



Minnesota Pollution Control Agency

March 17, 1999

Mr. J. P. Singh, P.E.
EPA Agreement Coordinator
United States Environmental Protection Agency Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604

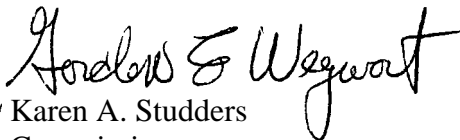
RE: Agreement Between US EPA and MPCA Regarding Qualified Municipal Waste Landfills
Under the Minnesota Landfill Cleanup Law
Dakhue Five Year Review

Dear Mr. Singh:

The Minnesota Pollution Control Agency (MPCA) is pleased to present to the United States Environmental Protection Agency (US EPA) the Closed Landfill Program's Dakhue Landfill Annual Report. The 1995 Agreement Between the US EPA and the MPCA Regarding Qualified Municipal Waste Landfills Under the Minnesota Landfill Cleanup Law (Agreement) identifies part II. G. 2. Five Year Review requirements. This item states the MPCA will submit . . . "periodic review of remedial action required . . . for any qualified landfill that is or was listed on the NPL for which a notice of compliance has been issued." It goes on to say the State's Annual Report must comply with the requirements under § 121 (c) CERCLA, to fulfill the Five Year Review requirement. This Five Year Review takes into account previous comments provided by US EPA regarding MPCA Annual Reports and the EPA's Five Year Review requirements.

The enclosed report is MPCA's fifth report provided under this Agreement. Please review and provide feedback or comments to Douglas Day, Supervisor in the Closed Landfill Program at (651) 297-1780.

Sincerely,

for 
Karen A. Studders
Commissioner

KS:lh

Enclosure

cc: Alan Williams, Attorney General



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:
SR-6J

Mr. Douglas Day, Supervisor
Minnesota Pollution Control Agency
520 Lafayette Road North
Saint Paul, Minnesota 55155-4184

Re: Dakhue Sanitary Landfill
Five-Year Review Reports

Dear Mr. Day:

The U. S. Environmental Protection Agency (U.S. EPA) has reviewed the Five-Year Review Report dated February 3, 1999 developed by the Minnesota Pollution Control Agency (MPCA) for the subject site. The report is hereby approved, provided the attached language is incorporated into the final Five-Year Review Report.

In future reports I recommend that MPCA include in the Introduction Section a portion describing the Authority and Purpose of Five-Year Reviews. This is not only required by U. S. EPA guidance but it is necessary to help the reader understand the purpose of Five-Year Review and allows the reader to differentiate them from a regular State "Annual Report." The attached language represents the standard means of incorporating this necessary information into a Five-Year Review Report. (Attached)

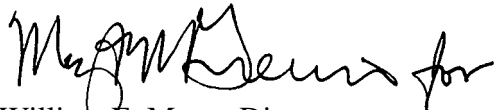
For completeness, it would have been useful to add background information, such as the following:

"The Dakhue Sanitary Landfill was addressed through a combination of Federal, State and potentially responsible parties' actions. The Site was proposed for the National Priority List (NPL) on October 26, 1989 and made final August 30, 1990.

One of the components for the Record of Decision (ROD) for the second operable unit is to verify that the deep aquifer is not affected. All components of the remedy have been met. The responsible parties have implemented all the appropriate required response actions and that no further Superfund response was necessary in order to provide protection of human health and the environment.”

U.S. EPA appreciates the efforts of Jean Hanson, Jean Olson and Peter Tiffany in conducting this review. If you have any questions, please contact Rosita Clarke-Moreno, our Five-Year Review coordinator, at (312) 886-7251.

Sincerely,

A handwritten signature in black ink, appearing to read "William E. Muno for". The signature is fluid and cursive, with a large initial "W" and "M".

William E. Muno, Director
Superfund Division

Attachment

Dakhue Sanitary Landfill Five Year Review

I. INTRODUCTION

A. Authority and Purpose

Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by SARA and Section 300.430(f) (4) (ii) of the National Contingency Plan (NCP), requires that periodic (no less often than five years) reviews are to be conducted for sites where hazardous substances, pollutants or contaminants remain at the site above levels that will not allow for unlimited use or unrestricted exposure following the completion of remedial actions for the site. The purpose of a statutory five-year review is to evaluate whether the remedial action remains protective of human health and the environment. This review focuses on the protectiveness of the Dakhue Sanitary Landfill, located in Hampton Township, Dakota County, Minnesota. This review will be placed in the Site files and local repository for the Dakhue Sanitary Landfill Site located at Minnesota Pollution Control Agency, 520 Lafayette Road North, Saint Paul, Minnesota 55155-4184.

The United States Environmental Protection Agency (U.S. EPA) has established a three-tier (with a sub-tier for Tier I, as Ia) approach to conducting Five-Year Reviews, the most basic of which provides a minimum protectiveness evaluation for sites with on-going response actions at the site (Level Ia review). U.S. EPA contemplates that a Level I review will be appropriate in all but relatively few cases where site-specific considerations suggest otherwise. The second and third levels (Level II and Level III) of review are intended to provide the flexibility to respond to varying site-specific considerations, employing further analysis. Site specific considerations, including the nature of the response action, the status of the on-site response activities, and the proximity to populated areas and sensitive environmental areas determine the level of review for a given site. A type I review was conducted for this site.

**Dakhue Sanitary Landfill
SW-050
1998 Annual Report
(Five Year Review)**

Completed by Feb. 3, 1999

**Project Leader: Jean Hanson
Hydrologist: Joe Julik
Engineer: Peter Tiffany
Inspector: Pat Hanson**

Closed Unit Annual Report

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Figures

Site Location Maps - see attached and MPCA files

Maps, plans and drawings showing the locations and pertinent details of any work conducted at the site including ground water monitoring well installation details, gas vent construction details, etc. are available from MPCA files.

Tables

Ground Water Monitoring Laboratory Data - available from MPCA files
Graphs Showing Trends in Ground Water Quality and Water Table Elevations

Appendices

Site Inspection Reports - see MPCA files

Site Inspection Photographs - see MPCA files

I. Site Background

The Dakhue Sanitary Landfill (Landfill) is located in Dakota County, Hampton Township (T113N, R18W, Sect. 24), received its first permit to accept waste on 10/1/71, and continued operating until 5/1/88. Figure 1 shows the location of this facility.

In accordance with the legislation enacted in 1992, (Minn. Laws 1992, Ch. 513, Art. 2, Sec. 2, Subd.3), the Minnesota Pollution Control Agency (MPCA) assessed and classified closed landfills in Minnesota. According to that assessment and classification, the Dakhue Sanitary Landfill was given a ranking of D and a score of 8.01 This classification was revised to a ranking of B and a score of 11 in 1997 due to some concerns regarding off fill migration of landfill gas and the potential need for further remedial actions. This concern is discussed below (II.C.).

On June 28, 1991, a Record of Decision (ROD) was signed for the Operable Unit one (source control). This action provided for a final cover system consisting of a gas control layer, a synthetic (HDPE) barrier layer over the waste, a drainage layer, topsoil cover and vegetation. The construction of this cover was completed in 1992.

The ROD for the Operable Unit two (groundwater) included Institutional Controls contained in Dakota County Ordinance No. 114 and Minnesota Rules 4725.2000 and 4725.4300 that restrict well development. Also included in this ROD was a long-term groundwater monitoring program to: 1) assess trends in water quality in the sand and gravel (surficial) aquifer; 2) verify that the deep aquifer is not affected; and 3) to provide adequate protection to aquatic life in Judicial Ditch No. 1.

The Dakhue Sanitary Landfill is 28 Acres in size and contains approximately 1,500,000 cubic yards of waste. The Landfill was under private ownership when in operation. A Binding Agreement was signed for this site on November 13, 1996 and a Notice of Compliance was also issued on November 13, 1996. The state of Minnesota now owns the permitted property associated with this facility.

The Environmental Monitoring System includes 14 monitoring wells. Of these, 1 well is located in an upgradient direction, 10 are downgradient and 3 are sidegradient.

Additional information regarding the Closed Landfill Assessment can be found in the Closed Landfill Assessment Report (January 1995).

II. Site Engineering Summary

A. Landfill Cover Maintenance/Construction Summary

The landfill was capped in 1992 with a buffer layer, sand barrier layer, a synthetic 40 mil. VLDPE barrier layer, a sand drainage layer, topsoil and vegetated with shallow rooted grasses.

B. Leachate Management System Summary

1. Leachate Management System Maintenance Summary

The Dakhue Sanitary Landfill does not have a Leachate Management System for leachate collection.

2. Leachate Monitoring Summary

Leachate generated by the Dakhue Sanitary Landfill is neither collected nor monitored. However the low permeability cover greatly reduces leachate generation by reducing infiltration of precipitation into the waste.

C. Landfill Gas Management System Summary

1. Landfill Gas Management System Maintenance Summary

The Dakhue Sanitary Landfill has a passive gas extraction system consisting of 25 passive vents tied to lateral piping running beneath the synthetic barrier layer.

2. Landfill Gas Monitoring Summary

There are no gas monitoring points to monitor for the presence of landfill gas generated by the Dakhue Sanitary Landfill outside the fill area. Some off fill migration of gas has occurred indicated by stressed vegetation away from the fill. There are, however no potential human receptors or buildings near the fill area. MPCA staff do intent to install gas monitoring probes outside the fill area in 1999.

This site is a possible candidate for an active gas extraction system. If an active system was installed at this site, it would not be until the year 2000. Some pilot studies being performed at the Oak Grove landfill in 1999 may have application to the Dakhue site. An active gas system also has the potential for removing and destroying VOCs and thereby reducing groundwater contamination.

D. Electricity Generated

Presently not applicable at this site.

E. Additional Maintenance Summary

The storm water outlet from the landfill surface water drainage system located on the west side of site was cleaned out and some minor cover work to fix settlement areas was done in the summer of 1997. The landfill cover was mowed during the summer of 1998.

F. Site Engineering Recommendations

Four (4) gas monitoring probes will be installed in the summer of 1999. The landfill cover will be mowed in the summer of 1999. And inspections of the cover system and passive gas venting system will be conducted during the summer of 1999.

G. Land Recovered for Beneficial Use

A variety of native wildlife use this facility. Hunting is restricted providing for a type of wildlife refuge.

