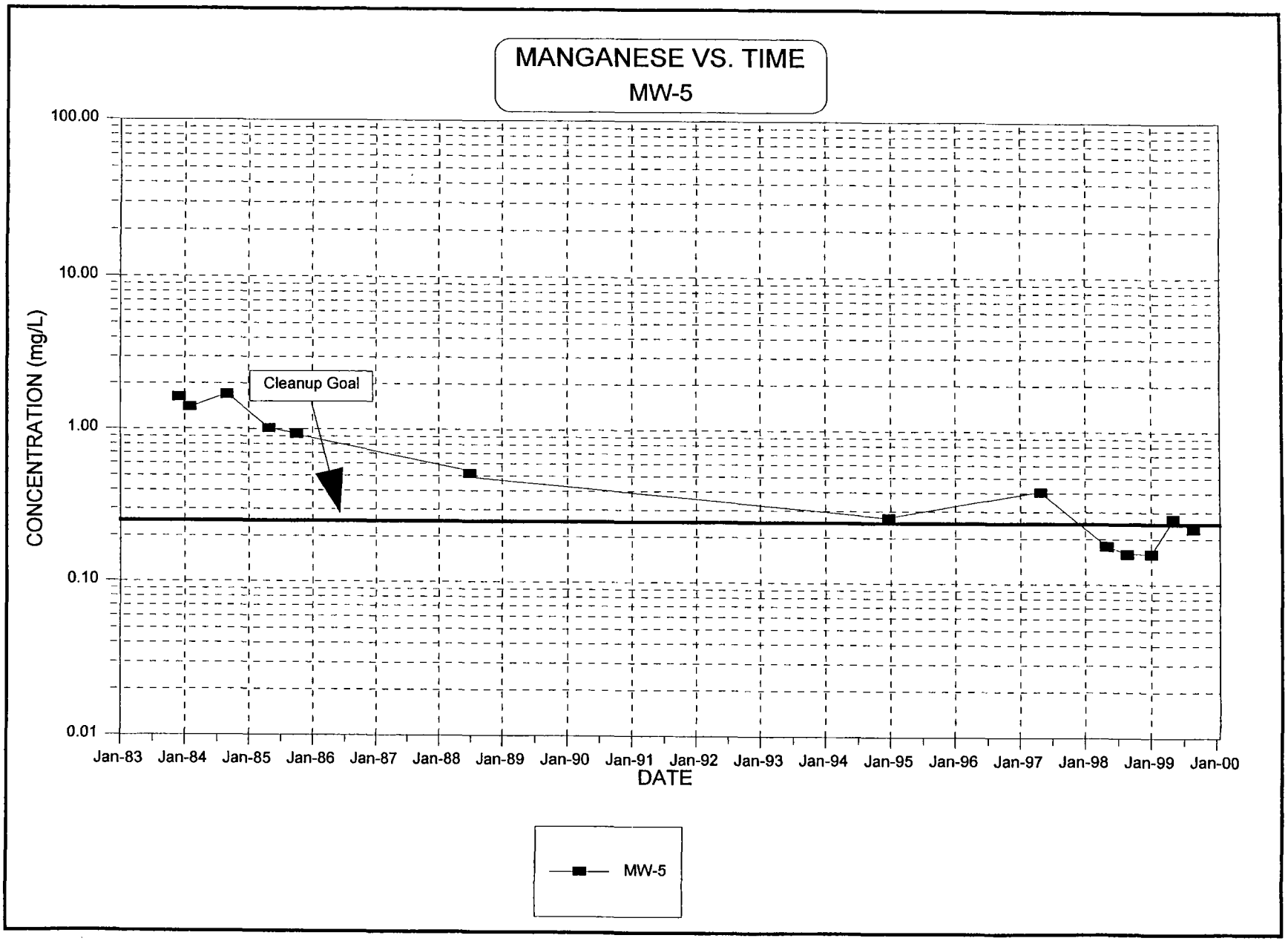


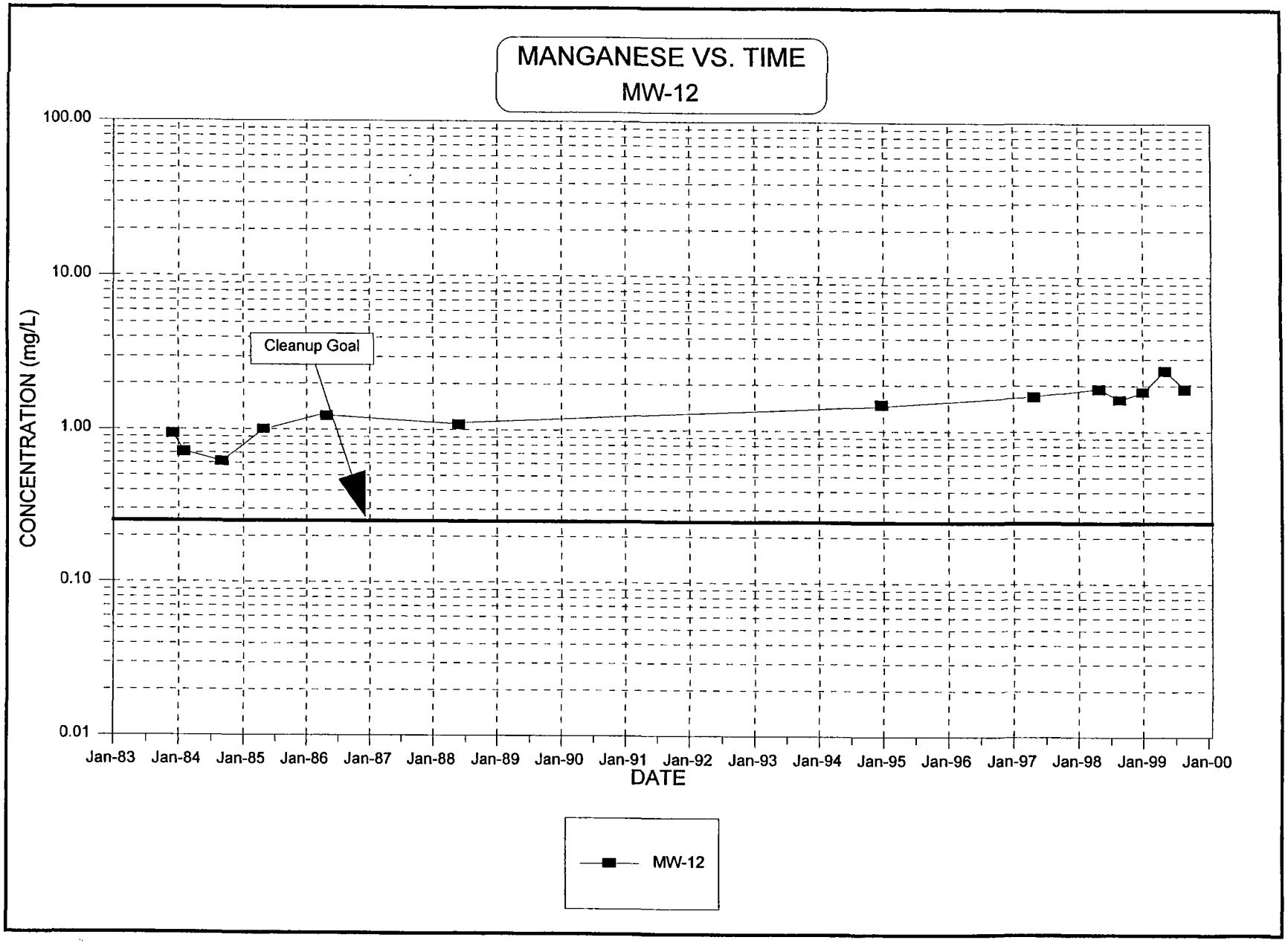
* = Below detection. Value plotted is detection limit.

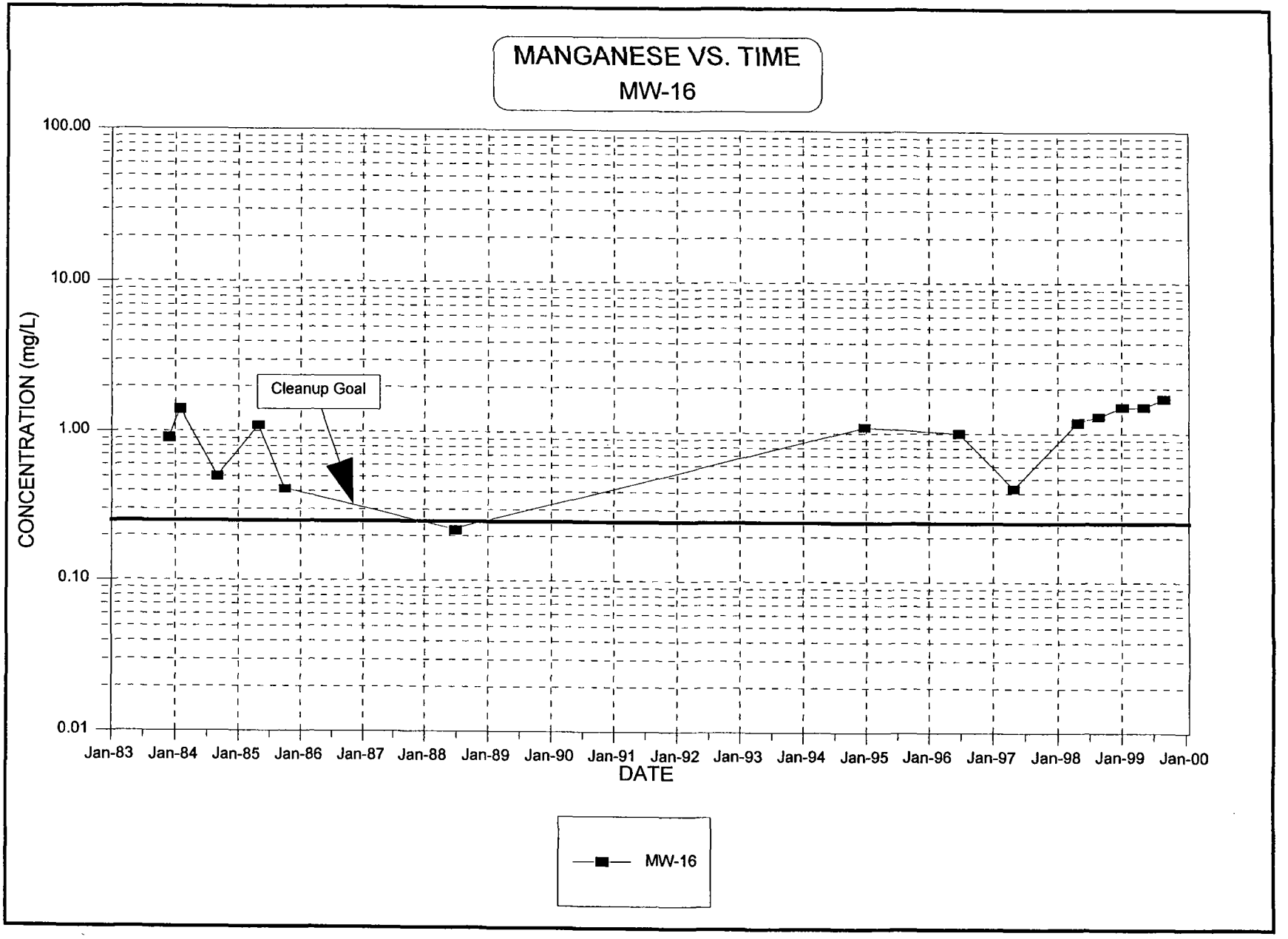
APPENDIX D-5

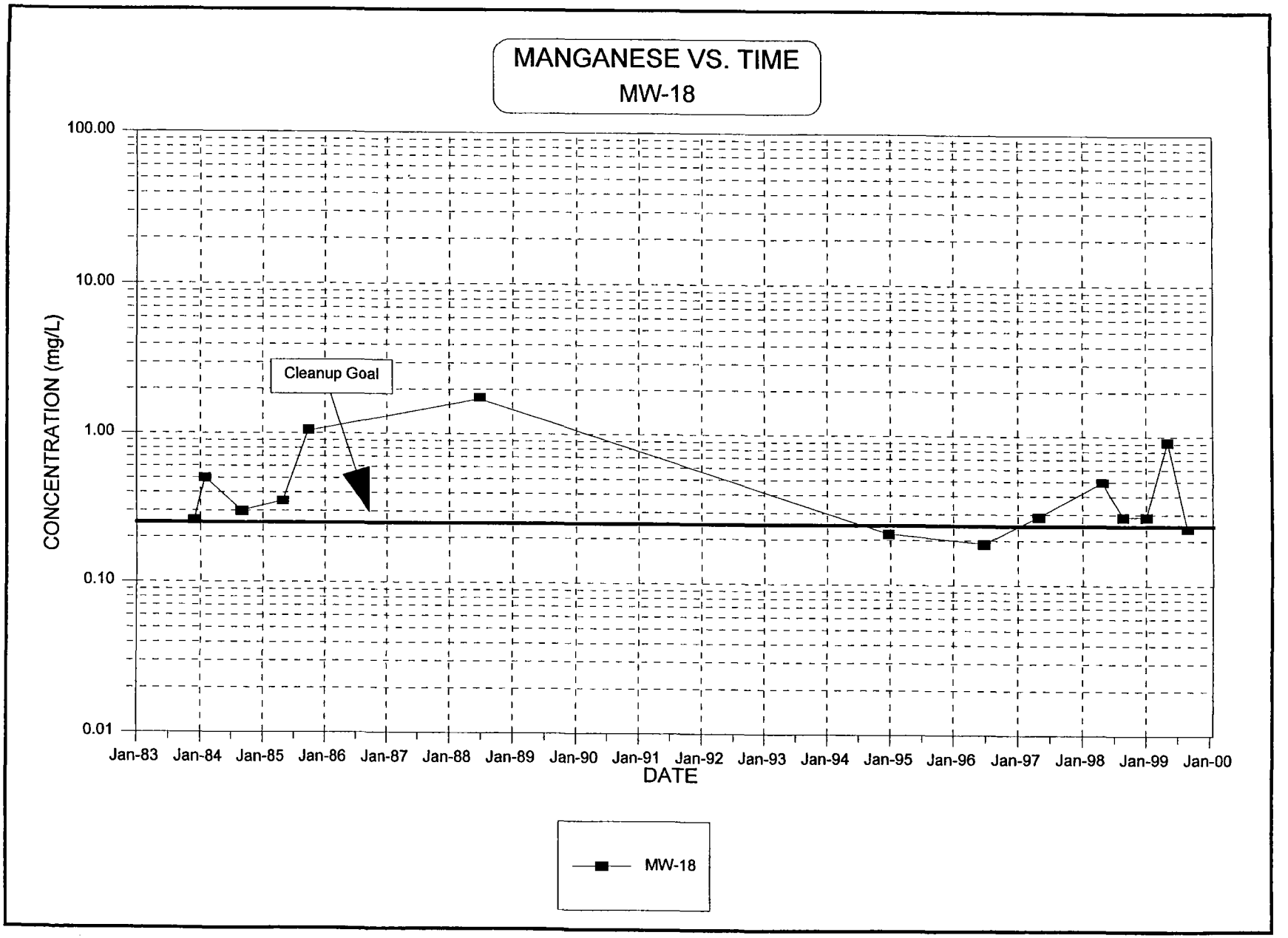
MANGANESE

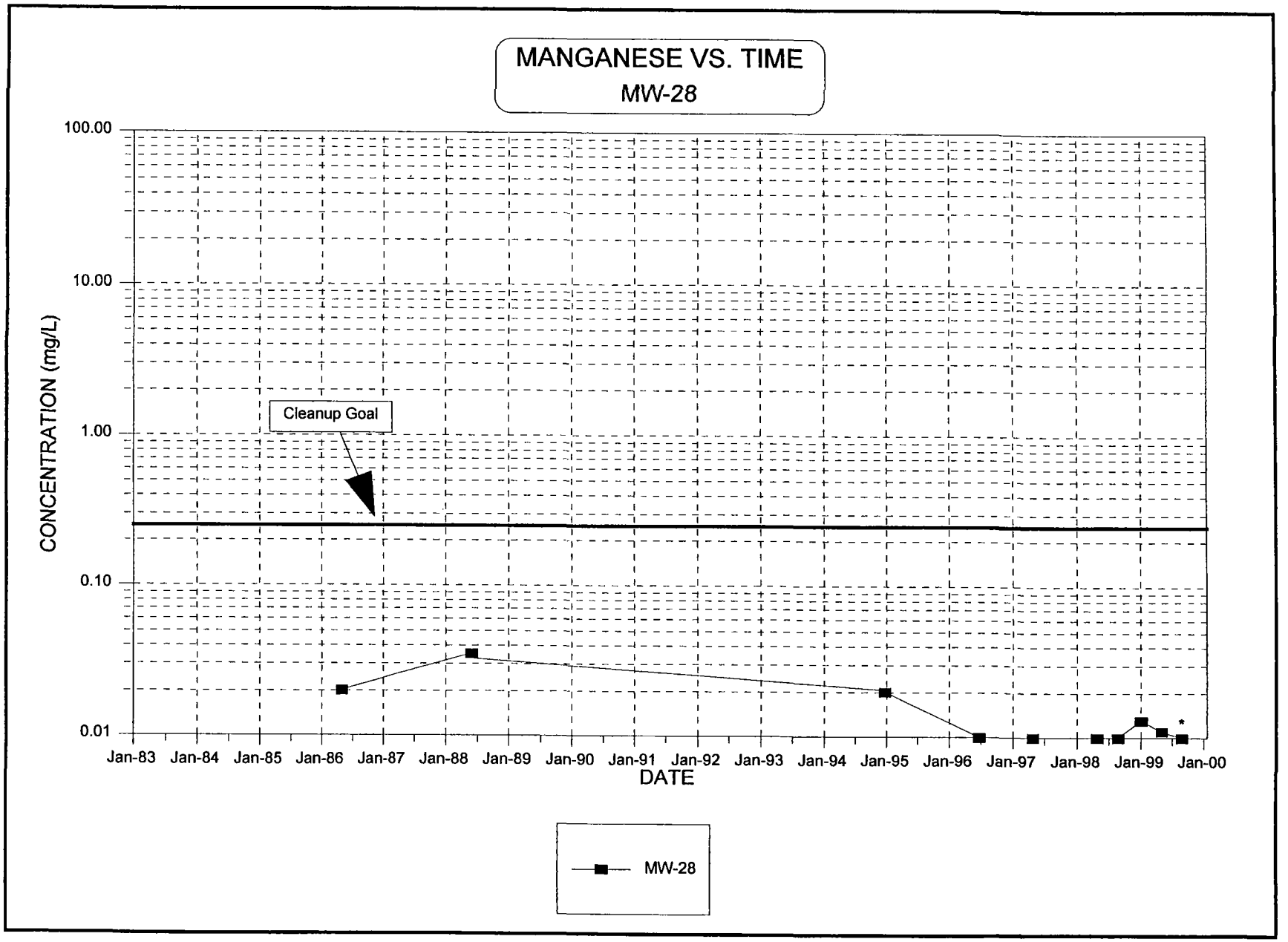

MANGANESE VS. TIME
MW-2
100.00
10.00
1.00
0.10
0.01
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-2

