Evaluation of Volatile Organic Compounds in Wisconsin Landfill Leachate and Lysimeter Samples

by

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REPORT SUMMARY

This study examined leachate and lysimeter concentration data from 34 engineered landfills in Wisconsin. The particular objectives were to (1) examine which volatile organic compounds (VOCs) are most prevalent, (2) determine typical VOC concentrations, (3) examine if temporal trends in VOC concentration exist, (4) compare typical VOCs and VOC concentrations between leachate and lysimeter data, (5) compare VOC concentrations in the lysimeters of clay and composite lined landfills, and (6) compare relative concentrations from field data with those determined from analytical solutions. Landfills examined in this study were located through-out the state and were constructed using either a compacted clay or composite (compacted clay overlain by a geomembrane) liner. Data from landfills examined show that 5 main compound classes are present in both leachate and lysimeters (aromatic hydrocarbons, alkanes, alkenes, ketones, and furans). The concentrations of these compound classes ranged between 1 and 100 μg/L in leachate and between 0.1 and 10 μg/L in lysimeters for the aromatics, between 5 and 75 μg/L in leachate and between 1 and 25 μg/L in lysimeters for the alkanes and alkenes, and between 1 and 10,000 μg/L in the leachate and between 1 and 1000 μg/L in the lysimeters for the ketones and furans. Temporal trends were examined using linear regression analysis. Linear regression results suggest that 70% of the analyses for leachate data and 80% of the analyses for lysimeter data have no trend in concentration with time. ANOVAs comparing leachate concentration data based on the type of waste stream suggest that higher average VOC concentrations are present at landfills accepting MSW compared to those co-disposing of MSW and ISW. VOC concentrations in leachate were examined spatially and VOCs were determined to be detected more frequently and at higher average concentrations in the southeast region of the state. Eleven VOCs were found in the lysimeters of both clay and composite lined landfills. Liner types were compared (clay vs. composite) using and analysis of variance (ANOVA). ANOVA results suggest that the concentrations were statistically no different between clay and composite lined landfills for 8 of the 11 VOCs. A solution to the advection diffusion equation (ADE) derived and presented by van Genuchten 1981 was used to predict contaminant transport through landfill liners. Results from the analytical solution under-predict the concentrations determined from field data for all of the compounds examined in this paper. VOCs are ubiquitous in landfill leachate and lysimeters and most VOC concentrations do not exhibit decreasing temporal trends. This study has shown that the potential for groundwater contamination from VOC migration remains a problem associated with both clay and composite lined landfills.

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ABSTRACT

Thirty four engineered landfills were examined in this study to determine the characteristics typical of landfill leachates in Wisconsin. The particular objectives were to examine (1) which volatile organic compounds (VOCs) are most prevalent, (2) if temporal trends in VOC concentration exist, (3) if VOC concentrations depend on the type of waste stream, and (4) if VOC concentrations vary spatially. Landfills examined in this study were located through out the state and were constructed using either a compacted clay or composite (compacted clay overlain by a geomembrane) liner. Since 1985, The Wisconsin Department of Natural Resources (WDNR) required landfill personnel to monitor leachate for VOCs. The data from landfills examined show that 5 main compound classes are present in leachates (aromatic hydrocarbons, alkanes, alkenes, ketones, and furans). The concentrations of these compound classes ranged between 1 and 100 μg/L for the aromatic, between 5 and 75 μg/L for the alkanes and alkenes, and between 1 and 10,000 μg/L for the ketones and furans. Temporal trends were examined using linear regression analysis. Linear regression results suggest that 70% of the analyses have no trend in concentration with time. ANOVAs comparing concentration data based on the type of waste stream suggest that higher average VOC concentrations are present at landfills accepting MSW compared to those co-disposing of MSW and ISW. VOCs were examined spatially and were determined to be detected more frequently and at higher average concentrations in the southeast region of the state. VOCs are ubiquitous in landfill leachate and most VOC concentrations do not exhibit decreasing temporal trends, which presents potential long-term impacts to groundwater if migration through liner systems occurs.

1.1 INTRODUCTION

Volatile organic compounds (VOCs) that are carcinogenic, mutagenic, and/or teratogenic are found in many items in residential and industrial wastes (e.g., cleaners, paints, paint thinners, finger nail polish remover, etc.) that are disposed in municipal solid waste (MSW) landfills (US EPA). These VOCs end up in leachate that forms as water percolates through the waste as well as the gas within the waste mass. Previous research in Wisconsin by the Wisconsin Deparment of Natural Resources WDNR has shown that VOCs are ubiquitous in MSW leachate in Wisconsin (Kmet and McGinley1982, Sridharan and Didier 1988, Friedman 1988, Battista and Connelly 1989, Battista and Connelly 1994, Huebner and Gordon 1995). VOCs have also been found in the leachate at landfills in many other states and countries including Minnesota, Massachusetts, Connecticut, Washington, Germany, Sweden, and Denmark (Nelson and Book 1986, Massachusetts Department of Environmental Quality Engineering 1986, Gibbons et al. 1992, Ragle et al. 1995, Gade et al. 1996, Oman and Hynning 1993, Gron et al. 1999)

VOCs present in MSW leachate have the potential to migrate through liners used for MSW landfills and thus impact groundwater. Battista and Connelly (1994) showed that VOC migration at unlined as well as clay lined landfills in WIsaonsin is occurring. The most frequently observed compounds were benzene, cis-1,2-dichloroethylene, vinyl chloride, and 1,1-dichloroethane, which are the same four VOCs found to occur most often in a study performed during the 1980's (Battista and Connelly, 1994). However, no analyses have been conducted to date to determine if VOCs are also migrating through more modern composite liners (i.e., geomembrane overlying a compacted clay layer).

The primary objective of this study was to evaluate whether VOCs are migrating through composite liners in MSW landfills in Wisconsin and whether the rate of migration is comparable to that in clay-lined landfills. Another objective was to evaluate whether VOCs are migrating at a rate that may adversely affect ground water quality. To accomplish these objectives, data collected by WNDR over approximately the past 25 yrs were analyzed. The data were obtained from the Groundwater Environmental Monitoring System (GEMS), a database compiled by WDNR that contains data on water quality and quantity surrounding 675 landfills in Wisconsin.

The GEMS database presents a unique opportunity by providing a temporal record of not only VOC concentrations in the leachate above the liner (since 1985) but also in the lysimeters below the liner (since 1987). Especially unique is the data from the lysimeters, since most states never required landfill owners to construct lysimeters. For each landfill, GEMS provides temporal data pertaining to VOC concentrations in the leachate, large pan lysimeters located beneath the liner, and monitoring wells.

This study will examine VOC concentrations in Wisconsin landfills to determine (1) the nature and concentrations of VOCs present in Wisconsin landfills, (2) if VOCs are migrating through landfill liners and the rate at which migration is occurring, and (3) the potential impact that VOC migration may pose to groundwater quality. The study will be separated into two papers. The focus of the first paper is: to characterize VOCs found in leachate in Wisconsin landfills. The second paper focuses on VOC concentrations in lysimeters, and how these concentrations are related to leachate concentrations and liner type.

1.2 BACKGROUND

Previous studies describing the composition of landfill leachate were reviewed to provide a comparison with the data collected in this study. Studies of leachate with data on VOC concentrations are summarized in this section (Kmet and McGinley 1982, Sridharan and Didier 1988, Friedman 1988, Forst et al. 1989, Gibbons et al. 1992, Tedder 1992, Krug and Ham 1995, Rowe 1995, Hunt and Dollins 1996, Townsend et al. 2000, Weber et al. 2002, Kjeldsen et al. 2002). Studies by Sabel and Clark (1984), Melba et al. (1991), Ragle et al. (1995), Reitzel et al. (1992), Alker et al. (1993), Ward et al. (2002), Kylefors et al. (2003), and Statom et al. (2004) were also reviewed. However, these studies were limited to indicator parameters (e.g. total suspended solids, chemical oxygen demand, and biochemical oxygen demand) and/or cations and anions. Thus, they are not summarized in this section.

1.2.1 Review of Previous Studies

Kmet and McGinely (1982) examined leachate from 8 landfills in Wisconsin for five classes of organic compounds: organic acids (3/11)[1], volatile organic compounds (VOCs) (23/32), base-neutral organic compounds (8/46), chlorinated pesticides (1/19), and polychlorinated biphenyls (PCBs) (1/7). The landfills primarily accepted MSW, but may also have received some hazardous waste due to the time period when the study by Kmet and McGinley was performed (i.e. fewer restrictions on the disposal of hazardous waste in MSW landfills were enforced). Kmet and McGinley (1982) report that 36 organic compounds were present in leachate and 10 organic compounds were present in at least half of the leachate samples that were analyzed. Concentration ranges for VOCs reported by Kmet and McGinley (1982) are summarized in Table 1.2.1. Additional data are summarized in Table A1 in Appendix A. Dichloromethane (DCM), toluene, 1,1-dichloroethane (1,1-DCA), trans-1,2-dichloroethene (trans-1,2-DCE), and ethylbenzene were detected in at least 60% of the samples analyzed and were the five most frequently detected VOCs. Approximately 61% (14/23) of the volatile

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[1]Numbers in parentheses indicate number of contaminants found and number of contaminants considered; e.g., 3/11 means that 3 compounds were found of the 11 compounds considered in the analysis.

organics reported by Kmet and McGinley (1982) are classified as either alkanes or alkenes (8/23), chlorinated hydrocarbons (3/23), or aromatic hydrocarbons (3/23).

Sridharan and Didier (1988) examined leachate from 56 landfills in Wisconsin and found 34 different organic compounds in the leachate samples that were analyzed. Summary statistics from their study are in Table 1.2.1. Additional data are in Table A2 in Appendix A. Seven VOCs, (benzene, carbon tetrachloride, dichloromethane, tetrachloroethene, trichloroethene, vinyl chloride, 1,1,2-trichloroethane) had median concentrations above USEPA's maximum contaminant level (MCL) for drinking water. Also, ethylbenzene, dichloromethane (DCM), phenol, tetrahydrofuran, toluene, and xylene (total) were above the limit of detection in at least 50% of the samples analyzed. Most of the aforementioned compounds are classified as alkenes (3/7), alkanes (1/7) or aromatic hydrocarbons (1/7).

Friedman (1988) examined leachate data from 20 MSW and 6 industrial solid waste (ISW) landfills in Wisconsin. Summary statistics for the concentrations are shown in Table 1.2.1. Additional data are shown in Table A3 in Appendix A. Friedman (1988) found that of the 19 compounds detected in leachate at landfills in Wisconsin, toluene was detected most often (95% of landfills) and styrene was detected least often (5% of landfills). The most frequently detected compounds are classified into four categories: furans (tetrahydrofuran), alkanes (chloroethane, 1,1-dichloroethane, and 1,1,1-trichloroethane), alkenes (trichloroethene and tetrachloroethene) and aromatic hydrocarbons (benzene, toluene,

Table 1.2.1 Range in VOC concentrations in landfill leachates reported in various past studies.

Parameter	Concentration (μg/l)												
	USEPA MCL	Kmet and McGinley (1982)	Sridharan and Didier (1988)	Friedman (1988)	Forst et al. (1989)	Gibbson et al. (1992) Old landfills (pre-1985)	Gibbson et al. (1992) New landfills (post-1985)	Tedder (1992)	Krug and Ham (1995)	Rowe (1995)	Hunt and Dollins (1996)	Townsend et al. (2000)	Kjeldsen et al. (2002)	Overall Range
Acetone	-	-	-	-	-	-	-	-	-	-	59.0-2100	-	6.0-440	6.0-2100
Phenol	-	221-5790	1.1-2170	-	-	-	-	1.0-6090	-	-	-	-	0.6-1200	1.0-6090
Dichloromethane	5	106-20000	27.6-58200	-	6.0	898	1390	1.1-191	ND	ND-8300	170	1.6-2.8	1.0-827	1.0-58200
Toluene	1000	280-1600	1.0-1100	1.2-610	3.6-48	583	406	2.0-870.4	2.7-12300	2.0-7000	10.0-87.0	1.2-6.7	1.0-12300	1.0-12300
1,1-dichloroethane	7	510-6300	-	3.7-190	-	400	116	2.1-12	6.0-4120	-	5.0-20.0	-	0.6-46	0.6-6300
1,2-dichloroethylene (trans)	100	96.0-2200	-	3.6-310	1.6	492	104	-	5.6	ND-2080	-	-	1.6-6582	1.6-6582
Ethylbenzene	700	100-250	1.0-1680	1.4-180	1.7-20	198	60	2.3-93	4.8-1280	27.1-1400	7.0-20.0	1.1-10.8	0.2-2329	0.2-2329
Chloroform	-	14.8-1300	4.4-16	3.4-32	6.6-8.5	-	-	1.0-2.1	7.1	-	-	-	-	1.0-1300
1,2-dichloroethane	5	13.0-11000	1.0-10000	-	-	-	-	1.0-4.0	212-1030	ND-<86	-	-	<6	1.0-10000
Diethylphthalate	-	43.0-300	-	-	-	-	-	5.4-12.9	-	-	-	-	0.1-660	0.1-660
Dibutylphthalate	-	12.0-150	13.0-540	-	-	-	-	10-12	-	-	-	10.5	0.1-70	0.1-540
Benzene	5	19.0	1.0-10000	1.4-220	1.1-572	65	7.0	1.0-130	2.2-1630	ND-590	-	-	0.2-1630	0.2-10000
Bromodichloromethane	-	-	2490	-	-	-	-	-	-	-	-	-	-	2490
Butylbenzylphthalate	-	125-150	10.0-64.1	-	-	-	-	-	-	-	-	-	0.2-8.0	0.2-150
Carbon tetrachloride	5	-	3.0-995	-	-	-	-	-	-	-	-	-	4.0-9.0	3-995
Chlorobenzene	100	-	3.0-188	2.3-5.8	-	736	-	1.3-9.4	6.0-911	-	-	-	0.1-110	0.1-911
Chlorodibromomethane	-	-	31.0		-	-	-	-	-	-	-	-	-	31
Chloroethane	-	170	2.0-730	5.6-730	-	-	-	1.5-6.5	9.0-410	-	11.0-17.0	-	-	1.5-730
1,3-dichloropropene (cis)	-	-	2.5	-	-	-	-	-	-	-	-	-	-	2.5
di-n-octyl phthalate	-	-	16.1-542	-	-	-	-	-	-	-	-	-	-	16.1-542

Table 1.2.1 Range in VOC concentrations in landfill leachates reported in various past studies (continued).

Parameter	Concentration (μg/l)													
	USEPA MCL	Kmet and McGinley (1982)	Sridharan and Didier (1988)	Friedman (1988)	Forst et al. (1989)	Gibbson et al. (1992)		Tedder (1992)	Krug and Ham (1995)	Rowe (1995)	Hunt and Dollins (1996)	Townsend et al. (2000)	Kjeldsen et al. (2002)	Overall Range
						Old landfills (pre-1985)	New landfills (post-1985)							
Dibromochloromethane	-	-	22.0-160	-	-	-	-	-	-	-	-	-	-	22.0-160
Dichlorodifluoromethane	-	180	100-242.1	-	-	-	-	-	2.0-1030	-	-	-	-	2.0-1030
Fluoranthene	-	-	9.5-723	-	-	-	-	-	-	-	-	-	-	9.6-723
Fluorotrichloromethane	-	-	1.0-183	3.2-200	-	-	-	-	-	-	-	-	-	1.0-200
Isophorone	-	-	3.2-520	-	-	-	-	9.4-28	-	-	-	-	-	3.2-520
Iospropylbenzene	-	-	1.0	-	-	-	-	-	-	-	-	-	-	1.0
Methyl ethyl ketone	-	-	2100-37000	640-37000	-	-	-	-	8.6-36000	-	-	-	110-6600	8.6-37000
Naphthalene	-	19.0	4.6-186	-	-	-	-	4.5-29	-	-	-	1.2	0.1-260	0.1-260
p-dichlorobenzene	75	-	2.0-250	-	-	-	-	1.0-39.8	-	-	-	-	0.1-16.0	1.0-250
Pentachlorophenol	1	3.0	25.0	-	-	-	-	63-540	-	-	-	-	-	3.0-540
Styrene	100	-	2.0	28.0	-	-	-	-	-	-	-	-	0.5-1.6	0.5-28
Tetrachloroethylene	5	26.0-60.0	1.0-232	1.4-69	2.8	-	-	1.0-2.0	0.8-44	ND-2000	-	3.2	0.05-250	0.05-2000
Tetrahydrofuran	-	-	410-1400	270-11000	-	-	-	-	-	-	-	-	9.0-430	9.0-11000
1,3-dichloropropene (trans)	-	-	2.5	-	-	-	-	-	-	-	-	-	-	2.5
1,1,1-trichloroethane	200	2400	1.0-10000	-	1.9-4.5	-	-	1.1-31	0.3-3810	-	33.0	-	0.01-3810	0.01-10000
Trichloroethylene	5	160-600	1.0-372.2	2.4-280	2.3-7.9	51	71	1.0-1.2	-	ND-230	-	-	0.05-750	0.05-750
Vinyl chloride	2	61.0	10.0-3000	11.0-150	-	107	51	1.0-19.6	0.3-5570	ND-2010	10.0-12.0	-	-	0.3-5570
Xylene (total)	10000	-	30.0-2000	2.5-240	3.7-38	-	-	4.4-85.2	10.2-3010	-	33.0-38.0	1.3-5.2	0.8-3500	0.8-3010
1,1,2-trichloroethane	5	500	1.5-10000	-	-	-	-	-	0.5-7130	-	-	-	2.5-16.0	1.5-10000

ethylbenzene, and xylene). Friedman (1988) compared data from Wisconsin landfills with those from an unpublished study by the Massachusetts Department of Environmental Quality Engineering (MDEQE) (1986) which reported the frequency at which VOCs were found in Massachusetts leachates (VOC concentrations were not reported by MDEQE). The percent of landfills with VOC detects in leachate is presented in Table 1.2.2. The most frequently detected class of compound found by the MDEQE was aromatic hydrocarbons (toluene, ethylbenzene, and xylene at 86%, 71%, and 71% of landfills), with the exception of methyl ethyl ketone, which was detected at 86% of landfills. For all VOCs detected in both Wisconsin and Massachusetts leachates, Wisconsin has a higher percentage of landfills where these VOCs have been detected with the exception of styrene and methyl ethyl ketone (Friedman 1988).

Forst et al. (1989) examined leachates from four MSW landfills and five hazardous waste (HW) landfills for chlorinated hydrocarbons and alkylated benzenes. Information regarding locations of the landfills was not provided. Summary statistics from the data reported by Forst et al. (1989) are shown in Table 1.2.1. Additional data are in Table A4 in Appendix A. Of the 22 compounds examined, all 22 were detected in the leachate of one or more of the HW landfills and 18 compounds were detected in the leachate of one or more of the MSW landfills. The alkylated benzenes (benzene, toluene, and ethylbenzene, which are also classified as aromatic hydrocarbons) were detected at all sites examined by Forst et al. (1989). Compounds that were only detected in HW landfill leachate include, 1,2-dichloroethane, 1,2-dichloropropane, propylbenzene, and 1,2,3,4-tetramethylbenzene. Also, for compounds detected in both HW and MSW landfill leachates the concentrations were two to three orders of magnitude lower in the MSW leachate, on average.

Gibbons et al. (1992) examined leachate data from 36 MSW, 12 HW, and 29 co-disposal (MSW and HW) landfills in 18 states operated between 1950 and 1991.

Table 1.2.2 Comparison of percent VOC detections in leachates of Massachusetts and Wisconsin landfills (adopted from Friedman (1988)).

Parameter	Percent landfills with VOC detections in leachate	
	Massachusetts	Wisconsin
Styrene	5	14
Vinyl chloride	16	0
Chlorobenzene	16	0
Trichloroflouromethane	26	0
Chloroform	26	14
Methyl ethyl ketone	37	86
1,2-dichloroethane	42	0
1,4-dichlorobenzene	42	0
1,2-dichloroethylene (trans)	42	29
1,1,1-trichloroethane	47	14
Chloroethane	58	14
Tetrahydrofuran	58	14
Tetrachloroethylene	58	14
1,1-dichloroethane	63	29
Trichloroethylene	63	29
Benzene	63	43
Xylene, o-	84	71
Ethylbenzene	84	71
Toluene	95	86

Leachate data were examined for 56 VOCs. Gibbons et al. (1992) defined “old” and “new” landfills as those accepting municipal, commercial, and industrial non-hazardous waste prior to and after 1985. Summary statistics for the VOC concentrations are in Table 1.2.1. The proportion of MSW landfills with detects and the arithmetic mean concentration is shown in Table A5 in Appendix A. Gibbons et al. (1992), found that aromatic hydrocarbons (benzene, chlorobenzene, and ethylbenzene), alkanes (DCM), and alkenes (trans-1,2-dichloroethene) were the most frequently detected VOCs regardless of landfill type (MSW vs HW).

Tedder (1992) examined leachate data from 6 MSW landfills in Florida. Five of the landfills accepted only MSW and one received MSW as well as ash from a MSW incinerator. One of the MSW landfills was operated with leachate recirculation. The landfills began operating between 1978 and 1989. Data from 150 samples collected between January 1987 and February 1992 were examined. Concentrations of 76 organic compounds listed by USEPA were examined, but not all compounds were examined at all 6 landfills (Tedder 1992). Summary statistics for the VOC concentrations are reported in Table 1.2.1. Additional data are summarized in Table A6 in Appendix A. Tedder (1992) found that 29 of 76 organic compounds were detected in leachate of the landfills examined. The most commonly detected classes of compounds (based on number of detects) were aromatic hydrocarbons (benzene, ethylbenzene, o-dichlorobenzene, p-dichlorobenzene, and toluene), alkanes (1,2-dichloroethane) and phenols (phenol). Also, the aromatic hydrocarbons and phenols tended to have the widest range in concentration. The average concentrations of benzene, DCM, pentachlorophenol (PCP), and vinyl chloride were above the USEPA’s MCL.

Krug and Ham (1995) examined VOC concentrations in leachate from 10 Wisconsin landfills. Eight of the landfills accepted only MSW or ISW and two of the landfills co-disposed MSW and HW. VOC concentrations reported by Krug and Ham (1995) are summarized in Table 1.2.1. Summary statistics on the frequency of detection and additional data for VOCs reported are found in Table A7 in Appendix A. The most frequently detected alkane was 1,1-dichloroethane (9 of 10 landfills). Aromatic compounds were also detected frequently, with toluene and ethylbenzene being detected in leachates for all 10 landfills and benzene and xylene being found in leachate from 7 of the landfills.

Rowe (1995) examined leachate characteristics for five landfills in Ontario, Canada and compared the findings with typical leachate concentrations reported for European and US landfills. The landfills began operating between 1972 and 1983, and four of the five were still operational in 1993 when the study by Rowe (1995) began. Two of the landfills primarily accepted MSW and ISW. The waste stream at the remaining three landfills was not reported. Ranges of VOC concentrations reported by Rowe (1995) are summarized in Table 1.2.1. Additional data are in Table A8 in Appendix A. The main classes of compounds detected in the study by Rowe (1995) were aromatic hydrocarbons, alkanes, and alkenes, which were detected at all sites examined. An alkane (dichloromethane) was the most commonly detected compound and the widest range in concentration was generally exhibited by the aromatic hydrocarbons (e.g. toluene).

Hunt and Dollins (1996) examined leachate quantity and quality data for a 1.8-ha MSW landfill cell in North Central Texas that was completely isolated from other cells at the landfill. Sampling for organic compounds took place on 5 separate occasions between June 1995 and June 1996. Compounds detected and the range of concentrations that were measured are summarized in Table 1.2.1. Additional data are in Table A9 in Appendix A. Detection frequency was not reported by Hunt and Dollins (1996). The ketone acetone had the widest range in concentration, which was between 59 and 2100 μg/l. The compounds that were detected are, aromatic hydrocarbons, alkanes, alkenes, and several chlorinated hydrocarbons. Fifteen VOCs were detected in the leachate samples of which DCM, 1,1,1-

TCA, 2-butanone, and carbon disulfide were only detected during one of the sampling events.

Townsend et al. (2000) and Weber et al. (2002) examined leachate samples from four 54 m^2 test cells in Florida containing construction and demolition (C&D) waste. Analyses were conducted for 52 VOCs and 12 VOCs were detected at least once during weekly sampling over a period of 161 d. Concentrations of the VOCs that were detected are summarized in Table 1.2.1. Additional data are summarized in Table A10 in Appendix A. Two aromatic hydrocarbons (ethylbenzene and toluene) were detected most often (15 and 6 detects, respectively), had maximum concentrations of 10.8 μg/l (ehtylbenzene) and 6.7 μg/l (toluene), and had the widest range in concentration of all compounds detected. Aromatic hydrocarbons comprise 83% (10/12) of the compounds detected. Only one semivolatile organic compound (di-n-butyl phthalate (10.5 μg/l)) was detected in one of the test cells.

Kjeldsen et al. (2002) presents information on the composition of MSW landfill leachate that is based on data published by others for landfills operated between the early 1960s and 2002 (Kjeldsen et al. 2002). Leachate data are presented for 105 different organic compounds. Ranges in the concentration of VOCs similar to those found by the aforementioned investigators and reported by Kjeldsen et al. (2002) are summarized in Table 1.2.1. Classes of compounds reported by Kjelsden et al. (2002) include aromatic hydrocarbons, alkanes, alkenes, phenols, alkylphenols, pesticides, phthalates, aromatic sulfonates, phosphonates, ketones, and several miscellaneous compounds. The most frequently detected compounds are aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene, and xylene) and alkenes (e.g. tetrachloroethene and trichloroethene). Concentrations of the aromatic hydrocarbons ranged between 0.1 μg/l and 12,300 μg/l, and concentrations of the alkenes ranged between 0.01 μg/l and 6582 μg/l.

1.2.2 Synthesis of Data

The data from the studies examined in this paper are summarized in Table 1.2.1. Most of the data in Table 1.2.1 are from MSW landfills, but some of the landfills for which data are presented were in operation when fewer restrictions were in place regarding disposal of hazardous waste in MSW landfills. The aromatic hydrocarbons toluene and ethylbenzene were the only two compounds reported in all studies. Toluene was detected above the USEPA's MCL in 46% of the studies and ethylbenzene was detected above the USEPA's MCL in 36% of the studies. Other commonly detected compounds found in most studies were dichloromethane and benzene (both at 82% of studies); tetrachloroethylene (PCE), TCE, and vinyl chloride (all three in 73% of studies); and 1,1-dichloroethane, trans-1,2-dichloroethene, and xylene (total) (all in 64% of studies). The highest concentrations for these ten compounds generally were from Wisconsin leachates.

Aromatic hydrocarbons, alkanes, and alkenes were detected in all of the studies that were reviewed. Concentrations of the alkanes and alkenes typically fell between 0.1 and 1,000 μg/l, with the exception of dichloromethane, 1,1,1-trichloroethane, and 1,1,2-trichloroethane, which ranged between approximately 1.0 and 10,000 μg/l. Concentrations of the aromatic hydrocarbons also ranged between 0.1 and 1000 μg/l, with the exception of toluene and benzene, which ranged between approximately 0.1 and 10,000 μg/l. One common aspect is that the concentration of each VOC varies over a broad range. The widest range in concentration was for 1,1,1-trichloroethane (between 0.01 and 10,000 μg/l). However, the lower limit (0.01 μg/l) is from the study by Kjeldsen et al. (2002). This seems unreasonably low and no discussion about analysis method used was provided by Kjeldsen et al. (2002). Thus, a more realistic range for 1,1,1-trichloroethane is 0.1 to 10,000 μg/l.

1.3 DATA SOURCES

Landfill operators in Wisconsin are required to monitor VOC concentrations in leachate, lysimeters, and groundwater wells at set intervals (monthly, quarterly, bi-annually, or annually) depending on the type of waste accepted, background concentrations in groundwater, and monitoring history (Wisconsin Administrative Code Ch. NR 507). Wisconsin landfills have between 12 and 250 monitoring points (lysimeters, leachate tanks, leachate collection risers, groundwater monitoring wells, private wells, etc.) where samples are extracted for environmental monitoring. The samples are generally collected by landfill personnel or their consultants and are sent to a certified independent laboratory for analysis. The data are then submitted to WDNR for uploading into the Groundwater Environmental Monitoring System (GEMS), an Oracle database established in 1979 (Connelly and Stocks 1999). Prior to 1996, analytical data were submitted on preprinted paper forms and were manually entered into GEMS. Since then, the data have been submitted electronically to minimize transcription errors and to minimize lag time between data submittal and data accessibility (Connelly and Stocks 1999). Appendix B contains additional information pertaining to data accessibility and information contained in GEMS.

GEMS contains data for up to 47 VOCs monitored at each landfill monitoring point. These VOCs are listed in Table 1.3.1 along with the corresponding WDNR preventative action limits (PALs), WDNR enforcement standard (ESs), and USEPA maximum contaminant levels (MCLs). WDNR ESs are generally equivalent to USPEA MCLs for drinking water. The concentrations established as ESs cannot be exceeded at the point of compliance (typically 46 m from the limits of waste). PALs are used as an indicator of potential groundwater problems and typically correspond to 10% to 50% of the ES (based on the threat a particular contaminant poses to public health or the environment).

Table 1.3.1 VOCs included in GEMS along with preventative action limits (PALs), WDNR enforcement standards (ESs), and USEPA maximum contaminant levels (MCLs).

VOCs	WDNR PAL	WDNR ES	US EPA MCL
Benzene	0.5	5	5
Chloromethane	0.3	3	-
Dichloromethane	0.5	5	5
1,1-dichloroethane	0.7	7	7
1,1,1-trichloroethane	40	200	200
Bromomethane	1	10	-
Naphthalene	8	40	-
1,2-dichloroethane	0.5	5	5
Bromodichloromethane	0.06	0.6	-
Carbon tetrachloride	0.5	5	5
Tribromomethane	0.44	4.4	-
Dibromochloromethane	6	60	-
Chloroform	0.6	6	-
Toluene	200	1000	1000
Chlorobenzene	20	100	100
Chloroethane	80	400	-
Tetrachloroethylene	0.5	5	5
Fluorotrichloromethane	698	3490	-
1,1-dichloroethylene	0.7	7	7
1,1,2-trichloroethane	0.5	5	5
o-dichlorobenzene	60	600	600
1,2-dichloropropane	0.5	5	5
1,2-dichloroethene (trans)	20	100	100
m-dichlorobenzene	125	1250	-
p-dichlorobenzene	15	75	75
Dichlorodifluoromethane	200	1000	-
1,3-dichloropropene	0.02	0.2	-
1,3-dichloropropene (cis)	0.02	0.2	-
1,2-dibromo-3-	0.02	0.2	0.2
Vinyl chloride	0.02	0.2	2
Trichloroethylene	0.5	5	5
Carbon disulfide	200	1000	-
1,2-dichloroethylene (cis)	7	70	70
Styrene	10	100	100
Xylene, O-	1000	10000	10000[T]
Dibromomethane	NS	NS	-
1,2-dibromoethane	0.005	0.05	-
Methyl tertiary butyl ether	12	60	-
Ethylbenzene	140	700	700
Xylene, O & P-	1000	10000	10000[T]
Xylene, P-	1000	10000	10000[T]
Xylene (total)	1000	10000	10000[T]
Acetone	200	1000	-
Methyl ethyl ketone	90	460	-
Tetrahydrofuran	10	50	-
Xylene, M-	1000	10000	10000[T]
Xylene, M & P-	1000	10000	10000[T]

[T] = MCL is based on the total xylenes in the sample

NS = Not Specified

The point of application for a PAL is any location where groundwater is monitored, including directly beneath a landfill. ESs and PALs provide a point of reference to compare concentrations found in leachate and lysimeters with regulated quantities. If the concentration of a groundwater sample exceeds the PAL, WDNR may require installation of additional groundwater monitoring wells or a change in the monitoring program (frequency of sampling), to investigate the extent of environmental impacts. WDNR may also require revisions to operational procedures, a change in the design of the landfill, or probation or closure of the landfill.

Gas chromatography (GC) using photoionization and gas chromatography/mass spectrometry (GC/MS), as defined in USEPA SW-846 (US EPAs Test Methods for Evaluating Solid Wastes Physical/Chemical Methods (1996)), are the most common analytical methods that have been used for measuring VOC concentrations for the sites in GEMs. Approximately 90% of the data stored in GEMS, collected prior to 1996, does not contain information as to the entity responsible for collecting the sample, the laboratory responsible for analyzing the sample, and the analysis method used. After 1996, all of the aforementioned missing information is available for approximately 95% of the samples analyzed.

This study focused on GEMs data pertaining to landfills with clay liners or composite liners that contained a pan lysimeter. Of the 675 landfills in GEMs, 86 landfills met this criterion and 34 landfills had detections of at least one VOC, on three or more sampling occasions, in the lysimeter. A map of Wisconsin describing the geographical location of each landfill examined is found in Figure 1.3.1. Data from 94 lysimeters (some landfills had multiple cells, each with a lysimeter) and 54 leachate monitoring points were examined in this study.

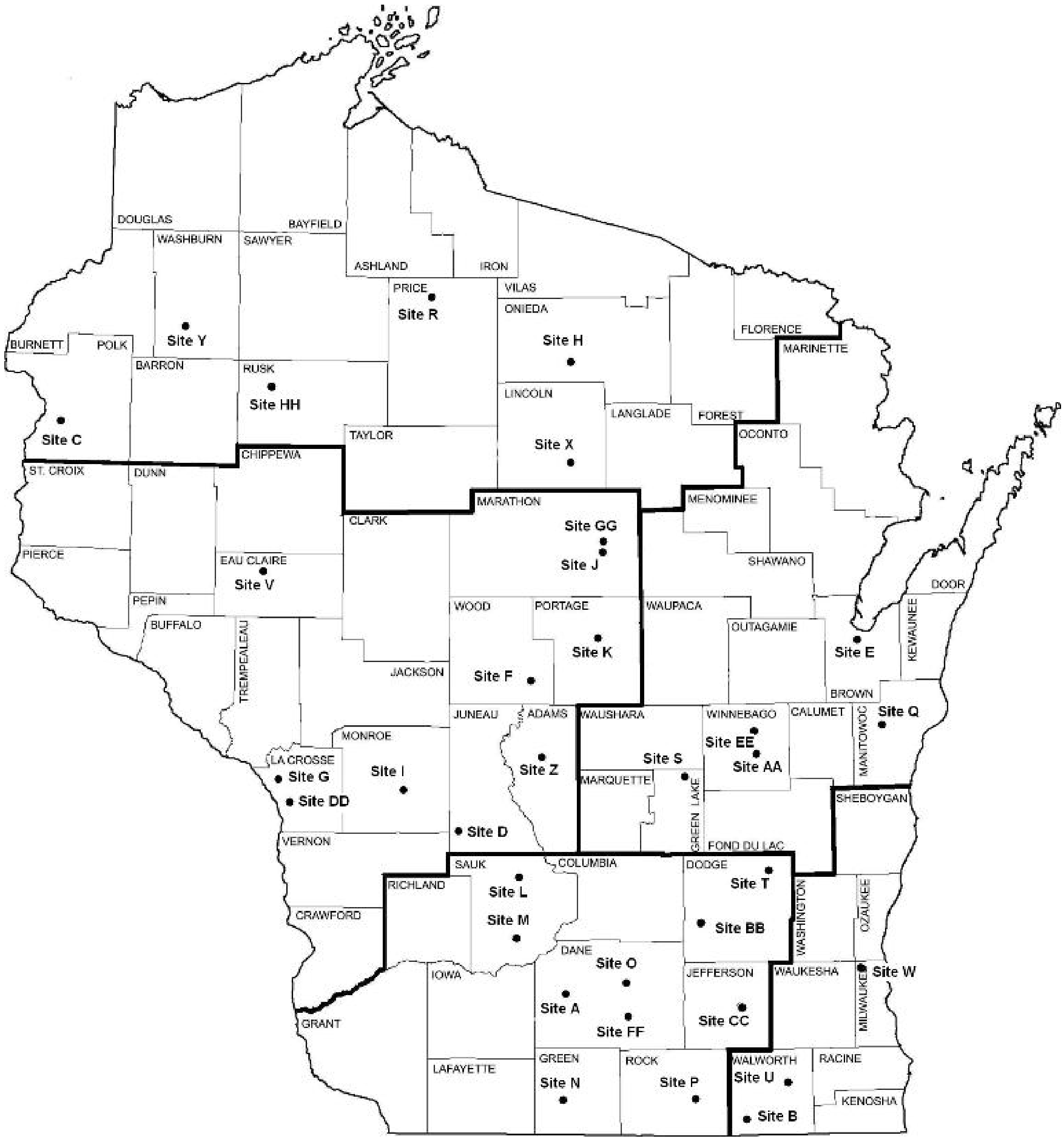


Figure 1.3.1. Geographical location of landfill sites examined.

1.4 RESULTS

Leachate data from 54 cells at 34 landfills were examined to determine the characteristics of VOCs in leachate from Wisconsin landfills. The particular objectives were to examine which VOCs were most prevalent, if temporal trends in VOC concentration existed, if VOC concentrations depended on the type of waste stream, and if VOC concentrations varied spatially. Overall, there were 5435 VOC detections (defined as concentration exceeding the limit of detection) in 9794 samples of landfill leachate.

A summary of VOCs detected in leachate is in Fig. 1.4.1. This graph shows the fraction of sites having at least one detection of a given VOC in the leachate (the number above each bar is the fraction of sites). Of the 47 VOCs for which analyses are conducted (summarized in Table 1.3.1), 31 were detected in leachate. Approximately two-thirds (20 of 31) of the VOCs in Fig. 1.4.1 are aromatic hydrocarbons (7 of 31), alkanes (9 of 31), or alkenes (4 of 31). Other classes of compounds for which VOCs were detected include ketones, furans, and ethers. The most prevalent compounds are toluene (49 cells), ethylbenzene (44 cells), and benzene (43 cells). Each of these is an aromatic compound.

1.4.1 General Characteristics

A summary is provided in Table 1.4.1 of the concentrations of VOCs that were detected; the number of sites with VOC detections; the Wisconsin PALs, Wisconsin ESs, and USEPA MCLs; the average minimum concentration, average maximum concentration, and the overall arithmetic mean concentration for all sites with detections, the average number of detections above the PAL, average number of detections above the ES, and the average number of detections above the LOD; and the average number of samples

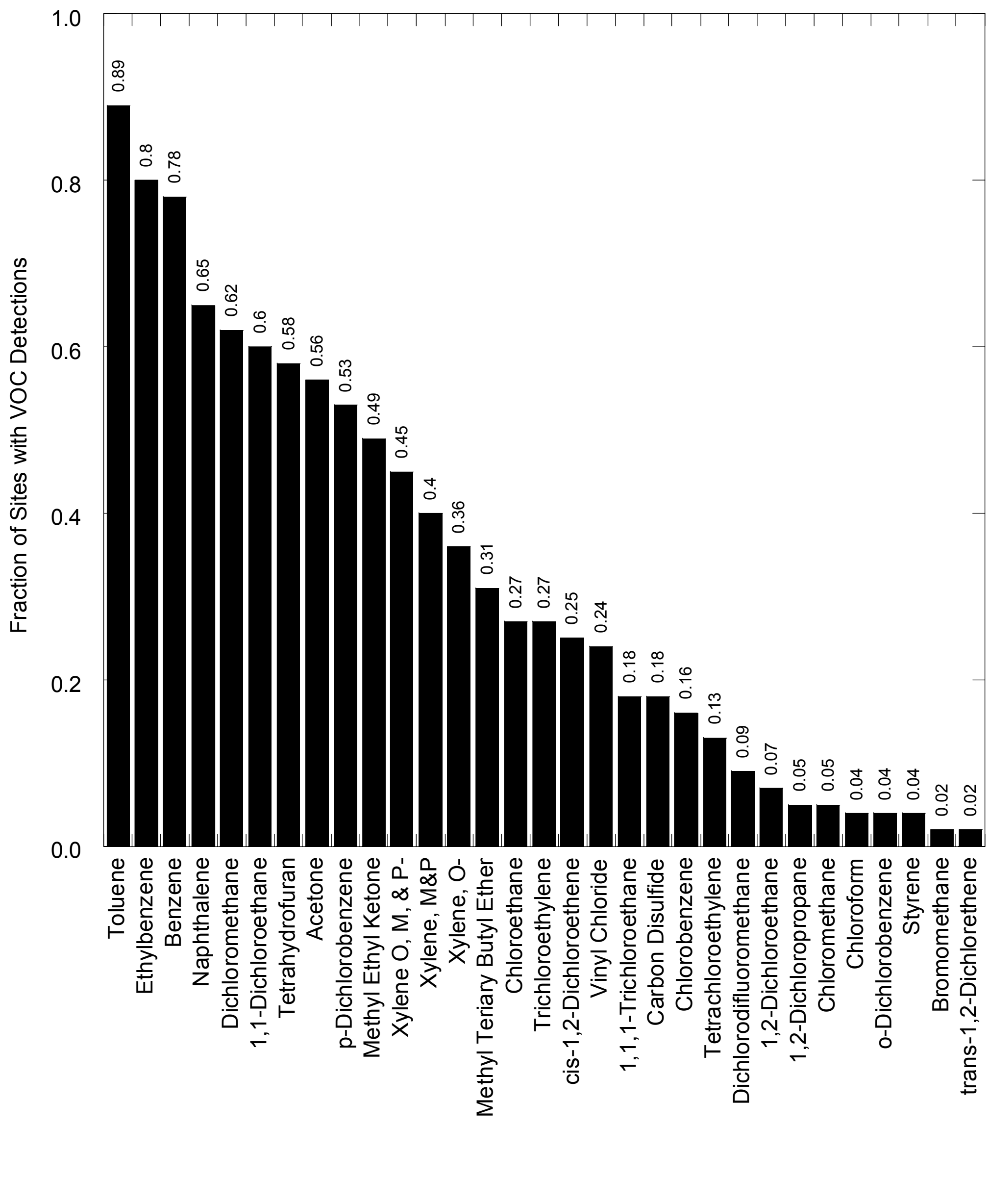


Figure 1.4.1. Fraction of landfill cells with VOC detections in the leachate (numbers above bars correspond to the fraction of cells with detections for a given VOC).

Table 1.4.1. Average concentrations and number of samples for compounds found in leachate in Wisconsin and the regulated standards.

Parameter	Landfill Cells with Detections in Leachate	PAL (μg/L)	ES (μg/L)	US EPA MCL (μg/L)	Avg. Minimum Conc. (μg/L)	Avg. Maximum Conc. (μg/L)	Overall Avg. Conc. (μg/L)	Avg. Number Detects	Avg. Number Samples	Range in Conc. (μg/L)	Avg. Number Detects >PAL	Avg. Number Detects >ES
1,1,1-trichloroethane	10	40	200	200	3.0	150	48.8	6.3	19.8	0.7-430	2.3	0.5
1,1-dichloroethane	33	0.7	7	7	2.6	101	31.5	8.0	18.6	0.4-37	1.0	0.0
1,2-dichloroethane	4	0.5	5	5	1.2	12.8	4.3	6.3	26.5	0.1-590	6.0	2.8
1,2-dichloropropane	3	0.5	5	5	2.3	13.0	6.0	5.0	22.3	1.0-21	5.0	2.0
Acetone	31	200	1000	-	540	9830	3430	10.2	13.0	3.1-59000	7.8	5.2
Benzene	43	0.5	5	5	2.1	13.3	6.2	7.9	16.0	0.1-85	7.6	3.4
Chlorobenzene	9	20	100	100	1.4	8.0	4.1	6.4	19.9	0.4-21	0.1	0.0
Chloroethane	15	80	400	-	3.5	127	36.6	6.2	17.9	0.8-1300	0.4	0.2
Chloromethane	3	0.3	3	-	0.9	10.6	3.7	5.3	13.3	0.3-26	5.0	1.0
1,2-dichloroethylene (cis)	14	7	70	70	2.5	44.3	17.5	6.1	17.9	0.4-200	3.0	0.4
Dichlorodifluoromethane	5	200	1000	-	1.1	66.2	16.0	7.4	24.8	0.2-140	0.0	0.0
Dichloromethane	34	0.5	5	5	10.0	1210	238	9.4	17.3	0.6-8200	9.4	8.0
Ethylbenzene	44	140	700	700	9.5	89.5	35.9	12.3	16.4	0.1-450	0.5	0.0
Methyl ethyl ketone	27	90	460	-	726	14900	5240	10.2	12.9	1.8-70000	8.4	6.9
Methyl tertiary butyl ether	17	12	60	-	6.0	54.0	25.0	6.5	12.2	0.3-620	2.1	0.2
Naphthalene	36	8	40	-	3.9	86.2	20.2	11.2	21.8	0.3-62	6.6	1.6
p-dichlorobenzene	29	15	75	75	3.9	31.6	11.4	11.7	20.4	0.5-350	2.0	0.1
Trichloroethylene	15	0.5	5	5	4.1	36.0	14.7	6.3	19.9	0.5-202	6.3	4.7
Tetrachloroethylene	7	0.5	5	5	1.9	27.0	8.1	8.0	23.1	0.6-79	8.0	4.9
Tetrahydrofuran	32	10	50	-	373	2590	1190	10.8	11.9	3.0-19000	10.6	10.2
Toluene	49	200	1000	1000	22.5	535	168	12.8	15.7	0.05-1900	3.8	0.7
Vinyl chloride	13	0.02	0.2	2	1.6	43.3	12.5	5.2	19.8	0.4-304	5.2	5.2
Xylene (total)	25	1000	10000	10000^T	27.8	262	102	12.8	15.7	0.4-2000	0.1	0.0
Xylene, M&P	22	1000	10000	10000^T	22.8	222	84.0	10.3	11.3	1.0-1300	0.0	0.0
Xylene, O-	20	1000	10000	10000^T	58.2	501	194	10.8	11.0	0.3-8400	0.9	0.0
Styrene	2	10	100	100	0.95	24.1	10.7	5.5	33.0	0.3-66	0	0
Carbon disulfide	10	200	1000	-	5.97	55.1	15.1	5.8	14.4	0.7-250	0.1	0
Bromomethane	1	1	10	-	0.47	160	32.4	16	40.0	0.5-160	14	10
1,2-dichlorethylene (trans)	1	20	100	100	21	210	63.4	19	28.0	21-210	19	3
o-dichlorobenzene	2	60	600	600	0.95	24.1	10.7	5.5	33.0	0.9-44	0	0
Chloroform	2	0.6	6	6	2.34	390	103	5	16.5	0.7-620	5	3

^{T}= MCL based on xylene (total) in sample, PAL = Preventative Action Limit, ES = Enforcement Standard, MCL = Maximum Contaminant Level analyzed. Of the 5435 detections, 45% (2457) exceeded the PAL and 26% (1412) exceeded the ES. Furthermore, some compounds were above one (or both) of the standard whenever detected. In particular, vinyl chloride was detected during 67 sampling events, and of those detections, all 67 exceeded the ES. Compounds that exist at or above the MCL in the leachate of landfills may present a potential source of groundwater contamination in Wisconsin and other areas.

1.4.1.1 Comparison of VOCs in Leachate at Landfills in Wisconsin and Other Areas

Leachate data from landfills in Wisconsin is compared with the concentration data reported for landfills in other areas (i.e. compound classes detected, frequency of detection, and range of concentration). The range of concentrations examined and reported in the current research and the range of concentration reported in other studies that were reviewed in Sec. 1.2 are shown in Table 1.4.2. Data in Table 1.4.2 indicate that concentrations of the aromatic hydrocarbons (e.g., benzene, toluene, ethylbenzene, etc.) typically range between 1 and 100 μg/L, whereas concentrations of the alkanes (e.g., chloromethane, 1,1-dichloroethane, 1,1,1-trichloroethane, etc.) and alkenes (vinyl chloride, trichloroethylene, tetrachloroethylene, etc.) typically range between about 5 and 75 μg/L. One exception to this is dichloromethane (DCM), an alkane, which ranges between approximately 1 and 1500 μg/L. A possible explanation for the broader variation in DCM concentration is that, compared to 1,1-dichloroethane, tetrachloroethylene, and trichloroethylene, DCM is commonly found in paint removers, degreasing agents, and solvents disposed in MSW landfills (Rowe et al. 1997) and thus may be more prevalent in leachate samples. The upper bound of the DCM concentrations seem to be affected mainly by the Wisconsin studies (i.e. most of the studies in Wisconsin reported DCM concentration on the order of

Table 1.4.2 Range in concentration of VOCs characteristic of MSW, ISW, C&D landfill leachates and the USEPA MCL.

