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VCP - V

BCP - C



June 9, 2005

Mr. Charles Burke, P.E.  
Risk Management Department  
National Fuel Gas Distribution Corp.  
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**Re: Annual Operations and Maintenance Report, 2005  
Mineral Springs Road Site**

Dear Charlie:

The following is an annual report documenting the results of the site-wide operations and maintenance program being implemented at National Fuel Gas Distribution Corporation's (NFG) Mineral Springs Road former manufactured gas plant (MGP) site under Voluntary Cleanup Agreement B9-0538-98-08 and as described in the Final Engineering Report – Volume II, Operations and Maintenance Plan, dated May 2002.

### **Evaluation of Groundwater and Surface Water Monitoring Results**

The Mineral Springs groundwater and surface water monitoring program includes sample collection and analysis from 13 monitoring wells and two surface water locations. Depth-to-water measurements are taken at 14 monitoring wells and one surface water location. The groundwater and surface water analytical results (from August 1995 to date) are tabulated in Appendix A1 and presented graphically in Appendix A2. Sampling locations are shown in Figure 1.

### **Groundwater Elevations and Flow**

Groundwater flows onto the site from the east and southeast, then flows to the west and northwest towards Calais Street, Mineral Springs Road, and ultimately to the Buffalo River. On-site groundwater also appears to discharge to the Class D Stream, which in turn discharges to the Calais Street storm sewer and the municipal wastewater treatment system.

Groundwater elevations fluctuate approximately 3 feet over the year, with highest elevations measured in April and lowest in June through November. Assuming an aquifer conductivity of approximately  $4.5 \times 10^{-2}$  cm/sec, groundwater velocity across the site would be in the magnitude of 3 feet per day.

### **Sampling and Analysis**

The primary constituents of interest (COI) are the MGP indicators BTEX, PAHs, and cyanide. Groundwater and surface water samples are analyzed using some or all of the following methods:

BTEX	Method SW846 8260B
PAHs	Method SW846 8270C
Cyanide (free)	Method ASTM D4282-89
Cyanide (total)	Method SW864 9012A

All sampling and analysis is conducted according to The RETEC Group, Inc.'s (RETEC) Standard Operating Procedures as provided in the project Quality Assurance Plan (QAP) of June 11, 1999. Cyanide sampling methods were further refined to include protecting the samples from sunlight and field verification of the sample pH following preservation. Prior to preservation, sulfide abatement is also performed for each cyanide sample by adding powdered lead carbonate, followed by sample filtration and pH adjustment. This sample pretreatment protocol is per Method 4500-CN<sup>-</sup> (American Public Health Association, 1998). Only samples from MW-16 routinely show significant clouding, indicative of the presence of filterable quantities of sulfide.

Duplicate total and free cyanide analyses have been performed by Exygen Research (Exygen) and Clarkson University (Clarkson), as discussed in correspondence to the New York State Department of Environmental Conservation (NYSDEC) dated May 20 and October 14, 2004. The purpose of the duplicate analyses was to provide additional quality control (the ASTM analytical method for free cyanide requires highly skilled work and has potential for error). Clarkson was selected because of their involvement in the EPA's inter-laboratory validation study for the ASTM method.

Severn Trent Laboratories (STL) performed the BTEX and PAH analyses of groundwater and surface water samples.

### **Analytical Results and Conclusions**

Groundwater and surface water analytical results (1995 to date) are tabulated and graphed in Appendices A1 and A2. The locations, sampling objectives, and a discussion of the analytical results for each of the specific areas of interest at the site are provided in the following sections.

#### ***Upgradient Site Perimeter***

Well MW-17 is located on NFG property in the southeast corner of the site and monitors upgradient groundwater quality.

Other than total cyanide, MGP COI are not typically present in detectable concentrations in the upgradient groundwater. The total cyanide concentration at MW-17 has ranged from below the detection limit to 378 µg/L, and appears to be increasing over time. Free cyanide is not typically detected at MW-17.

#### ***Downgradient Site Perimeter***

Wells MW-20 and MW-21 are located downgradient of the western boundary of the site on Calais Street. Wells MW-13, MW-14, MW-22, and MW-23 are located just inside the northern property boundary near Mineral Springs Road. These six "sentinel" wells monitor groundwater quality at the

downgradient perimeter of the site. The sentinel wells are typically analyzed for total and free cyanide only. On an annual basis, MW-13 and MW-23 are also analyzed for BTEX and PAHs.

Low concentrations of benzene are occasionally detected at MW-13. BTEX and PAHs are not otherwise detected in MW-13 or MW-23 and off-site groundwater does not appear to be impacted by hydrocarbon COI from the Mineral Springs site.

All six of the sentinel wells contain, or have periodically contained, total cyanide in concentrations above the NYSDEC groundwater standard of 200 µg/L. Total cyanide concentrations may be increasing over time in some wells, but decreasing in others. The average downgradient perimeter concentration has ranged between 424 µg/L and 650 µg/L, and appears to be declining over time (see Appendix A-2, page 2). Free cyanide has also occasionally been detected in the sentinel wells.

#### *On-site Purifier Residuals Impacted Areas*

Wells MW-12 and MW-16 monitor groundwater quality at locations of known subsurface deposits of gas purifier residuals. These deposits were remediated by capping. Samples from these two wells are typically analyzed for total and free cyanide only.

There does not appear to be a significant trend towards increase or reduction over time at MW-12. Concentrations at MW-16 appear to have declined and rebounded over time. Free cyanide has occasionally been detected in samples from both of these wells.

#### *On-site Hydrocarbon Impacted Areas*

Wells MW-7, MW-10, MW-11A, and MW-19 monitor on-site groundwater at locations downgradient of hydrocarbon-impacted subsurface soil. Samples from these wells are typically analyzed for BTEX and PAHs.

BTEX and PAH compounds are not typically detected in MW-10. BTEX concentrations in MW-7 and MW-19 have fluctuated, with apparent declines and rebounds over time. BTEX and PAH concentrations in MW-11A have been in decline since its installation in July 2003.

#### *Surface Water*

Surface water samples are collected at the Calais Street storm sewer inlet (SW-01) and at the Eastern Drainage Ditch near the Class D Stream (SW-02). These surface sampling locations monitor the effectiveness of the Eastern Drainage Ditch Cap and also monitor the concentrations of COI in surface water at its most downgradient location at the Mineral Springs site.

BTEX and PAHs are not typically detected in the surface water samples. Total cyanide is usually detected, though at concentrations below standards. Free cyanide has been sporadically detected, also typically at low concentrations, with rare exceedances of the surface water standard (22 µg/L).

### *QA/QC*

Quality control samples, consisting of duplicates, equipment blanks, and trip blanks, are collected during the sampling events to meet the requirements of the project QAP. With rare exception, the results are within acceptable ranges.

Clarkson and Exygen have generally reported comparable concentrations of total cyanide (with some exceptions) in the duplicate sets of analyses performed over the past four sampling events. Clarkson's free cyanide concentrations, however, are generally lower and have fewer detections than Exygen's. This difference could be explained by inter-laboratory differences in analytical practices and sample handling. The iron cyanide complexes that are a by-product of the former gas purification process (and the source of cyanide impacts at the site) are known to be relatively stable, but will partially degrade in sunlight to produce free cyanide. It is therefore anticipated that detections of free cyanide would occur in conjunction with total cyanide in surface water at the site. Free cyanide should not, however, be routinely prevalent in iron cyanide impacted groundwater, unless the samples are over-exposed to sunlight or the laboratory has difficulty with the analytical method.

Because of Clarkson's qualifications and their lower achievable detection limit, Clarkson's cyanide data, both total and free, may be more reliable than Exygen's. It is our intention, beginning with the next sampling event, to halt the use of duplicate cyanide labs and to send cyanide samples to Clarkson only. Hydrocarbon samples will continue to be sent to STL.

### DNAPL Recovery Test System Evaluation

The groundwater monitoring program includes periodic checking of the DNAPL Recovery Test Well (RTW-01) and recovery of any accumulated DNAPL.

The total measurable volume of DNAPL recovered to date has remained at less than 100 gallons, nearly all of which was recovered in the initial month of system operations in 2001. In the past 12 months, less than 250 ml has been recovered.

### Site Inspection and Maintenance

An annual site inspection was conducted on April 19, 2005 by Mr. Mark Hofferbert, P.E. (RETEC). The inspection checklist is included as Appendix B and the observations are discussed below.

#### **Clay Caps**

Clay caps are located behind Building 14 and in the Eastern Drainage Ditch north of the northern culvert and south of the southern culvert.

The clay cap behind Building 14 has been mowed periodically to prevent tree growth. No erosion or blue-stained soils (purifier residuals) were visible. Active woodchuck dens were observed at the upgradient edge of the cap and should be controlled.

In the clay-capped sections of the Eastern Drainage Ditch, no erosion, woodchuck or muskrat dens, deep-rooted perennial plant species, or hydrocarbon sheen were detected.

### Geomembrane Caps

Geomembrane caps, constructed of 40-mil HDPE and soil or stone cover, are located in the Eastern Swale and in the Eastern Drainage Ditch between the culverts.

The Eastern Swale cap has been mowed periodically. No erosion, HDPE plastic or geofabric, woodchuck dens, or blue-stained surface soil were visible.

The Eastern Drainage Ditch cap is located below an 18-inch diameter HDPE drain pipe. The pipe flow was low, but there was no erosion, woodchuck or muskrat dens, deep-rooted perennial plant species, or hydrocarbon sheen observed. Some debris was observed to have collected in the trash grates and should be removed. The "no dig" signage was in place.

### Asphalt Caps

The asphalt caps are located south and east of Building 3, and north and south of the Eastern Swale.

No blue-stained surface soil was visible in the area. The edges of the caps have been mowed periodically.

Some cracking of the asphalt surface was observed south of Building 3. The cap includes a layer of low-permeability Petromat, so surface water intrusion should not be a significant issue at this time. For long term protection of the asphalt, however, the cracks should be repaired this year or next.

### Other Areas

Throughout the remainder of the site, no tar boils or blue-stained soils were observed.

No hydrocarbon sheens were observed in the Class D Stream or the Eastern Drainage Ditch.

The compacted backfill placed in the various former Tar Boils and Separator Pit excavations has been maintained as necessary to assure run-off control.

The site perimeter security fence was observed to be intact except for approximately 20 feet of damage (near MW-23) due to a fallen tree.

During the April 2005 groundwater sampling event, monitoring well MW-14 was observed to have been severely damaged, probably by a snow plow. The well was not sampled at that time and should be reconstructed by a qualified contractor prior to the next sampling event.

An Annual Certification of Institutional/Engineering Controls is attached in Appendix C.

Mr. C. Burke  
June 9, 2005  
Page 6 of 6

### Recommendations

RETEC recommends that we continue the long-term groundwater monitoring program, but, based on the quality of the data set generated to date, we also recommend reducing the number of sampling events to two per year, i.e. one in April (high groundwater elevation period) and one in July/August (low elevation).

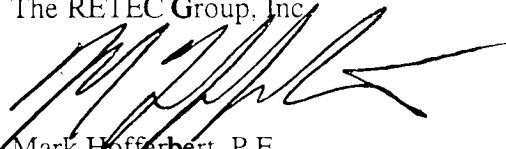
RETEC recommends that we discontinue submittal of (duplicate) total and free cyanide samples to Exygen and that we select Clarkson to perform the cyanide analyses henceforth.

Our additional recommended actions are to:

- Reconstruct MW-14,
- Repair the chain link fence near MW-22, and
- Consider patching the asphalt cracks south of Building 3 before they expand significantly.

Please call me with questions at 607-277-5716.

Sincerely,  
The RETEC Group, Inc.



Mark Hofferbert, P.E.  
Project Engineer

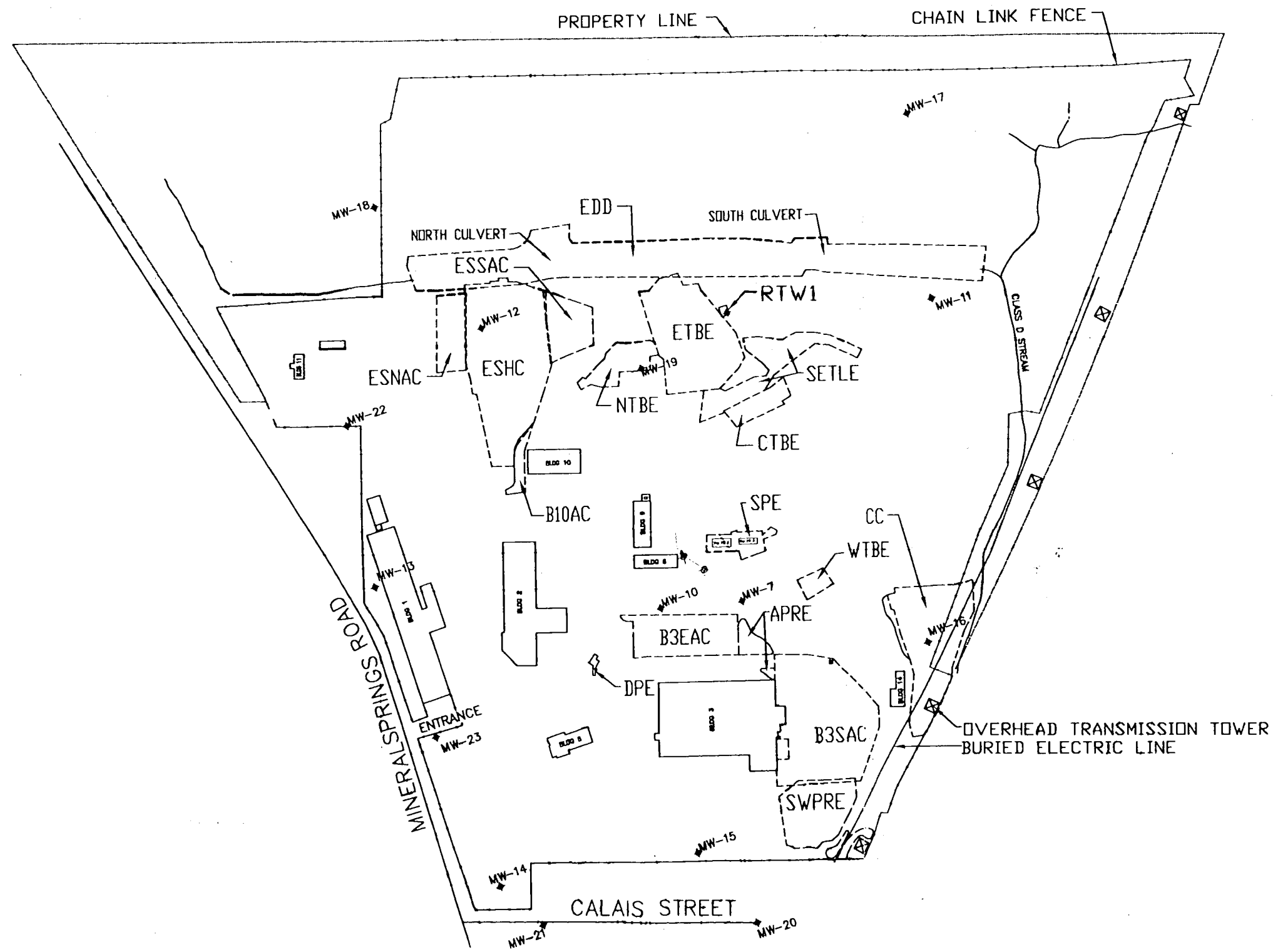
### Attachments:

Figure 1 - Site Plan  
Appendix A1 - Groundwater and Surface Water Analytical Results (Tables)  
Appendix A2 - Groundwater and Surface Water Analytical Results (Graphs)  
Appendix B - Annual Site Inspection Form  
Appendix C - Certification of Institutional/Engineering Controls

cc: T. Alexander - NFG  
J. Loesch - NFG  
D. Szymanski - NYSDEC  
M. Doster - NYSDEC  
G. Bailey - NYSDEC  
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D. Flynn - Phillips Lytle  
File: NFGD3-14852-400