III. Site Environmental Monitoring Summary

A. Ground Water Monitoring/Remediation System Maintenance Summary

1. Ground Water Monitoring System Maintenance Summary

Two dedicated submersible pumps were replaced at monitoring wells MW-6A and MW-9A by Bergerson Caswell drillers during the summer of 1997. Seven additional wells had dedicated pumps installed in 1998. This was done to improve sampling quality control and cost effectiveness of the long term monitoring program at this site.

2. Ground Water Monitoring Summary

Three (3) rounds of water quality samples were collected by Interpoll Laboratories, Inc. (Interpoll) in 1998 at Dakhue Landfill. The landfill monitoring system consists of 14 monitoring wells and no surface water sampling points. The judicial ditch has been sampled in the past with no impacts detected. Two of these wells were not monitored during 1996 due to pump problems. These pumps have been replaced. A map showing the location of each of the monitoring points is presented in Figure 2. Other maps, including cross sections of the hydrogeology of the site, can be found in the MPCA files.

Figure 3 & 4 have been prepared to show groundwater elevation trends for select monitoring wells. Review of ground water data indicates that the groundwater flow direction in the surficial aquifer is to the south-southeast. Based upon the ground water flow data, there was 1 upgradient well, 9 downgradient wells and 3 wells that were side gradient to flow from the fill area.

Ground water samples were collected by Interpoll Laboratories, Inc. Laboratory analyses of inorganic and organic parameters were performed by Minnesota Department of Health (MDH). Ground water samples collected from monitoring wells have shown impacts from organic and inorganic parameters. The water quality analytical data obtained from the sampling events is divided into inorganic and organic sets. Water quality data collected from the existing monitoring system at the landfill site is tabulated and is available from MPCA paper files or in electronic format.

Graphs showing trends in water quality for select wells are included in Figures 5-8. The concentration trends for total VOCs are decreasing for all wells except MW-13 and MW-14. These wells, being a long distance from the fill area would be expected to have a delayed peak in ground water contamination levels after the remedy (landfill cover) has been installed. Also the contaminant levels at these wells are far below the drinking water standards (HRLs). Figures 9-16 contain graphs of specific compounds at select wells and compare these concentrations to their respective drinking water standards (HRLs) for five (5) of the most highly contaminated wells. As can be seen, several compounds, including Vinyl Chloride, Tetrachloroethene (PERC), and 1,2-DCA still exceeded standards. It should be noted that the concentration trends for these compounds are continuing to decrease and these wells are screened directly adjacent and/or beneath the landfill.

3. Ground Water Remediation System Maintenance Summary

No active ground water remediation system is operating at the Dakhue Landfill. It should be noted that the landfill cover, by limited infiltration and leachate generation is acting to remediate the groundwater contamination.

4. Monitoring System Modifications

Resurvey all wells. No other system modifications are anticipated at this time.

B. Surface Water Monitoring Summary

There are no surface water monitoring points at the Dakhue Sanitary Landfill. Judicial Ditch No. 1, located south has been monitored in the past and was found not to be impacted.

C. Residential Well Sampling

No residential wells were included in the monitoring system for the Dakhue Sanitary Landfill.

D. Site Monitoring Recommendations

The current monitoring system shall be continued throughout 1999.

IV. Inspections

Quarterly inspections were completed in 1998. No significant issues were noted. Inspection reports can be found in MPCA files.

V. Required Permits

Dakota County Environmental Division Well Permits updated.

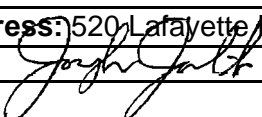
VI. Recommendations Summary

- 1) Four gas monitoring probes will be installed and monitored around the fill area in 1999.
- 2) The landfill cover system will be mowed once and inspected quarterly in 1999.
- 3) The groundwater monitoring system will be sampled quarterly in 1999.

VII. Certifications

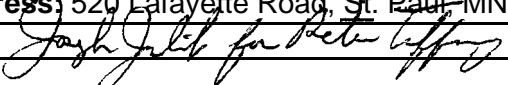
A. Hydrogeologic Certification

I certify, that the hydrogeologic portions of this document and all attachments, were prepared under my direction or supervision under a system designed to assure that qualified personnel gathered and evaluated the information submitted. Based upon my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Furthermore, I certify that I am knowledgeable in the field of hydrogeology.

Name: Joe Julik	Title: Hydrogeologist	Date: February 3, 1999
Mailing Address: 520 Lafayette Road, St. Paul, MN 55155		Phone: 296-8454
Signature: 		

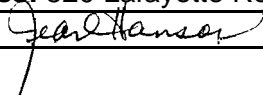
B. Engineering Certification

I certify, that the engineering portions of this document and all attachments, were prepared under my direction or supervision under a system designed to assure that qualified personnel gathered and evaluated the information submitted. Based upon my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Name: Peter Tiffany	Title: Engineer	Date: February 3, 1999
Mailing Address: 520 Lafayette Road, St. Paul, MN 55155		Phone: 296-7274
Signature: 		

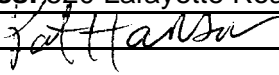
C. Annual Report Certification

I certify, that this document and all attachments, were prepared under my direction or supervision under a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based upon my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Name: Jean Hanson	Title: Projected Leader	Date: February 3, 1999
Mailing Address: 520 Lafayette Road, St. Paul, MN 55155		Phone: 296-7390
Signature: 		

D. Field Inspection Certification

I certify, that this document and all attachments, were prepared under my direction or supervision under a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based upon my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Name: Pat Hanson	Title: Field Inspector	Date: February 3, 1999
Mailing Address: 520 Lafayette Road, St. Paul, MN 55155		Phone: 296-7740
Signature: 		

E. Statement of Protectiveness

The Record of Decision (ROD) for the Source Control Operable Unit consisted of the following elements:

- 1) High permeability sand layer to promote passive gas venting;
- 2) Synthetic landfill cap (40 mil. VLDPE) to prevent infiltration of precipitation;
- 3) Rooting zone soils;
- 4) Top soils;
- 5) Passive gas vents connected by lateral lines.

By limiting infiltration this cover system limits the generation of landfill leachate that contributes to groundwater contamination.

The ROD for the Ground Water Operable Unit consisted of the following elements:

- 1) Institutional Controls contained in Dakota County Ordinance No. 114 and Minnesota Rules 4725.2000 and 4725.4300 which restrict well development; and
- 2) Long term groundwater monitoring program to assess trends in water quality downgradient of the landfill

There are no residences impacted by the Dakhue Sanitary Landfill, either by a potential risk due to drinking groundwater or exposure to landfill gas. However, there is some VOC contamination in the aquifer downgradient of the fill area. The contamination levels all drop below drinking water standards within a few hundred feet of the fill area.

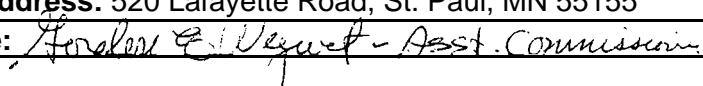
The source control provided is a low permeability cover over the Landfill which has achieved its design criteria by significantly reducing both the production of leachate and the toxicity of the compounds released from the Landfill. Since the cover was constructed, there has been significant reduction in the contaminant concentrations in the ground water monitoring wells.

A network of gas monitoring probes will be installed around the Landfill during 1999 which are designed to detect migration of landfill gas, specifically methane, away from the fill area. There are no buildings or other receptors within ¼ mile of the fill area. Also, the MPCA will be conducting studies designed to examine the feasibility of converting the passive gas system to an active gas system over the next two years.

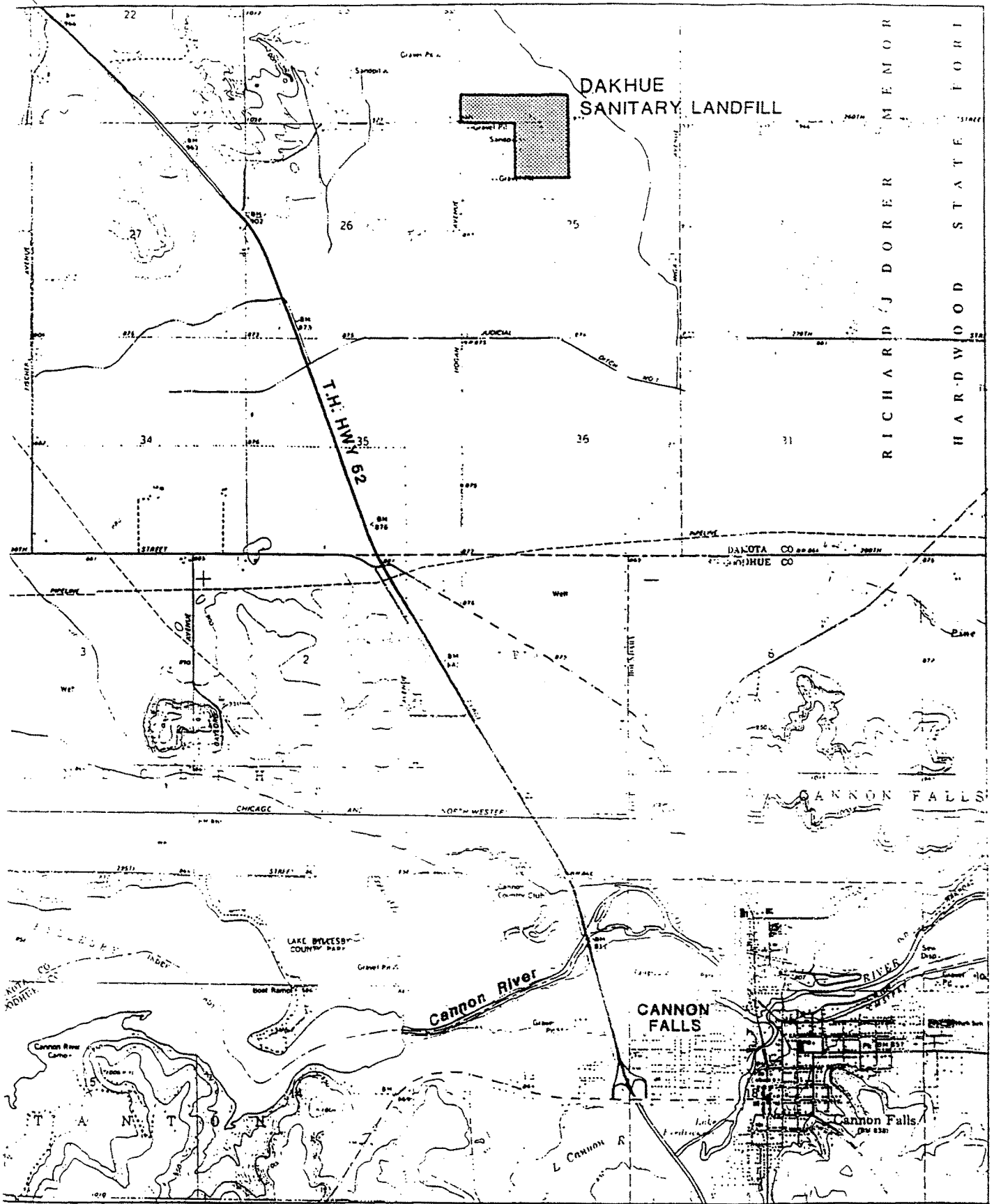
The landfill cover is mowed annually. The cover is inspected for erosion or other damage and repairs are made when and where necessary to maintain the integrity of the cover system, including maintaining proper slopes for positive drainage off the fill area.

