DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: **TORRINGTON LANDFILL**
Facility Address: **OLD DUMP ROAD, TORRINGTON, CT 06790**
Facility EPA ID #: **CTD991289513**

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   __X__ If yes - check here and continue with #2 below.

   _____ If no - re-evaluate existing data, or

   _____ if data are not available, skip to #8 and enter"IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Is **groundwater** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

__X__ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

_____ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

The groundwater at the Torrington Landfill has been monitored as part of the RCRA closure and post-closure process since 1988. The latest (1998), annual monitoring report reveals that the following contaminants had exceedances over the State of Connecticut DWS: barium, cadmium, vinyl chloride, carbon tetracloride, benzene, acrylonitrile and 1,1,2-trichloroethane. The highest measured concentrations and the corresponding DWS are shown in the enclosed Table CA750-5 of Attachment (CA750)-5.

Footnotes:

[1]"Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

__X__ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2]).

_____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) - skip to #8 and enter "NO" status code, after providing an explanation.

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Information derived from groundwater flow contours, topography and hydrology of the site indicate that the Naugatuck River is the hydraulic boundary of the groundwater flow from the Torrington landfill.

[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

__X__ If yes - continue after identifying potentially affected surface water bodies.

_____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s): **Potentially affected surface water bodies are the Naugatuck River, Peck Brook, surrounding wetlands, a groundwater fed man-made pond at South Main and Old Dump Road and the unnamed intermittent stream located south of the landfill.**

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

__X__ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

_____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

PLEASE SEE ATTACHMENT (CA750) - 5

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

_____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable**") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s):_____

[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

__X__ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

_____ If no - enter "NO" status code in #8.

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

In accordance with the approved Torrington Landfill RCRA Metal Hydroxide Closure and Post-closure Plan, the eight monitoring wells of the RCRA post-closure groundwater monitoring will continue being monitored for additional 20 years to comply with 40CFR Section 265 Subpart F. In addition, surface sampling locations at Peck Brook, the unnamed intermittent stream and the private water supply wells will continue to be monitored until the end of the post-closure period. The landfill monitoring network consists of the following wells: MW-1A, MW-2R, MW-3, MW-4, MW-5A, MW-7, MW-8A and MW-9. Ten private wells PW-1 to PW-10, as well as three surface sampling points, S-1, S-2 and S-3 are also included in the post-closure monitoring.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

__X__ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the **TORRINGTON LANDFILL** facility , **EPA ID # CTD991289513** , located at **OLD DUMP ROAD, TORRINGTON, CT**. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

_____ NO - Unacceptable migration of contaminated groundwater is observed or expected.

_____ IN - More information is needed to make a determination.

Reviewed ~~Completed~~ by (signature) David Lim Date 4/6/2000
(print) David Lim
(title) Environmental Engineer

Supervisor (signature) Mark Hoagland Date 4/13/00
(print) Section Chief
(title) Matthew R. Hoagland
(EPA Region or State) EPA New England

Locations where References may be found:

CT DEPARTMENT OF ENVIRONMENTAL PROTECTION, HARTFORD, CT
U.S. ENVIRONMENTAL PROTECTION AGENCY, BOSTON, MA

Contact telephone and e-mail numbers

(name) Marina Crawford
(phone #) (860)424-3574
(e-mail)_____

ATTACHMENT (CA750)-5
MIGRATION OF CONTAMINATED GROUNDWATER UNDER CONTROL
TORRINGTON LANDFILL

The groundwater contaminants are not increasing over time. For the period 1995-1998 data results show that the contamination is stabilized, as documented in the enclosed graphical summaries of landfill groundwater monitoring well data for arsenic, barium, vinyl chloride, chloroethane, methylene chloride, 1,1-dichloroethane, 1, 2-dichloroethene, 1,1,1-trichloroethane, benzene, toluene, chlorobenzene and ethylbenzene.

Following are the contaminants in the groundwater whose concentrations exceeded the CT DWS. Action Levels and RSR's for 1998.

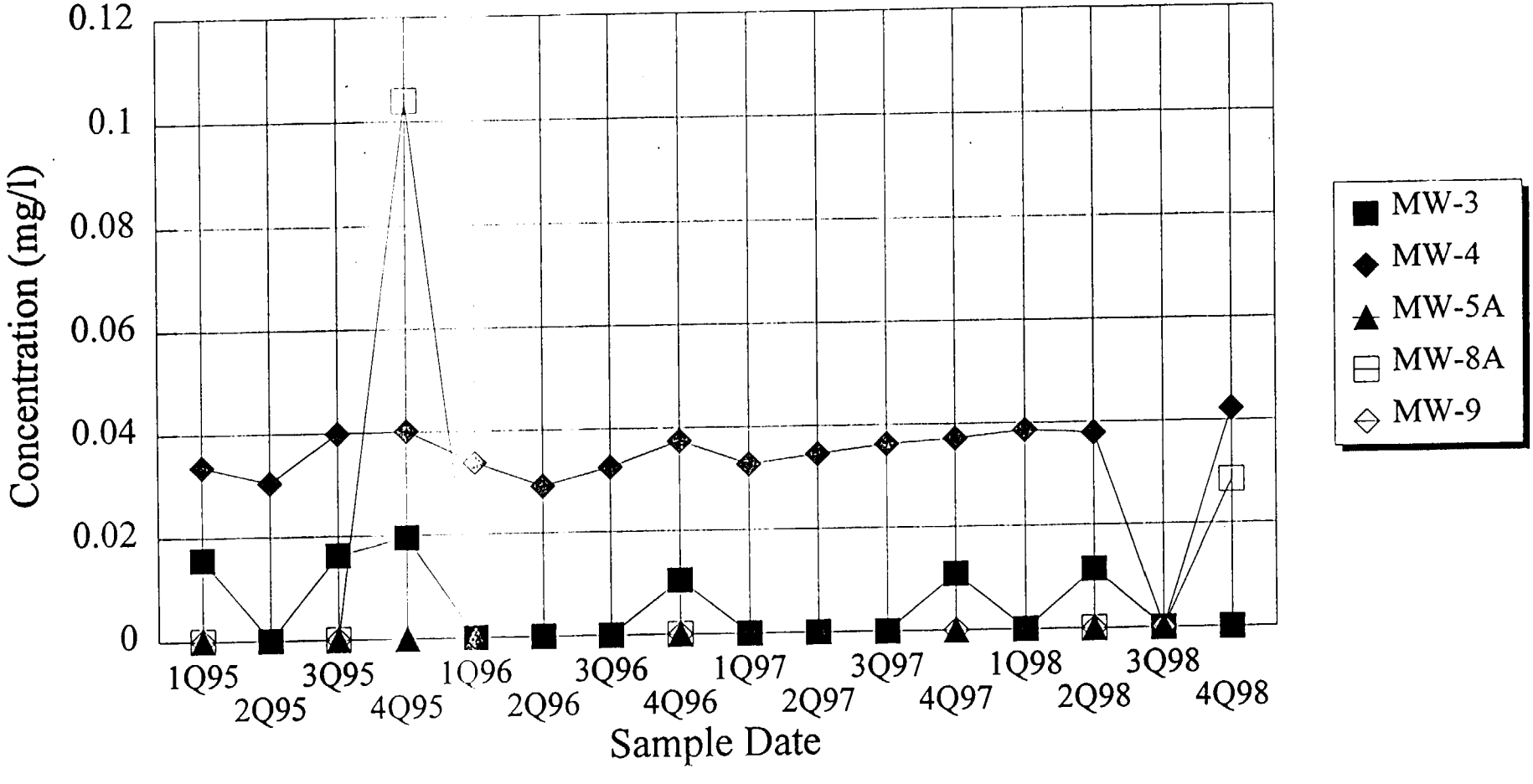
TABLE CA 750-5
1998 CONTAMINANTS' EXCEEDANCES

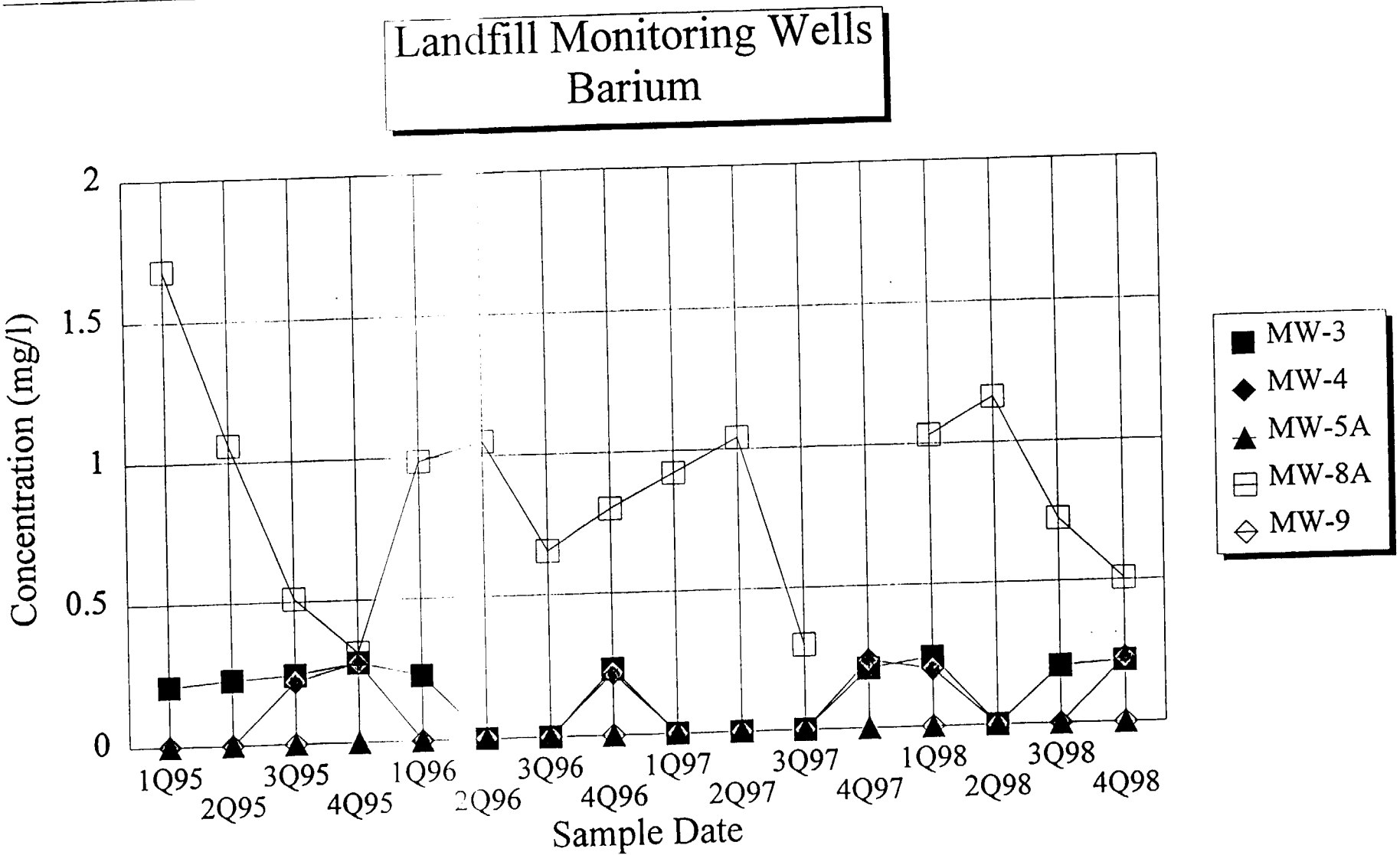
CONTAMINANT	LOCATION	CONCENTRATION, ug/l	CT DWS ug/l	CT SWPC ug/l
BARIUM	MW - 8A	1,160	1000	NE
CADMIUM	MW - 8A	13	5	6
VINYL CHLORIDE	MW - 1A	8	2	15,750
CARBON TETRA-CHLORIDE	PW - 6	6	5	132
BENZENE	MW -7	10	1	710
ACRYLONITRILE	MW - 1A	22	0.5	20
1,1,2-TRICHLOROETH-ANE	MW -1A	18	5	1,260