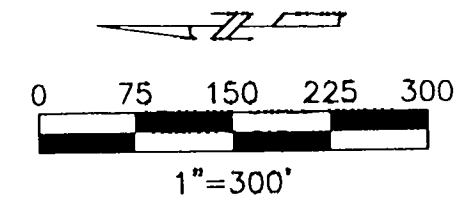
**Figure**





# LEGEND

	EXISTING STRUCTURE
	REMEDIAL CONSTRUCTION
	MONITORING WELLS
APRE	ADDITIONAL PURIFIER RESIDUALS EXCAVATION
B3EAC	BUILDING 3 EAST ASPHALT CAP
B3SAC	BUILDING 3 SOUTH ASPHALT CAP
B10AC	BUILDING 10 ASPHALT CAP
CC	CLAY CAP
CTBE	CENTRAL TAR BOILS EXCAVATION
DPE	DIESEL PAD EXCAVATION
EDD	EASTERN DRAINAGE DITCH
ESHC	EASTERN SWALE HDPE CAP
ESNAC	EASTERN SWALE NORTH ASPHALT CAP
ESSAC	EASTERN SWALE SOUTH ASPHALT CAP
ETBE	EASTERN TAR BOILS EXCAVATION
NTBE	NORTHERN TAR BOILS EXCAVATION
RTW1	RECOVERY TEST WELL AND DNAPL SHED
SETLE	SOUTHEASTERN TAR LENSES EXCAVATION
SPE	SEPARATOR PITS EXCAVATION
SWPRE	SOUTHWEST RESIDUALS EXCAVATION
WTBE	WESTERN TAR BOILS EXCAVATION



**Appendix A1**

**Groundwater and Surface Water  
Analytical Results  
Tables**

Mineral Springs

All units ug/L

MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07
DATE	Aug-95	May-96	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
Benzene	3320	1210	4900		5100	5200	4800	3900	3300	2700	2200	3000	2100	1800	3200	2800	2000	1700	2800
Toluene	389	20	750		2000	2700	2500	3400	1700	1500	1200	1400	1200	990	1700	1800	1300	930	1100
Ethylbenzene	2400	410	2900		3700	3600	3300	2000	2100	2300	1900	2200	1900	1900	2700	2500	2500	1800	2700
Xylene (sum of isomers)	1038	63	1200		1800	1900	1800	1600	1100	1200	1100	1100	1100	1000	1400	1200	1400	1000	1600
Total BTEX	7147	1703	9750		12600	13400	12400	10900	8200	7700	6400	7700	6300	5730	9000	8300	7200	5430	8200
Naphthalene	3270	3000	2400		4100	5900	3400	3400	3600	2200	2600	5000	3100	3800	3200	3700	2700	4600	3500
Acenaphthylene	nd	nd	nd		nd	nd	nd	2.2	nd	nd	nd	nd	nd	nd	nd	nd	3	nd	nd
Acenaphthene	240	150	180		180	180	150	140	180	80	120	150	nd	160	120	160	180	160	130
Fluorene	nd	28	45		nd	nd	nd	28	nd	nd	nd	33	nd	nd	27	nd	42	nd	24
Phenanthrene	nd	nd	37		nd	nd	nd	32	nd	nd	nd	30	nd	nd	nd	nd	38	nd	nd
Anthracene	nd	nd	nd		nd	nd	nd	3.6	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Pyrene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Anthracene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chrysene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(k)Fluoranthene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Pyrene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(g,h,i)Perylene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene							180	190	200	100	180	230	nd	280	170	270	320	300	230
Total PAHs	3510	3178	2662		4280	6080	3730	3795.8	3960	2380	2900	5443	3100	4240	3517	4130	3283	5060	3884
Cyanide, total			189																
Cyanide, total (Clarkson Univ.)																			
Cyanide, free																			
Cyanide, free (Clarkson Univ.)																			
Water Elevation (feet)		580.13	581.68	579.84	581.70	581.50	579.98	580.58	582.01	580.96	580.26	581.66	580.31	580.32	582.45	581.24	581.36	582.28	

## Mineral Springs

All units ug/L

MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10
DATE	Aug-95	May-96	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
Benzene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	1.2	nd	nd	nd	nd	nd	0.83
Toluene	nd	nd	nd		nd	nd	nd	nd	nd	0.89	nd	nd	0.81	nd	nd	nd	nd	nd	nd
Ethylbenzene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	0.9	nd	nd	nd	nd	nd	nd
Xylene (sum of isomers)	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Total BTEX	0	0	0		0	0	0	0	0	0.89	0	0	2.91	0	0	0	0	0	0.83
Naphthalene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	2.1	nd	nd	nd	nd	nd	nd	0.78
Acenaphthylene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Acenaphthene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluorene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Phenanthrene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Anthracene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Pyrene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Anthracene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chrysene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(k)Fluoranthene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Pyrene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(g,h,i)Perylene	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene							nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Total PAHs	0	0	0		0	0	0	0	0	0	0	2.1	0	0	0	0	0	0	0.78
Cyanide, total			334																
Cyanide, total (Clarkson Univ.)																			
Cyanide, free																			
Cyanide, free (Clarkson Univ.)																			
Water Elevation (feet)			579.87	581.44	579.33	581.19	581.07	579.64	580.10	581.61	580.51	579.51	581.23	579.93	579.16	581.92	580.80	580.90	581.78

Mineral Springs

All units ug/L

MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11A	MW-11A	MW-11A	MW-11A	MW-11A	MW-11A
DATE	Aug-95	May-96	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
Benzene			35		nd	nd	nd	nd		nd	nd	nd	nd	350	80	50	270	150	140
Toluene			17		nd	nd	nd	88		nd	3.8	nd	nd	230	1.2	0.7	35	nd	1.2
Ethylbenzene			94		nd	nd	nd	nd		nd	nd	nd	nd	650	3.5	6.9	30	5.4	9.6
Xylene (sum of isomers)			83		7	nd	nd	nd		nd	nd	nd	nd	410	9.1	9.2	38	16	16
Total BTEX			229		7	0	0	68		0	3.8	0	0	1640	93.8	68.8	373	171.4	166.8
Naphthalene			140		12	nd	nd	nd		nd	nd	nd	nd	150	130	nd	39	31	nd
Acenaphthylene			9		2	nd	nd	nd		nd	nd	nd	nd	12	8.4	nd	7.9	9.4	2.8
Acenaphthene			7		nd	nd	nd	nd		nd	nd	nd	nd	4.4	3.1	1.2	4.5	5.9	4.5
Fluorene			nd		nd	nd	nd	nd		nd	nd	nd	nd	2.2	nd	nd	1.9	2.3	1.3
Phenanthrene			nd		nd	nd	nd	nd		nd	nd	nd	nd	2.7	2.2	nd	3.7	6.4	nd
Anthracene			nd		nd	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	0.5	1.6	nd
Fluoranthene			nd		nd	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	0.3
Pyrene			nd		nd	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	0.3	0.73	0.46
Benzo(a)Anthracene			nd		nd	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chrysene			nd		nd	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene			nd		nd	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(k)Fluoranthene			nd		nd	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Pyrene			nd		nd	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene			nd		nd	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dibenzo(a,h)Anthracene			nd		nd	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(g,h,i)Perylene			nd		nd	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene							nd	nd		nd	nd	nd	nd	31	4.4	nd	0.26	nd	nd
Total PAHs			156		14	0	0	0		0	0	0	0	202.3	148.1	1.2	58.06	57.33	9.38
Cyanide, total			1040							1340									
Cyanide, total (Clarkson Univ.)																			
Cyanide, free										nd									
Cyanide, free (Clarkson Univ.)																			
Water Elevation (foot)			580.28	582.26	579.82	583.55	583.85	579.28	581.30	583.85	581.32	581.03	582.97	580.70	581.11	583.03	581.54	581.87	582.74

## Mineral Springs

All units ug/L

MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12
DATE	Aug-95	May-96	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
Benzene			17																
Toluene			nd																
Ethylbenzene			nd																
Xylene (sum of isomers)			nd																
Total BTEX			17																
Naphthalene			nd																
Acenaphthylene			nd																
Acenaphthene			nd																
Fluorene			nd																
Phenanthrene			nd																
Anthracene			nd																
Fluoranthene			nd																
Pyrene			nd																
Benzo(a)Anthracene			nd																
Chrysene			nd																
Benzo(b)Fluoranthene			nd																
Benzo(k)Fluoranthene			nd																
Benzo(a)Pyrene			nd																
Indeno(1,2,3-cd)Pyrene			nd																
Dibenzo(a,h)Anthracene			nd																
Benzo(g,h,i)Perylene			nd																
2-Methylnaphthalene																			
Total PAHs			0																
Cyanide, total			375		294	380	434	1840	393	522	2020	438	440	384	437	134	458	514	2110
Cyanide, total (Clarkson Univ.)																---	461	491	425
Cyanide, free						nd	nd	nd	nd	nd	58	7	nd	88	57	19	6	5	817
Cyanide, free (Clarkson Univ.)																6.7	nd	nd	3.3
Water Elevation (feet)			579.45	581.07	578.98	580.90	580.72	579.30	579.54	581.40	580.30	579.29	580.82	579.59	579.75	581.55	580.39	580.51	581.48

## Mineral Springs

All units ug/L

MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13
DATE	Aug-95	May-96	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
<b>Benzene</b>			4	nd								1.8			3.7			1.2	
<b>Toluene</b>			nd	nd								nd			nd			nd	
Ethylbenzene			nd	nd								nd			nd			nd	
Xylene (sum of isomers)			nd	nd								nd			nd			nd	
Total BTEX			4	0								1.8			3.7			1.2	
<b>Naphthalene</b>			nd									nd			nd			nd	
Acenaphthylene			nd									nd			nd			nd	
Acenaphthene			nd									nd			nd			nd	
Fluorene			nd									nd			nd			nd	
Phenanthrene			nd									nd			nd			nd	
Anthracene			nd									nd			nd			nd	
Fluoranthene			nd									nd			nd			nd	
Pyrene			nd									nd			nd			nd	
Benzo(a)Anthracene			nd									nd			nd			nd	
Chrysene			nd									nd			nd			nd	
Benzo(b)Fluoranthene			nd									nd			nd			nd	
Benzo(k)Fluoranthene			nd									nd			nd			nd	
Benzo(a)Pyrene			nd									nd			nd			nd	
Indeno(1,2,3-cd)Pyrene			nd									nd			nd			nd	
Dibenzo(a,h)Anthracene			nd									nd			nd			nd	
Benzo(g,h,i)Perylene			nd									nd			nd			nd	
2-Methylnaphththalene												nd			nd			nd	
Total PAHs			0									0			0			0	
Cyanide, total			323		356	280	129	465	716	nd	157	399	142	423	528	175	108	280	103
Cyanide, total (Clarkson Univ.)																—	145	234	55
Cyanide, free						nd	33	119	nd	nd	96	13	nd	51	22	22	nd	nd	45
Cyanide, free (Clarkson Univ.)																5.3	nd	nd	nd
Water Elevation (feet)			578.17	579.72	577.70	579.47	579.28	577.91	578.23	579.00	578.80	577.83	579.23	578.13	578.18	579.78	587.69	578.80	579.87

## Mineral Springs

All units ug/L

MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14
DATE	Aug-95	May-96	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
Benzene			nd																
Toluene			nd																
Ethylbenzene			nd																
Xylene (sum of isomers)			nd																
Total BTEX			0																
Naphthalene			nd																
Acenaphthylene			nd																
Acenaphthene			nd																
Fluorene			nd																
Phenanthrene			nd																
Anthracene			nd																
Fluoranthene			nd																
Pyrene			nd																
Benzo(a)Anthracene			nd																
Chrysene			nd																
Benzo(b)Fluoranthene			nd																
Benzo(k)Fluoranthene			nd																
Benzo(a)Pyrene			nd																
Indeno(1,2,3-cd)Pyrene			nd																
Dibenzo(a,h)Anthracene			nd																
Benzo(g,h,i)Perylene			nd																
2-Methylnaphthalene																			
Total PAHs			0																
Cyanide, total			644		427	800	914	378	449	888	416	487	664	962	583	nd	503	537	—
Cyanide, total (Clarkson Univ.)																—	514	571	—
Cyanide, free						nd	nd	nd	nd	nd	17	12	nd	9	7	nd	14	13	—
Cyanide, free (Clarkson Univ.)																nd	nd	nd	—
Water Elevation (feet)			577.36	579.19	577.03	578.44	578.21	577.21	577.31	578.56	577.61	578.76	577.92	577.23	577.11	578.15	577.55	577.46	—



Mineral Springs

All units ug/L

MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15
DATE	Aug-86	May-98	Jul-97	Feb-98	Jun-98	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05

Benzene nd

Toluene nd

Ethylbenzene nd

Xylene (sum of isomers) nd

Total BTEX 0

Naphthalene nd

Acenaphthylene nd

Acenaphthene nd

Fluorene nd

Phenanthrene nd

Anthracene nd

Fluoranthene nd

Pyrene nd

Benzo(a)Anthracene nd

Chrysene nd

Benzo(b)Fluoranthene nd

Benzo(k)Fluoranthene nd

Benzo(a)Pyrene nd

Indeno(1,2,3-cd)Pyrene nd

Dibenzo(a,h)Anthracene nd

Benzo(g,h,i)Perylene nd

2-Methylnaphthalene

Total PAHs 0

Cyanide, total 78.8

Cyanide, total (Clarkson Univ.)

Cyanide, free

Cyanide, free (Clarkson Univ.)

Water Elevation (feet) 579.11 579.81 578.70 580.15 580.55 578.98 579.49 580.98 579.48 578.88 580.40 579.11 579.30 581.04 579.99 — 580.54

## Mineral Springs

All units ug/L

MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16
DATE	Aug-95	May-98	Jul-97	Feb-88	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
Benzene			nd																
Toluene			nd																
Ethylbenzene			nd																
Xylene (sum of isomers)			nd																
Total BTEX			0																
Naphthalene			nd																
Acenaphthylene			nd																
Acenaphthene			nd																
Fluorene			nd																
Phenanthrene			nd																
Anthracene			nd																
Fluoranthene			nd																
Pyrene			nd																
Benzo(a)Anthracene			nd																
Chrysene			nd																
Benzo(b)Fluoranthene			nd																
Benzo(k)Fluoranthene			nd																
Benzo(a)Pyrene			nd																
Indeno(1,2,3-cd)Pyrene			nd																
Dibenzo(a,h)Anthracene			nd																
Benzo(g,h,i)Perylene			nd																
2-Methylnaphthalene																			
Total PAHs			0																
Cyanide, total			346		459	360	214	214	138	174	23	187	203	130	220	254	297	293	307
Cyanide, total (Clarkson Univ.)																---	332	297	305
Cyanide, free						nd	nd	147	nd	nd	17	13	nd	89	20	95	12	104	nd
Cyanide, free (Clarkson Univ.)																3.4	2.8	nd	nd
Water Elevation (feet)			580.17	581.49	579.68	581.81	581.59	580.06	580.77	582.08	580.23	580.34	581.92	580.42	580.95	582.83	581.35	581.72	581.08

## Mineral Springs

All units ug/L

MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17
DATE	Aug-85	May-86	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
Benzene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.32	nd	nd	nd
Toluene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Ethylbenzene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Xylene (sum of isomers)				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Total BTEX				0	0	0	0	0	0	0	0	0	0	0	0	0.32	0	0	0
Naphthalene				nd	nd	nd	nd	3	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Acenaphthylene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Acenaphthene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluorene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Phenanthrene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Anthracene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Pyrene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Anthracene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chrysene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(k)Fluoranthene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Pyrene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dibenzo(a,h)Anthracene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(g,h,i)Perylene				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene							nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Total PAHs				0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Cyanide, total				34	nd	27	65	38	74	185	127	108	185	50	66	378	106	160	217
Cyanide, total (Clarkson Univ.)																--	142	162	260
Cyanide, free						nd	13	nd	nd	nd	nd	nd	nd	16	nd	nd	nd	nd	61
Cyanide, free (Clarkson Univ.)																nd	nd	nd	nd
Water Elevation (feet)				582.36	579.73	581.90	581.96	580.12	580.88	582.38	579.86	580.48	582.01	580.46	580.96	582.40	581.27	581.72	582.71

## Mineral Springs

All units ug/L

MW-18	MW-18	MW-18	MW-18	MW-18	MW-18	MW-18	MW-18	MW-18	MW-18	MW-18
DATE	Aug-95	May-96	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02

Benzene				nd	nd	nd	nd	nd	nd	nd
Toluene				nd	nd	nd	nd	1.1	nd	nd
Ethylbenzene				nd	nd	nd	nd	nd	nd	nd
Xylene (sum of isomers)				nd	nd	nd	nd	nd	nd	nd
Total BTEX				0	0	0	0	1.1	0	0

Naphthalene				nd	nd	nd	nd	nd	nd	nd
Acenaphthylene				nd	nd	nd	nd	nd	nd	nd
Acenaphthene				nd	nd	nd	nd	nd	nd	nd
Fluorene				nd	nd	nd	nd	nd	nd	nd
Phenanthrene				nd	nd	nd	nd	nd	nd	nd
Anthracene				nd	nd	nd	nd	nd	nd	nd
Fluoranthene				nd	nd	nd	nd	nd	nd	nd
Pyrene				nd	nd	nd	nd	nd	nd	nd
Benzo(a)Anthracene				nd	nd	nd	nd	nd	nd	nd
Chrysene				nd	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene				nd	nd	nd	nd	nd	nd	nd
Benzo(k)Fluoranthene				nd	nd	nd	nd	nd	nd	nd
Benzo(a)Pyrene				nd	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene				nd	nd	nd	nd	nd	nd	nd
Dibenzo(a,h)Anthracene				nd	nd	nd	nd	nd	nd	nd
Benzo(g,h,i)Perylene				nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene							nd	nd	nd	nd
Total PAHs				0	0	0	0	0	0	0

Cyanide, total				nd	nd	nd	13	nd	nd	nd
Cyanide, total (Clarkson Univ.)										
Cyanide, free						nd	nd	24	nd	nd
Cyanide, free (Clarkson Univ.)										