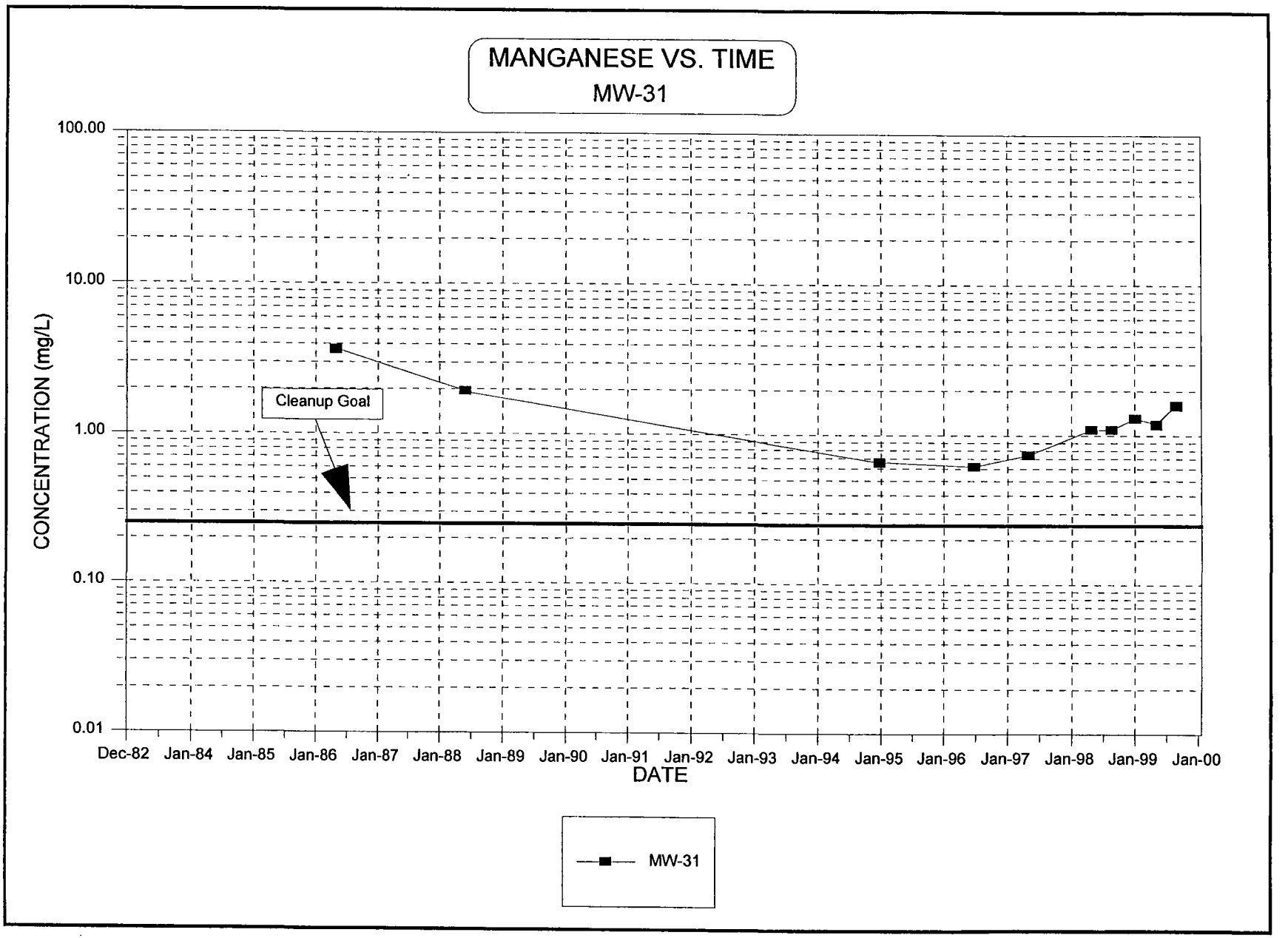

MANGANESE VS. TIME
MW-5
100.00
10.00
1.00
0.10
0.01
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-5

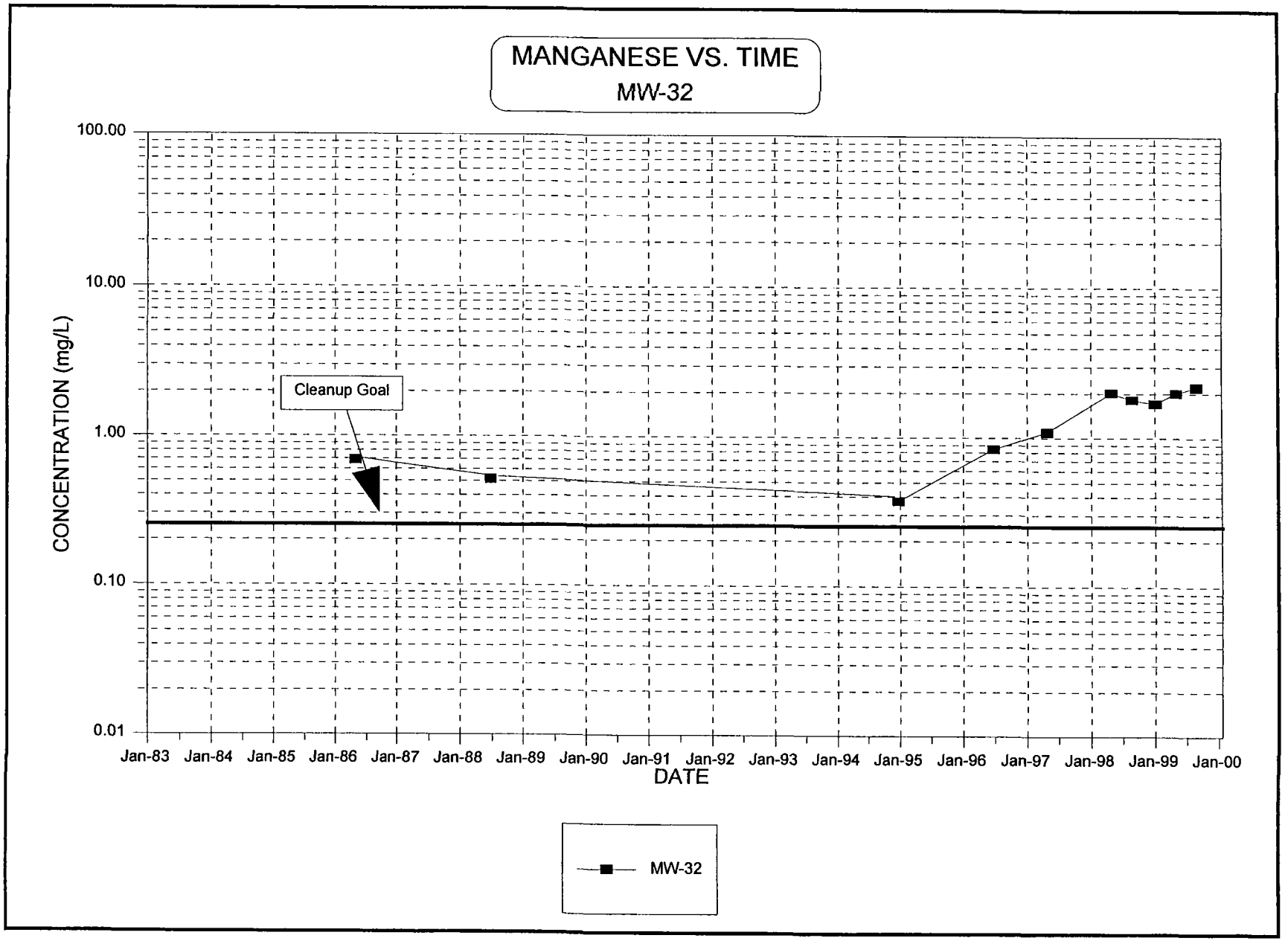

MANGANESE VS. TIME
MW-12
100.00
10.00
1.00
0.10
0.01
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-12

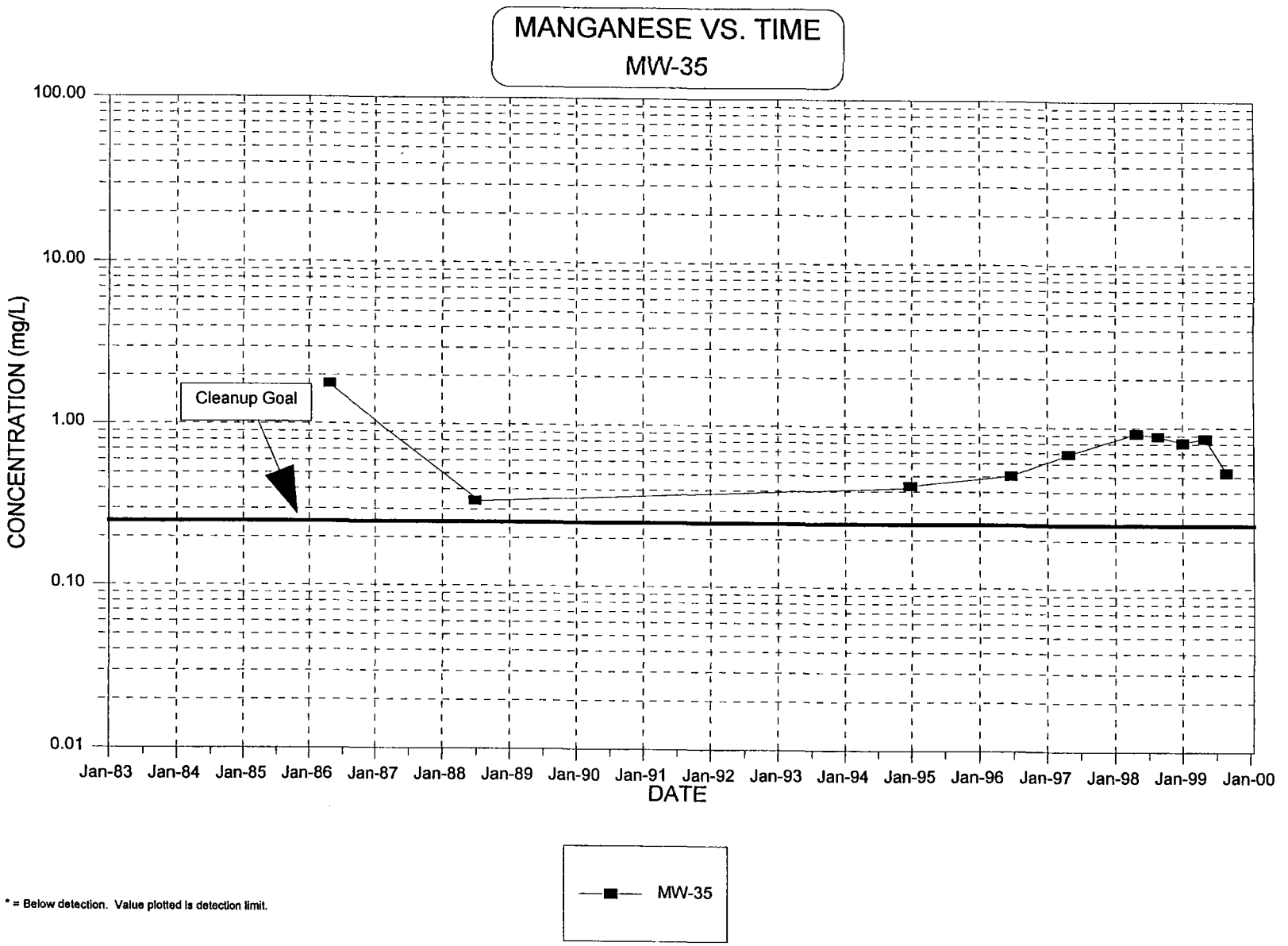

MANGANESE VS. TIME
MW-16
100.00
10.00
1.00
0.10
0.01
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-16


MANGANESE VS. TIME
MW-18
100.00
10.00
1.00
0.10
0.01
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-18

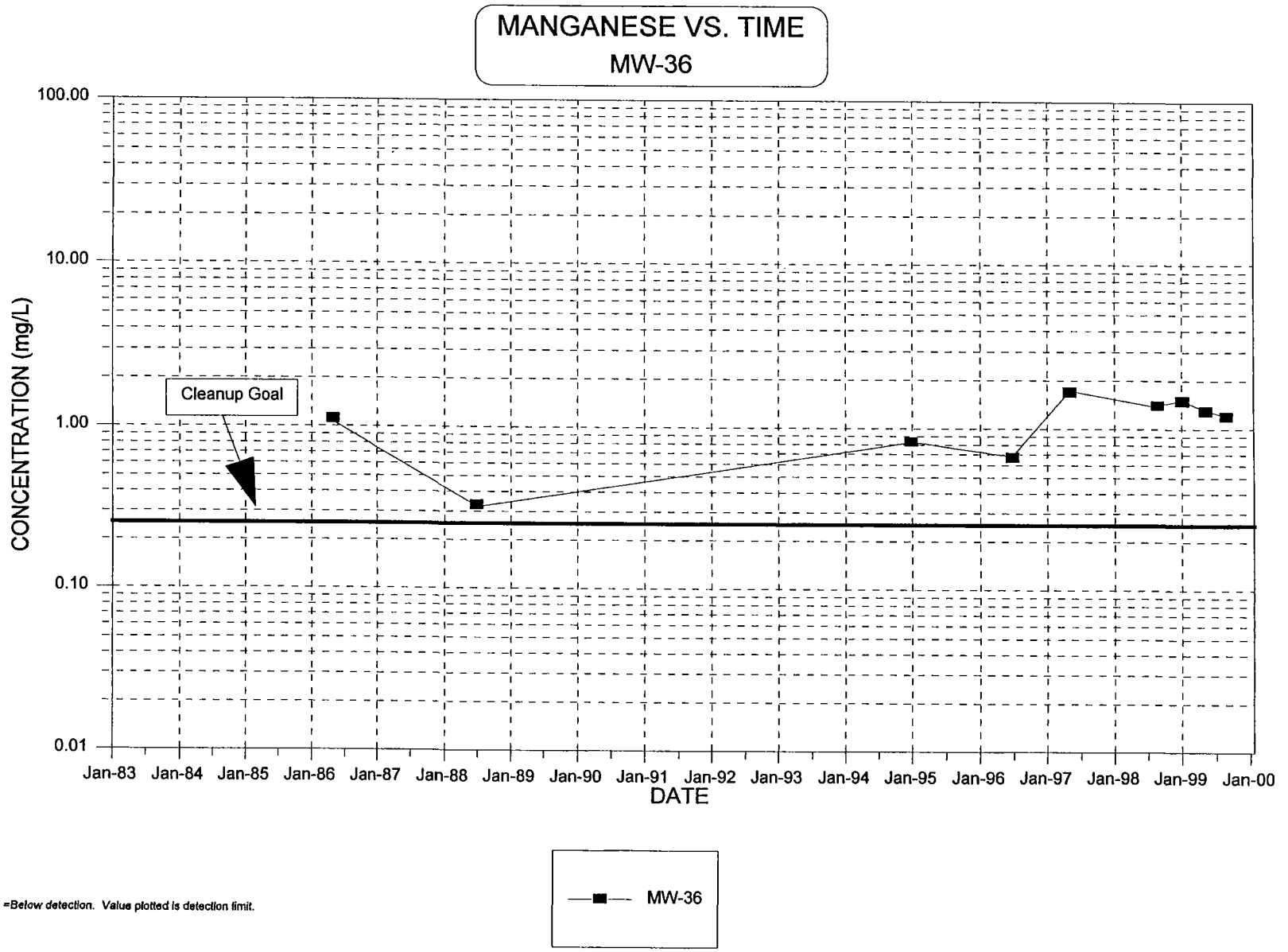

MANGANESE VS. TIME
MW-28
100.00
10.00
1.00
0.10
0.01
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-28