Long-term monitoring of the ground water system is ongoing quarterly at the Landfill. Long-term groundwater monitoring has demonstrated that the chemicals of concern have declining to below appropriate ARARs. Long-term trends show significant and adequate improvements in ground water quality.

The next five year review will be completed by June 30, 2004.

Name: Karen A. Studders	Title: Commissioner	Date: March 2, 1999
Mailing Address: 520 Lafayette Road, St. Paul, MN 55155		Phone: 651-296-7301
Signature:  - Asst. Commissioner		

Hampton, 1 Mile



From USGS Cannon Falls, MN Quadrangle

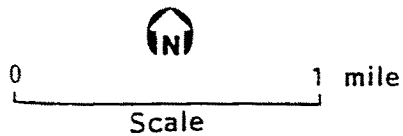
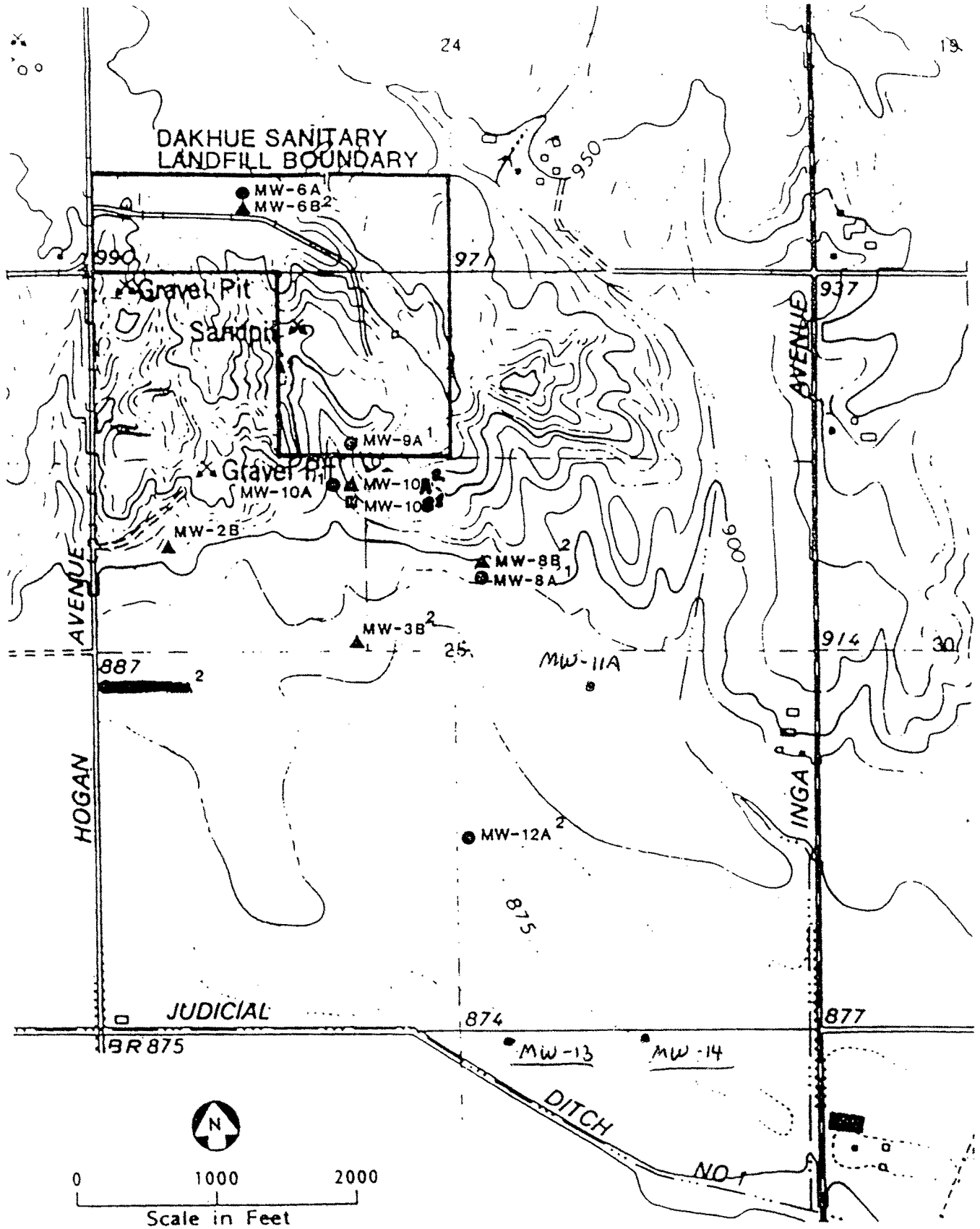


Figure 1
 SITE LOCATION MAP
 Dakhue Sanitary Landfill



- MW-9A sand and gravel aquifer monitoring well
- MW-10B shallow Prairie du Chien monitoring well
- MW-10C deep Prairie du Chien monitoring well

- 1 Monitoring Wells To Be Completed During Phase One
- 2 Monitoring Wells To Be Completed During Phase Two