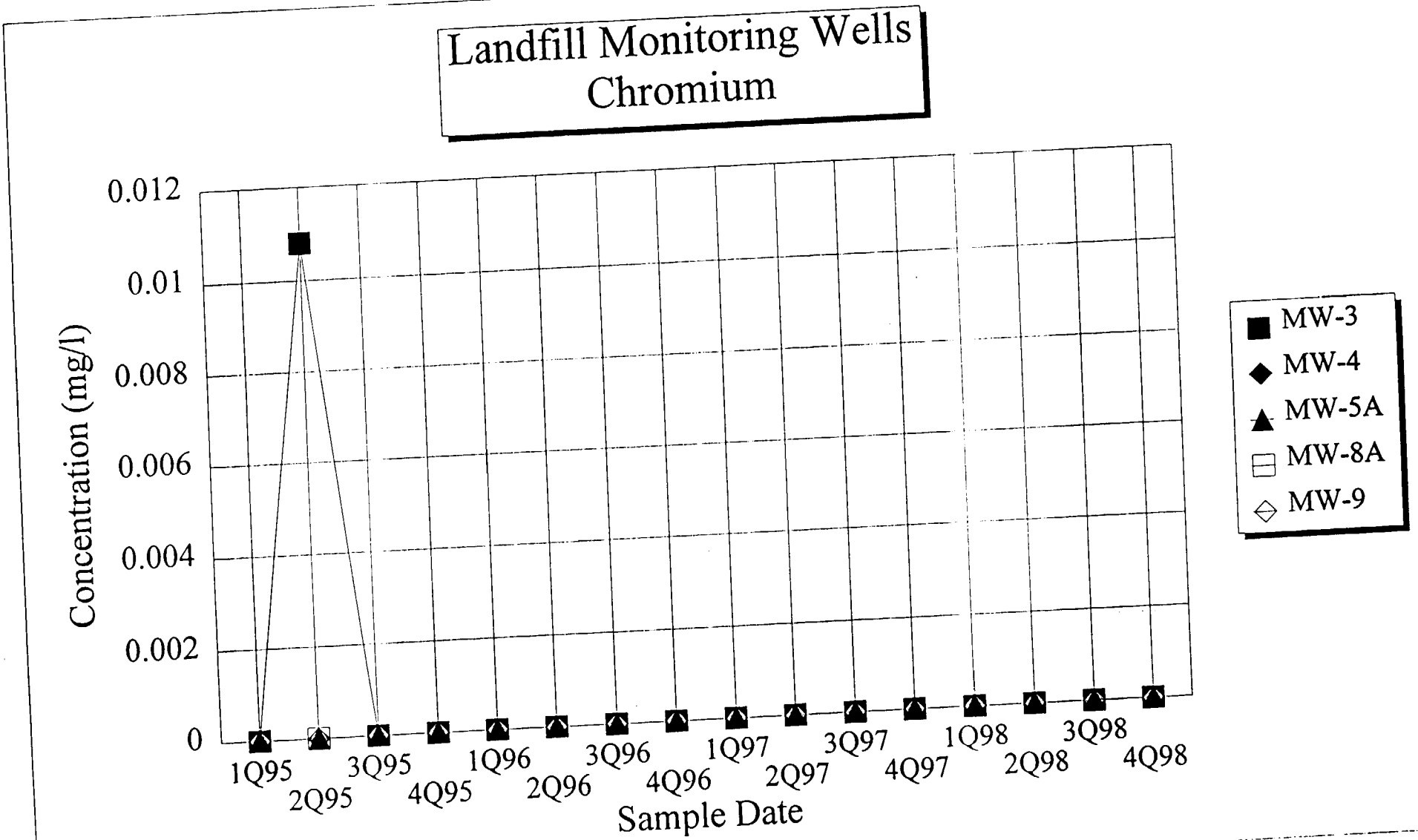
None of the contaminants concentrations in the groundwater exceed the CTDEP surface water protection criteria at the point of discharge into a surface water body, (SWPCx10).

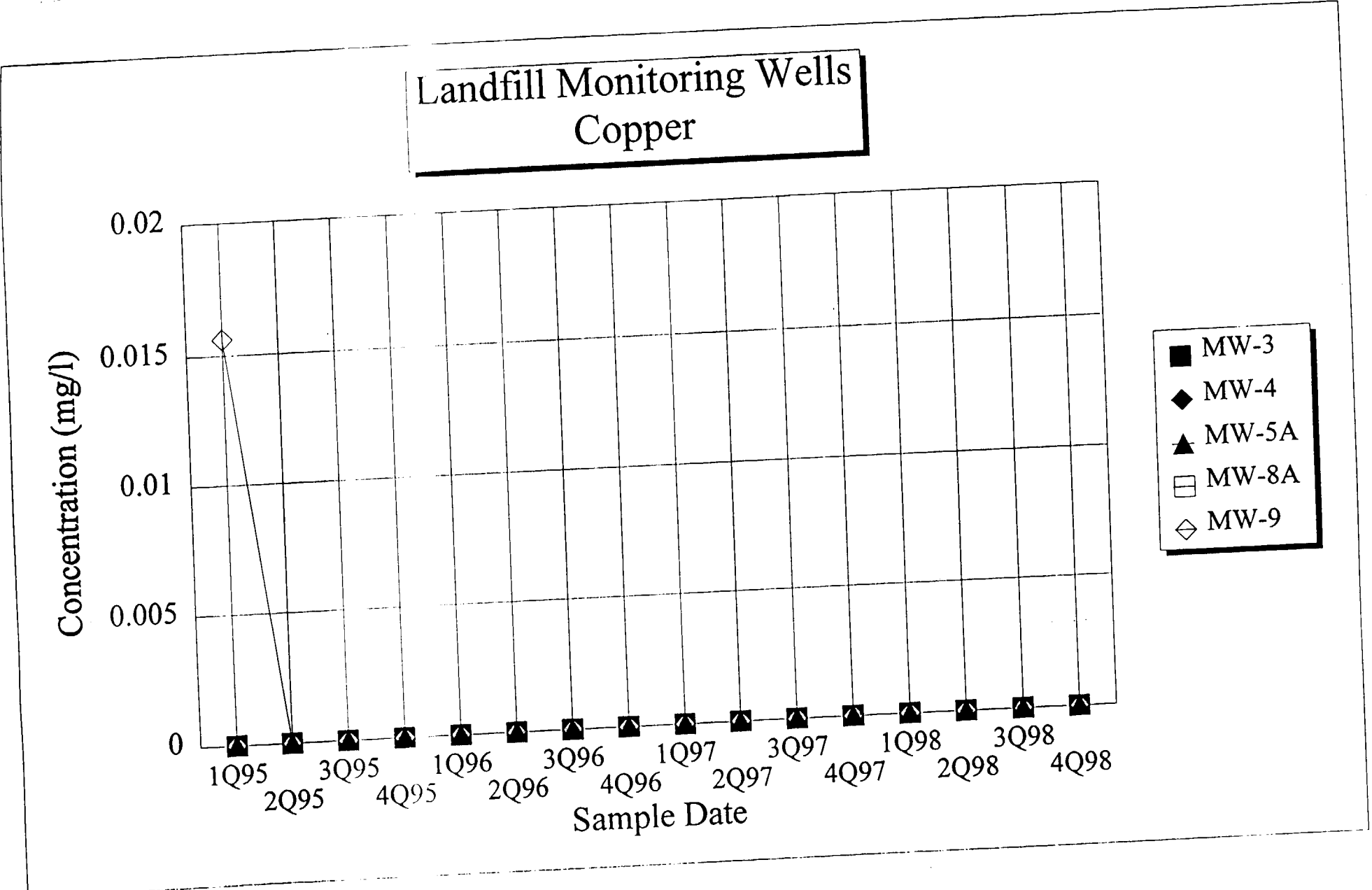
The contaminated groundwater has remained in the existing area of contaminated groundwater. The plume is not expanding either vertically or horizontally. The groundwater travels a short distance, approximately 600 to 800 feet towards the Naugatuck River which acts as a hydraulic barrier.