MANGANESE VS. TIME
MW-31
100.00
10.00
1.00
0.10
0.01
CONCENTRATION (mg/L)
Cleanup Goal
Dec-82
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-31

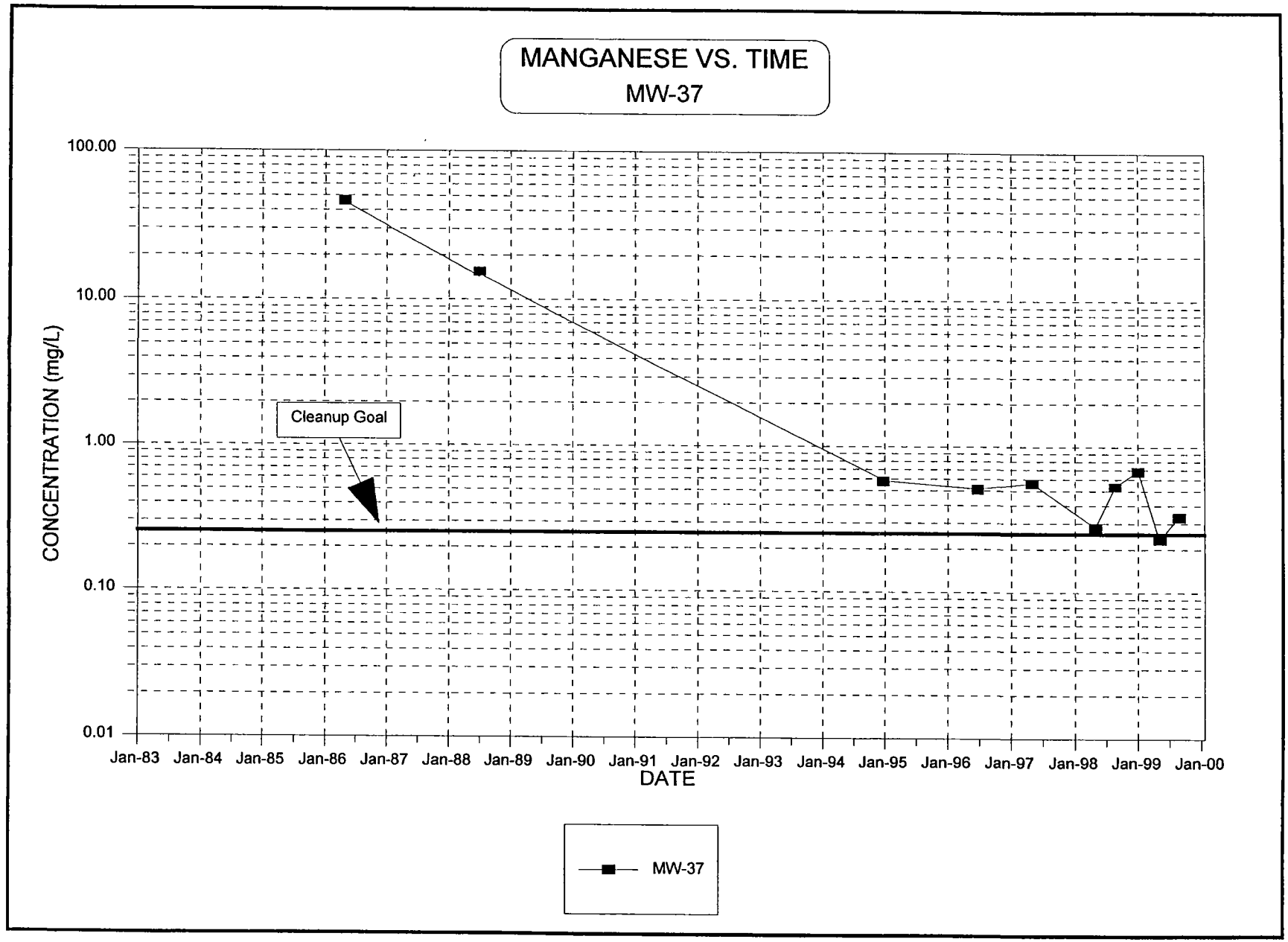

MANGANESE VS. TIME
MW-32
100.00
10.00
1.00
0.10
0.01
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-32



* = Below detection. Value plotted is detection limit.

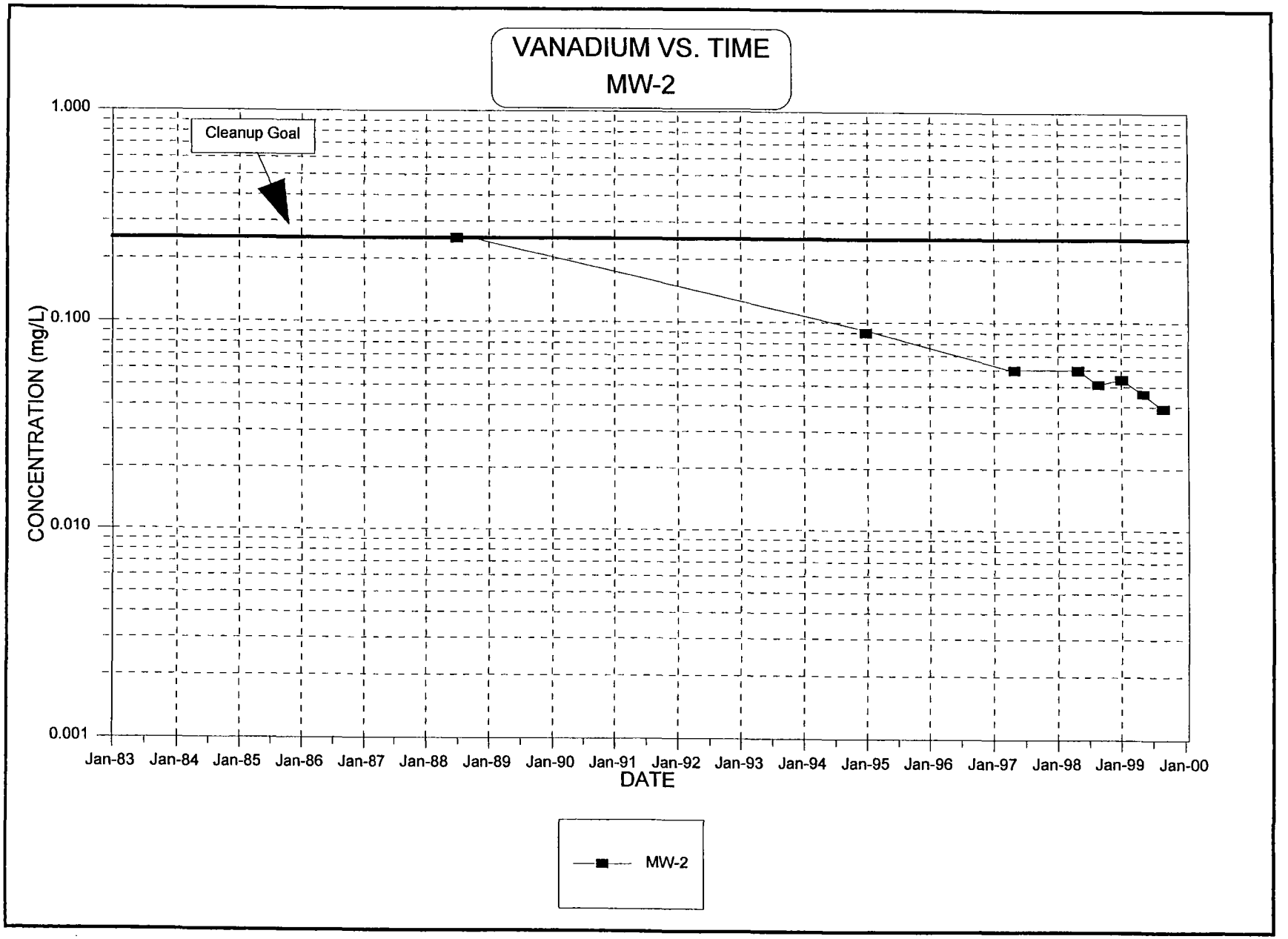


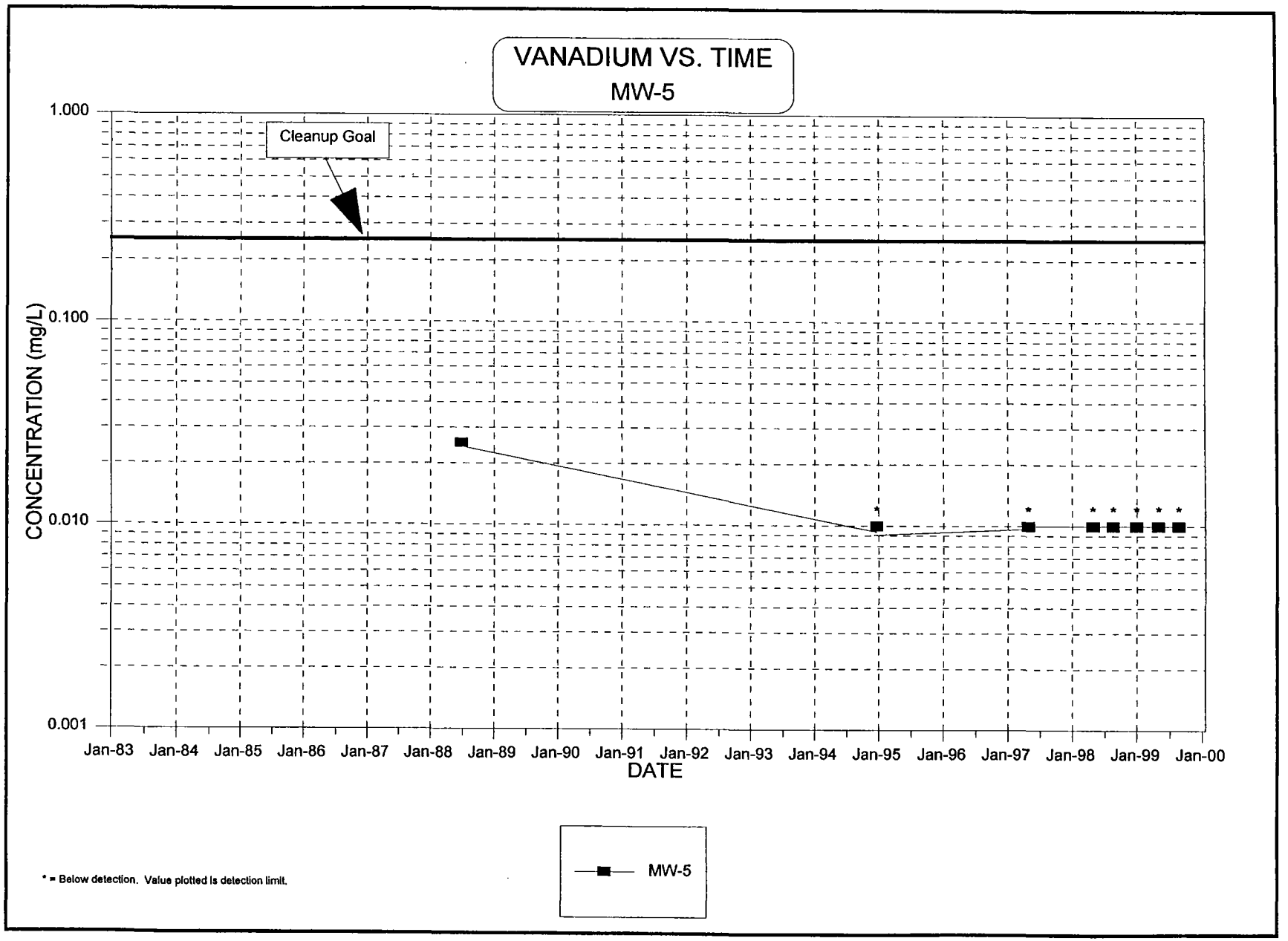
* =Below detection. Value plotted is detection limit.

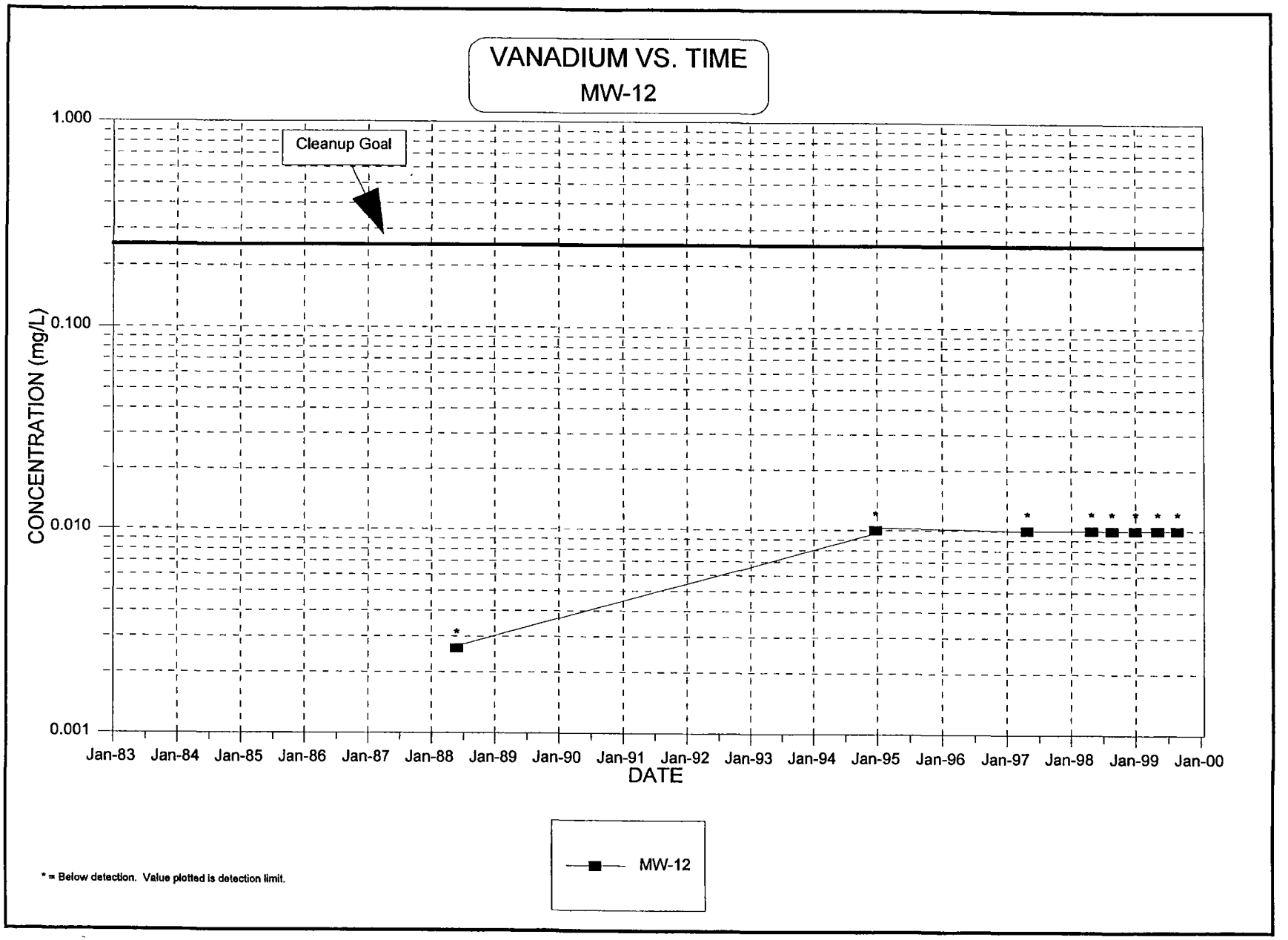

MANGANESE VS. TIME
MW-37
100.00
10.00
1.00
0.10
0.01
CONCENTRATION (mg/L)
Cleanup Goal
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-37