Figure 2
PROPOSED MONITORING WELL LOCATIONS
Dakhue Sanitary Landfill

Dakhue SLF Water Levels @ Select Wells

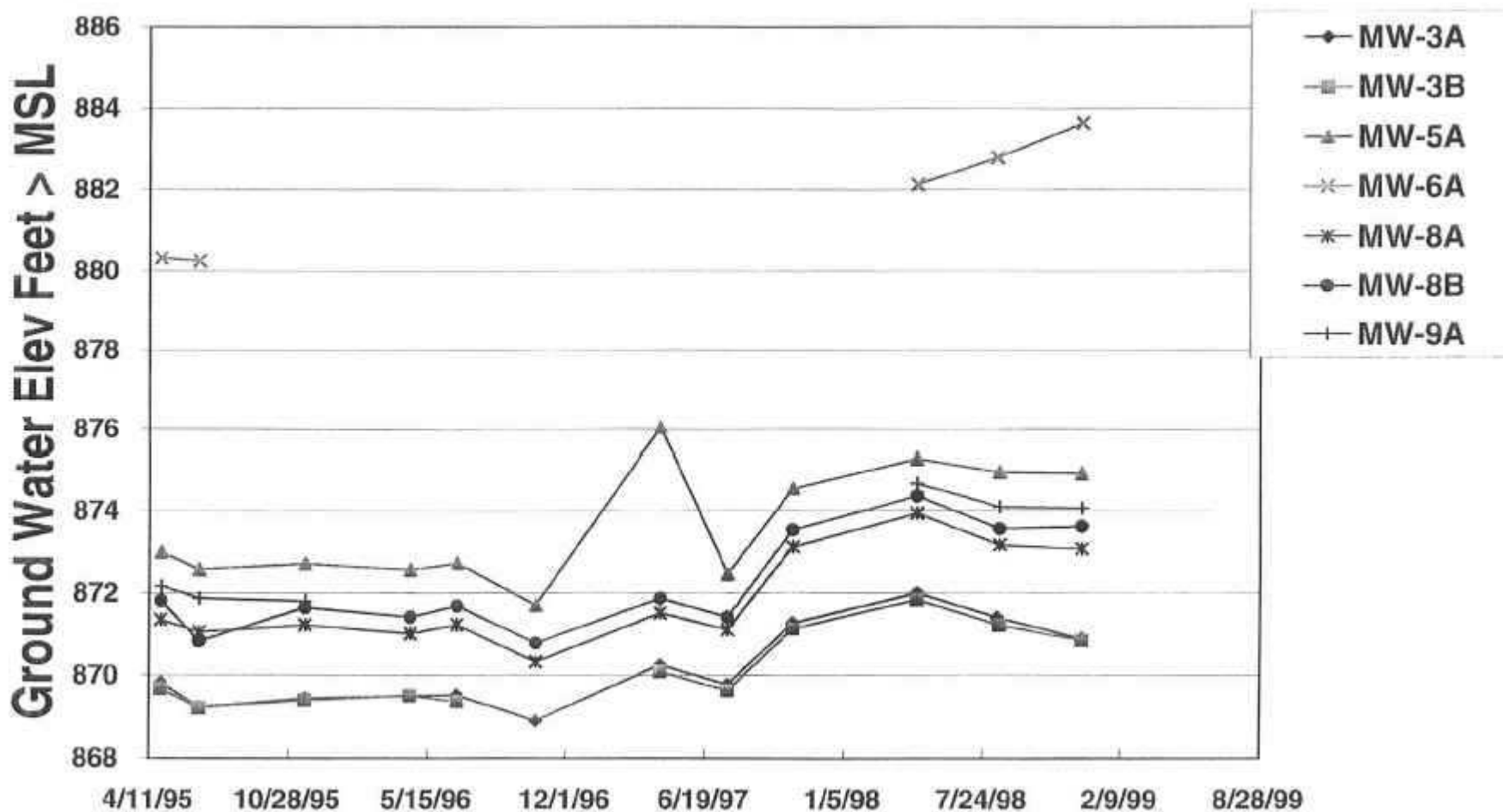


Figure 3

Dakhue SLF Ground Water Levels

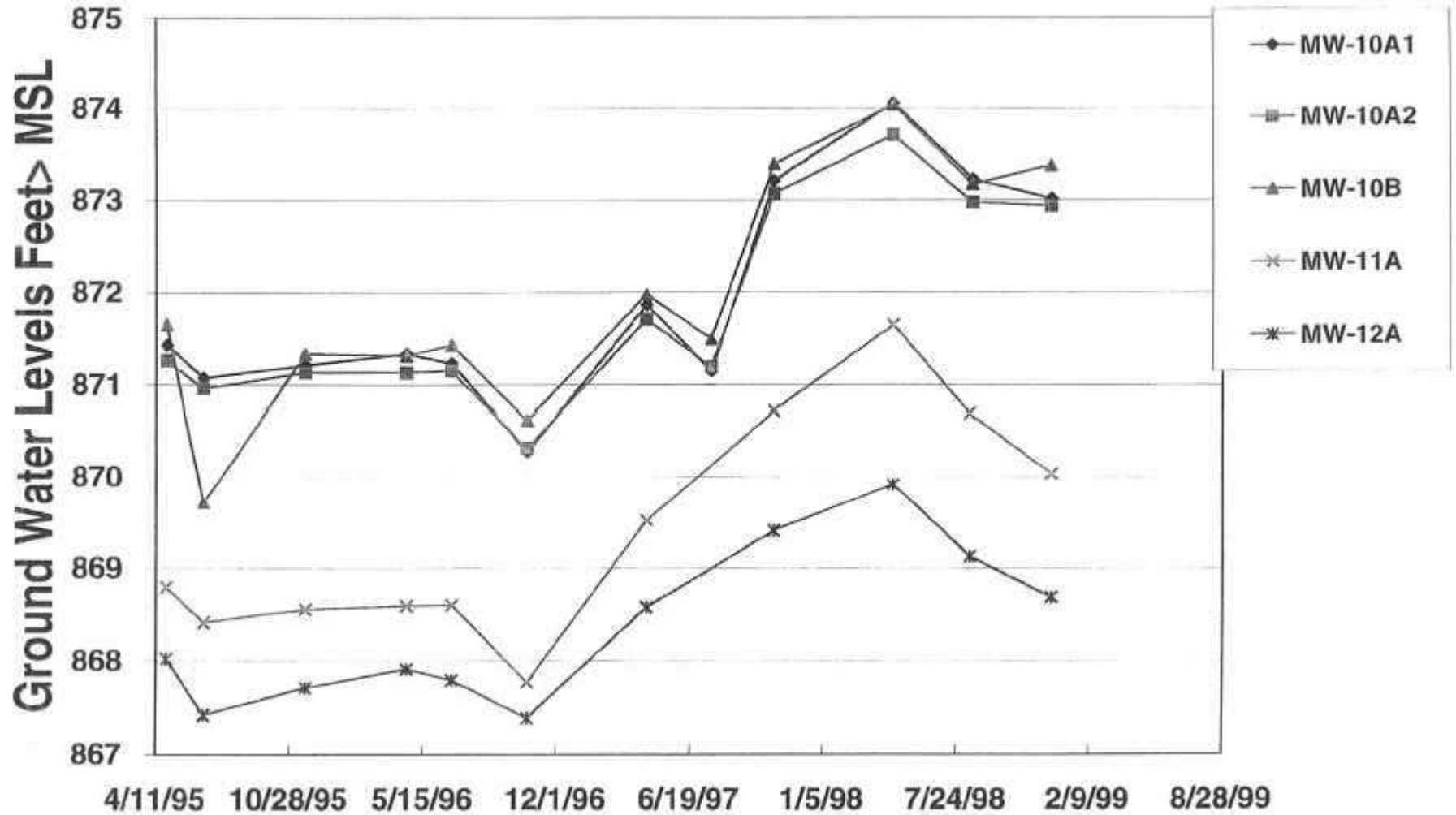


Figure 4

Dakhue SLF Total VOCs @ Select Wells

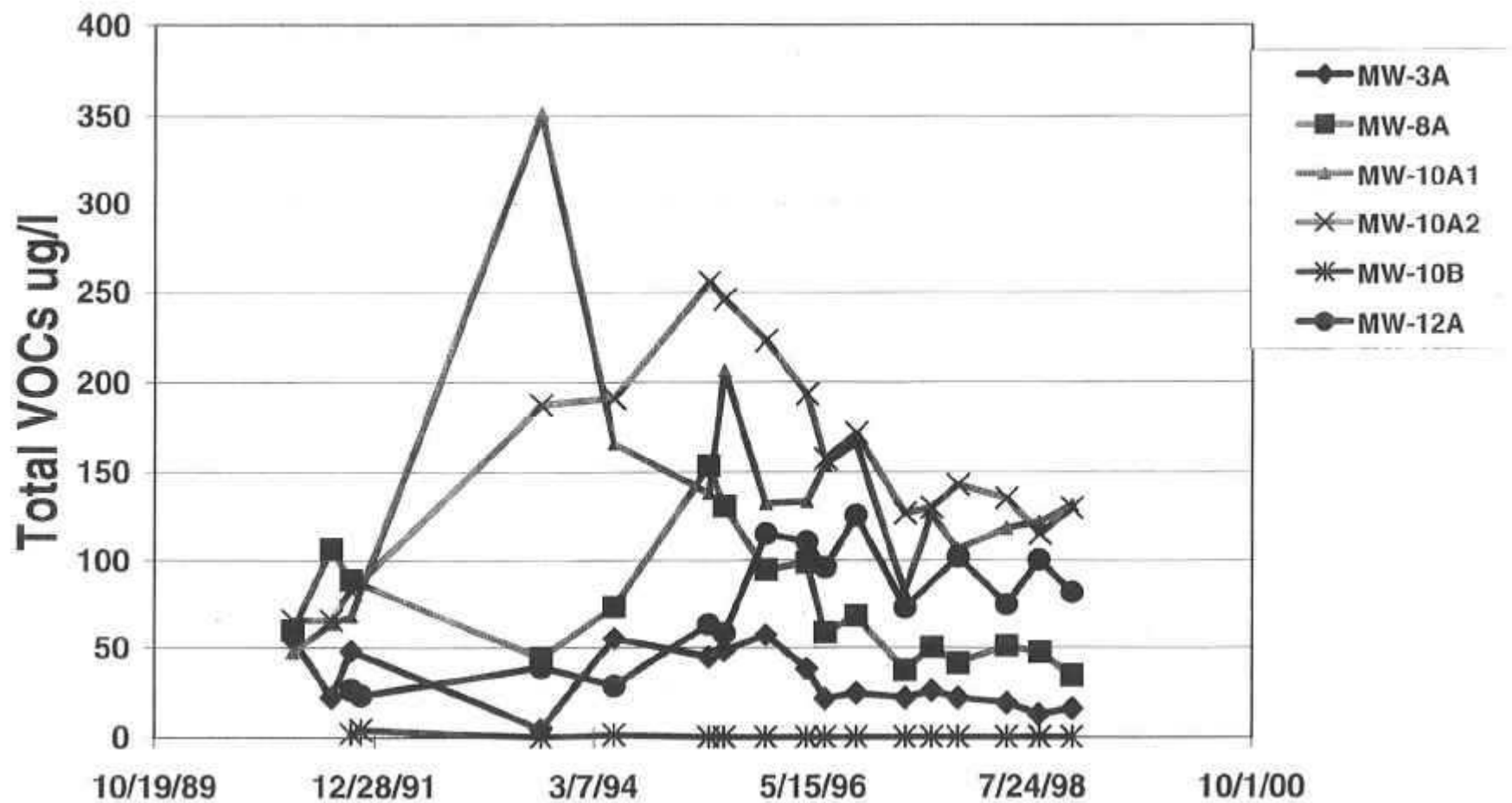


Figure 5

Dakhue SLF Total VOCs @ Select Wells

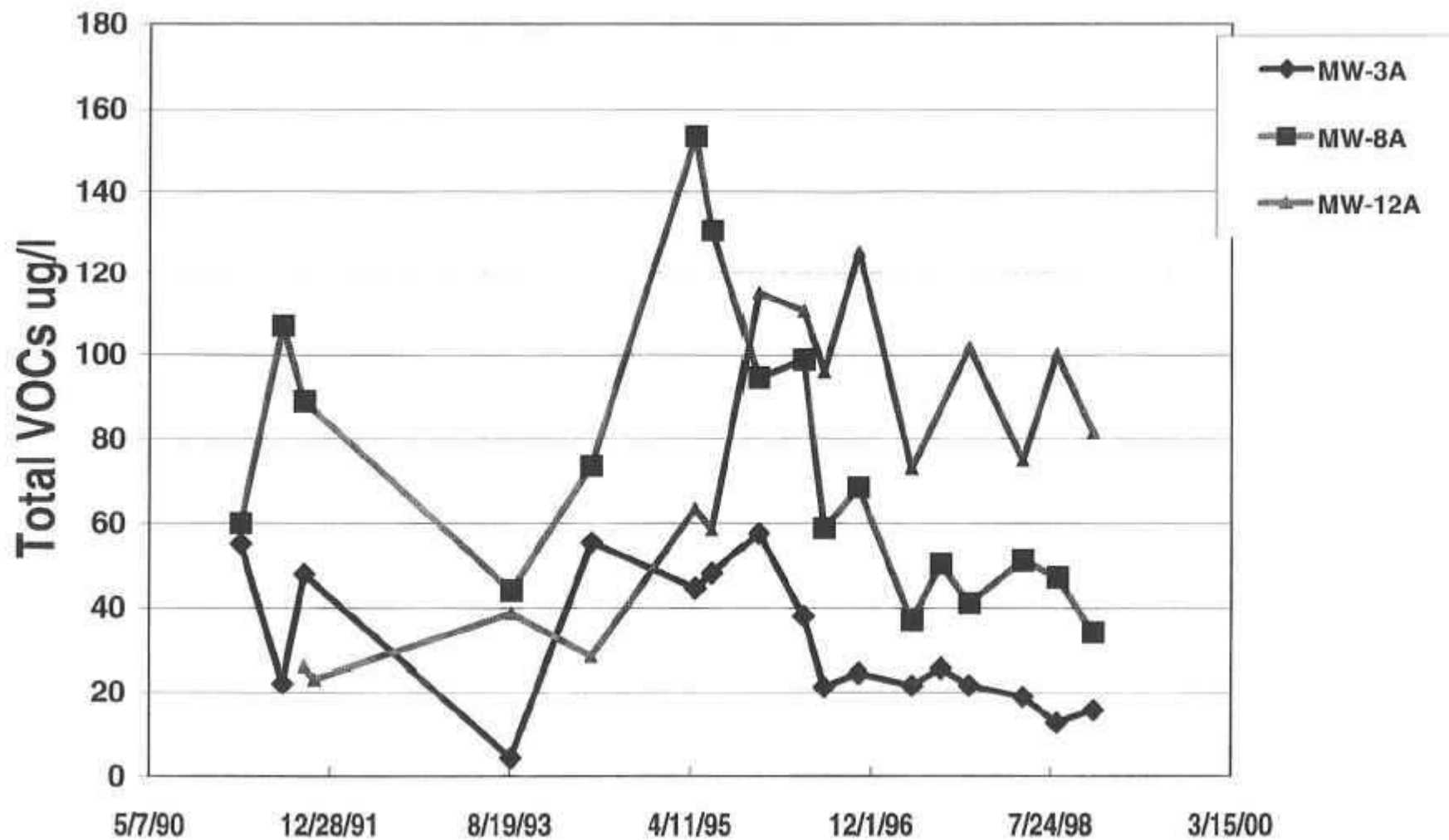


Figure 6

Dakhue SLF Total VOCs @ Select Wells

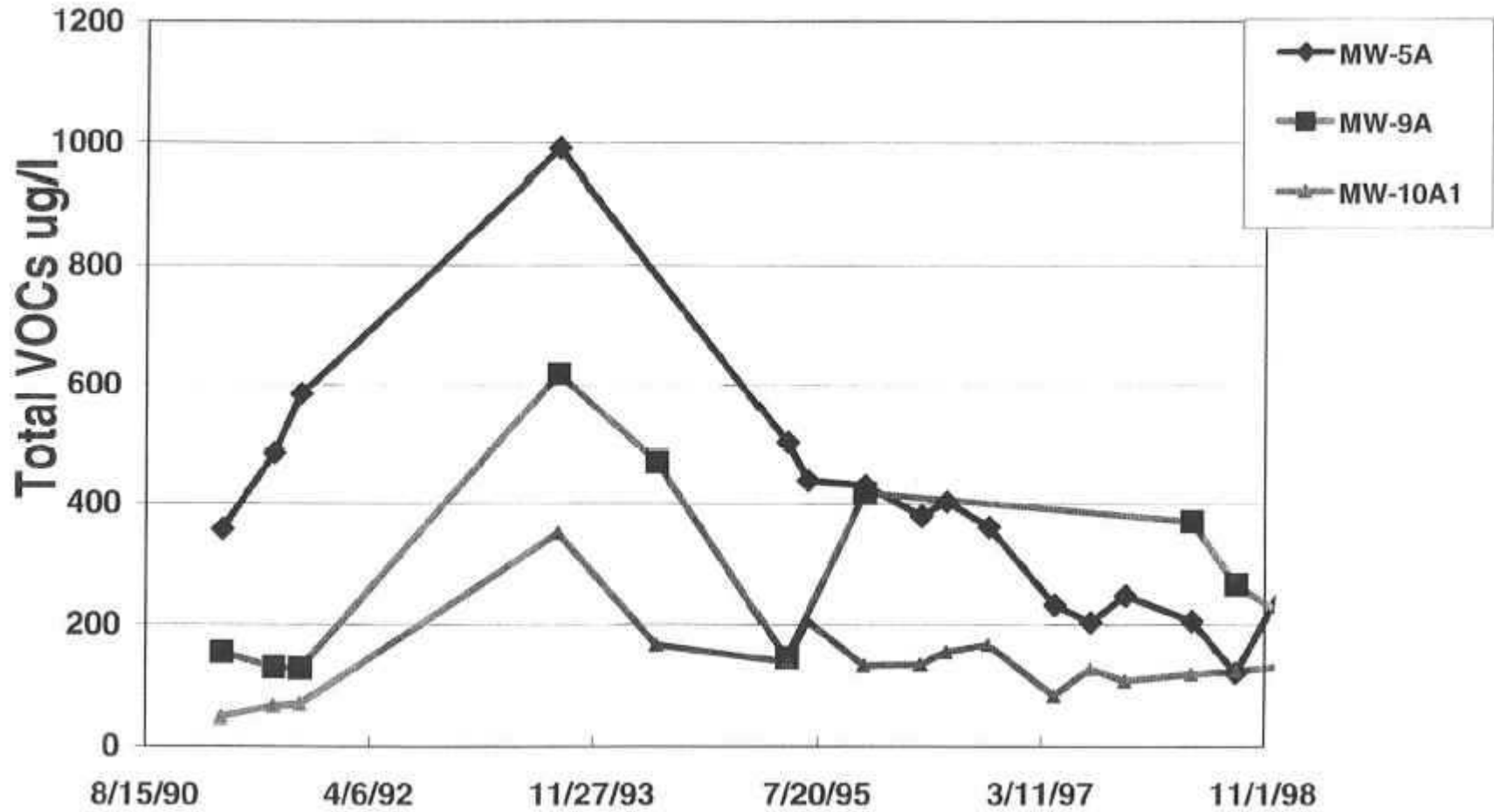


Figure 7

Dakhue SLF Total VOCs @ Select Wells