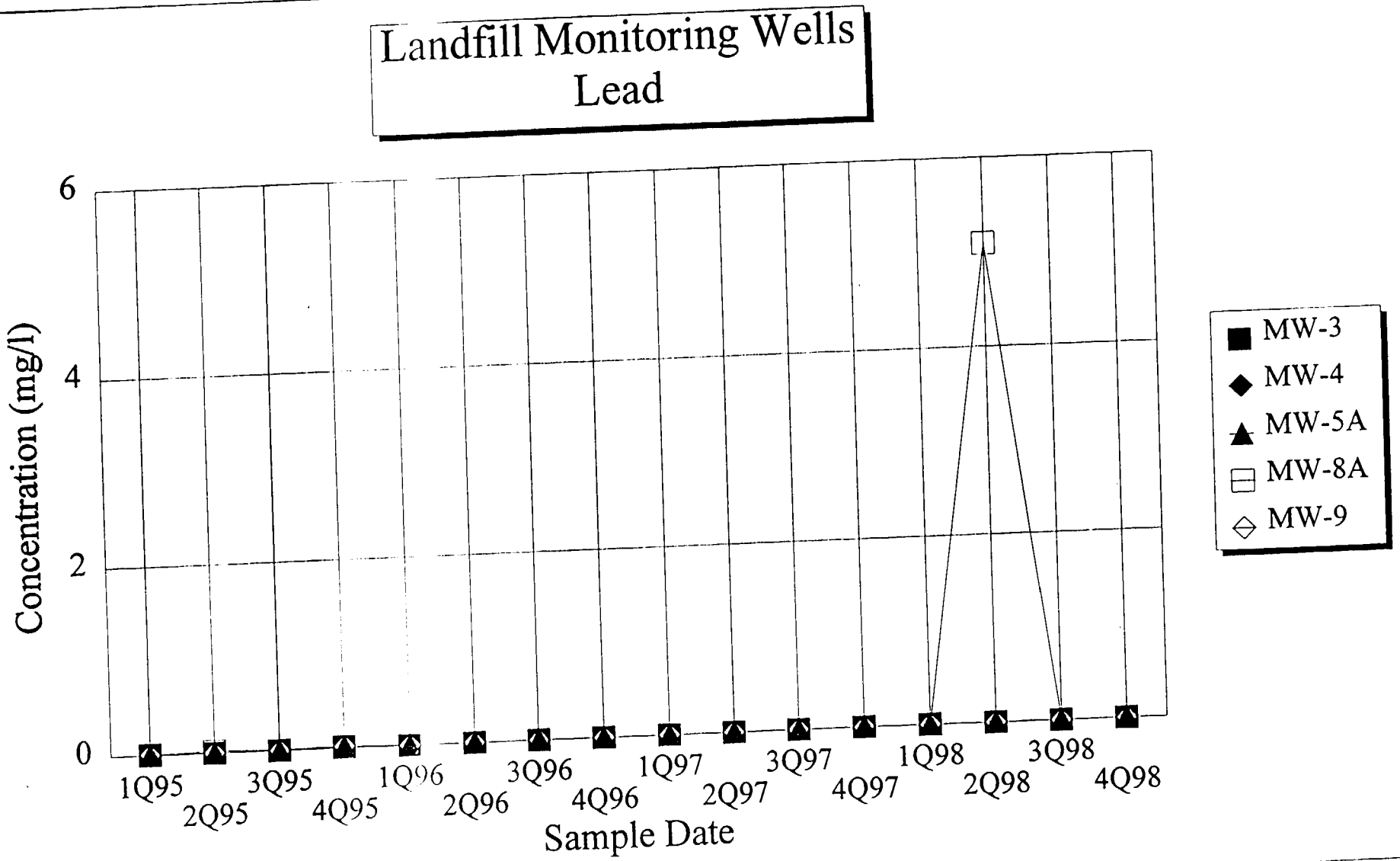
Landfill Monitoring Wells
Arsenic

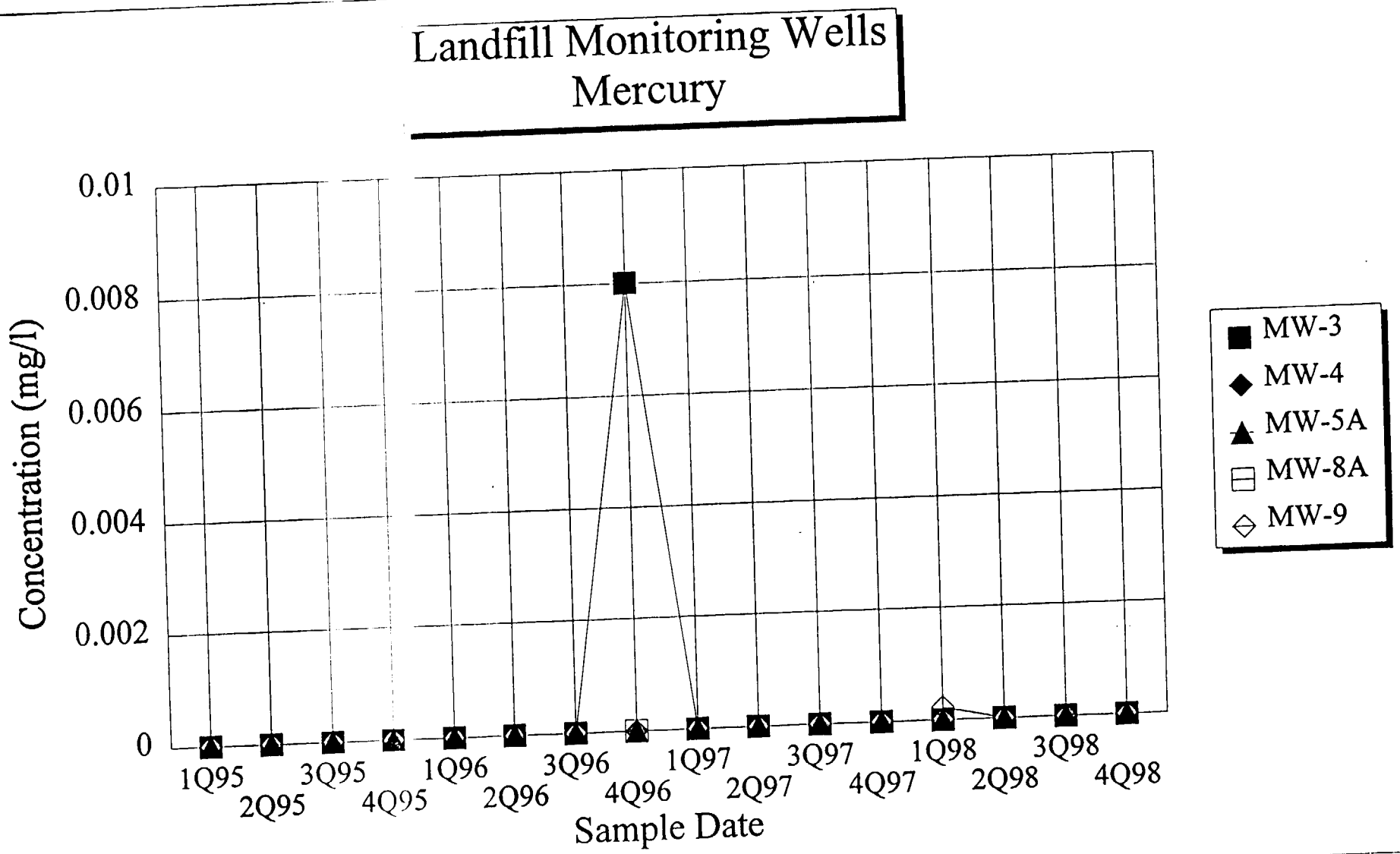


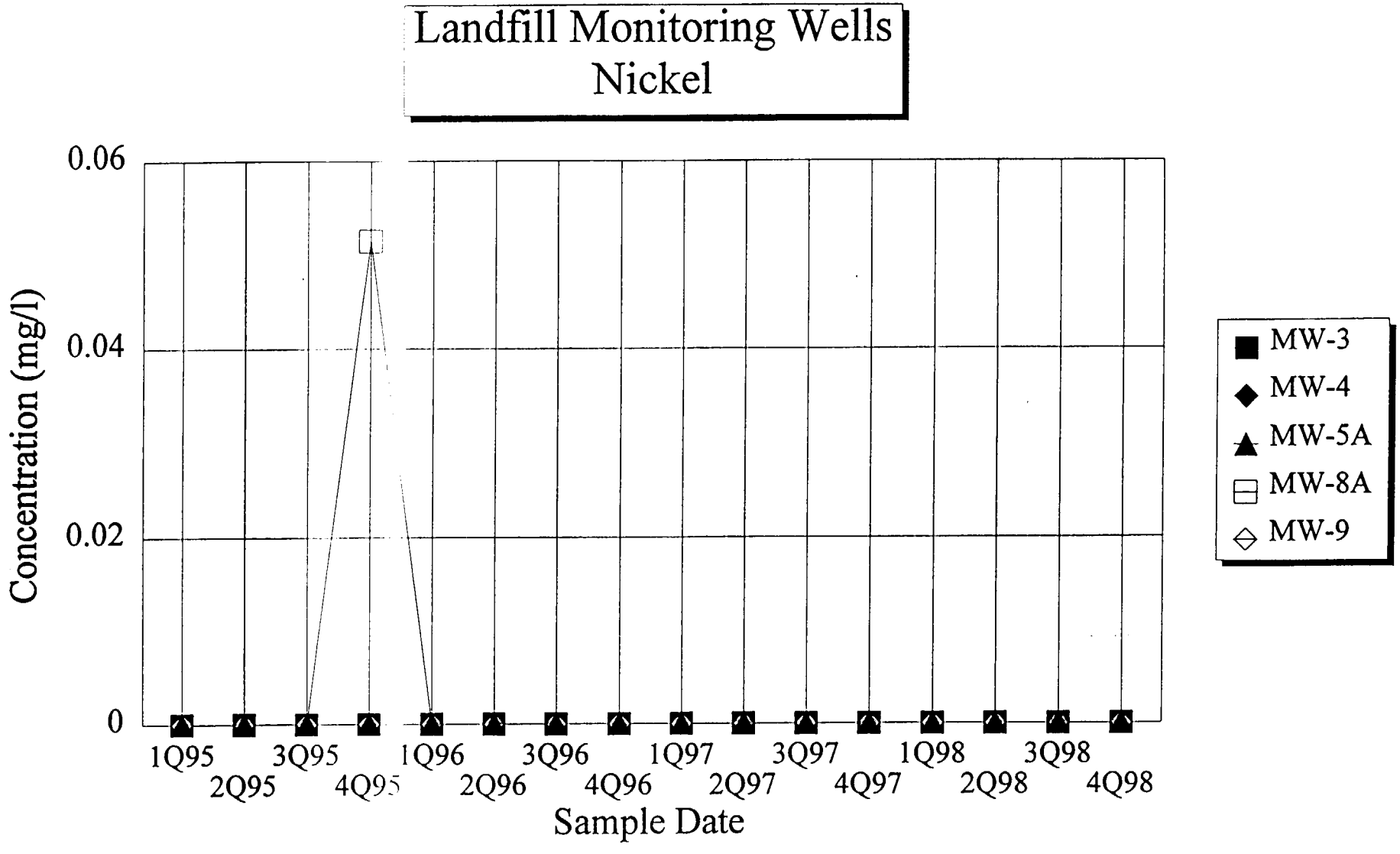

Landfill Monitoring Wells
Barium
Concentration (mg/l)
2
1.5
1
0.5
0
1Q95
2Q95
3Q95
4Q95
1Q96
2Q96
3Q96
4Q96
1Q97
2Q97
3Q97
4Q97
1Q98
2Q98
3Q98
4Q98
Sample Date
MW-3
MW-4
MW-5A
MW-8A
MW-9

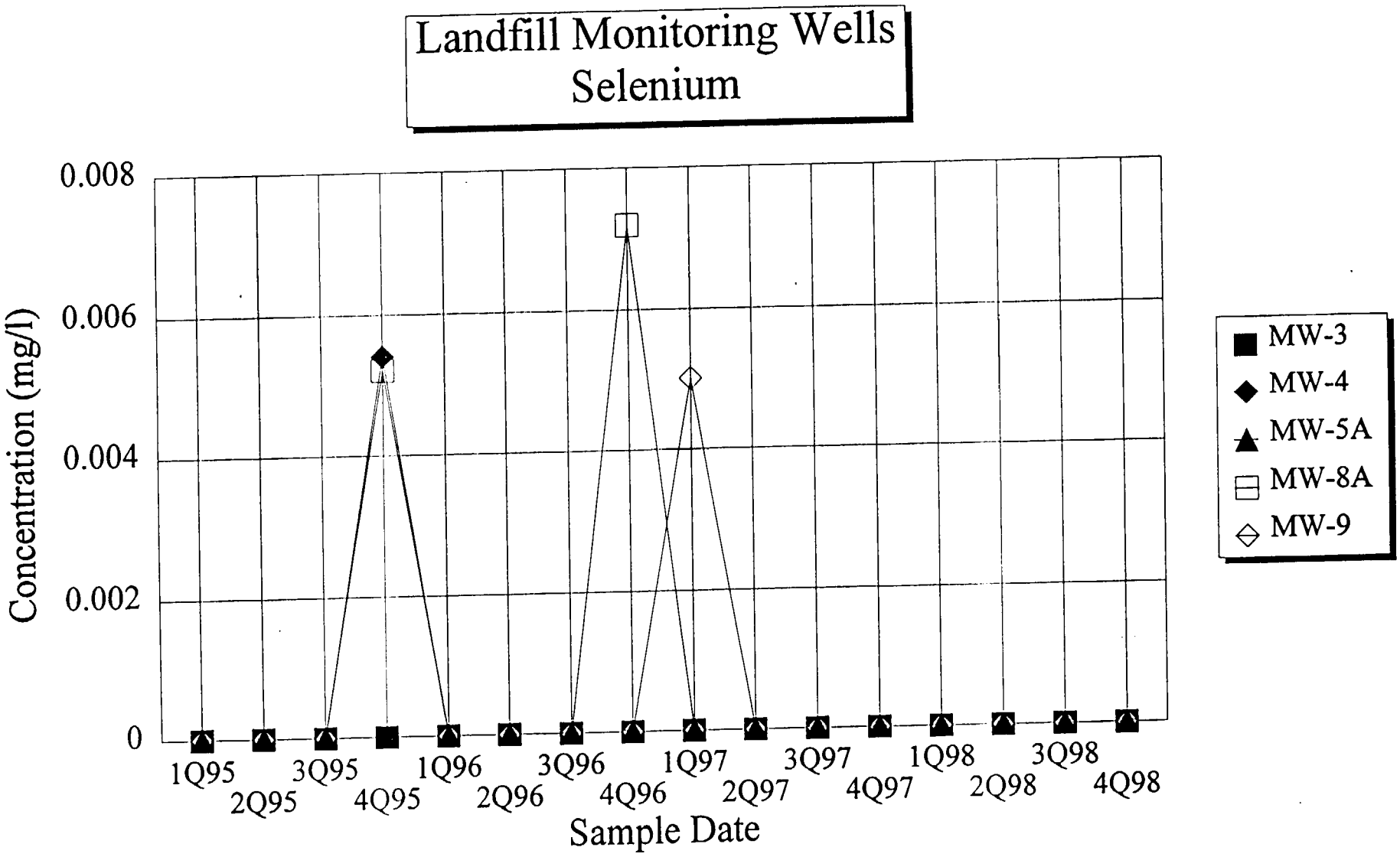

Landfill Monitoring Wells
Chromium
Concentration (mg/l)
0.012
0.01
0.008
0.006
0.004
0.002
0
1Q95
2Q95
3Q95
4Q95
1Q96
2Q96
3Q96
4Q96
1Q97
2Q97
3Q97
4Q97
1Q98
2Q98
3Q98
4Q98
Sample Date
MW-3
MW-4
MW-5A
MW-8A
MW-9