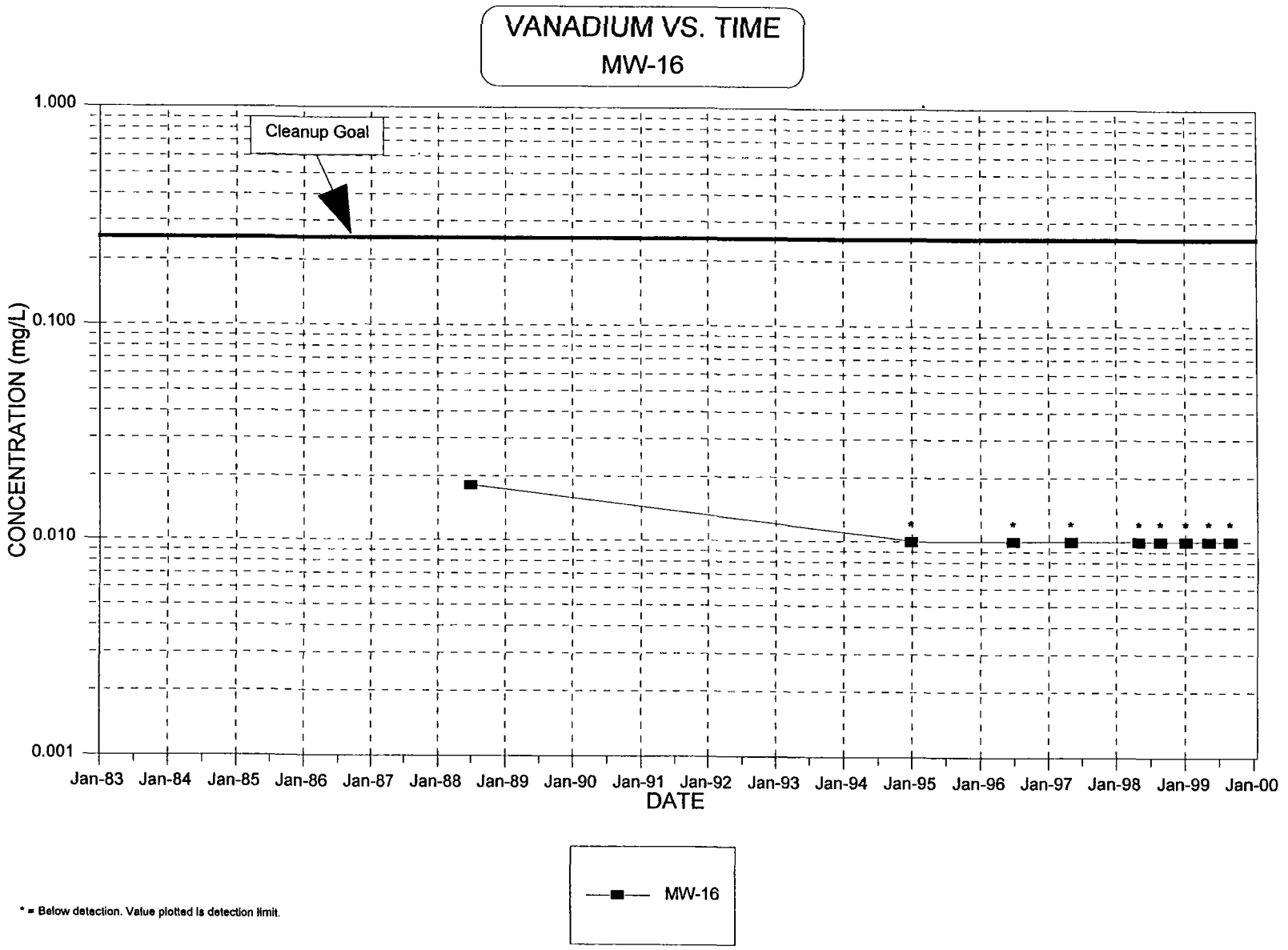
APPENDIX D-6

VANADIUM

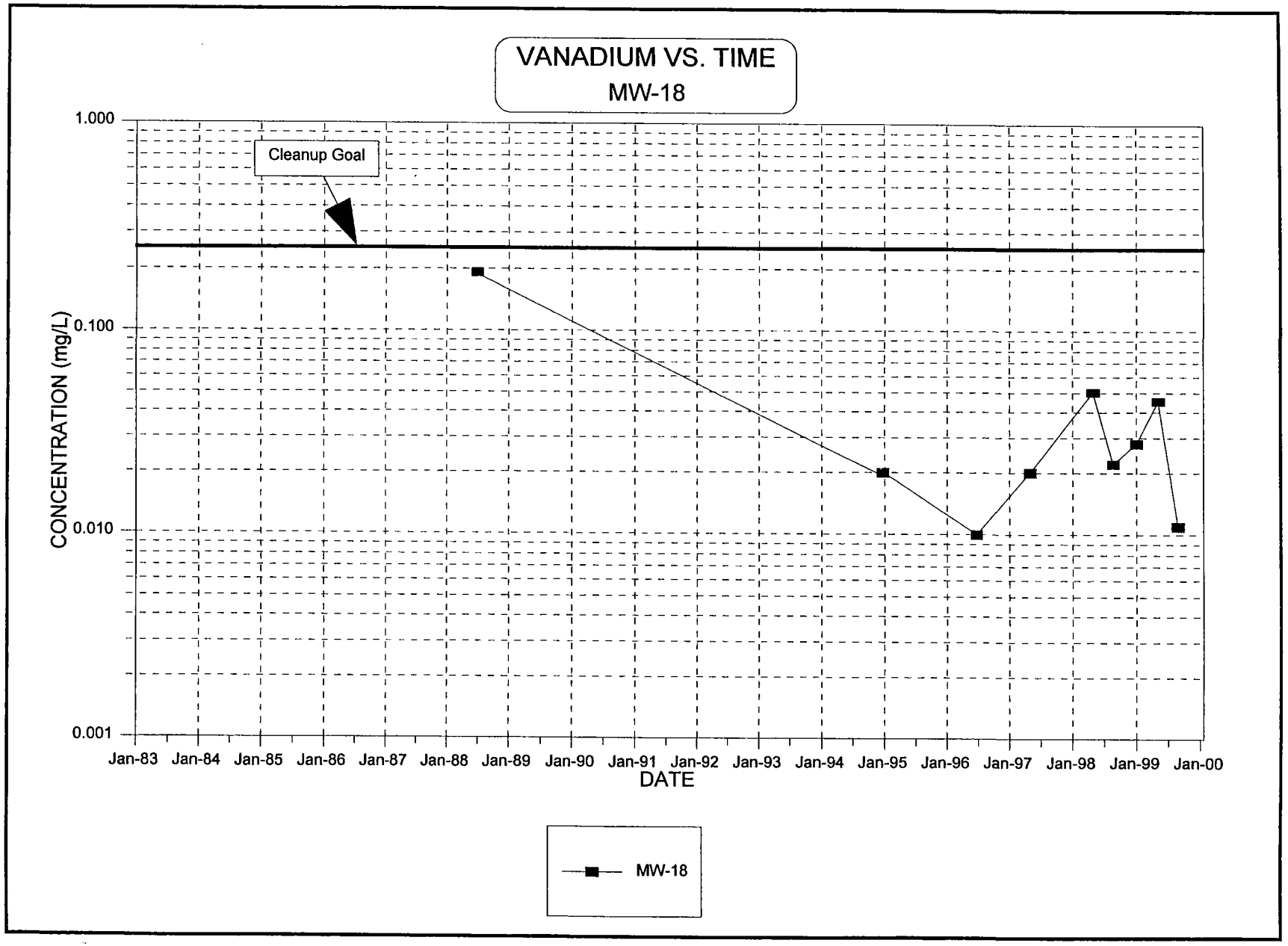

VANADIUM VS. TIME
MW-2
Cleanup Goal
1.000
0.100
0.010
0.001
CONCENTRATION (mg/L)
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-2

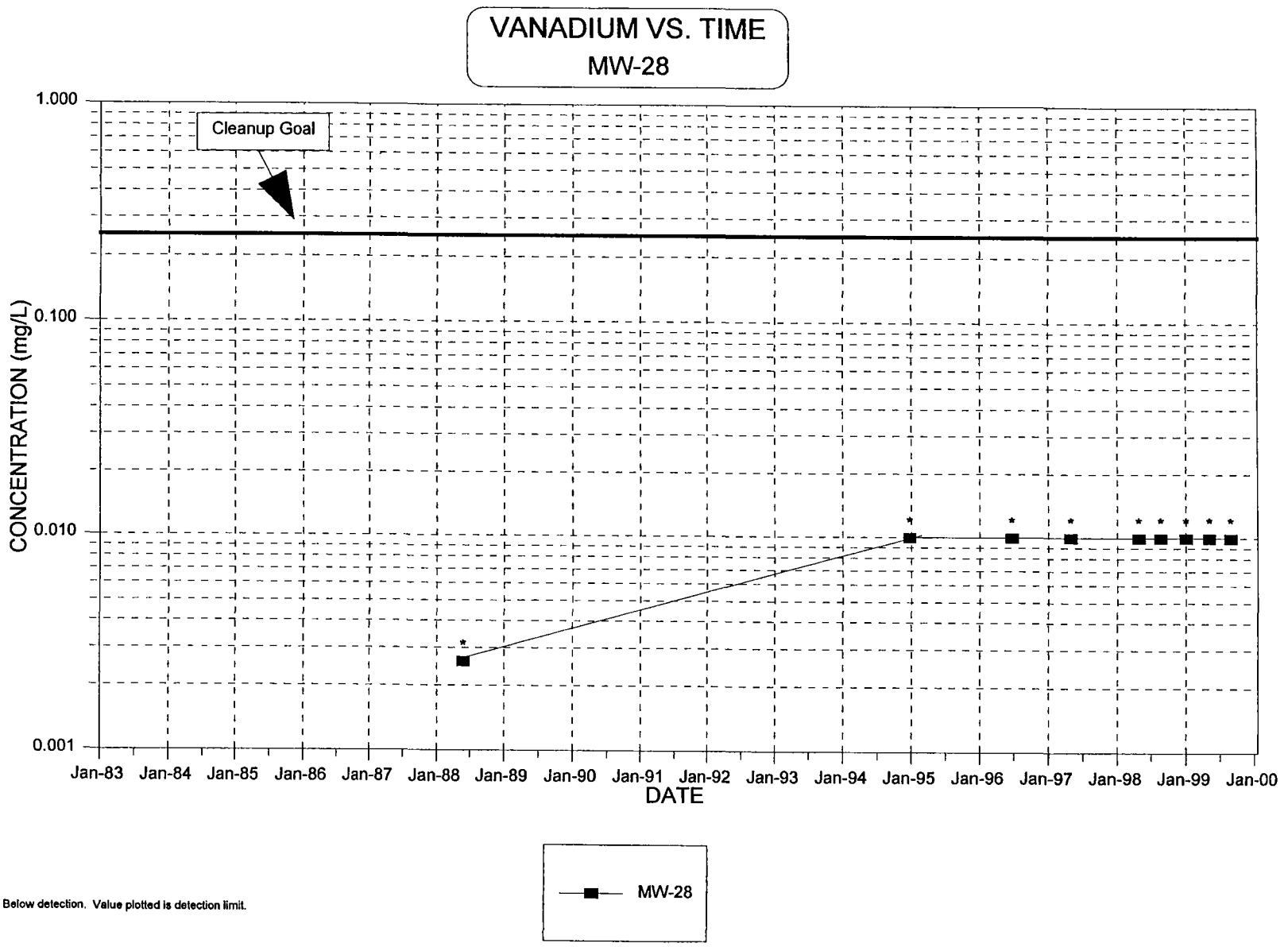

VANADIUM VS. TIME
MW-5
Cleanup Goal
1.000
0.100
0.010
0.001
CONCENTRATION (mg/L)
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-5
* = Below detection. Value plotted is detection limit.


VANADIUM VS. TIME
MW-12
Cleanup Goal
1.000
0.100
0.010
0.001
CONCENTRATION (mg/L)
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-12
* = Below detection. Value plotted is detection limit.

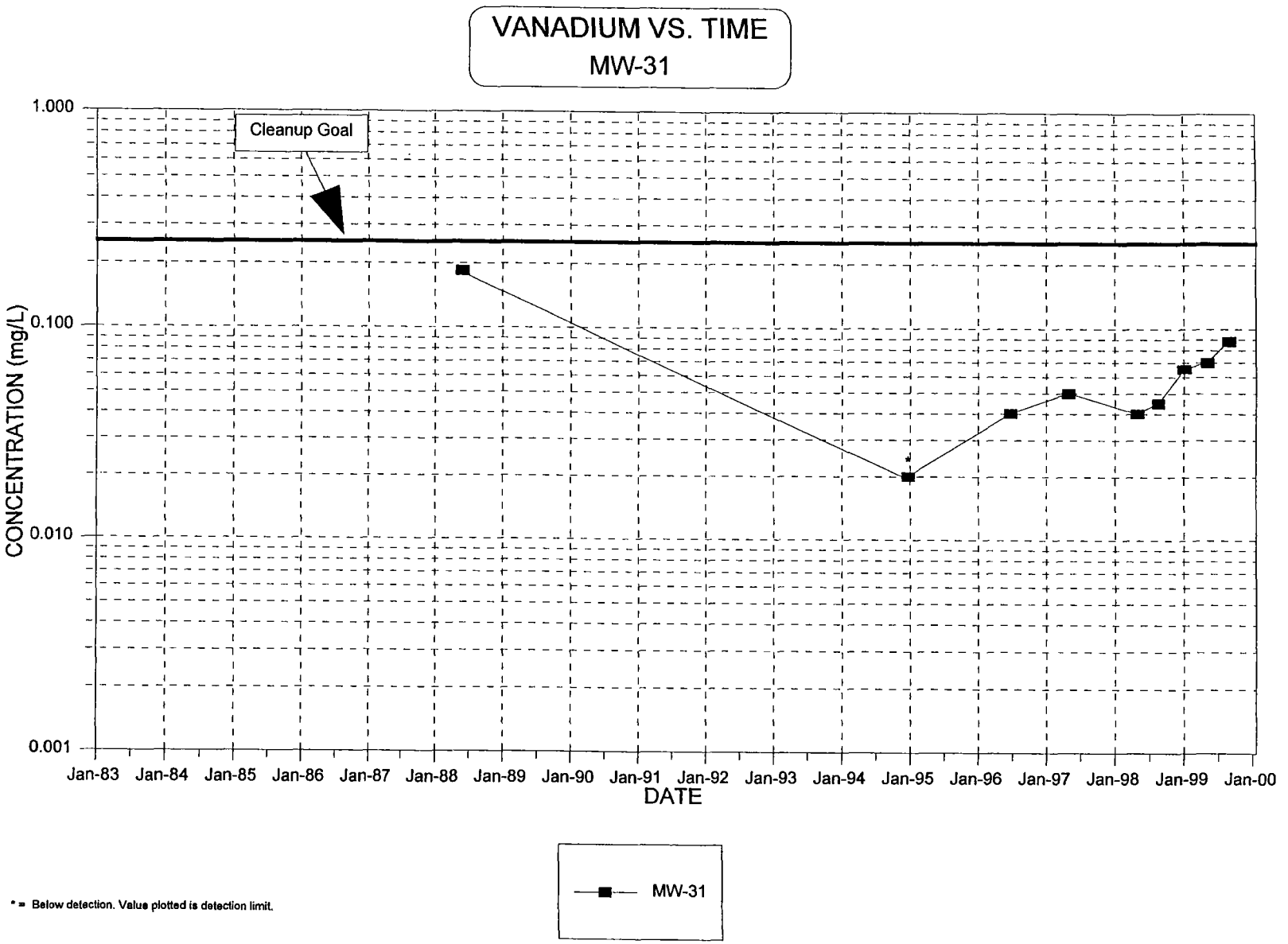


* = Below detection. Value plotted is detection limit.