Water Elevation (feet)				585.48	582.65	585.06	585.40	583.84	583.84	582.74
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## Mineral Springs

All units ug/L

MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19
DATE	Aug-95	May-96	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
<b>Benzene</b>					4700	5700	8000	4800	4700	4800	3800	4200	4800		5300	4900	8000	5800	7500
<b>Toluene</b>					nd	nd	nd	160	nd	nd	nd	nd	nd		nd	nd	nd	nd	nd
Ethylbenzene					nd	280	260	nd	nd	160	150	140	170		130	170	330	180	350
Xylene (sum of isomers)					1500	2200	1500	930	660	580	470	540	560		400	440	1000	660	950
Total BTEX					6200	8180	7760	5690	5360	5540	4420	4880	5330		5830	5510	7330	6640	8800
<b>Naphthalene</b>					1900	2200	2200	2000	2100	2300	2000	2100	2400	2100	2000	2700	2900	2800	3000
Acenaphthylene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Acenaphthene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluorene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Phenanthrene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Anthracene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Pyrene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Anthracene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chrysene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(k)Fluoranthene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Pyrene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dibenzo(a,h)Anthracene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(g,h,i)Perylene					nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene							nd	0.82	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Total PAHs					1900	2200	2200	2000.82	2100	2300	2000	2100	2400	2100	2000	2700	2900	2800	3000
Cyanide, total					1100														
Cyanide, total (Clarkson Univ )																			
Cyanide, free																			
Cyanide, free (Clarkson Univ )																			
Water Elevation (feet)					577.43	581.36	581.13	579.63	580.12	581.73	579.73	579.83	581.24	580.01	580.19	582.00	580.79	580.98	581.00

## Mineral Springs

All units ug/L

MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20
DATE	Aug-95	May-96	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
Benzene					nd														
Toluene					nd														
Ethylbenzene					nd														
Xylene (sum of isomers)					nd														
Total BTEX					0														
Naphthalene					nd														
Acenaphthylene					nd														
Acenaphthene					nd														
Fluorene					nd														
Phenanthrene					nd														
Anthracene					nd														
Fluoranthene					nd														
Pyrene					nd														
Benzo(a)Anthracene					nd														
Chrysene					nd														
Benzo(b)Fluoranthene					nd														
Benzo(k)Fluoranthene					nd														
Benzo(a)Pyrene					nd														
Indeno(1,2,3-cd)Pyrene					nd														
Dibenzo(a,h)Anthracene					nd														
Benzo(g,h,i)Perylene					nd														
2-Methylnaphthalene																			
Total PAHs					0														
Cyanide, total					344	450	295	439	46	455	361	8	506	399	21	501	242	387	644
Cyanide, total (Clarkson Univ.)																—	242	444	402
Cyanide, free						nd	13	nd	nd	nd	10	9	nd	44	14	nd	nd	53	13
Cyanide, free (Clarkson Univ.)																nd	nd	nd	nd
Water Elevation (feet)					576.67	579.24	578.86	576.76	577.15	579.20	577.49	576.60	578.34	576.90	577.16	578.96	577.42	577.82	578.82

Mineral Springs

All units ug/L

MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21
DATE	Aug-95	May-96	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
Benzene					nd														
Toluene					nd														
Ethylbenzene					nd														
Xylene (sum of isomers)					nd														
Total BTEX					0														
Naphthalene					nd														
Acenaphthylene					nd														
Acenaphthene					nd														
Fluorene					nd														
Phenanthrene					nd														
Anthracene					nd														
Fluoranthene					nd														
Pyrene					nd														
Benzo(a)Anthracene					nd														
Chrysene					nd														
Benzo(b)Fluoranthene					nd														
Benzo(k)Fluoranthene					nd														
Benzo(a)Pyrene					nd														
Indeno(1,2,3-cd)Pyrene					nd														
Dibenzo(a,h)Anthracene					nd														
Benzo(g,h,i)Perylene					nd														
2-Methylnaphthalene																			
Total PAHs					0														
Cyanide, total					511	560	898	558	535	756	674	870	637	708	569	714	741	740	664
Cyanide, total (Clarkson Univ.)																—	749	709	688
Cyanide, free						nd	14	nd	nd	24	12	13	nd	11	nd	nd	nd	7	20
Cyanide, free (Clarkson Univ.)																nd	nd	nd	nd
Water Elevation (feet)					578.51	578.08	577.68	576.55	576.58	578.03	576.97	576.28	575.32	578.55	576.42	577.70	576.86	576.85	577.71

## Mineral Springs

All units ug/L

MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22
DATE	Aug-95	May-96	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
Benzene					6														
Toluene					nd														
Ethylbenzene					nd														
Xylene (sum of isomers)					nd														
Total BTEX					6														
Naphthalene					nd														
Acenaphthylene					nd														
Acenaphthene					nd														
Fluorene					nd														
Phenanthrene					nd														
Anthracene					nd														
Fluoranthene					nd														
Pyrene					nd														
Benzo(a)Anthracene					nd														
Chrysene					nd														
Benzo(b)Fluoranthene					nd														
Benzo(k)Fluoranthene					nd														
Benzo(a)Pyrene					nd														
Indeno(1,2,3-cd)Pyrene					nd														
Dibenzo(a,h)Anthracene					nd														
Benzo(g,h,i)Perylene					nd														
2-Methylnaphthalene																			
Total PAHs					0														
Cyanide, total					487	600	1010	734	460	703	1570	487	604	560	1080	741	504	803	941
Cyanide, total (Clarkson Univ.)																—	676	759	628
Cyanide, free						nd	nd	201	nd	nd	49	231	267	88	49	132	nd	207	99
Cyanide, free (Clarkson Univ.)																nd	8	nd	3.1
Water Elevation (feet)					578.80	580.70	580.51	579.09	579.50	581.25	580.05	579.10	580.62	579.42	579.47	581.27	580.05	580.22	581.28



Mineral Springs

All units ug/L

MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23	MW-23
DATE	Aug-85	May-86	Jul-97	Feb-98	Jun-98	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
Benzene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Toluene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Ethylbenzene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Xylene (sum of isomers)	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Total BTEX	-	-	-	-	-	0	-	-	-	-	-	0	-	-	0	-	-	0	-
Naphthalene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Acenaphthylene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Acenaphthene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Fluorane	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Phenanthrene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Anthracene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Fluoranthene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Pyrene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Benzo(a)Anthracene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Chrysene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Benzo(b)Fluoranthene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Benzo(k)Fluoranthene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Benzo(a)Pyrene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Indeno(1,2,3-cd)Pyrene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Dibenzo(a,h)Anthracene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Benzo(g,h,i)Perylene	-	-	-	-	-	nd	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
2-Methylnaphthalene	-	-	-	-	-	-	-	-	-	-	-	nd	-	-	nd	-	-	nd	-
Total PAHs	-	-	-	-	-	0	-	-	-	-	-	0	-	-	0	-	-	0	-
Cyanide, total	-	-	-	-	-	480	658	469	654	480	425	728	356	620	729	587	446	437	274
Cyanide, total (Clarkson Univ.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	---	493	560	359
Cyanide, free	-	-	-	-	-	nd	nd	nd	nd	nd	12	10	nd	15	6	5	9	5	57
Cyanide, free (Clarkson Univ.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	nd	nd	nd	nd
Water Elevation (feet)	-	-	-	-	-	578.68	578.30	577.40	577.58	578.68	577.83	577.18	578.11	577.40	577.29	578.54	577.83	577.91	578.61

## Mineral Springs

All units ug/L

SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-01
DATE	Aug-95	May-96	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
Benzene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	0.44	nd	nd	nd
Toluene			nd				nd	nd	nd	nd	2	nd	nd	nd	nd	0.38	nd	nd	nd
Ethylbenzene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Xylene (sum of isomers)			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Total BTEX			0				0	0	0	0	2	0	0	0	0	0.82	0	0	0
Naphthalene			nd				nd	2.9	nd	nd	nd	1.6	nd	nd	nd	nd	nd	nd	nd
Acenaphthylene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Acenaphthene			nd				nd	1.1	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluorene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Phenanthrene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Anthracene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Pyrene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Anthracene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chrysene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(k)Fluoranthene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Pyrene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dibenzo(a,h)Anthracene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(g,h,i)Perylene			nd				nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene							nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Total PAHs			0				0	4	0	0	0	1.6	0	0	0	0	0	0	0
Cyanide, total			12.2				21	55	35	8	405	21	13	88	36	989	40	38	9
Cyanide, total (Clarkson Univ.)																—	46	53	10
Cyanide, free							nd	16	nd	nd	29	6	nd	10	nd	86	6	19	nd
Cyanide, free (Clarkson Univ.)																98.1	nd	nd	3.2
Water Elevation (feet)					579.80	580.40	580.10	580.00	580.10	581.00	579.60	579.80	580.70	581.40	582.00	582.30	580.60	581.30	581.30

## Mineral Springs

All units ug/L

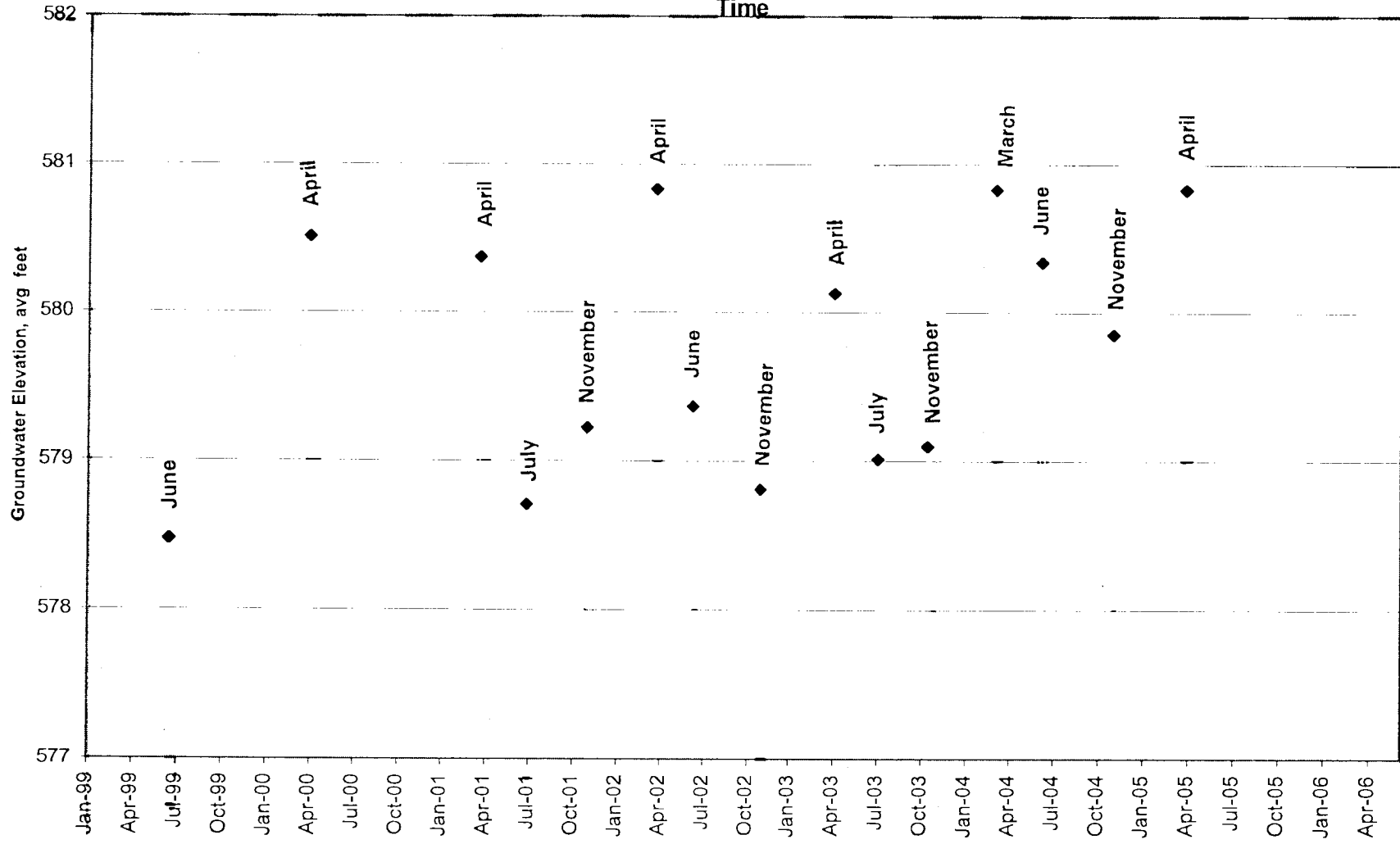
SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02
DATE	Aug-95	May-96	Jul-97	Feb-98	Jun-99	Apr-00	Apr-01	Jul-01	Nov-01	Apr-02	Jun-02	Nov-02	Apr-03	Jul-03	Nov-03	Mar-04	Jun-04	Nov-04	Apr-05
<b>Benzene</b>			nd		nd	6	2	nd	nd	1.2	nd	nd	nd	nd	nd	nd	nd	nd	nd
<b>Toluene</b>			nd		nd	8	2	nd	nd	0.25	nd	nd	nd	nd	nd	nd	nd	nd	nd
Ethylbenzene			nd		nd	15	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Xylene (sum of isomers)			nd		nd	24	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Total BTEX			0		0	53	4	0	0	1.45	0	0	0	0	0	0	0	0	0
Naphthalene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Acenaphthylene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Acenaphthene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluorone			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Phenanthrene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Anthracene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Pyrene			nd		nd	nd	nd	0.77	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Anthracene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chrysene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(k)Fluoranthene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Pyrene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dibenzo(a,h)Anthracene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(g,h,i)Perylene			nd		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene							nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Total PAHs			0		0	0	0	0.77	0	0	0	0	0	0	0	0	0	0	0
Cyanide, total			77.5		nd	380	121	nd	7	130	nd	1440	17	30	82	48	nd	24	nd
Cyanide, total (Clarkson Univ.)																—	nd	50	nd
Cyanide, free						111	nd	nd	nd	16	nd	42	nd	nd	nd	20	nd	12	nd
Cyanide, free (Clarkson Univ.)																18.2	nd	6.2	nd
Water Elevation (feet, approximate)					580.3	580.9	580.6	580.5	580.6	581.5	580.1	580.3	581.1	581.8	582.4	582.7	581.0	581.7	581.7