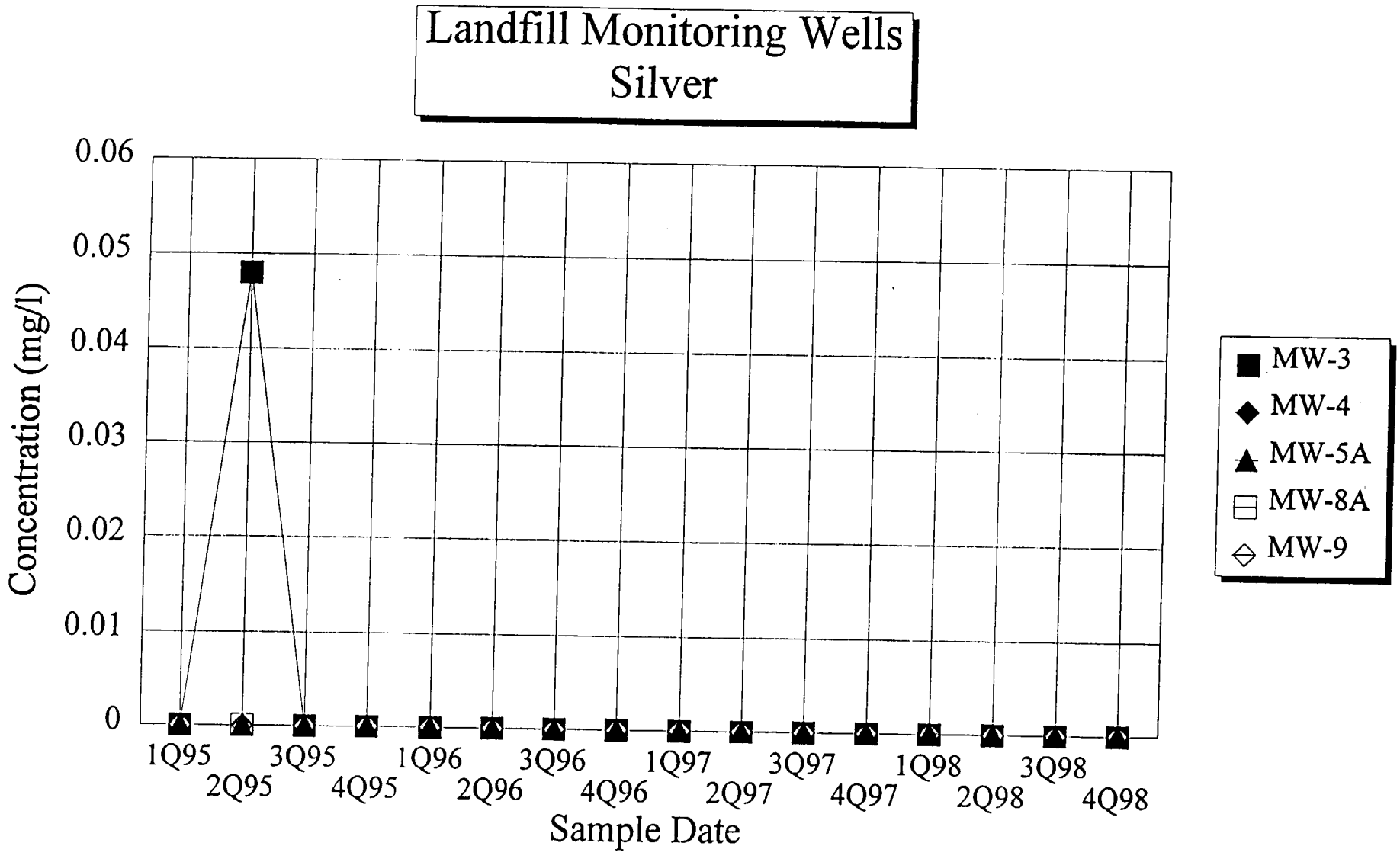

Landfill Monitoring Wells
Copper
Concentration (mg/l)
0.02
0.015
0.01
0.005
0
1Q95
2Q95
3Q95
4Q95
1Q96
2Q96
3Q96
4Q96
1Q97
2Q97
3Q97
4Q97
1Q98
2Q98
3Q98
4Q98
Sample Date
MW-3
MW-4
MW-5A
MW-8A
MW-9

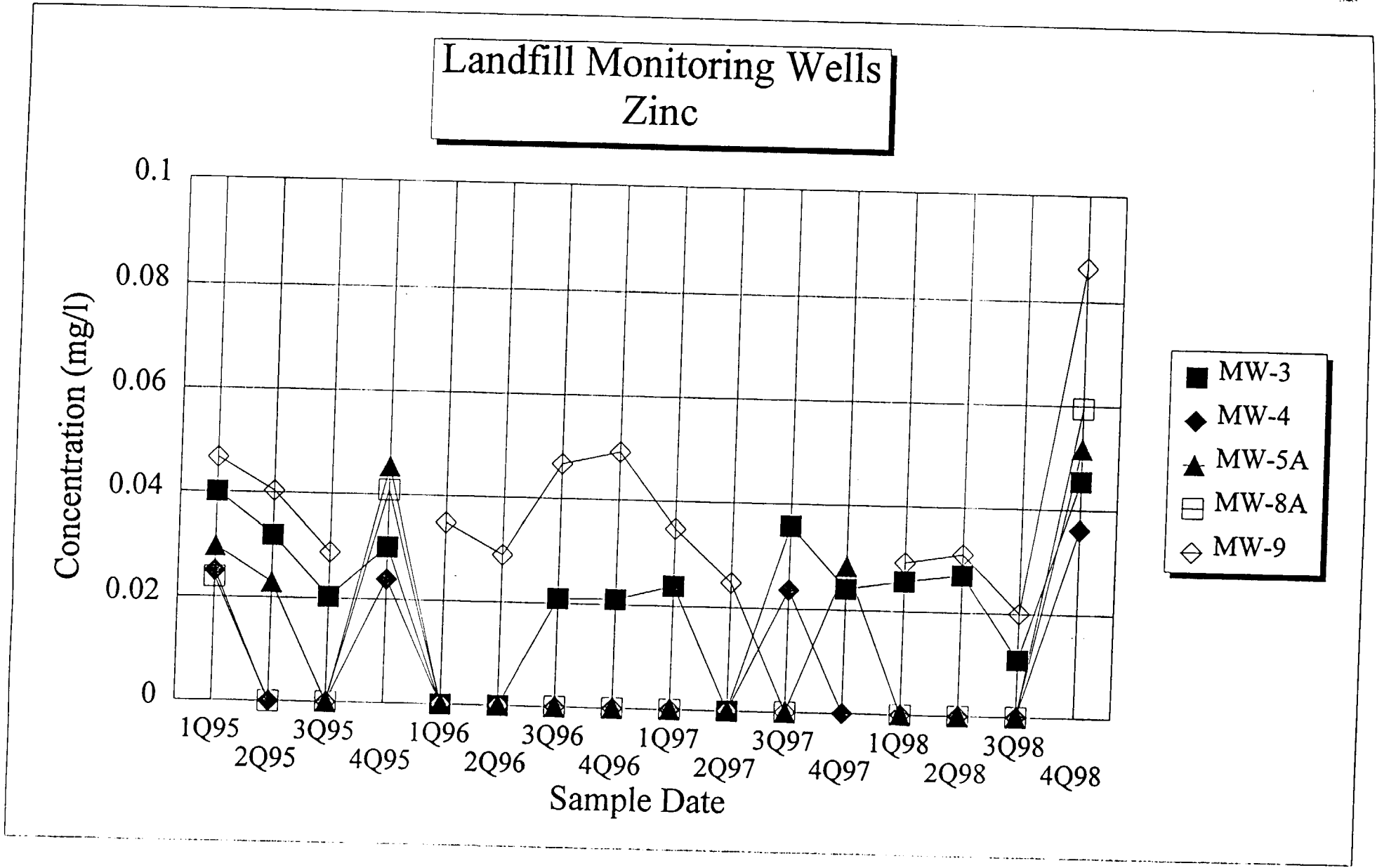

Landfill Monitoring Wells
Lead
Concentration (mg/l)
6
4
2
0
1Q95
2Q95
3Q95
4Q95
1Q96
2Q96
3Q96
4Q96
1Q97
2Q97
3Q97
4Q97
1Q98
2Q98
3Q98
4Q98
Sample Date
MW-3
MW-4
MW-5A
MW-8A
MW-9

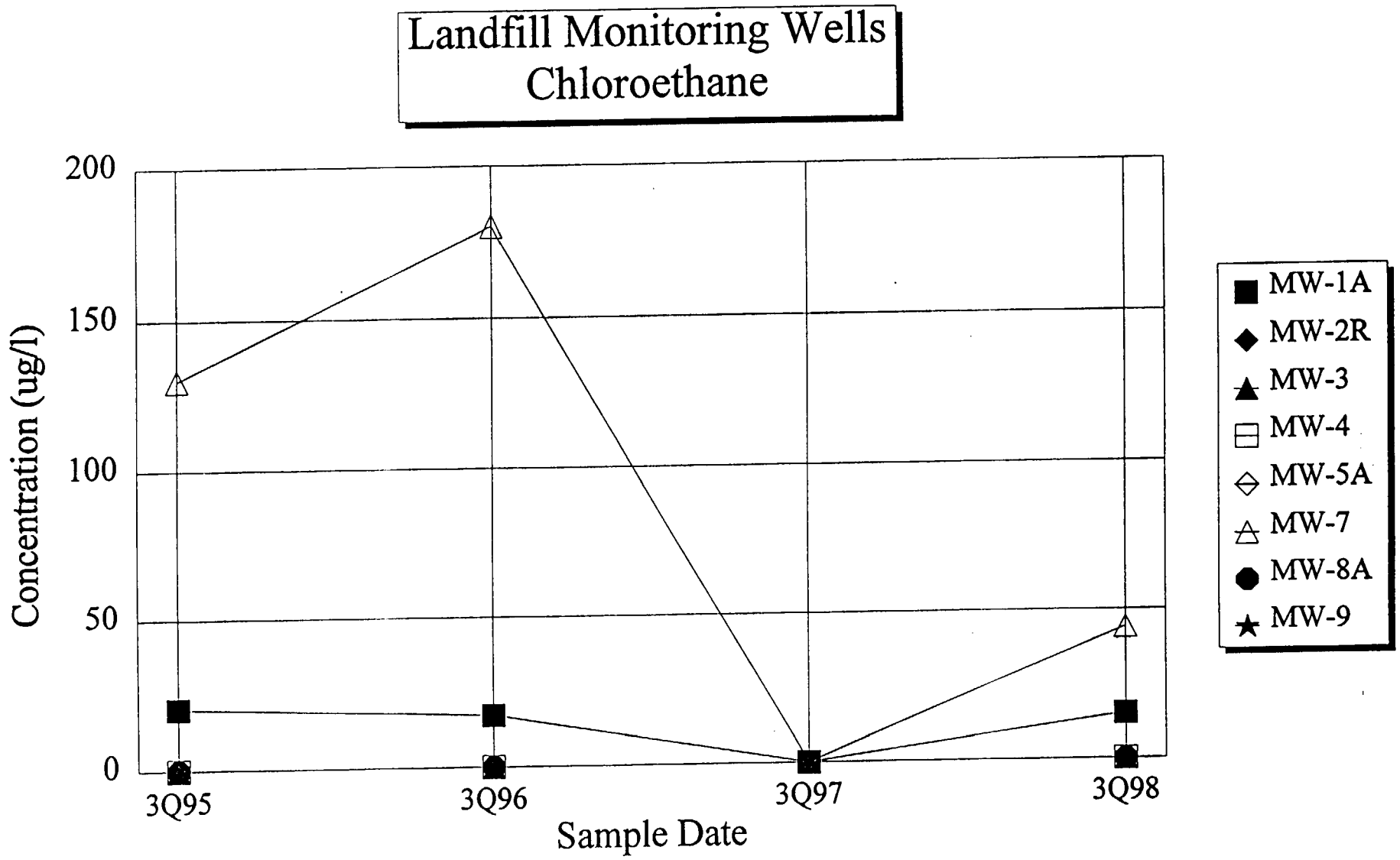

Landfill Monitoring Wells
Mercury
Concentration (mg/l)
0.01
0.008
0.006
0.004
0.002
0
1Q95
2Q95
3Q95
4Q95
1Q96
2Q96
3Q96
4Q96
1Q97
2Q97
3Q97
4Q97
1Q98
2Q98
3Q98
4Q98
Sample Date
MW-3
MW-4
MW-5A
MW-8A
MW-9