Parameter	Concentration (μg/l)															
	USEPA MCL	Kmet and McGinley (1982)	Sridharan and Didier (1988)	Friedman (1988)	Forst et al. (1989)	Gibbson et al. (1992) Old landfills (pre-1985)	Gibbson et al. (1992) New landfills (post-1985)	Tedder (1992)	Krug and Ham (1995)	Rowe (1995)	Hunt and Dollins (1996)	Townsend et al. (2000)	Kjeldsen et al. (2002)	Range Past Studies	This Study	Overall Range
Acetone	-	-	-	-	-	-	-	-	-	-	59-2100	-	6.0-440	6.0-2100	3.1-59000	3.1-59000
Phenol	-	221-5790	1.1-2170	-	-	-	-	1.0-6090	-	-	-	-	0.6-1200	0.6-6090	-	0.6-6090
Dichloromethane	5	106-20000	27.6-58200	-	6	898	1390	1.1-191	ND	ND-8300	170	1.6-2.8	1.0-827	1.0-58200	0.6-8200	0.6-58200
Toulene	1000	280-1600	1-1100	1.2-610	3.6-48	583	406	2.0-870	2.7-12300	2.0-7000	10-87	1.2-6.7	1-12300	1-12300	0.1-1900	0.1-12300
1,1-dichloroethane	7	510-6300	-	3.7-190	-	400	116	2.1-12	6.0-4120	-	5.0-20	-	0.6-46	0.6-6300	0.1-590	0.1-6300
1,2-dichloroethylene (trans)	100	96-2200	-	3.6-310	1.6	492	104	-	5.58	ND-2080	-	-	1.6-6582	1.6-6582	21-210	1.6-6582
Ethylbenzene	700	100-250	1-1680	1.4-180	1.7-20	198	60	2.3-93	4.8-1280	27.1-1400	7.0-20	1.1-10.8	0.2-2329	0.2-2329	0.2-450	0.2-2329
Chloroform	-	14.8-1300	4.4-16	3.4-32	6.6-8.5	-	-	1.0-2.1	7.2	-	-	-	-	1-1300	0.7-620	0.7-1300
1,2-dichloroethane	5	13-11000	1-10000	-	-	-	-	1.0-4	212-1030	ND-<86	-	-	<6	1-11000	0.4-37	1-10000
Diethylphthalate	-	43-300	-	-	-	-	-	5.4-12.9	-	-	-	-	0.1-660	0.1-660	-	0.1-660
Dibutylphthalate	-	12-150	13-540	-	-	-	-	10-12	-	-	-	10.5	0.1-70	0.1-540	-	0.1-540
Benzene	5	19	1-10000	1.4-220	1.1-572	65	7	1-130	2.2-1630	ND-590	-	-	0.2-1630	0.2-10000	0.1-85	0.1-10000
Bromodichloromethane	-	-	2490	-	-	-	-	-	-	-	-	-	-	2490	-	2490
Butylbenzylphthalate	-	125-150	10-64.1	-	-	-	-	-	-	-	-	-	0.2-8	0.2-150	-	0.2-150
Carbon tetrachloride	5	-	3-995	-	-	-	-	-	-	-	-	-	4.0-9.0	3-995	-	3-995
Chlorobenzene	100	-	3-188	2.3-5.8	-	736	-	1.3-9.4	6.0-911	-	-	-	0.1-110	0.1-911	0.4-21	0.1-911
Chlorodibromomethane	-	-	31		-	-	-	-	-	-	-	-	-	31	-	31
Chloroethane	-	170	2-730	5.6-730	-	-	-	1.5-6.5	9-410	-	11-17	-	-	1.5-730	0.8-1300	0.8-1300
1,3-dichloropropene (cis)	-	-	2.5	-	-	-	-	-	-	-	-	-	-	2.5	-	2.5
Di-n-octyl phthalate	-	-	16.1-542	-	-	-	-	-	-	-	-	-	-	16.1-542	-	16.1-542

Table 1.4.2 Range in concentration of VOCs characteristic of MSW, ISW, C&D landfill leachates and the USEPA MCL (continued).

Parameter	Concentration (μg/l)															
	USEPA MCL	Kmet and McGinley (1982)	Sridharan and Didier (1988)	Friedman (1988)	Forst et al. (1989)	Gibbson et al. (1992)		Tedder (1992)	Krug and Ham (1995)	Rowe (1995)	Hunt and Dollins (1996)	Townsend et al. (2000)	Kjeldsen et al. (2002)	Range Past Studies	This Study	Overall Range
						Old landfills (pre-1985)	New landfills (post-1985)									
Dibromochloromethane	-	-	22-160	-	-	-	-	-	-	-	-	-	-	22-160	-	22-160
Dichlorodifluoromethane	-	180	100-242	-	-	-	-	-	2.0-1030	-	-	-	-	2.0-1030	0.2-140	0.2-1030
Fluoranthene	-	-	9.5-723	-	-	-	-	-	-	-	-	-	-	9.5-723	-	9.5-723
Fluorotrichloromethane	-	-	1.0-183	3.2-200	-	-	-	-	-	-	-	-	-	1.0-200	-	1.0-200
Isophorone	-	-	3.2-520	-	-	-	-	9.4-28	-	-	-	-	-	3.2-520	-	3.2-520
Iospropylbenzene	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	1
Methyl ethyl ketone	-	-	2100-37000	640-37000	-	-	-	-	8.6-36000	-	-	-	110-6600	8.6-37000	1.8-70000	1.8-70000
Naphthalene	-	19	4.6-186	-	-	-	-	4.5-29	-	-	-	1.2	0.1-260	0.1-260	0.3-62	0.1-260
p-dichlorobenzene	75	-	2-250	-	-	-	-	1-39.8	-	-	-	-	0.1-16	0.1-250	0.5-350	0.5-350
Pentachlorophenol	1	3	25	-	-	-	-	63-540	-	-	-	-	-	3-540	-	3-540
Styrene	100	-	2	28	-	-	-	-	-	-	-	-	0.5-1.6	0.5-28	-	0.5-28
Tetrachloroethylene	5	26-60	1-232	1.4-69	2.8	-	-	1-2	0.8-44	ND-2000	-	3.2	0.05-250	0.05-2000	0.6-79	0.05-2000
Tetrahydrofuran	-	-	410-1400	270-11000	-	-	-	-	-	-	-	-	9-430	9-11000	3.0-19000	3.0-19000
1,3-dichloropropene (trans)	-	-	2.5	-	-	-	-	-	-	-	-	-	-	2.5	-	2.5
1,1,1-trichloroethane	200	2400	1-10000	-	1.9-4.5	-	-	1.1-31	0.3-3810	-	33	-	0.01-3810	0.01-10000	0.7-430	0.01-10000
Trichloroethylene	5	160-600	1-372	2.4-280	2.3-7.9	51	71	1-1.2	-	ND-230	-	-	0.05-750	0.05-750	0.5-202	0.05-750
Vinyl chloride	2	61	10-3000	11-150	-	107	51	1-19.6	0.3-5570	ND-2010	10-12	-	-	0.3-5570	0.4-304	0.3-5570
Xylene (total)	10000	-	30-2000	2.5-240	3.7-38	-	-	4.4-85.2	10-3010	-	33-38	1.3-5.2	0.8-3500	0.8-3010	0.4-2000	0.4 - 3010
1,1,2-trichloroethane	5	500	1.5-10000	-	-	-	-	-	0.5-7130	-	-	-	2.5-16	0.5-10000	-	0.5-10000

10,000 μg/L) and if those studies are excluded the range is nearer to other alkanes (5-75 μg/L). Other classes of compounds are ketones, which range on the order of 1 and 10,000 μg/L and furans which also range on the order of 1 and 10,000 μg/L.

The most frequently detected classes of compound (in descending order in terms of number of studies with detections) reported in Table 1.4.2, are the aromatic hydrocarbons, followed by the alkanes, the alkenes, ketones, phenols, phthalates, and furans. The aromatic hydrocarbons toluene and ethylbenzene were the only two compounds found in all studies. The most frequently detected classes of VOCs from the current study are the aromatic hydrocarbons (89% of sites) and the alkanes and alkenes (62% of sites). Examination of the most frequently detected alkanes, alkenes, and aromatic hydrocarbons shows that dichloromethane and benzene both were found in 82% of the studies, tetrachloroethylene (PCE), TCE, and vinyl chloride each were found in 73% of the studies, and 1,1-dichloroethane, trans-1,2-dichloroethene, and xylene (total) each were found in 64% of the studies.

The maximum reported VOC concentrations found in leachate in Wisconsin are compared with the maximum reported concentrations found by other investigators (maximum concentrations reported in Table 1.4.2). Results from this comparison suggest that the maximum reported concentration in Wisconsin was 6.4 times higher for dichloromethane than measured in other reported sites, 14.8 times higher for 1,1-dichloroethane, 5.1 times higher for benzene, and 1.8 times higher for vinyl chloride. The widest range in concentration (1.8-70,000 μg/L) was exhibited by a ketone (methyl ethyl ketone) followed by an alkane (dichloromethane ranged between 1-58,200 μg/L). The remaining classes of compounds ranged between 1 and 10,000 μg/L. The class of compound with the lowest range in concentration was the phthalates which ranged between 0.1 and 650 μg/L.

1.4.1.2 VOCs in Leachate of Landfills in Wisconsin

Typical records of VOC concentration are shown in Fig. 1.4.2 for four compounds (565 other similar graphs were prepared, one for each compound in each cell; all graphs are presented in Appendix C). VOC concentration is shown on a logarithmic scale in Fig. 1.4.2 because of the large (orders of magnitude) ranges in concentrations that were encountered. Elapsed time in Fig. 1.4.2 corresponds to the time since filling began. VOC analyses were not required in earlier periods for many of these sites. Thus, a gap often exists at the beginning of the record. Data used to create each of the VOC concentration records is given in a summary table (Table C.1) in Appendix C.

The Wisconsin ES, Wisconsin PAL, and the highest limit of detection (LOD) that was reported are shown on Fig. 1.4.2. Concentrations below this LOD (non-detections) were assigned a “concentration” of 0.01 μg/L, which is at least 5 times lower than the minimum reported LOD. A different symbol was used for these data points to avoid confusion with data falling above the LOD. Inclusion of non-detections in graphs of concentration vs. elapsed time provides a visual record of the sampling history that includes samples with VOC concentrations above and below the LOD as a function of elapsed time from the date refuse was first accepted at the site.

The graphs in Fig. 1.4.2 represent four of the major compound classes detected in leachate in Wisconsin landfills (e.g. aromatic hydrocarbons, alkanes, furans, and ketones) and illustrate that concentrations can range over an order of magnitude or more in a matter of 6 months to one year. For example, the concentration of methyl ethyl ketone at Site W

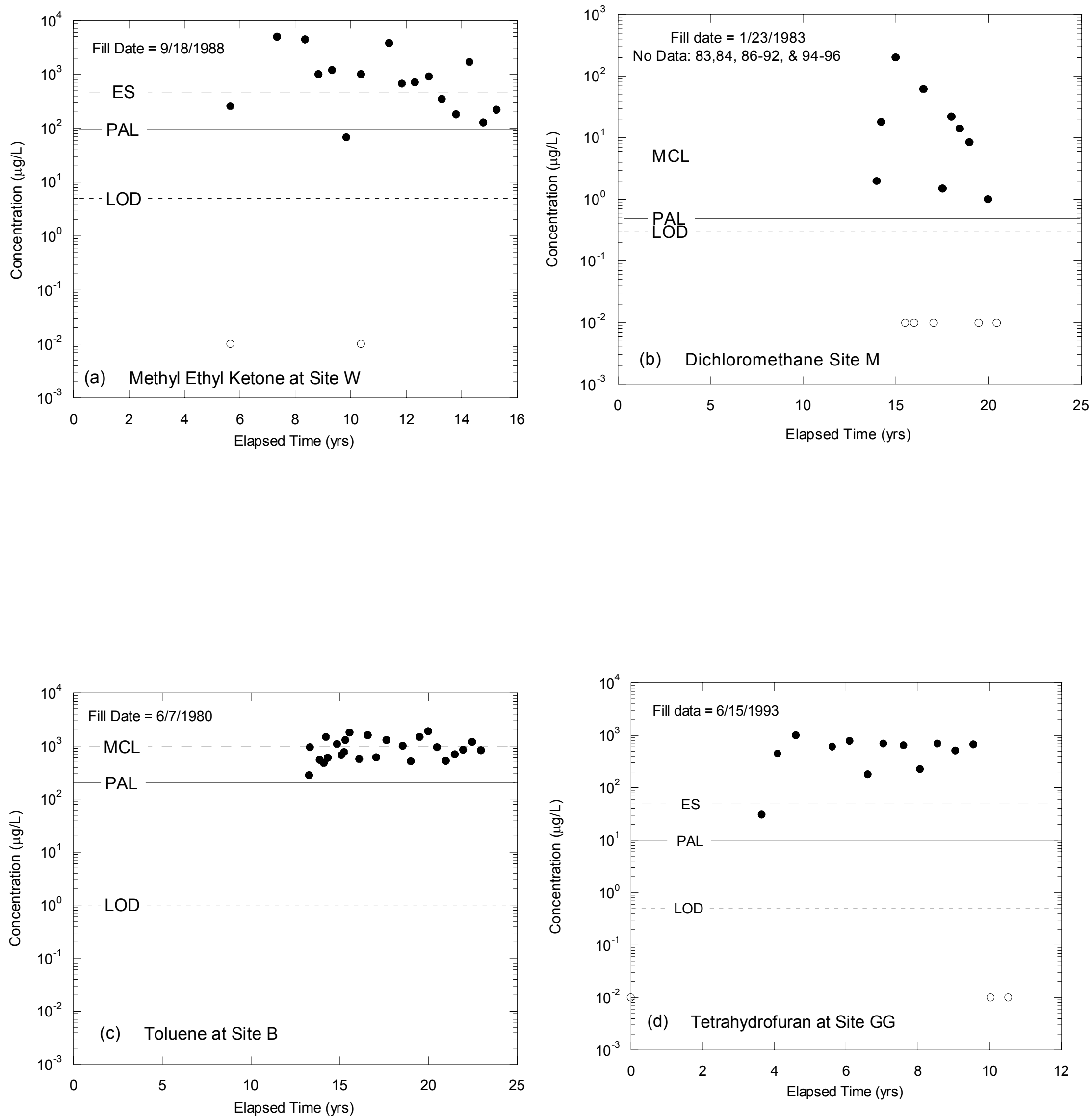


Figure 1.4.2. Typical concentration record for VOCs along with the LOD, PAL, and ES: methyl ethyl ketone (a), dichloromethane (b), toluene (c), and tetrahydrofuran (d).

varies between 68 and 1000 μg/L between years 9 and 10 (Fig. 1.4.2a) and the concentration of dichloromethane at Site M varies between 2 and 200 μg/L between years 13 and 14 (Fig. 1.4.2b). Alternatively, the concentration can be relatively stable (e.g. toluene at Site B and tetrahydrofuran at Site GG, as shown in Fig. 1.4.2c and 1.4.2d). The data in Fig. 1.4.2 also illustrate that non-detections (open symbols in Fig 1.4.2) occur periodically, even when VOCs are regularly detected in leachate.

Box plots summarizing the concentration variation of o-xylene and trichloroethylene on a site-to-site basis are in Fig. 1.4.3. O-xylene (Fig 1.4.3(a)) and trichloroethylene (Fig 1.4.3(b)) were selected because they fall in the two most frequently detected classes (i.e. aromatic hydrocarbons and alkanes). The median concentration is represented by center line in each box, the outer extent of the box is defined as the interquartile range, and the whiskers correspond to the upper or lower quartile plus 1.5 times the interquartile range. The range in concentration of o-xylene from all sites in Fig 1.4.3(a) is approximately1-4500 μg/L, with the most variation at Site B (75-4500 μg/L). The range in concentration for trichloroethylene is more stable and is approximately 1-85 μg/L. The variability in concentration exhibited by o-xylene and trichloroethylene is typical of the variability exhibited by the VOCs examined. That is, the graphs for these compounds bracket the typical conditions for the VOCs examined. Three exceptions, which generally vary between approximately 10-10,000 μg/L, are acetone, methyl ethyl ketone, and tetrahydrofuran.

An analysis of variance (ANOVA) was conducted, with $\alpha = 0.05$, to determine if VOC concentrations differed significantly from site-to-site. A statistical inference was made by comparing the F statistic from the ANOVA to a critical value (F_{cr}) corresponding to a significance level α. If $F < F_{cr}$, then the null hypothesis is accepted (differences between the groups are not statistically significant). Concentrations of each VOC detected were

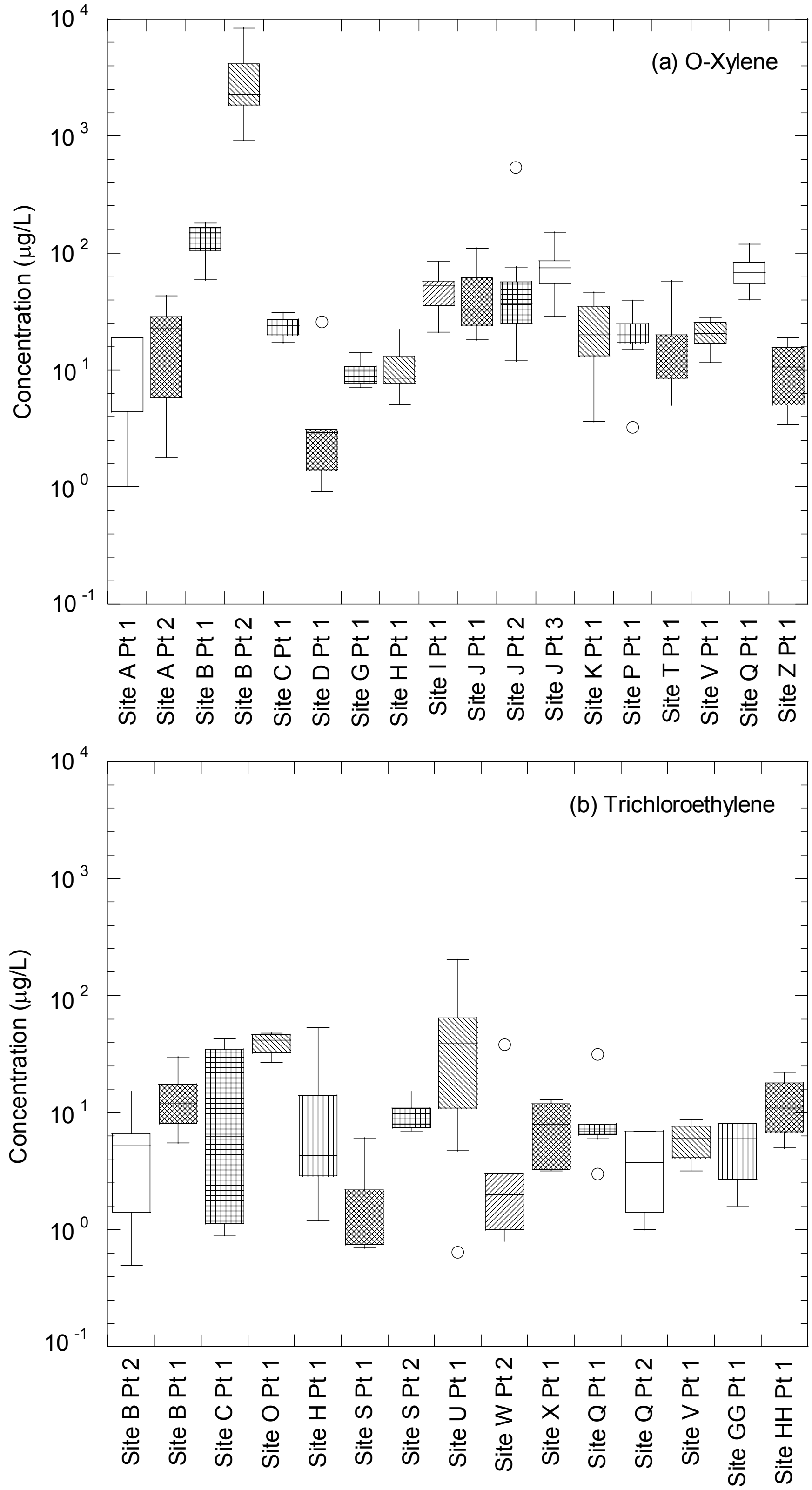


Figure 1.4.3 Box plots showing the concentration distribution of o-xylene (a) and trichloroethylene (b) at all sites with detections.

compared to the concentrations at all other sites (e.g., toluene concentrations from all sites were compared on a site-by-site basis) to determine if concentration data could be pooled by compound. A second criterion was added to ensure there was adequate data for pooling. The second criterion was that VOCs examined were found in at least 10% of the cells. Analysis following the aforementioned criteria resulted in pooling data from 48-90% of the sites for the 21 VOCs in Table 1.4.3 (e.g., concentration data for naphthalene was pooled from 73% of the landfills).

The box plots shown in Fig. 1.4.4 were prepared using the data pooled from all sites (following the aforementioned criteria for pooling of data). The thick horizontal line traversing each box represents the MCL for the compound (e.g., the MCL for dichloromethane is 5 μg/L). Seven compounds (acetone, chloroethane, carbon disulfide, methyl ethyl ketone, methyl tertiary butyl ether, naphthalene, and tetrahydrofuran) do not have a MCL defined by USEPA; in these cases the Wisconsin ES is shown. The median concentrations of 1,1-dichloroethane, dichloromethane, trichloroethylene, tetrachloroethylene, vinyl chloride, and styrene are above the MCLs (e.g. the median concentration for trichloroethylene is 8 μg/L and the MCL is 5 μg/L) and the median concentrations of acetone, methyl ethyl ketone, naphthalene, and tetrahydrofuran exceed the Wisconsin ES. The classes of compounds that most frequently exceed the MCL or ES are the alkanes, alkenes, ketones, chlorinated hydrocarbons, and furans. In contrast, the aromatic hydrocarbons, which are ubiquitous, have median concentrations below the MCL. Benzene was the only aromatic hydrocarbon that had a median concentration near (14% below) the MCL.

For nearly all compounds detected in leachate in Wisconsin, a large range in concentrations (100 to 1000 fold) was encountered in each cell. Possible explanations for the variability in VOC concentrations may include the following: (1) VOCs escaping the

Table 1.4.3 Results of ANOVA comparing VOC concentrations between landfills.

Parameter	No. Landfills with Detections	Number Landfills with VOC Concentrations that were not Significantly Different	Number Landfills with VOC Concentrations that were Significantly Different	% Landfills with Detections Included in Pooled Data	Degrees of Freedom	F Statistic	F_{cr}
1,1,1-trichloroethane	9	8	1	89	7	0.79	2.22
1,1-dichloroethane	24	21	3	88	20	1.58	1.62
Acetone	20	12	8	60	11	1.79	1.85
Benzene	27	14	13	52	13	1.69	1.78
Chlorobenzene	8	6	2	75	5	1.49	2.48
Chloroethane	14	13	1	93	12	0.47	1.89
1,2-dichloroethylene (cis)	13	10	3	77	9	0.87	2.14
Dichloromethane	25	25	0	100	24	1.47	1.55
Ethylbenzene	29	18	11	62	17	1.60	1.66
Methyl ethyl ketone	16	8	8	50	7	1.37	2.09
Methyl tertiary butyl ether	13	13	0	100	12	0.99	1.85
Naphthalene	26	19	7	73	18	1.13	1.65
p-dichlorobenzene	21	16	5	76	15	1.45	1.71
Trichloroethylene	12	10	2	83	9	0.91	2.01
Tetrachloroethylene	6	6	0	100	5	1.69	2.34
Tetrahydrofuran	19	9	10	47	8	1.92	2.01
Toluene	32	18	14	56	17	1.65	1.66
Vinyl chloride	10	10	0	100	9	1.23	2.05
Xylene (total)	15	10	5	67	9	1.70	1.93
Styrene	12	8	4	67	7	1.83	2.25
Carbon disulfide	6	6	0	100	5	0.68	2.39

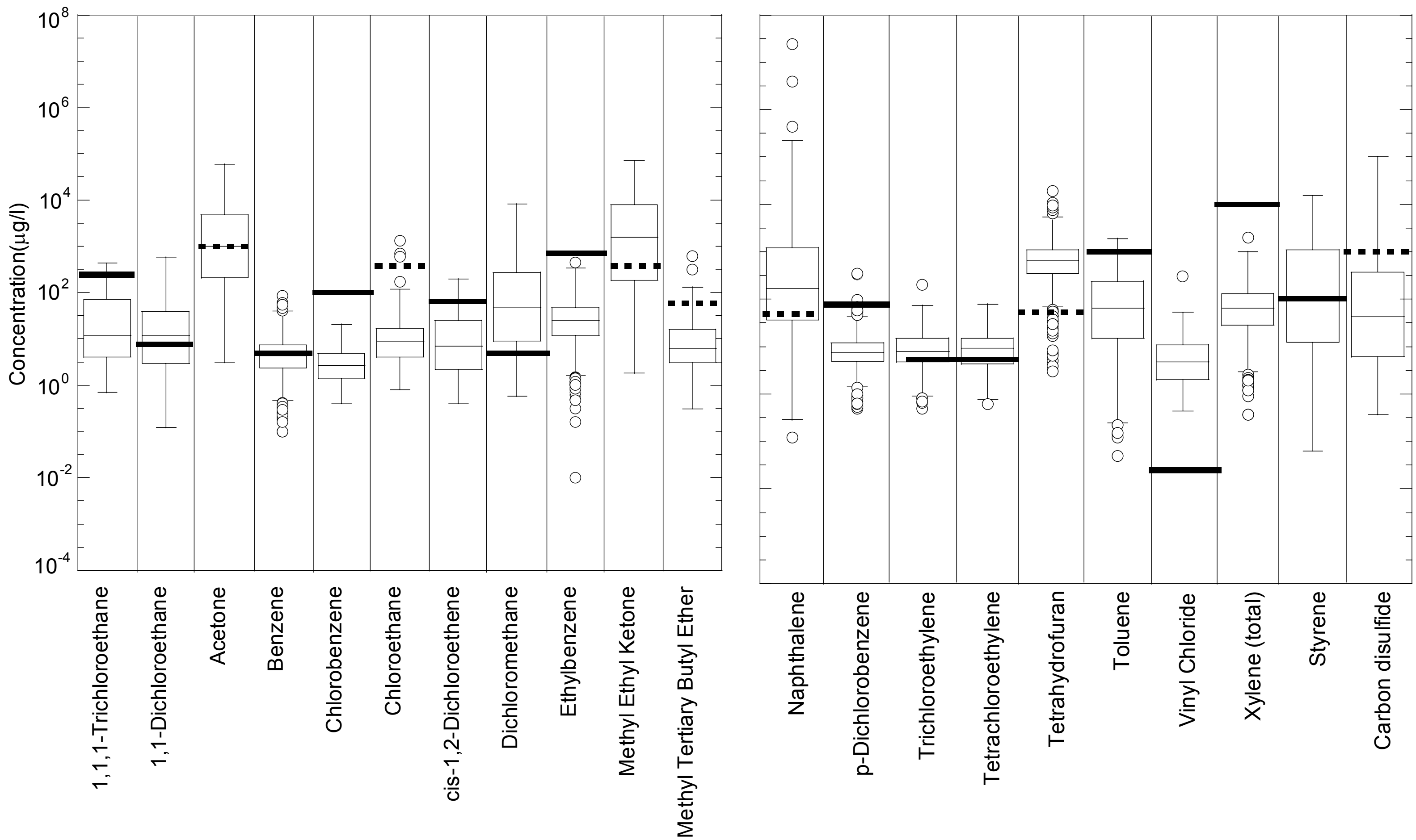
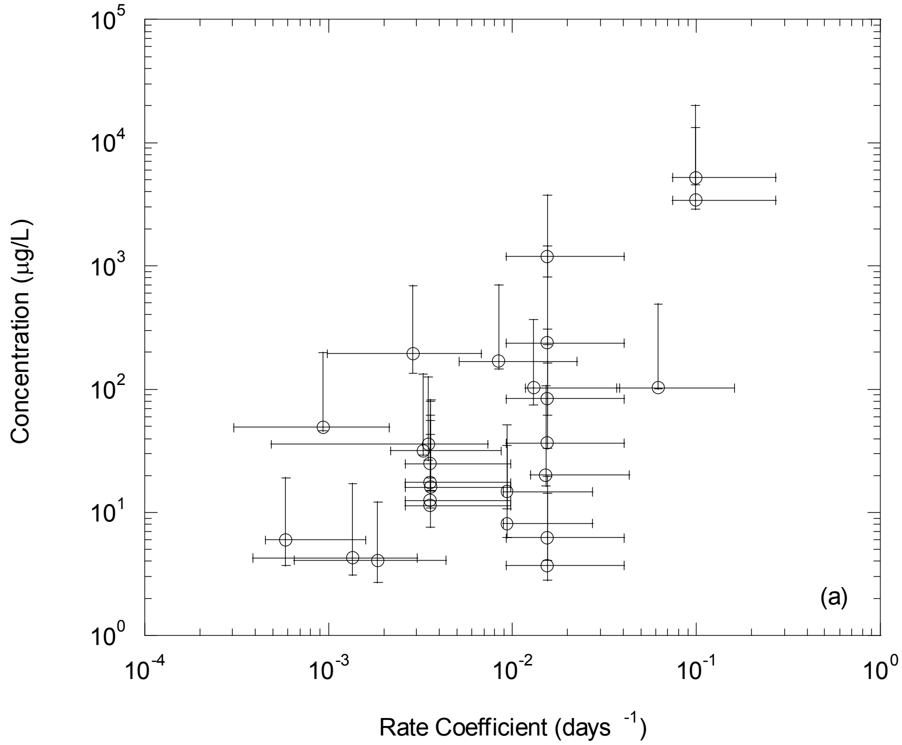


Figure 1.4.4 Box plots showing the concentration distribution of the 21 most frequently detected VOCs in leachate from landfills in Wisconsin and the associated MCL or ES (i.e. thick lines traversing boxes).

system with out being monitored, which may include migration from landfills in the gaseous phase, (2) removal by the gas collection system (Cook et al. 1991, Kerfoot 1994, Challa et al. 1997), and (3) migration through the liner system in the aqueous phase. Another possible explanation, provided by Kjeldsen et al. (2002), is that the variation in VOC concentrations may be due, in part, to volatilization or sorption onto the sampling equipment. However, Parker (1994) indicates that only very poor sampling protocols can seriously jeopardize leachate analyses for VOCs.

Two additional factors that may affect the concentrations of VOCs in leachate are the rate of degradation and the aqueous solubility of each compound. That is, lower concentrations may be associated with VOCs that degrade faster or are less soluble in water. To assess whether either factor explained the range of VOC concentrations in leachate, graphs were made comparing leachate concentration to first-order anaerobic degradation coefficients and aqueous solubilities reported in the literature for each compound. These graphs are shown in Fig. 1.4.5. The rate coefficients and solubilities that were used are summarized in Table 1.4.4. Error bars in the x-direction (in Fig 1.4.5 (a)) represent the range in reported rate coefficients (Howard et al. 1991) and error bars in the y-direction represent the overall average minimum and maximum concentration found in leachate at landfills in Wisconsin. In general, as the rate coefficient increases the concentration also increases, which is opposite the expected behavior (i.e. increasing rate coefficient implies a decreasing half life, faster degradation and an expected decreasing concentration). The half lives associated with the rate coefficients range from 4 days (methyl ethyl ketone) to over 14 years (1,2-dichloropropane). In Fig 1.4.5(b) the concentration range is represented by error bars in the y-direction (as in Fig 1.4.5(a)) and is plotted versus aqueous solubility. In general, the overall average concentrations range between 1 and 1000 μg/L regardless of the aqueous solubility. One exception is methyl



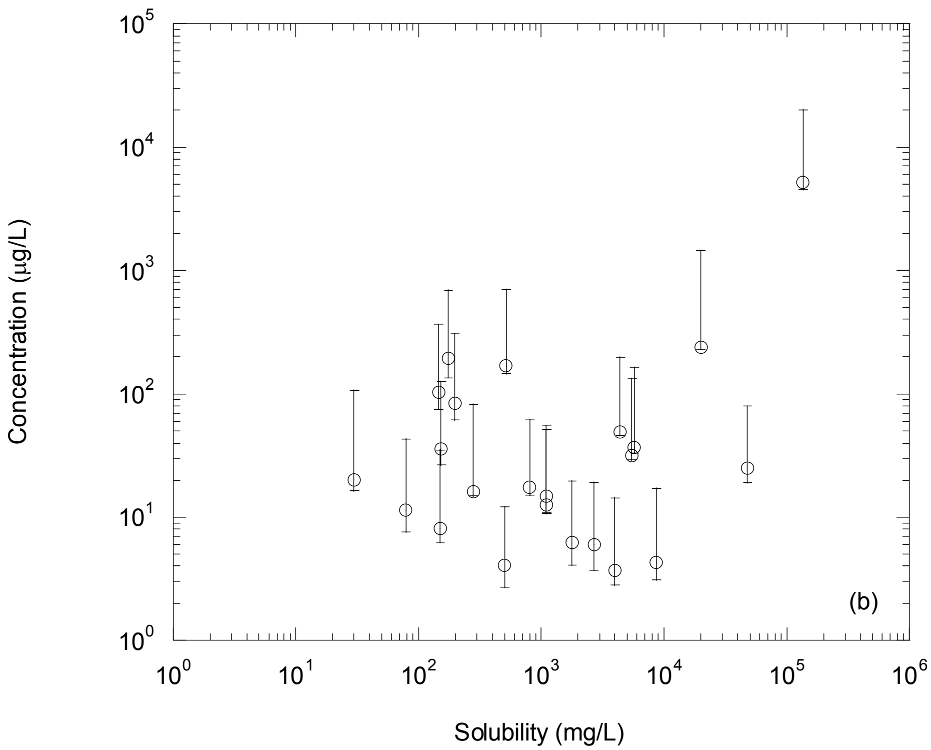


Figure 1.4.5 Overall average concentration and error bars representing minimum and maximum concentration of VOCs detected in the lysimeters compared to the rate coefficient (a) and solubility (b) for each compound.

Table 1.4.4 Aqueous solubility and first order rate coefficients for the VOCs found in leachate.

Compounds	Class	Solubility (mg/l)	Rate Constant ($days^{-1}$)	Rate Constant ($days^{-1}$)
Chloromethane	Alkanes	4000	$2.5x10^{-2}$	$6.2x10^{-3}$
Dichloromethane	Alkanes	20000	$2.5x10^{-2}$	$6.2 x10^{-3}$
Chloroform	Alkanes	8000	$9.9 x10^{-2}$	$2.5 x10^{-2}$
Dichlorodifluoromethane	Alkanes	280	$6.2 x10^{-3}$	$1.0 x10^{-3}$
Chloroethane	Alkanes	5740	$2.5 x10^{-2}$	$6.2 x10^{-3}$
1,1-dichloroethane	Alkanes	5500	$5.4 x10^{-3}$	$1.1 x10^{-3}$
1,2-dichloroethane	Alkanes	8690	$1.7 x10^{-3}$	$9.6 x10^{-4}$
1,1,1-trichloroethane	Alkanes	4400	$1.2 x10^{-3}$	$6.3 x10^{-4}$
1,2-dichloropropane	Alkanes	2700	$1.0 x10^{-3}$	$1.3 x10^{-4}$
Vinyl chloride	Alkenes	1100	$6.2 x10^{-3}$	$9.6 x10^{-4}$
1,2-dichloroethylene (cis)	Alkenes	800	$6.2 x10^{-3}$	$9.6 x10^{-4}$
Trichloroethylene (TCE)	Alkenes	1100	$1.8 x10^{-2}$	$4.2 x10^{-4}$
Tetrachloroethylene (PCE)	Alkenes	150	$1.8 x10^{-2}$	$4.2 x10^{-4}$
Benzene	Arenes (Aromatic hydrocarbons)	1780	$2.5 x10^{-2}$	$6.2 x10^{-3}$
Chlorobenzene	Arenes (Aromatic hydrocarbons)	500	$2.5 x10^{-3}$	$1.2 x10^{-3}$
p-dichlorobenzene	Arenes (Aromatic hydrocarbons)	79	$6.2 x10^{-3}$	$9.6 x10^{-4}$
Toluene	Arenes (Aromatic hydrocarbons)	515	$1.4 x10^{-2}$	$3.3 x10^{-3}$
Ethylbenzene	Arenes (Aromatic hydrocarbons)	152	$3.9 x10^{-3}$	$3.0 x10^{-3}$
Xylene O-	Arenes (Aromatic hydrocarbons)	175	$3.9 x10^{-3}$	$1.9 x10^{-3}$
Xylene M-	Arenes (Aromatic hydrocarbons)	146	$2.5 x10^{-2}$	$1.3 x10^{-3}$
Xylene P-	Arenes (Aromatic hydrocarbons)	198	$2.5 x10^{-2}$	$6.2 x10^{-3}$
Naphthalene	Arenes (Aromatic hydrocarbons)	30	$2.8 x10^{-2}$	$2.7 x10^{-3}$
Acetone	Ketones	miscible	$1.7 x10^{-1}$	$2.5 x10^{-2}$
Methyl ethyl ketone	Ketones	136000	$1.7 x10^{-1}$	$2.5 x10^{-2}$
Methyl tertiary butyl ether	Ethers	48000	$6.2 x10^{-3}$	$9.6 x10^{-4}$
Tetrahydrofuran	Furans	miscible		

Sources: Howard et al. 1991and Verschueren 1977 ethyl ketone, which has a concentration range of 700-15,000 μg/L and also has the highest reported solubility (136,000 mg/L). The range of solubility within each class of compound was between 30 and 20,000 mg/L (IUPAC-NIST solubility database). The range in solubility of the aromatic hydrocarbon class was 30-1,780 mg/L compared with a range of 150-20,000 mg/L for halogenated hydrocarbons (alkanes and alkenes). No significant conclusions could be made relative to solubility, because the range within each class overlapped the range between classes.

1.4.2 Temporal Analysis

At most landfill sites, monitoring of the leachate collection system was performed quarterly, biannually, or yearly and generally data are available for 8 to 25 sampling events per site. Linear regression analyses were conducted on the data from each cell to determine if statistically significant trends existed in VOC concentration over time (i.e., to determine if the VOC concentration increased, decreased, or stayed the same). The analyses were conducted in two ways, with VOC concentration (C) regressed on elapsed time and the natural logarithm of VOC concentration (lnC) regressed on elapsed time. Analyses were conducted with logarithmically transformed data because lnC is more closely normally distributed than C (an implicit assumption when conducting trend analysis using linear regression). Samples that were below the LOD were not included in the regression analysis. In several cases, outliers (defined as a concentration 5 times greater than the average that does not follow a trend in the data) were excluded.

Significance of the trend was evaluated by determining if the slope of the regression line was statistically different from zero (if the slope is not different from zero, then the data do not exhibit temporal trend). Under the null-hypothesis of the slope being zero, the slope follows a t-distribution with n-1 degrees of freedom. When the probability of falsely rejecting the null hypothesis (the p-value) is greater then the significance level α, the slope is statistically no different from zero and the data have no linear temporal trend (Berthouex and Brown 2002). For all analyses, α was set at 0.05, which is the significance level most commonly used in hypothesis tests. Examples of representative trends corresponding to increasing concentration, no significant trend in concentration, and decreasing concentration are showed in terms of C in Fig. 1.4.6 and lnC in Fig. 1.4.7. P-dichlorobenzene was chosen for creating Figs. 1.4.6 and 1.4.7 because p-dichlorobenzene had the highest percentage of detections exhibiting all three trends (increasing trend-10%, decreasing trend-14%, and no significant trend-76%) for both C and lnC.

Results of the regression analyses are summarized in Table 1.4.5. Most of the regression analyses (72% based on C and 70% based on lnC) showed no significant trend in C or lnC. Of the cases where the trend in C was significant, 17 of 569 (3%) had an increasing trend and 141 of 569 (25%) had a decreasing trend. When the analyses were based on lnC, 15 of 569 (2.6%) had an increasing trend and 169 of 569 (30%) had a decreasing trend (regression based on lnC resulted in approximately 5% more sites with a statistically significant trend than regression based on C).

When results of the C and lnC regression analyses conflicted, an additional examination was conducted. This involved examining the conflicting data to determine if any of the concentration data were “near” outliers (i.e. near 5 times the average concentration, but not defined as an outlier), or if there was a particularly wide range in VOC concentration. These examinations suggested that approximately 53% of the conflicting regression analyses resulted in a statistically significant trend based on lnC, but resulted in no significant trend based on the C. Of the conflicting analyses examined, 25% had a concentration from a sampling event that was near the definition of an outlier, but was within

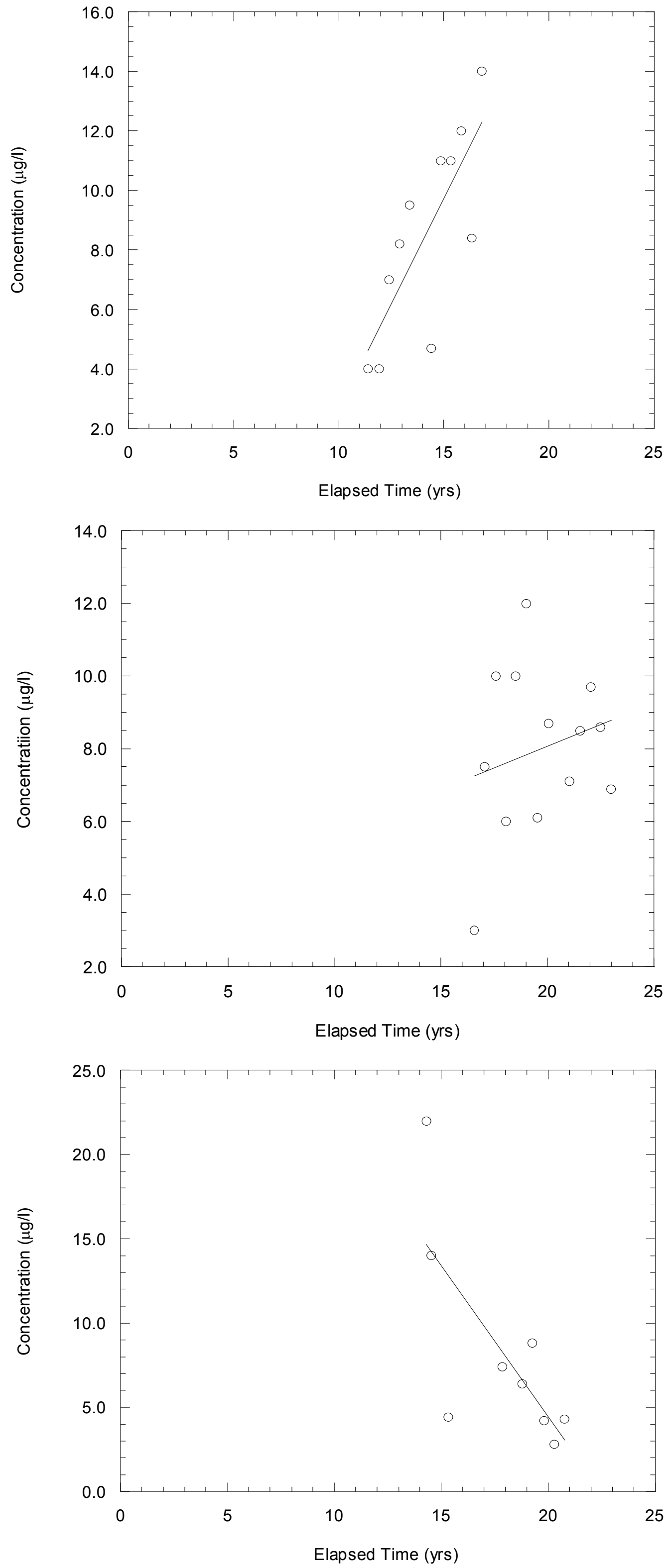


Figure 1.4.6. Data for showing an increasing trend (a), no trend (b), or a decreasing trend (c) for p-dichlorobenzene using C.

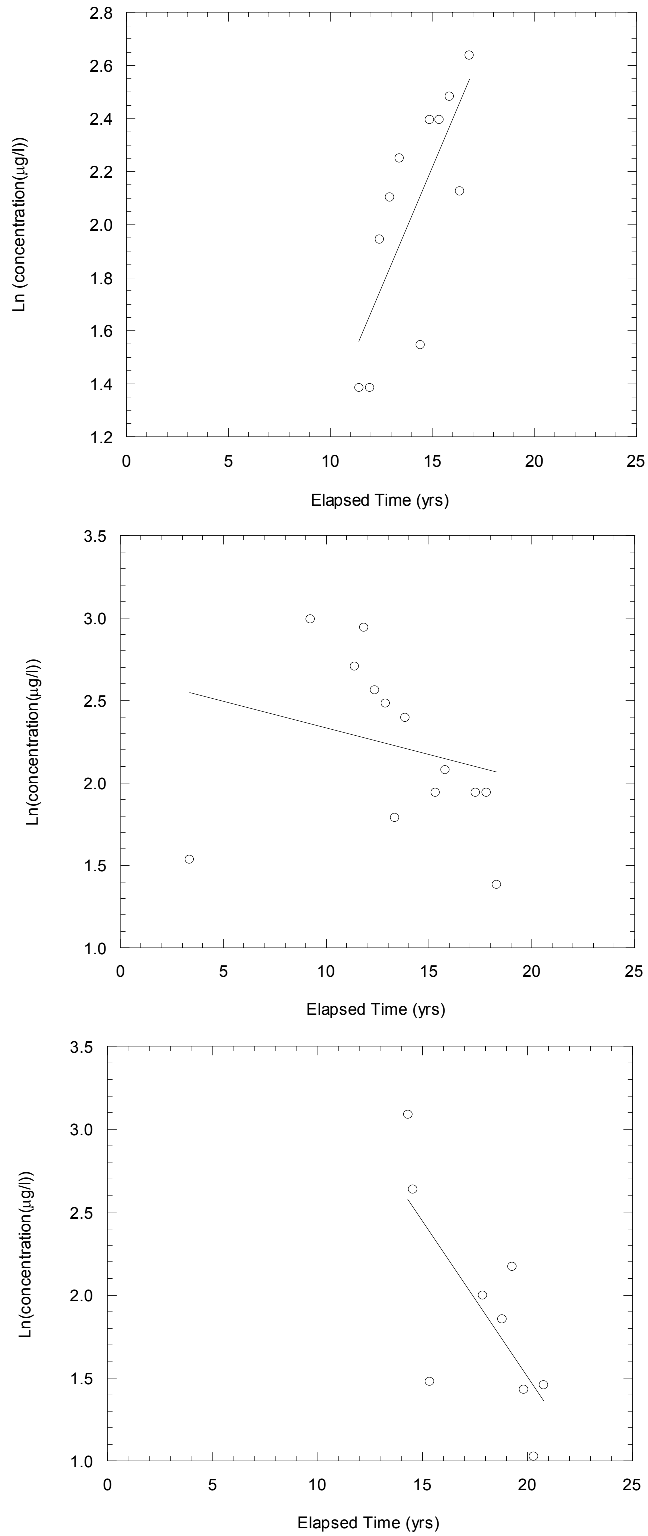


Figure 1.4.7 Data for showing an increasing trend (a), no trend (b), or a decreasing trend (c) for p-dichlorobenzene using lnC.

Table 1.4.5. Results from regression analysis for all compounds detected in leachate at landfills in Wisconsin.

Parameter	Landfill Cells with Detections in Leachate	Analysis Based on C			Analysis Based on ln C		
		Number Sites With Increasing Trend	Number Sites With No Trend	Number Sites With Decreasing Trend	Number Sites With Increasing Trend	Number Sites with No Trend	Number Sites With Decreasing Trend
1,1,1-trichloroethane	10	0	8	2	0	7	3
1,1-dichloroethane	33	0	17	16	0	15	18
1,2-dichloroethane	4	0	4	0	0	4	0
1,2-dichloropropane	3	0	2	1	0	2	1
Acetone	31	1	25	5	1	25	5
Benzene	43	0	34	9	0	35	8
Chlorobenzene	9	1	7	1	1	7	1
Chloroethane	15	0	13	2	0	13	2
Chloromethane	3	0	3	0	0	3	0
1,2-dichloroethylene (cis)	14	0	12	2	0	11	3
Dichlorodifluoromethane	5	0	5	0	0	5	0
Dichloromethane	34	0	20	14	0	18	16
Ethylbenzene	44	3	7	34	3	7	34
Methyl ethyl ketone	27	0	23	4	1	21	5
Methyl tertiary butyl ether	17	1	15	1	0	16	1
Naphthalene	36	2	29	5	2	30	4
p-dichlorobenzene	29	3	22	4	3	22	4
Trichloroethylene	15	0	12	3	0	12	3
Tetrachloroethylene	7	0	6	1	0	6	1
Tetrahydrofuran	32	3	24	5	2	24	6
Toluene	49	0	32	17	0	31	18
Vinyl chloride	13	0	13	0	0	10	3
Xylene (total)	25	0	18	7	0	19	6
Xylene, M&P	22	1	18	3	1	18	3
Xylene, O	20	1	15	4	1	14	5
Styrene	13	0	12	1	0	12	1
Carbon disulfide	10	0	10	0	0	10	0
Bromomethane	1	0	1	0	0	1	0
1,2-dichloroethylene (trans)	1	0	0	1	0	0	1
o-dichlorobenzene	2	1	1	0	0	2	0
Chloroform	2	0	2	0	0	1	1

4 times the average and thus was included. However, these “near” outliers appeared to control the trend. Finally, 22% of the conflicting analyses were found to have concentrations that ranged over two to three orders of magnitude from different sampling events at a single site. Overall, when the concentration data with high variability or “near” outliers were logarithmically transformed, more trends (increasing or decreasing) were statistically significant.