**Appendix A2**

**Groundwater and Surface Water  
Analytical Results  
Graphs**

# Average Site-Wide Groundwater Elevation

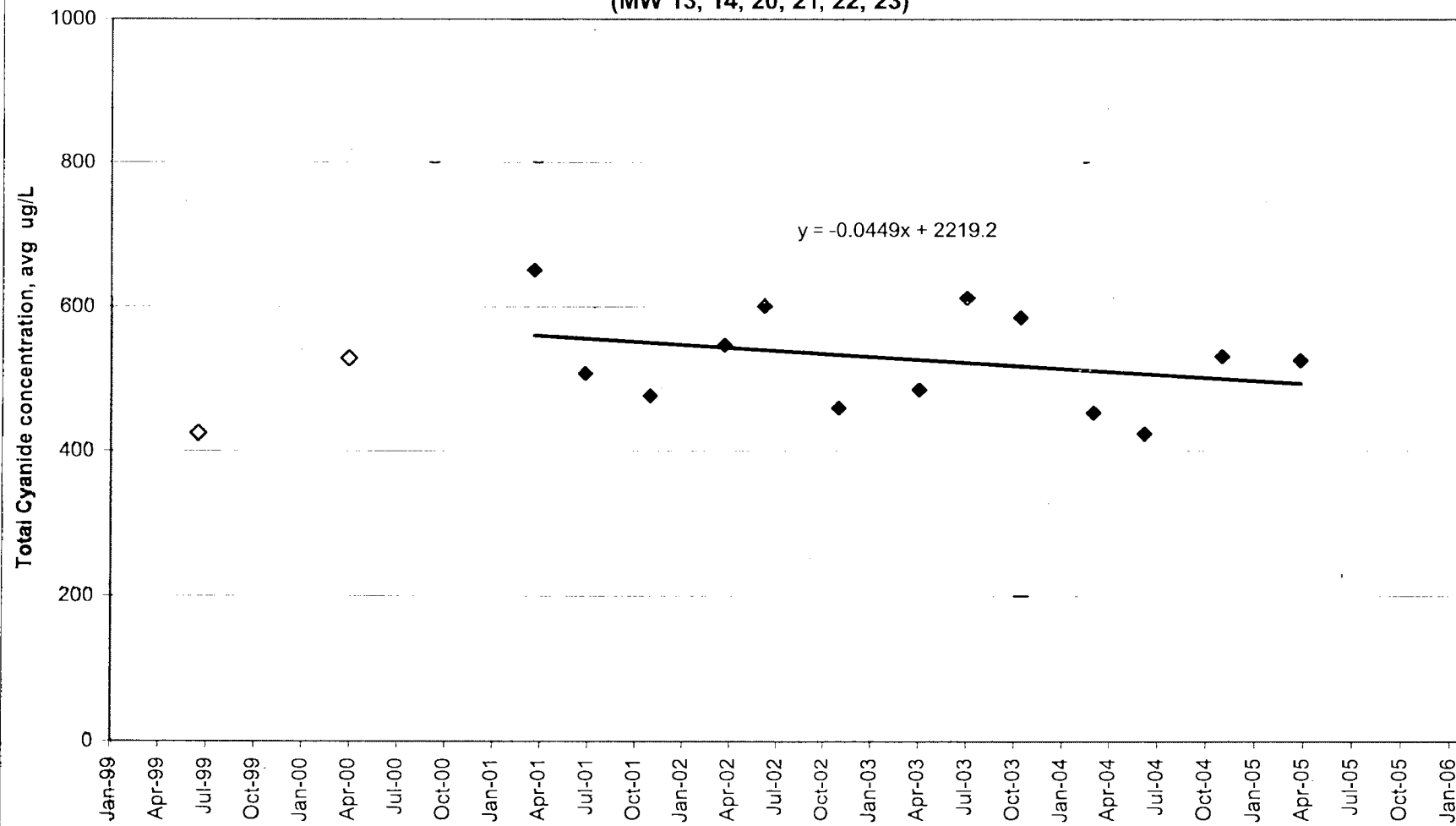
vs  
Time

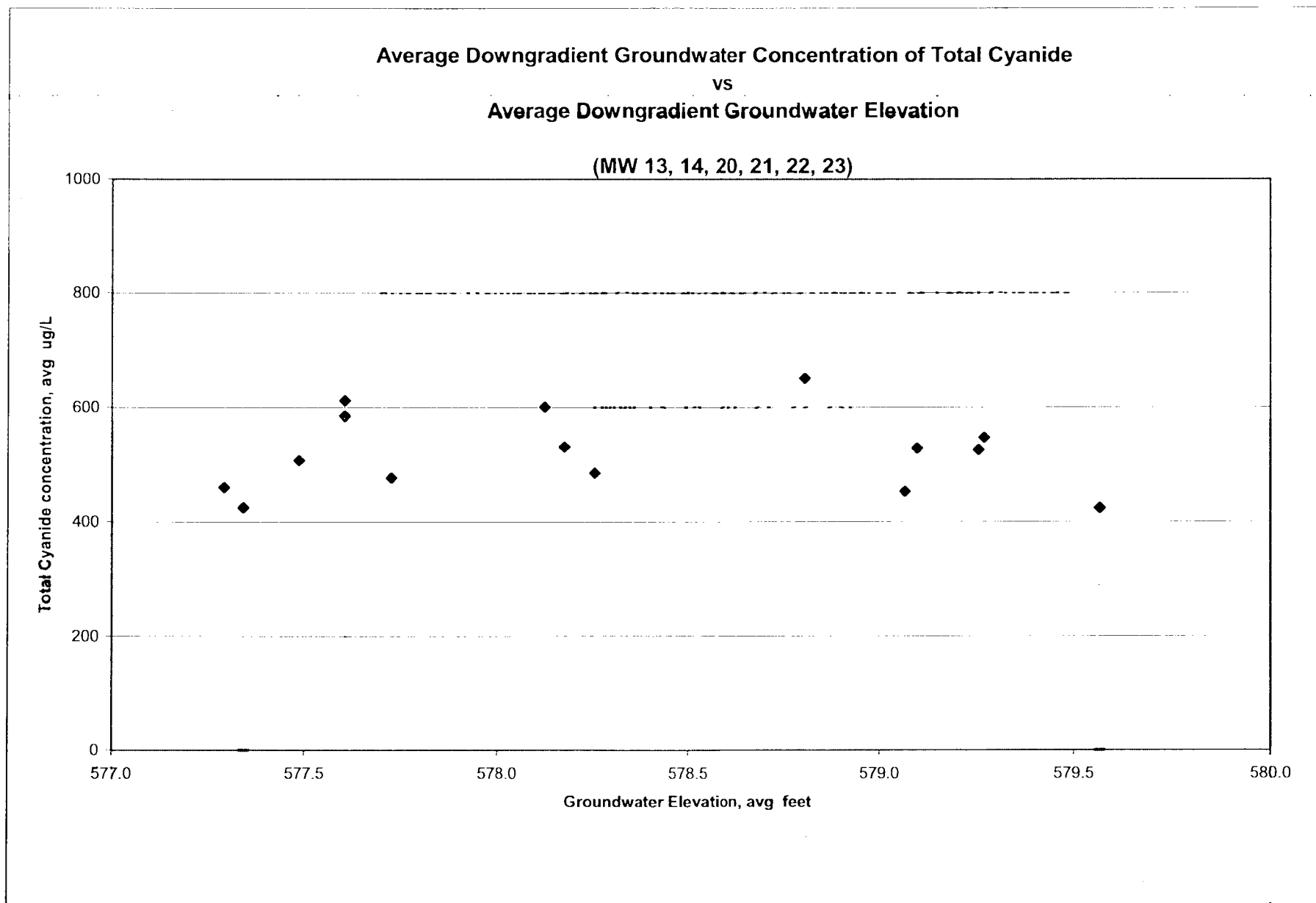


## Average Downgradient Groundwater Concentration of Total Cyanide

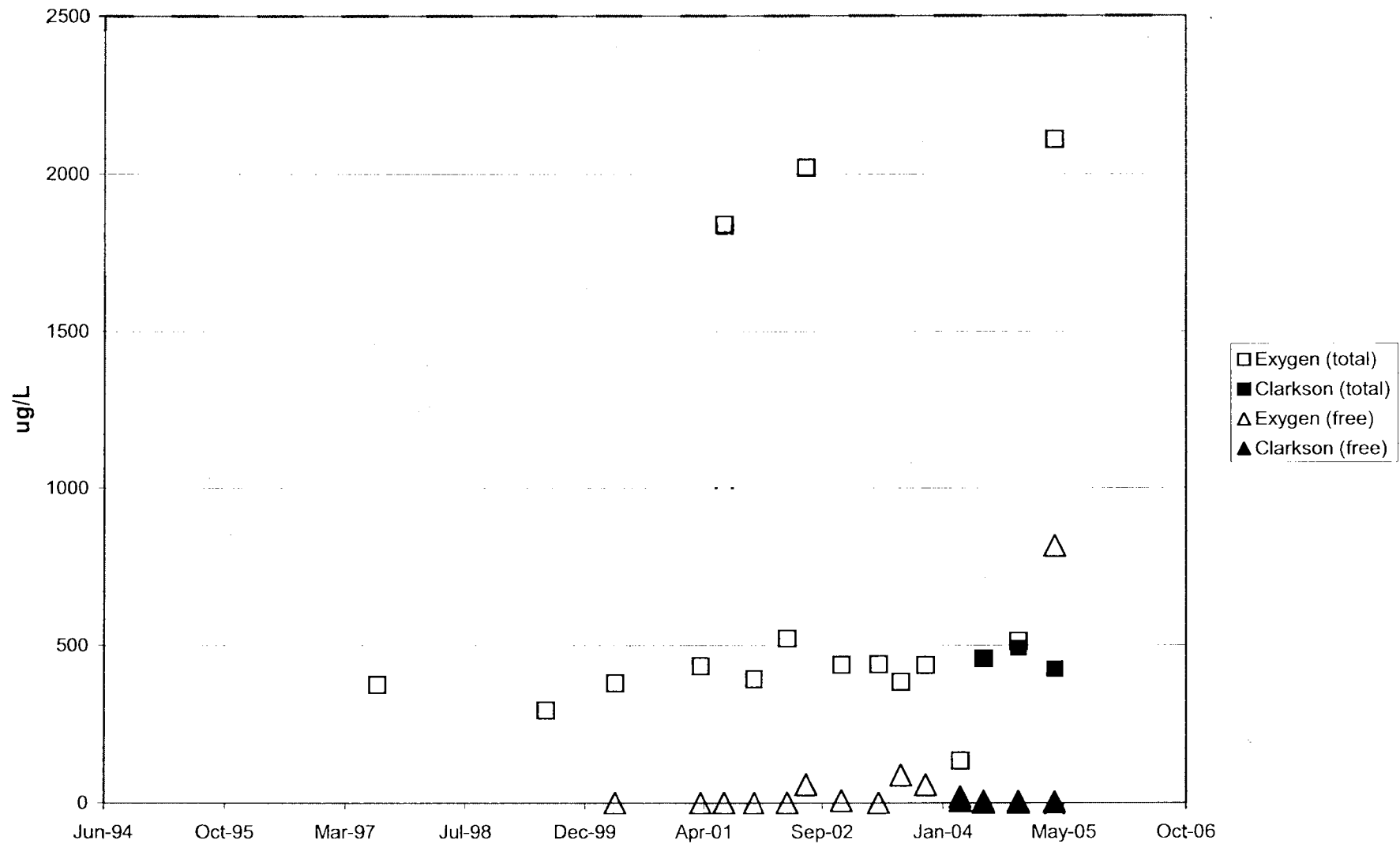
vs  
Time

(MW 13, 14, 20, 21, 22, 23)