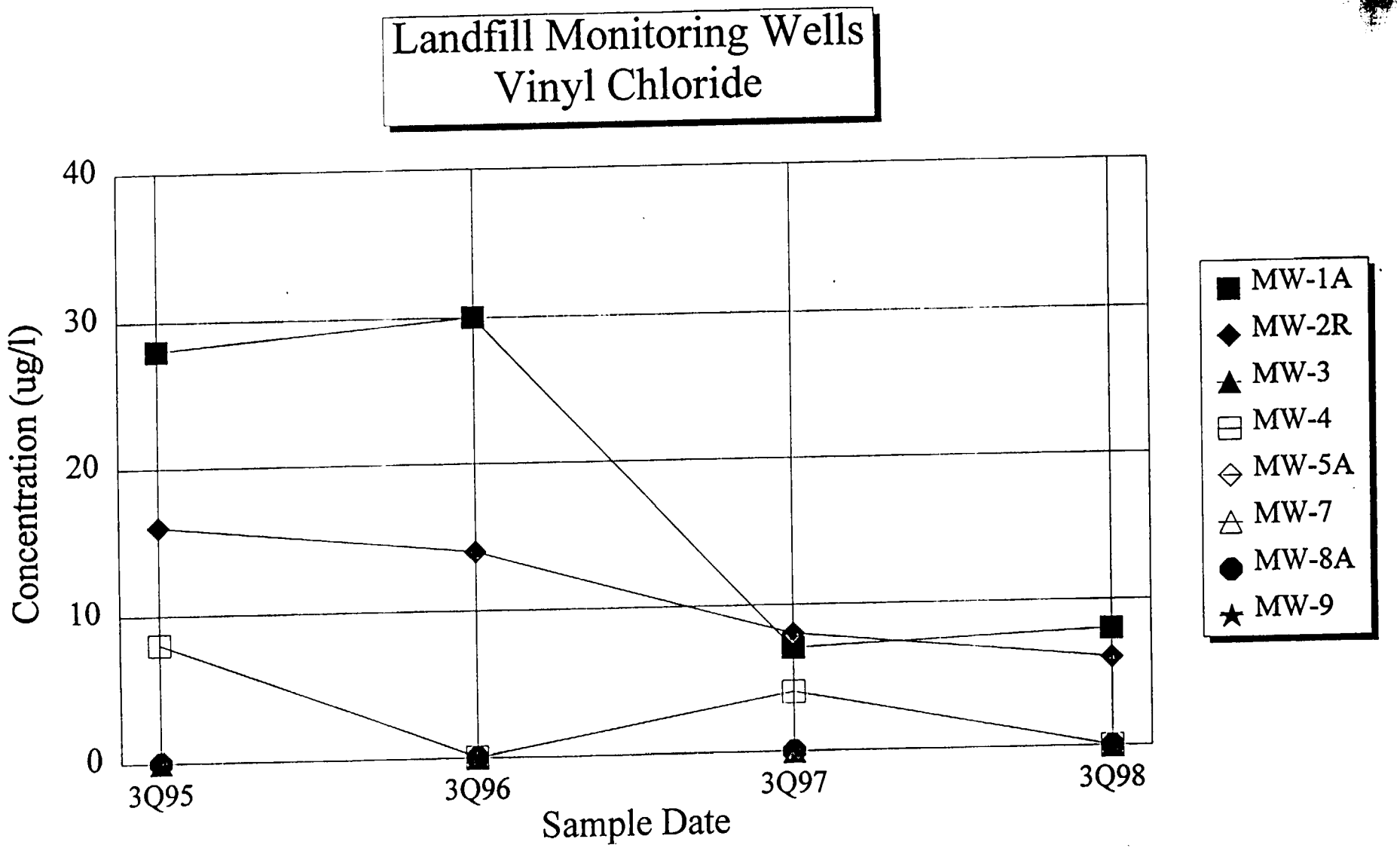

Landfill Monitoring Wells
Nickel
0.06
0.04
0.02
0
Concentration (mg/l)
1Q95
2Q95
3Q95
4Q95
1Q96
2Q96
3Q96
4Q96
1Q97
2Q97
3Q97
4Q97
1Q98
2Q98
3Q98
4Q98
Sample Date
MW-3
MW-4
MW-5A
MW-8A
MW-9

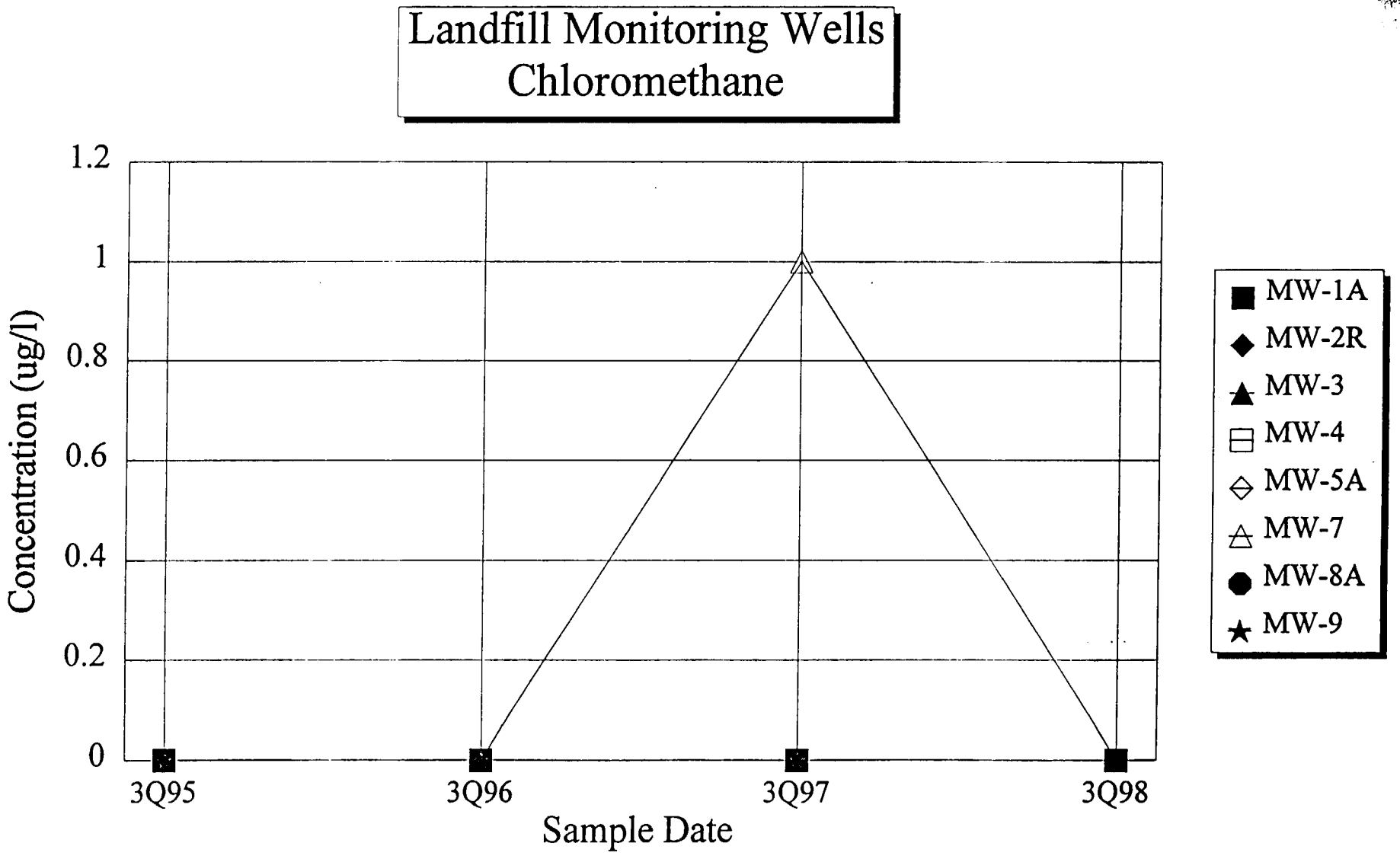

Landfill Monitoring Wells
Selenium
Concentration (mg/l)
0.008
0.006
0.004
0.002
0
1Q95
2Q95
3Q95
4Q95
1Q96
2Q96
3Q96
4Q96
1Q97
2Q97
3Q97
4Q97
1Q98
2Q98
3Q98
4Q98
Sample Date
MW-3
MW-4
MW-5A
MW-8A
MW-9

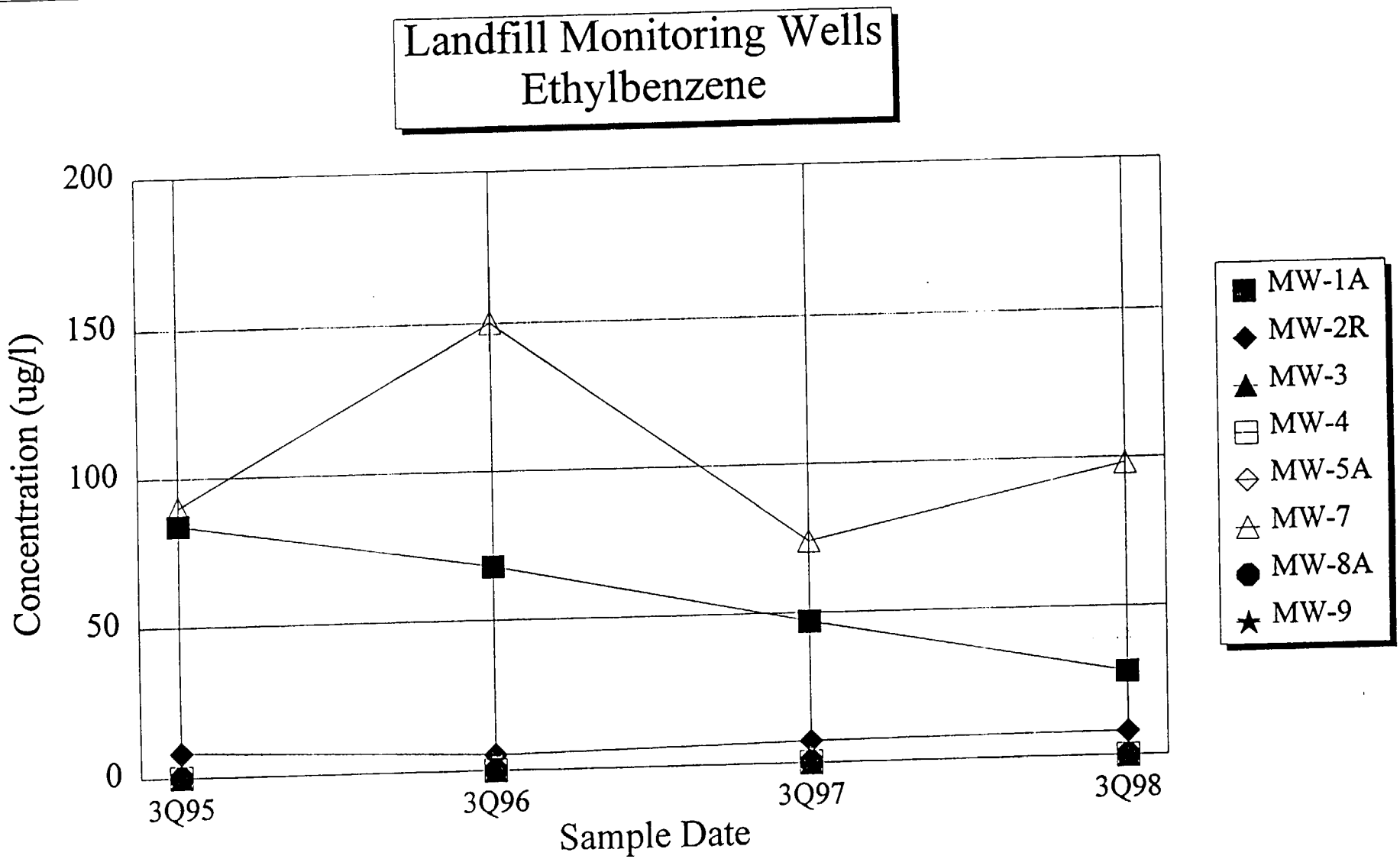

Landfill Monitoring Wells
Silver
Concentration (mg/l)
0.06
0.05
0.04
0.03
0.02
0.01
0
1Q95
2Q95
3Q95
4Q95
1Q96
2Q96
3Q96
4Q96
1Q97
2Q97
3Q97
4Q97
1Q98
2Q98
3Q98
4Q98
Sample Date
MW-3
MW-4
MW-5A
MW-8A
MW-9