Examination of the aromatic hydrocarbons (e.g. toluene, ethylbenzene, benzene, naphthalene, and xylenes) from all sites suggests that these compounds tend to exhibit decreasing trends more frequently (79 of 569) when compared with the alkanes (e.g., dichloromethane or 1,1,1-trichloroethane) and the alkenes (e.g., tetrachloroethylene and trichloroethylene), of which had 44 of 569 analyses showed decreasing trends (based on C). Examination of the increasing trends suggests similar results in that the aromatic hydrocarbons exhibit increasing trends more frequently than the alkenes and alkanes (i.e. of the 569 regression analyses based on C, 10 were statistically significant increasing trends for aromatic hydrocarbons compared to no statistically significant increasing trends for halogenated hydrocarbons).

1.4.3 Effect of Waste Stream

Data were examined to determine the type of waste accepted at each site. The number of compounds detected, range in VOC concentration (max and min), number of detections above the ES, and type of waste stream are summarized in Table 1.4.6. Two categories of waste stream were considered: MSW (19 landfills) and co-disposal of MSW and ISW (noted henceforth as MSW-ISW, 15 landfills). Data for each VOC were pooled into two groups for the analysis: MSW and MSW-ISW. An analysis of variance (ANOVA) was

Table 1.4.6 VOC summary statistics and waste stream accepted at landfills in Wisconsin.

Landfill Sites Examined	Number of VOCs detected	Waste Stream	Number of VOC Detections > ES	Min VOC Conc. (mg/l)	Max VOC Conc. (mg/l)
Site A	8	MSW	3	0.3	120
Site B	25	MSW	265	0.4	53000
Site C	15	MSW	7	0.3	298
Site D	9	MSW	19	0.47	15000
Site E	14	MSW	41	0.69	5040
Site F	1	MSW-ISW	0	0.12	11
Site G	14	MSW	11	0.47	724
Site H	13	MSW	24	1.2	7700
Site I	13	MSW-ISW	9	1	900
Site J	15	MSW	52	0.83	2800
Site K	14	MSW	4	0.6	382
Site L	5	MSW-ISW	0	0.1	250
Site M	10	MSW-ISW	22	0.96	3100
Site N	11	MSW	14	0.26	760
Site O	11	MSW	21	1	2400
Site P	15	MSW-ISW	28	0.5	37000
Site Q	21	MSW	142	0.8	26000
Site R	2	MSW-ISW	0	5.4	410
Site S	17	MSW-ISW	117	0.7	28000
Site T	8	MSW	4	0.33	450
Site U	20	MSW	61	0.6	25000
Site V	11	MSW-ISW	13	3.2	540
Site W	16	MSW	93	0.3	8900
Site X	15	MSW	38	0.82	2450
Site Y	9	MSW-ISW	16	1.1	3400
Site Z	16	MSW	37	1.5	11900
Site AA	14	MSW-ISW	28	0.14	1100
Site BB	6	MSW-ISW	10	0.58	820
Site CC	6	MSW	64	32	70000
Site DD	14	MSW-ISW	25	0.1	523.5
Site EE	2	MSW-ISW	0	1.5	190
Site FF	9	MSW-ISW	12	1	2000
Site GG	16	MSW-ISW	81	0.31	16000
Site HH	15	MSW	77	1.8	34000

MSW = Municipal Solid Waste and ISW = Industrial Solid Waste conducted to determine if (1) the number of VOCs detected and (2) the concentration of VOCs differed depending on the type of waste stream at each landfill.

Results of the ANOVA comparing the number of VOCs detected suggest that a significant difference exists between the number of VOCs detected at MSW and MSW-ISW sites. MSW sites had 14 VOCs detected in leachate, on average, compared to 9.6 VOCs detected at the MSW-ISW sites on average. The F statistic associated with this ANOVA was 6.49 and F_{cr} = 4.15. Thus, the null hypothesis was rejected and there is a significant difference in the number of VOCs detected at MSW versus MSW-ISW landfills.

Results of the ANOVA comparing VOC concentrations with type of waste stream are summarized in Table 1.4.7. For this analysis, only VOCs that were detected in at least 10% of the leachate samples were examined (21 VOCs were included in the analysis). Significantly different concentrations exist for 13 of the 21 VOCs. For the 13 compounds with significantly different concentrations, higher average concentrations were in the MSW leachates and 6 of the 13 VOCs were aromatic hydrocarbons. The remaining 7 of 13 VOC were alkanes, alkenes, ketones, and furans.

The results of the ANOVA are consistent with general characteristics of the data set. For example, the three sites with the greatest number of VOCs in the leachate (Site B-25 detections, Site Q-21 detections, and Site U-20 detections) were MSW sites. Two of these three sites also had the greatest number of VOC concentrations above the MCL (Site B-265, Site Q-142). Additionally, 9 MSW sites had 15 or more VOCs detected, whereas only 3 MSW-ISW sites had 15 or more VOCs detected. VOC concentrations for the MSW sites ranged between 0.3-70,000 μg/L, compared to 0.1-37,000 μg/L for the MSW-ISW sites.

Table 1.4.7 Summary of results from analysis of variance (ANOVAs) comparing average VOC concentrations from landfills accepting MSW and landfills accepting MSW and ISW. Numbers in parentheses are the number of detections used in calculating the average concentration.

Compound	Average Concentration (μg/L)		F	F_{cr}	Statistically Significant Difference In Concentration Between Waste Stream
	MSW	MSW-ISW			
1,1,1-trichloroethane	63 (48)	28 (15)	1.94	3.99	No
1,1-dichloroethane	50 (174)	19 (95)	11.60	3.88	Yes
Acetone	5200 (246)	620 (73)	22.80	3.87	Yes
Benzene	9.2 (219)	3.9 (125)	24.20	3.87	Yes
Carbon disulfide	12 (31)	23 (27)	1.12	4.01	No
Chlorobenzene	2.8 (43)	5.7 (20)	9.89	3.99	Yes
Chloroethane	54 (70)	15 (23)	0.95	3.94	No
1,2-dichloroethylene (cis)	24 (63)	7.1 (22)	4.39	3.95	Yes
Dichloromethane	400 (234)	83 (86)	11.60	3.87	Yes
Ethylbenzene	42 (349)	32 (196)	7.22	3.86	Yes
Methyl ethyl ketone	7500 (189)	3800 (86)	6.81	3.88	Yes
Methyl tertiary butyl ether	23 (84)	10 (30)	0.85	3.92	No
Naphthalene	32 (262)	20 (142)	1.64	3.86	No
p-dichlorobenzene	16 (225)	8.9 (123)	4.64	3.87	Yes
Styrene	14 (63)	14 (15)	0.01	3.97	No
Trichloroethylene	16 (84)	5.9 (10)	1.69	3.95	No
Tetrachloroethylene	11 (44)	ND	-	-	Yes
Tetrahydrofuran	1300 (223)	890 (132)	5.61	3.87	Yes
Toluene	230 (414)	120 (228)	20.70	3.86	Yes
Vinyl chloride	15 (41)	12 (26)	0.10	3.99	No
Xylene (total)	110 (195)	74 (113)	4.41	3.87	Yes

1.4.4 Effect of Location

ANOVAs were conducted with α = 0.05 to determine if the number of VOCs and the concentration of VOCs in landfill leachate varies spatially within Wisconsin. The landfills were divided into the 5 regions defined by the regional offices of the WDNR. Locations of the landfills and the boundaries of the regions are shown in Fig. 1.3.1. The analyses were constrained to VOCs detected in at least 10% of the landfill cells.

The ANOVA comparing the number of VOCs detected between regions resulted in $F > F_{cr}$ (i.e. 3.00 > 2.70). The null hypothesis is that there is no significant difference between sites, but since $F > F_{cr}$ the null hypothesis is rejected. The number of VOCs differed significantly between the southeast region and the remaining regions. Landfills in the southeast region, which consisted of 3 sites, had an average of 20.3 VOCs in their leachate, whereas the remaining regions had averages of 9.6 to 13.6 (southern region-9.6, northern region-11.5, central region-12.9, and northeast region-13.6) VOCs in their leachate. The southeast region is more industrial than the other regions, and this may play a role in the increased number of detections.

ANOVAs were conducted on the data for each of the aforementioned 21 compounds at each site within each of the 5 regions to determine if the data could be pooled by region. Results of these ANOVAs are summarized in Table 1.4.8. Each region averaged between 2.5 and 4.6 sites with detections of VOCs. Overall, 78% of the sites were not significantly different. That is, on average, data from approximately 3 out of 4 sites were pooled and used in a second ANOVA to determine if the concentration of each VOC varied significantly between regions. When exclusion of data within a region due to significant differences resulted in no data for a region, the ANOVA was performed without consideration of the region with no data.

Table 1.4.8 Analysis of variance (ANOVA) results from comparing VOC concentrations between sites within each of the five regions in Wisconsin and the number of pooled sites.

	Northern Region				Northeast Region				Central Region				Southeast Region				Southern Region			
Compound	Sites	F	F_{cr}	Pooled Sites	Sites	F	F_{cr}	Pooled Sites	Sites	F	F_{cr}	Pooled Sites	Sites	F	F_{cr}	Pooled Sites	Sites	F	F_{cr}	Pooled Sites
1,1,1-trichloroethane	2	0.118	4.84	2	1	NA	NA	1	1	NA	NA	1	2	10.7	4.3	1	3	3.74	3.89	3
1,1-dichloroethane	4	3.23	2.89	3	4	1.78	2.83	4	8	0.717	2.15	8	3	14.2	3.11	2	5	4.33	2.71	4
Acetone	3	2.47	3.29	3	4	8.61	2.71	2	4	3.35	2.77	3	3	12.2	3.12	1	6	8.84	2.38	5
Benzene	5	2.96	2.59	3	4	13.8	2.75	3	9	3.17	2.03	7	3	5.37	3.13	2	6	6.55	2.43	4
Carbon disulfide	0	NA	NA	NA	2	0.871	4.75	2	2	0.153	4.21	2	1	NA	NA	1	1	NA	NA	1
Chlorobenzene	2	11.7	4.45	1	1	NA	NA	1	2	1.75	5.32	2	1	NA	NA	1	2	0.133	5.32	2
Chloroethane	4	2.12	3.16	4	2	0.237	5.59	2	2	0.359	4.6	2	2	10.3	4.25	1	4	0.255	3.24	4
1,2-dichloroethylene (cis)	1	NA	NA	1	4	0.689	3.24	4	5	1.58	3.01	5	2	11.2	4.18	1	1	NA	NA	1
Dichloromethane	3	0.611	3.24	3	4	0.579	2.75	4	8	2.25	2.2	7	2	5.57	3.98	1	8	1.25	2.13	8
Ethylbenzene	5	38.7	2.51	3	4	5.07	2.69	3	9	15.3	1.98	5	3	8.77	3.09	2	8	11.3	2.12	5
Methyl ethyl ketone	2	2.68	4.38	2	4	7.74	2.72	2	4	1.47	2.77	4	3	17.2	3.13	2	3	7.49	3.29	1
Methyl tertiary butyl ether	2	4.09	5.32	2	3	0.578	3.29	3	3	78.6	3.59	2	1	NA	NA	1	4	2.68	2.93	4
Naphthalene	5	7.98	2.64	4	5	6.07	2.46	3	8	1.98	2.09	8	3	2.21	3.14	3	5	3.48	2.53	3
p-dichlorobenzene	3	4.53	3.35	2	4	1.75	2.73	4	7	2.14	2.17	7	3	4.32	3.15	1	4	1.83	2.91	4
Styrene	1	NA	NA	1	1	NA	NA	1	5	1.51	2.84	5	3	14.4	3.47	2	2	11.4	5.98	2
Trichloroethylene	4	0.502	3.12	4	2	0.206	4.49	2	2	0.054	5.98	2	3	6.73	3.24	2	1	NA	NA	1
Tetrachloroethylene	2	0.814	5.32	2	1	NA	NA	1	0	NA	NA	0	3	2.16	3.25	3	0	NA	NA	0
Tetrahydrofuran	2	0.02	4.28	2	4	32.9	2.69	1	4	1.95	2.71	4	3	10.8	3.15	2	6	35.2	2.35	2
Toluene	6	7.53	2.31	3	5	8.04	2.44	3	10	2.27	1.93	8	3	6.87	3.07	2	8	4.61	2.12	5
Vinyl chloride	1	NA	NA	1	3	0.919	3.88	3	3	0.94	3.52	3	2	2.86	4.45	2	1	NA	NA	1
Xylene (total)	4	4.89	2.95	3	4	13.9	2.69	2	2	0.905	4.01	2	3	11.9	3.11	1	3	3.19	3.33	3

NA = Not Applicable

Results of the ANOVA comparing concentrations between regions are summarized in Table 1.4.9. A significant difference in VOC concentrations between regions was obtained for 14 of 21 (67%) of the VOCs in the analysis. Of the 14 VOCs for which the concentration varied significantly between regions, 7 were aromatic hydrocarbons, 4 were alkanes or alkenes, 2 were ketones, and 1 was a furan. Twelve of the 14 analyses suggested that the highest average concentrations were from landfills in the south (4 of 14) or southeast (8 of14) region.

1.5 SUMMARY

Concentrations of 47 VOCs in leachate from municipal solid waste (MSW) and industrial solid waste (ISW) landfills were characterized using data from 54 cells located at 34 engineered landfills. The data were examined to identify the prevalence of compounds, the average concentration and range of concentration for each compound, and temporal trends in concentration (i.e., whether the concentration was increasing, decreasing, or remaining the same over time). Analyses were also conducted to determine if the number of detections and the concentrations of VOCs varied regionally or by the type of waste stream.

Of the 47 VOCs monitored, 31 were detected in the leachate samples at the sites examined. Approximately two-thirds (20 of 31) of these VOCs were aromatic hydrocarbons (7 of 31), alkanes (9 of 31), or alkenes (4 of 31). The alkanes and alkenes typically were halogenated hydrocarbons. Furans, ethers, and ketones were also detected. The most prevalent are the aromatic compounds toluene, ethylbenzene, and benzene (detected in at least 78% or 42 of the cells). The alkanes and alkenes dichloromethane and 1,1-dichloroethane were the next most frequently detected VOCs (60% or 32 cells) followed by

Table 1.4.9 Analysis of variance (ANOVA) results from comparing the number of VOC detections between regions in Wisconsin. .

Compound	Number of VOC Detections Within Each Region					ANOVA Results	
	Northern Region	Northeast Region	Central Region	South Region	Southeast Region	F	F_{cr}
1,1,1-trichloroethane	13 (53)	5 (43)	6 (44)	15 (28)	15 (28)	0.522	2.56
1,1-dichloroethane	31 (31)	46 (21)	73 (17)	25 (27)	65 (42)	3.88	2.41
Acetone	35 (3300)	27 (660)	54 (940)	41 (330)	10 (5900)	12.8	2.42
Benzene	22 (9.1)	27 (5.4)	90 (4.4)	40 (4.5)	48 (21)	28.8	2.41
Carbon disulfide	0	14 (20)	29 (12)	10 (33)	5 (0.97)	1.07	2.78
Chlorobenzene	9 (3.2)	4 (2.9)	10 (8.1)	10 (4.5)	15 (2.4)	4.43	2.58
Chloroethane	22 (14)	11 (12)	16 (11)	20 (14)	18 (13)	0.095	2.48
1,2-dichloroethene (cis)	7 (3.2)	20 (6.7)	21 (9.1)	6 (65)	26 (23)	8.45	2.49
Dichloromethane	42 (440)	65 (190)	54 (100)	87 (400)	53 (490)	2.77	2.41
Ethylbenzene	33 (17)	80 (40)	95 (18)	45 (25)	62 (82)	25.1	2.40
Methyl ethyl ketone	21 (6200)	61 (6600)	61 (1300)	20 (23000)	33 (16000)	26.4	2.42
Methyl tertiary butyl ether	10 (9.7)	35 (44)	9 (5.1)	16 (9)	35 (5.3)	1.83	2.46
Naphthalene	34 (12)	57 (25)	123 (15)	68 (82)	34 (8.4)	5.83	2.41
p-dichlorobenzene	26 (7.6)	79 (9.1)	130 (11)	35 (8.2)	37 (49)	16.9	2.40
Styrene	5 (9.8)	15 (18)	26 (16)	4 (8.8)	20 (4.9)	2.47	2.51
Trichloroethylene	23 (13)	18 (7.3)	8 (5.8)	4 (40)	32 (11)	10.2	2.49
Tetrachloroethylene	10 (6.6)	33 (13)	0	0	40 (12)	1.04	3.11
Tetrahydrofuran	25 (1200)	38 (1100)	90 (660)	32 (660)	38 (660)	5.41	2.41
Toluene	56 (360)	60 (45)	166 (150)	54 (64)	75 (460)	27.8	2.39
Vinyl chloride	5 (8.8)	15 (3.9)	22 (14)	6 (21)	19 (22)	0.502	2.52
Xylene (total)	26 (73)	65 (130)	59 (53)	32 (86)	51 (320)	18.8	2.41

(x) = average concentration from all sites within a region the furan tetrahydrofuran (58% or 31 cells), the ketones acetone and methyl ethyl ketone (49% or 26 cells), and the ether methyl tertiary butyl ether (31% or 17 cells).

The concentration of each VOC typically ranged over 2-3 orders of magnitude (0.1-100 μg/L). Concentrations of the aromatic hydrocarbons typically ranged between 1-100 μg/L, whereas concentrations of the halogenated hydrocarbons (alkanes and alkenes) typically ranged between 5 and 75 μg/L. One exception is the alkane dichloromethane (DCM), which typically ranged between 1 and 1500 μg/L. The concentrations of the ketones and furans ranged between 0.1-10,000 μg/L. The concentrations of these compounds are generally higher and have a wider range for leachates in Wisconsin when compared to the leachate characteristics reported in literature by other researchers.

There were 5435 VOC detections in the leachate at landfills examined of which 45% (2457) exceeded the PAL and 26% (1412) exceeded the ES. An analysis of variance (ANOVA) was conducted using these detections on a compound-by-compound basis to determine if VOC concentrations differed significantly from site-to-site. Concentrations of each VOC detected were compared to the concentrations at all other sites to determine if concentration data could be pooled by compound. The aforementioned ANOVAs resulted in pooling data from 48-90% of the sites for 21 VOCs. The median concentrations of the pooled data for 1,1-dichloroethane, dichloromethane, trichloroethylene, tetrachloroethylene, vinyl chloride, and styrene are above the MCLs and the median concentrations of acetone, methyl ethyl ketone, naphthalene, and tetrahydrofuran exceed the Wisconsin ES. The classes of compounds that most frequently exceed the MCL or ES are the alkanes, alkenes, ketones, chlorinated hydrocarbons, and furans. In contrast, the aromatic hydrocarbons, which are ubiquitous, have median concentrations below the MCL.

Trend analyses showed no significant temporal trend in concentration in a large majority (72%) of the analyses. Increasing trends were uncommon (3% of analyses) and decreasing trends were common, but not typical (25% of analyses). This finding suggests that the risk of groundwater contamination imposed by the landfills in this study was not diminishing significantly over time, at least for the time periods that were considered. Temporal trends were most common for the aromatic hydrocarbons, but these compounds were also detected more frequently.

An ANOVA was conducted to determine if the number of VOCs detected and the concentration of VOCs differed depending on the type of waste stream at each landfill. Results of these ANOVAs suggest that a significant difference exists between the number of VOCs detected at MSW and MSW-ISW sites (i.e., more VOCs were detected at MSW landfills) and that higher average concentrations were in the leachates of MSW landfills.

ANOVAs were conducted to determine if the number of VOCs and the concentration of VOCs in landfill leachate vary spatially within Wisconsin. The landfills were divided into the 5 regions defined by the regional offices of the WDNR. The ANOVA comparing the number of VOCs detected between regions resulted in the number of VOCs differing significantly between the regions. Results of the ANOVA comparing concentrations between regions suggest a significant difference in VOC concentrations between regions for 14 of 21 (67%) VOCs included in the analysis. Of the 14 VOCs for which the concentration varied significantly between regions, 7 were aromatic hydrocarbons, 4 were alkanes or alkenes, 2 were ketones, and 1 was a furan. Twelve of the 14 analyses suggested that the highest average concentrations were from landfills in the south (4 of 14) or southeast (8 of 14) region. One possible explanation for this is that the southeast region is more industrial than the other regions, and this may play a role in the increased number of detections the highest average concentration.

SECTION 2: MIGRATION OF VOLATILE ORGANIC COMPOUNDS(VOCS) FROM LINED LANDFILLS IN WISCONSIN

ABSTRACT

This section examines volatile organic compound concentrations in the lysimeters of clay and composite (compacted clay overlain by a geomembrane) lined landfills in Wisconsin. Objectives of this study were to (1) examine VOC prevalence in lysimeters, (2) determine typical VOC concentrations in lysimeters, (3) determine if temporal trends in VOC concentration in lysimeters exist, (4) compare VOC concentrations between leachate and lysimeter data, (5) compare VOC concentrations in the lysimeters of clay and composite lined landfills, and (6) compare relative concentrations from field data with those determined from analytical solutions. Data examined suggest that aromatics, alkanes, alkenes, ketones, and furans are the 5 most common compound classes in lysimeters. The average concentration range for these compound classes were between 0.1 and 100 μg/l for the aromatics, the alkanes, and the alkenes, and between 100 and 1000 μg/l for the ketones and furans. Results from linear regression analysis suggest that over 80% of the analyses have no trend in concentration with time. Concentrations of the aforementioned compound classes range between 3 and 10 times higher in the leachate as compared to the lysimeter concentrations. Eleven VOCs were found in the lysimeters of both clay and composite lined landfills and concentrations were compared between liner type using and analysis of variance (ANOVA). ANOVA results suggest that the concentrations were statistically no different between clay and composite lined landfills for 8 of the 11 VOCs. The advection diffusion equation (ADE) derived and presented by van Genuchten 1981 was used to predict contaminant transport through landfill liners. Results from the analytical solution under-predicted the concentrations determined from field data for all of the compounds examined in this paper. This study has shown that VOCs exist in the lysimeters of both clay and

composite lined landfills and that the potential for groundwater contamination from VOC migration remains a problem associated with both clay and composite lined landfills.

2.1 INTRODUCTION

Volatile organic compounds (VOCs) are found in many products that are disposed in municipal solid waste (MSW) landfills (e.g. paints, personal care items, oils and greases, carpets, adhesives, automotive care products, etc.) and are ubiquitous in MSW leachate (Kmet and McGinley1982, McGinley and Kmet 1984, Nelson and Book 1986, Sridharan and Didier 1988, Friedman 1988, Battista and Connelly 1989, Gibbons et al. 1992, Tedder 1992, Oman and Hynning 1993, Battista and Connelly 1994, Rowe 1995, Krug and Ham 1995, Hunt and Dollins 1996, Gade et al. 1996, Gron et al. 1999, Kjeldsen and Christophersen 2001, Kjeldsen et al. 2002, Frascari et al. 2004, Baun et al. 2004). VOCs commonly detected in landfill leachate include tetrahydrofuran, chloroethane, 1,1-dichloroethane, 1,1,1-trichloroethane, trichloroethylene, tetrachloroethylene, acetone, and BTEX compounds (Nelson and Book 1986, Friedman 1988, Gibbons et al. 1992). Concentrations of these VOCs in leachate vary over a broad range (~0.1 to 10,000 μg/l) and in many cases the concentrations are near or above USEPA maximum contaminant levels (MCLs) (Friedman 1988, Gibbson et al. 1992, Tedder 1992, Krug and Ham 1995, Rowe 1995, Paxeus 2000, Jiměnez et al. 2002, Kjeldsen et al 2002).

VOCs present in MSW leachate can migrate through landfill base liners and therefore may impact groundwater (Sangam and Rowe 2001, Kim et al. 2001, Foose et al. 2002). In fact, VOCs have been detected in ground water monitoring wells adjacent to a lined landfill (Battista and Connelly 1994) and in lysimeters beneath seven clay-lined MSW landfills in Wisconsin (Tilkens and Svavarsson 1995). In Wisconsin, a unique opportunity exists to evaluate migration of VOCs through MSW landfill liners because state regulations required that a large pan lysimeter be placed directly beneath the liner of all MSW landfill cells constructed between 1988-1997. These lysimeters have been sampled regularly (some for nearly 20 yr) and analyzed for concentration of 47 VOCs, volume of liquid discharged, indicators of water quality, and a variety of other regulated compounds. Similar measurements were made on samples of leachate and groundwater from adjacent monitoring wells. The objective of this study was to use the leachate and lysimeter data collected in Wisconsin to assess migration of VOCs from clay and composite (clay overlain by geomembrane) liners used in Wisconsin landfills.

2.2 BACKGROUND

2.2.1 Wisconsin Liner and Lysimeter Requirements

Between 1982 and 1995, several studies were conducted to determine the adequacy of landfill liner systems in Wisconsin and to determine the characteristics of leachates from MSW landfills in Wisconsin (Kmet and McGinely 1982, McGinley and Kmet 1984, Friedman 1988, Sirdharan and Didier 1988, Battista and Connelly 1989, Battista and Connelly 1994, Krug and Ham 1995, Tilkens and Svavarsson 1995). Each of these studies showed that VOCs are common in MSW leachate and that groundwater near unlined sites was often contaminated with VOCs and other inorganic and organic compounds. In response to these studies and previous case-specific contamination events, the Wisconsin Department of Natural Resources (WDNR) began requiring landfill owners to install compacted clay liners in new landfill cells on a case-by-case basis as early as 1980, to reduce the risk for groundwater contamination. Pan lysimeters located beneath the liner were also required on a case-by-case basis.

Revisions to the Wisconsin regulations in 1988 formalized these requirements. In particular, all new MSW landfill cells were required to include a compacted clay liner at least 1.5 m thick, a leachate collection system, and an underlying collection pan lysimeter for monitoring the quality and quantity of effluent discharged from the liner (Chapters NR 500-520 of the Wisconsin Administrative Code). Additional revisions promulgated in 1996 required (MSW) landfill cells to be composite lined with a geomembrane at least 1.5-mm thick overlying a clay liner at least 1.2 m thick. The 1996 revisions also eliminated the requirement for a lysimeter. However, some landfill cells approved and constructed in Wisconsin between 1995 and 1997 were constructed with a composite liner and a lysimeter.

Other investigators have also detected VOCs in groundwater around landfills (Nelson and Book 1986, Josephson et al. 1988, Friedman 1988, Battista and Connelly 1989, Hallbourg et al. 1992, Battista and Connelly 1994). The difficulty with using analysis results from groundwater monitoring is that many of the landfills examined have several cells which may include unlined, clay lined, and composite lined cells. If results from groundwater monitoring wells suggest that contamination exists at a landfill with multiple cells implementing various liner systems (unlined, compacted clay, or composite designs) the source of contamination (e.g. from unlined, clay lined, or composite lined cells) may be difficult to define. Therefore, this study will not examine results based on VOCs found in groundwater and will focus on VOCs found in lysimeters directly beneath the liner system (compacted clay or composite).

2.2.2 VOCs in Leachate and Lysimeters

Despite the presence of a liner, MSW landfills still pose a risk for groundwater contamination by VOCs because VOCs are ubiquitous in landfill leachates, even at sites that receive no hazardous wastes. Section 1 of this paper provides a comprehensive review of VOC concentrations in leachates of MSW landfills in Wisconsin that were lined with compacted clay or composite liners. Data from a database compiled by WDNR were used for the analysis along with data reported by other investigators (Kmet and McGinley 1982, Sridharan and Didier 1988, Friedman 1988, Forst et al. 1989, Gibbons et al. 1992, Tedder 1992, Krug and Ham 1995, Rowe 1995, Hunt and Dollins 1996, Townsend et al. 2000, Weber et al. 2002, Kjeldsen et al. 2002). A summary of the data reported in Klett et al. (2005a) is in Table 2.1. Toluene and ethylbenzene, which are both aromatic hydrocarbons, were the only two compounds found in all studies. Toluene was above the USEPA MCL in 46% of the studies and ethylbenzene was above the USEPA MCL in 36% of the studies. Other commonly detected compounds include dichloromethane and benzene (both found at 82% of studies), tetrachloroethylene (PCE), TCE, and vinyl chloride (all three found at 73% of studies), and 1,1-dichloroethane, 1,2-dichloroethylene (trans), and xylene (total) (all at 64% of studies). The highest concentrations for these ten compounds generally were from Wisconsin leachates. Overall, the most frequently detected VOCs are the aromatic hydrocarbons (e.g. toluene, ethylbenzene, benzene, naphthalene, and xylenes) and halogenated hydrocarbons (e.g. dichloromethane, 1,1-dichloroethane, tetrachloroethylene, and trichloroethylene), both of which had concentrations ranging between 0.1 μg/l and 10,000 μg/l. One common aspect among all studies reviewed is that the concentration of each VOC varies over a broad range. The widest range in concentration was for 1,1,1-trichloroethane (between 0.01 and 10,000 μg/l). However, the lower limit of 0.01 μg/l, from the study by Kjeldsen et al. (2002) seems unreasonably low and no discussion about analysis method used was provided by Kjeldsen et al. (2002). A more realistic range may be 0.1-10,000 μg/l based on other studies examined.

Table 2.2.1. Range in concentration of VOCs characteristic of MSW, ISW, C&D landfill leachates and the USEPA MCL.

Parameter	Concentration (μg/l)														
	USEPA MCL	Kmet and McGinley (1982)	Sridharan and Didier (1988)	Friedman (1988)	Forst et al. (1989)	Gibbson et al. (1992)		Tedder (1992)	Krug and Ham (1995)	Rowe (1995)	Hunt and Dollins (1996)	Townsend et al. (2000)	Kjeldsen et al. (2002)	This Study	Overall Range
						Old landfills (pre-1985)	New landfills (post-1985)								
Acetone	-	-	-	-	-	-	-	-	-	-	59-2100	-	6.0-440	3.1-59000	3.1-59000
Phenol	-	221-5790	1.1-2170	-	-	-	-	1.0-6090	-	-	-	-	0.6-1200	-	0.6-6090
Dichloromethane	5	106-20000	27.6-58200	-	6	898	1390	1.1-191	ND	ND-8300	170	1.6-2.8	1.0-827	0.6-8200	0.6-58200
Toulene	1000	280-1600	1-1100	1.2-610	3.6-48	583	406	2.0-870	2.7-12300	2.0-7000	10-87	1.2-6.7	1-12300	0.1-1900	0.1-12300
1,1-dichloroethane	7	510-6300	-	3.7-190	-	400	116	2.1-12	6.0-4120	-	5.0-20	-	0.6-46	0.1-590	0.1-6300
1,2-dichloroethylene (trans)	100	96-2200	-	3.6-310	1.6	492	104	-	5.58	ND-2080	-	-	1.6-6582	21-210	1.6-6582
Ethylbenzene	700	100-250	1-1680	1.4-180	1.7-20	198	60	2.3-93	4.8-1280	27.1-1400	7.0-20	1.1-10.8	0.2-2329	0.2-450	0.2-2329
Chloroform	-	14.8-1300	4.4-16	3.4-32	6.6-8.5	-	-	1.0-2.1	7.2	-	-	-	-	0.7-620	0.7-1300
1,2-dichloroethane	5	13-11000	1-10000	-	-	-	-	1.0-4	212-1030	ND-<86	-	-	<6	0.4-37	1-10000
Diethylphthalate	-	43-300	-	-	-	-	-	5.4-12.9	-	-	-	-	0.1-660	-	0.1-660
Dibutylphthalate	-	12-150	13-540	-	-	-	-	10-12	-	-	-	10.5	0.1-70	-	0.1-540
Benzene	5	19	1-10000	1.4-220	1.1-572	65	7	1-130	2.2-1630	ND-590	-	-	0.2-1630	0.1-85	0.1-10000
Bromodichloromethane	-	-	2490	-	-	-	-	-	-	-	-	-	-	-	2490
Butylbenzylphthalate	-	125-150	10-64.1	-	-	-	-	-	-	-	-	-	0.2-8	-	0.2-150
Carbon tetrachloride	5	-	3-995	-	-	-	-	-	-	-	-	-	4.0-9.0	-	3-995
Chlorobenzene	100	-	3-188	2.3-5.8	-	736	-	1.3-9.4	6.0-911	-	-	-	0.1-110	0.4-21	0.1-911
Chlorodibromomethane	-	-	31		-	-	-	-	-	-	-	-	-	-	31
Chloroethane	-	170	2-730	5.6-730	-	-	-	1.5-6.5	9-410	-	11-17	-	-	0.8-1300	0.8-1300
1,3-dichloropropene (cis)	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-	2.5
Di-n-octyl phthalate	-	-	16.1-542	-	-	-	-	-	-	-	-	-	-	-	16.1-542

Table 2.2.1 Range in concentration of VOCs characteristic of MSW, ISW, C&D landfill leachates and the USEPA MCL (continued).

Parameter	Concentration (μg/l)														
	USEPA MCL	Kmet and McGinley (1982)	Sridharan and Didier (1988)	Friedman (1988)	Forst et al. (1989)	Gibbson et al. (1992)		Tedder (1992)	Krug and Ham (1995)	Rowe (1995)	Hunt and Dollins (1996)	Townsend et al. (2000)	Kjeldsen et al. (2002)	This Study	Overall Range
						Old landfills (pre-1985)	New landfills (post-1985)								
Dibromochloromethane	-	-	22-160	-	-	-	-	-	-	-	-	-	-	-	22-160
Dichlorodifluoromethane	-	180	100-242	-	-	-	-	-	2.0-1030	-	-	-	-	0.2-140	0.2-1030
Fluoranthene	-	-	9.5-723	-	-	-	-	-	-	-	-	-	-	-	9.5-723
Fluorotrichloromethane	-	-	1.0-183	3.2-200	-	-	-	-	-	-	-	-	-	-	1.0-200
Isophorone	-	-	3.2-520	-	-	-	-	9.4-28	-	-	-	-	-	-	3.2-520
Iospropylbenzene	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1
Methyl ethyl ketone	-	-	2100-37000	640-37000	-	-	-	-	8.6-36000	-	-	-	110-6600	1.8-70000	1.8-70000
Naphthalene	-	19	4.6-186	-	-	-	-	4.5-29	-	-	-	1.2	0.1-260	0.3-62	0.1-260
p-dichlorobenzene	75	-	2-250	-	-	-	-	1-39.8	-	-	-	-	0.1-16	0.5-350	0.5-350
Pentachlorophenol	1	3	25	-	-	-	-	63-540	-	-	-	-	-	-	3-540
Styrene	100	-	2	28	-	-	-	-	-	-	-	-	0.5-1.6	-	0.5-28
Tetrachloroethylene	5	26-60	1-232	1.4-69	2.8	-	-	1-2	0.8-44	ND-2000	-	3.2	0.05-250	0.6-79	0.05-2000
Tetrahydrofuran	-	-	410-1400	270-11000	-	-	-	-	-	-	-	-	9-430	3.0-19000	3.0-19000
1,3-dichloropropene (trans)	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-	2.5
1,1,1-trichloroethane	200	2400	1-10000	-	1.9-4.5	-	-	1.1-31	0.3-3810	-	33	-	0.01-3810	0.7-430	0.01-10000
Trichloroethylene	5	160-600	1-372	2.4-280	2.3-7.9	51	71	1-1.2	-	ND-230	-	-	0.05-750	0.5-202	0.05-750
Vinyl chloride	2	61	10-3000	11-150	-	107	51	1-19.6	0.3-5570	ND-2010	10-12	-	-	0.4-304	0.3-5570
Xylene (total)	10000	-	30-2000	2.5-240	3.7-38	-	-	4.4-85.2	10-3010	-	33-38	1.3-5.2	0.8-3500	0.4-2000	0.4 -3010
1,1,2-trichloroethane	5	500	1.5-10000	-	-	-	-	-	0.5-7130	-	-	-	2.5-16	-	0.5-10000

Studies have also illustrated that VOCs can migrate through landfill liners (Josephson et al. 1988, Friedman 1988, Battista and Connelly 1989, Hallbourg et al. 1992, Battista and Connelly 1994, Rugge et al. 1995, Tilkens and Savavarsson 1995,). Friedman (1988) examined lysimeter data from 7 landfills (5 MSW and 2 industrial solid waste (ISW) landfills) in Wisconsin. The landfills that were examined employed 3 different liner configurations, which included 5 landfills constructed with compacted clay liners and 2 landfills having cells that were constructed with either no lining system (natural attenuation), or were classified by the WDNR as retarder landfills (e.g. a landfill constructed with a reworked, fine-grained material base that does not meet the specifications for a clay liner) (Friedman 1988) Vinyl chloride, toluene, and tetrahydrofuran were the only VOCs detected in the lysimeters and a summary of the results from Friedman (1988) is in Table 2.2. Tetrahydrofuran (a furan) was the compound most frequently detected in lysimeters (3 of 7 landfills) and was detected in the lysimeter at one of the clay lined landfills. Toluene (an aromatic hydrocarbon) and vinyl chloride (a chlorinated hydrocarbon) were each detected once at separate landfills employing natural attenuation or retarder liner configurations.

Tilkens and Svavarsson (1995) examined lysimeter data from 10 landfills in Wisconsin that were lined with 1.5 m of compacted clay and monitored for VOCs in the lysimeter. At least one VOC was detected in at least one lysimeter at 7 of the landfills. Of the 47 VOCs typically monitored in Wisconsin, 27 were detected in the lysimeters of these 7 landfills. However, due to different regulatory requirements, not all 47 VOCs were evaluated at each landfill. Alkanes and alkenes (trichloroethene, 1,1-dichloroethane, tetrachloroethene, dichloromethane, and 1,1,1-trichloroethane) were the most commonly detected VOCs, with concentrations ranging between 0.2 μg/l and 2500 μg/l. Other classes of compounds that were detected were aromatic compounds, furans, and chlorinated hydrocarbons. Summary statistics for the concentrations of VOCs found in lysimeters are in Table 2.3.

Table 2.2.2 Range in concentration of VOCs found in leachate, lysimeters, and groundwater monitoring wells in Wisconsin (adopted from Friedman 1988).

Parameter	Leachate		Lysimeter		Groundwater Monitoring	
	% Landfills with detects	Concentration Range (ppb)	% Landfills with detects	Concentration Range (ppb)	% Landfills with detects	Concentration Range (ppb)
Chloroethane	58	5.6-730	-	-	19	4.8-420
1,1-dichloroethane	63	3.7-190	-	-	42	1.0-360
1,2-dichloroethane	42	1.3-600	-	-	15	1.8-8.5
1,1,1-trichloroethane	47	3.1-130	-	-	30	1.3-130
vinyl chloride	16	11-150	5	1.5	15	2.0-190
1,2-dichloroethylene	42	3.6-310	-	-	19	1.0-3900
trichloroethylene	63	2.4-280	-	-	30	1.2-480
tertachloroethylene	58	1.4-69	-	-	30	1.2-1300
Benzene	63	1.4-220	-	-	27	1.0-32
chlorobenzene	16	2.3-5.8	-	-	11	2.0-110
ethylbenzene	84	1.4-180	-	-	19	1.3-74
1,4-dichlorobenzene	42	3.0-21	-	-	11	2.7-6.2
Toluene	95	1.2-610	5	1.2	23	1.1-3500
xylene, (total)	84	2.5-240	-	-	23	3.3-160
trichlorofluoromethane	26	3.2-200	-	-	23	3.7-66
methyl ethyl ketone	37	640-37000	-	-	8	120-5100
Styrene	5	28	-	-	-	-
tetrahydrofuran	58	270-2600	16	800-11000	11	520-3400
chloroform	26	3.4-32	-	-	4	1.0-19.0
1,1-dichloroethylene	-	-	-	-	11	1.6-4.9
1,2-dichlorobenzene	-	-	-	-	4	2.8

Table 2.2.3. Concentration of VOCs found in lysimeters of landfills in Wisconsin (adopted from Tilkens and Svavarsson 1995).

Parameter	Concentration Range (μg/l)														
	Site A			Site B	Site C		Site D	Site E		Site F			Site G		
	Lys 1	Lys 2	Lys 3	Lys 1	Lys 1	Lys 2	Lys 1	Lys 1	Lys 2	Lys 1	Lys 2	Lys 3	Lys 1	Lys 2	Lys 3
dichloromethane	5.7	-	-	7	11.-14	-	2.4	2500	4.6	-	-	-	1.5	1	1.2-2.5
toluene	-	-	-	0.11	2.2-2.7	24	-	5.1-740	-	1.6	-	-	-	-	-
1,1-dichloroethane	10.3	5-8.24	-	3.6-9.9	17	12	7.4	10-430	3.1-3.9	2.6-4.4	-	-	-	-	-
trans-1,2-dichloroethylene	5.7	11.5	-	-	-	1.3	-	-	-	na	na	na	0.5	0.8	1.2
ethylbenzene	-	-	-	-	0.78-0.8	-	-	84	-	3.2	-	1.2-2.9	-	-	-
1,2-dichloroethane	-	-	-	-	1.8	1.3	-	-	-	-	-	-	-	-	-
benzene	-	-	-	0.1	0.7-1.8	5.5	0.41	25	-	0.2	-	0.4	-	-	-
chloroform	-	-	-	-	-	0.12	1.3	-	-	-	-	-	-	-	-
methyl ethyl ketone	-	-	-	-	1.2-7.6	0.51-3.4	na	23-900	450	-	-	-	na	-	9.9
naphthalene	-	-	-	0.22	na	na	-	-	-	-	-	-	na	na	na
tetrachloroethene	-	-	-	3-3.2	3.6-5.5	-	0.96	2.2-32	-	-	0.8	-	1	2.-11	-
1,1,1-trichloroethane	-	-	-	3.1-4.7	-	-	0.84-9.1	31	1.5-4	-	-	-	1.3-5.8	-	-
trichloroethene	-	-	-	0.7	2.1-17	-	0.62-1.7	2.-58	0.6	0.3	0.4	0.2	5.4	11-155	-
vinyl chloride	-	-	-	1.6	1.7-5.5	-	2.4-3	-	-	-	-	-	-	-	-
xylene (total)	-	-	-	-	5-7.3	41	-	8-202	-	-	-	-	-	3	-
tetrahydrofuran	-	-	240	-	80-100	70-160	-	-	1000	-	-	-	30-170	14	63-91
chloroethane	-	-	-	3.3	2.2	-	1.8-2.9	-	-	-	-	1.8	-	-	-
chloromethane	-	-	-	0.16	na	na	4.1	4.4-71	-	-	-	-	na	na	na
dichlorodifluoromethane	-	-	-	12.-17	1.2	1.5	1.1-1.9	-	-	-	-	-	na	na	na
cis-1,2-dichloroethene	-	-	-	2.3	40-120	-	-	-	-	-	-	1.4-2.2	na	na	na
p-dichlorobenzene	-	-	-	0.1	0.56-1.6	2.2	-	-	-	-	-	-	-	-	-
1,1-dichloroethene	-	-	-	-	-	-	2.8	-	-	-	-	-	1.1	-	-
acetone	-	-	-	-	-	-	-	20	-	-	-	-	na	na	na
freon	-	-	-	2-8.2	na	na	2.1-5.5	-	-	-	-	-	-	-	-
isopropyltoluene	na	na	na	0.09	-	-	na	na	na	na	na	na	na	na	na
1,2-dichloropropane	-	-	-	-	4.8-8	6	-	-	-	-	-	-	na	na	na
Methyl tertiary butyl ether	-	-	-	-	-	-	-	-	-	1.1	1.6	2.1	na	na	na

"-" compound was not detected

na = not analyzed

Tilkens and Svavarsson (1995) suggested that the presence of VOCs in the lysimeters can not be linked to breakthrough of leachate through the liner. Rather, they speculate that construction or cross contamination is the source of VOCs in landfill lysimeters in Wisconsin. The aforementioned conclusion was based on the observation that detections of VOCs does not correlate to elevated inorganic data. That is, inorganic contaminant transport through the liner systems is not exhibited and thus VOC detections are believed to be caused by construction or cross contamination.

Workman (1993) examined a MSW landfills which had a primary liner consisting of a geomembrane on the side slopes and a geomembrane and compacted clay liner on the base. The average flow rates found in the leak detection system ranged from 50-700 lphd. Workman (1993) also found that after approximately one year of monitoring, several of the cells began having VOC detects. The most frequently detected compounds were chloroethene, 1,1-dichloroethane, ethylbenzene, dichloromethane, toluene, 1,1,1-trichloroethane, trichloroethane, and xylene. Specific concentrations were not reported, but were explained to be in the low parts per billion range.

2.2.3 VOC Transport in Liners

Analytical solutions such as the advection diffusion equation (ADE) have been used to describe contaminant transport through compacted clay liners (Ogata and Banks 1961, Van Genuchten 1981, Shackelford 1990, Shackelford and Daniel 1991, Kim et al. 2001, Sangam and Rowe 2001, Foose et al. 2001). The ADE equation can also be used to estimate contaminant transport through composite liners by reducing the hydraulic conductivity term to essentially zero. The analytical solutions have been used to predict contaminant transport in laboratory studies and experimentally controlled field scale compacted clay liners, but limited information has been found in literature that describes assessing the ADE against field data directly above and below a landfill liner system (i.e. clay and/or composite) (Van Genuchten 1981, Johnson et. al 1989, Foose et al 2001, Edil 2003, Willingham et. al 2004).

Sangam and Rowe (2001) conducted laboratory diffusion tests simulating VOC transport in compacted clay and composite liners. The tests were performed in double compartment cells (closed systems) with source and receptor reservoirs separated by either a layer of compacted clay or a layer over compacted clay overlain by a geomembrane (i.e. a composite liner). The initial concentration of DCM was 4.7 for the compacted clay tests and 10 mg/l for the composite liner tests. The initial concentration of TCE was 3.3 for the compacted clay tests and 4.3 mg/l for the composite liner tests. The maximum flux of DCM was 75 $\mu g/cm^2/s$ for the compacted clay and 17 $\mu g/cm^2/s$ for the composite liner. For TCE, the maximum flux was 5 $\mu g/cm^2/s$ for the compacted clay and was undetectable for the clay-geomembrane composite liner systems. In addition, the concentration of DCM diffusing into the receptor below the compacted clay was approximately 5 times greater than the concentration of DCM found in the receptor of the clay-geomembrane composite.

Sangam and Rowe (2001) explain that the rate of migration depends on the chemical being examined and the affinity of the geomembrane for the chemical. Both diffusion and partition processes should be considered in the migration of VOCs through high density polyethylene (HDPE) geomembranes. Partitioning coefficients are important, because varying the partitioning coefficients effects the permeation rate of HDPE geomembranes.

Kim et al. (2001) examined VOC transport through compacted clay liners in the laboratory using bench-scale columns and large tank tests. The influent was spiked with aromatic hydrocarbons (toluene and m-xylene), halogenated hydrocarbons (methylene chloride, 1,1,1-trichloroethane, trichloroethene), and a chlorinated hydrocarbon (chloroform).

The total influent concentration for each compound was16 mg/l for the tank tests and 20 mg/l for the column tests to represent typical VOC concentrations in MSW leachate. The data were analyzed using a one-dimensional mass transport equation which accounted for first order degradation during transport. They found that that the clay-water partition coefficients (K_p) for VOCs can be estimated from the organic carbon fraction (f_{oc}) and the organic carbon partition coefficients (K_{oc}):

$$K_p = f_{oc}K_{oc} \tag{1}$$

with K_{oc} estimated from the octanol-water partition coefficient (Kow) using the relationship reported by (Kim et al. 2001):

$$\log K_{oc} = 0.92 + 0.36\log K_{ow} \tag{2}$$

Kim et al. (2001) also emphasized the importance of accounting for degradation during laboratory tests. Ignoring degradation may result in under-estimated dispersion coefficients and over-estimated partition coefficients. They also found that the half-lives of all compounds examined ranged from 2 to 116 days and that molecular diffusion coefficients and apparent tortuosities generally decreased with decreasing aqueous solubility.