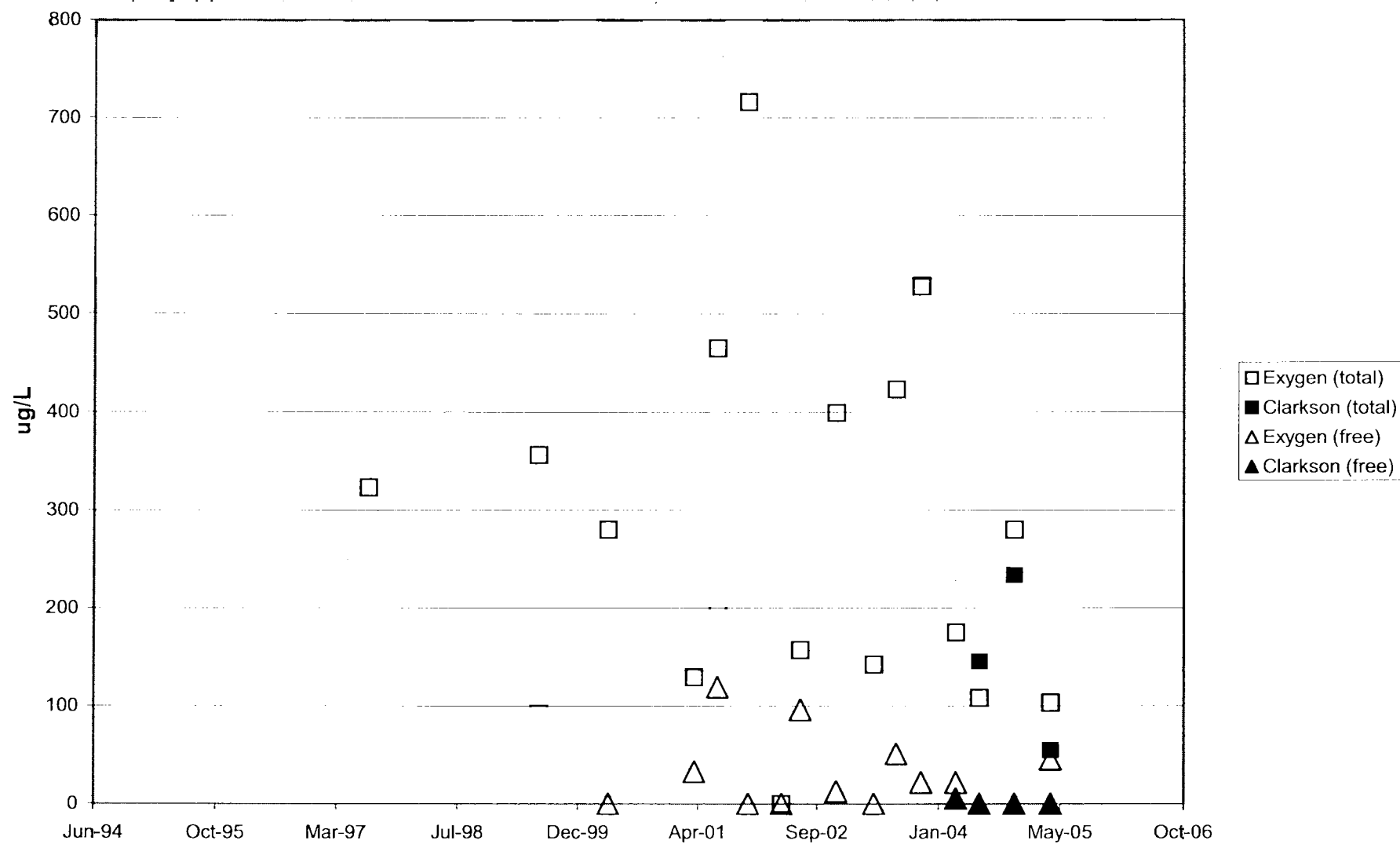


MW-12  
Cyanide

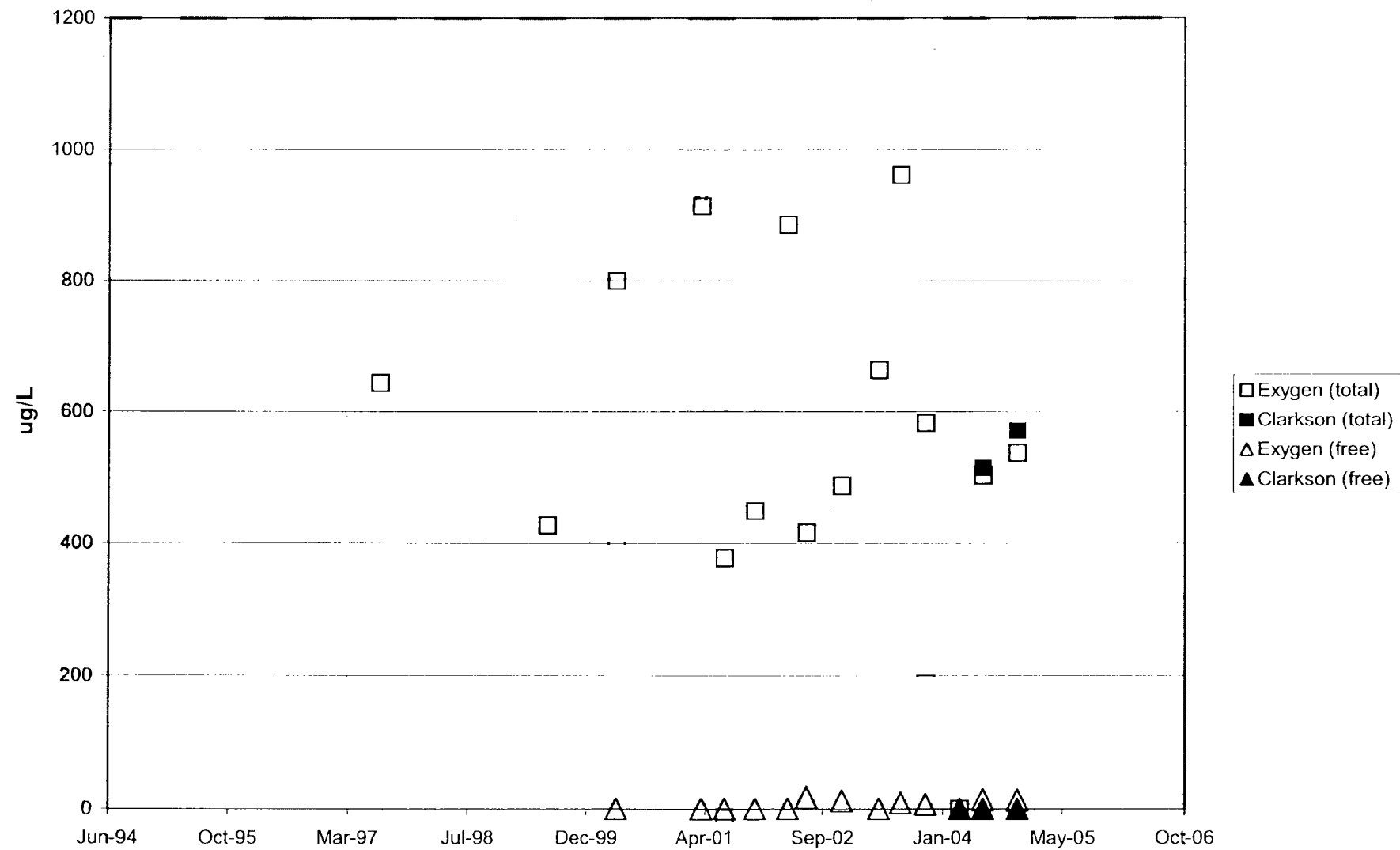




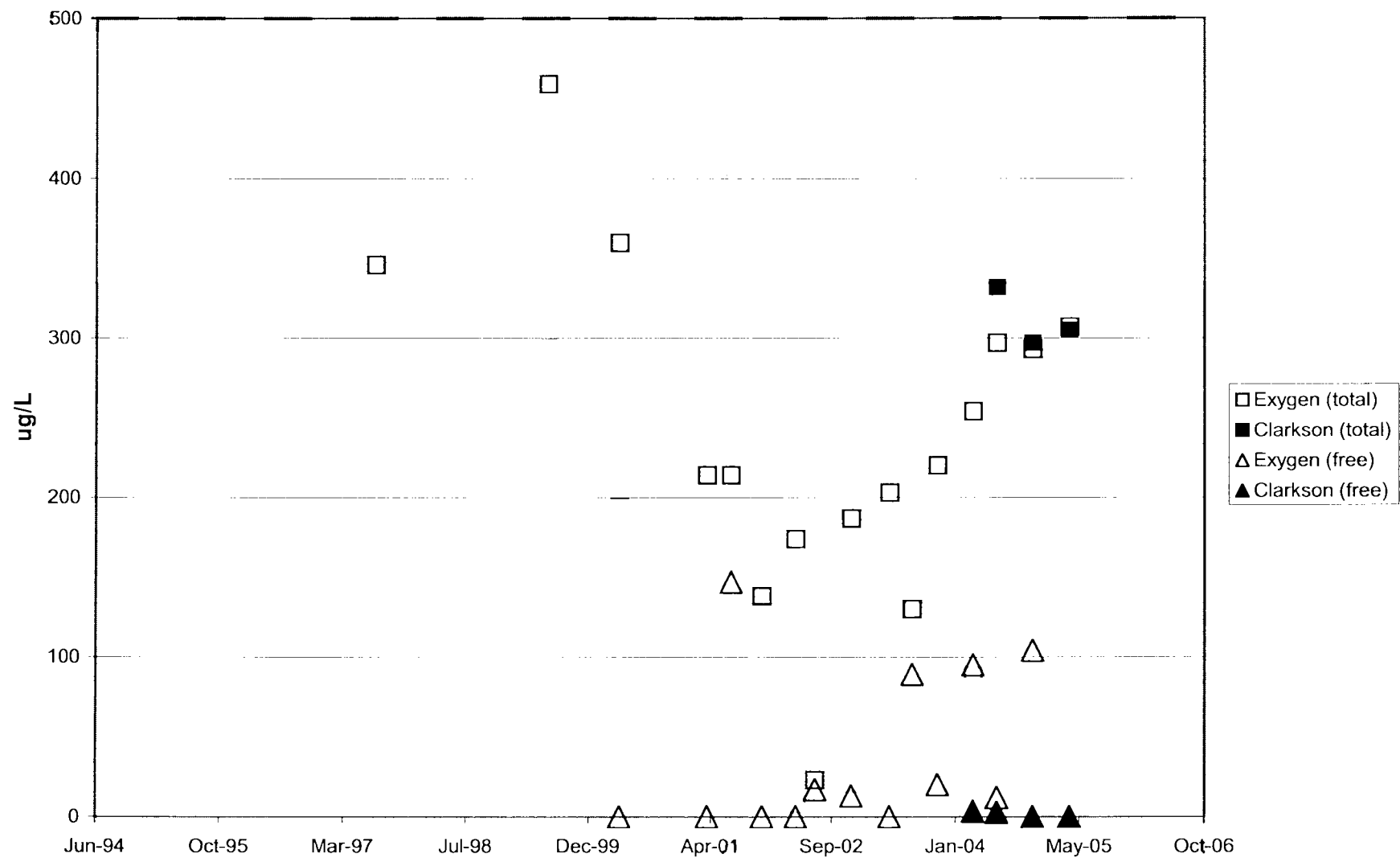
MW-13  
Cyanide



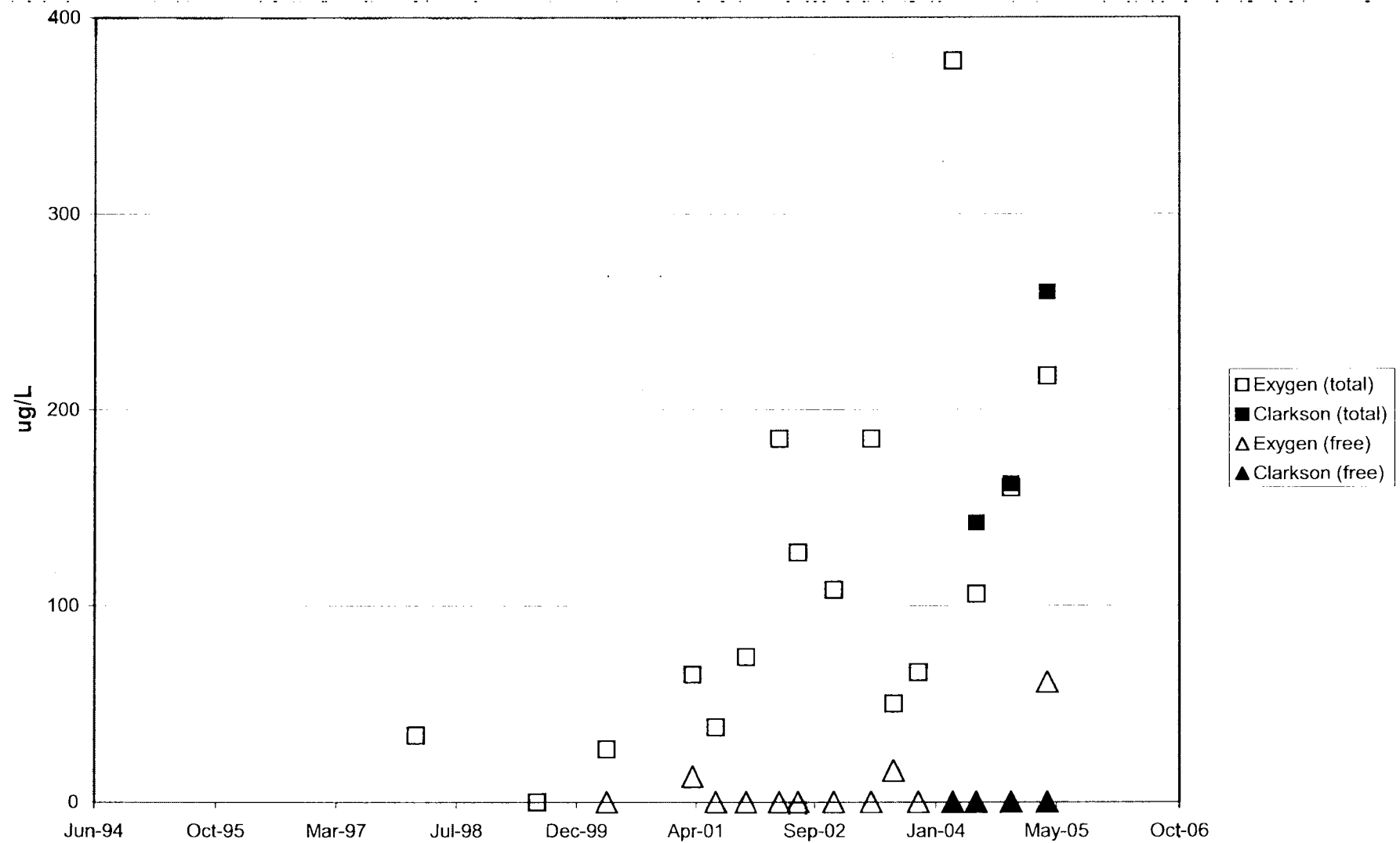
MW-14  
Cyanide



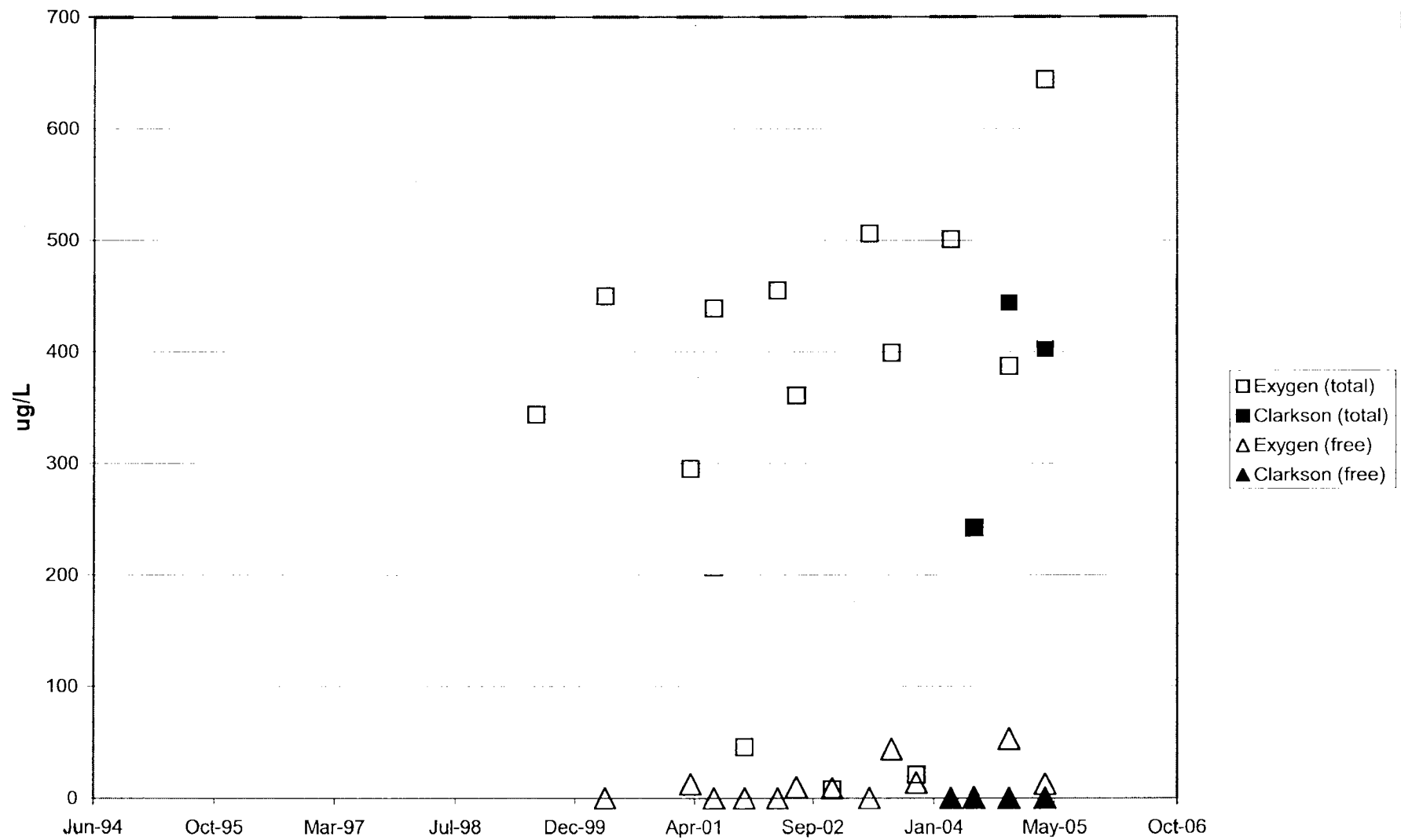
MW-16  
Cyanide



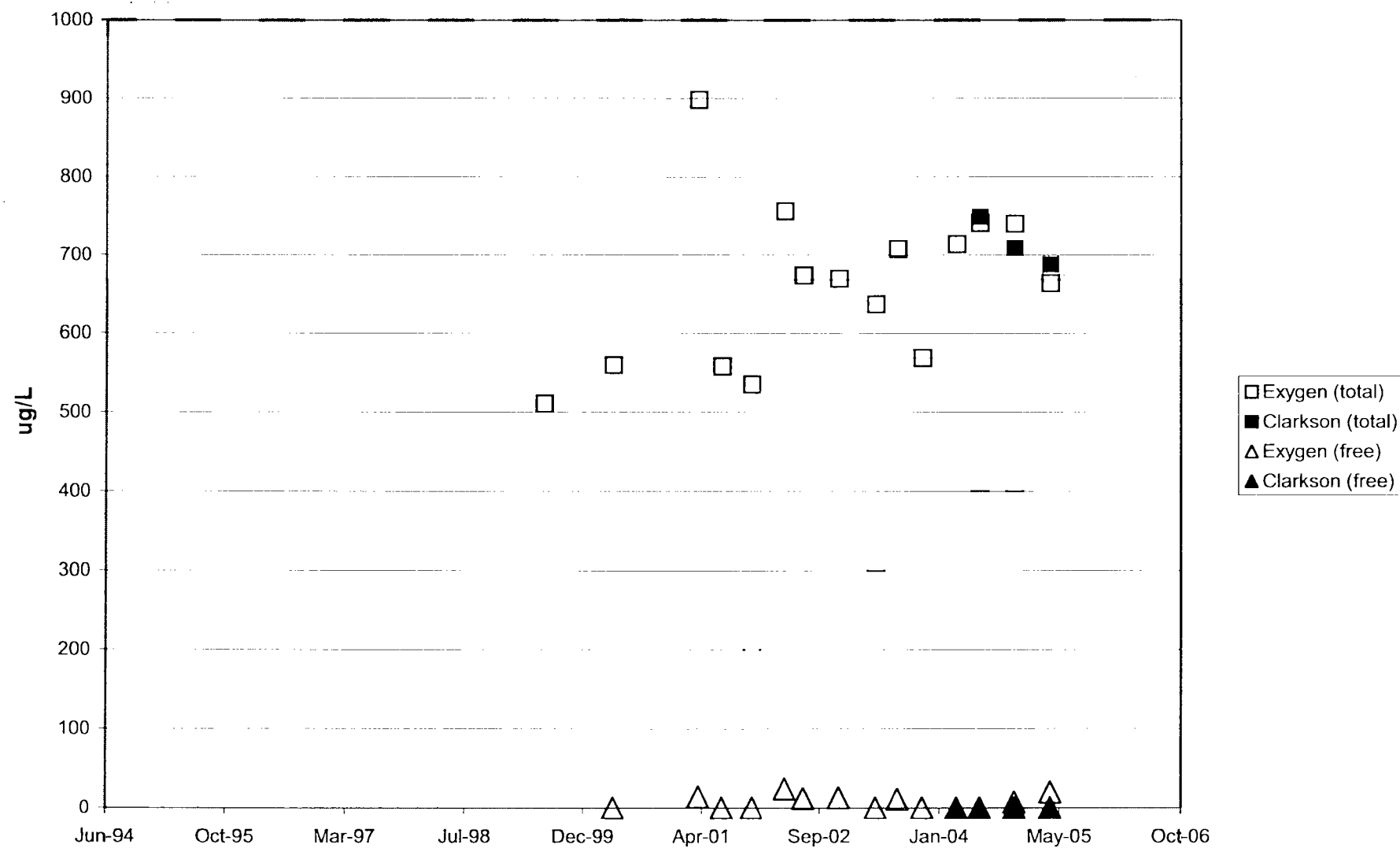
MW-17  
Cyanide



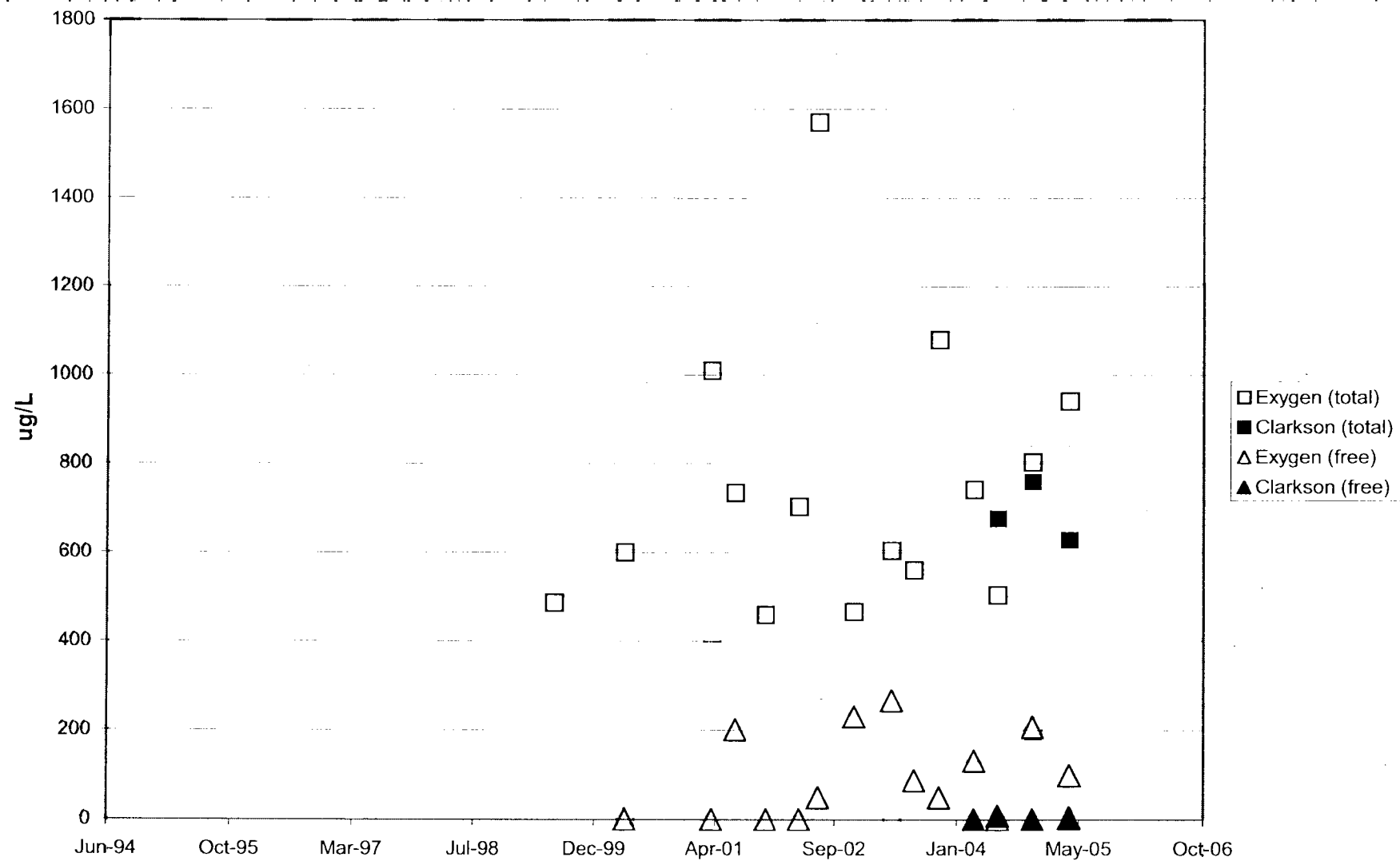
MW-20  
Cyanide



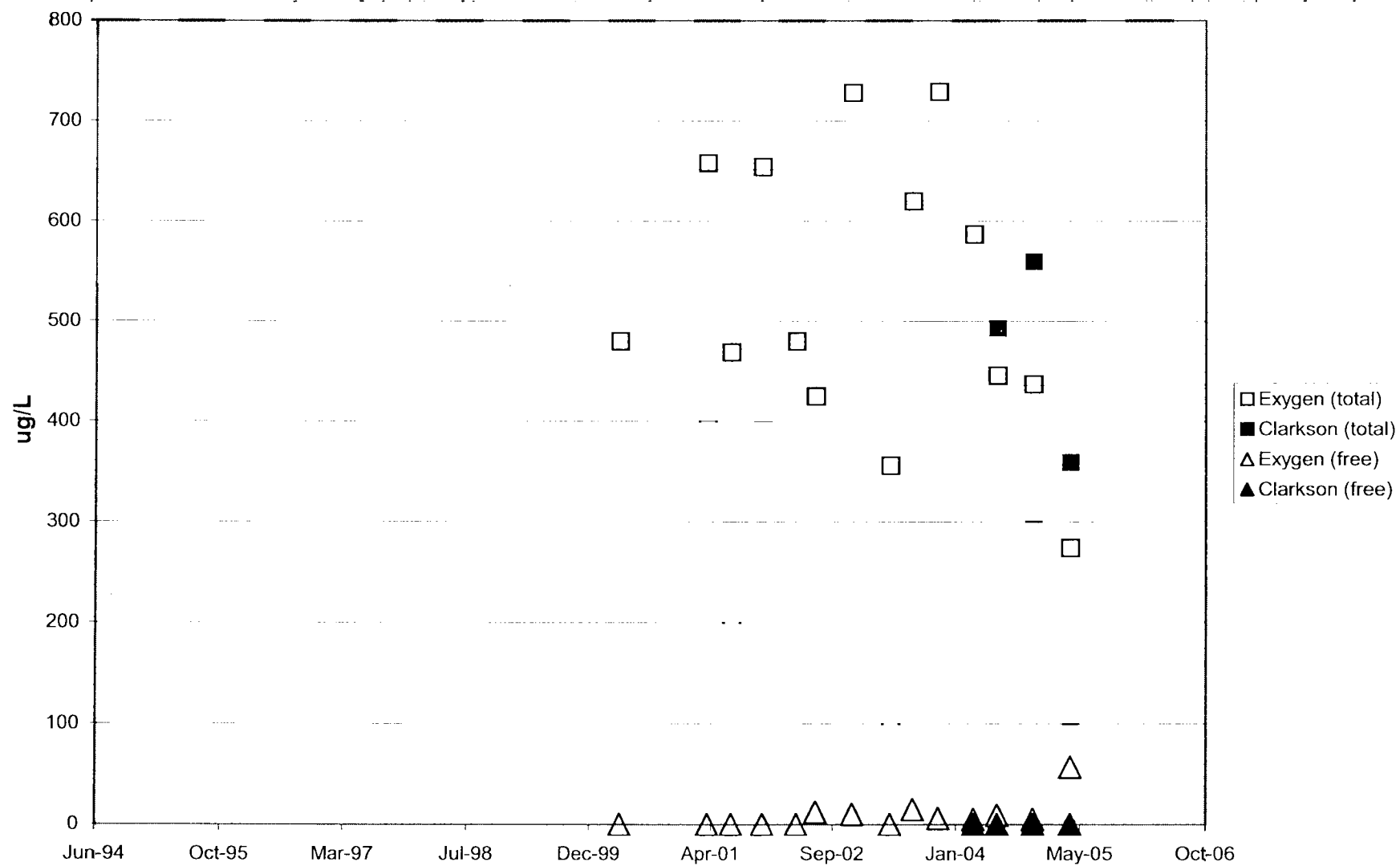
MW-21  
Cyanide



MW-22  
Cyanide

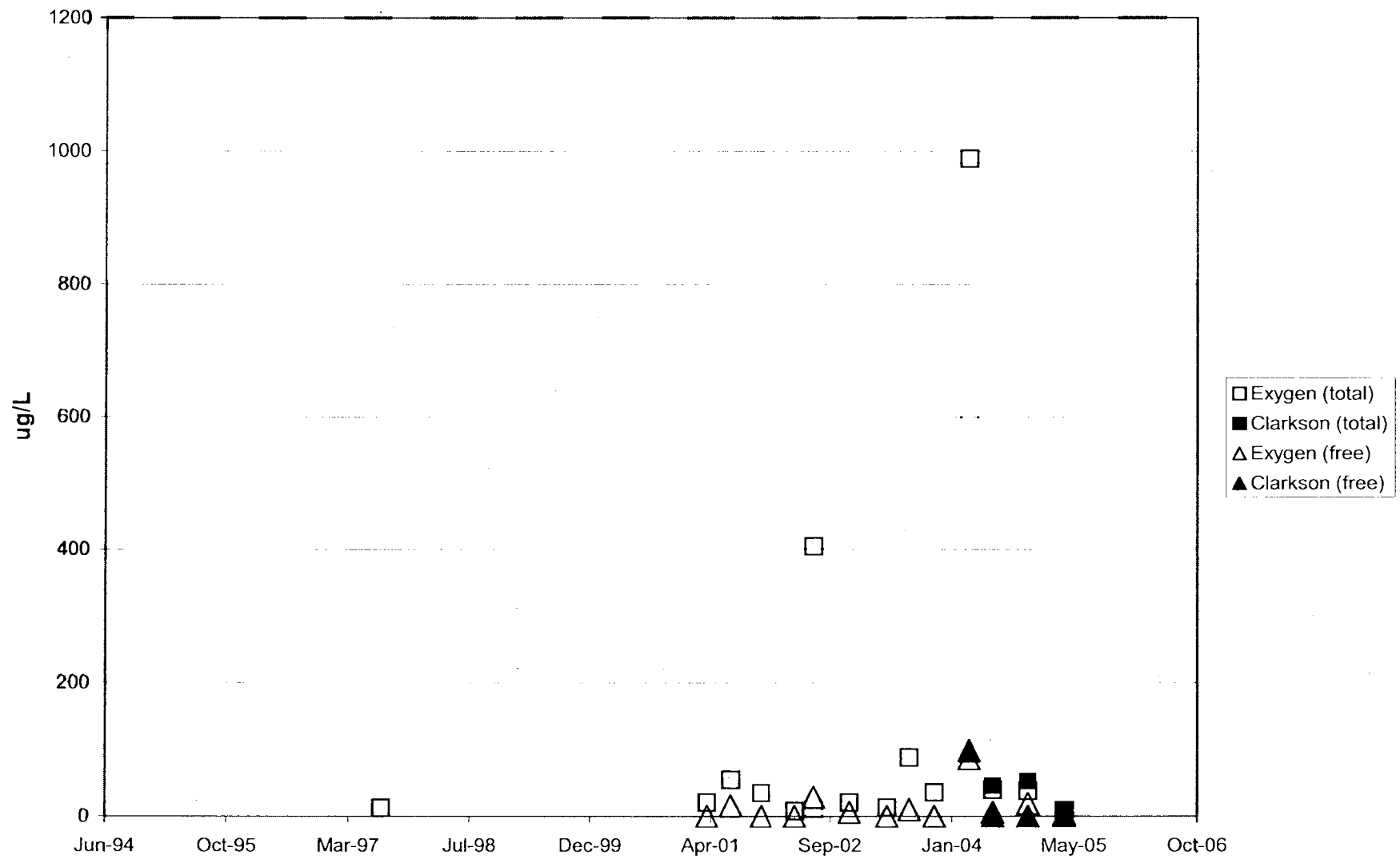


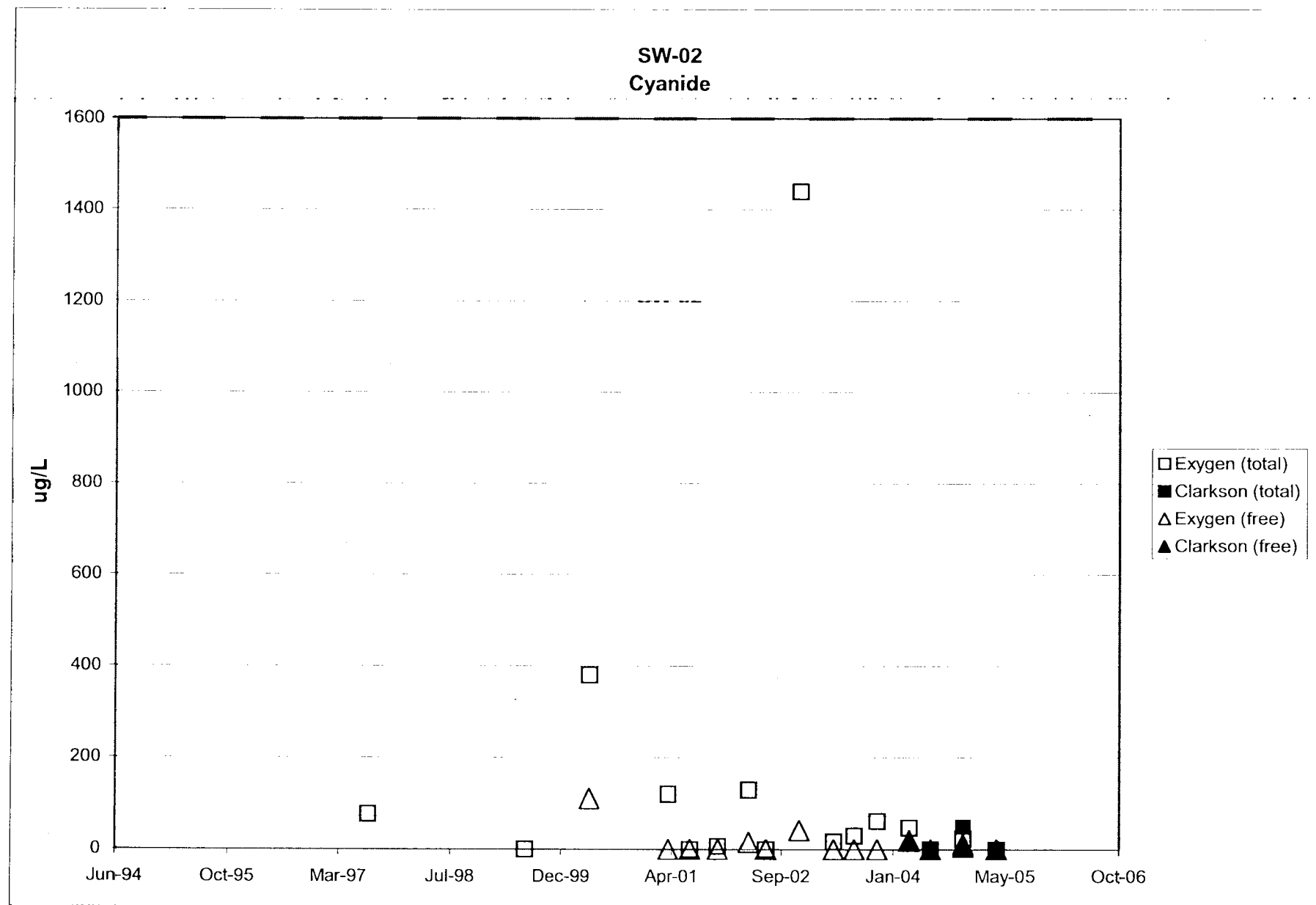
MW-23  
Cyanide





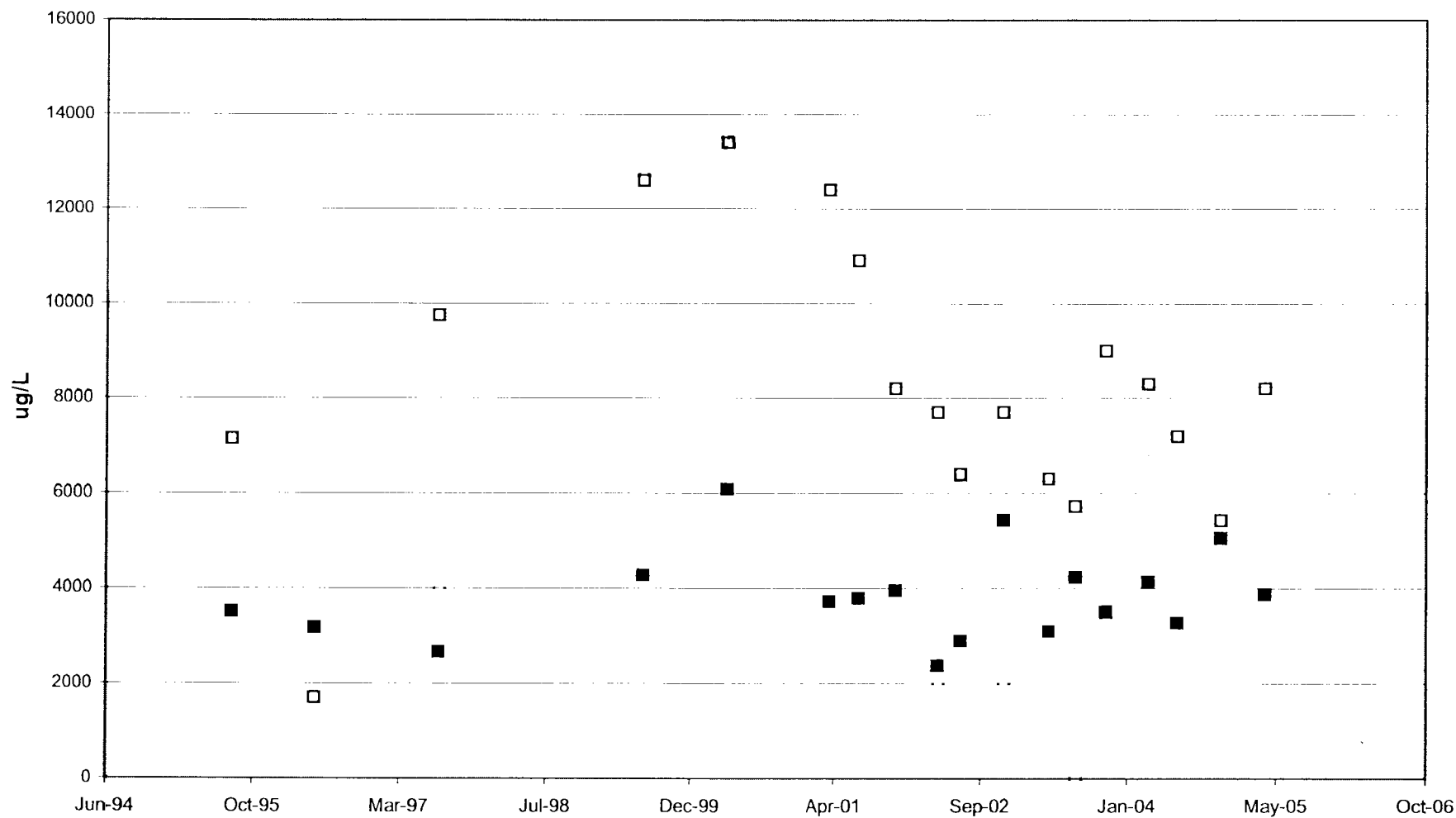
SW-01  
Cyanide





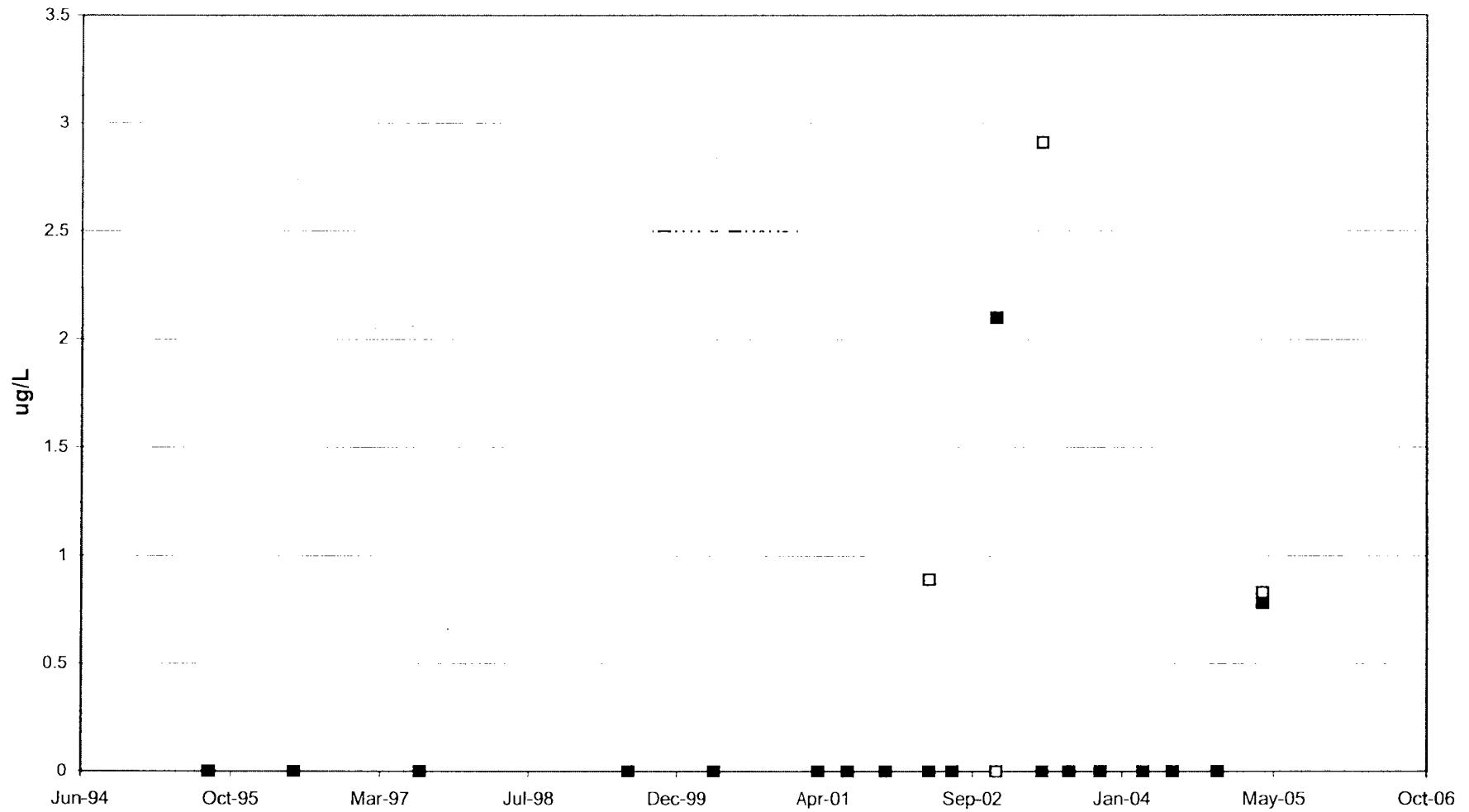
MW-07  
Total Hydrocarbons

□ BTEX ■ PAHs



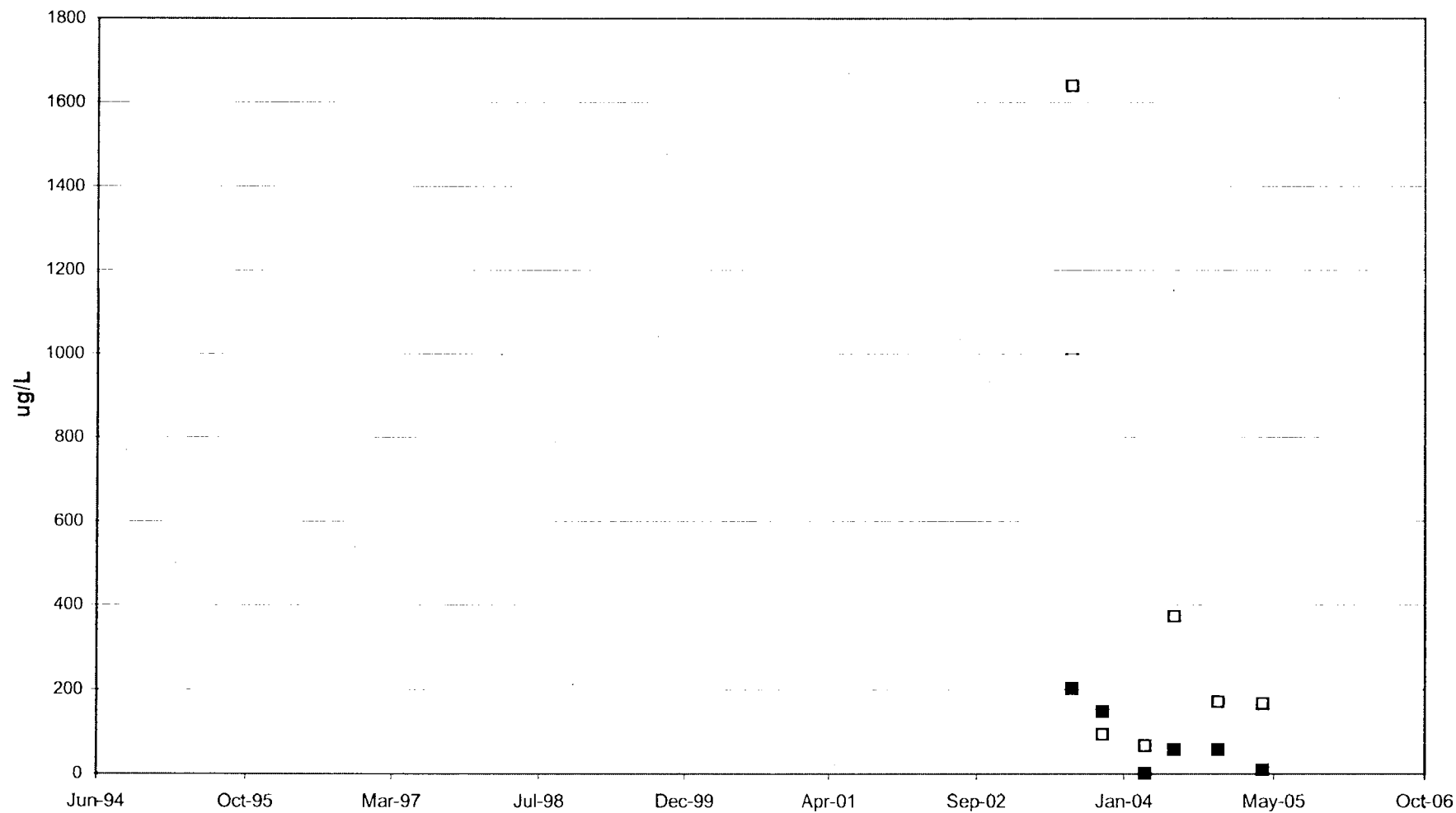
MW-10  
Total Hydrocarbons

□ BTEX ■ PAHs



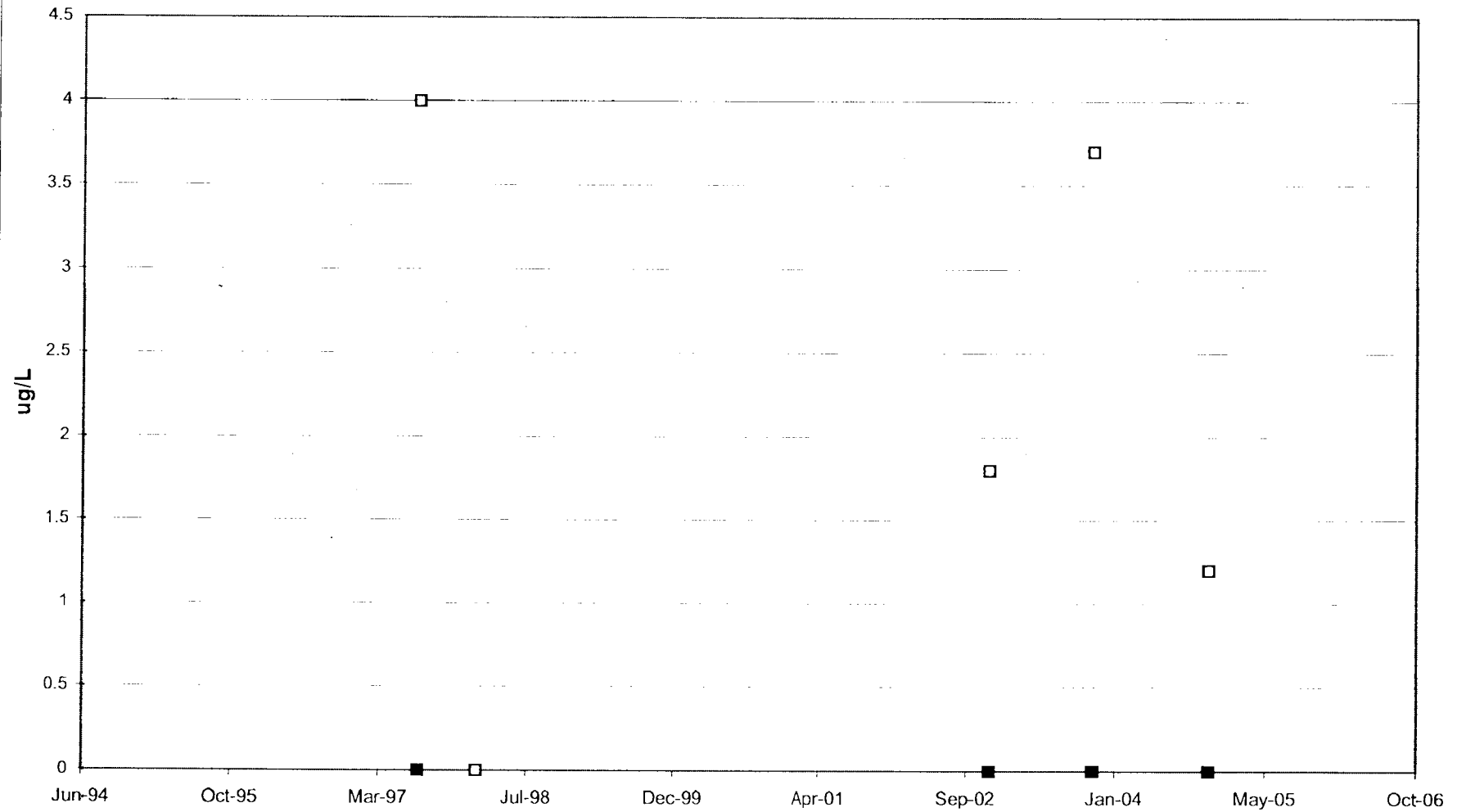
MW-11A  
Total Hydrocarbons

□ BTEX ■ PAHs



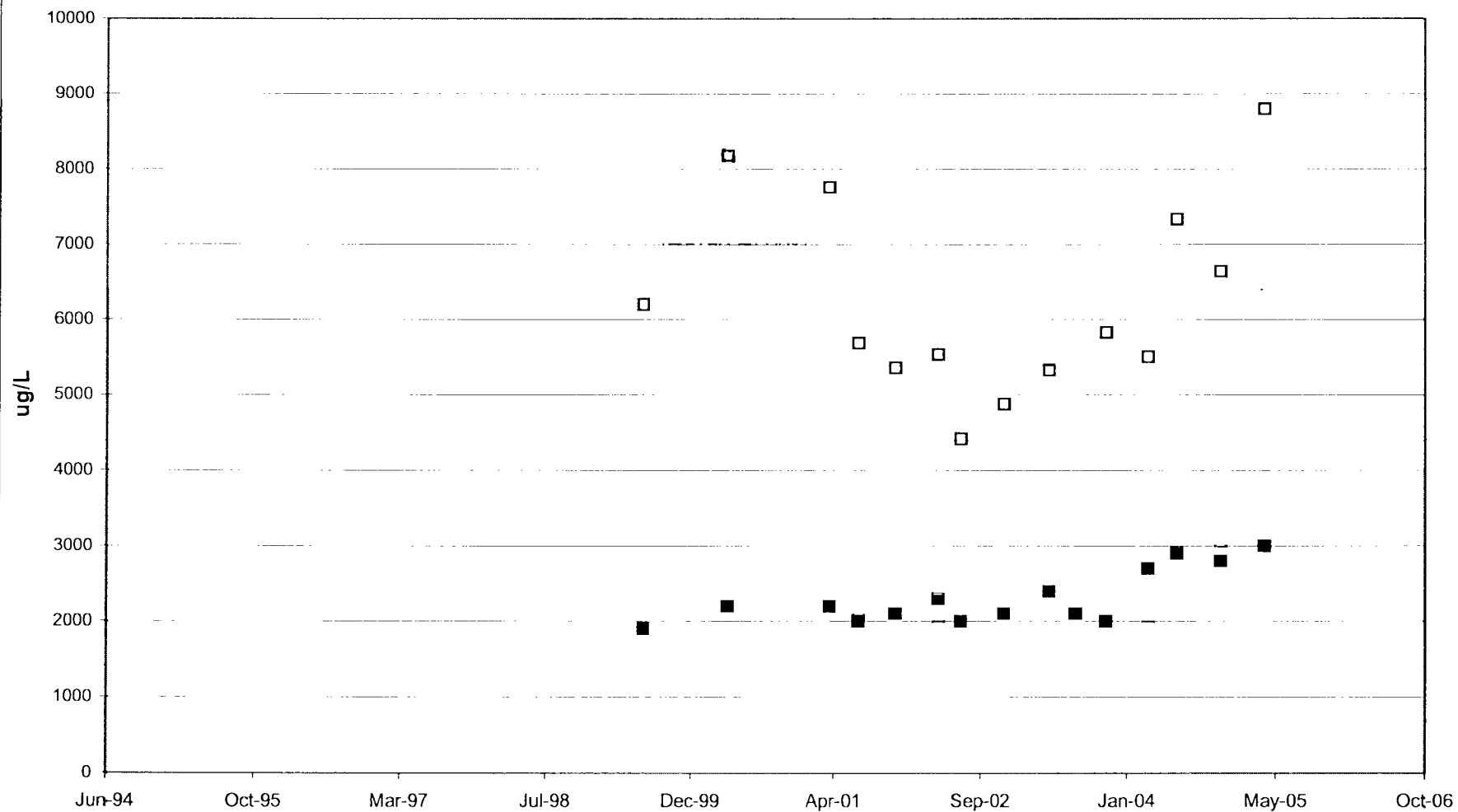
MW-13  
Total Hydrocarbons

□ BTEX ■ PAHs



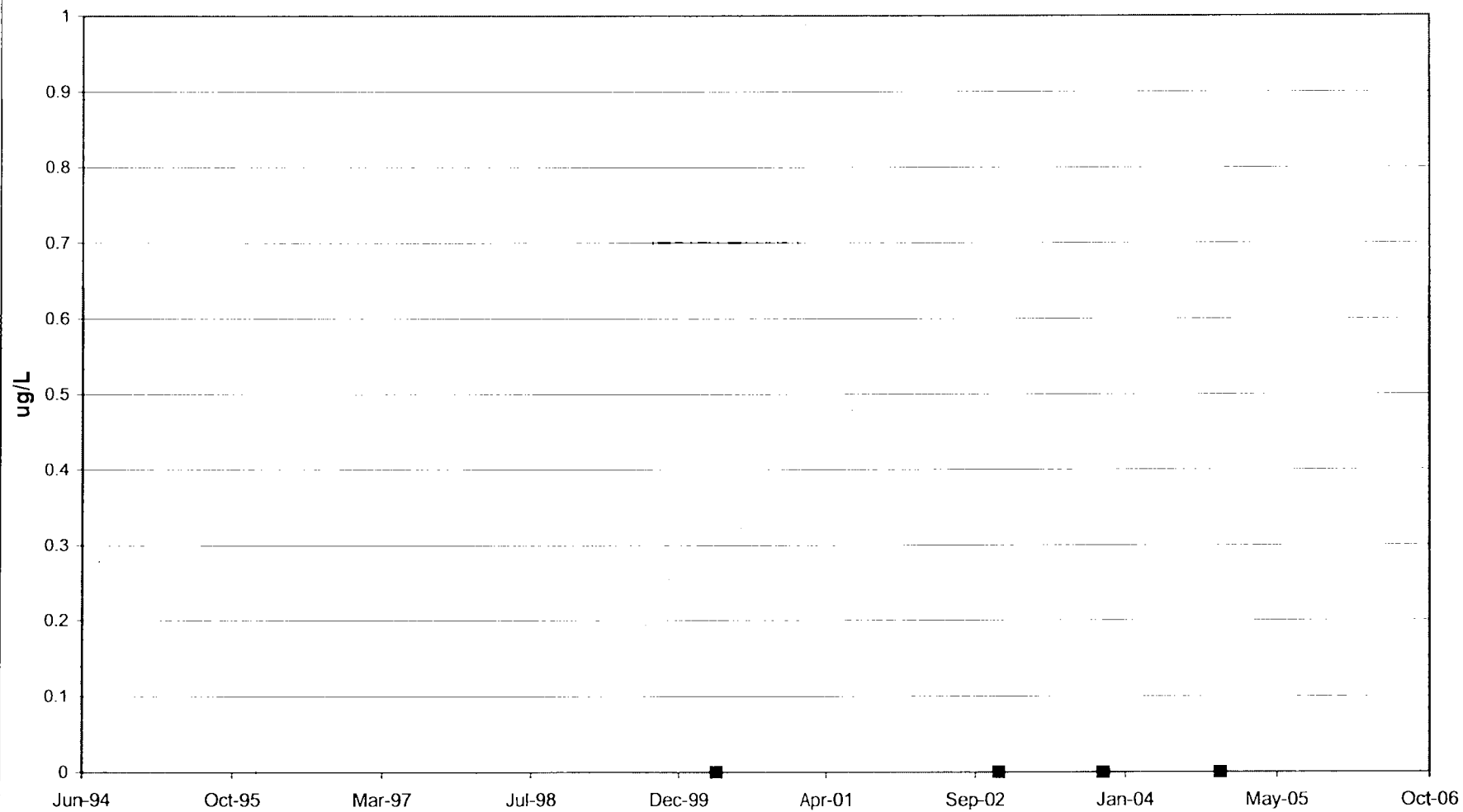