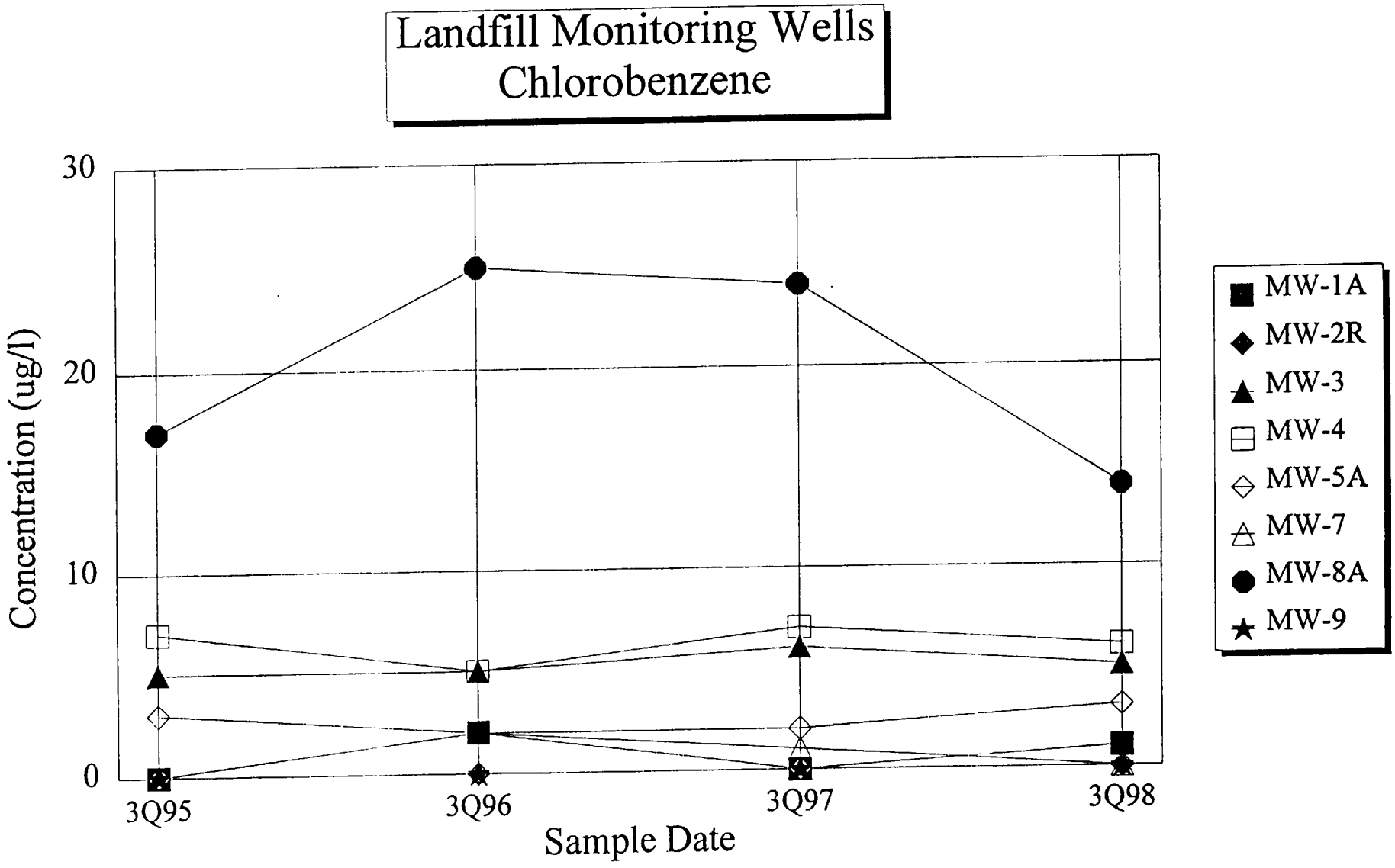

Landfill Monitoring Wells
Zinc
Concentration (mg/l)
0.1
0.08
0.06
0.04
0.02
0
1Q95
2Q95
3Q95
4Q95
1Q96
2Q96
3Q96
4Q96
1Q97
2Q97
3Q97
4Q97
1Q98
2Q98
3Q98
4Q98
Sample Date
MW-3
MW-4
MW-5A
MW-8A
MW-9

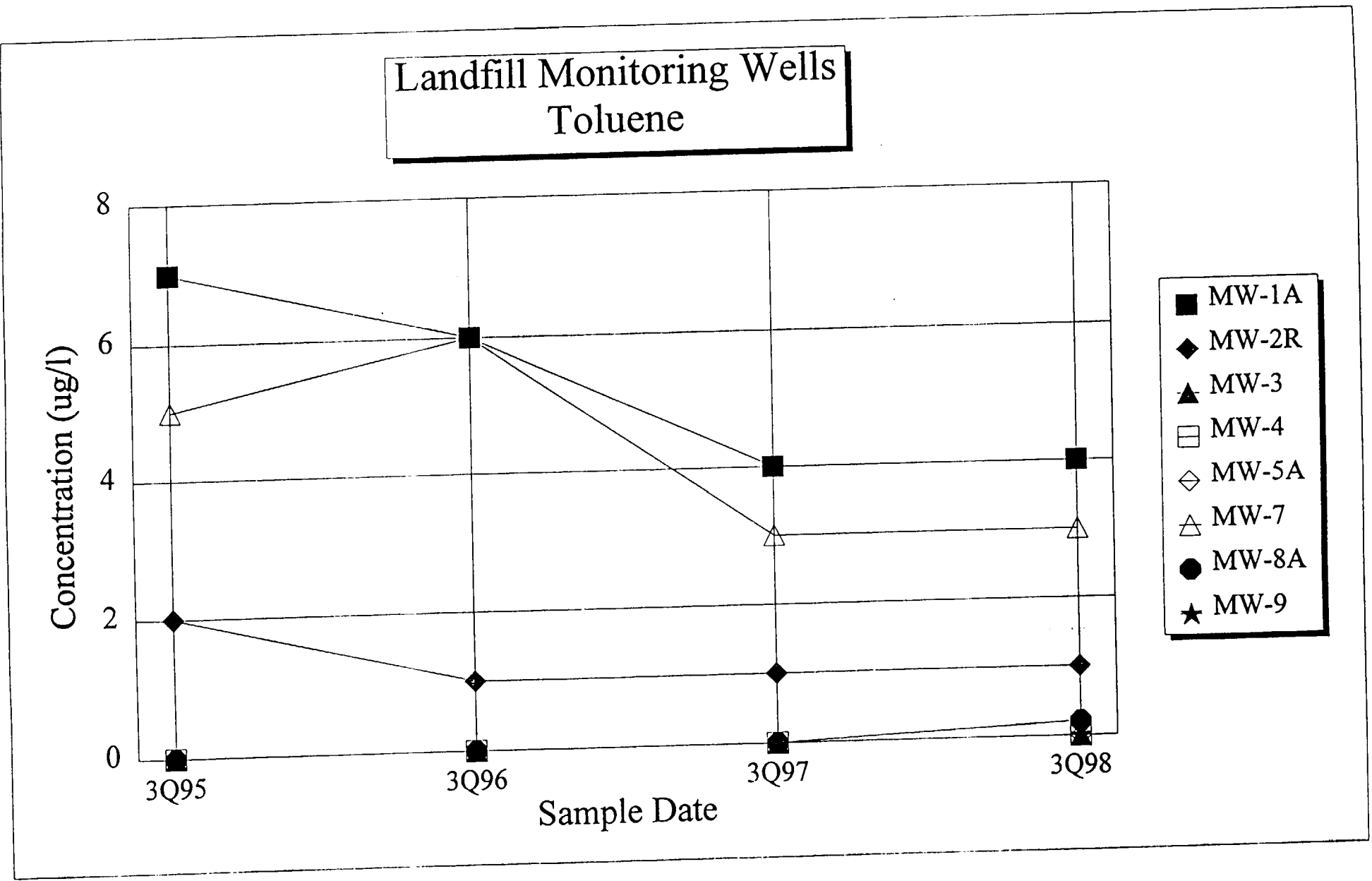

Landfill Monitoring Wells
Chloroethane
200
150
100
50
0
Concentration (ug/l)
3Q95
3Q96
3Q97
3Q98
Sample Date
MW-1A
MW-2R
MW-3
MW-4
MW-5A
MW-7
MW-8A
MW-9