Foose et al. (2002) examined methods for analyzing advective and diffusive transport through composite liners and compared flow and transport through composite liners with geomembranes containing defects and those with intact geomembranes. They found that the mass flux of VOCs through an intact liner is 4 to 6 orders of magnitude greater than through a defect. Thus, transport of organic compounds through defects can be ignored if a high level of quality control quality assurance is followed during geomembrane installation. Transport through intact composite liners was analyzed using a one dimensional finite-difference model, which accounted for the thickness of the geomembrane and the soil liner, the “equivalent” steady-state diffusion coefficient for the composite liner, the difference in concentration between the source at the top of the geomembrane and the base of the liner, and the sorptive capacity of the underlain soil. The numerical model converged to the Ogata and Banks (1961) solution of the advection diffusion equation for the case of diffusion in a thick soil liner without a geomembrane (Foose 1997). A limitation to this analysis method is that the method can only be used to analyze one chemical at a time. Some of the mechanisms included in the analysis of composite liners include diffusion, advection (if defects are present), and sorption (in the clay portion of the liner). Diffusion through intact geomembranes occurs at appreciable rates (Park and Nibras 1993) and is the dominant mode of VOC transport through composite liners reported by Foose (2002) and Foose et al. (2002).

Previous research on field-scale liner systems suggests that VOCs transport through compacted clay liners, but data from field-scale composite lined landfills is limited and VOC transport through composite lined landfills has not been clearly established. However, analytical studies have suggested that significant diffusion based transport is possible, but this is based only on laboratory determined parameters. Therefore, this study will examine field-scale data from landfills in Wisconsin to determine if VOC transport is pervasive or not in clay and especially composite lined landfill systems and if observations from field data are consistent with the diffusive transport models.

2.3 DATA SOURCES

See Section 1.3 Data Sources.

2.4 DATA ANALYSIS

2.4.1 General Characteristics

The lysimeter data set consists of 2738 samples analyzed for VOCs that were obtained from 94 lysimeters at 34 landfills (some landfills had multiple cells, each with a lysimeter). At least one VOC with a concentration above the limit of detection (LOD), referred to henceforth as a detection, was detected in 1356 of these samples. Moreover, at least one VOC was detected during one sampling event in each of the 94 lysimeters in the study. The fraction of lysimeters having a least one detection of a particular VOC is shown in Fig. 2.4.1a (the number above each bar is the fraction of lysimeters with a detection of the VOC). Toluene was detected most frequently (60% of the lysimeters) and ten VOCs (toluene, tetrahydrofuran, dichloromethane, benzene, acetone, chloromethane, xylene (total), ethylbenzene, trichloroethylene, and 1,1-dichloroethane) were detected in more than 25% of the lysimeters. The most prevalent compounds are aromatic hydrocarbons (toluene and benzene), furans (tetrhydrofuran), and the alkanes (dichloromethane and 1,1-dichloroethane).

In approximately 45% of the lysimeters examined, a particular VOC was detected during only one or two sampling events. These detections potentially could be attributed to random events such as sample contamination or analytical error. Thus, an analysis was also conducted considering only cases where a given VOC was detected at least three times in a given lysimeter. Three or more detections of a given VOC occurred in 45 of the 94 lysimeters in the study. The fraction of lysimeters having three detections of a particular VOC is shown in Fig. 2.4.1b in terms of the total number of lysimeters (94) and in Fig. 2.4.1c in terms of the total number of lysimeters with a least three detections of a particular VOC (45 lysimeters). There were 27 VOCs detected at least three times in a lysimeter, and

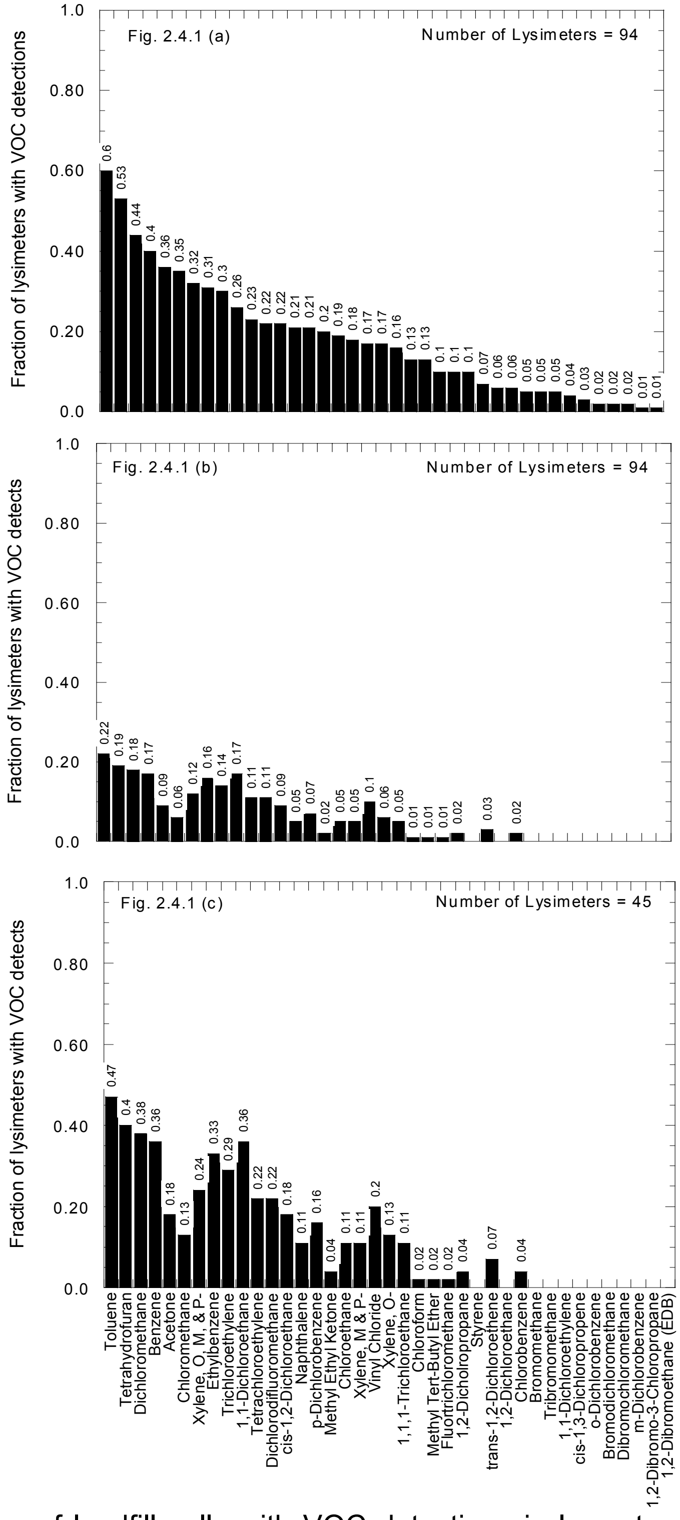


Figure 2.4.1. Fraction of landfill cells with VOC detections in lysmeters (numbers above bars correspond to the fraction of cells with detections) (a) based on one or more detections (b) based on sites with 3 or more detections (c) based on sites with 3 or more detections and only lysimeters (45) with three or more detections used to calculate fraction.

toluene was the most frequently detected compound that was detected at least three times (22% of the lysimeters). Also, 8 of the 10 most frequently detected compounds detected at least once were also detected at least three times (e.g., toluene, tetrahydrofuran, dichloromethane, benzene, xylene (total), ethylbenzene, trichloroethylene, and 1,1-dichloroethane). Tetrachloroethylene and dichlorodifluoromethane were the other two VOCs in the top 10 compounds detected at least three times (acetone and chloromethane were in the top ten VOCs with at least one detection, but were not in the top ten when at least three detections were considered).

Concentration records for four VOCs detected in different lysimeters are shown in Fig. 2.4.2 (219 similar graphs were prepared, one for each compound in each lysimeter; all graphs are presented in Appendix E; data used to create each of the VOC concentration records is given in a summary table (Table B.1) in Appendix F.). These concentration records are typical of those evaluated in this study. The Wisconsin ES and PAL as well as the limit of detection (LOD) are also shown in each graph in Fig. 2.4.2 (the LODs shown in Fig. 2.4.2, and reported elsewhere in this section, correspond to the highest LOD reported for each compound). VOC concentration is shown on a logarithmic scale in Fig. 2.4.2 because of the large ranges in concentration (orders of magnitude) for each VOC. Data points corresponding to concentrations below the LOD were assigned a "concentration" of 0.01 μg/L so that the data could be displayed on a logarithmic scale. Inclusion of data below the LOD provides a visual record of the sampling history from the date refuse was first accepted at the site. The minimum reported LOD was at least 5 times greater than 0.01 μg/L. A different symbol was used for these data points to avoid confusion with data falling above the LOD.

The graphs in Fig. 2.4.2 represent 4 of the 6 classes of compounds that were detected (e.g., aromatic hydrocarbons, alkanes, furans, and ketones). Data from the

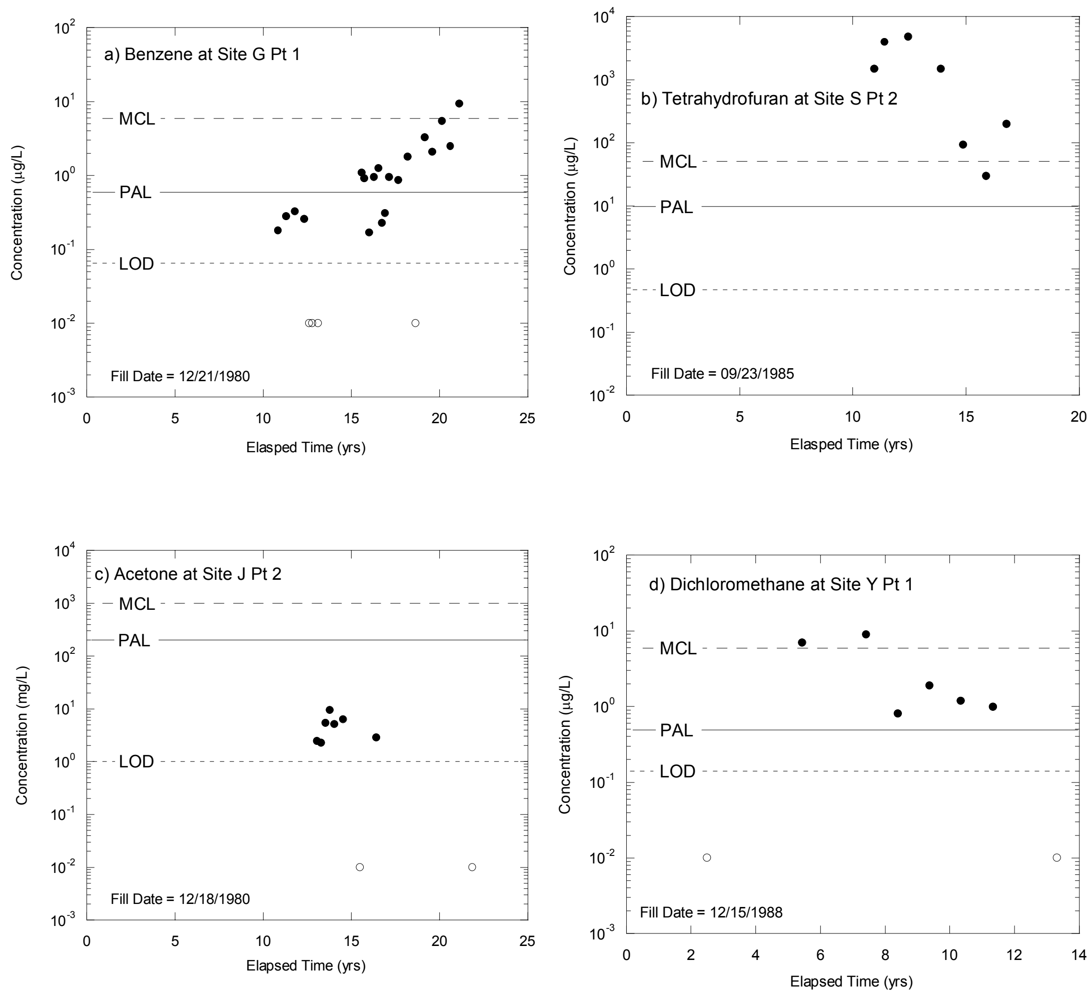


Figure 2.4.2 Typical concentration record for VOCs along with the LOD, PAL, and ES: (a) benzene, (b) tetrahydrofuran, (c) acetone, and (d) dichloromethane.

alkenes are not graphed in Fig. 2.4.2, but data pertaining to compounds in this class exhibit variability similar to that of the alkanes. The data in Fig. 2.4.2 indicate that VOC concentrations frequently exceed the Wisconsin PAL and in some cases exceed the USEPA MCL. Trends with time as measured from the date refuse was first placed in the landfill exist in some, but not all of the data (e.g., the benzene concentration is increasing at Site G, whereas the acetone concentration at Site J shows no trend), and at essentially all sites some non-detections periodically occur even when detections are commonplace (open symbols in Figs. 2.4.2a, c, and d). The data in Fig. 2.4.2 also illustrate that VOCs are present in lysimeters in as little as 6 yrs from the date when refuse was first placed in the landfill (e.g. dichloromethane at Site Y). Even earlier arrivals are possible, given that VOC monitoring was not required at all sites until the mid-1990s. The lag between fill date and VOC detection in the lysimeter is believed to be a result of monitoring start date because other data examined have VOC detections arriving as early as one year.

Summary statistics are provided in Table 2.4.1 for the concentrations of the 27 VOCs with three or more detections in a lysimeter. Also included in Table 2.4.1 is the number of lysimeters for which each VOC was detected, the Wisconsin PAL and ES and the USEPA MCL for each VOC, the average minimum concentration, the average maximum concentration, the overall arithmetic mean concentration for each VOC (computed using concentrations above the LOD), the average number of detections above the PAL, the average number of detections above the ES, the average number of detections above the LOD, and the average number of samples analyzed. The averages were based on all lysimeters with 3 or more detections. Of the 1356 detections, 37% (495) exceeded the Wisconsin PAL and 15% (202) exceeded the Wisconsin ES or the USEPA MCL. The average concentrations range between 0.1 and 100 μg/l for the aromatics, the alkanes, and

Table 2.4.1 Summary statistics for VOCs in lysimeters in Wisconsin along with the Wisconsin ES and PAL and the USEPA MCL.

Parameter	Number Sites with Detections	PAL[2] (µg/l)	ES[3] (µg/l)	US EPA MCL[4] (µg/l)	Avg. Minimum Conc. (µg/l)	Avg. Maximum Conc. (µg/l)	Overall Avg. Conc. (µg/l)	Avg. Number Detections >PAL	Avg. Number Detections >ES	Avg. Number Detections	Avg. Number Samples
1,1,1-trichloroethane	5	40	200	200	0.8	52.2	10.5	0.4	0.0	7.0	14.0
1,1-dichloroethane	16	85	850	-	1.2	30.8	8.5	0.1	0.0	7.1	13.6
1,2-dichloroethane	0	0.5	5	5	-	-	-	-	-	-	-
1,2-dichloropropane	2	0.5	5	5	0.4	5.0	1.9	6.0	1.0	7.5	10.5
Acetone	8	200	1000	-	5.2	811	268	0.5	0.1	4.9	8.4
Benzene	16	0.5	5	5	0.7	7.7	2.7	4.5	1.1	6.6	12.4
Chlorobenzene	2	20	100	100	5.6	58.5	19.9	3.0	0.0	14.5	16.0
Chloroethane	5	80	400	-	3.8	54.6	21.7	0.6	0.0	5.6	16.4
Chloroform	1	0.6	6	-	0.4	5.9	2.1	5.0	0.0	9.0	13.0
Chloromethane	6	0.3	3	-	0.7	2.7	1.7	3.2	1.0	4.3	13.7
1,2-dichloroethylene (cis)	8	7	70	70	0.4	95.8	20.3	2.3	0.5	7.1	12.5
Dichlorodifluoromethane	10	200	1000	-	7.0	24.3	13.3	0.0	0.0	5.3	10.8
Dichloromethane	17	0.5	5	5	0.8	87.4	15.4	3.0	0.7	4.2	11.4
Ethylbenzene	14	140	700	700	1.0	19.8	6.8	0.0	0.0	5.1	13.2
Fluorotrichloromethane	2	698	3490	-	1.7	17.1	6.4	0.0	0.0	7.0	9.0
Methyl Ethyl Ketone	2	90	460	-	0.6	9.4	3.2	0.0	0.0	9.0	14.5
Methyl Tertiary Butyl Ether	1	12	60	-	0.9	30.0	10.8	3.0	0.0	9.0	16.0
Naphthalene	5	8	40	-	0.5	5.0	2.2	0.0	0.0	3.4	21.0
p-dichlorobenzene	7	15	75	75	0.7	11.7	3.8	0.6	0.0	8.3	17.4
1,2-dichloroethylene (trans)	3	20	100	100	0.4	2.5	1.2	0.0	0.0	4.7	12.3
Trichloroethylene	13	0.5	5	5	1.6	42.8	10.5	6.2	2.1	7.2	11.4
Tetrachloroethylene	10	0.5	5	5	3.3	44.5	21.9	6.1	1.9	6.6	13.1
Tetrahydrofuran	18	10	50	-	323	1130	638	4.7	2.9	6.3	8.1
Toluene	21	200	1000	1000	0.9	74.7	15.9	0.2	0.0	5.9	12.5
Vinyl Chloride	9	0.02	0.2	2	0.6	11.5	4.3	7.0	6.9	7.0	12.8
Xylene (total)	11	1000	10,000	10,000[1]	8.5	233	50.2	0.1	0.0	4.8	12.2
Xylene, M&P	5	1000	10,000	10,000[1]	0.7	4.2	2.1	0.0	0.0	5.6	9.0
Xylene, O-	6	1000	10,000	10,000[1]	0.4	4.9	2.6	0.0	0.0	5.0	8.7

[1] = USEPA MCL is based on xylene (total) in sample

[2] = PAL: Preventative Action Limit

[3] = ES: Enforcement Standard

[4] = MCL: Maximum Contaminant Level

the alkenes, and between 100 and 1000 μg/l for the furan tetrahydrofuran (the only furan detected).

2.4.2 Analysis of Temporal Trends

Trend analyses were conducted on the VOC data from each lysimeter using linear regression to determine if statistically significant trends existed in VOC concentration over time (i.e. to determine if the VOC concentration in the lysimeter was increasing, decreasing, or staying the same over time). The analyses were conducted by regressing concentration (C) on time and the natural logarithm concentration (lnC) on time. Analyses were conducted with logarithmically transformed data because lnC is more closely normally distributed than C (an implicit assumption when conducting trend analysis using linear regression). Samples that were below the LOD were not included in the regression analysis. In 4% of the cases, outliers (defined as a concentration 5 times greater then the average) were excluded. For most analyses, at least 10 data points were available for the regression analysis.

Significance of the trend was evaluated by determining if the slope of the regression line was statistically different from zero (if the slope is not different from zero, the data do not exhibit temporal trend). Under the null-hypothesis of the slope being zero, the slope follows a t-distribution with n-1 degrees of freedom. When the probability of falsely rejecting the null hypothesis (i.e. the p-value) is greater then the significance level α, the slope is statistically no different from zero and the data have no linear temporal trend (Berthouex and Brown 2002). For all analyses, α was set at 0.05, which is the common significance level used in hypothesis testing (Berthouex and Brown 2002).

Graphs illustrating cases of increasing concentration, no trend, and decreasing concentration are reported in terms of C in Fig. 2.4.3 and lnC in Fig. 2.4.4. Benzene was

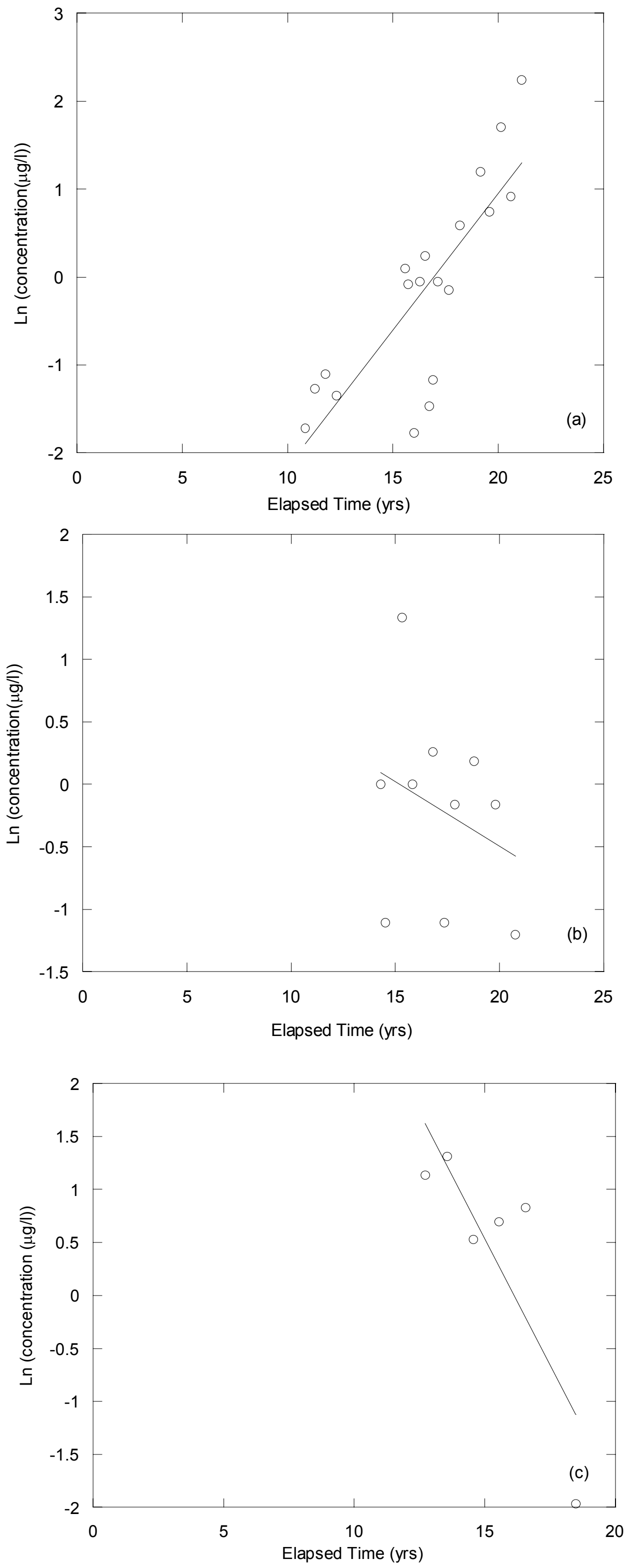


Figure 2.4.3. Representative trends for benzene from regression analysis using the natural logarithm of the concentration: (a) increasing, (b) no trend and (c) decreasing.

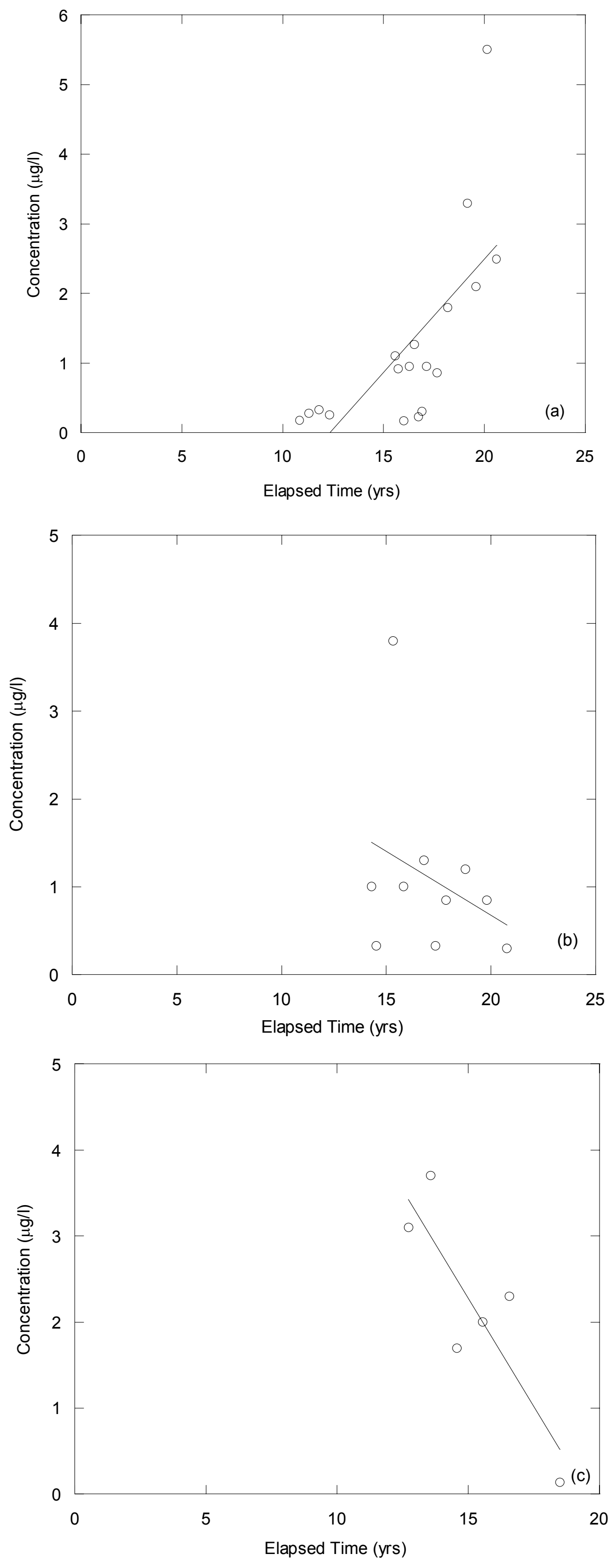


Figure 2.4.4. Representative trends for benzene from regression analysis using the reported concentration: (a) increasing, (b) no trend and (c) decreasing.

chosen for creating Figs. 2.4.3 and 2.4.4 because benzene was the only VOC that exhibited all three trends for analyses based on C and lnC.

Results of the regression analyses are summarized in Table 2.4.2. Of the 223 regression analyses performed, three (1%) had a statistically significant increasing trend based on C and 4 (2%) had a statistically significant increasing trend based on lnC, 25 (11%) had a decreasing trend based on C and 36 (16%) analyses had a decreasing trend based on lnC. The aromatic hydrocarbons more frequently had an increasing trend (1% based on C), whereas the alkanes and alkenes more frequently exhibit a decreasing trend (7% based on C).

There were 22 individual regression analyses that had conflicting results (e.g. analysis based on lnC indicated a particular trend and the analysis based on C indicated a different trend). Of the 22 conflicting analyses, 17 (77%) indicated a statistically significant trend based on lnC, but no trend based on C and 5 (23%) had opposite results (i.e., a statistically significant trend based on C, but no statistically significant trend based on lnC). When results of the C and lnC regression analyses conflicted, an additional examination was conducted. This involved examining the conflicting data from each lysimeter for each compound to determine if any of the concentration data were near-outliers (i.e. data with a concentration more than three, but less than five times the average concentration), if there was a particularly wide range in VOC concentration, or if there were relatively few VOC detections. This additional examination suggested that 9% of the conflicting analyses had detections between three and five times the average concentration, 27% had concentrations ranging at least two orders of magnitude, and 23% had only 3 or 4 detections.

Contrary to what might be expected, concentration data generally do not exhibit a temporal trend over the range of times during which data were collected (4 to 20 yr). In fact, most analyses (88% based on C and 82% based on lnC) had no statistically significant

Table 2.4.2. Results from regression analysis for all compounds detected in leachate at landfills in Wisconsin.

Parameter	Number Sites with Detections	Analysis based on C			Analysis based on Ln C		
		Number Sites With Increasing Trend	Number Sites With No Trend	Number Sites With Decreasing Trend	Number Sites With Increasing Trend	Number Sites With No Trend	Number Sites With Decreasing Trend
1,1,1-trichloroethane	5	0	3	2	0	3	2
1,1-dichloroethane	16	0	14	2	0	13	3
1,2-dichloroethane	-	-	-	-	-	-	-
1,2-dichloropropane	2	0	1	1	0	1	1
Acetone	8	0	8	0	0	8	0
Benzene	16	1	13	2	1	14	1
Chlorobenzene	2	1	1	0	1	1	0
Chloroethane	5	0	4	1	0	4	1
Chloroform	1	0	1	0	0	0	1
Chloromethane	6	0	6	0	0	6	0
1,2-dichloroethylene (cis)	8	0	7	1	0	7	1
Dichlorodifluoromethane	10	0	9	1	0	8	2
Dichloromethane	17	0	15	2	1	14	2
Ethylbenzene	14	0	14	0	0	13	1
Fluorotrichloromethane	2	0	1	1	0	1	1
Methyl Ethyl Ketone	2	0	2	0	0	2	0
Methyl Tertiary Butyl Ether	1	0	1	0	0	1	0
Naphthalene	5	0	5	0	1	4	0
p-dichlorobenzene	7	0	6	1	0	5	2
1,2-dichloroethylene (trans)	3	0	3	0	0	3	0
Trichloroethylene	13	0	9	4	0	10	3
Tetrachloroethylene	10	0	9	1	0	10	0
Tetrahydrofuran	18	0	17	1	0	15	3
Toluene	21	0	20	1	0	17	4
Vinyl Chloride	9	0	8	1	0	7	2
Xylene (total)	11	0	11	0	0	8	3
Xylene, M&P	5	1	3	1	0	4	1
Xylene, O-	6	0	4	2	0	4	2

temporal trends (for approximately 25 yrs of concentration data). This suggests that landfills may present a relatively constant contaminant source for an extended period of time.

2.4.3 Comparison of VOC Concentrations with Regulatory Standards

Data pertaining to VOC concentrations in the lysimeter were collected and pooled on a VOC specific basis for comparison with the concentration from many sites and the USEPA MCL or Wisconsin ES. The VOC concentrations in the lysimeters were pooled to provide a larger data set from which general observations could be made. However, before data were pooled, the data for each VOC were examined on a site-by-site basis to determine if there were statistical differences in concentration data between sites. To determine if the data could be pooled on a VOC specific basis, 2 criteria were established. One criterion was that a particular VOC needed to be detected at least three times in at least 5 lysimeters, to ensure that adequate data were available and so that data from one lysimeter did not dominate the overall pooled data set. Additionally, an analysis of variance (ANOVA) was conducted using the data pertaining to each VOC satisfying the first criterion (i.e. separate ANOVAs were conducted comparing concentrations from all lysimeters on a compound-by-compound basis). The criterion used for the ANOVA was that $F < F_{cr}$, suggesting that differences between the data for each lysimeter are not statistically significant. Data that met these criteria were considered statistically similar and were pooled.

Of the 27 VOCs detected in lysimeters, 7 were detected three or more times in less than 5 lysimeters and were thus not included in the ANOVA. The remaining 20 VOCs (1,1,1-trichloroethane, 1,1-dichloroethane, acetone, benzene, chloroethane, chloromethane, 1,2-dichloroethylene (cis), dichlorodifluoromethane, dichloromethane, ethylbenzene, naphthalene, p-dichlorobenzene, trichloroethylene, tetrachloroethylene, tetrahydrofuran, toluene, vinyl chloride, xylene (total), m&p-xylene, o-xylene) were detected three or more times (in each lysimeter) in 5 or more lysimeters and were thus included in the ANOVA. Each ANOVA compared concentrations of a given VOC between all lysimeters. That is, 20 ANOVAs were conducted, with each ANOVA comparing concentrations of a given VOC in a given lysimeter to concentrations of the same VOC in all other lysimeters meeting the previously stated criterion.

Results of these ANOVAs are summarized in Table 2.4.3. Ten of the VOCs (1,1,1-trichloroethane, 1,1-dichloroethane, cis-1,2-dichloroethene, dichloromethane, ethylbenzene, naphthalene, trichloroethylene, toluene, xylene (total), and o-xylene) showed no significant difference in concentration between any of the lysimeters. A pooled concentration data set was formed for each of these VOCs. For the other 10 VOCs, significant differences existed between data sets for some of the lysimeters. For these VOCs, only those data sets that were not statistically different were included in the pool. For these VOCs, the pooled data sets excluded data from 14% (acetone) to 60% (chloromethane) of the lysimeters.

An example of a pooled data set (73 detections of dichloromethane (DCM) from 11 sites) is shown in Fig. 2.4.5. The data fall within a band having an upper bound of 20 μg/L and a lower bound of 0.2 μg/L. Of the detections shown in Fig. 2.4.5, 16% exceed the MCL and 69% exceed the PAL. The geometric and arithmetic mean concentrations are also shown in Fig. 2.4.5. Parkhurst (1998) suggests that geometric means are biased low and do not represent components of mass balance properly, whereas arithmetic means are unbiased and more consistent with mass balance. Nevertheless, both are provided here. The arithmetic mean is 43 times greater than the PAL and the geometric means is 2.5 times greater than the PAL for DCM. When comparing the geometric and arithmetic means to the

Table 2.4.3 ANOVA results from sites where VOCs were detected and the percentage of sites where the concentrations were not significantly different.

VOC	F	F_{cr}	Degrees of Freedom	% Sites With no Significant Difference
1,1,1-trichloroethane	1.04	2.67	4	100
1,1-dichloroethane	1.34	1.91	12	100
Acetone	2.41	2.68	4	83
Benzene	1.72	1.92	11	86
Chloroethane	1.98	3.16	3	80
Chloromethane	3.88	4.75	1	40
1,2-dichloroethylene (cis)	1.32	2.20	6	100
Dichlorodifluoromethane	2.98	3.03	3	50
Dichloromethane	0.76	1.99	10	100
Ethylbenzene	1.12	1.92	12	100
Naphthalene	0.15	3.41	3	100
p-dichlorobenzene	0.77	2.68	4	83
Trichloroethylene	1.26	1.95	10	100
Tetrachloroethylene	2.06	3.16	3	44
Tetrahydrofuran	1.31	2.31	6	64
Toluene	0.76	1.78	14	100
Vinyl Chloride	0.99	2.83	3	57
Xylene (total)	0.57	2.11	9	100
Xylene, M&P	0.08	3.52	2	75
Xylene, O-	0.62	2.76	4	100

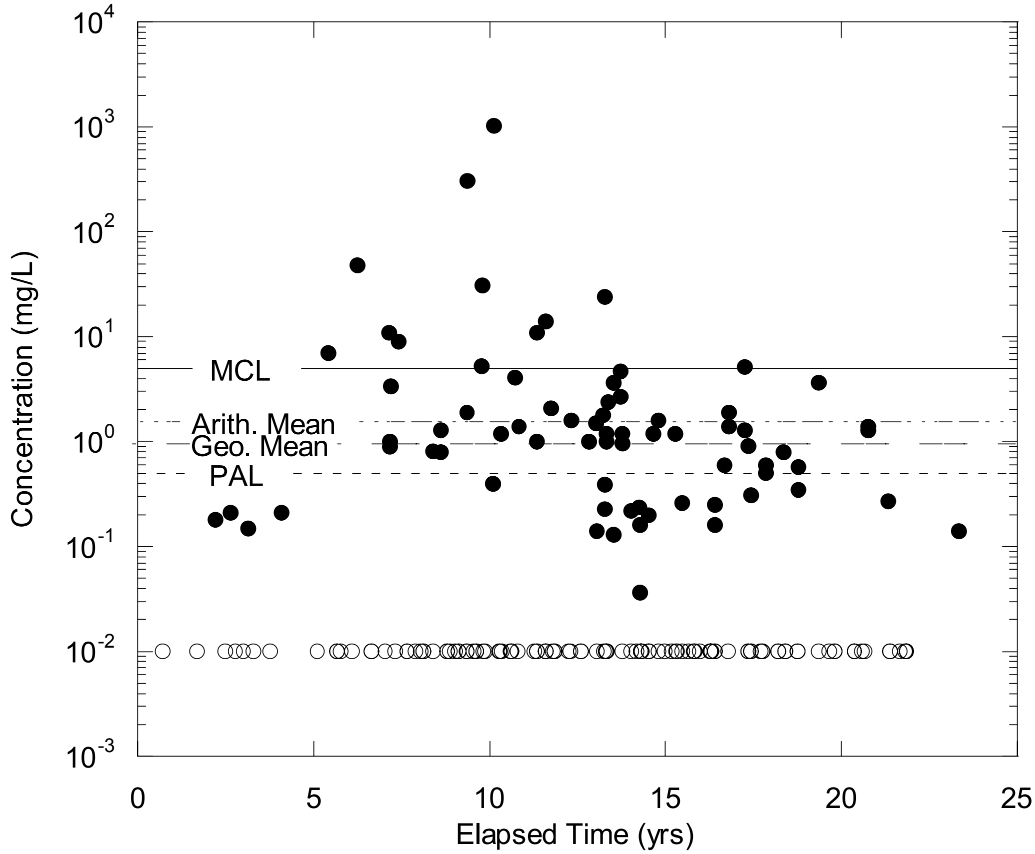


Figure 2.4.5.Typical concentration of dichloromethane in lysimeters at landfills in Wisconsin, including the MCL, PAL, arithmetic mean, and geometric mean.

MCL, the geometric mean is 4.1 times less than the MCL whereas the arithmetic mean is 4.3 times greater than the MCL for DCM.

Examination of the overall average VOC concentrations in the pooled lysimeter data sets suggests that 5 VOCs (dichloromethane, trichloroethylene, tetrachloroethylene, tetrahydrofuran, and vinyl chloride), representing three compound classes (alkanes, alkenes, and furans), have overall average concentrations exceeding the MCL. The percent of detections of these VOCs with concentrations exceeding the MCL are as follows: dichloromethane (DCM)-17%, trichloroethylene (TCE)-29%, tetrachloroethylene (PCE)-29%, tetrahydrofuran-46%, and vinyl chloride-98%. The overall average concentration appears to be controlled by fewer detections significantly above the MCL for DCM, TCE, and PCE since these compounds have a low (<30%) percentage of detections above the MCL.

2.4.4 Comparison of Leachate and Lysimeter Data

VOC concentrations in the lysimeters (i.e. the lysimeters at the 34 landfills discussed in section 2.4.1) were compared with corresponding concentrations in the leachate for all lysimeters with three or more detections of a given VOC. Results of the comparison are summarized in Table 2.4.4. A 'Y' indicates that a VOC was detected in both the leachate and the lysimeter at the landfill and a hyphen indicates that a VOC was not detected in both the leachate and the lysimeter. Of the 34 landfills included in the comparison (i.e. those with a VOC detected three or more times in either the leachate or lysimeter), 28 landfills had at least one VOC detected three or more times in both the leachate and the lysimeter. Of these 28 landfills with at least one particular VOC detected on three or more occasions in the leachate and the lysimeter, 6 landfills were lined (Site Q, Site V, Site CC, Site DD, Site

Table 2.4.4. Landfills in Wisconsin with VOC detections in leachate and lysimeters reported on a compound-by-compound basis.

Compounds	Number of landfills with detections in leachate and lysimeters	Landfills with VOCs detected in leachate and lysimeters																											
		A	B	C	E	G	H	I	J	L	M	N	O	P	Q	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	GG	HH
1,1,1-trichloroethane	2	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-
1,1-dichloroethane	11	-	-	Y	Y	Y	Y	-	Y	-	-	-	Y	Y	-	Y	-	Y	-	-	-	Y	-	-	-	-	Y	-	
1,2-dichloroethane	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-dichloropropane	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	5	-	-	-	Y	-	-	-	-	-	-	Y	Y	-	-	Y	-	-	-	-	-	-	-	-	-	Y	-	-	-
Benzene	14	Y	-	-	Y	Y	Y	Y	Y	Y	Y	-	-	Y	Y	Y	-	Y	-	-	-	Y	-	-	-	-	Y	-	-
Chlorobenzene	1	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	2	Y	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-dichloroethylene (cis)	5	-	-	-	-	Y	-	Y	-	-	-	-	Y	-	-	Y	-	Y	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	3	-	-	-	-	Y	-	Y	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	8	-	-	-	Y	-	Y	-	Y	-	-	-	Y	-	-	-	-	Y	-	-	-	-	Y	-	-	Y	-	Y	-
Ethylbenzene	13	Y	-	-	Y	Y	-	Y	Y	-	-	Y	Y	-	Y	Y	Y	Y	-	-	-	Y	-	-	-	-	Y	-	-
Methyl Ethyl Ketone	1	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Teriary Butyl Ether	1	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	4	-	-	-	-	Y	-	Y	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-
p-dichlorobenzene	5	-	Y	Y	-	Y	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-
Trichloroethylene	4	-	-	-	-	-	Y	-	-	-	-	-	Y	-	-	-	-	Y	-	-	Y	-	-	-	-	-	-	-	-
Tetrachloroethylene	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-
Tetrahydrofuran	11	-	-	-	-	-	-	-	Y	-	Y	Y	-	Y	Y	Y	-	-	-	-	-	Y	Y	Y	Y	Y	-	-	-
Toluene	15	Y	-	-	Y	Y	Y	Y	Y	-	Y	-	Y	-	Y	Y	-	-	Y	Y	-	Y	-	-	-	-	Y	-	Y
Vinyl Chloride	1	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene (total)	9	-	-	-	Y	Y	-	-	-	-	-	Y	Y	-	Y	Y	-	-	-	-	-	Y	-	-	-	-	Y	-	Y
Xylene, M&P	3	Y	-	-	-	-	-	Y	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, O-	4	Y	-	-	-	-	-	Y	Y	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Disulfide	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-dichlorethylene (trans)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-dichlorobenzene	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

"-" = not detected in leachate and lysimeter
"Y" = detected in leachate and lysimeter

GG, and Site HH) with a composite liner (geomembrane over 1.22 m of clay) and 22 landfills were lined with a clay liner (thicknesses ranging between 1.22 and 1.52 m).

There were 22 VOCs detected in both leachate and lysimeter samples of the 28 landfills with VOC detections during three or more monitoring occasions. The VOCs detected most frequently in both the leachate and lysimeters on a site-by-site basis are the aromatic hydrocarbons [toluene (15 sites), benzene (14 sites), and ethylbenzene (13 sites)], the alkane 1,1-dichloroethane (11 sites), and the furan tetrahydrofuran (11 sites). For 20 (91%) of the VOCs, detections were more frequent in the leachate than in the lysimeters. Sixteen (73%) VOCs were detected in leachate in at least twice as many cells as they were detected in lysimeters. However, in some cases, VOCs were detected in the lysimeters in more cells than in the leachate. Fluorotrichloromethane was detected in three lysimeters, but was not detected in any leachate samples. Also, chloromethane, dichlorodifluoromethane, 1,2-dichloroethylene (trans), and tetrachloroethylene were detected in leachate from fewer cells than lysimeters. One possible reason why some VOCs may be detected more frequently in the lysimeters as compared to the leachate is that some VOCs may degrade and thus the degradation products are detected more frequently in the lysimeters (e.g. a degradation product of trichloroethylene is 1,2-dichloroethylene (trans) or degradation products of refrigerants). Another possible reason is that some “parent” VOCs may not be monitored (i.e. not detected in leachate), but the degradation products are monitored and thus these VOCs are found more frequently in the lysimeters.

Overall arithmetic mean VOC concentrations in leachate and the lysimeters are compared in Table 2.4.5. The arithmetic means for VOCs in leachate are from Section 1. The arithmetic means for the lysimeters are based on the data in Sec. 2.4.1. For 19 (86%) of the VOCs detected in both leachate and lysimeters, the arithmetic mean

Table 2.4.5 Comparison of the overall average VOC concentration in leachate and lysimeters and the concentration detected in lysimeters relative to leachate (as a percentage).

Parameter	Overall Avg. Leachate Concentration (μg/l)	Overall Avg. Lysimeter Concentration (μg/l)	Lysimeter Concentration as a % of Leachate Conc.
1,1,1-trichloroethane	48.8	10.5	22
1,1-dichloroethane	31.5	8.53	27
1,2-dichloroethane	4.3	-	-
1,2-dichloropropane	5.97	1.9	32
Acetone	3430	268	8
Benzene	6.16	2.69	44
Chlorobenzene	4.1	19.9	485
Chloroethane	36.6	21.7	59
Chloroform	103	2.07	2
Chloromethane	3.71	1.71	46
1,2-dichloroethylene (cis)	17.5	20.3	116
Dichlorodifluoromethane	15.9	13.3	84
Dichloromethane	238	15.4	6
Ethylbenzene	35.9	6.78	19
Methyl Ethyl Ketone	5240	3.15	0
Methyl Tertiary Butyl Ether	24.9	10.8	43
Naphthalene	20.3	2.18	11
p-dichlorobenzene	11.4	3.77	33
Trichloroethylene	14.7	10.5	71
Tetrachloroethylene	8.1	21.9	270
Tetrahydrofuran	1194	638	53
Toluene	168	15.9	9
Vinyl Chloride	12.5	4.28	34
Xylene O, M, and P-	102	50.2	49
Xylene, M&P	84	2.09	2
Xylene, O-	194	2.56	1
trans-1,2-dichlorethene	63.4	1.19	2
Styrene	10.7	-	-
Carbon Disulfide	15.1	-	-
Bromomethane	32.4	-	-
o-dichlorobenzene	10.7	-	-
Fluorotrichloromethane	-	6.39	-

"-" Indicates compound was not detected and thus no % is calculated concentration in the leachate is higher than the arithmetic mean concentration in the lysimeter, with arithmetic mean concentrations in the lysimeters ranging from <1% (methyl ethyl ketone) to 84% (dichlorodifluoromethane) of the arithmetic mean concentrations in the leachate. The higher concentrations observed in the leachate compared to the lysimeters indicates that the liners at the sites in this study are functioning as transport retarders. A comparison of leachate and lysimeter concentrations for each of the five VOCs most frequently detected in leachate and lysimeters is in Figure 2.4.6 using box plots. The median leachate concentration exceeds the median lysimeter concentration by a factor of 2.8 for 1,1-dichloroethane (1,1-DCA), 4.3 for benzene, 17.2 for ethylbenzene, 16.1 for tetrahydrofuran, and 49 for toluene.

Comparison on a VOC class basis also indicates that concentrations in the leachate are higher than those in the lysimeters. The concentrations reported in Section 1 show that the aromatic compounds are in the range of 1-100 μg/L in the leachate and between 1 and 10 μg/L in the lysimeters. The alkanes and alkenes range between 5 and 75 μg/L in the leachate and between 1 and 25 μg/L in the lysimeters. The ketones and furans range between 1 and 10,000 μg/L in the leachate where as the ketones are in the range of 1-800 μg/L and the furans are in the range of 100-1000 μg/L in the lysimeters. Given that each of the sites in the analysis was lined with at least 1.22 m of compacted clay overlain, in some cases, by a geomembrane, higher concentrations were anticipated in the leachate than in the lysimeters.