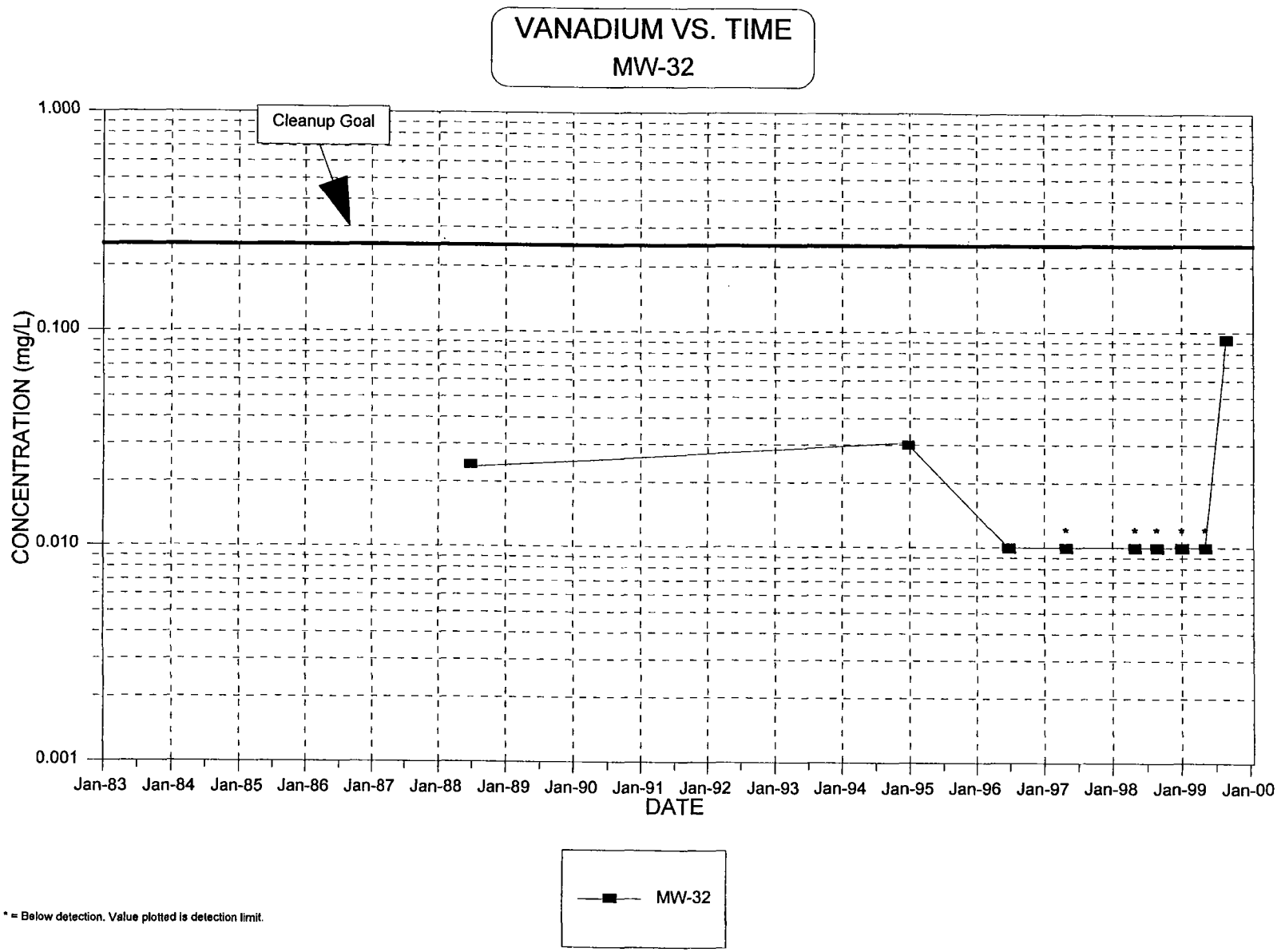

VANADIUM VS. TIME
MW-18
Cleanup Goal
1.000
0.100
0.010
0.001
CONCENTRATION (mg/L)
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-18



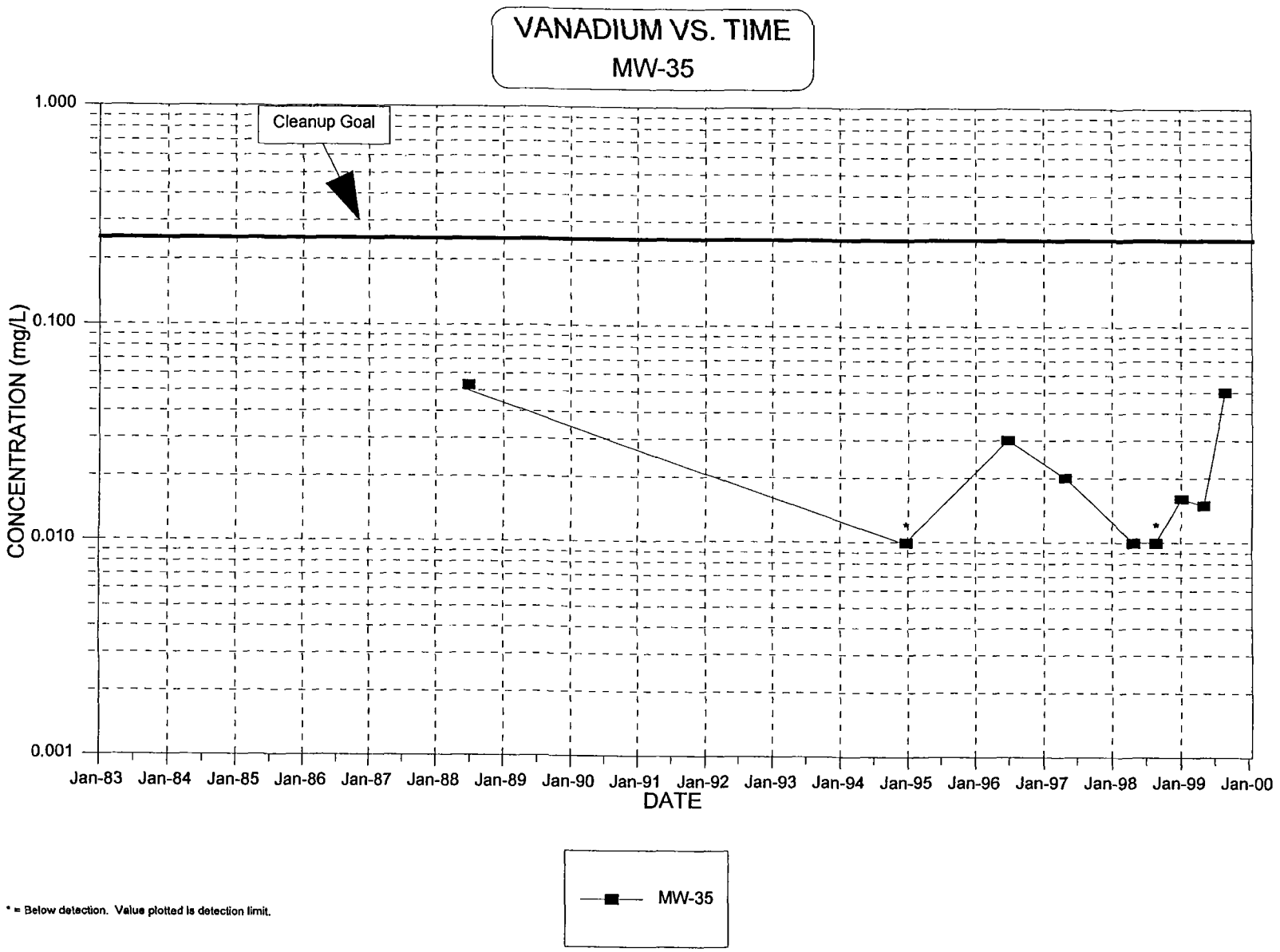
* = Below detection. Value plotted is detection limit.



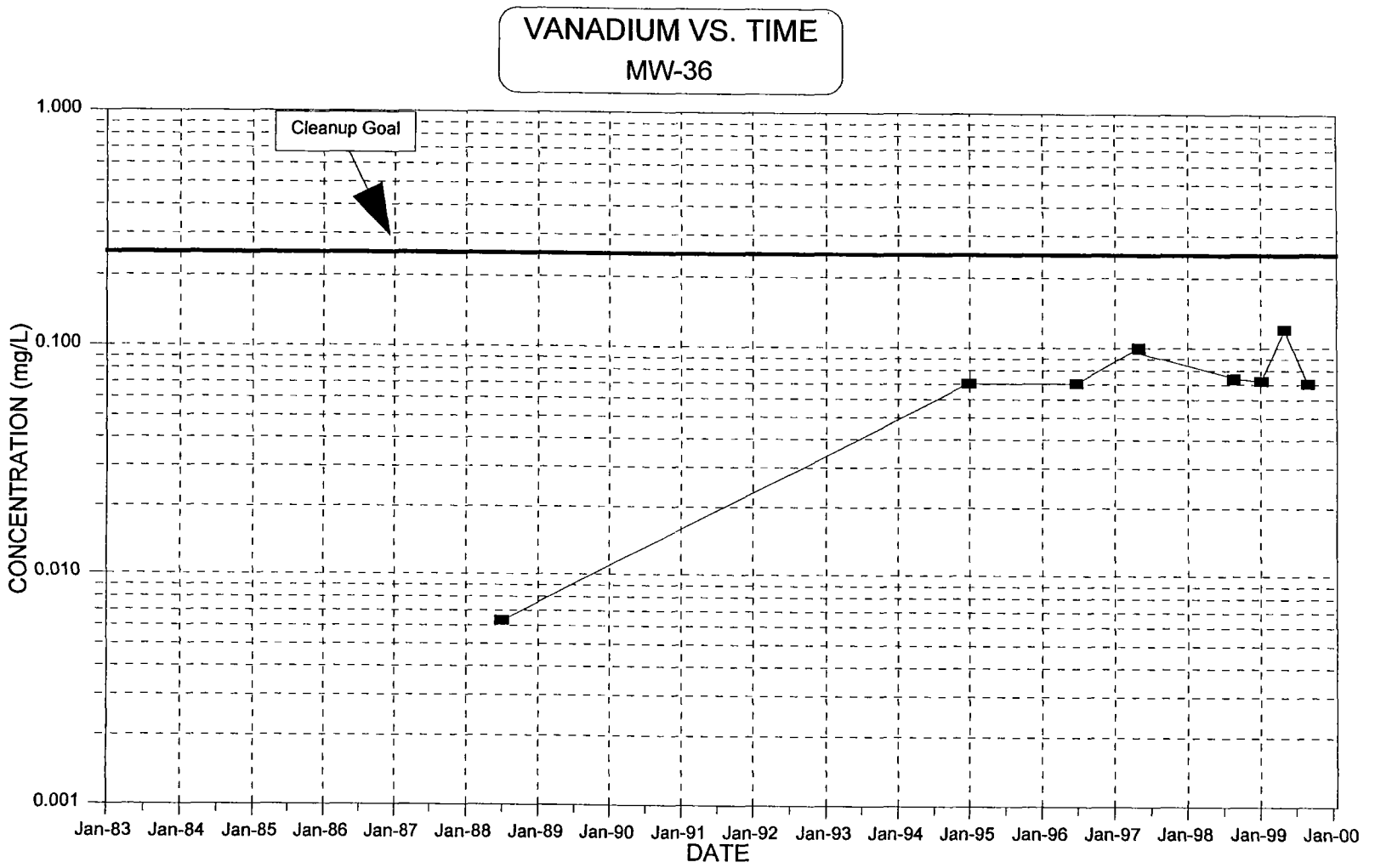
* = Below detection. Value plotted is detection limit.



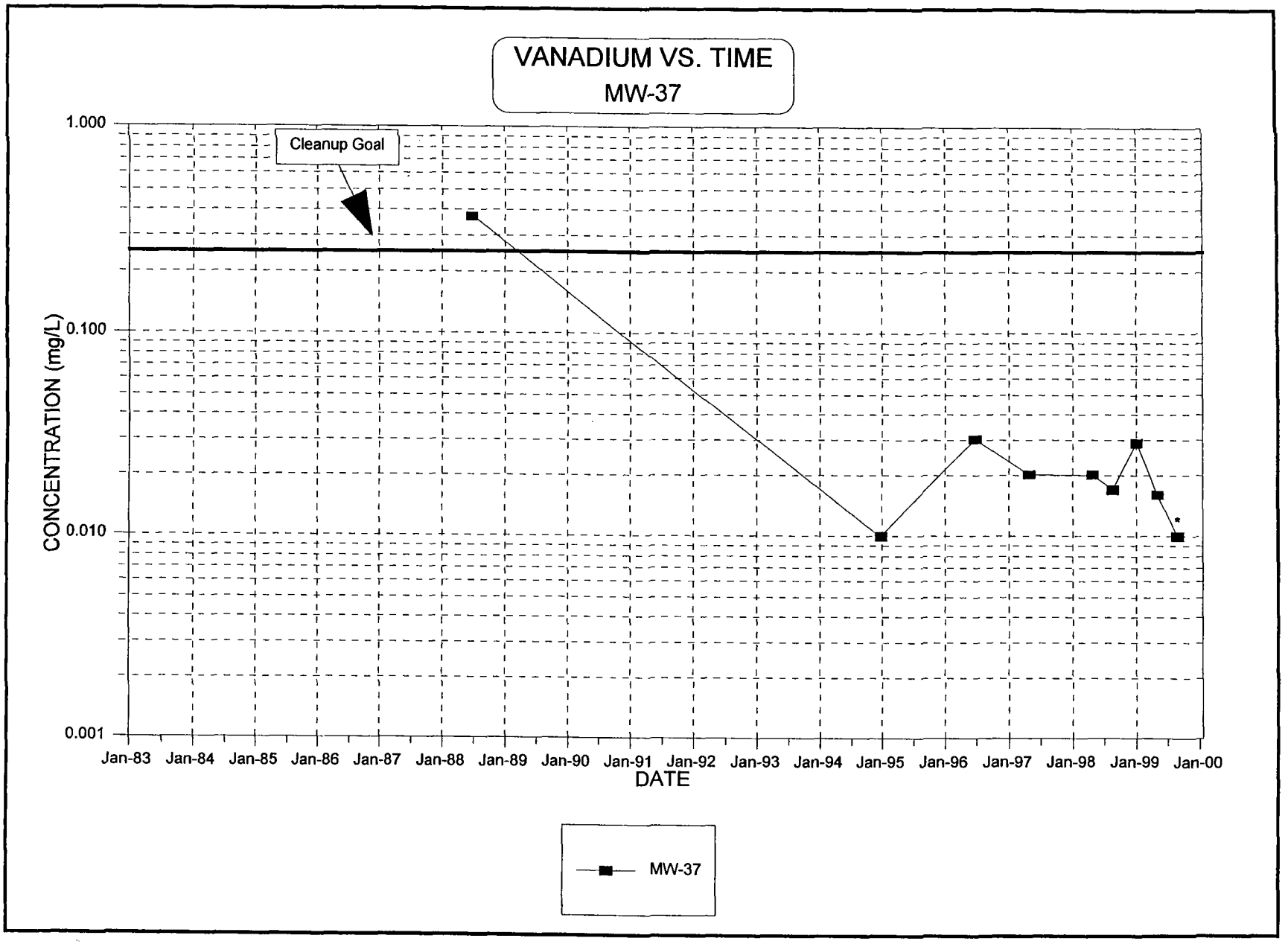
* = Below detection. Value plotted is detection limit.



* = Below detection. Value plotted is detection limit.



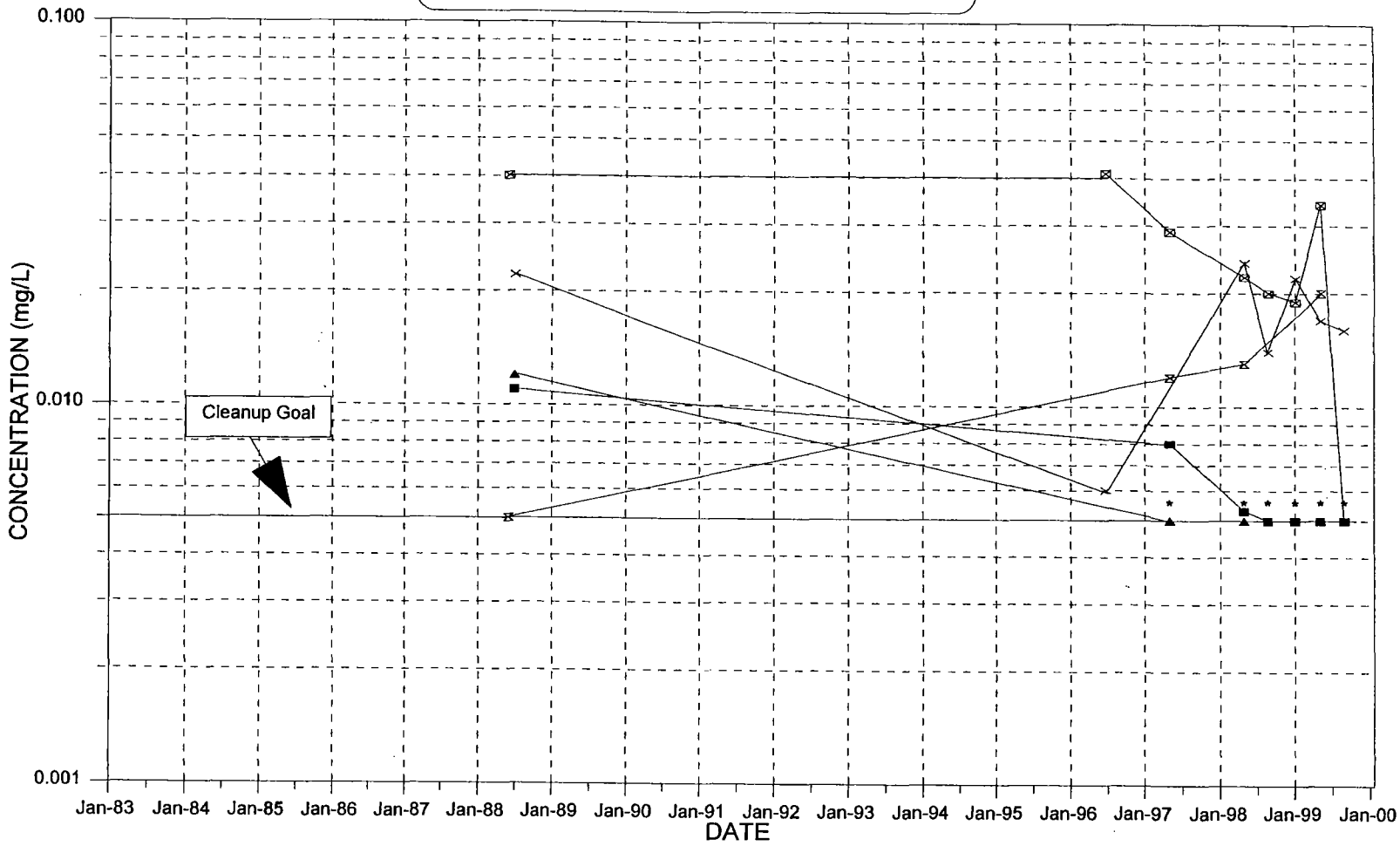
* = Below detection. Value plotted is detection limit.