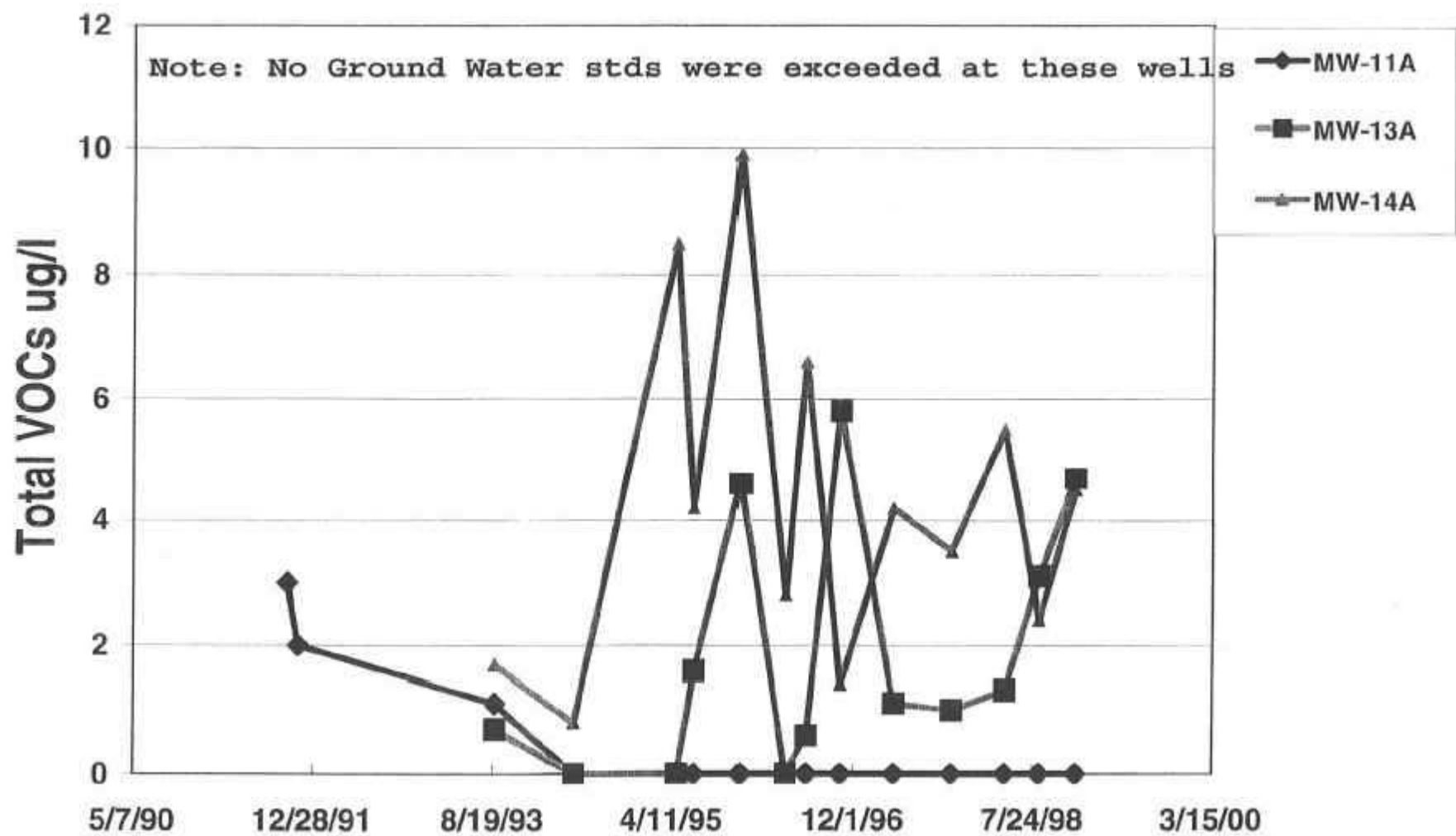


Figure 8

Dakhue MW-3A Select Compound Trends

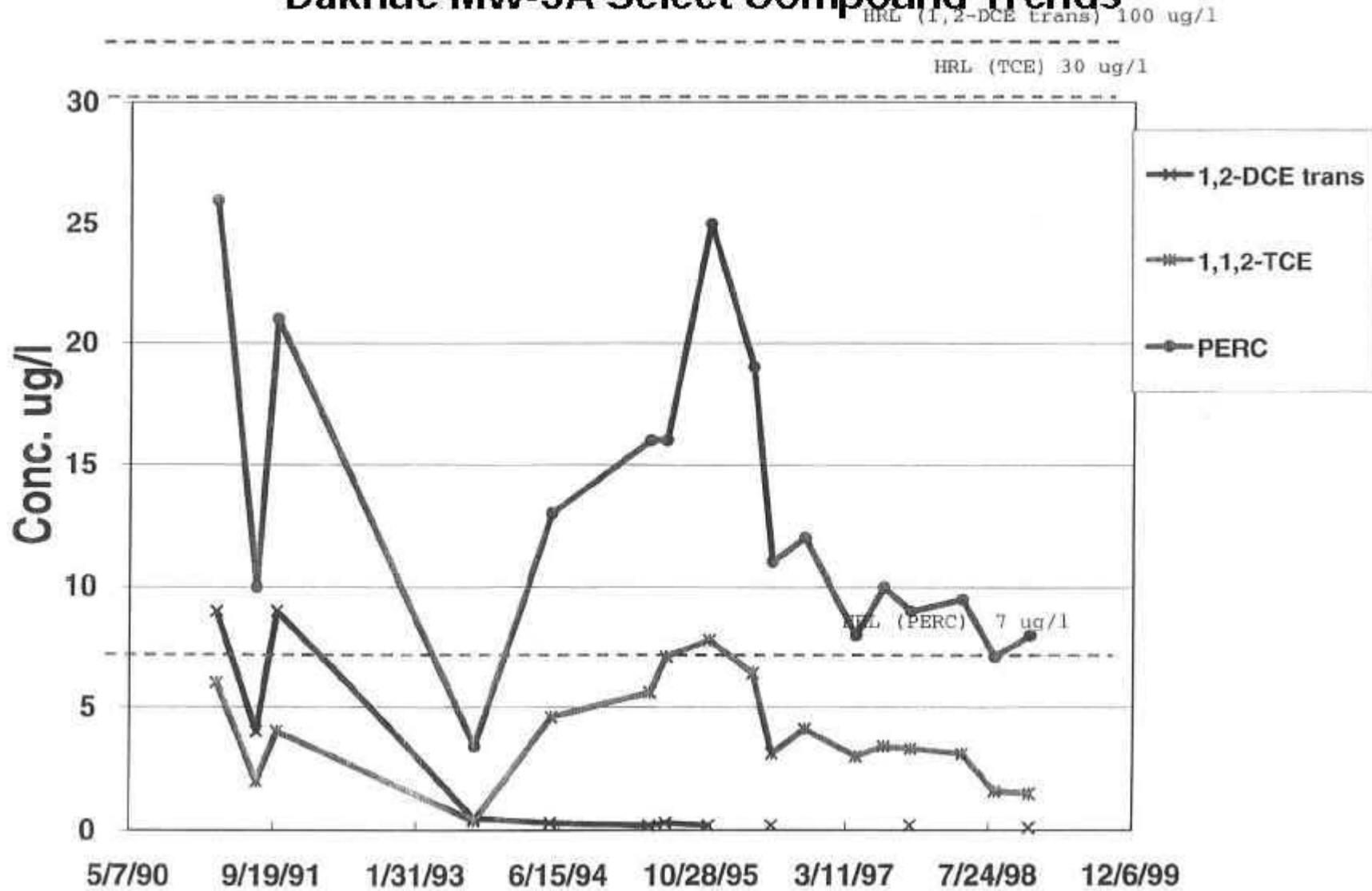


Figure 9

Dakhue SLF MW-5A Conc. Trends for Select Compounds

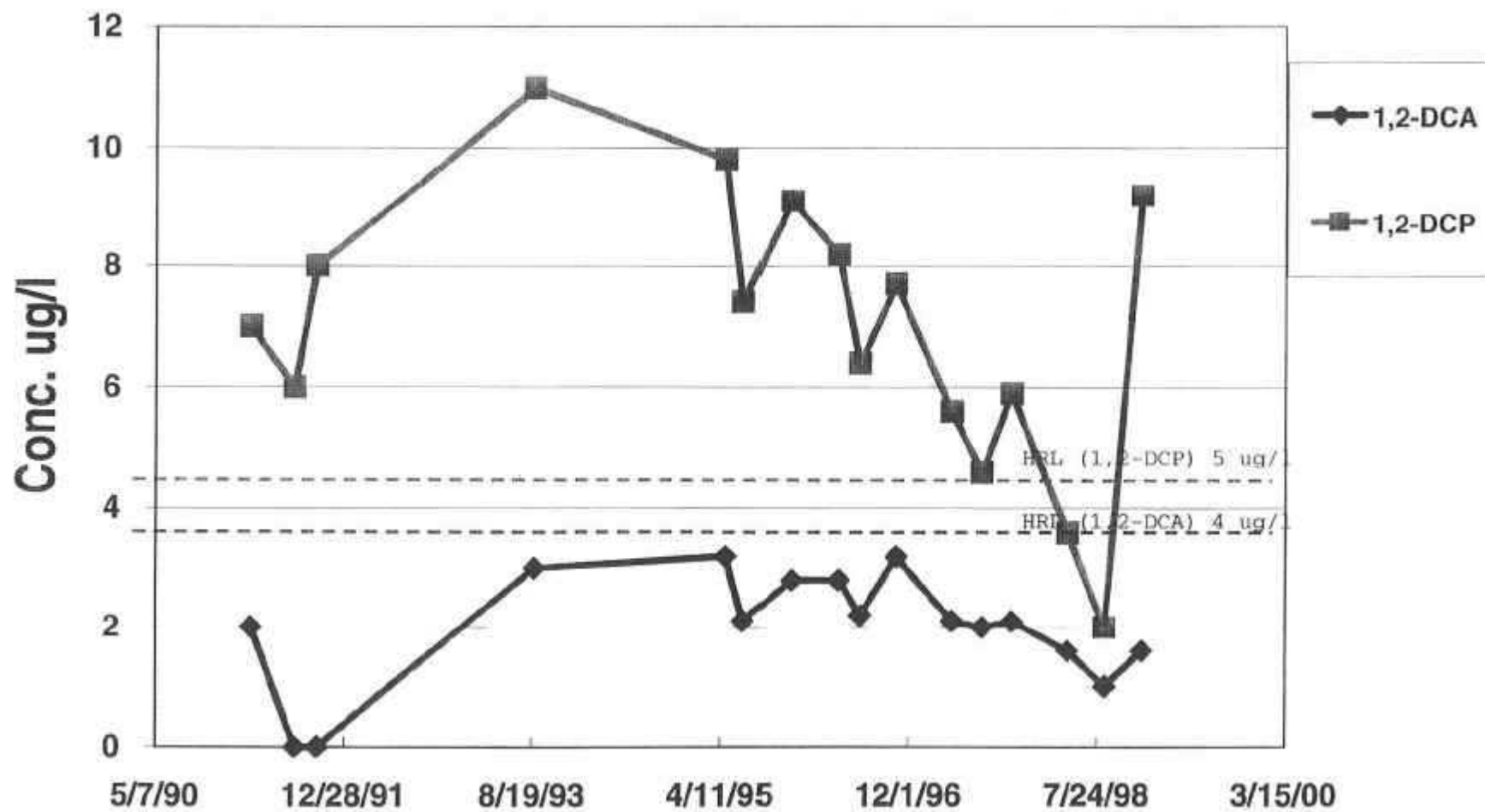


Figure 10

Dakhue SLF MW-5 Conc. Trends for Select Compounds

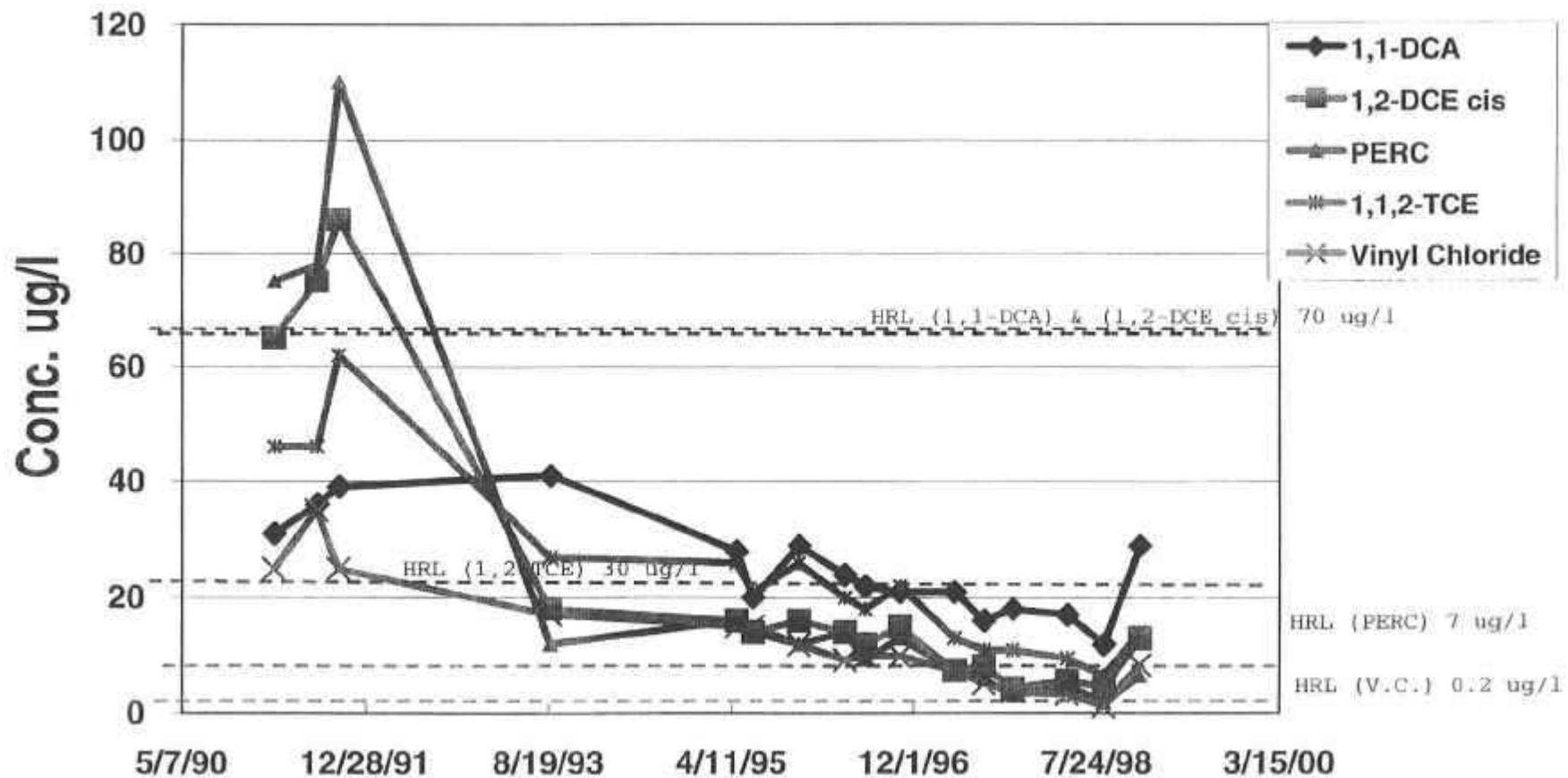


Figure 11

Dakhue MW-10A(1) Select Compound Trends

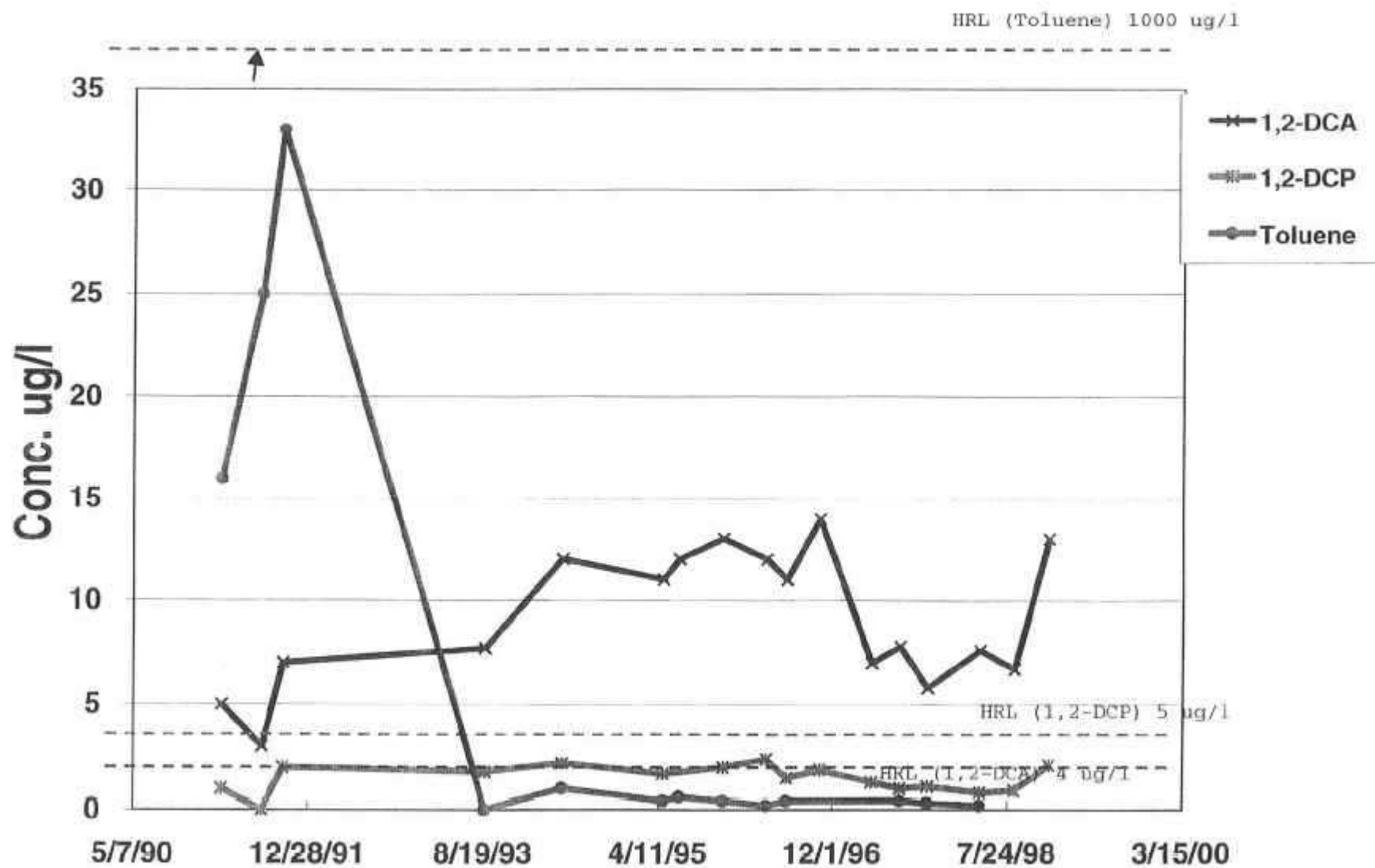


Figure 12

Dakhue MW-10A(2) Conc. Trends for Select Compounds

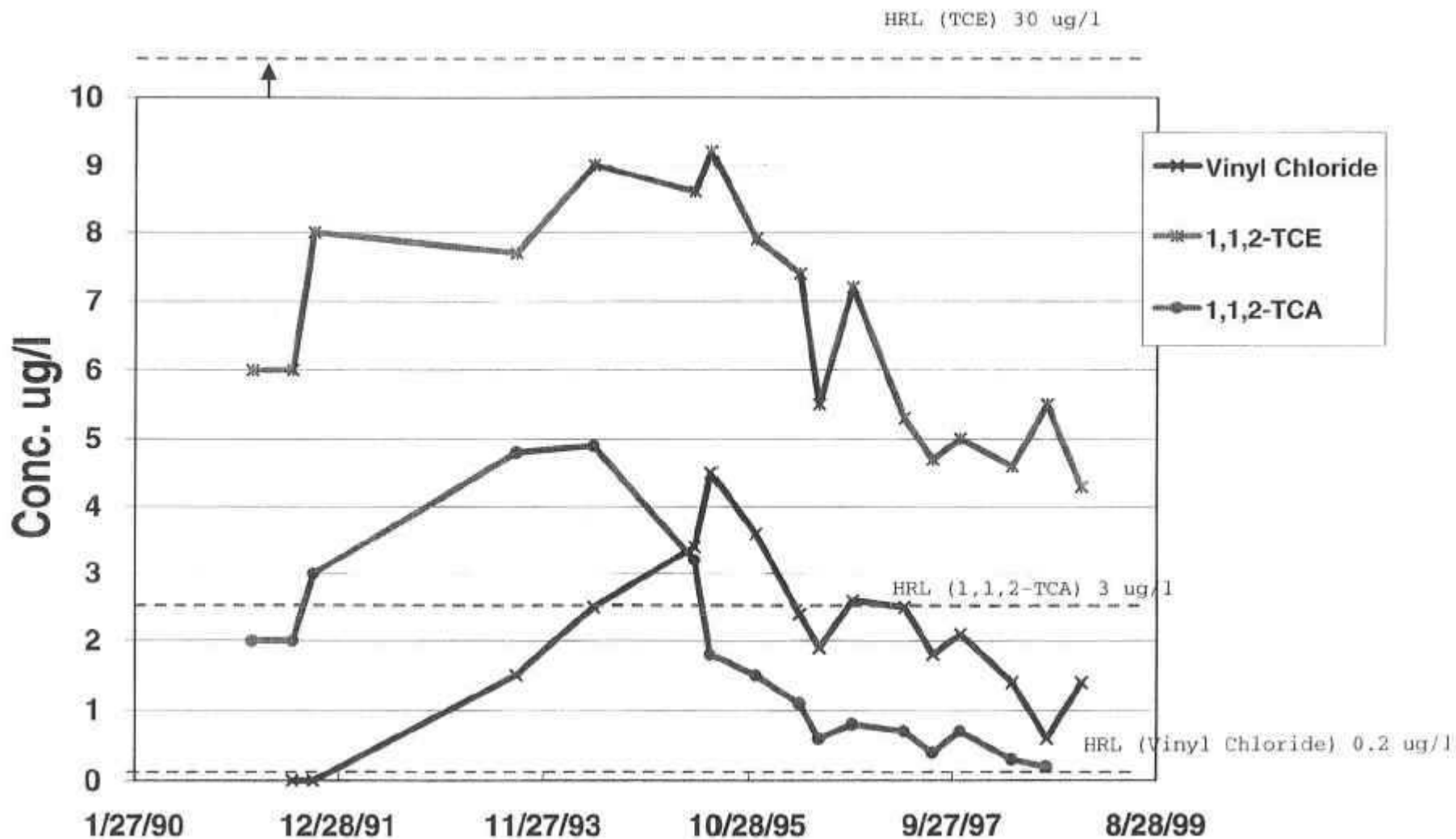


Figure 13

Dakhue MW-10A(2) Conc. Trends for Select Compounds