2.4.5 Effect of Liner Type

An analysis was conducted to determine if VOC concentrations in the lysimeters differed depending on the type of liner (clay liner vs. composite liner). Twenty-two VOCs

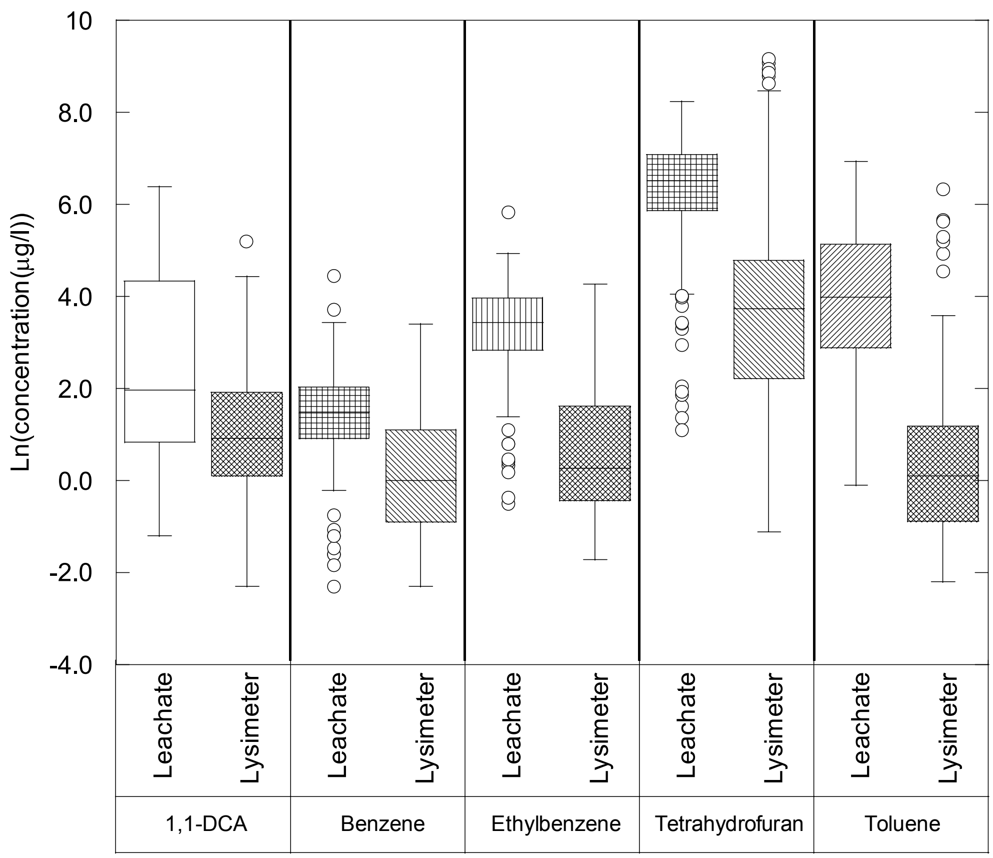


Figure 2.4.6. Box plots of concentration in pooled data for the 5 most frequently detected VOCs found in both leachate and lysimeters.

were detected in both leachate and lysimeters in cells lined with compacted clay and 11 VOCs (1,1-dichloroethane, acetone, benzene, dichloromethane, ethylbenzene, p-dichlorobenzene, tetrahydrofuran, toluene, trichloroethylene, xylene (total), and naphthalene) were detected in both the leachate and lysimeters in cells with composite liners. All of the VOCs detected in both the leachate and lysimeters in cells with composite liners were also detected in the cells with clay liners.

VOC data were pooled into data sets for composite-lined and clay-lined landfills., To determine those data sets that could be included in each pool, ANOVAs were conducted to compare concentrations of the 11 aforementioned VOCs (i.e., those VOCs detected in both the leachate and lysimeters) in the lysimeters on a site-by-site basis. The data were separated into two groups based on liner type (i.e. concentration data for a particular VOC pertaining to composite lined landfills in one group and concentration data pertaining to clay lined landfills in another) and an ANOVA was conducted on each group to determine if significant differences existed between VOC concentrations in each of the lysimeters. Data that were not significantly different were pooled. The criterion used for this first analysis was that $F < F_{cr}$, with F_{cr} defined for a 5% significance level. On average, there were approximately 3 times more concentration measurements pertaining to the clay lined landfills, as compared to the composite lined landfills in these ANOVAs.

Results of these ANOVAs are summarized in Table 2.4.6. For 8 of the 11 VOCs (1,1-dichloroethane, acetone, benzene, dichloromethane, ethylbenzene, naphthalene, p-dichlorobenzene, trichloroethylene, tetrahydrofuran, toluene, and xylene, (total)) with detections in both leachate and lysimeters, there was no statistically significant difference between VOC concentrations at the sites being considered for the pool. Therefore, the concentration data for all clay-lined sites were pooled and all composite-lined sites were pooled for these 8 VOCs. Examination of the data for the other 3 VOCs (benzene,

Table 2.4.6 ANOVA results for the number of clay-lined and composite-lined sites included in each pool on a compound-by-compound basis.

VOC	Clay			Composite		
	Number of Sites Pooled	F	F_{cr}	Number of Sites Pooled	F	F_{cr}
1,1-dichloroethane	10	1.62	2.01	1	NA	NA
Acetone	4	2.85	4.26	1	NA	NA
Benzene	11(12)	1.84	1.97	2	1.01	4.84
Dichloromethane	7	0.79	2.3	2	3.19	6.61
Ethylbenzene	11	1.97	2.03	2	0.01	4.84
Naphthalene	3	0.23	4.46	1	NA	NA
p-dichlorobenzene	4	1.59	2.91	1	NA	NA
Trichloroethylene	3	0.82	3.68	1	NA	NA
Tetrahydrofuran	5(9)	2.51	2.52	2	1.43	5.12
Toluene	11	1.39	1.96	4	0.69	2.98
Xylene (total)	6	1.97	2.64	3	0.61	3.59

NA = not applicable when data from only one site available
(x) = number of sites originally considered for pooling

trichloroethylene, and tetrahydrofuran) indicated that several sites with particularly high concentrations were controlling the ANOVA. These "outlier" sites were removed, and ANOVAs were conducted on the trimmed data sets. After conducting this ANOVA, statistically similar concentrations were obtained for benzene at 92% (11 of 12) of the clay-lined sites and all (2 of 2) of the composite-lined sites, trichloroethylene at 75% (3 of 4) of the clay-lined sites and the only composite-lined site, and tetrahydrofuran at 56% (5 of 9) of the clay-lined sites and all (2 of 2) of the composite-lined sites. When a significant difference in concentration existed at a particular site for a particular VOC, a visual examination was performed and site(s) with significantly different concentrations were removed and an additional ANOVA was conducted on the trimmed data set.

ANOVAs were then conducted with the pooled data to determine if there was a statistically significant difference in VOC concentration in the lysimeters beneath clay-lined landfills and composite-lined landfills. A significance level $\alpha = 0.05$ was used. Findings from this ANOVA are summarized in Table 2.4.7. Arithmetic mean concentrations and the number of sites with detections of a particular VOC are also reported in Table 2.4.7. Only two VOCs (acetone and benzene) had significantly different concentrations in the lysimeters beneath the sites with clay and composite liners. For both compounds, the average concentration was higher in the lysimeter beneath composite-lined landfills. However, acetone had an outlier, which when removed, resulted in no significant difference in concentration between liner types. Additionally, the data set used to determine the average benzene concentration in the lysimeters of clay-lined landfills was much larger than the data set for the composite-lined landfills.

Table 2.4.7 The average concentration of VOCs detected in lysimeters and results from ANOVA comparing concentrations in lysimeters between clay and composite lined landfills.

Parameter	Number of Clay Lined Sites	Number of Composite Lined Sites	Average concentration in lysimeter (mg/L)		F	F_{cr}	Statistical Inference
			Clay	Composite			
1,1-dichloroethane	10 (83)	1 (3)	19	8.5	0.54	3.95	No Difference
Acetone	3 (12)	1 (3)	7.6	1900[1]	5.22	4.67	Significant Difference
Benzene	11 (83)	2 (13)	1.9	5.4	7.67	3.94	Significant Difference
Dichloromethane	7 (54)	2 (7)	8.2	9.1	0.002	4.01	No Difference
Ethylbenzene	11 (61)	2 (13)	5.7	8.9	0.66	3.97	No Difference
Naphthalene	3 (11)	1 (6)	2	2.5	0.18	4.54	No Difference
p-dichlorobenzene	4 (36)	1 (17)	6.2	2.7	3.87	4.03	No Difference
Trichloroethylene	3 (18)	1 (3)	4.9	1.5	0.84	4.38	No Difference
Tetrachloroethylene	1 (4)	1 (5)	7.7	31	1.56	5.59	No Difference
Tetrahydrofuran	5 (67)	2 (11)	56	73	0.36	3.97	No Difference
Toluene	11 (88)	4 (30)	17	27	0.46	3.92	No Difference
Xylene (total)	6 (29)	3 (20)	10	120	1.86	4.05	No Difference

"[1]" = outlier was not removed when average was calculated
"(x)" = indicated the number of concentration measurements for calculating the average concentration

2.5 VOC TRANSPORT ANALYSIS

2.5.1 Objectives

Concentration data pertaining to VOCs found in the leachate and lysimeters have been examined. The data presented and summarized have shown which VOCs are most frequently detected in the leachate and lysimeters and the type of temporal trends in VOC concentration in the leachate and lysimeters (increasing, decreasing, or no trend). In particular, 82% of the temporal trend analyses for lysimeters and 71% of the temporal trend analyses have shown that there were no statistically significant increasing or decreasing trends. The ANOVAs previously described provide information as to which VOC concentration data can be pooled (by compound). Concentration data that were (1) detected in at least 10% of the landfills, (2) had no temporal trends within each site, and (3) had no statistically significant difference in concentration (for a particular VOC) between landfills were pooled. In general, twice as many VOC detection data are from leachate and lysimeters at clay lined landfills as compared to composite lined landfills. The following investigation of contaminant transport will consider both clay and composite lined landfills.

There are analytical solutions and solute transport models which have been developed to describe contaminant transport (diffusive and advective) through soils and other materials (e.g., geomembranes and geosynthetic clay liners (GCLs)) used for landfill liner systems (Ogata and Banks 1961, Freeze and Cherry 1979, van Genuchten 1981, Zheng 1992, Sangam and Rowe 2001, Kim et al. 2001, Foose et al. 2002). Analytical solutions such as those presented by Ogata and Banks (1961), van Genuchten (1981), and Shackelford (1990) were examined. Additionally, more complex models, such as those presented by Foose et al. (1999) and Foose et al. (2002) that used a multiple-layer, finite-difference model and a three-dimensional flow and solute transport model to simulate diffusion and solute transport for various liner configurations (clay, composite using clay and a geomembrane, composite using a geosynthetic clay liner (GCL) and a geomembrane, etc.) were considered. Foose et al. (2001) also examined analytical equations that can be used for solute transport and are less numerically intensive than the aforementioned models, but were shown to provide results similar to the more complex models. They showed that these analytical solutions can be used to evaluate solute transport through clay and composite liners provided proper boundary conditions are applied.

A special case of the three dimensional solute transport equation, examined by Foose et al. 2001, for one dimensional solute transport in a saturated, homogenous, and semi-infinitely thick porous medium, is used to describe contaminant transport through landfill liners. The special case of the three dimensional solute transport equation derived and presented by van Genuchten 1981 is given in Eq 3. Equation 3 was used to model contaminant transport at the landfills in Wisconsin and comparisons were made to assess if the transport through the liners could be explained by this model of advective-diffusive transport. These comparisons involved examining VOC concentration data from field samples from landfills in Wisconsin and comparing these data with the results from the analytical solutions described in Eq.3 which is given below:

$$C/C_o = \frac{v}{(v+u)}\exp\left[\frac{(v-u)x}{2D}\right]erfc\left[\frac{Rx-ut}{2(DRt)^{1/2}}\right] + \frac{v}{(v-u)}\exp\left[\frac{(v+u)x}{2D}\right]erfc\left[\frac{Rx+ut}{2(DRt)^{1/2}}\right] + \frac{v^2}{2\mu D}\exp\left(\frac{vx}{D}-\frac{\mu t}{R}\right)erfc\left[\frac{Rx+vt}{2(DRt)^{1/2}}\right] \quad (3)$$

where v = seepage velocity; D = diffusion coefficient; R = retardation factor; μ = general first-order decay constant; and $u = v\left[1+4\mu D/v^2\right]^{1/2}$. Leachate concentration data are considered source concentration (C_0) and the concentration in the lysimeter are the breakthrough concentration (C) for the field data. Equation 3 accounts for advection, diffusion, and reactions (i.e., degradation) and was used to predict the expected relative VOC concentration for each particular VOC at sites where VOCs were detected in both the leachate and lysimeters at the examined Wisconsin landfills.

Pathways for VOC migration from the leachate on top of the liner to the lysimeter beneath the liner are via advection and diffusion for clay liners and via advection (through defects in the geomembrane) and diffusion through the entire footprint of the landfill for composite liners (Park et al. 1996). Advective transport in clay liners generally occurs as a result of poorly constructed liners with inter-clod pores or where lifts are not keyed together properly resulting in voids that allow advective transport. The amount of contaminant mass transported via advection is proportional to the seepage velocity and the concentration of contaminant. Since the seepage velocity for well constructed liners is on the order of approximately 10^{-8} cm/s (Benson et al. 1999) diffusive transport is believed to be the dominant mode of VOC transport through landfill liners. Foose et al. 2001, explains that diffusion of organic solutes through geomembranes occurs at the molecular level and can be described as a three step process, which includes partitioning between leachate and geomembrane, diffusion through the geomembrane, and partitioning between the geomembrane and pore water in the clay component of the landfill liner (Figure 2.5.1).

2.5.2 Required Transport Parameters

The hydraulic conductivity, decay constant, diffusion coefficient, effective porosity, and partition coefficients are required input parameters in Eq.3. They were varied within published ranges for each compound to determine the sensitivity of the solution results (Benson et al. 1999, Howard et al. 1991, Kim et al. 1997). This process is described in the following paragraphs.

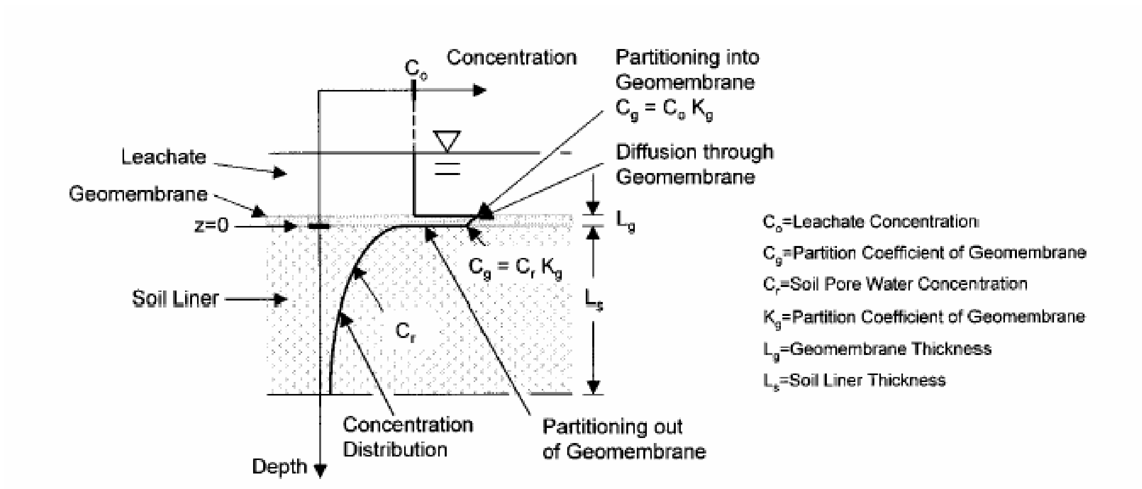


Figure 2.5.1 Schematic diagram of diffusion through composite liners (adopted from Foose et al. 2001)

The hydraulic conductivity (K) of compacted clay liner was varied to determine what effect variations in K had on the results from the analytical solution and to determine the hydraulic conductivity required to “best fit” the field data. The hydraulic conductivity of the liners was determined using data found in GEMS on the volume of liquid pumped from the lysimeters and construction documentation from each landfill. This information is used to determine the average hydraulic conductivity at clay lined landfills. The volume of liquid pumped is generally recorded in GEMS on a monthly or quarterly basis. The construction documentation was used to determine the area of each lysimeter. Using the difference in time (Δt) between lysimeter fluid extraction, the volume removed, the area of the lysimeter, and the hydraulic gradient (liner thickness plus 30 cm head divided by liner thickness) the hydraulic conductivity of the liner could be calculated. The hydraulic conductivities from sites with adequate data (from GEMS) are plotted in Figure 2.5.2. The average hydraulic conductivity is (5.19×10^{-8} cm/s), which is nearly the same as the results found by Benson et al. (1999) (average K = 4.37×10^{-8} cm/s) for landfills with well built compacted soil liners and well within the allowable regulatory level (K=1.0×10^{-7} cm/s or lower). Based on these results, C/Co was calculated with K = 1.0×10^{-7} cm/s (corresponding to the regulatory maximum K for clay liners) and with K = 5.19×10^{-8} cm/s (corresponding to the average K for the clay liners examined in this paper). It is noted that hydraulic conductivities within the aforementioned range represent the likely field hydraulic conductivities. The average leakage rate from composite lined landfills was also considered, but could not be accurately determined because adequate data were not available.

The decay constants published by Howard et al. 1991, and shown in Table 2.5.1, were used in Eq 3. Generally, the lower decay constants (longer half life) were used because higher decay constants (shorter half life) caused the results from the analytical solution to further underestimate the field data. Furthermore, results from the analytical

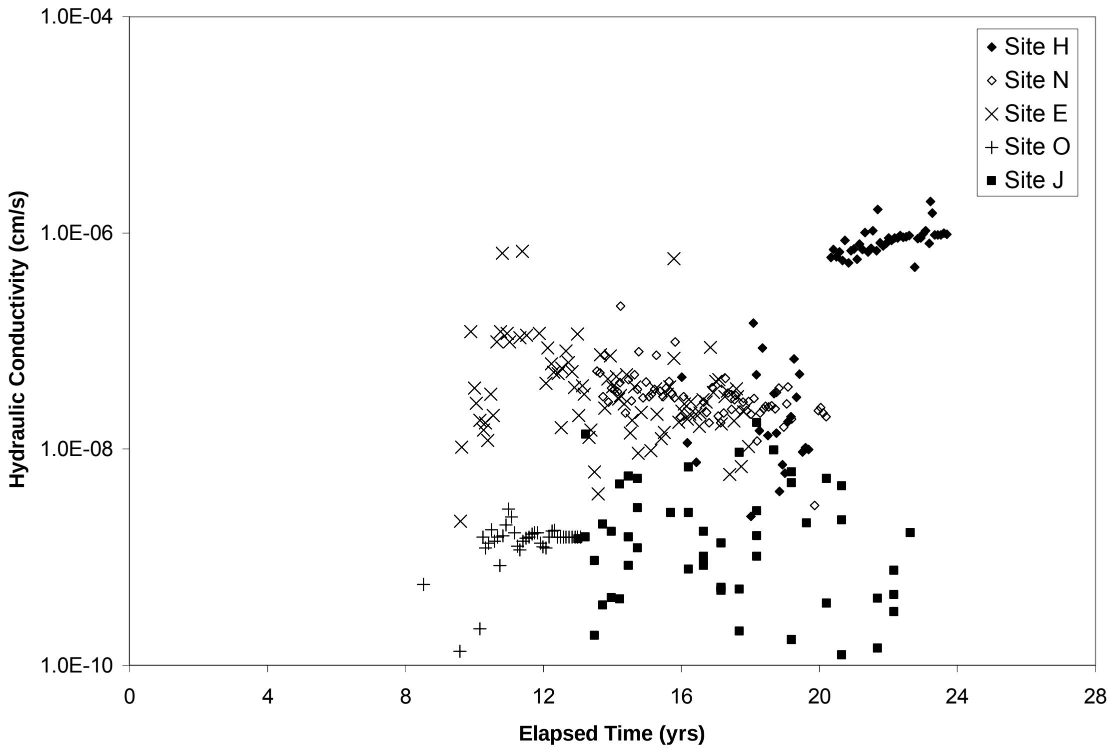


Figure 2.5.2 Hydraulic conductivity of five clay lined landfills in Wisconsin calculated based on field data.

Table 2.5.1 Input parameters used in the analytical solution for transport analysis.

Compounds	Solubility (mg/l)	High Rate Constant (days^{-1})	Low Rate Constant (days^{-1})	log K_{ow}	Diffusion Coefficient (cm^2/sec)
Alkanes					
Chloromethane	4000	2.5x10^{-2}	6.2 x10^{-3}	0.91	1.49 x10^{-5}
Dichloromethane	20000	2.5 x10^{-2}	6.2 x10^{-3}	1.31	1.26 x10^{-5}
Chloroform	8000	9.9 x10^{-2}	2.5 x10^{-2}	1.95	1.08 x10^{-5}
Dichlorodifluoromethane	280	6.2 x10^{-3}	1.0 x10^{-3}	2.16	1.11 x10^{-5}
Chloroethane	5740	2.5 x10^{-2}	6.2 x10^{-3}		1.20 x10^{-5}
1,1-Dichloroethane	5500	5.4 x10^{-3}	1.1 x10^{-3}	1.79	1.05 x10^{-5}
1,2-Dichloroethane	8690	1.7 x10^{-3}	9.6 x10^{-4}	1.46	1.08 x10^{-5}
1,1,1-Trichloroethane	4400	1.2 x10^{-3}	6.3 x10^{-4}	2.49	9.36 x10^{-5}
1,2-Dichloropropane	2700	1.0 x10^{-3}	1.3 x10^{-4}	1.99	9.33 x10^{-6}
Alkenes					
Vinyl Chloride	1100	6.2 x10^{-3}	9.6 x10^{-4}	1.27	1.34 x10^{-5}
Cis-1,2-Dichloroethene	800	6.2 x10^{-3}	9.6 x10^{-4}	1.86	1.12 x10^{-5}
Trichloroethylene (TCE)	1100	1.8 x10^{-2}	4.2 x10^{-4}	2.42	9.93 x10^{-6}
Tetrachloroethylene (PCE)	150	1.8 x10^{-2}	4.2 x10^{-4}	2.88	8.99 x10^{-6}
Arenes (Aromatic hydrocarbons)					
Benzene	1780	2.5 x10^{-2}	6.2 x10^{-3}	2.17	1.16 x10^{-5}
Chlorobenzene	500	2.5 x10^{-3}	1.2 x10^{-3}	2.78	8.97 x10^{-6}
p-Dichlorobenzene	79	6.2 x10^{-3}	9.6 x10^{-4}	3.45	8.15 x10^{-6}
Toluene	515	1.4 x10^{-2}	3.3 x10^{-3}	2.69	9.68 x10^{-6}
Ethylbenzene	152	3.9 x10^{-3}	3.0 x10^{-3}	3.20	9.16 x10^{-6}
Xylene O-	175	3.9 x10^{-3}	1.9 x10^{-3}	3.16	8.00 x10^{-6}
Xylene M-	146	2.5 x10^{-2}	1.3 x10^{-3}	3.30	7.91 x10^{-6}
Xylene P-	198	2.5 x10^{-2}	6.2 x10^{-3}	3.27	7.89 x10^{-6}
Naphthalene	30	2.8 x10^{-2}	2.7 x10^{-3}	3.33	7.63 x10^{-6}
Ketones					
Acetone	miscible	1.7 x10^{-1}	2.5 x10^{-2}	-0.24	1.28 x10^{-5}
Methyl Ethyl Ketone	136000	1.7 x10^{-1}	2.5 x10^{-2}	0.29	9.91 x10^{-6}
Ethers					
Methyl Tertiary Butyl Ether	48000	6.2 x10^{-3}	9.6 x10^{-4}	0.94	8.48 x10^{-6}
Furans					
Tetrahydrofuran	miscible				1.07 x10^{-5}

Note: The effective diffusion coefficient (D*) used in the analytical solution was calculated by multiplying the diffusion coefficient by a tortousity of 0.25.

solution were obtained with extremely low decay constants (i.e. half lives of $1x10^9$ days) to simulate a solution with advection, diffusion, and retardation, but essentially no decay.

Manassero and Shackelford 1994, explain that for low permeability soils used in liner construction, the contribution of mechanical dispersion to total dispersion is negligible, thus the total dispersion can be reduced to the effective diffusion for compacted clay liners. To determine the effective diffusion coefficient, first the molecular diffusion coefficient in water for each compound was obtained from data published by various researchers (Kim et al. 2001, Yaws 1995) as summarized in Table 2.5.1. The effective diffusion coefficient was then determined by multiplying the diffusion coefficient in water by a tortuosity of 0.25. A tortuosity factor of 0.25 was reported by Toupiol et al 2002 for a clay liner and is within 8% of the results (τ = 0.27) found by Willingham et al. (2004). The soil for which this tortuosity was reported was classified as a loam to clay-loam using the USDA classification system. Other studies examined by Willingham et al. 2004 provide similar results for tortuosity.

The effective porosity (n) used in the calculation of seepage velocity and retardation factor was adopted as the total porosity based on the findings of Kim et al. 1997. Kim et al. 1997 performed column and tank tests in order to determine the effective porosity of compacted clay materials. They found that the effective porosity from the column and tank tests ranged from 89 to 104% of the total porosity calculated from the weight-volume phase relationship. Considering the errors involved in measurement, they concluded that the effective porosity is essentially equal to the total porosity. The estimated effective porosities reported by Kim et al. 1997 ranged between 0.17 and 0.35 with an average effective porosity of 0.29. The effective porosity used to determine the parameters in Eq 3 was varied within the range reported by Kim et al. 1997 to determine the effect on the maximum relative concentration of benzene. This variation resulted in a 9% difference in maximum relative concentration when comparing n = 0.17 and n = 0.35. Because of this relatively small effect, the aforementioned average effective porosity (n = 0.29) was used to determine the seepage velocity and retardation factor in Eq.3.

The soil-water partition coefficient (K_p) was determined using the organic carbon-organic compound partition coefficient (K_{oc}), of the organic compound and the organic carbon fraction (f_{oc}) (Briggs 1981, Chiou et al. 1983, Piwoni and Banerjee 1989, Kile et al. 1995). The organic carbon fraction was varied between 0.1-6%, which is the same range found in typical clays that meet the liner requirements (Kim et al. 2001). With K_{oc} and f_{oc} the soil-water partition coefficient (K_p) was calculated using Equation 4.

$$K_p = f_{oc} K_{oc} \tag{4}$$

If K_{oc} could not be found in the literature, the equation published by Kim et al. 2001 (Eq.5), which relates the octonal-water partition coefficient (K_{ow}) and the organic carbon-organic compound partition coefficient (K_{oc}) was used.

$$\log K_{oc} = 0.92 + 0.36 \log K_{ow} (R^2 = 0.93) \tag{5}$$

Once K_p was determined, the retardation factor was calculated using Equation 6.

$$R = 1 + \left(\frac{\rho_d K_p}{n} \right) \tag{6}$$

The seepage velocity (v_s), in Equation 3, was calculated using the hydraulic conductivity (K), the hydraulic gradient (i), and the porosity (n). The hydraulic head on the base of the liner was assumed to be 30 cm, which is conservative since WDNR regulations require the maximum mound height on the landfill liner not exceed 30 cm. The hydraulic gradient was 1.19 for liners with a thickness of 1.52 m and 1.25 for liners with a thickness of 1.22 m. The remaining terms used in Eq. 3 are defined in the notations section.

Figures 2.5.3 and 2.5.4 provide examples of the effect of varying the hydraulic conductivity and decay constants of benzene. As expected, a decrease in K (while maintaining a constant decay constant 9.6×10^{-4} d^{-1}) resulted in the solution of Eq.3 shifting along the x-axis (increased time until a detectable relative concentration resulted) and thus decreasing the maximum relative concentration after 25 years (in Fig. 2.5.3). Similarly, a decrease in the decay constant (while maintaining a constant hydraulic conductivity K = 1×10^{-7} cm/s) resulted in a decrease of the maximum relative concentration (Fig. 2.5.4). However, results using a high K and slow decay constant and low K and rapid decay do not bracket the relative concentration exhibited by field data (Figure 2.5.5).

2.5.3 Data Pooling and Compound Selection

The compounds pooled and examined in this study represent the VOCs that were most frequently detected in leachate and are considered to pose a potential threat to groundwater quality. Data were pooled, as discussed in Section 2.4.3 and in Section 1.4.1.2, following criteria based on the frequency of detection (in at least 10% of the leachate and 10% of the lysimeter samples). An additional criterion that was adopted was that each compound must be detected in both the leachate and the lysimeter of a landfill. If these criteria were met, the data were pooled. The compounds for which data were pooled include acetone, benzene, cis-1,2-dichloroethylene, dichloromethane, ethylbenzene, p-dichlorobenzene, trichloroethylene, tetrachloroethylene, tetrahydrofuran, toluene, and xylene (total). These compounds represent the compound classes (alkanes, alkenes, aromatic hydrocarbons, ketones, and furans) found both in leachate and lysimeters of landfills in Wisconsin.

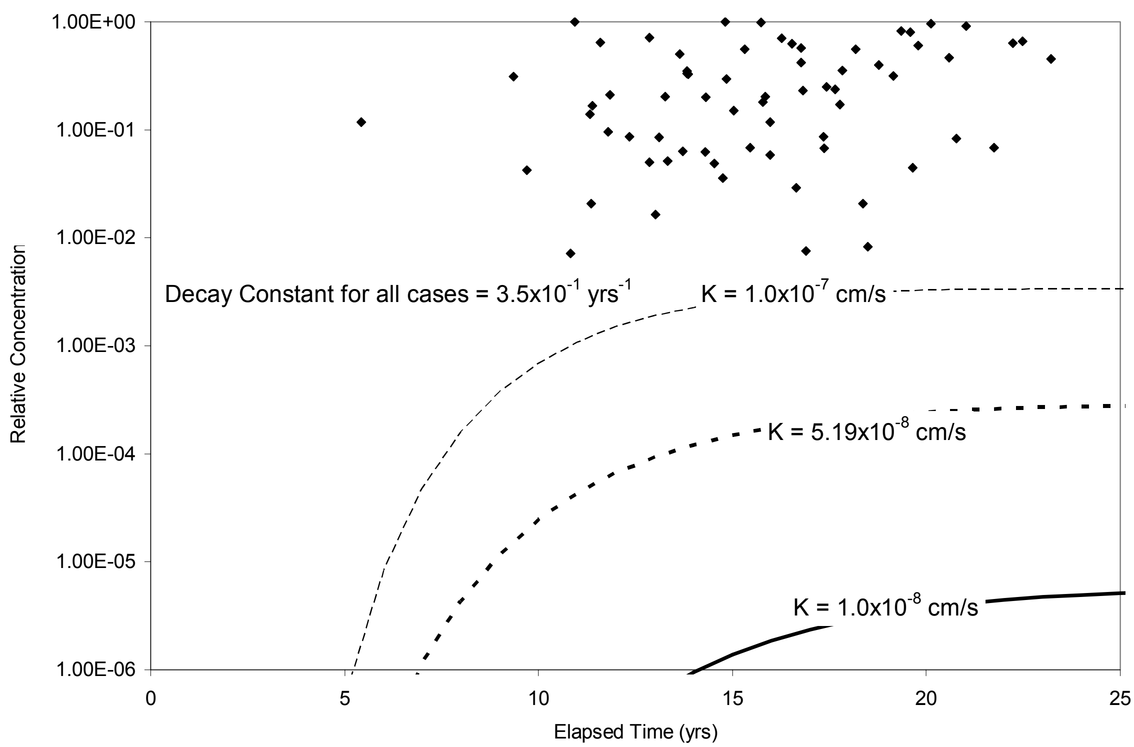


Figure 2.5.3 Results from the analytical solution with three different hydraulic conductivities with the same decay constant for benzene.

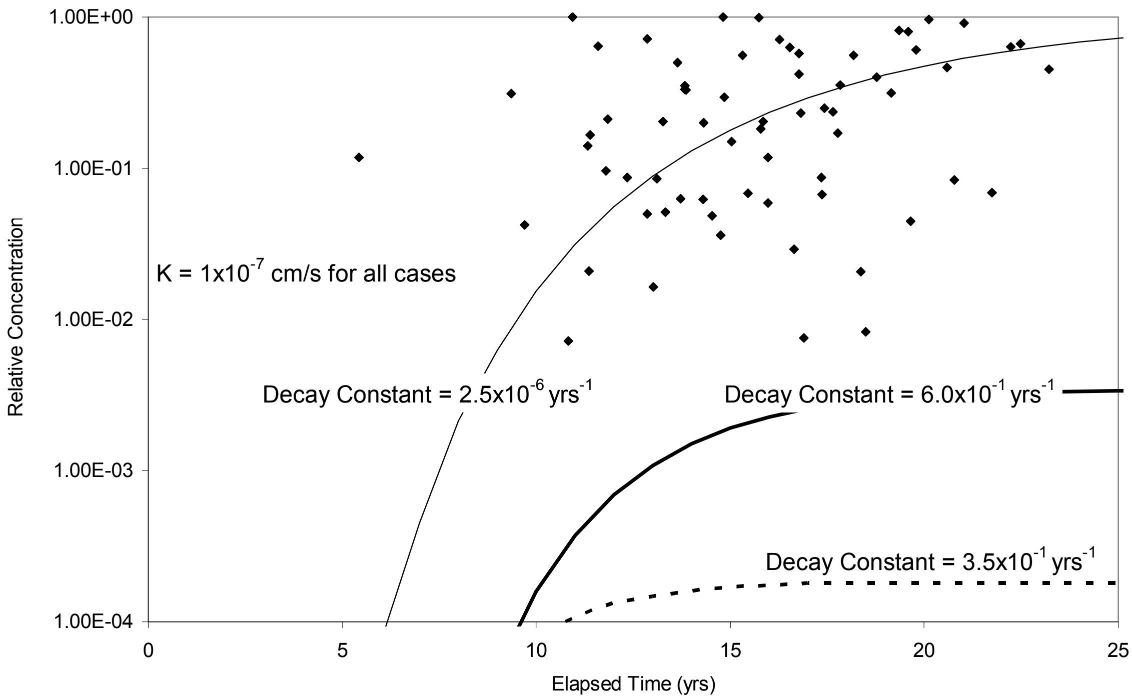


Figure 2.5.4 Results from the analytical solution with three different decay constants with the same hydraulic conductivity for benzene.

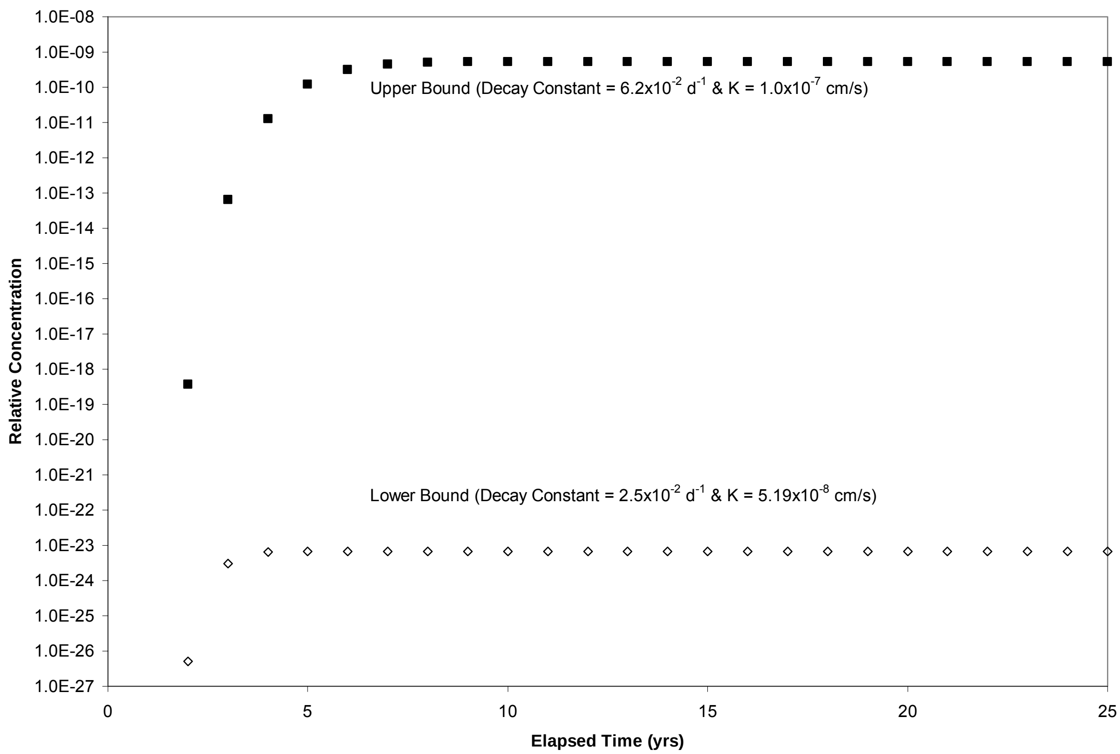


Figure 2.5.5 Upper and lower bounds of relative concentration for benzene calculated using the reported high and low decay constant for benzene and regulated and average (calculated from field data) hydraulic conductivity.

2.5.4 Comparison of Analytical Solution Results with Field Data

Field data from the leachate and lysimeter samplings were used to determine C/C_o for a given date when samples were collected at each site with adequate data (i.e. concentration data from both leachate and lysimeters sampled during the same time period). As previously mentioned, concentrations in the leachate were taken as C_o and concentrations in the lysimeters were C. The relative concentrations (C/C_o) from the pooled field data and C/C_o calculated from Eq. 3 for dichloromethane are shown in Fig. 2.5.6. Similar figures for the 11 compounds with adequate leachate and lysimeter data (i.e. in the leachate and lysimeter of 10% or more landfills) are given in Appendix G. Three solutions for clay lined landfills shown in Fig 2.5.6 represent (1) the solution with the required hydraulic conductivity (K = $1x10^{-7}$ cm/s) without decay, (2) the solution with the average hydraulic conductivity (K = $5.19x10^{-8}$ cm/s) without decay, and (3) the solution with the average hydraulic conductivity (K = $5.19x10^{-8}$ cm/s) and a decay constant (decay constant = 2.25 yrs^{-1}) for dichloromethane. The third solution has a maximum relative concentration of $3.74x10^{-16}$ μg/L and thus does not appear on the graph, but is noted in the lower right hand corner. All three solutions under-predict the maximum relative concentration after 25 years and do not capture the initial time of first detection (e.g. the relative concentration from field data after 2.5 years is on the order of $1x10^{-3}$ whereas the relative concentration from the solution with K = $1x10^{-7}$ cm/s is on the order of $1x10^{-4}$ after 12 years).

When reasonable decay constants were included in Eq. 3, Eq. 3 under-predicted the relative concentrations determined from field data for all of the compounds. The relative concentrations of xylene (total), p-dichlorobenzene, toluene, and trichloroethylene were under-predicted with a decay constant of $6.93x10^{-9}$ (to simulate essentially no decay) and K = $1x10^{-7}$ cm/s (i.e. the case resulting in the highest maximum relative concentration). The

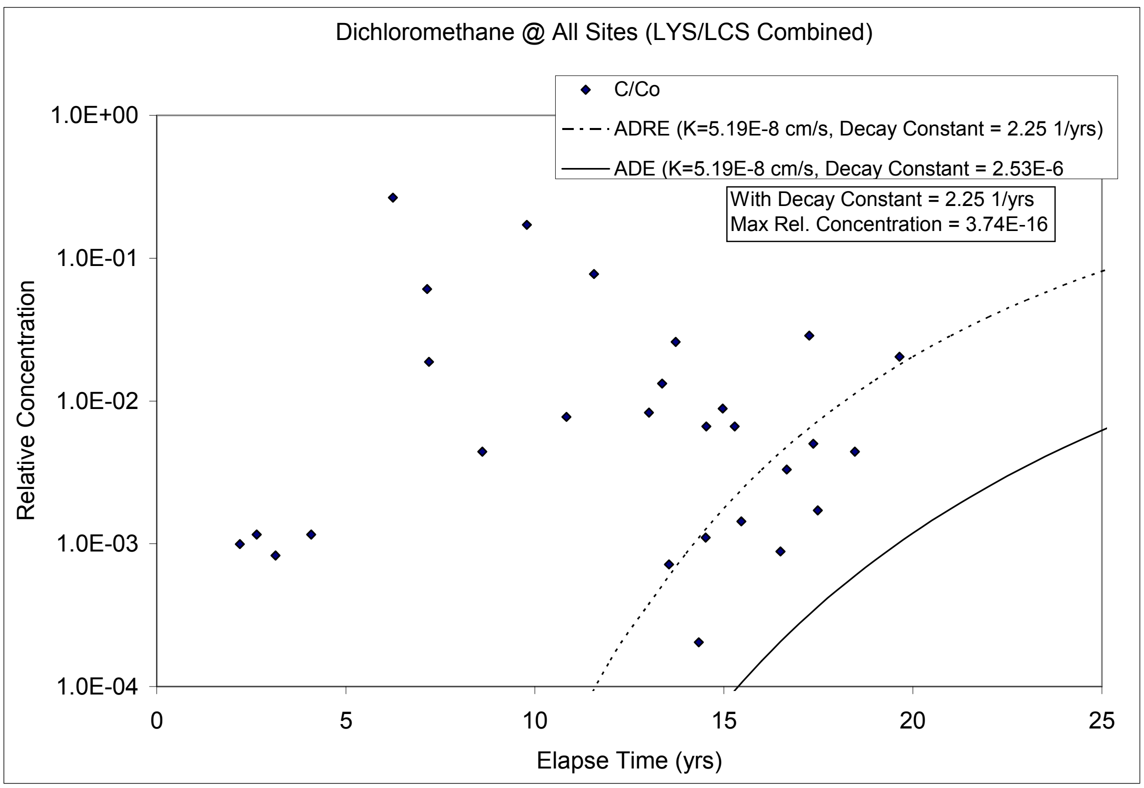


Figure 2.5.6 Relative concentration of dichloromethane from field data and the results from varying parameters in the analytical solution.

solution to Eq. 3 (with K = $1x10^{-7}$ cm/s and K = $5.19x10^{-8}$ cm/s) was representative (i.e. the solution passed through the plotted field data) of the relative concentrations from the field data for tetrahydrofuran, benzene, acetone, and cis-1,2-dichloroethene for the case with a decay constant of $6.93x10^{-9}$ (to simulate no decay).

The transport at clay lined sites appears to be diffusion controlled because variations of K (within the regulated limit) do not result in a solution that describes the field data. However, if the tortuosity is varied (and thus the effective diffusion coefficient) the solution to the analytical equation provides a result that reasonably captures the field data in most cases, but the tortuosity factors necessary (in excess of 0.9) to produce these results are unrealistic for compacted clay soils (Willingham et al. 2004).

The seepage velocity (v_s) was decreased to 1 x 10^{-25} cm/s when comparing Eq. 3 with field data from sites with composite liners so the advection term in Eq.3 would essentially drop out and transport would be diffusion controlled. By decreasing the hydraulic conductivity to essentially zero, the solution to Eq. 3 suggests that there should be a difference in the VOC concentration at clay versus composite sites. However, results from examining the concentration of VOCs from landfills in Wisconsin at both clay and composite lined sites do not suggest that there is a significant difference in concentration (within the lysimeter). Analytical solution results and field data in Fig 2.5.7 are from clay (closed symbols) and composite (open symbols) lined landfills with detections of toluene.

The aforementioned results from examination of VOC concentrations from field data and the results from analytical solutions using widely accepted parameters suggests that the solutions do not accurately represent field relative concentrations. This poses potential problems to designers to assess the effectiveness of current liner systems (i.e. composite liners) and suggests that composite liner systems may not perform any better than the thicker compacted clay liners. Another potential threat is contamination of ground water

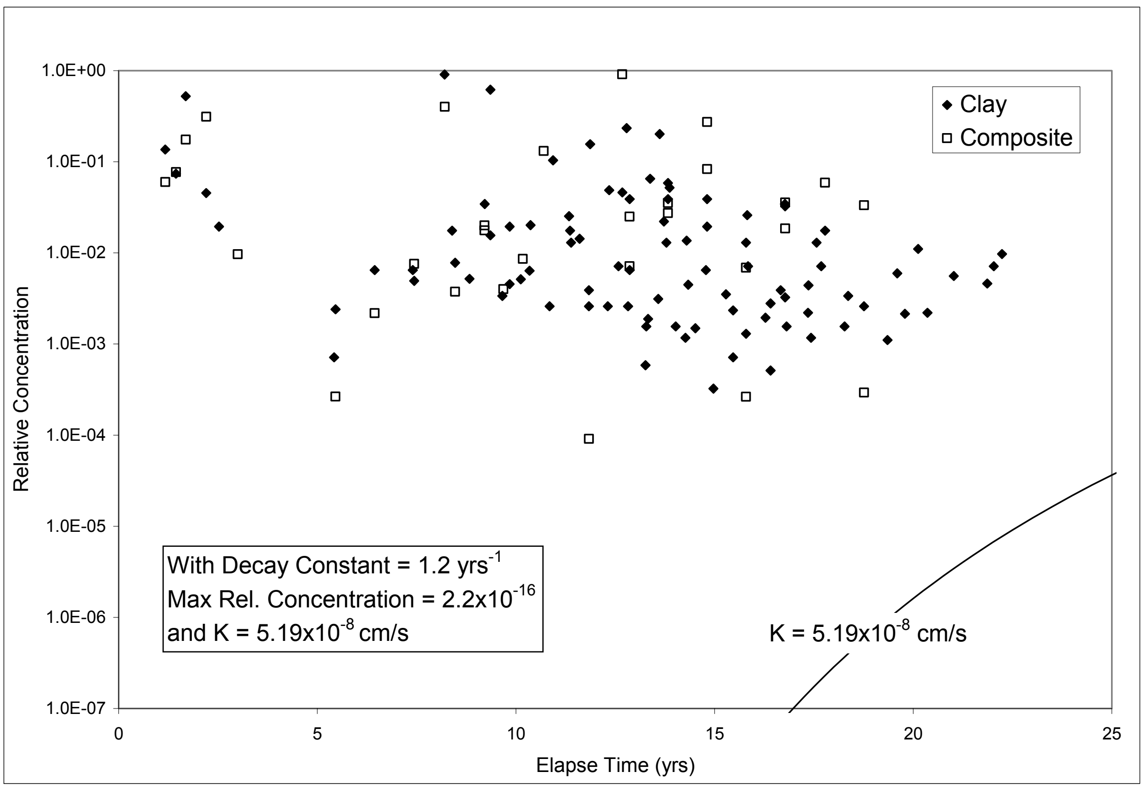


Figure 2.5.7 Relative concentrations of toluene from clay and composite lined landfills along with the results from the analytical solution (with and with out a decay constant).

around landfills if VOCs continue to migrate through the liner systems. This investigation has shown that VOCs exist in the lysimeters of both clay and composite lined landfills and as additional data become available further investigation is warranted. The potential for ground water contamination remains to be a problem associated with both clay and composite lined landfills. Additionally, models used and/or parameters used in these models do not accurately predict contaminant transport and thus must be re-considered.

2.6 SUMMARY

Data presented in this paper were obtained from a comprehensive search of the GEMS database at the Wisconsin DNR. In particular, VOC concentrations in the lysimeters beneath clay and composite lined landfills were examined to determine which compounds and classes were most frequently detected in landfill lysimeters. Examination of concentration data showed that the most frequently detected classes of compounds are aromatic hydrocarbons, alkanes, alkenes, furans, and ketones. The average concentration range for these compound classes were between 0.1 and 100 μg/l for the aromatics, the alkanes, and the alkenes, and between 100 and 1000 μg/l for the furan and ketones. Additionally, of the 1356 VOC detections, 37% (495) exceeded the Wisconsin PAL and 15% (202) exceeded the Wisconsin ES or the USEPA MCL.

Temporal trend analyses were conducted using the VOC concentration data from each of the lysimeters examined to determine if concentrations tend to increase, decrease, or remain constant with time. VOC concentration data generally do not exhibit a temporal trend over the range of times during which data were collected (4 to 20 yr). In fact, most analyses (88% based on C and 82% based on lnC) had no statistically significant temporal trends. This suggests that landfills may present a relatively constant contaminant source for an extended period of time.

A comparison was made between the VOC concentrations found in leachate and the concentrations in the corresponding lysimeters for 34 engineered landfills in Wisconsin to determine how VOC concentrations compare above and beneath the landfill liners. The aromatic hydrocarbons, alkanes, and furans were the compound classes most frequently detected in both leachate and lysimeter samples. For 86% of the VOCs detected in both leachate and lysimeters, the arithmetic mean concentration in the leachate is higher than the arithmetic mean concentration in the lysimeter. The higher concentrations observed in the leachate compared to the lysimeters indicates that the liners at the sites in this study are functioning as transport retarders.

An analysis was conducted to determine if VOC concentrations in the lysimeters differed depending on the type of liner (clay liner vs. composite liner). Results of this analysis suggest that, on a compound-by-compound basis, there is generally not a significant difference in concentrations in the lysimeters beneath the sites with clay and composite liners.

A special case of the three dimensional solute transport equation, examined by Foose et al. 2001, for one dimensional solute transport in a saturated, homogenous, and semi-infinitely thick porous medium, is used to describe contaminant transport through landfill liners. The special case of the three dimensional solute transport equation derived and presented by van Genuchten 1981 used to model contaminant transport at the landfills in Wisconsin. Comparisons were made to assess if transport through the liners could be explained by this model of advective-diffusive transport, which involved examining VOC concentration data from field samples from landfills in Wisconsin and comparing these data with the results from the analytical solutions.

When widely accepted parameters were used, the analytical solution under-predicted the concentrations determined from field data for all of the compounds examined in this paper. This investigation has shown that VOCs exist in the lysimeters of both clay and composite lined landfills and as additional data become available further investigation is warranted. The potential for ground water contamination remains to be a problem associated with both clay and composite lined landfills. Additionally, models used and/or parameters used in these models do not accurately predict contaminant transport and thus must be re-considered.