VANADIUM VS. TIME
MW-37
Cleanup Goal
1.000
0.100
0.010
0.001
CONCENTRATION (mg/L)
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-37

APPENDIX D-7

TETRACHLOROETHENE

TETRACHLOROETHENE VS. TIME

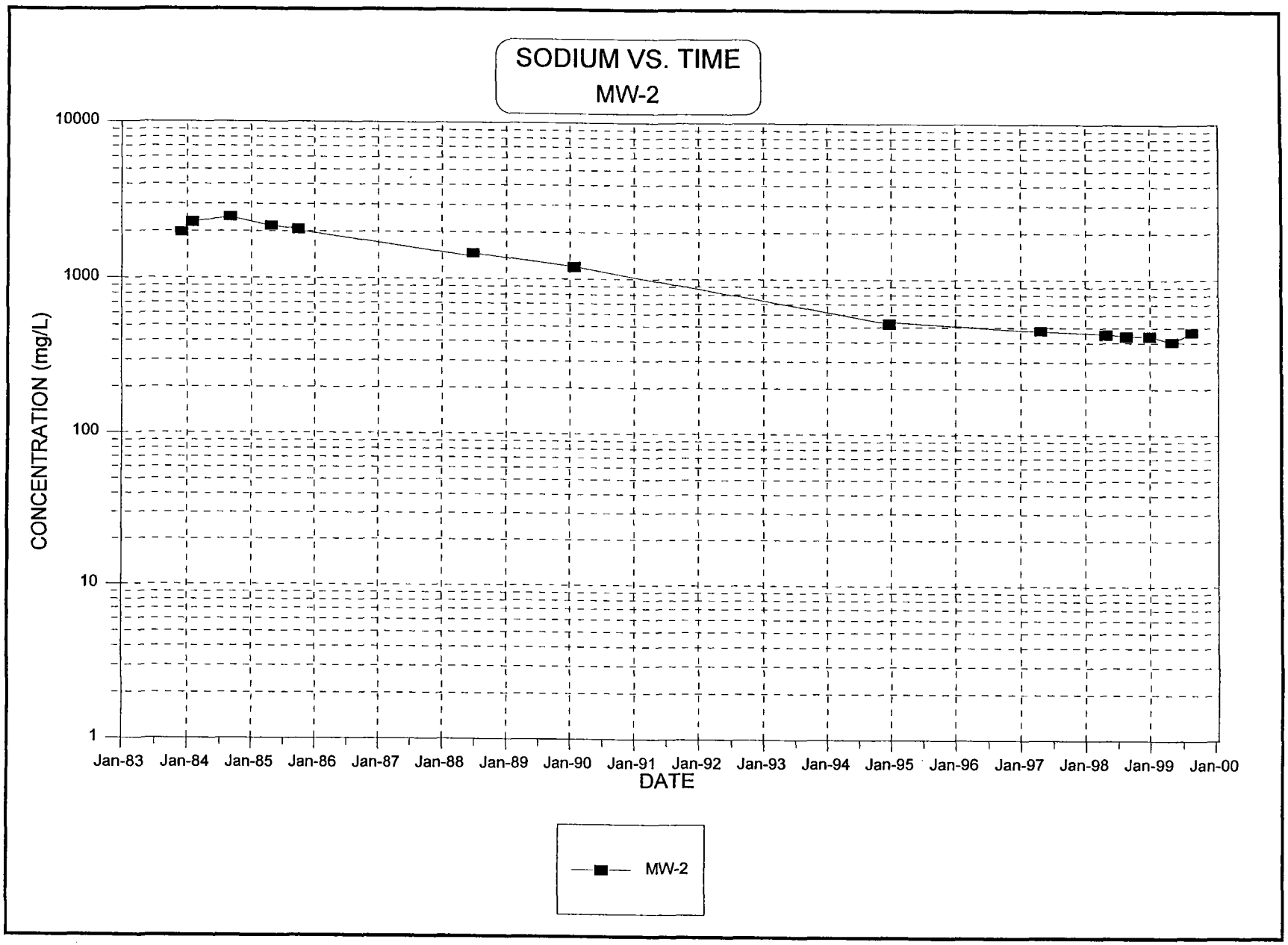


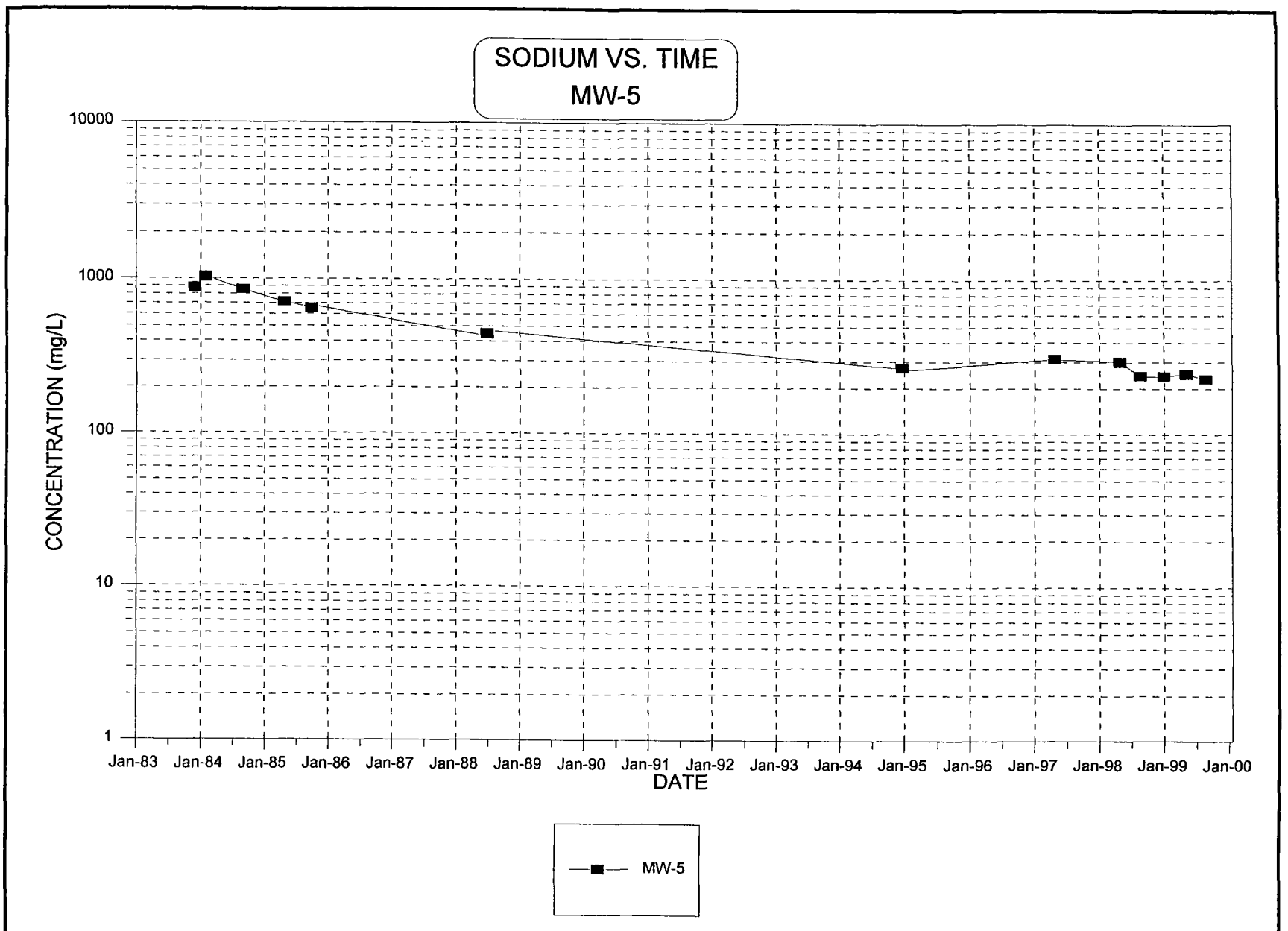
* = Below Detection. Value plotted is detection limit.