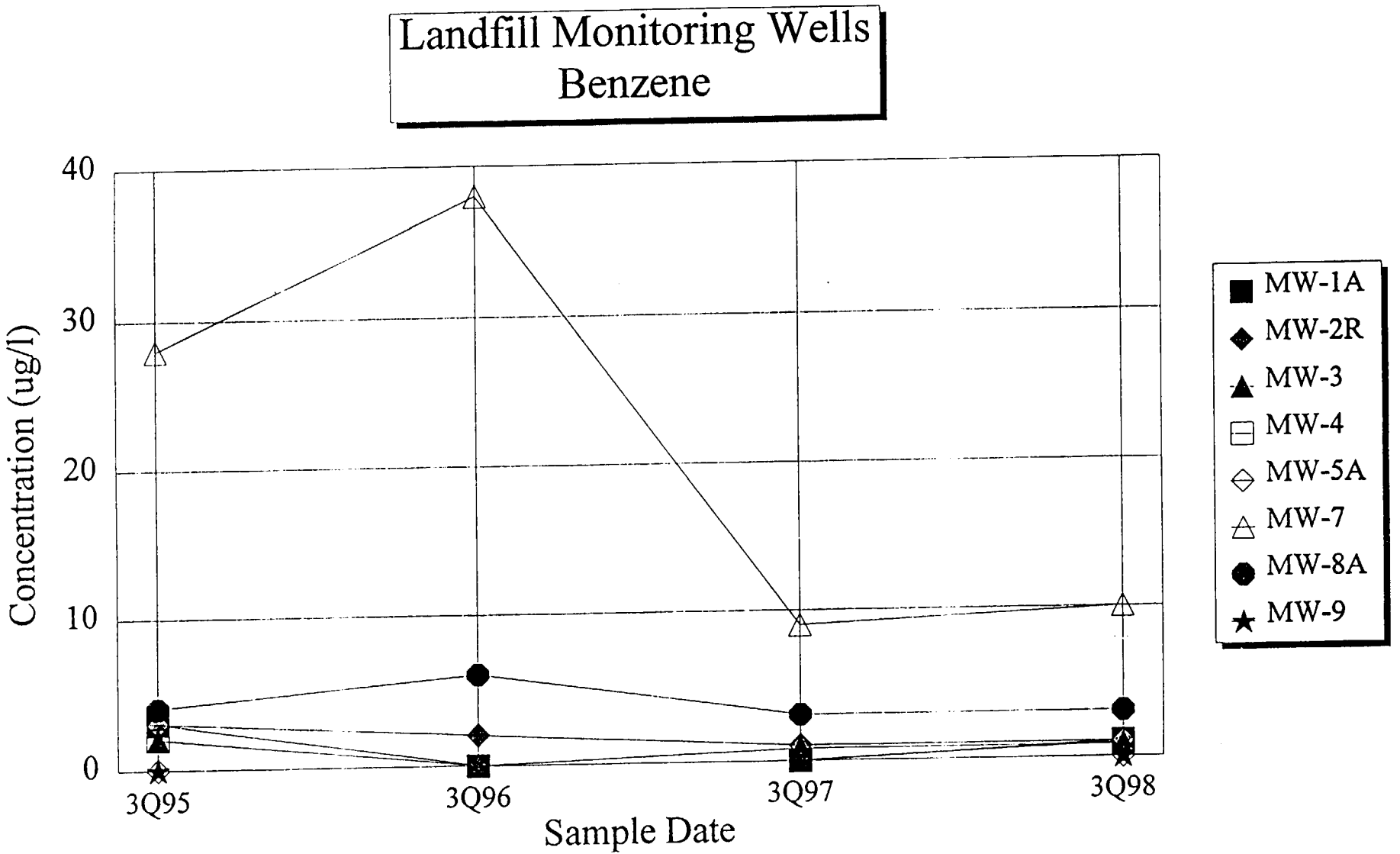

Landfill Monitoring Wells
Vinyl Chloride
Concentration (ug/l)
40
30
20
10
0
3Q95
3Q96
3Q97
3Q98
Sample Date
MW-1A
MW-2R
MW-3
MW-4
MW-5A
MW-7
MW-8A
MW-9

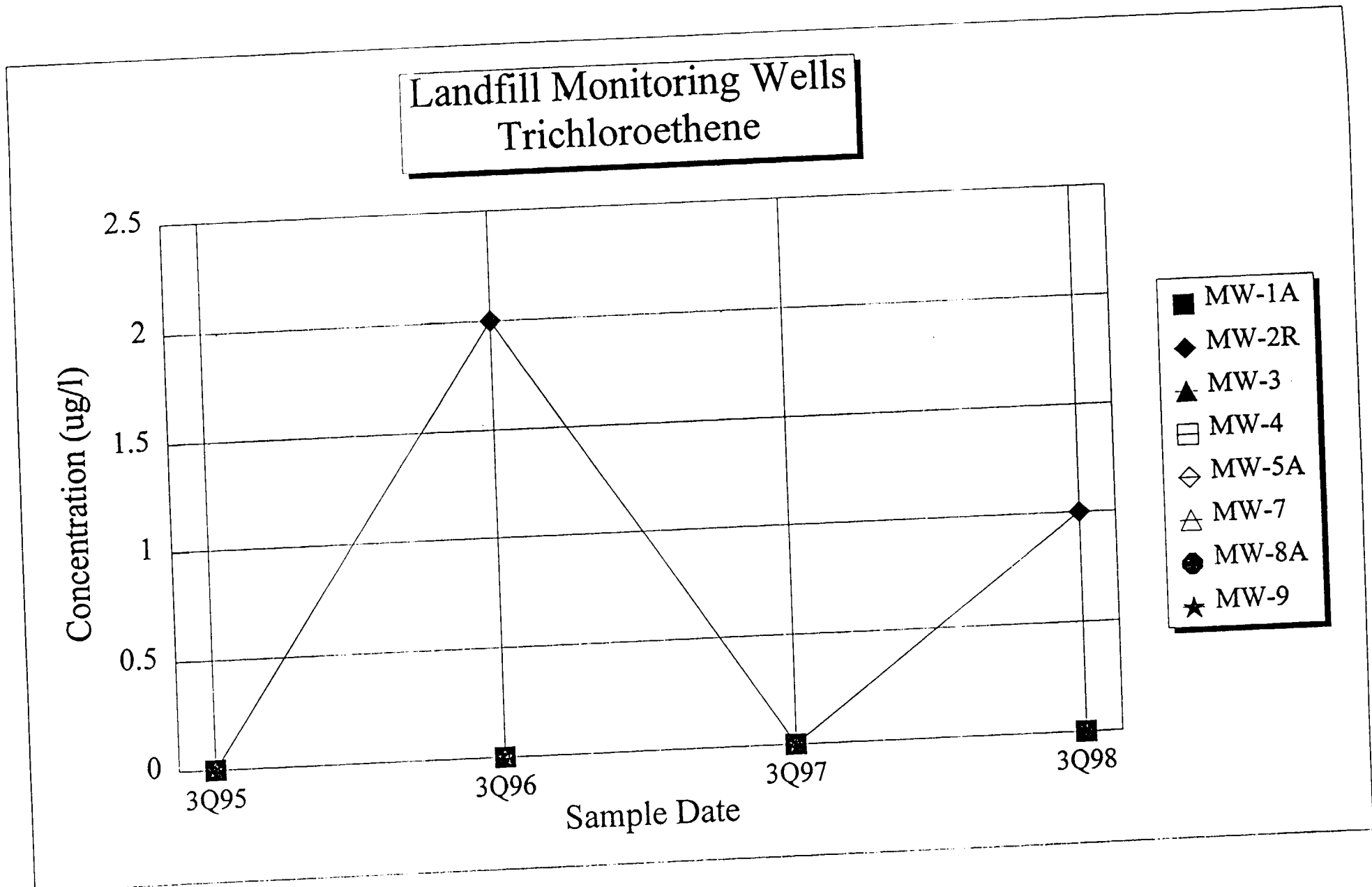

Landfill Monitoring Wells
Chloromethane
1.2
1
0.8
0.6
0.4
0.2
0
Concentration (ug/l)
3Q95
3Q96
3Q97
3Q98
Sample Date
MW-1A
MW-2R
MW-3
MW-4
MW-5A
MW-7
MW-8A
MW-9

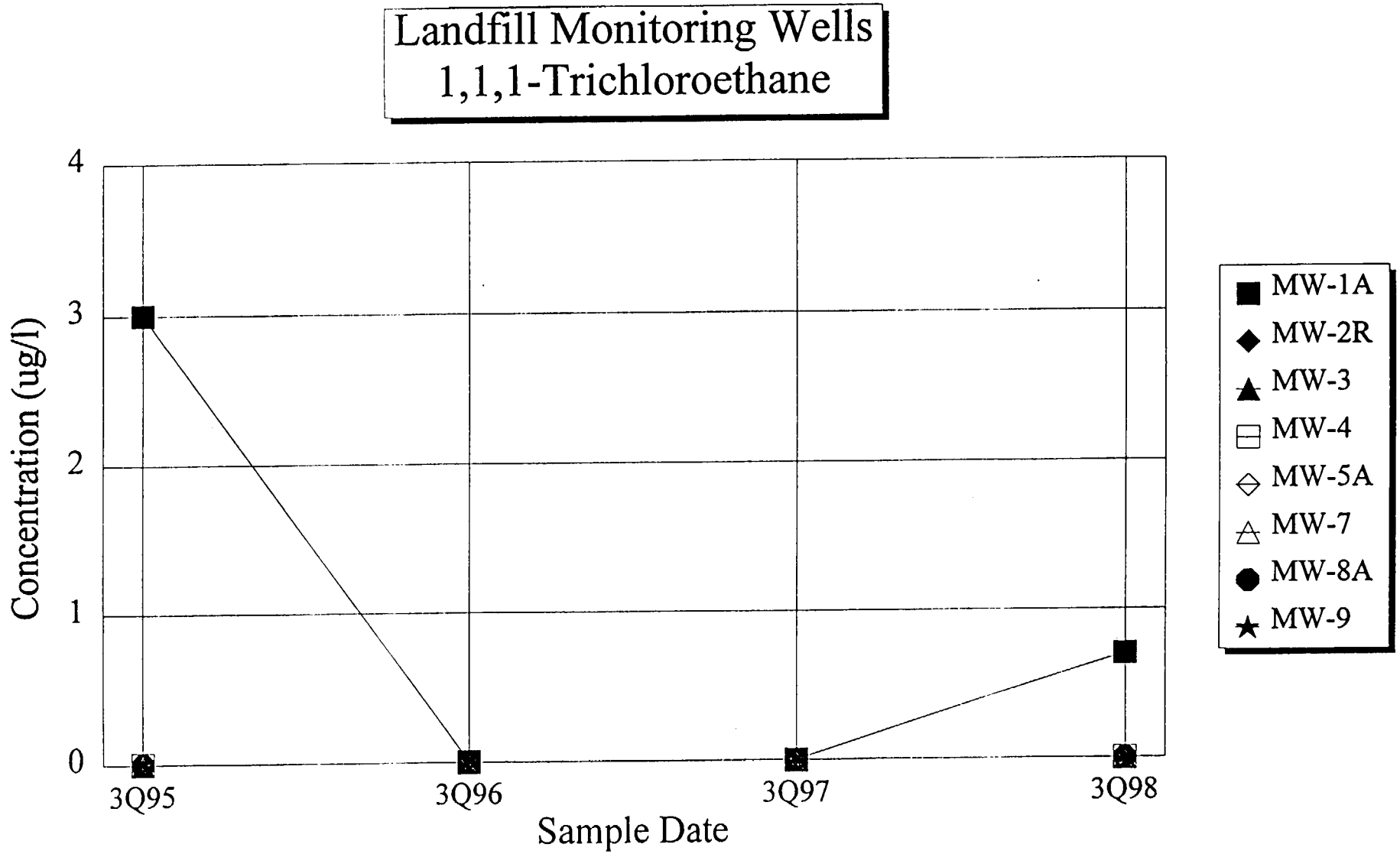

Landfill Monitoring Wells
Ethylbenzene
200
150
100
50
0
Concentration (ug/l)
3Q95
3Q96
3Q97
3Q98
Sample Date
MW-1A
MW-2R
MW-3
MW-4
MW-5A
MW-7
MW-8A
MW-9