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APPENDICES

Appendix A: Supplemental Tables from studies examined in Section 1.2

Table A.1. Range and median concentrations of organics found in leachate at landfills in Wisconsin (Adopted from Kmet and McGinley (1982)).

Parameter	Concentration Range (ppb)	Median Concentration (ppb)
Acid Organics		
Phenol	221-5790	293
Volatile Organics		
Dichloromethane	106-20000	2650
Toluene	280-1600	420
1,1-dichloroethane	510-6300	570
trans-1,2-dichloroethene	96-2200	1300
Ethylbenzene	100-250	150
Chloroform	14.8-1300	71
Base-Neutral Organics		
Bis(2-ethylhexyl)phthalate	34-150	110
Diethylphthalate	43-300	175
Dibutylphthalate	12-150	100

Table A.2. Range in concentration and median concentration of VOC detected in leachate samples in Wisconsin (adopted from Sirdharan and Didier (1988)).

Parameter	Number of Samples	Number Samples > detection limit	Concentration Range (ppb)	Median Concentration (ppb)
Benzene	**35**	**14**	**1-10000**	**11.1**
Bromodichloromethane	39	1	2490	2490
Butylbenzylphthalate	27	2	10-64.1	37.1
Carbon tetrachloride	**50**	**3**	**3-995**	**28**
Chlorobenzene	50	7	3-188	25.2
Chlorodibromomethane	36	1	31	31
Chloroethane	50	11	2-730	17
Chloroform	50	7	4.4-16	7.14
cis-1,3-dichloropropene	40	1	2.5	2.5
di-n-butyl phthalate	26	4	13-540	28.7
di-n-octyl phthalate	26	5	16.1-542	110
Dibromochloromethane	24	2	22-160	91
Dichlorodifluoromethane	37	2	100-242.1	171.1
Dichloromethane	**41**	**25**	**27.6-58200**	**483**
Ethylbenzene	52	30	1-1680	43.5
Fluoranthene	27	4	9.56-723	39.1
Fluorotrichloromethane	50	7	1-183	34
Isophorone	26	13	3.18-520	76
Iospropylbenzene	11	1	1	1
methyl ethyl ketone	11	2	2100-37000	19550
Naphthalene	21	10	4.6-186	33.75
p-dichlorobenzene	37	12	2-250	14
Pentachlorophenol	25	1	25	25
Phenol	27	16	1.1-2170	174
Styrene	11	1	2	2
Tetrachloroethylene	**52**	**10**	**1-232**	**16.3**
Tetrahydrofuran	12	6	410-1400	730
Toluene	53	42	1-11800	360
trans-1,3-dichloropropene	38	1	2.5	2.5
Tribromomethane	50	1	47	47
Trichloroethylene	**53**	**12**	**1-372.2**	**19**
vinyl chloride	**42**	**12**	**10-3000**	**230**
xylene (total)	13	10	30-2000	210
1,1,2-trichloroethane	**53**	**NA**	**1.5-10000**	**10**

Table A.3. Range in VOC concentration found in leachate samples in Wisconsin (adopted from Friedman (1988)).

Parameter	Concentration Range (ppb)	% landfills with VOC detected in leachate
methyl ethyl ketone	640-37000	37
Ethylbenzene	1.4-180	84
Toluene	1.2-610	95
Benzene	1.4-220	63
Xylene, (total)	2.5-240	84
Tetrahydrofuran	270-2600	58
Styrene	28	5
Vinyl chloride	11-150	16
Chloroethane	5.6-730	58
Chlorobenzene	2.3-5.8	16
1,1-dichloroethane	3.7-190	63
1,2-dichloroethane	1.3-600	42
1,2-dichloroethylene	3.6-310	42
1,1,1-trichloroethane	3.1-130	47
1,4-dichlorobenzene	3.0-21	42
Trichloroethylene	2.4-280	63
Chloroform	3.4-32	26
Trichlorofluoromethane	3.2-200	26
Tertachloroethylene	1.4-69	58

Table A.4. VOC concentrations in sanitary landfills determined by Forst et al. (1989)

Parameter	Concentration Range (ppb)
Dichloromethane	6.0
trans-1,2-dichloroethylene	1.6
cis-1,2-dichloroethylene	1.9-14.2
Chloroform	6.6-8.5
1,1,1-trichloroethane	1.9-4.5
Trichloroethylene	2.3-7.9
Tetrachloroethylene	2.8
Benzene	1.1-572
Toluene	3.6-48
Ethylbenzene	1.7-20
xylene, m & p	3.7-8.3
xylene, o-	4.2-38
1,3,5-trimethylbenzene	2.6-4.8
1,2,4-trimethylbenzene	0.94-8.1
1,2,3-trimethylbenzene	1.0-9.1
1,2,4,5-tetramethylbenzene	1.2
1,2,3,5-tetramethylbenzene	3.7-5.1

Table A.5. Concentration arithmetic mean of VOCs found at old and new MSW landfills (adopted from Gibbons et al. 1992)).

Parameter	Proportion of MSW landfills with detects		Concentration arithmetic mean (ppb)	
	Old	New	Old	New
Benzene	0.60	0.29	65	7
Chlorobenzene	0.44	0.15	736	NA
Ethylbenzene	0.78	0.50	198	60
Dichloromethane	0.84	1.00	898	1390
Toluene	0.86	1.00	583	406
trans-1,2-dichloroethene	0.64	0.79	492	104
Trichloroethene	0.44	0.64	51	71
vinyl chloride	0.37	0.43	107	51
1,1,1-trichloroethane	0.09	0.64	NA	178
1,1-dichloroethane	0.44	0.79	400	116

Table A.6. VOC concentration data in leachate from MSW in Florida (adopted from Tedder 1992)

Parameter	Concentration Arithmetic mean (ppb)
Dichloromethane	34.8
Toluene	84
1,1-dichloroethane	5.9
Ethylbenzene	27
1,2-dichloroethane	2
Benzene	9.9
Chlorobenzene	3.9
Naphthalene	10
tetrachloroethylene	1
1,1,1-trichloroethane	12
Trichloroethylene	67
vinyl chloride	19
xylene (total)	38

Table A7. VOC concentration data from 8 MSW or ISW and 2 co-disposal (MSW and HW) landfills in Wisconsin (adopted from Krug and Ham 1995)).

Parameter	Sites with Detects in Leachate (10 sites)	Concentration Range (ppb)	Average (ppb)
toulene	10	2.75-12300	417
1,1-dichloroethane	9	6.0-4120	210
trans-1,2-dichloroethene	1	5.58	5.58
ethylbenzene	10	4.8-1280	110
chloroform	4	7.14	7.14
1,2-dichloroethane	1	212-1030	612
benzene	7	2.2-1630	123
chlorobenzene	4	6.0-911	172
chloroethane	4	9-410	112
dichlorodifluoromethane	4	2.0-1030	219
methyl ethyl ketone	4	8.6-36000	7556
tetrachloroethylene	4	0.8-44	19
1,1,1-trichloroethane	8	0.3-3810	538
vinyl chloride	6	0.3-5570	613
xylene (total)	7	10.2-3010	461
1,1,2-trichloroethane	4	0.5-7130	1487
dichloromethane	0	0	0

Table A.8. Variation in VOC concentration at five sites in Ontario, Canada (adopted from Rowe (1995).

Parameter	Site 1	Site 2	Site 3	Site 4	Site 5	Overall
	Conc. Range (ppb)	Conc. Range (ppb)	Conc. Range (ppb)	Conc. Range (ppb)	Conc. Range (ppb)	Conc. Range (ppb)
Benzene	Nd-57	nd-3.1	7-238	<0.1-25	1.8-590	nd-590
Ethylbenzene	42-310	27.1-134	36-790	30-1400	52-1300	27.1-1400
Dichloromethane	<0.4-3700	nd	0.3-2300	215-7100	nd-8300	nd-8300
Toluene	3.15-1600	120-600	2-7000	485-1821	350-5900	2-7000
Xylene, m&p	2.1-860	186-1230	101-2350	70-3900	nd-1400	nd-3900
Xylene, o-	19.5-400	93.7-1110	57-1290	30-1450	nd-670	nd-1450
vinyl chloride	nd	nd-23.1	2-2010	nd-70	nd-13.6	nd-2010
1,1-dichloroethylene	nd	-	<1-<100	nd-60	-	nd-<100
1,2-dichloroethylene	nd-230	-	11-2080	nd-900	-	nd-2080
Trichloroethylene	<1.9-79	nd	1-80	nd-<230	nd-110	nd-230
tetracholroethylene	6.7-23	nd	6-582	nd-<86	nd-2000	nd-2000
1,4-dichlorobenzene	1-22	nd-390	<1-18	nd-<86	nd-4	nd-390
1,2-dichloroethane	nd-<40	nd	0.9-<16	nd-<86	nd	nd-<86

Table A.9. Range in concentration of VOCs detected in leachate from a MSW landfill cell in North Central Texas (adopted from Hunt and Dollins 1996)).

Parameter	Range in concentration (ppb)
chloroethane	11-17
dichloromethane	170
1,1-dichloroethane	5-20
ethylbenzene	7-20
toulene	10-87
1,1,1-trichloroethane	33
vinyl chloride	10-12
xylene (total)	33-38
carbon disulfide	54
acetone	59-2100
4-methyl-2-pentanone	71-85
1,1-dichloroethene	5-80
cis-1,2-dichloroethene	12-28
2-butanone	75

Table A.10. VOC concentrations detected in leachate of C&D landfills (adopted from Townsend et al. (2000)).

Parameter	Number Analyzed Samples	Number Detects	Minimum Concentration (ppb)	Maximum Concentration (ppb)
Ethylbenzene	26	15	1.1	10.8
1,1-dichloropropene	26	1	2.1	
1,2,4-trimethylbenzene	26	1	9.7	
1,3,5-trimethylbenzene	26	1	3	
4-isopropyltoluene	26	5	1.1	1.7
Xylene-m & p	26	1	2.7	
Dichloromethane	26	4	1.6	2.8
Naphthalene	26	1	1.2	
Xylene-o	26	2	1.3	5.2
tert-butylbenzene	26	1	3	
tetrachloroethane	26	1	3.2	
Toluene	26	6	1.2	6.7

Appendix B: Supplemental data pertaining to GEMS

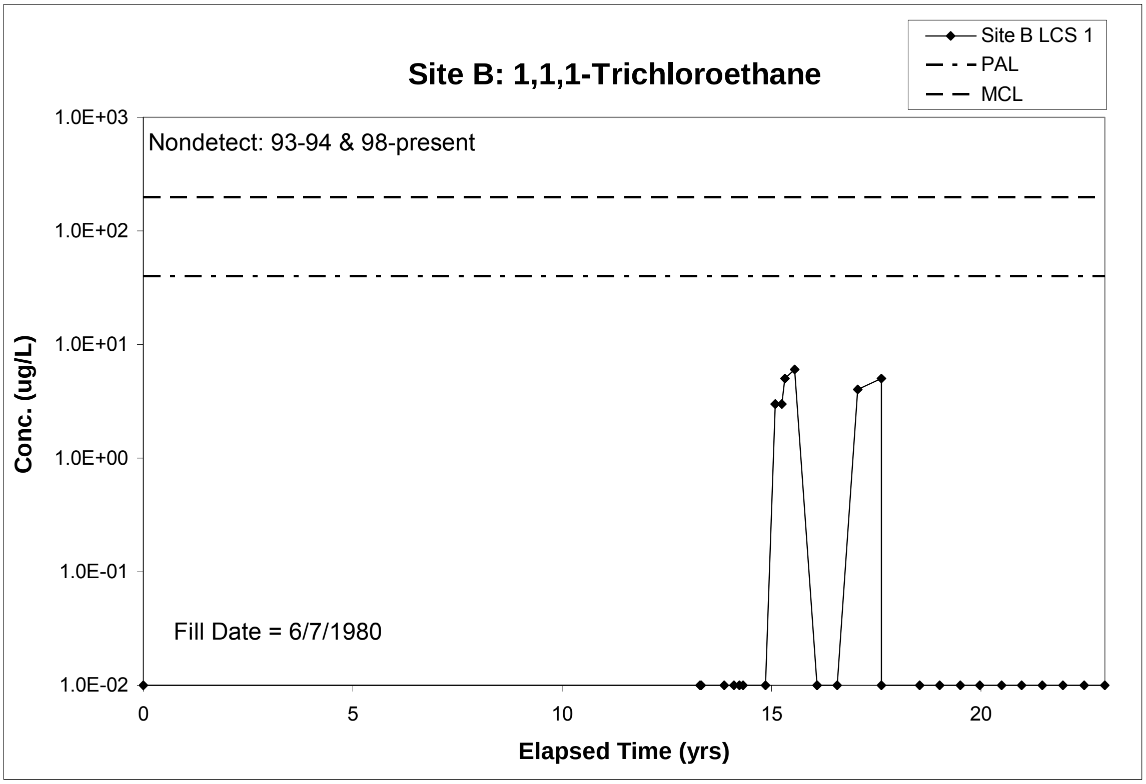
Each licensed landfill has a unique site identification number which is used to locate data pertaining to a particular landfill site within GEMS. Data is sorted within GEMS based on landfill site ID, monitoring point ID, sample date, and parameter (e.g. acetone, toluene, etc.). Each monitoring point is given a unique identification number (within a site) so that records can be tracked temporally. Data collected on a given sampling date, are separated into individual parameters and are assigned a parameter code. Some example parameter codes include total suspended solids, chemical oxygen demand, pH, ethylbenzene, etc.

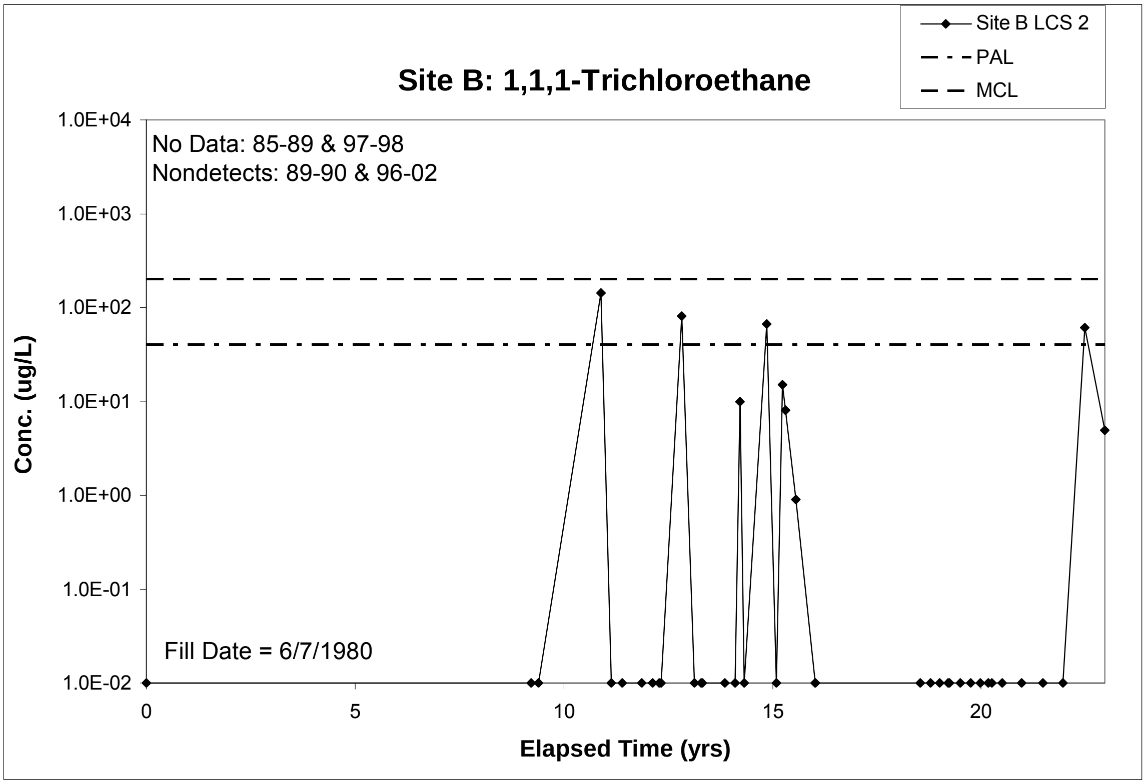
GEMS allows users to search the database by first entering a specific site ID number. Once the user has entered the site ID a sample extraction point must be selected. With a known sampling date and parameter code of interest, the following information can generally be determined:

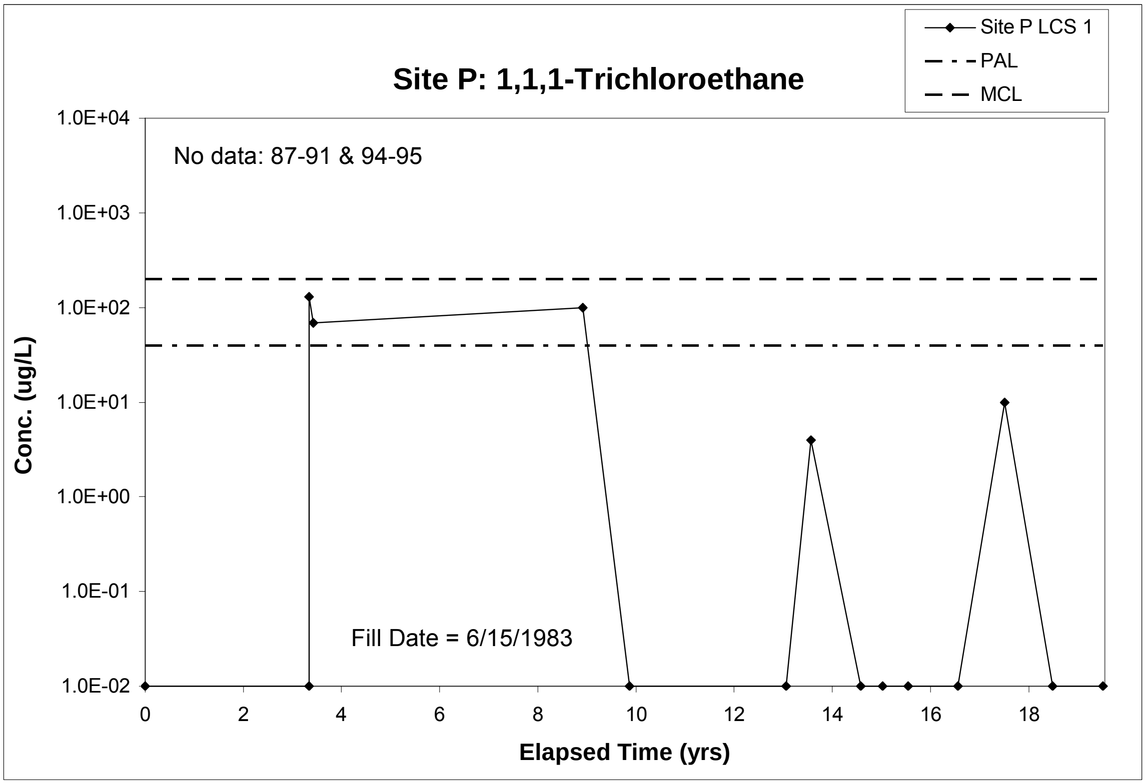
- the result amount, (i.e. the measured parameter concentration (mg/l or μg/l depending on the parameter of interest),
- if the sample exceeded the preventative action limit (PAL)
- limit of detection (i.e. the lowest concentration level that can be determined to be statistically different from a blank),
- limit of quantitation (i.e. the level above which quantitative results may be obtained with a specified degree of confidence typically 10/3 times the limit of detection),
- if the sample passed or failed the three quality control flags,
- the method used to analyze the sample,
- the lab identification number, and
- the entity responsible for collecting samples.

Approximately 90% of the data stored in GEMS, which was collected and entered prior to 1996, does not contain information as to the entity responsible for collecting the sample, the laboratory responsible for analyzing the sample, and the analysis method used. Currently, GEMS stores over 8 million sample results for 675 licensed landfills, which include unlined sites as well as clay and composite lined sites.