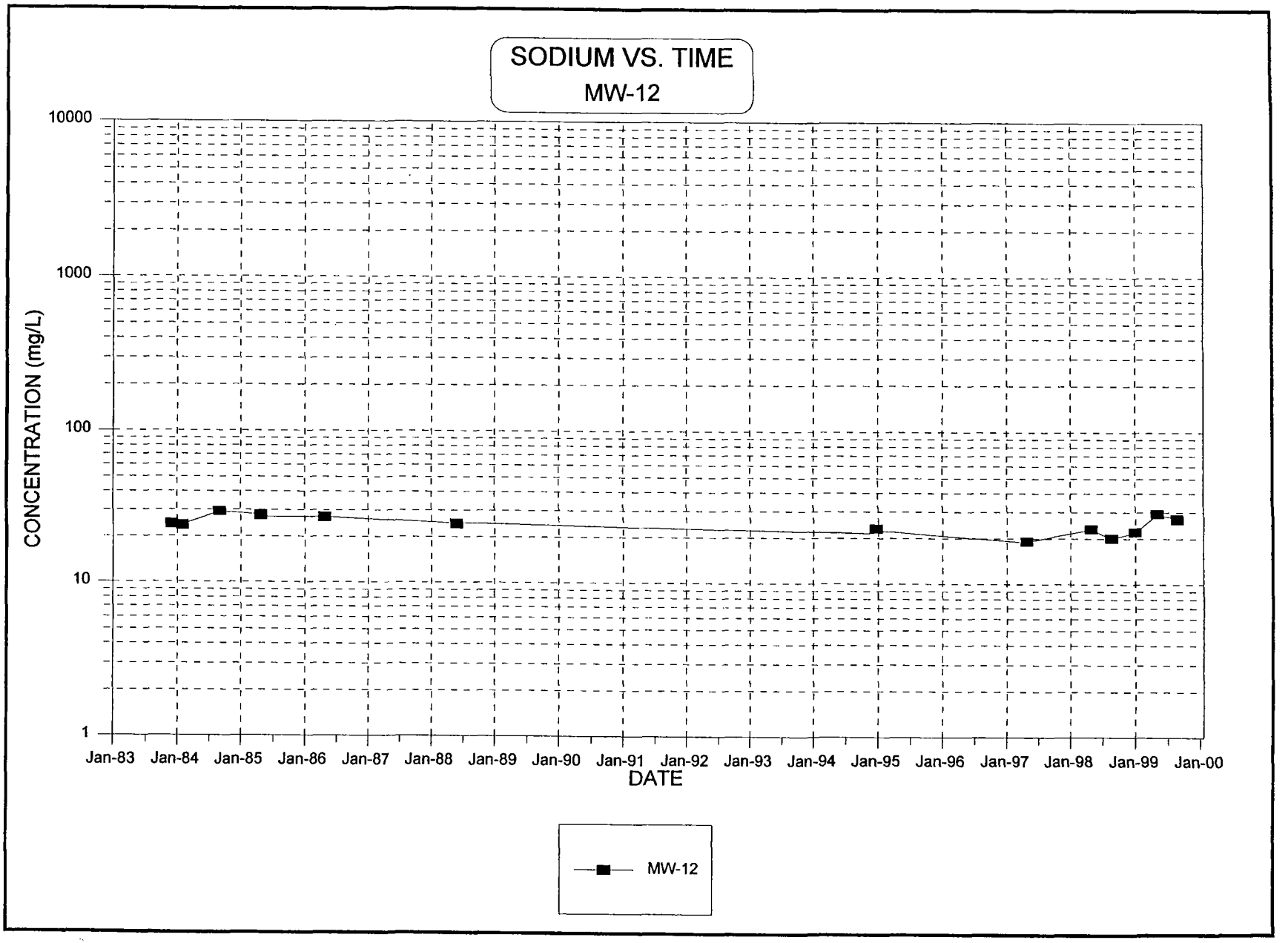
MW-2 MW-5 MW-18 MW-30 MW-31

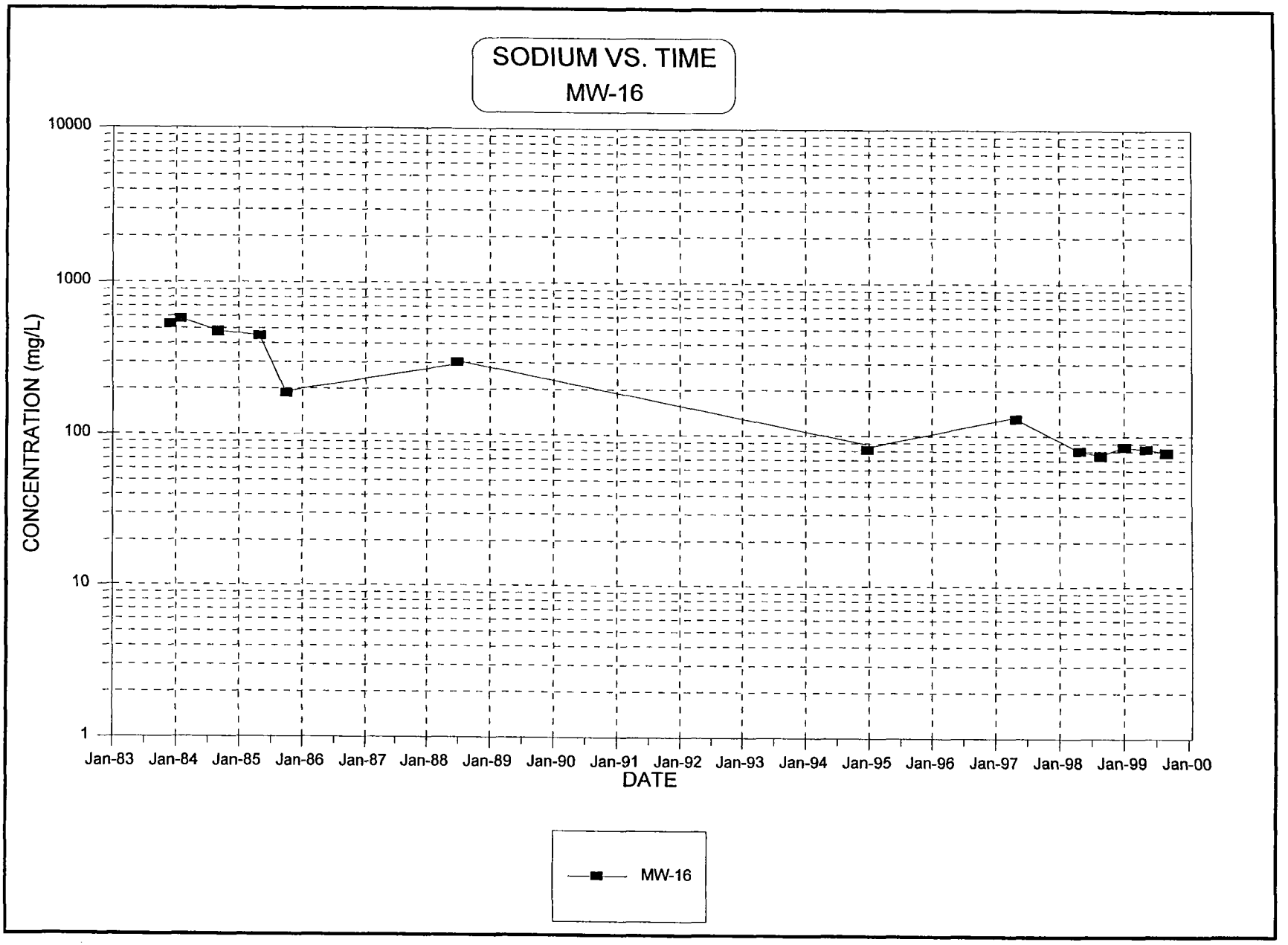
APPENDIX D-8

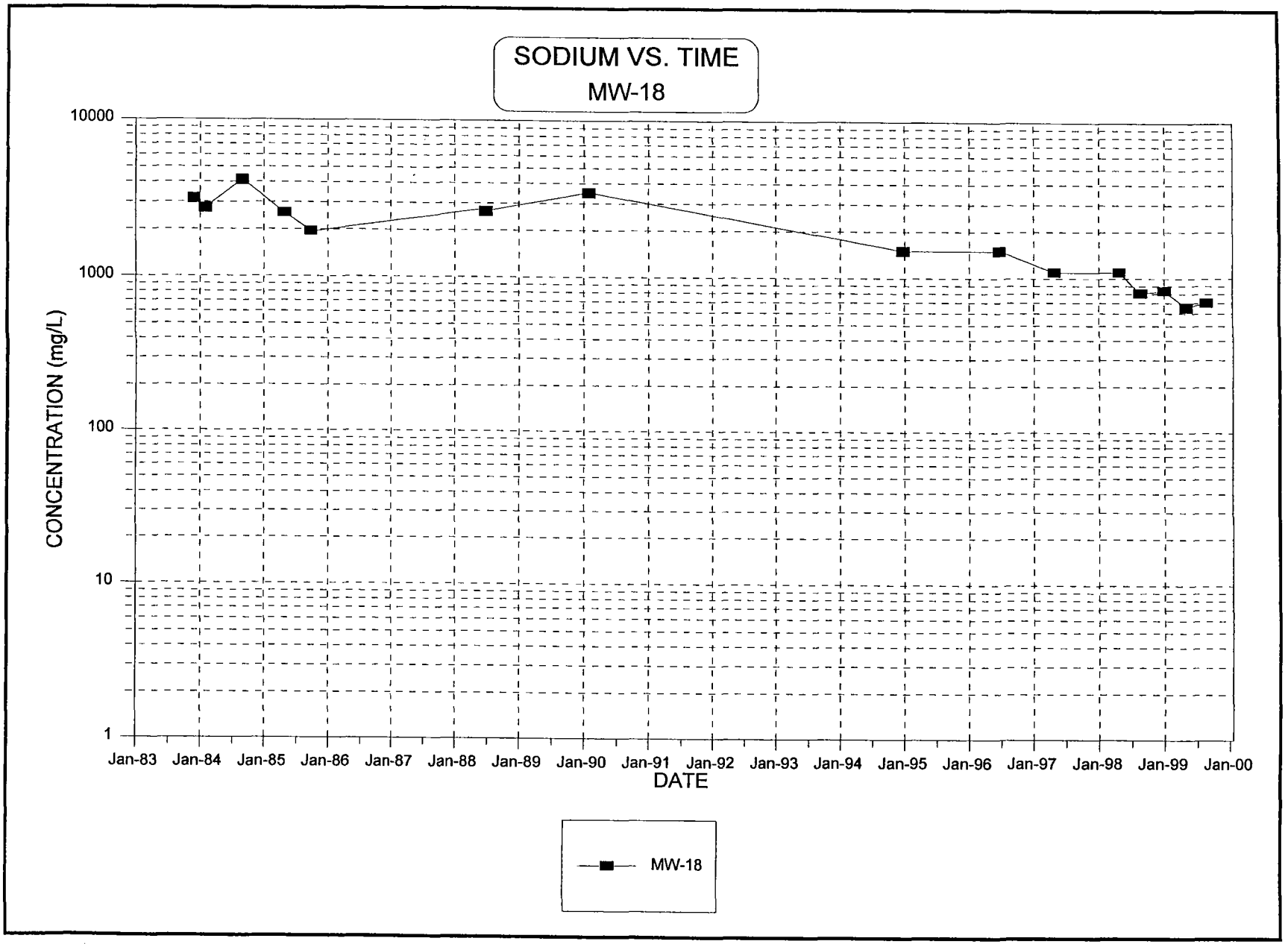
SODIUM

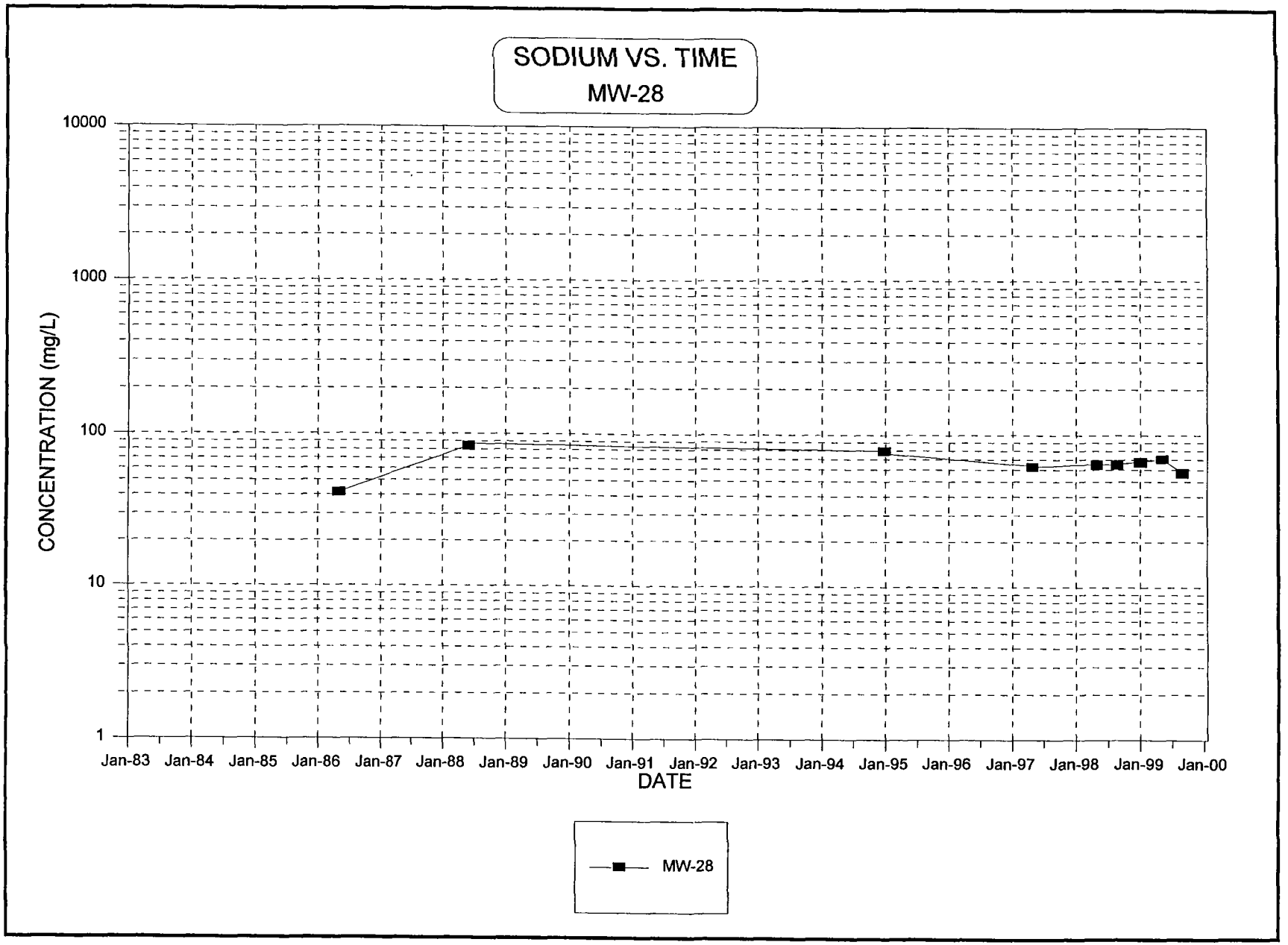

SODIUM VS. TIME
MW-2
CONCENTRATION (mg/L)
10000
1000
100
10
1
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-2

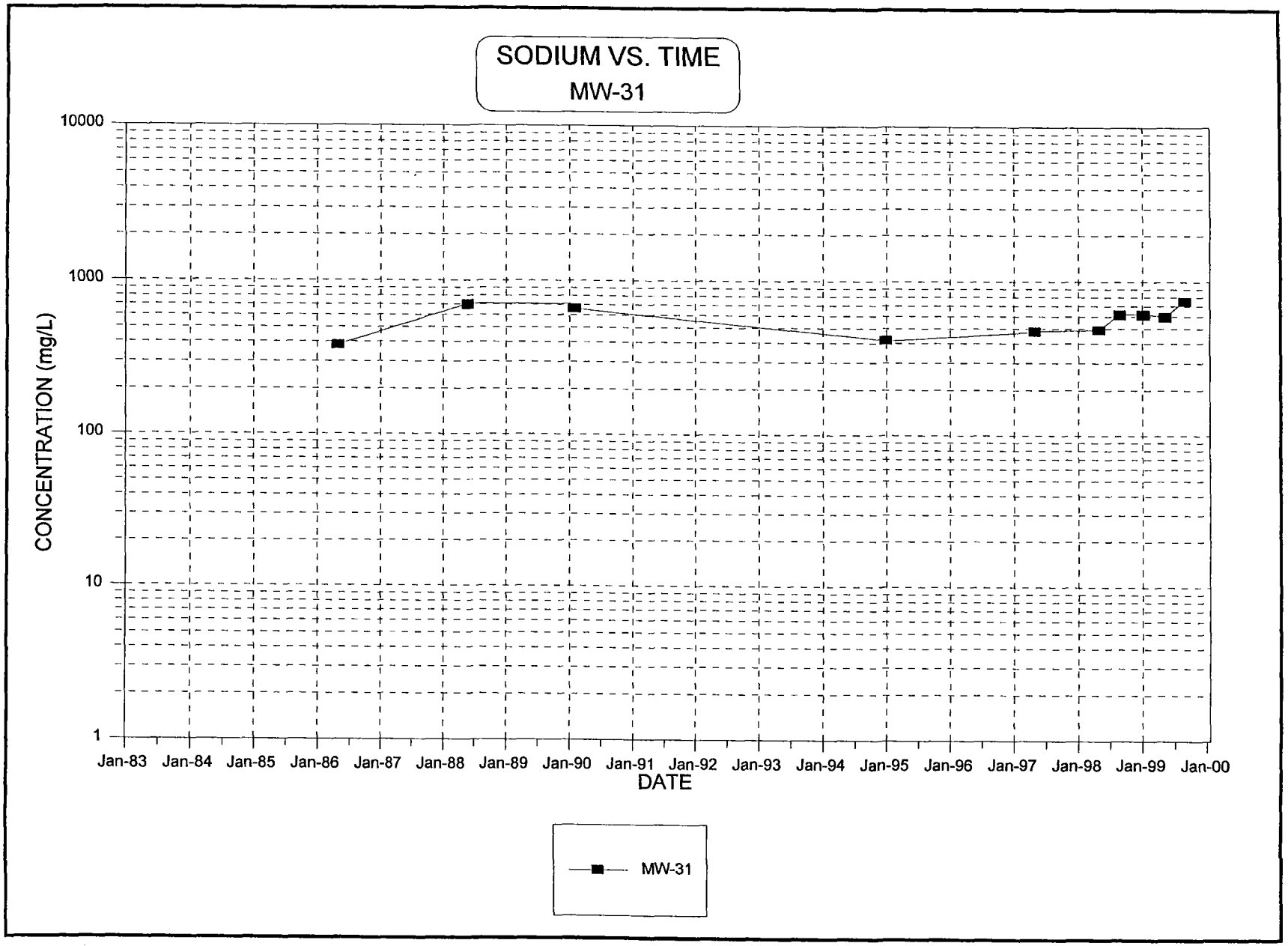

SODIUM VS. TIME
MW-5
CONCENTRATION (mg/L)
10000
1000
100
10
1
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-5

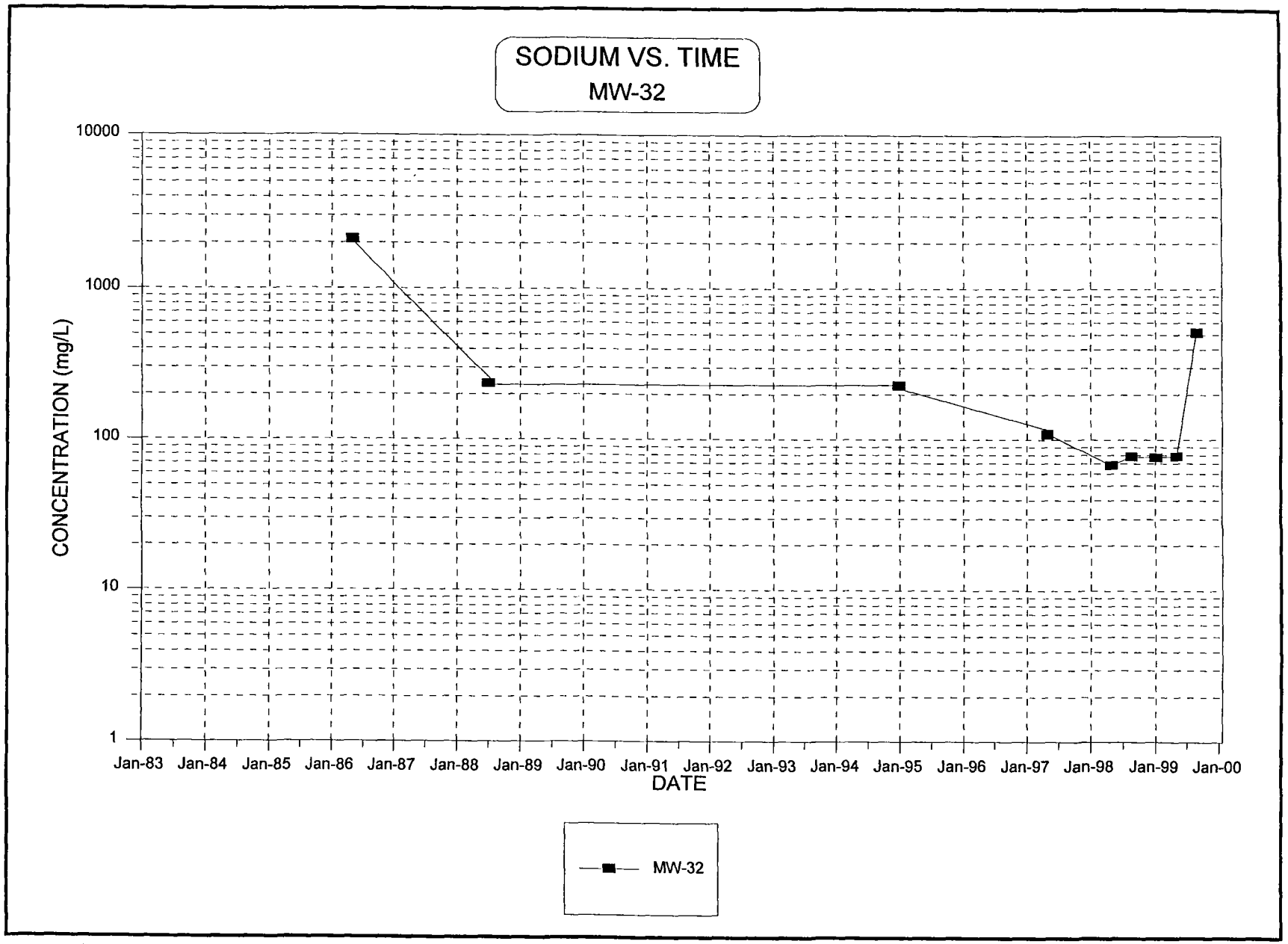

SODIUM VS. TIME
MW-12
CONCENTRATION (mg/L)
10000
1000
100
10
1
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-12

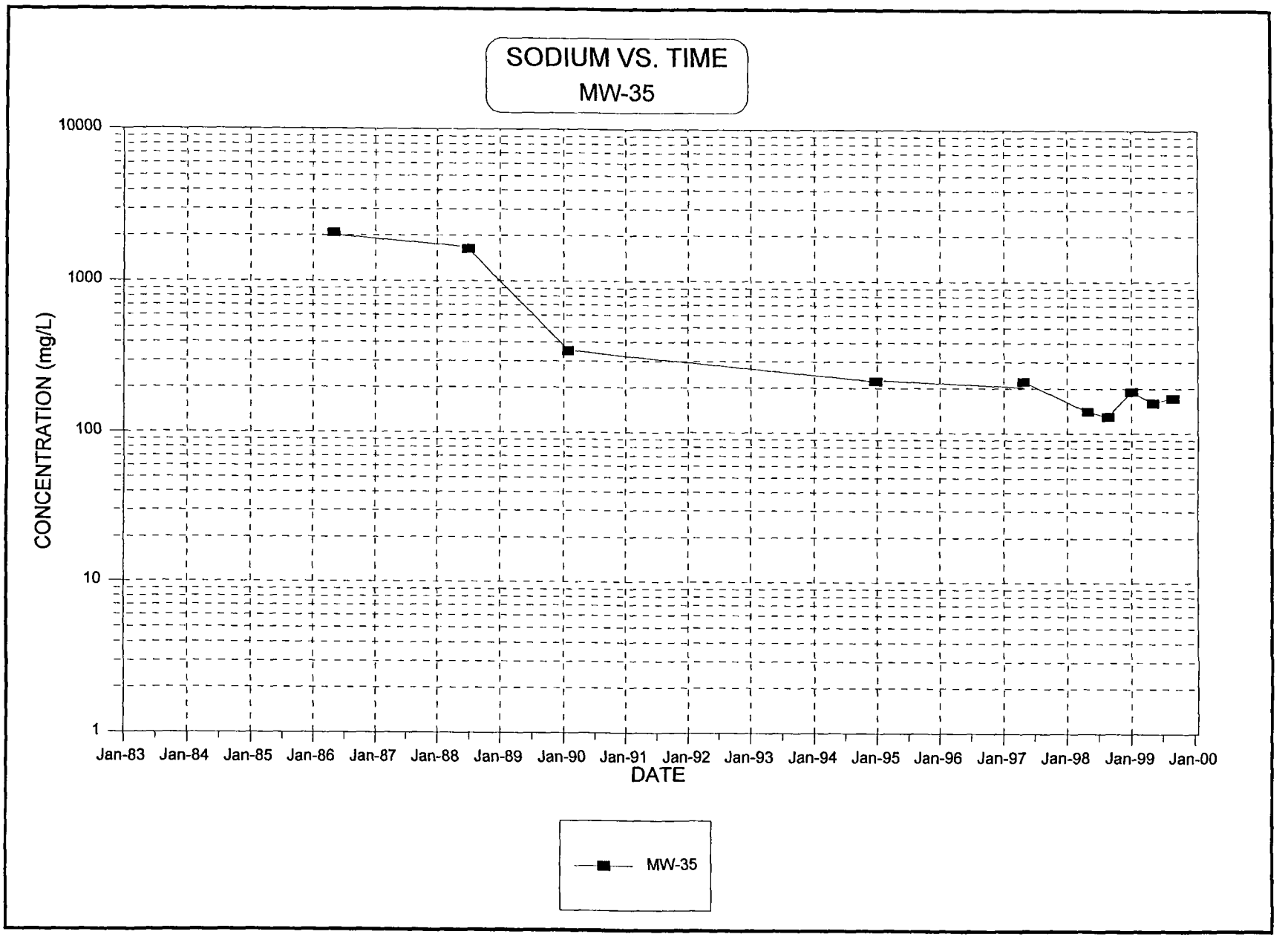

SODIUM VS. TIME
MW-16
10000
1000
100
10
1
CONCENTRATION (mg/L)
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-16