MW-19  
Total Hydrocarbons

□ BTEX ■ PAHs



MW-23  
Total Hydrocarbons

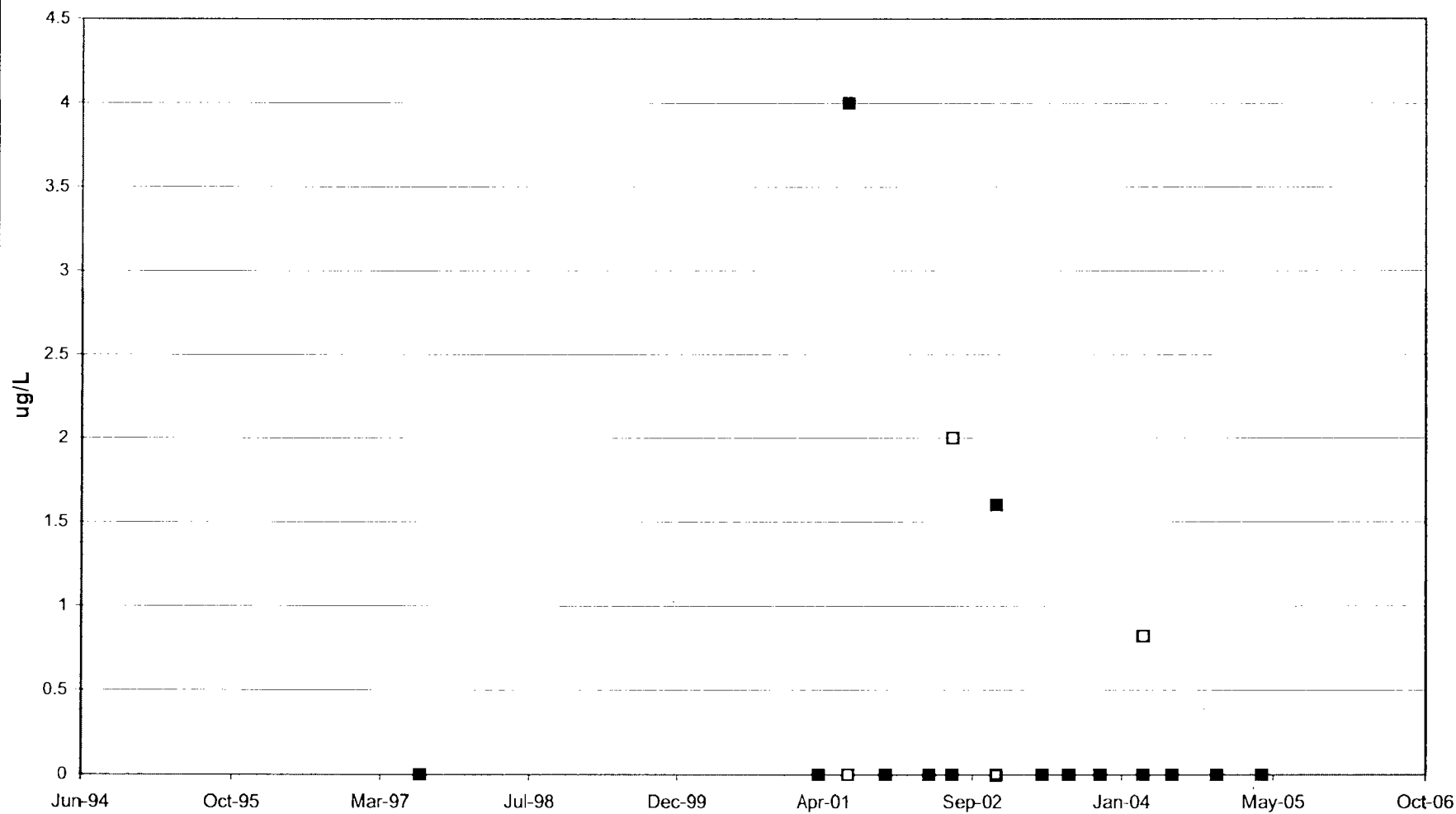
□ BTEX ■ PAHs





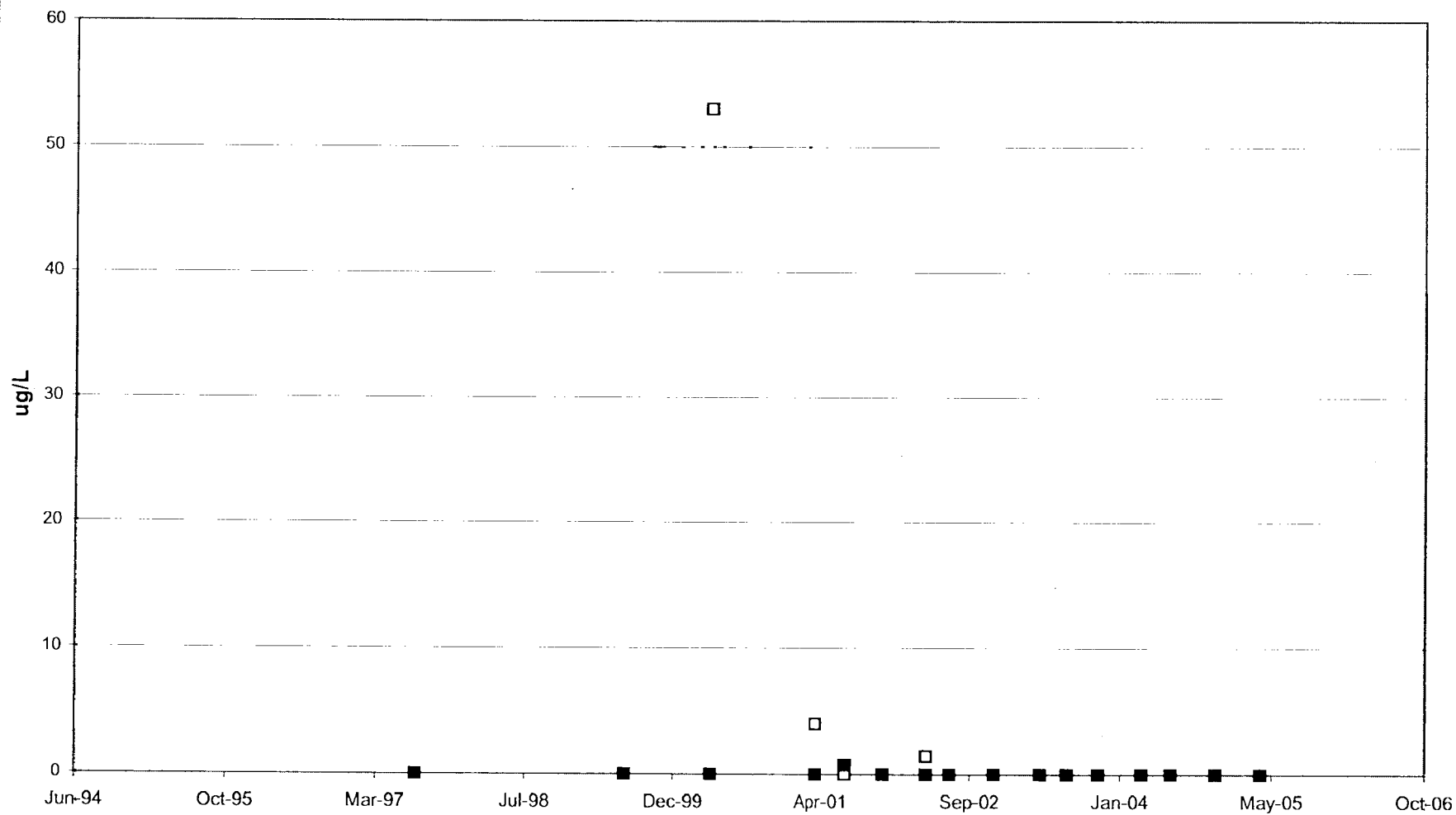
SW-01  
Total Hydrocarbons

□ BTEX ■ PAHs



SW-02  
Total Hydrocarbons

□ BTEX ■ PAHs



**Appendix B**

**Annual Site Inspection Form**

# Annual Site Inspection Form

Mineral Springs Road Former MGP

Inspection by: Mark Hofferbert  
Signature: [Signature]

Affiliation: RETEC  
Date: 4/19/05

## ASPHALT CAP SOUTH OF BUILDING #3

Cracks or ruts? Yes ☒ No ☐  
Erosion at edges? Yes ☒ No ☐  
Blue-stained soil? Yes ☒ No ☐

Comments:

*Need to (again) patch cracks*

## ASPHALT CAP EAST OF BUILDING #3

Cracks or ruts? Yes ☒ No ☐  
Erosion at edges? Yes ☒ No ☐  
Blue-stained soil? Yes ☒ No ☐

Comments:

## ASPHALT CAP NORTH OF EASTERN SWALE

Cracks or ruts? *Minor* Yes ☒ No ☐  
Erosion at edges? Yes ☒ No ☐  
Blue-stained soil? Yes ☒ No ☐

Comments:

## ASPHALT CAP SOUTH OF EASTERN SWALE

Cracks or ruts? Yes ☒ No ☐  
Erosion at edges? Yes ☒ No ☐  