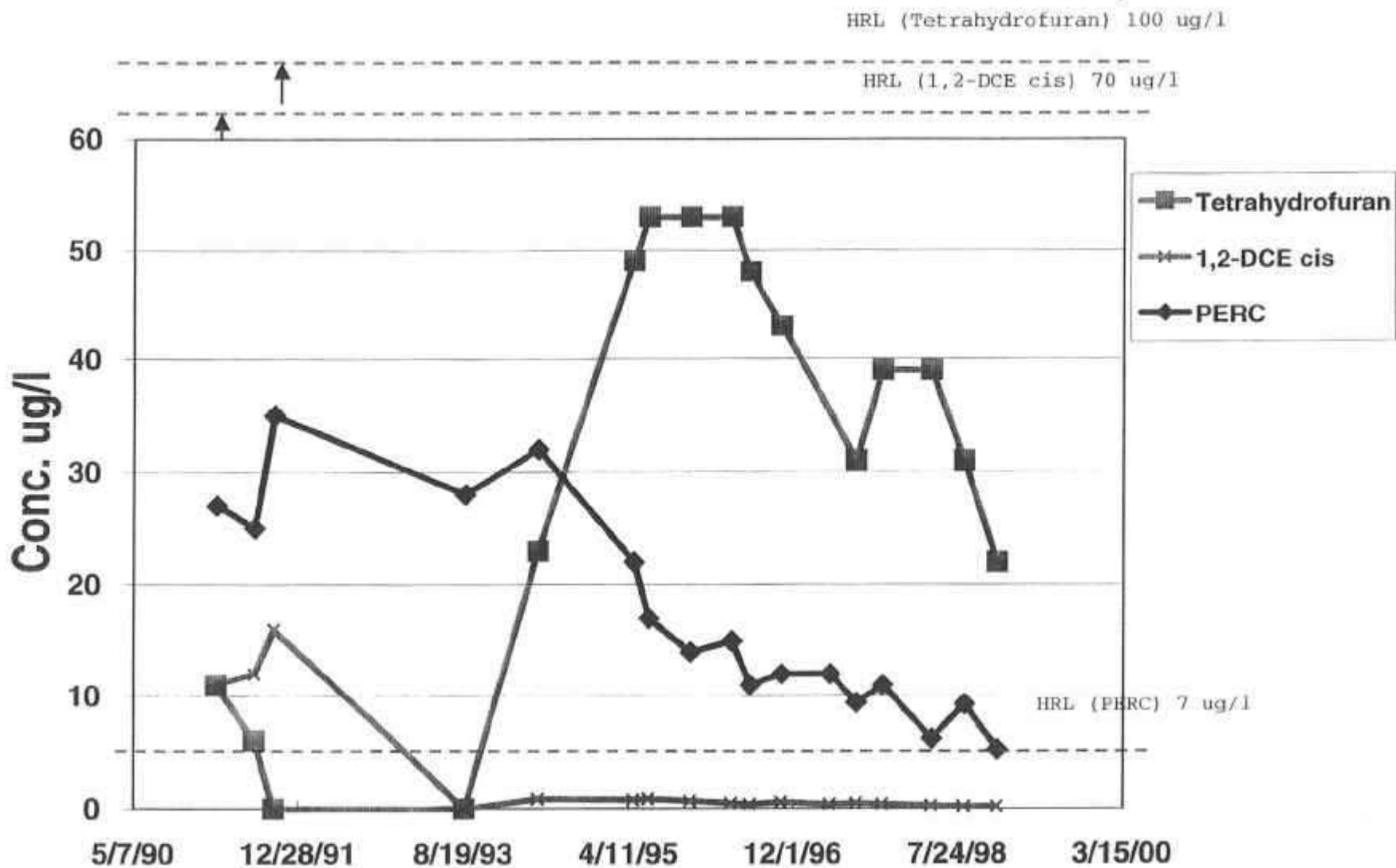


Figure 14

Dakhue MW-12A Conc. Trends for Select Compounds

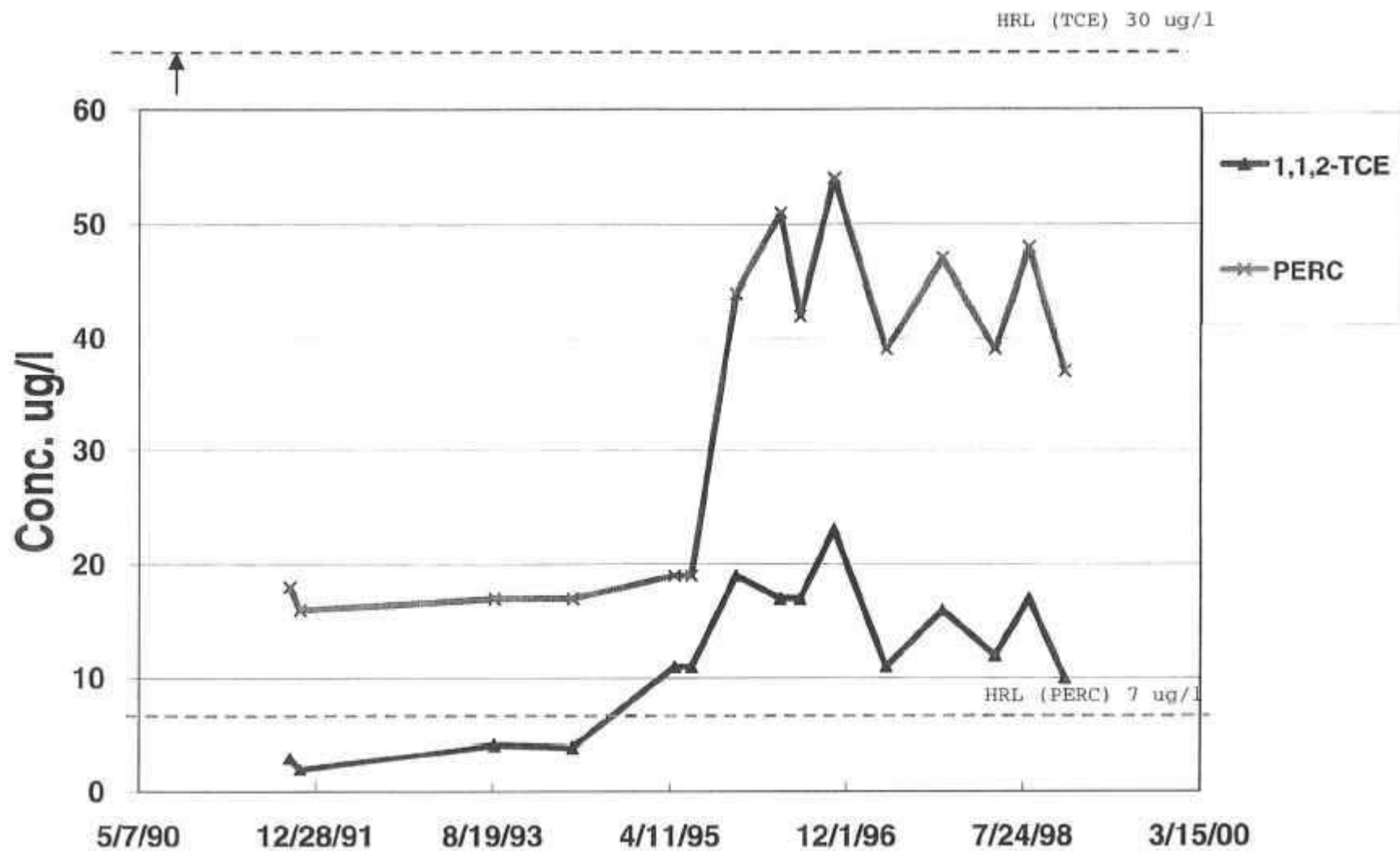


Figure 15

Dakhue SLF MW-8A Conc.Trends for Select Compounds

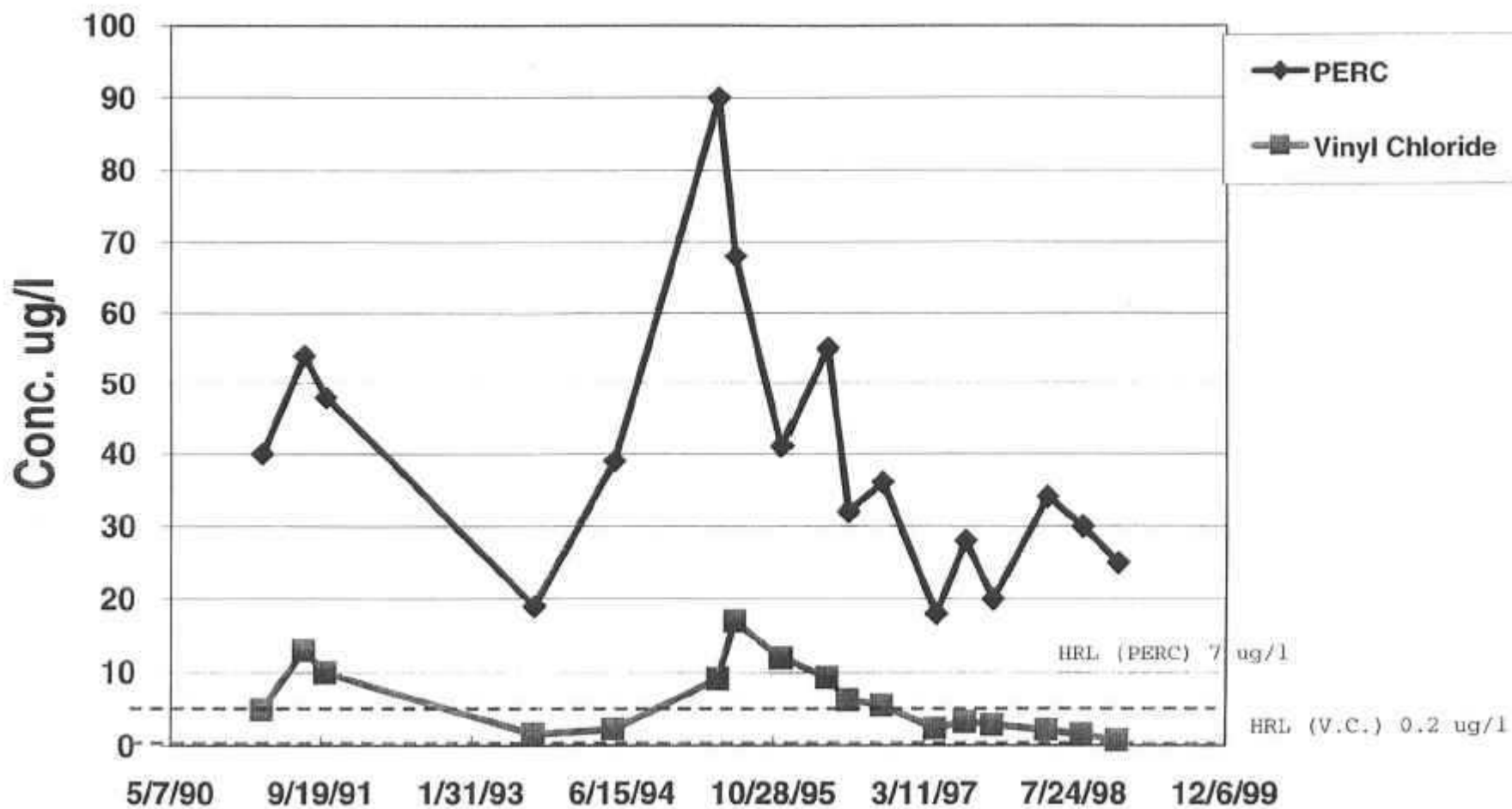


Figure 16

E. Statement of Protectiveness

The Record of Decision (ROD) for the Source Control Operable Unit consisted of the following elements:

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The source control provided is a low permeability cover over the Landfill which has achieved its design criteria by significantly reducing both the production of leachate and the toxicity of the compounds released from the Landfill. Since the cover was constructed, there has been significant reduction in the contaminant concentrations in the ground water monitoring wells.

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The landfill cover is moved annually. The cover is inspected for erosion or other damage and repairs are made when and where necessary to maintain the integrity of the cover system, including maintaining proper slopes for positive drainage off the fill area.

Long-term monitoring of the ground water system is ongoing quarterly at the Landfill. Long-term groundwater monitoring has demonstrated that the chemicals of concern have declining to below appropriate ARARs. Long-term trends show significant and adequate improvements in ground water quality.

The next five year review will be completed by June 30, 2004.

Name: Karen A. Studders	Title: Commissioner	Date: March 2, 1999
Mailing Address: 520 Lafayette Road, St. Paul, MN 55155		Phone: 651-296-7301
Signature: <i>Karen A. Studders - Asst. Commissioner</i>		