Appendix C: Temporal Concentration Variation: Representative Figures



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PAL
MCL
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1.0E+03
1.0E+02
1.0E+01
1.0E+00
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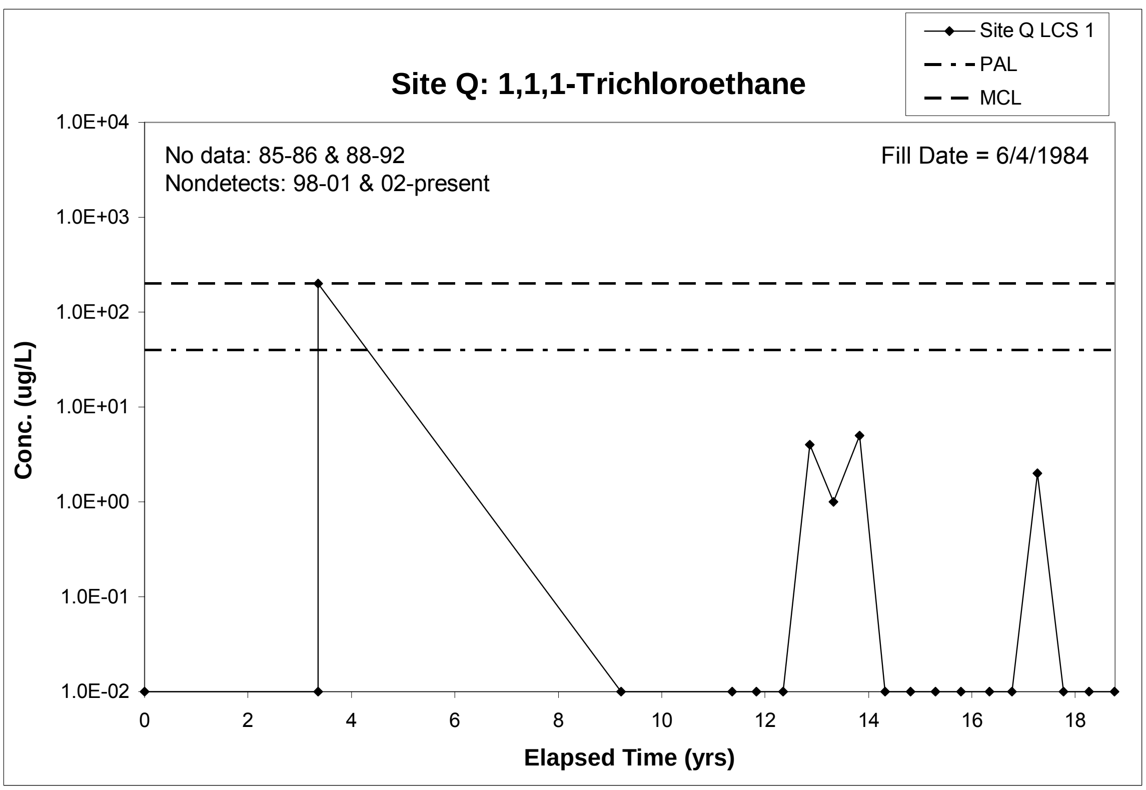
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)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Site Q LCS 1
PAL
MCL
No data: 85-86 & 88-92
Nondetects: 98-01 & 02-present
Fill Date = 6/4/1984
Conc. (ug/L)
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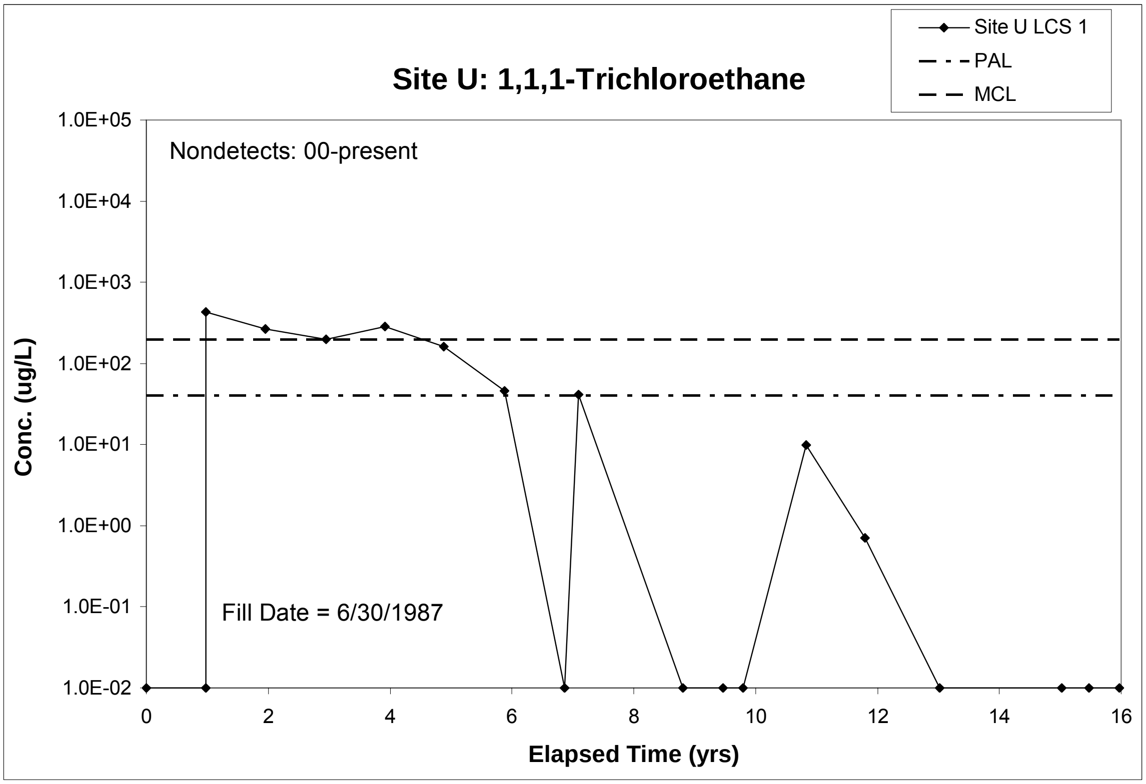
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)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PAL
MCL
Nondetects: 00-present
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1.0E+03
1.0E+02
1.0E+01
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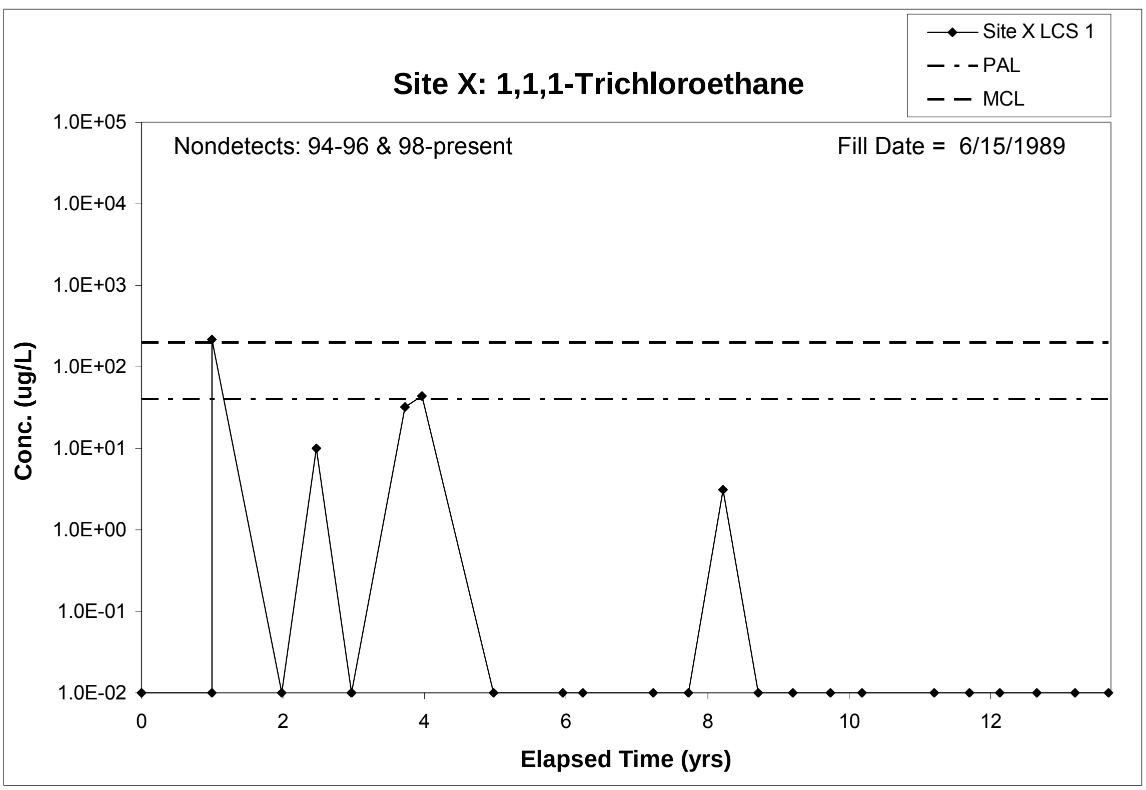
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)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PAL
MCL
Nondetects: 94-96 & 98-present
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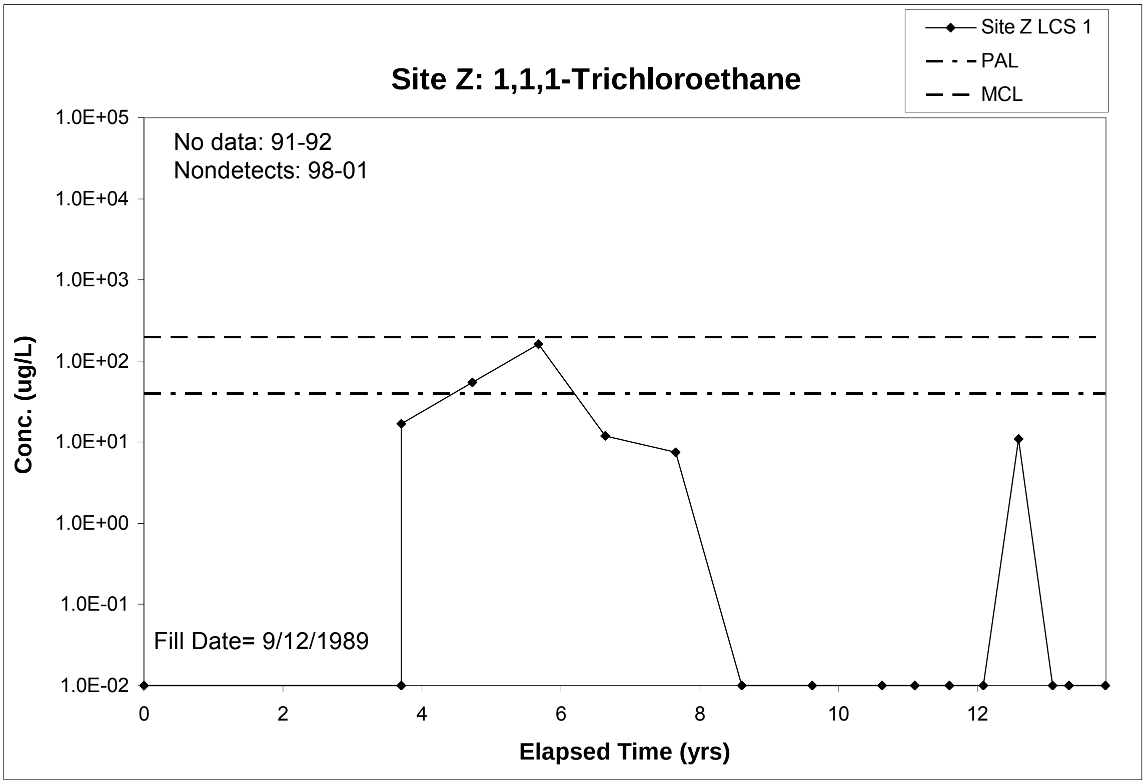
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)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Site Z LCS 1
PAL
MCL
No data: 91-92
Nondetects: 98-01
Fill Date= 9/12/1989
Conc. (ug/L)
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1.0E+04
1.0E+03
1.0E+02
1.0E+01
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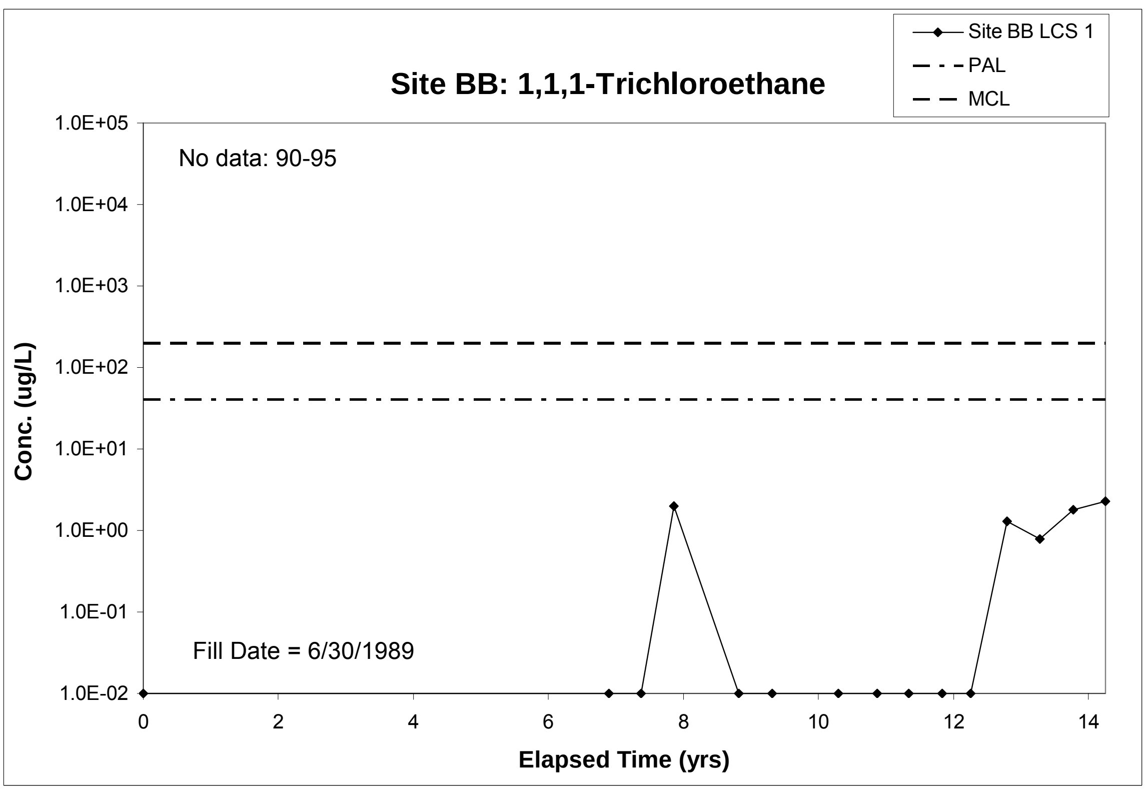
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)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PAL
MCL
No data: 90-95
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Conc. (ug/L)
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1.0E+04
1.0E+03
1.0E+02
1.0E+01
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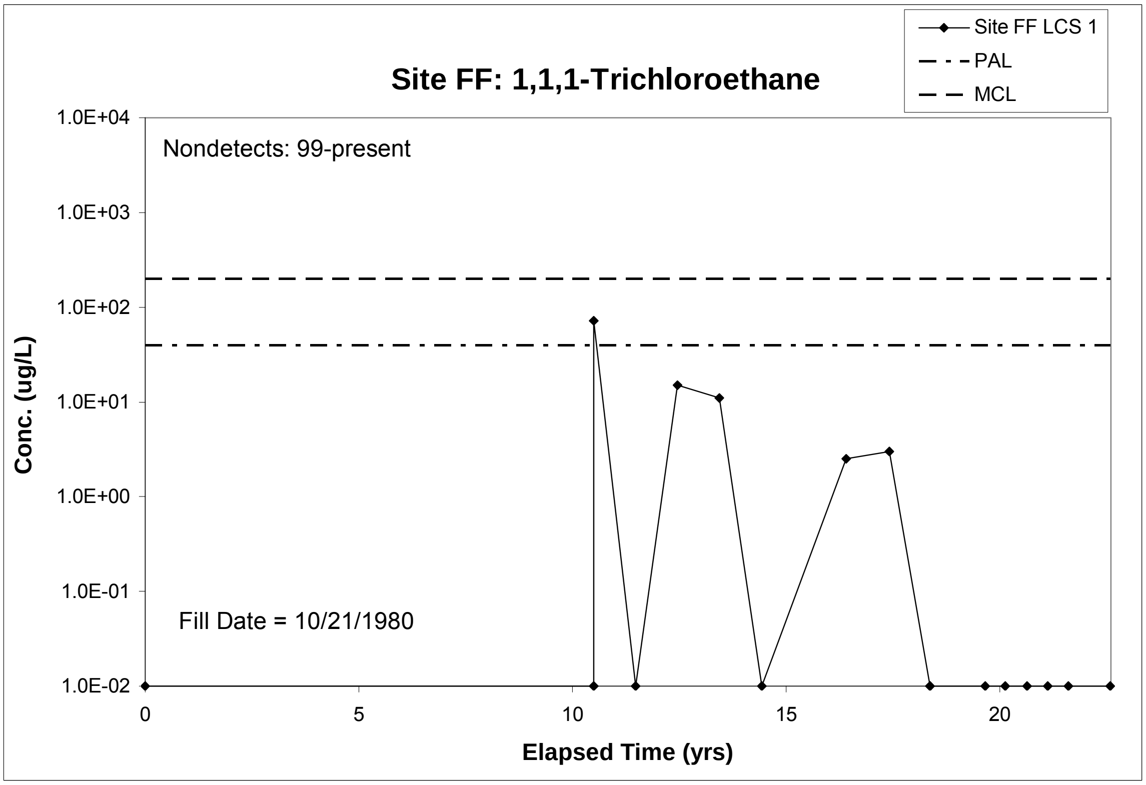
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)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PAL
MCL
Nondetects: 99-present
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Conc. (ug/L)
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1.0E+03
1.0E+02
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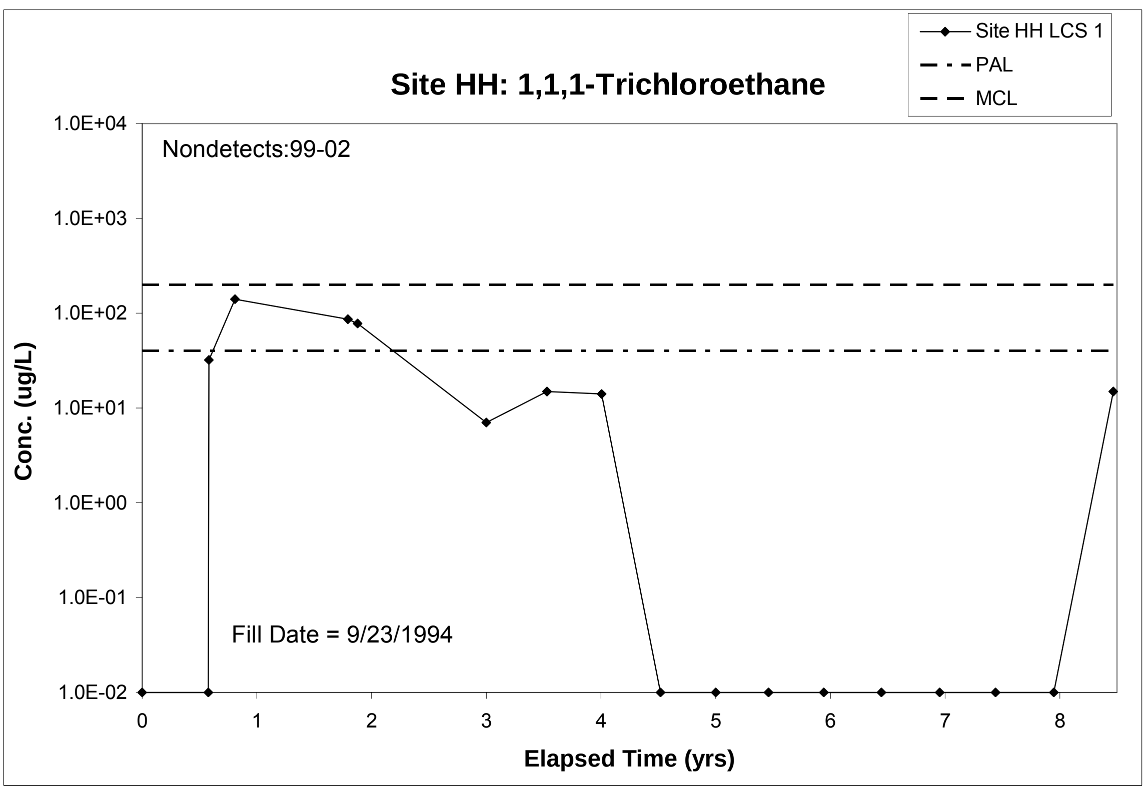
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)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Site HH LCS 1
PAL
MCL
Nondetects:99-02
Fill Date = 9/23/1994
Conc. (ug/L)
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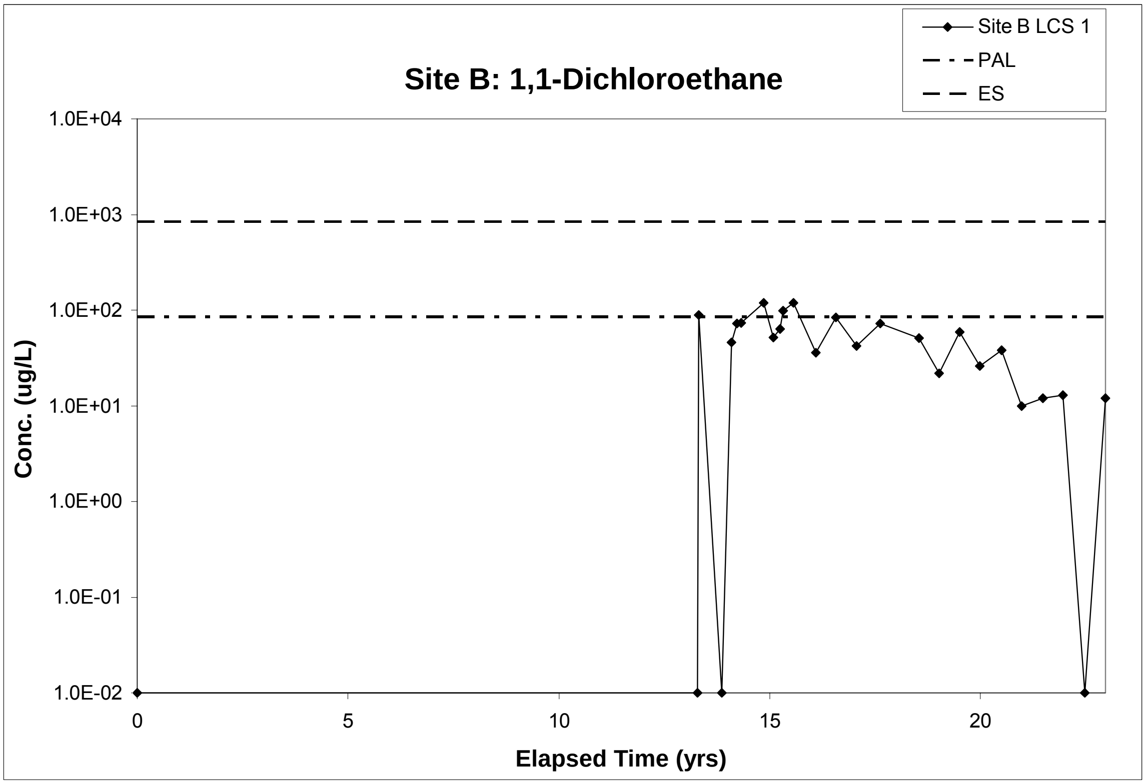
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)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Site B LCS 1
PAL
ES
Conc. (ug/L)
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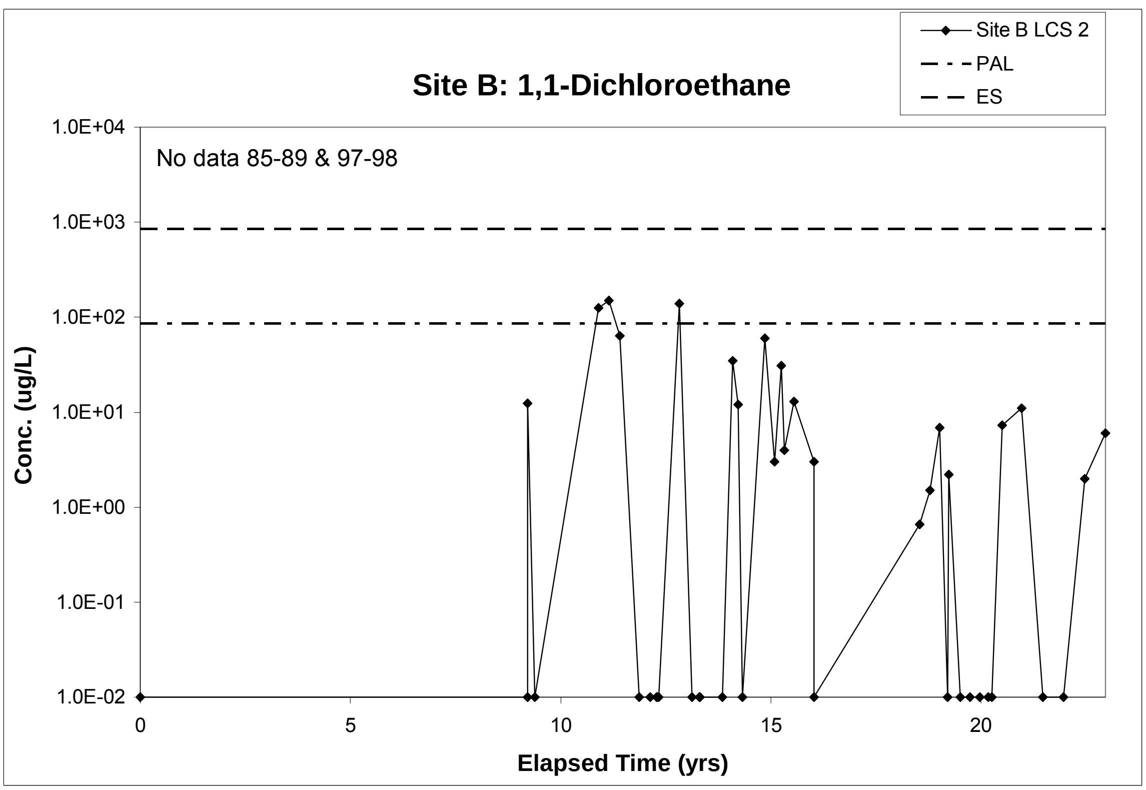
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)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ES
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Conc. (ug/L)
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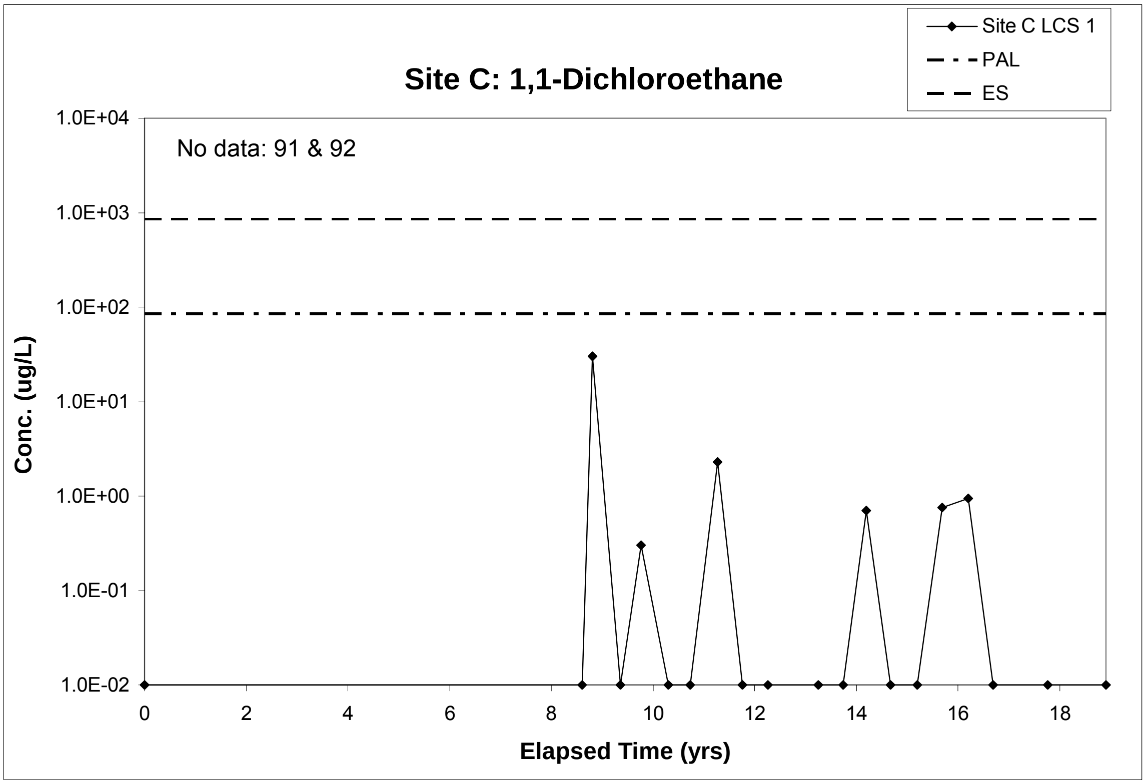
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)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Site C LCS 1
PAL
ES
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Conc. (ug/L)
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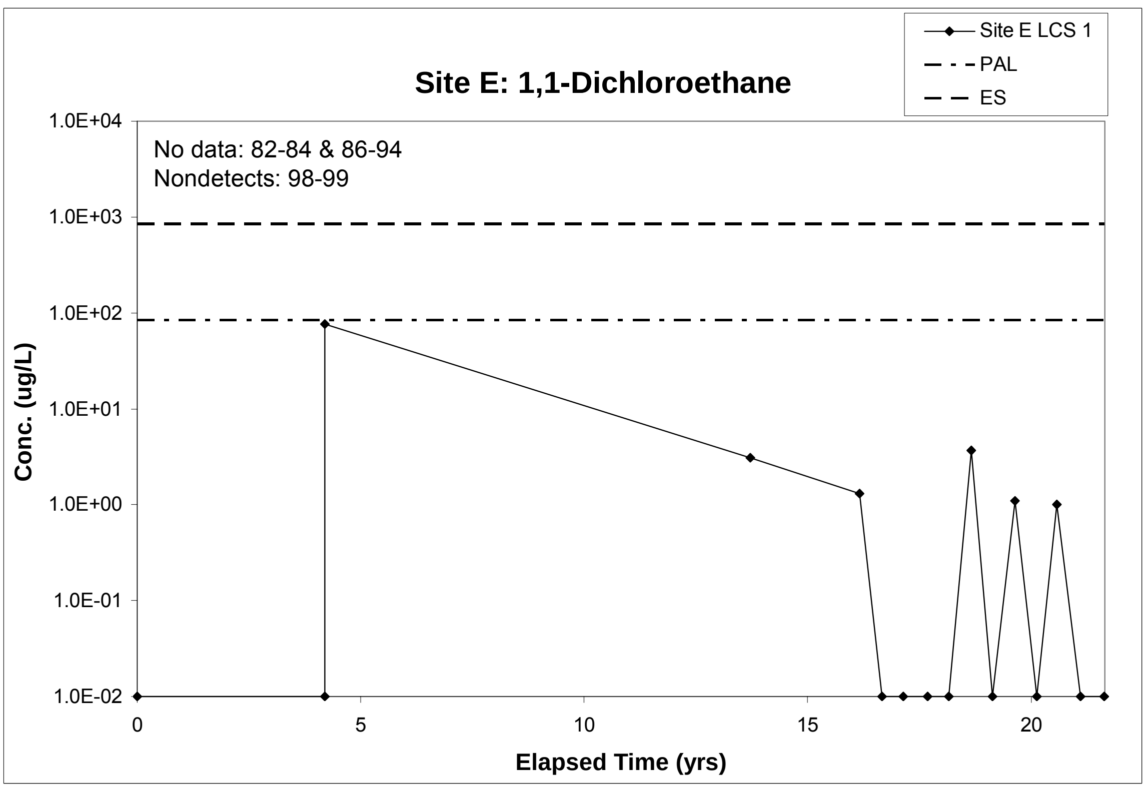
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)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PAL
ES
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Nondetects: 98-99
Conc. (ug/L)
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1.0E+03
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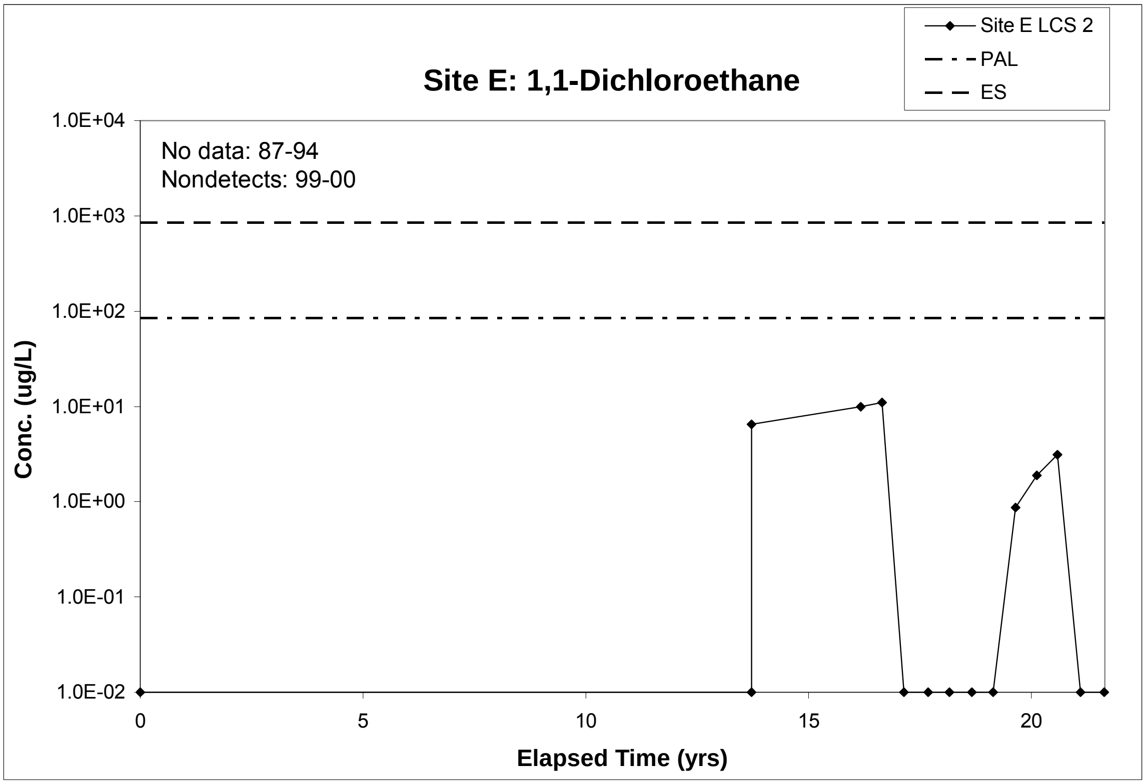
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)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PAL
ES
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Nondetects: 99-00
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1.0E+03
1.0E+02
1.0E+01
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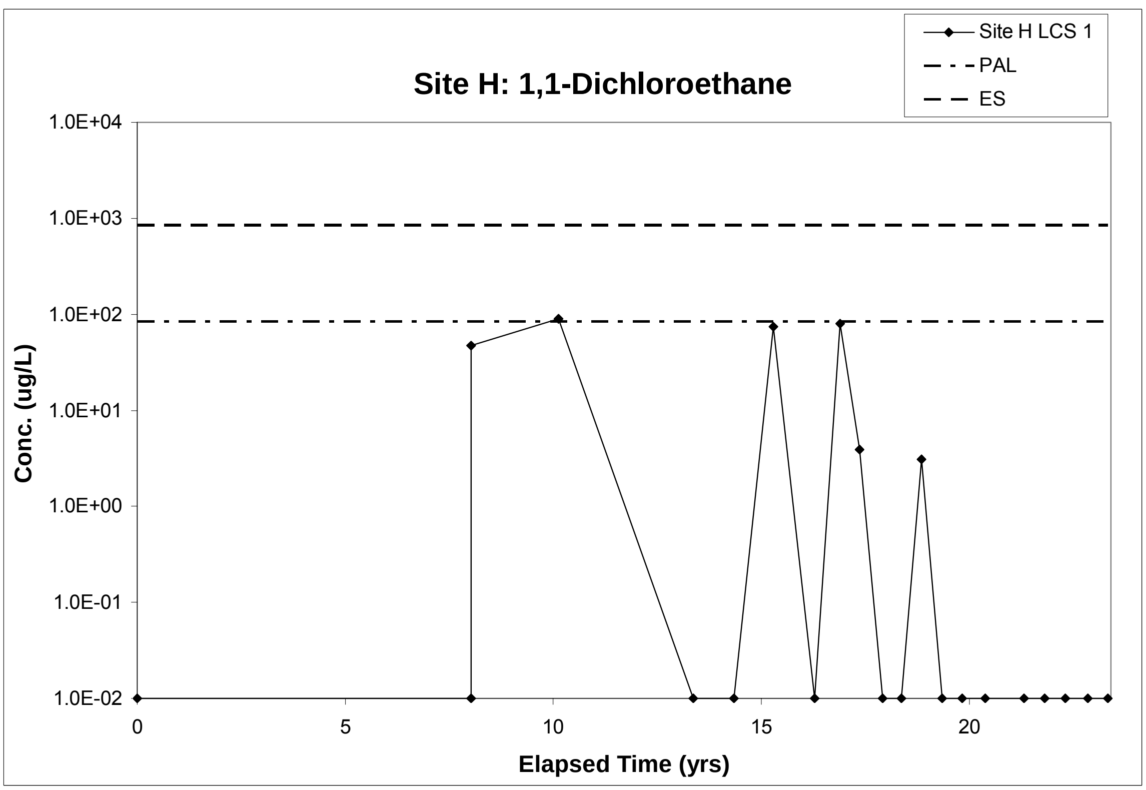
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)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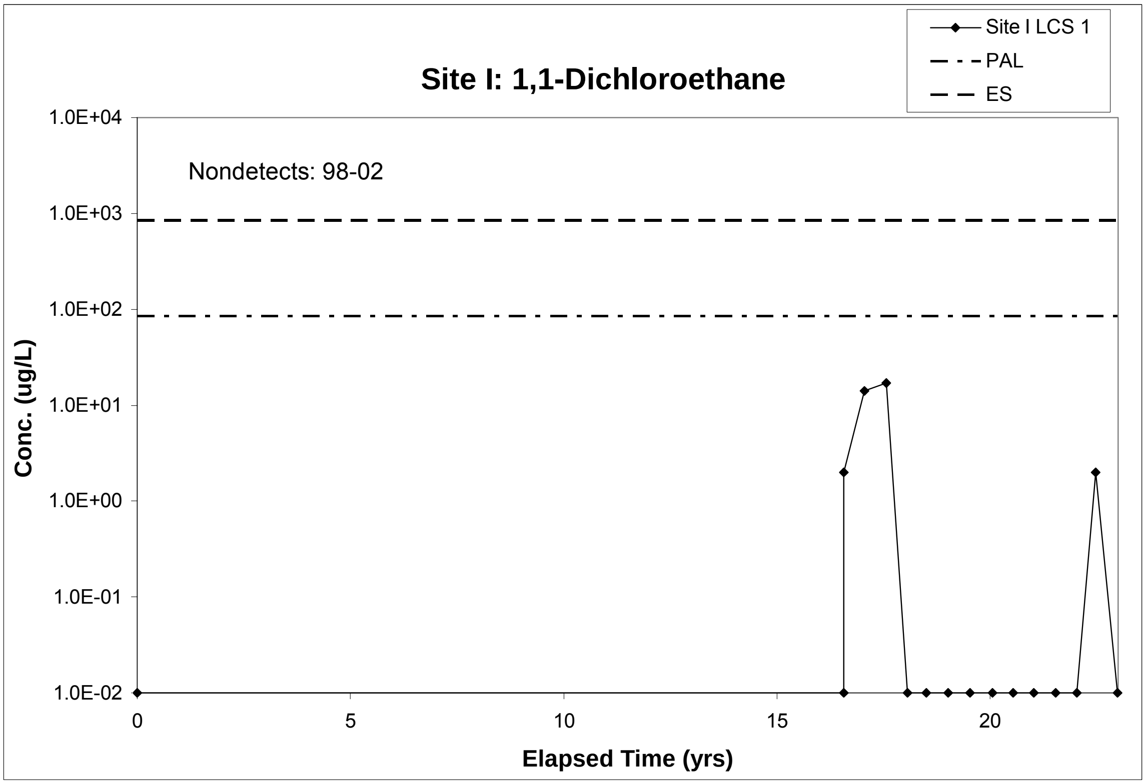
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)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PAL
ES
Nondetects: 98-02
Conc. (ug/L)
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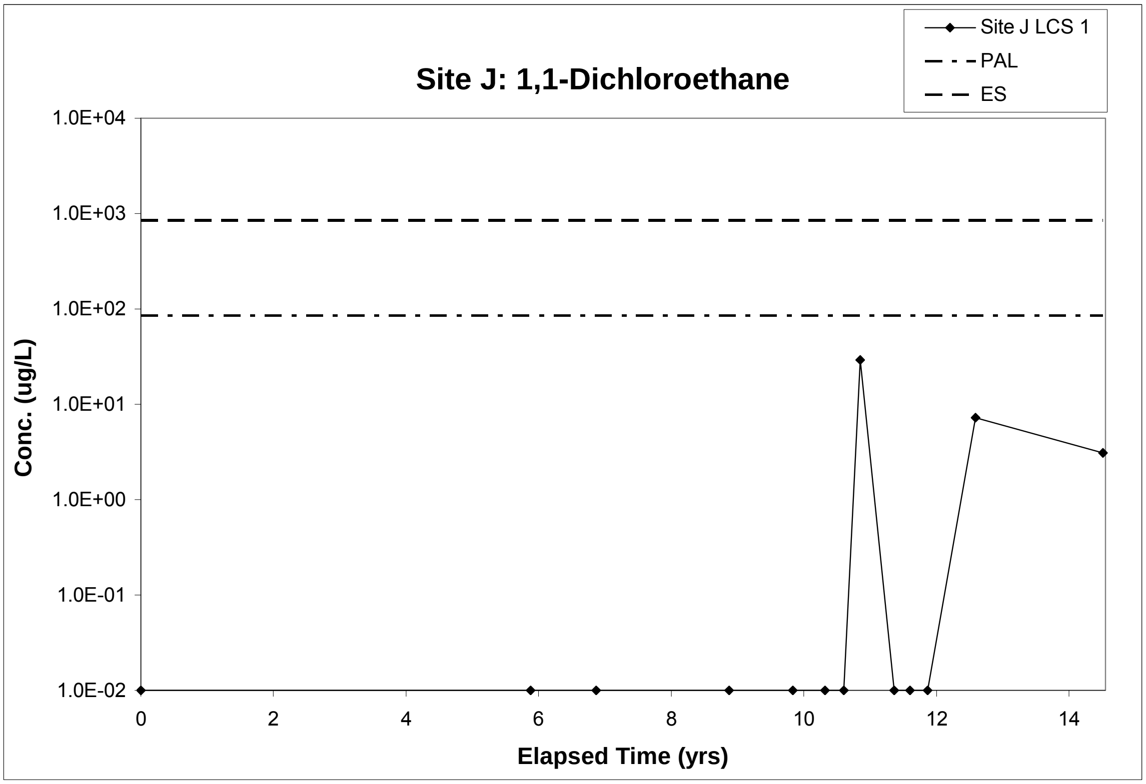
0
5
10
15
20
Elapsed Time (yrs)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PAL
ES
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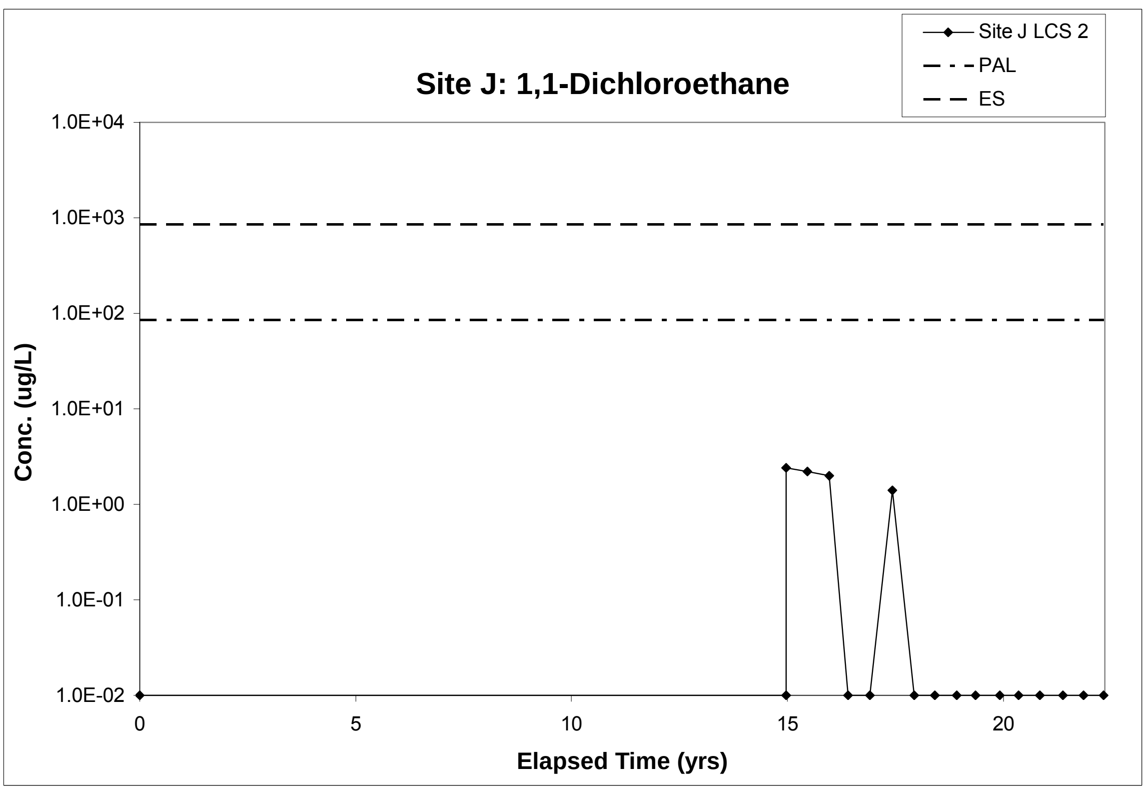
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)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PAL
ES
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1.0E+03
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1.0E+01
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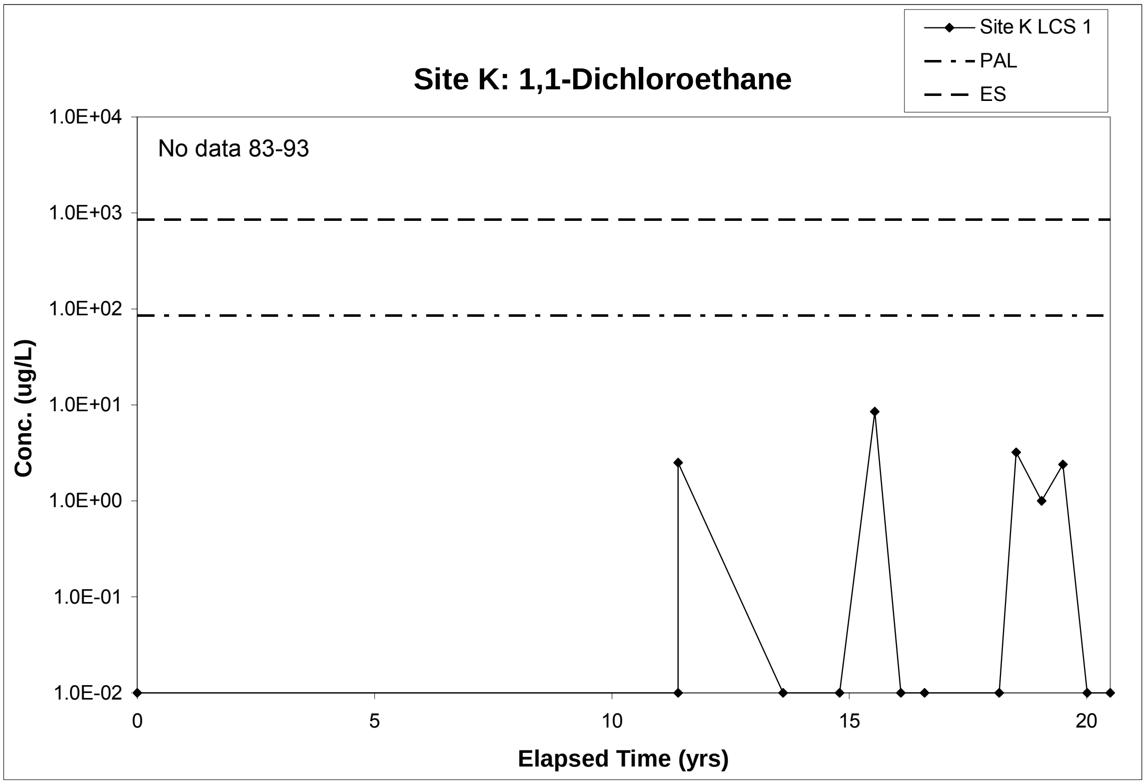
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)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Site K LCS 1
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ES
No data 83-93
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1.0E+01
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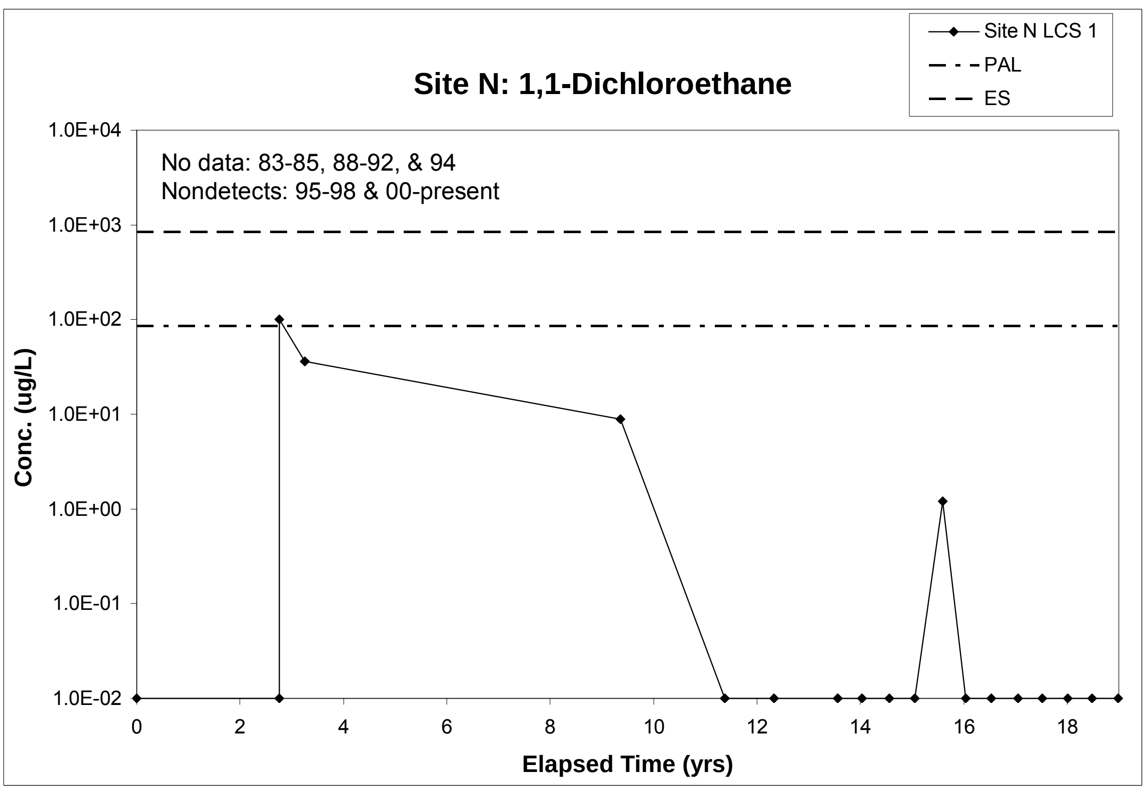
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)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Site N LCS 1
PAL
ES
No data: 83-85, 88-92, & 94
Nondetects: 95-98 & 00-present
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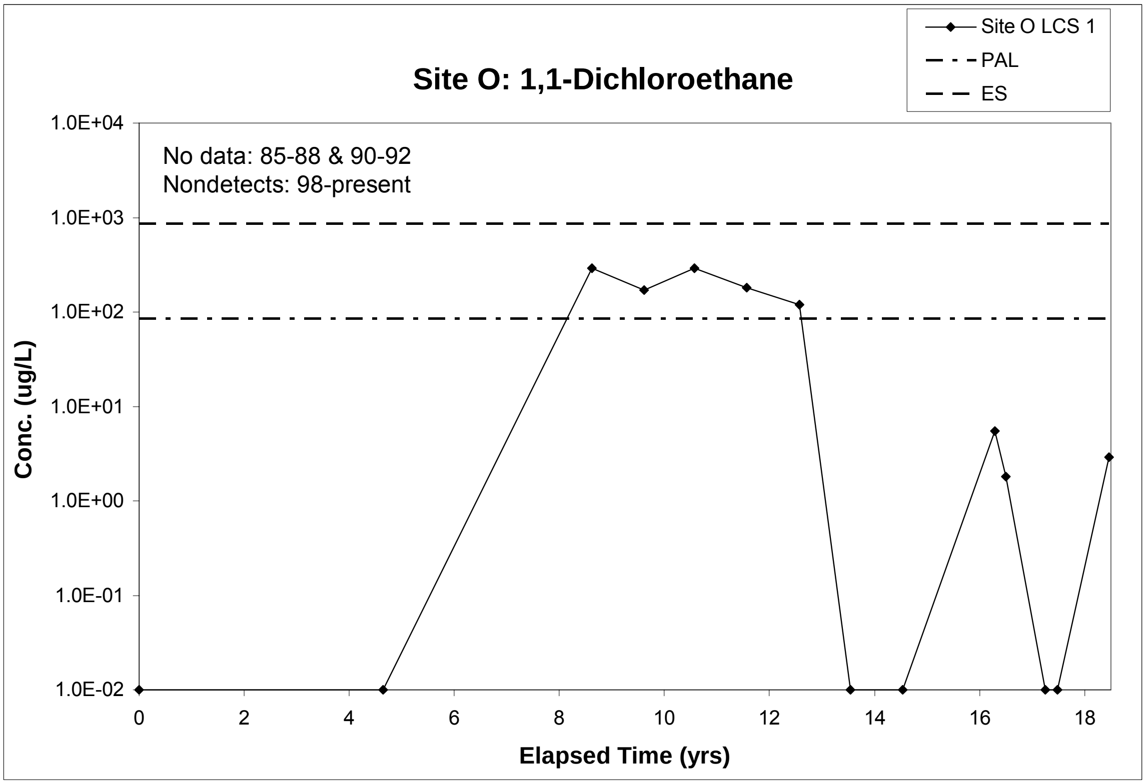
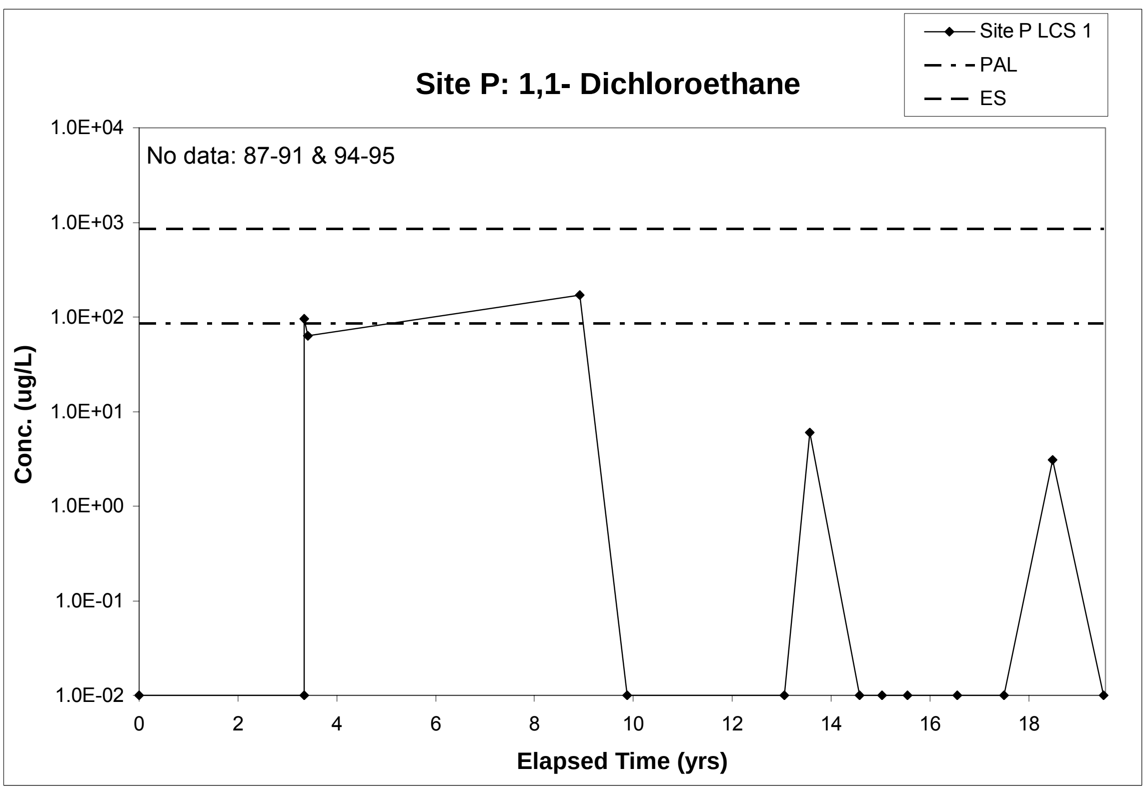
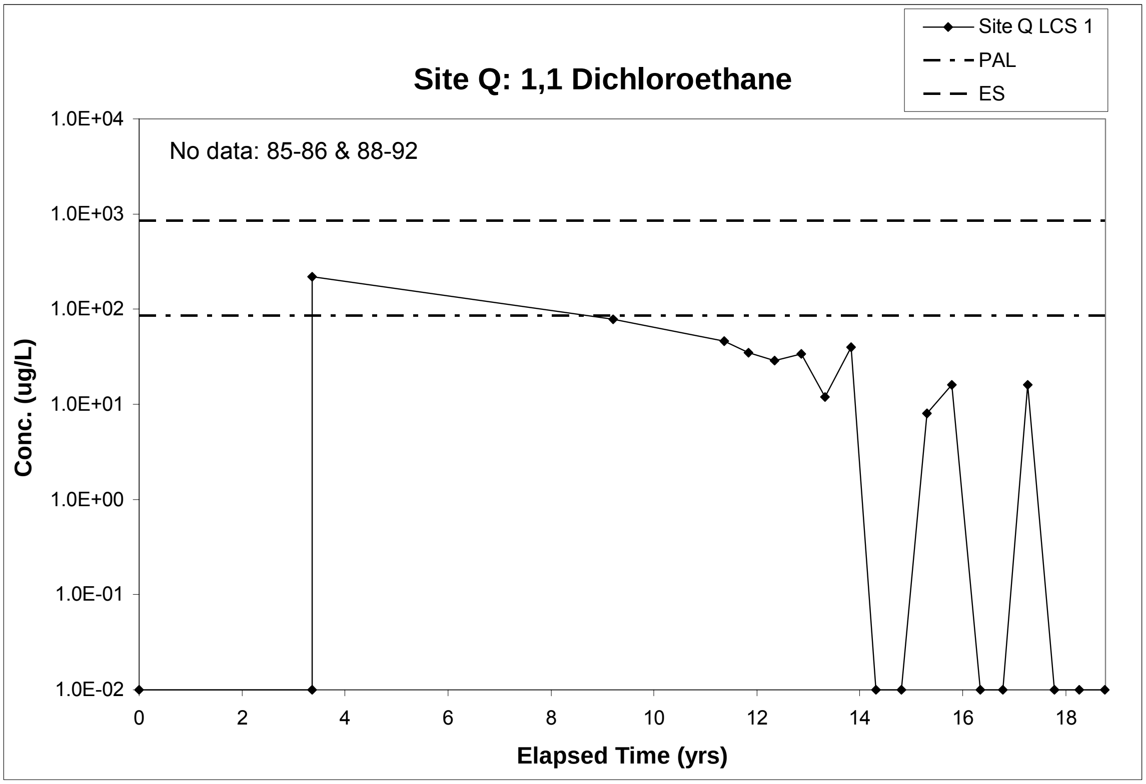
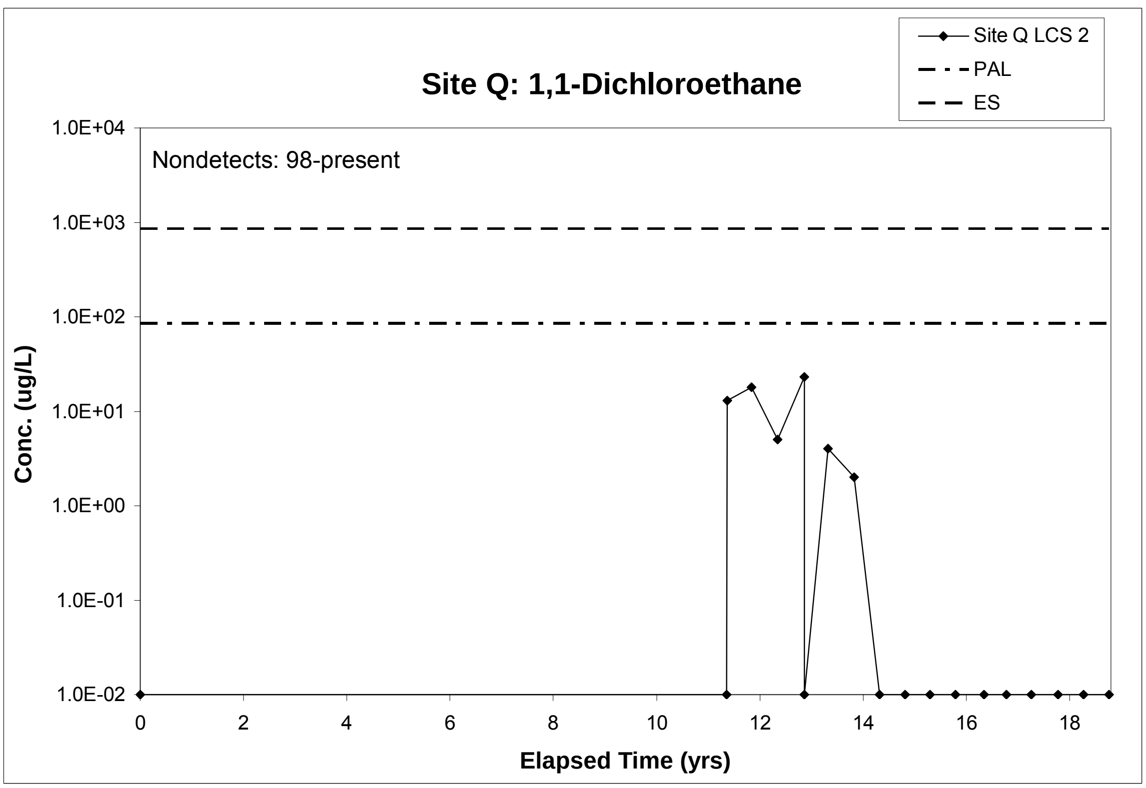
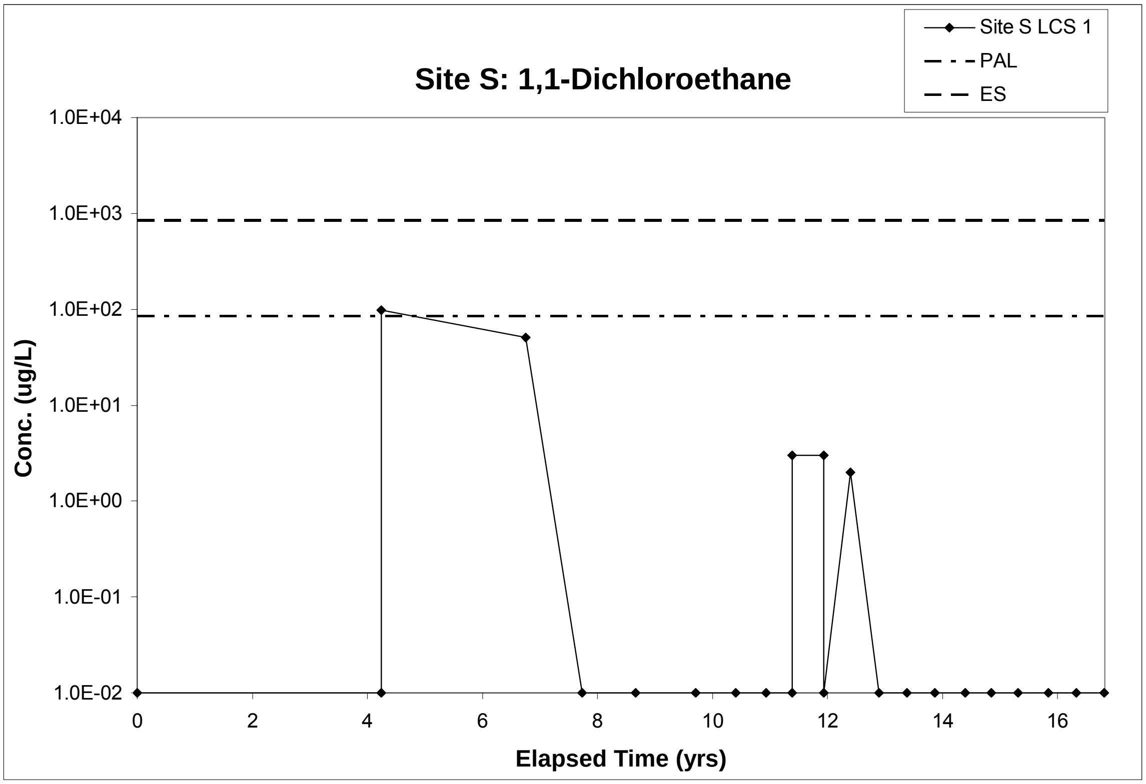
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

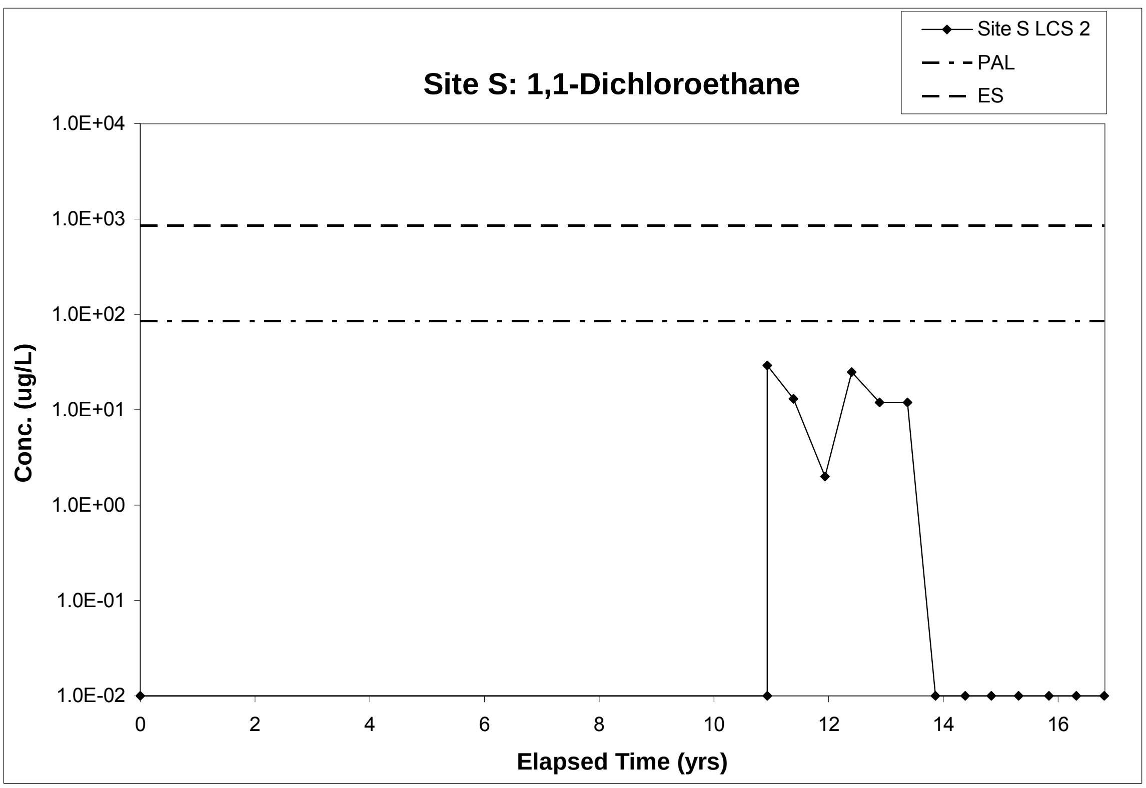

Site O: 1,1-Dichloroethane
Site O LCS 1
PAL
ES
No data: 85-88 & 90-92
Nondetects: 98-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0 2 4 6 8 10 12 14 16 18
Elapsed Time (yrs)

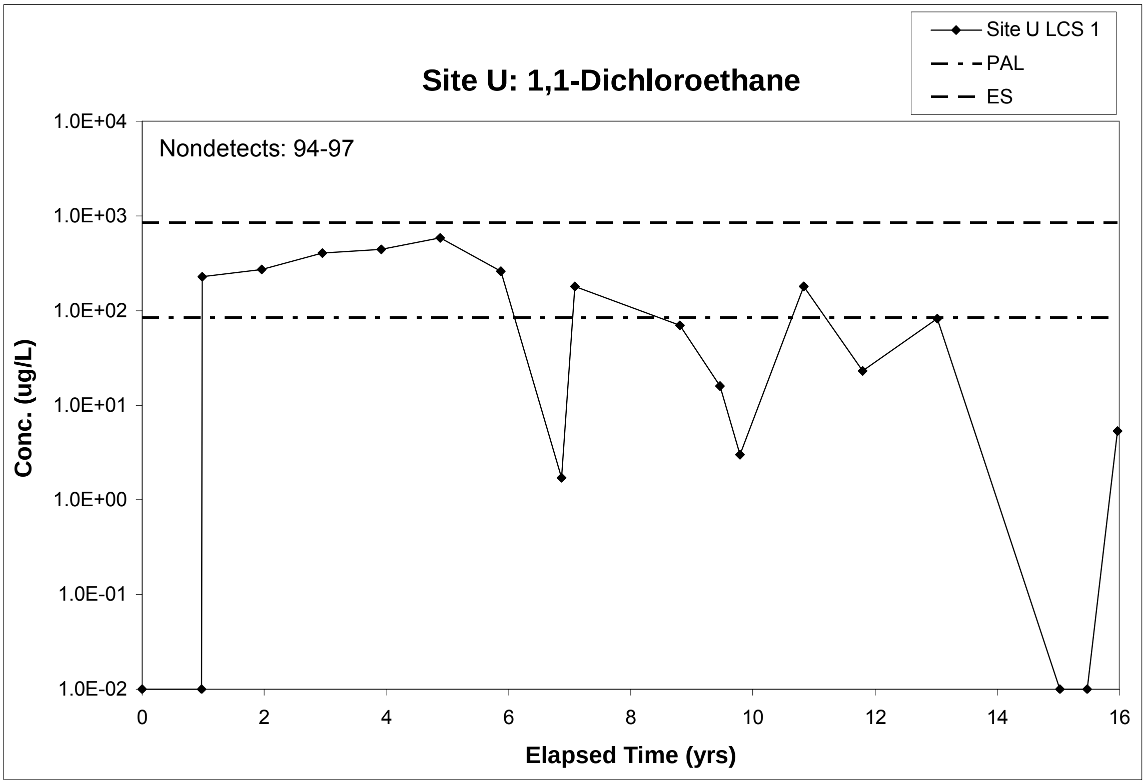

Site P: 1,1- Dichloroethane
Site P LCS 1
PAL
ES
No data: 87-91 & 94-95
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0 2 4 6 8 10 12 14 16 18
Elapsed Time (yrs)

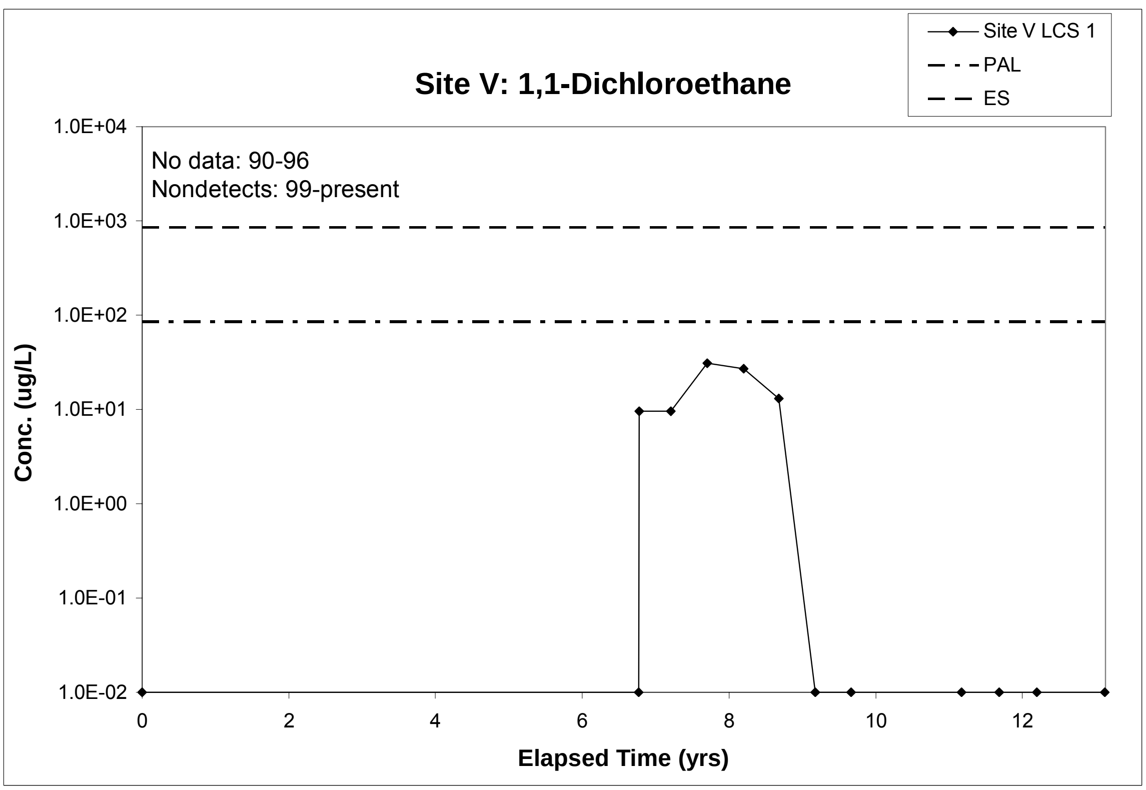

Site Q: 1,1 Dichloroethane
Site Q LCS 1
PAL
ES
No data: 85-86 & 88-92
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

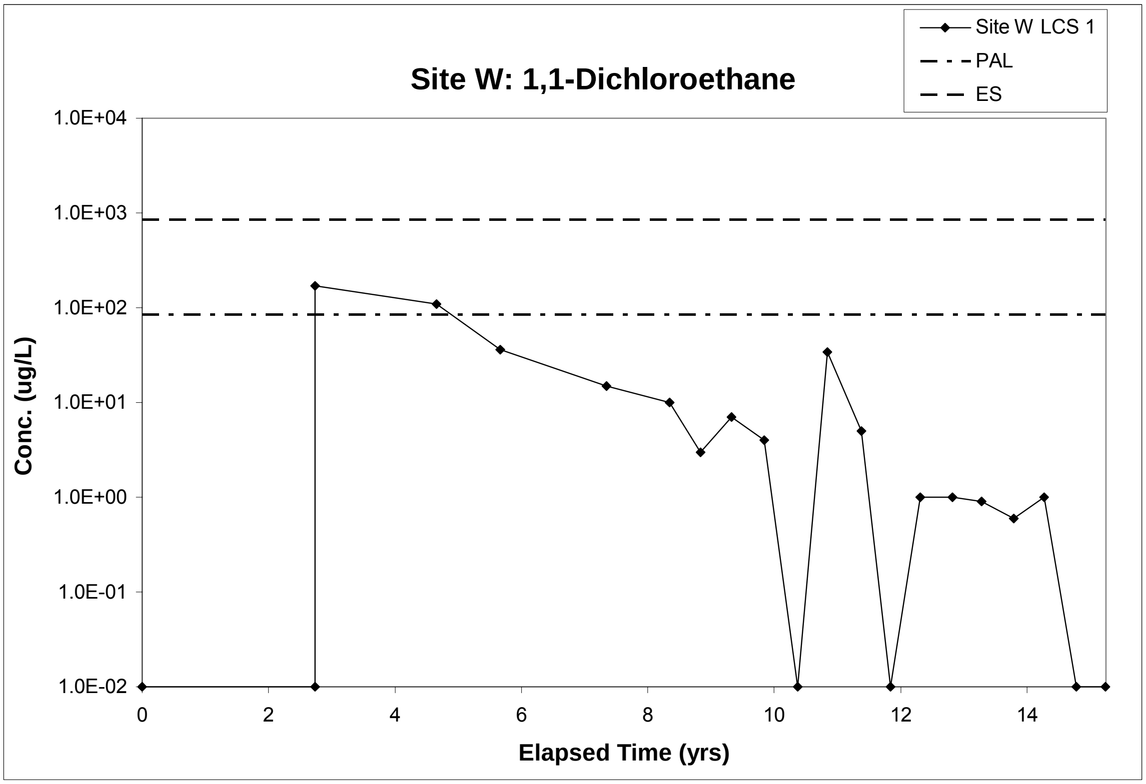

Site Q: 1,1-Dichloroethane
Site Q LCS 2
PAL
ES
Nondetects: 98-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