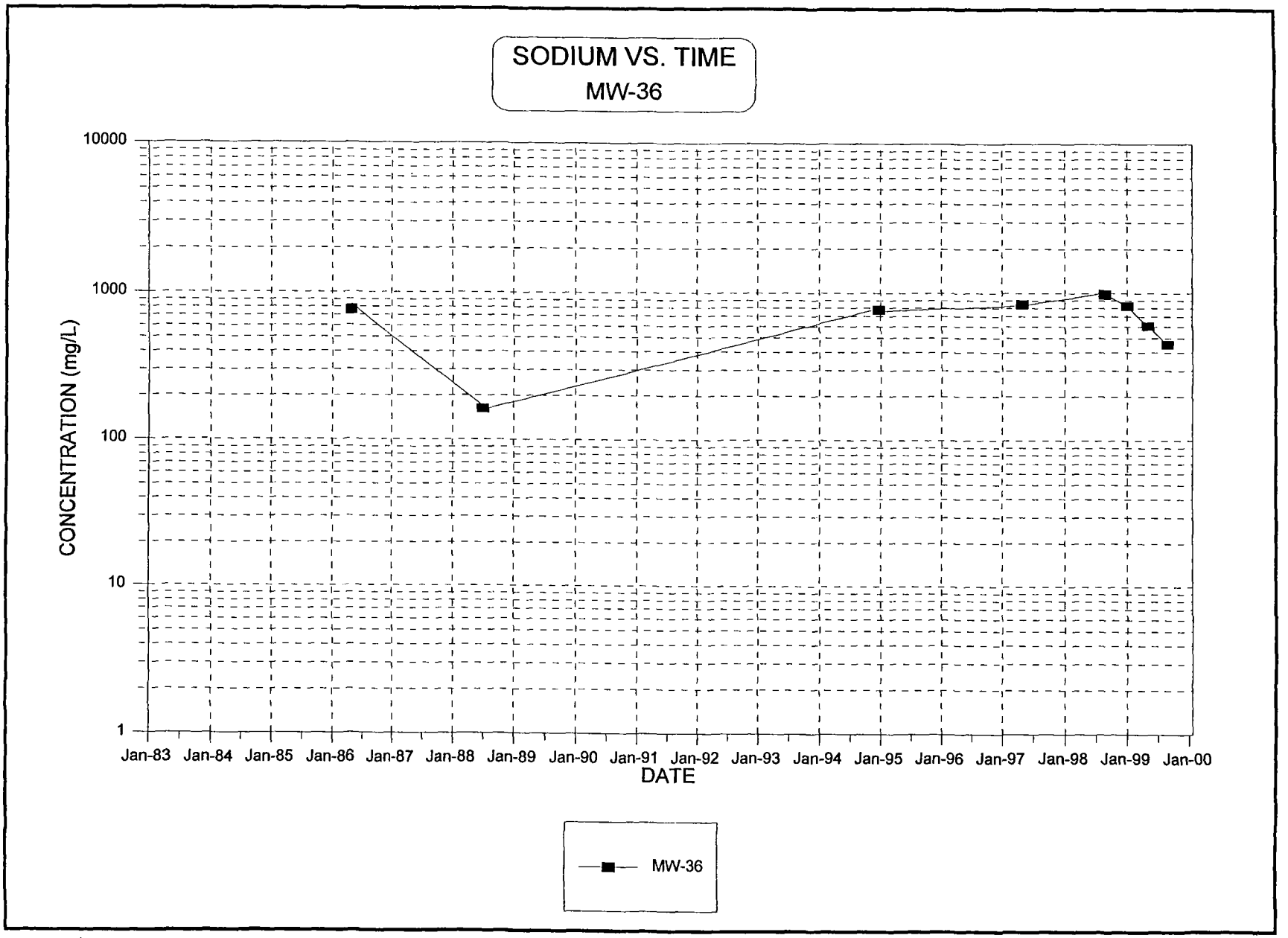

SODIUM VS. TIME
MW-18
CONCENTRATION (mg/L)
10000
1000
100
10
1
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-18

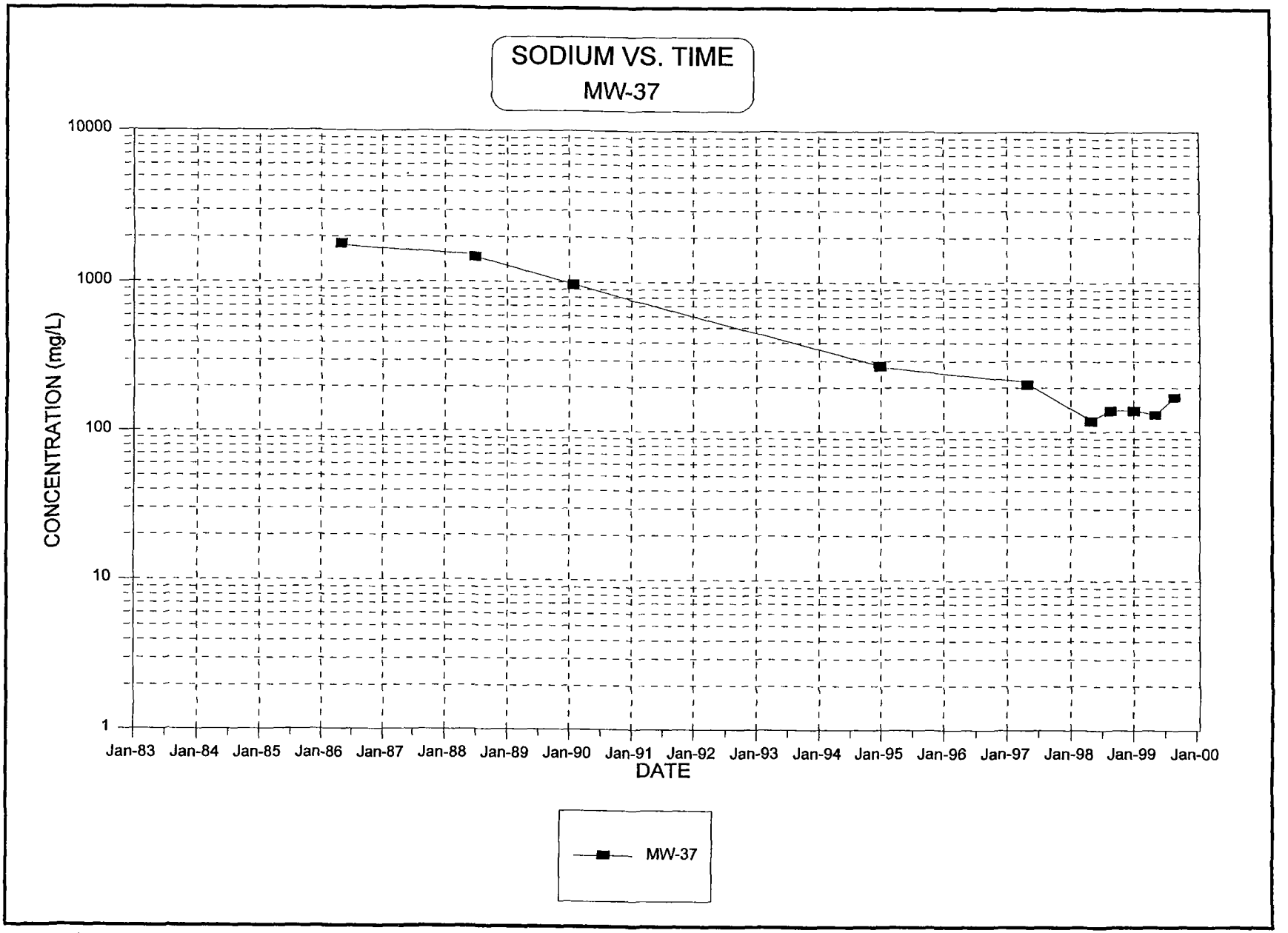

SODIUM VS. TIME
MW-28
CONCENTRATION (mg/L)
10000
1000
100
10
1
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-28


SODIUM VS. TIME
MW-31
CONCENTRATION (mg/L)
10000
1000
100
10
1
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-31


SODIUM VS. TIME
MW-32
CONCENTRATION (mg/L)
10000
1000
100
10
1
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-32


SODIUM VS. TIME
MW-35
CONCENTRATION (mg/L)
10000
1000
100
10
1
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-35


SODIUM VS. TIME
MW-36
10000
1000
100
10
1
CONCENTRATION (mg/L)
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-36


SODIUM VS. TIME
MW-37
10000
1000
100
10
1
CONCENTRATION (mg/L)
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
DATE
MW-37

APPENDIX E

CONTAMINANT MASS-IN-PLACE ESTIMATION SUPPORTING DATA

Appendix E-1 May 1999 Monitoring Event

APPENDIX E-1

MAY 1999 MONITORING EVENT

APPENDIX E-1
ANALYTICAL RESULTS FOR GROUND-WATER SAMPLES
COLLECTED MAY 1999

ORMET CORPORATION
HANNIBAL, OHIO

SAMPLE I.D.:	MW-2	MW-5	MW-7	MW-8	MW-10	MW-11	MW-12	MW-15	MW-16	MW-17
Cyanide, Total	25	1.9/2.2	<0.01	0.028	<0.01	0.024	0.026	8.5	2.8	0.46/0.49
Fluoride	67	16/16	0.16	2.4	0.41	1.7	0.73	15	9	3.2/3.2

SAMPLE I.D.:	MW-18	MW-19	MW-28	MW-29S	MW-29D	MW-30	MW-31	MW-32	MW-34S	MW-34D
Cyanide, Total	95	<0.01	0.13	0.22	0.19	0.016	29	4.4	0.19	0.062
Fluoride	370	1.3	0.35	16	3.4	0.19	130	12	6.8	3.6

SAMPLE I.D.:	MW-35	MW-36	MW-37	MW-39S	MW-39D	MW-40S	MW-40D	MW-41	MW-42S	MW-42D
Cyanide, Total	28	19	11	3.4/3.6	0.037	0.32	0.16	<0.01	0.54	0.03
Fluoride	38	150	22	120/120	3.4	30	12	0.33	26	3.4

NOTE: All results in mg/L.

99-E1a.123

APPENDIX E-1 (CONT.)
PLUME CONTOUR AREA CALCULATIONS
FOR TOTAL CYANIDE AND FLUORIDE
BASED ON RESULTS OF SAMPLING CONDUCTED MAY 1999

ORMET CORPORATION
HANNIBAL, OHIO

TOTAL CYANIDE	CONTOUR INTERVAL (from Figure 6)	CONTOUR AREA in sqare feet (estimated using CAD* software)
	>50 mg/L	18,756.50
	40-50 mg/L	24,594.65
	30-40 mg/L	84,561.15
	20-30 mg/L	208,980.25
	10-20 mg/L	250,158.69
	1-10 mg/L	500,622.20
	0.2-1 mg/L	653,181.50

TOTAL FLUORIDE	CONTOUR INTERVAL (from Figure 5)	CONTOUR AREA in sqare feet (estimated using CAD* software)
	>300 mg/L	7,865.73
	200-300 mg/L	11,463.89
	100-200 mg/L	74,492.33
	>100 (tp/rt) mg/L	21,087.57
	>100 (bt/rt) mg/L	12,664.49
	50-100 (center) mg/L	180,338.67
	50-100 (tp/rt) mg/L	28,595.61
	50-100 (bt/rt) mg/L	23,951.90
	10-50 mg/L	1,173,318.20

* CAD - Computer Aided Drafting

99-E1b.123

APPENDIX E-1 (CONT.)
AVERAGE AQUIFER THICKNESS CALCULATIONS
WITHIN EACH PLUME CONTOUR INTERVAL
BASED ON RESULTS OF SAMPLING CONDUCTED MAY 1999

ORMET CORPORATION
HANNIBAL, OHIO

TOTAL CYANIDE

CONTOUR INTERVAL (from Figure 6)	MONITORING WELL ID	AQUIFER THICKNESS (in feet)	AVERAGE AQUIFER THICKNESS (b, in feet)
>50 mg/L	MW-18	21	21
40-50 mg/L	MW-18 MW-31	21 20	21
30-40 mg/L	MW-2 MW-18 MW-31	28 21 20	23
20-30 mg/L	MW-2 MW-31 MW-35	28 20 11	20
10-20 mg/L	MW-32 MW-36 MW-37	16 14 16	15
1-10 mg/L	MW-5 MW-16 MW-32 MW-15 MW-28 MW-39	27 34 16 20 25 41	27
0.2-1 mg/L	MW-42 MW-29 MW-40 MW-28	45 41 38 25	37

99-E1c.123

APPENDIX E-1 (CONT.)
AVERAGE AQUIFER THICKNESS CALCULATIONS
WITHIN EACH PLUME CONTOUR INTERVAL
BASED ON RESULTS OF SAMPLING CONDUCTED MAY 1999

ORMET CORPORATION
HANNIBAL, OHIO

FLUORIDE

CONTOUR INTERVAL (from Figure 5)	MONITORING WELL ID	AQUIFER THICKNESS (in feet)	AVERAGE AQUIFER THICKNESS (b, in feet)
>300 mg/L	MW-18	21	21
200-300 mg/L	MW-18 MW-31	21 20	21
100-200 mg/L	MW-18 MW-31	21 20	21
>100 (tp/rt) mg/L	MW-36	14	14
>100 (bt/rt) mg/L	MW-39	41	41
50-100 (center) mg/L	MW-2 MW-31	28 20	24
50-100 (tp/rt) mg/L	MW-36	14	14
50-100 (bt/rt) mg/L	MW-39	41	41
10-50 mg/L	MW-5 MW-40 MW-29 MW-42 MW-16 MW-32 MW-15 MW-37 MW-35	27 38 41 45 34 16 20 16 11	28

99-E1d.123

APPENDIX E-1 (CONT.)
TOTAL CYANIDE AND FLUORIDE MASS-IN-PLACE
CALCULATION WORKSHEET
BASED ON RESULTS OF SAMPLING CONDUCTED MAY 1999

ORMET CORPORATION
HANNIBAL, OHIO

	Contour Interval (from Figure 6)	Contour Interval Area (in square feet) A	Average Aquifer Thickness (in feet) b	1. Aquifer Volume (in cubic feet) VA	Aquifer Porosity n	2. Volume of Ground Water (in cubic feet) Vgw	3. Volume of Ground Water (in Liters) Vgw	Average Concentration (mg/L) Cwi	4. Mass-in-Place for each interval (in mg) Mi	5. Mass-in-Place for each interval (in lbs) Mi
TOTAL CYANIDE	>50 mg/L	18,757	21	393,897	0.25	98,474	2,788,784	72.5	202,186,840	446
	40-50 mg/L	24,595	21	516,495	0.25	129,124	3,656,792	45.0	164,555,640	363
	30-40 mg/L	84,561	23	1,944,903	0.25	486,226	13,769,920	35.0	481,947,200	1,063
	20-30 mg/L	208,980	20	4,179,600	0.25	1,044,900	29,591,568	25.0	739,789,200	1,631
	10-20 mg/L	250,159	15	3,752,385	0.25	938,096	26,566,879	15.0	398,503,185	879
	1-10 mg/L	500,622	27	13,516,794	0.25	3,379,199	95,698,916	5.5	526,344,038	1,161
	0.2-1 mg/L	653,182	37	24,167,734	0.25	6,041,934	171,107,571	0.6	10,266,455	23
									TOTAL Cyanide Mw:	5,566
FLUORIDE	(from Figure 5)									
	>300 mg/L	7,866	21	165,186	0.25	41,297	1,169,531	335	391,792,885	864
	200-300 mg/L	11,464	21	240,744	0.25	60,186	1,704,468	250	426,117,000	940
	100-200 mg/L	74,492	21	1,564,332	0.25	391,083	11,075,471	150	1,661,320,650	3,663
	>100 mg/L (top rt)	21,088	14	295,232	0.25	73,808	2,090,243	125	261,280,375	576
	>100 mg/L (bt rt)	12,644	41	519,224	0.25	129,806	3,676,106	110	404,371,660	892
	50-100 mg/L (mid)	180,339	24	4,328,136	0.25	1,082,034	30,643,203	75	2,298,240,225	5,068
	50-100 mg/L (top rt)	28,596	14	400,344	0.25	100,086	2,834,436	75	212,582,700	469
	50-100 mg/L (bt rt)	23,952	41	982,032	0.25	245,508	6,952,787	75	521,459,025	1,150
	10-50 mg/L	1,173,318	28	32,852,904	0.25	8,213,226	232,598,560	30	6,977,956,800	15,386
									TOTAL Fluoride Mw:	29,008

1. VA = A x b
2. Vgw = VA x n
3. Vgw in ft3 multiplied by 28.32 L/ft3 = Vgw in Liters
4. Mi = Vgw x Cwi
5. Mi in mg divided by 1000 mg/g multiplied by 2.205x10-3 lb/g = Mi in pounds

99-E1e.123