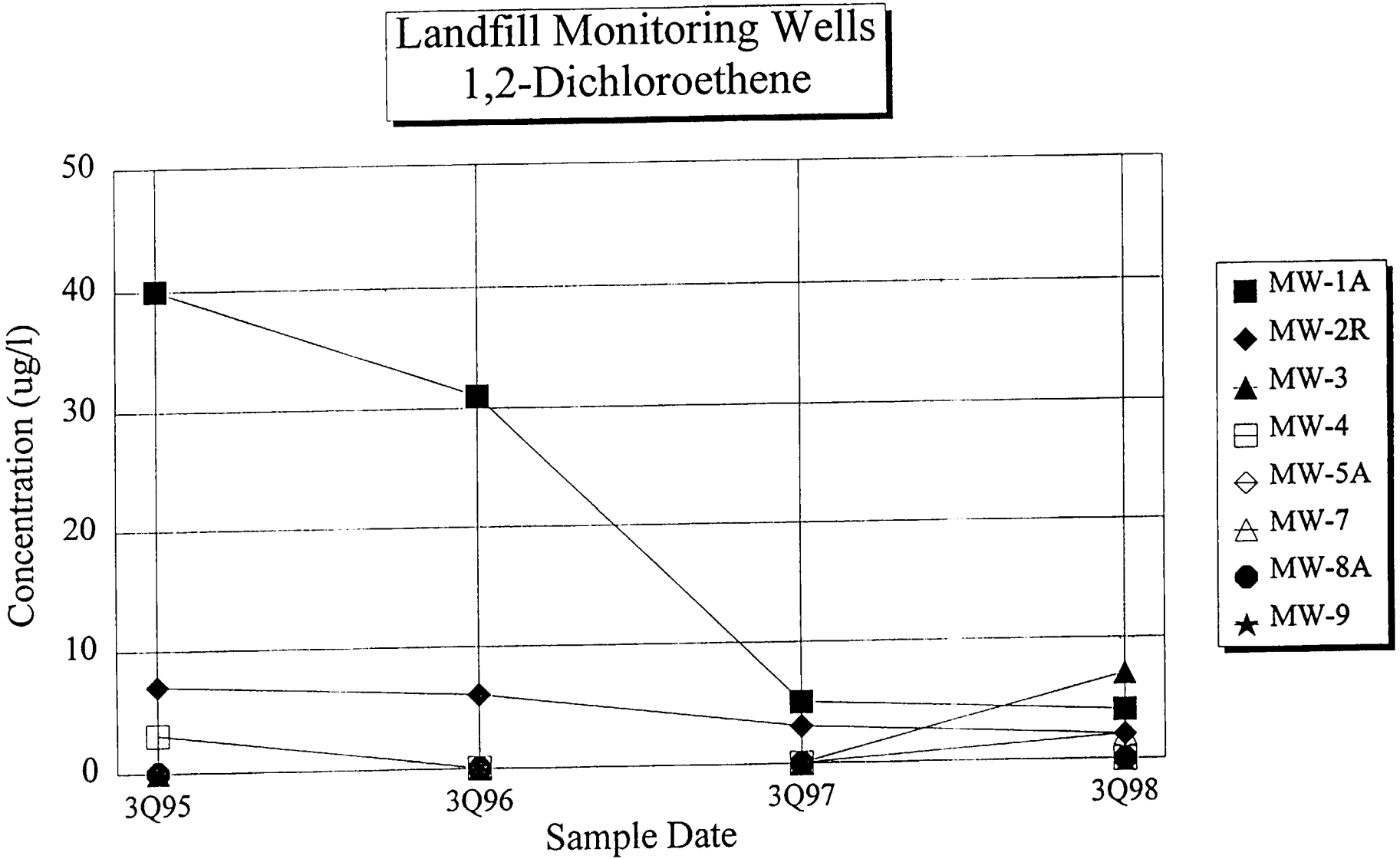

Landfill Monitoring Wells
Chlorobenzene
Concentration (ug/l)
30
20
10
0
3Q95
3Q96
3Q97
3Q98
Sample Date
MW-1A
MW-2R
MW-3
MW-4
MW-5A
MW-7
MW-8A
MW-9

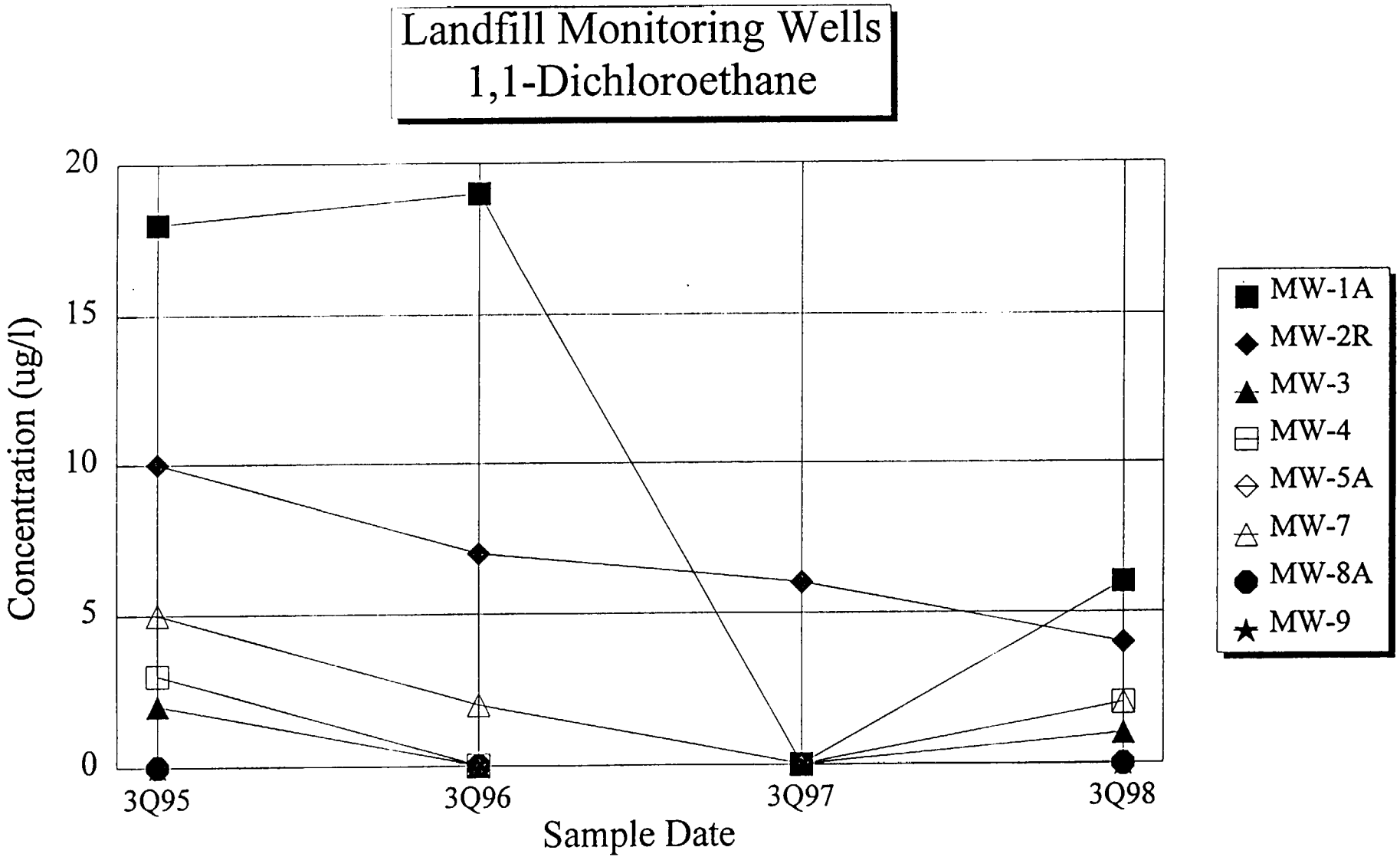

Landfill Monitoring Wells
Toluene
Concentration (ug/l)
8
6
4
2
0
3Q95
3Q96
3Q97
3Q98
Sample Date
MW-1A
MW-2R
MW-3
MW-4
MW-5A
MW-7
MW-8A
MW-9

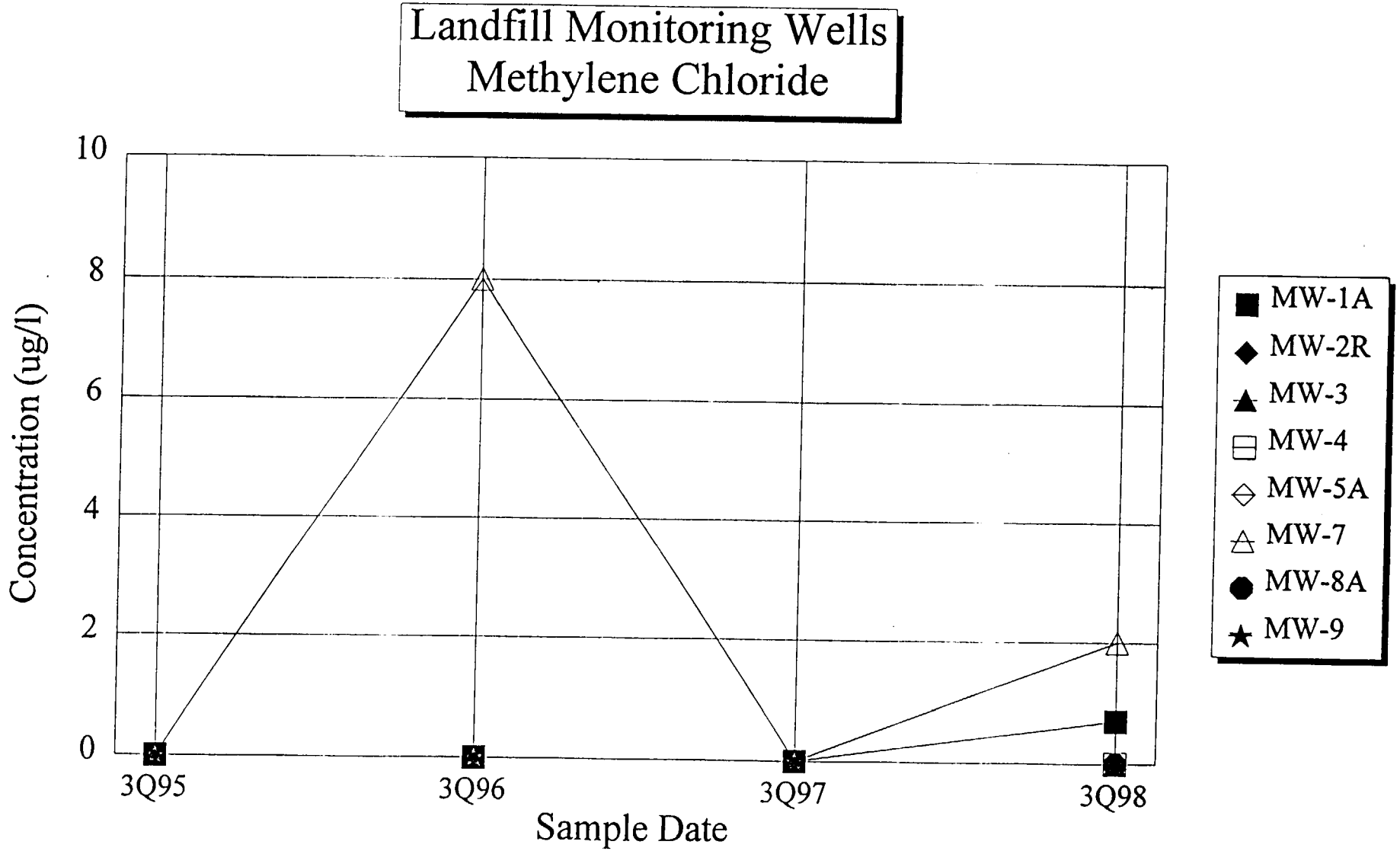

Landfill Monitoring Wells
Benzene
Concentration (ug/l)
40
30
20
10
0
3Q95
3Q96
3Q97
3Q98
Sample Date
MW-1A
MW-2R
MW-3
MW-4
MW-5A
MW-7
MW-8A
MW-9


Landfill Monitoring Wells
Trichloroethene
Concentration (ug/l)
2.5
2
1.5
1
0.5
0
3Q95
3Q96
3Q97
3Q98
Sample Date
MW-1A
MW-2R
MW-3
MW-4
MW-5A
MW-7
MW-8A
MW-9


Landfill Monitoring Wells
1,1,1-Trichloroethane
Concentration (ug/l)
4
3
2
1
0
3Q95
3Q96
3Q97
3Q98
Sample Date
MW-1A
MW-2R
MW-3
MW-4
MW-5A
MW-7
MW-8A
MW-9


Landfill Monitoring Wells
1,2-Dichloroethene
Concentration (ug/l)
50
40
30
20
10
0
3Q95
3Q96
3Q97
3Q98
Sample Date
MW-1A
MW-2R
MW-3
MW-4
MW-5A
MW-7
MW-8A
MW-9


Landfill Monitoring Wells
1,1-Dichloroethane
Concentration (ug/l)
20
15
10
5
0
3Q95
3Q96
3Q97
3Q98
Sample Date
MW-1A
MW-2R
MW-3
MW-4
MW-5A
MW-7
MW-8A
MW-9


Landfill Monitoring Wells
Methylene Chloride
Concentration (ug/l)
10
8
6
4
2
0
3Q95
3Q96
3Q97
3Q98
Sample Date
MW-1A
MW-2R
MW-3
MW-4
MW-5A
MW-7
MW-8A
MW-9