Blue-stained soil? Yes ☒ No ☐

Comments:

## HDPE/SOIL CAP IN EASTERN SWALE

Cracks or ruts? Yes ☒ No ☐  
Erosion at edges? Yes ☒ No ☐  
Blue-stained soil? Yes ☒ No ☐

Comments:

## CLAY CAP BEHIND BUILDING #14

Animal dens? Yes ☒ No ☐  
Erosion? Yes ☒ No ☐  
Trees? Yes ☒ No ☐  
Blue-stained soil? Yes ☒ No ☐

Comments:

*5 or 6 holes*  
*some trash in sewer inlet grate*

## EASTERN DRAINAGE DITCH

Animal dens? Yes ☒ No ☐  
Erosion? Yes ☒ No ☐  
Trees? Yes ☒ No ☐  
Blue-stained soil? Yes ☒ No ☐  
Hydrocarbon sheen? Yes ☒ No ☐  
Inadequate Signage? Yes ☒ No ☐  
Trash / Debris? Yes ☒ No ☐

Comments:

*Low / No Flow*

## BACKFILLED EXCAVATIONS

Excessive settlement? Yes ☒ No ☐  
Ponding of surface water? Yes ☒ No ☐  
Tar boils? Yes ☒ No ☐  
Blue-stained soil? Yes ☒ No ☐

Comments:

*Dry weather / No puddles*

## CLASS D STREAM

Hydrocarbon sheen? Yes ☒ No ☐  
Comments:

*Small patches of stagnant bio-sheen*

## SITE FENCE

Damage / Holes? Yes ☒ No ☐  
Comments:

*20' of damage near MW-22*

**Appendix C**

**Certification of  
Institutional/Engineering Controls**

# Annual Certification of Institutional/Engineering Controls at Voluntary Clean-Up Program Site

Site Number: V00195-9

Site Name: National Fuel Gas - Mineral Springs Road Maintenance Facility

Site Address: 365 Mineral Springs Road, West Seneca (T), Erie County, New York

County: Erie County

Town: Town of West Seneca

Property ID: 123.16 - 2 - 8

I James D. Ramsdell, residing at 4647 Winding Woods Lane, Hamburg, NY  
as owner, or a duly authorized representative, of the property listed above which is  
located wholly or partially within the boundaries of the Voluntary Cleanup Site named  
above; do certify that the engineering and/or institutional controls, as specified in the  
Restrictive Covenant for the Voluntary Cleanup Site are in-place and functioning as  
designed within the property listed above.

Signature: James D. Ramsdell

(This area for notary public)

Eileen D. Guerra

EILEEN D. GUERRA  
Notary Public, State of New York  
Qualified in Erie County  
My Commission Expires Aug. 23, 2005