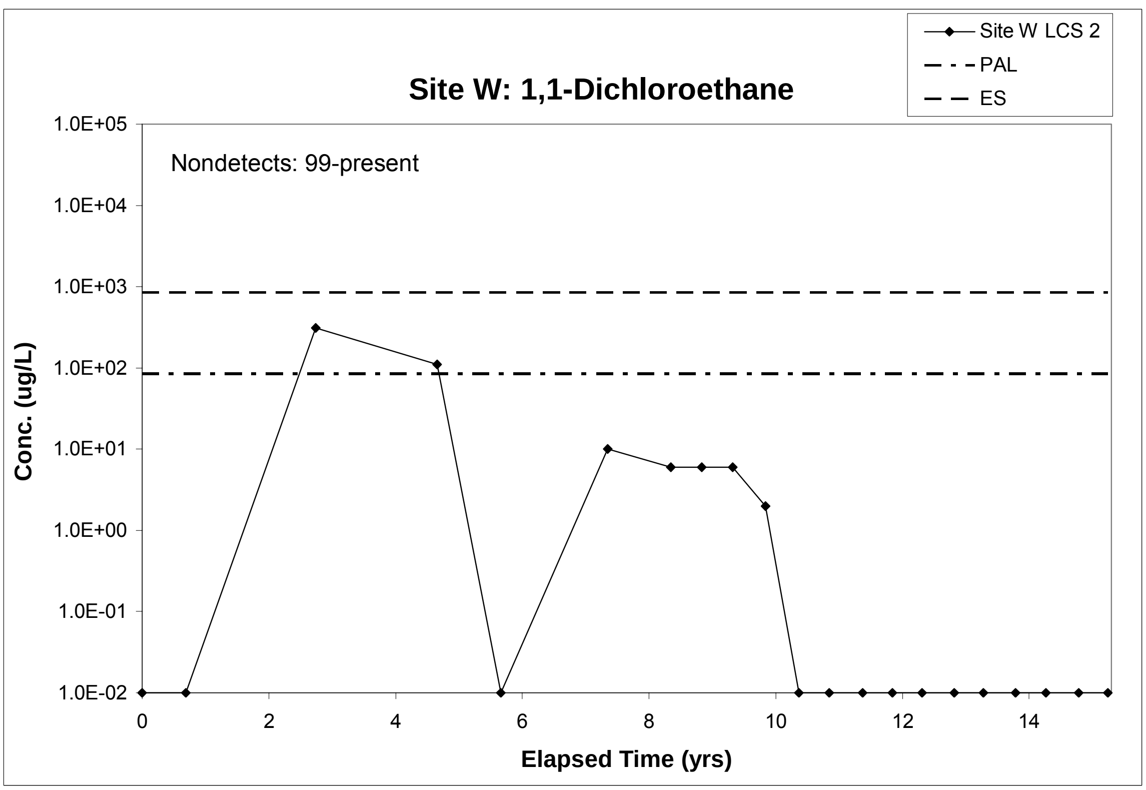

Site S LCS 1
PAL
ES
Site S: 1,1-Dichloroethane
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

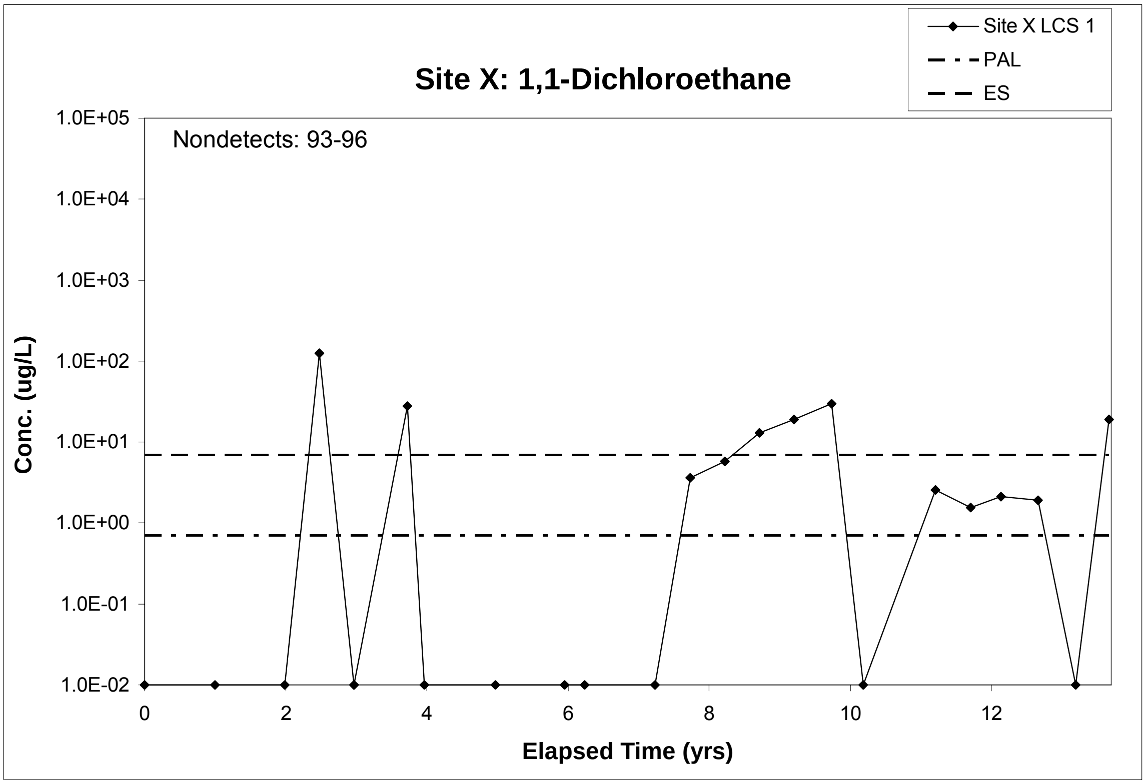

Site S LCS 2
PAL
ES
Site S: 1,1-Dichloroethane
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

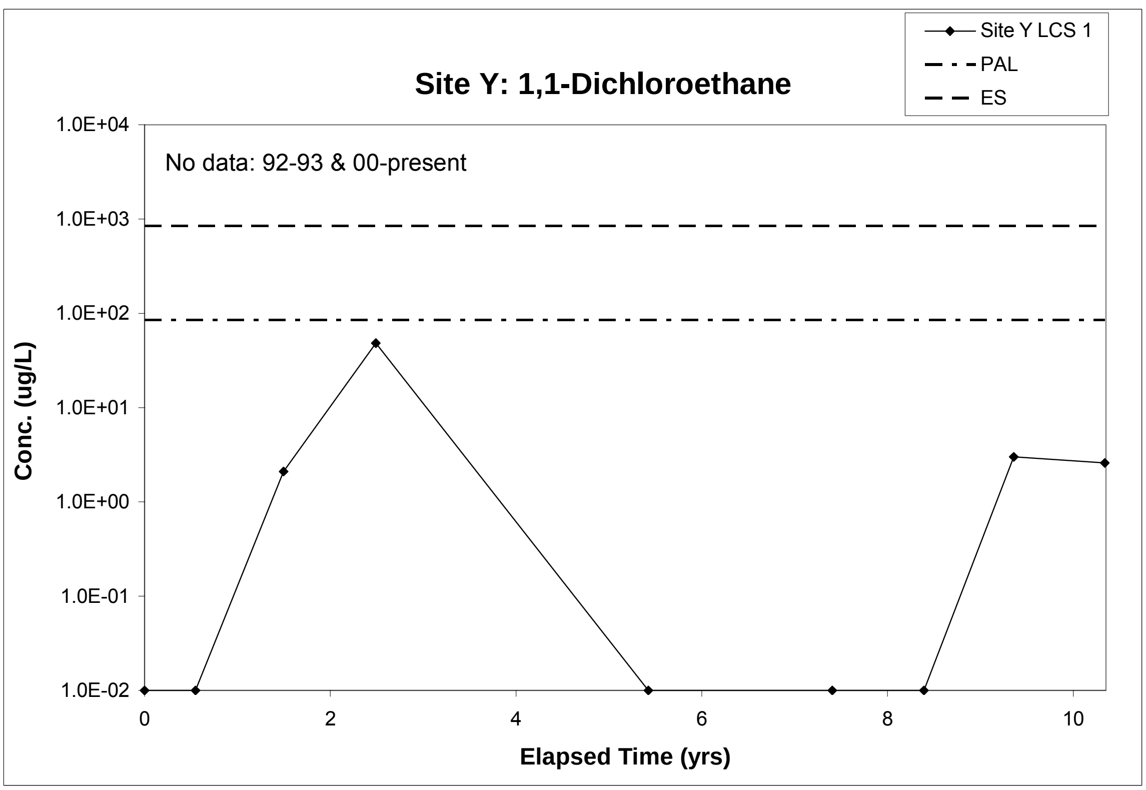

Site U: 1,1-Dichloroethane
Site U LCS 1
PAL
ES
Nondetects: 94-97
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

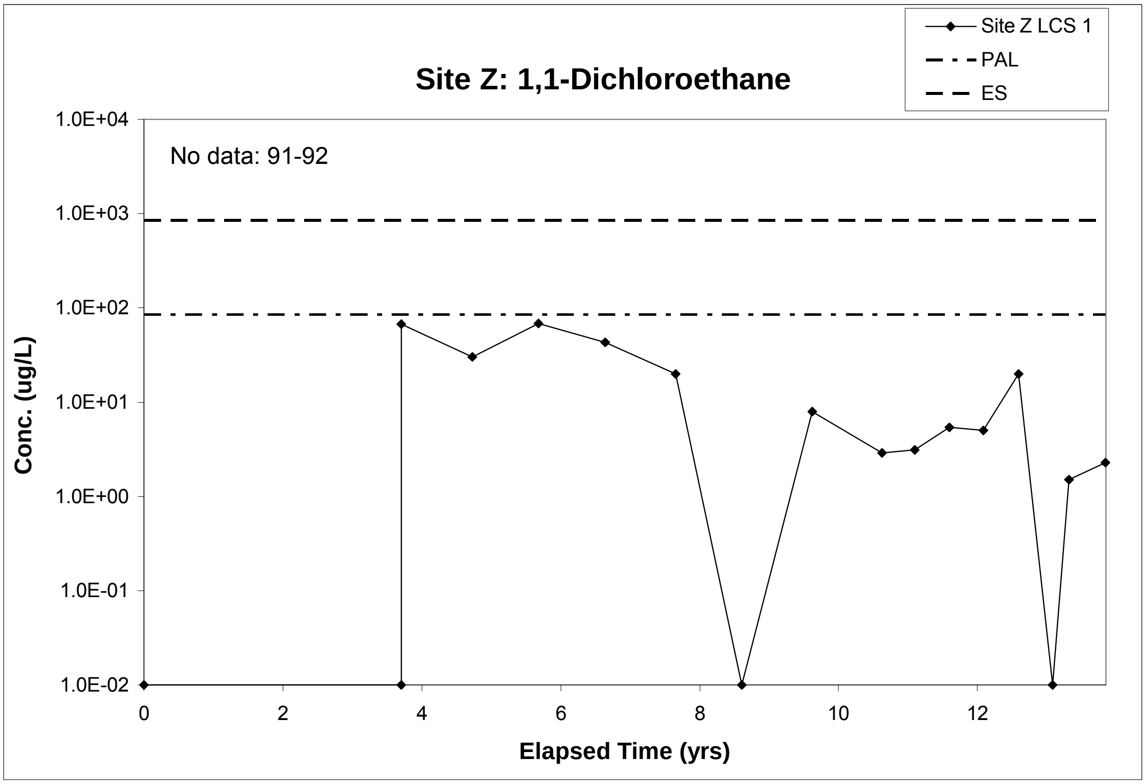

Site V: 1,1-Dichloroethane
Site V LCS 1
PAL
ES
No data: 90-96
Nondetects: 99-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

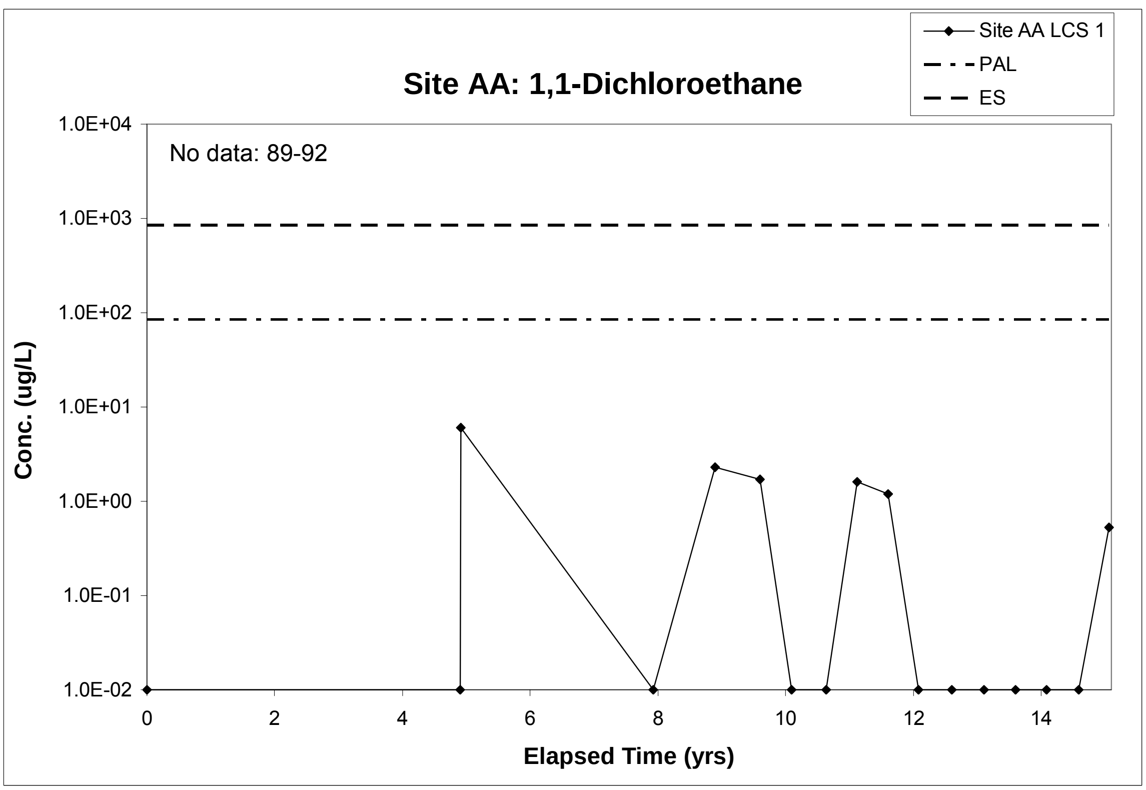

Site W: 1,1-Dichloroethane
Site W LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

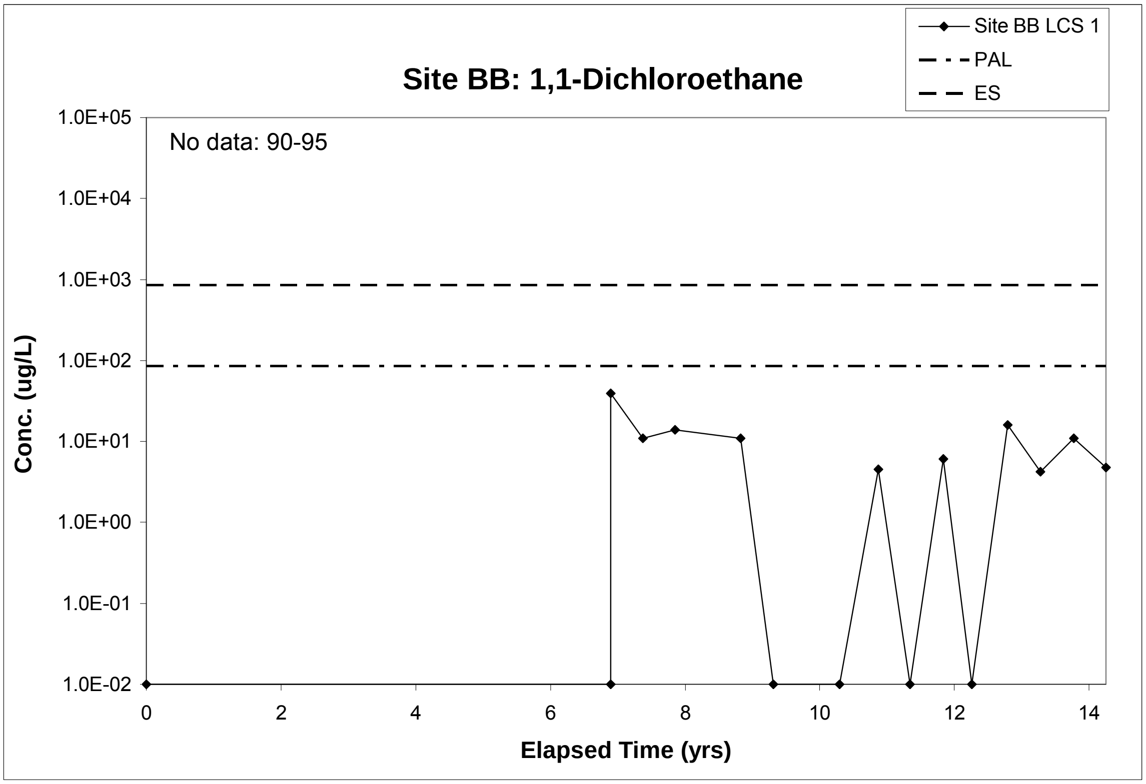

Site W: 1,1-Dichloroethane
Site W LCS 2
PAL
ES
Nondetects: 99-present
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

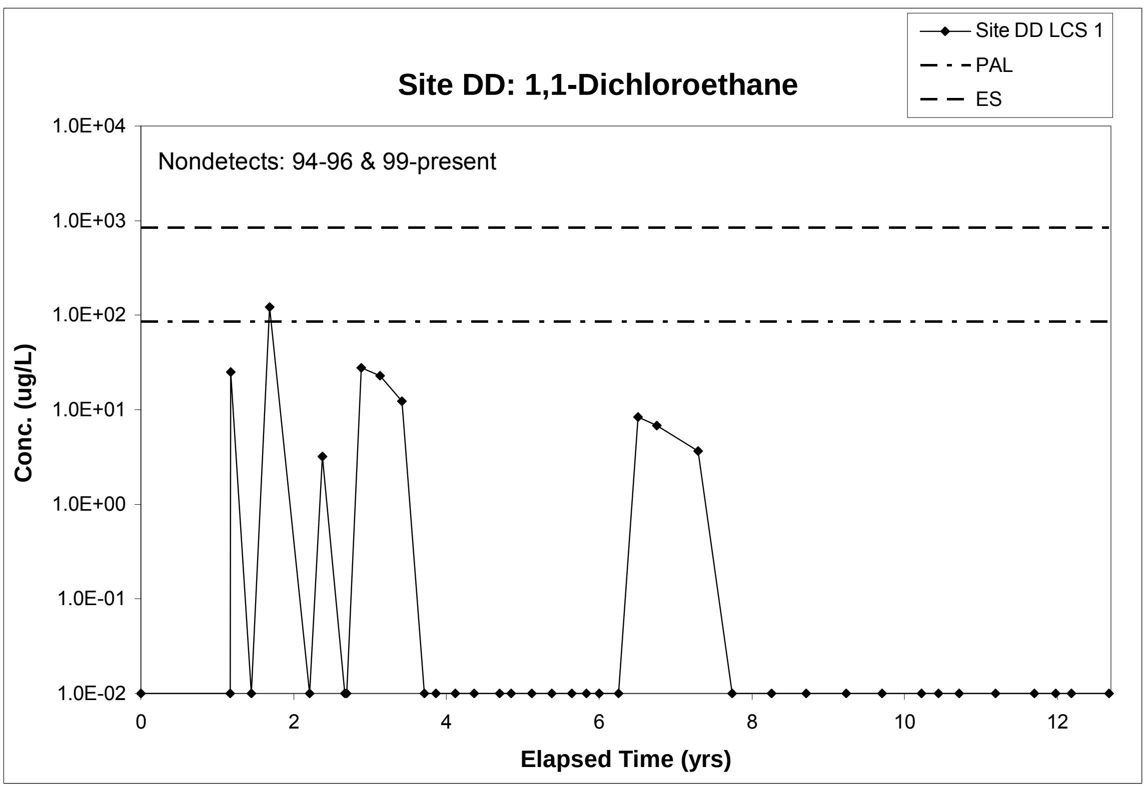

Site X LCS 1
PAL
ES
Site X: 1,1-Dichloroethane
Nondetects: 93-96
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

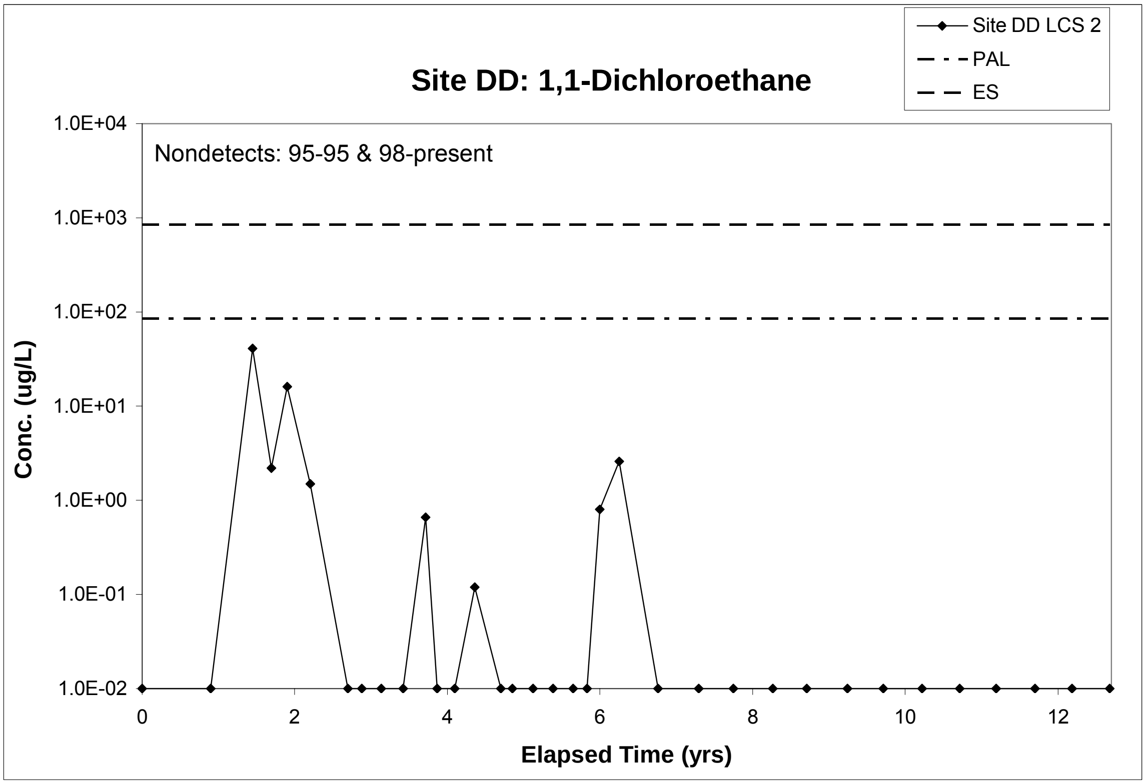

Site Y LCS 1
PAL
ES
Site Y: 1,1-Dichloroethane
No data: 92-93 & 00-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)


Site Z: 1,1-Dichloroethane
Site Z LCS 1
PAL
ES
No data: 91-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

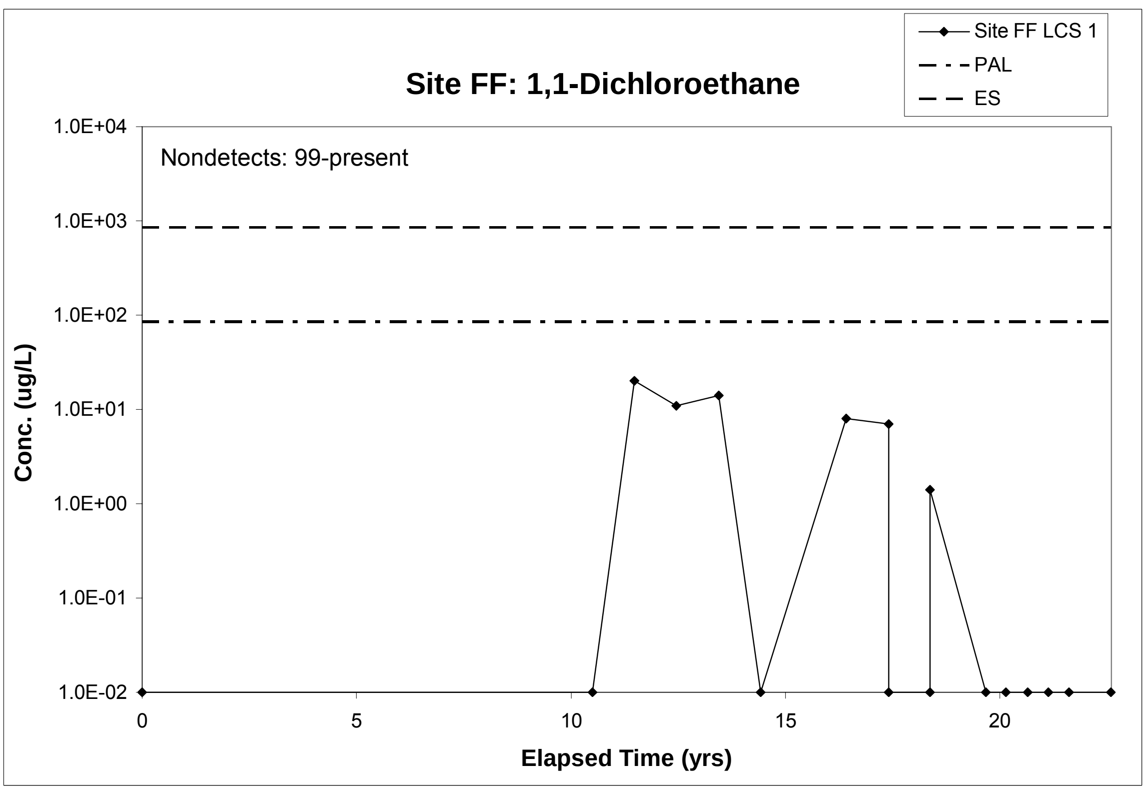

Site AA: 1,1-Dichloroethane
Site AA LCS 1
PAL
ES
No data: 89-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)


Site BB: 1,1-Dichloroethane
Site BB LCS 1
PAL
ES
No data: 90-95
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

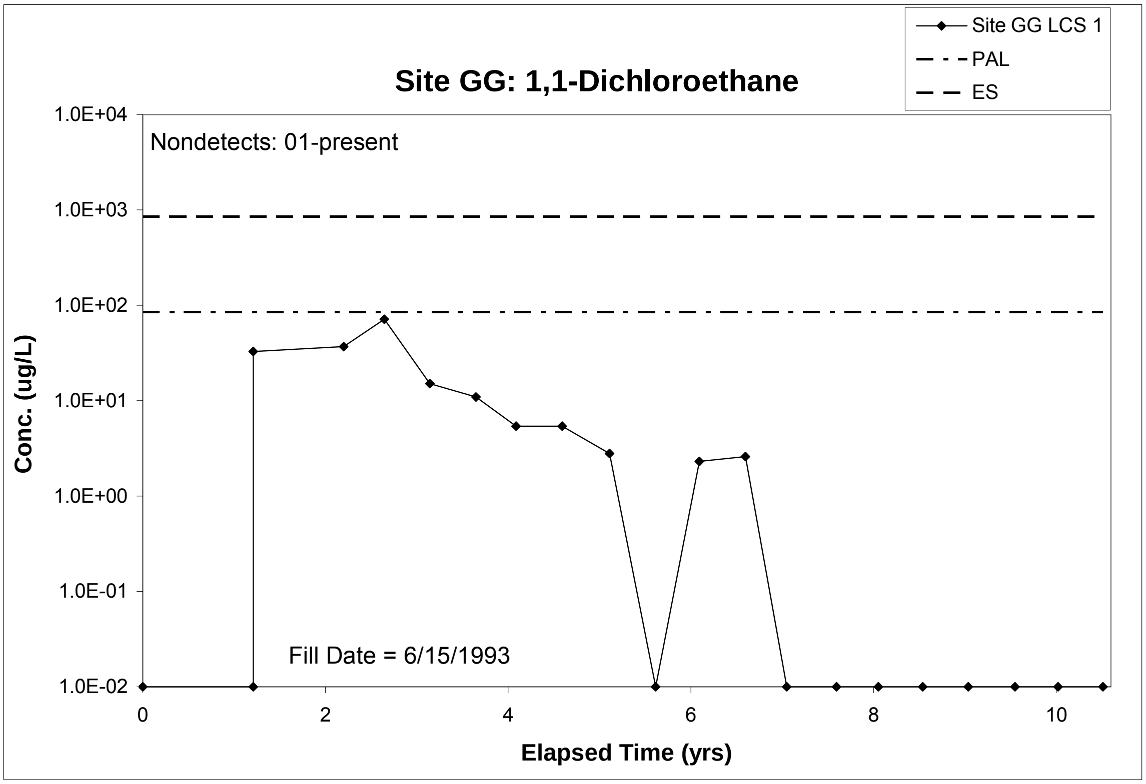

Site DD: 1,1-Dichloroethane
Site DD LCS 1
PAL
ES
Nondetects: 94-96 & 99-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

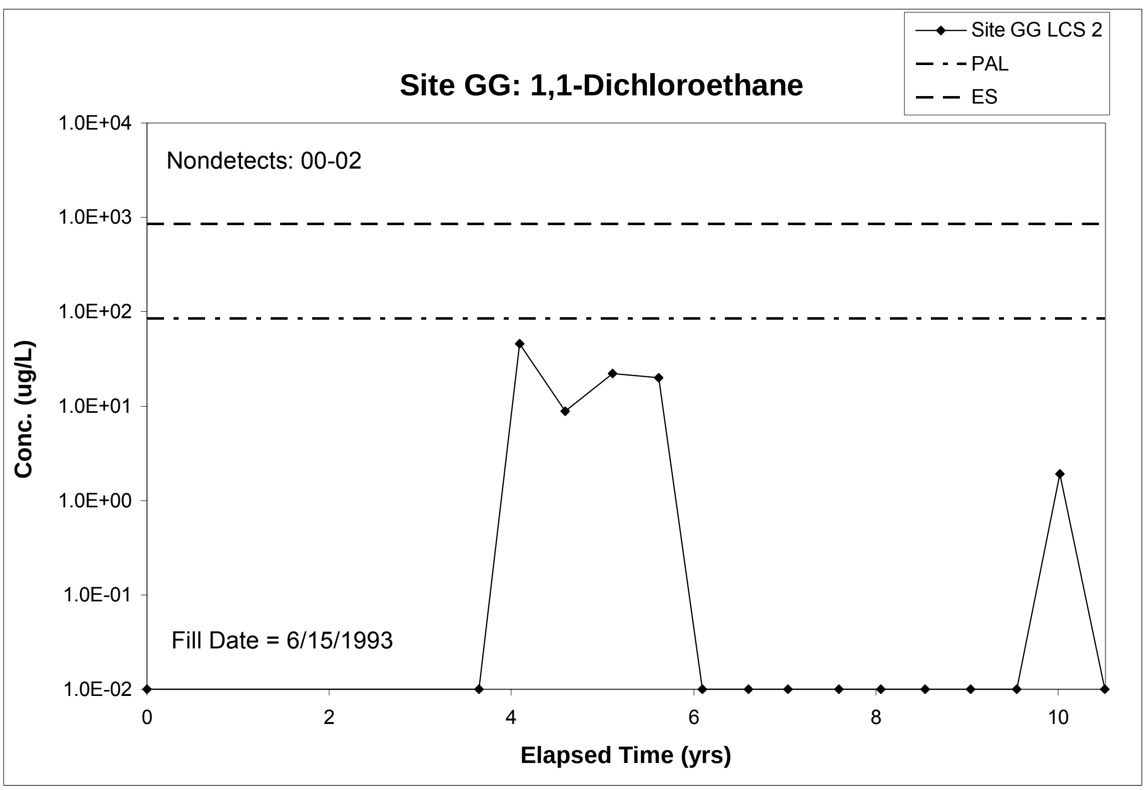


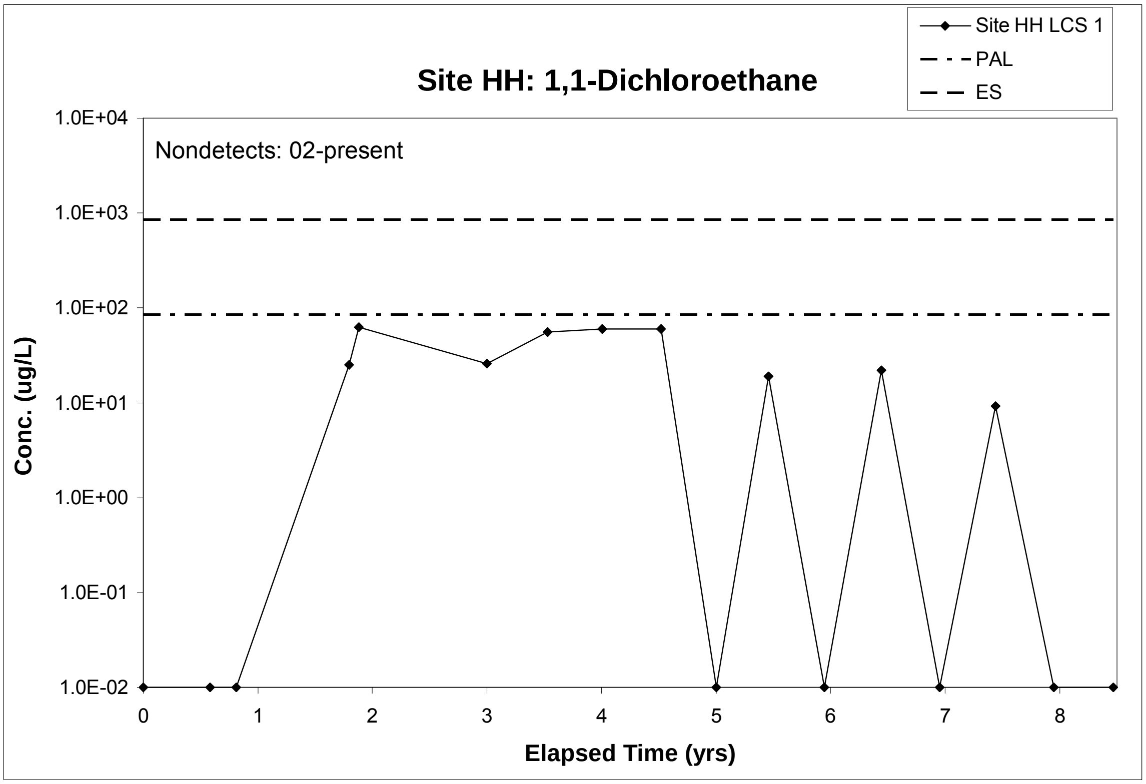
Site DD: 1,1-Dichloroethane
Site DD LCS 2
PAL
ES
Nondetects: 95-95 & 98-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

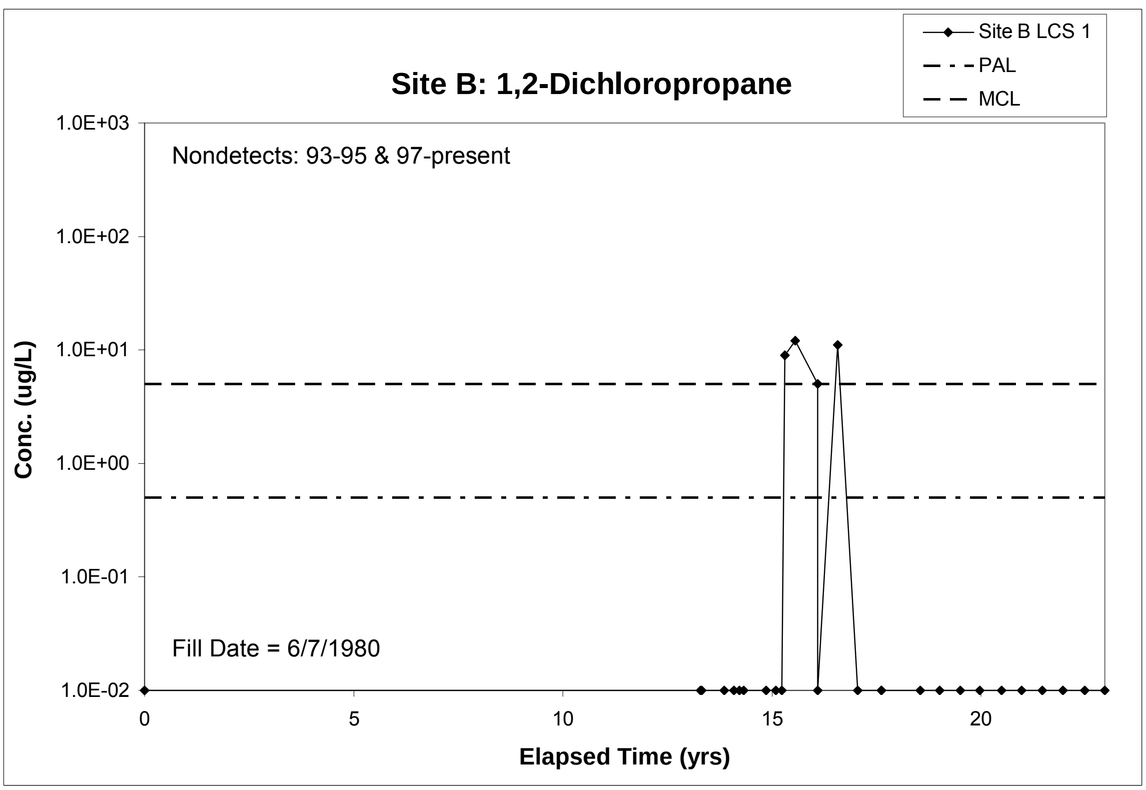


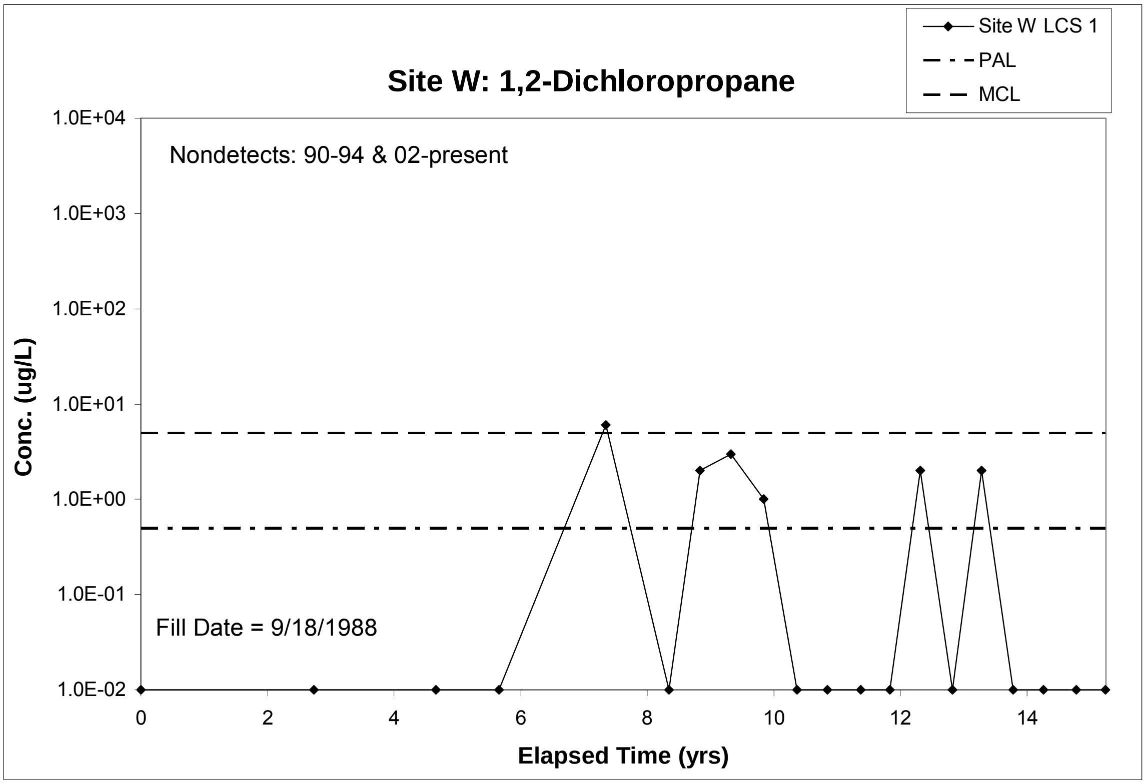
Site FF: 1,1-Dichloroethane
Site FF LCS 1
PAL
ES
Nondetects: 99-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

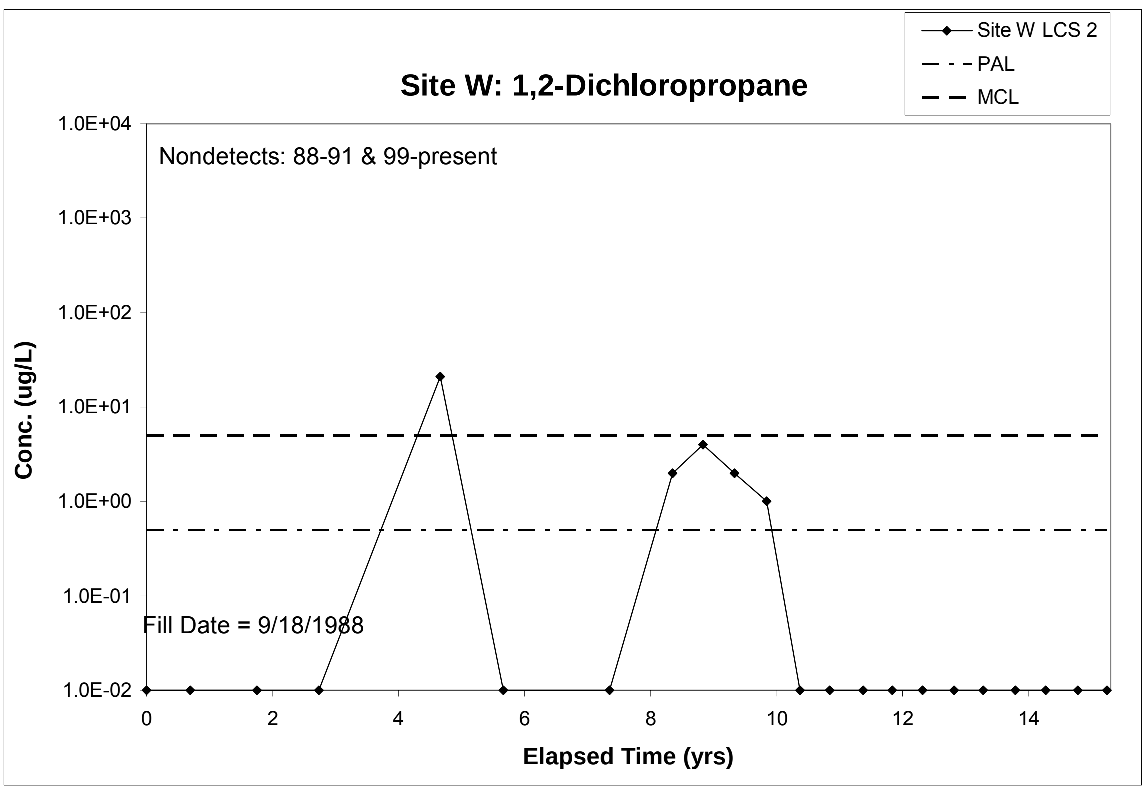

Site GG: 1,1-Dichloroethane
Site GG LCS 1
PAL
ES
Nondetects: 01-present
Fill Date = 6/15/1993
Conc. (ug/L)
Elapsed Time (yrs)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10

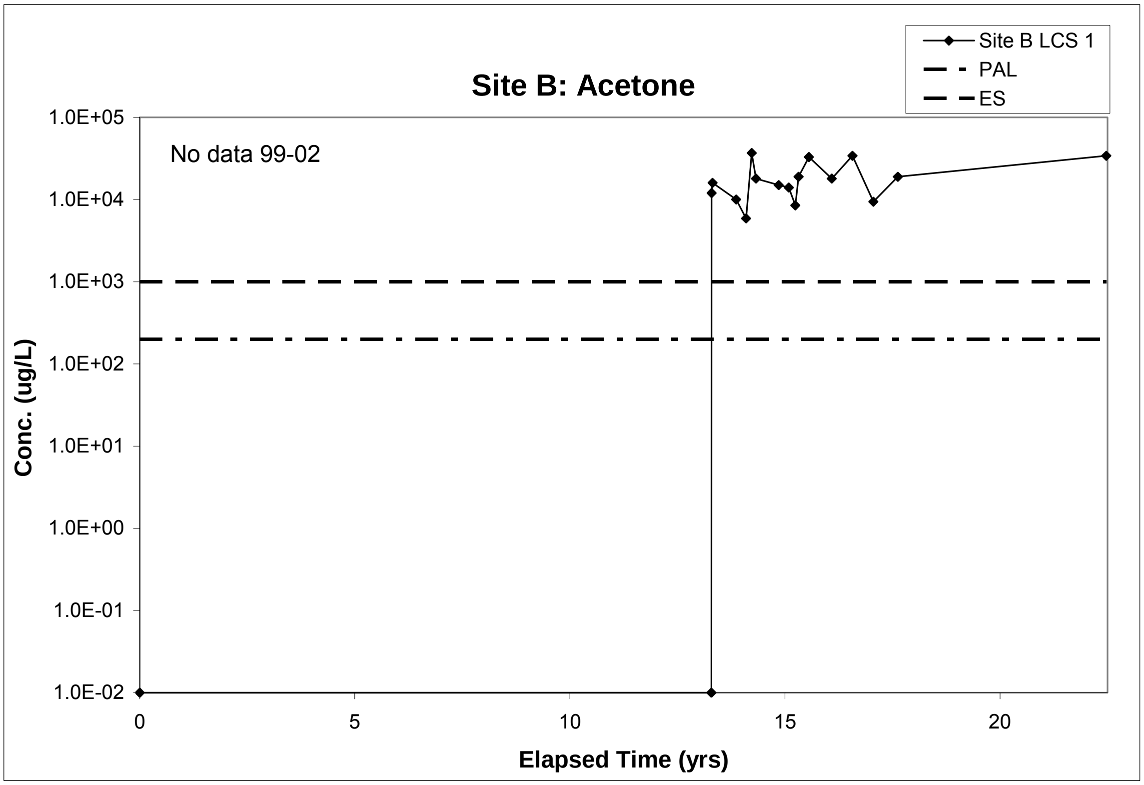

Site GG: 1,1-Dichloroethane
Site GG LCS 2
PAL
ES
Nondetects: 00-02
Fill Date = 6/15/1993
Conc. (ug/L)
Elapsed Time (yrs)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10

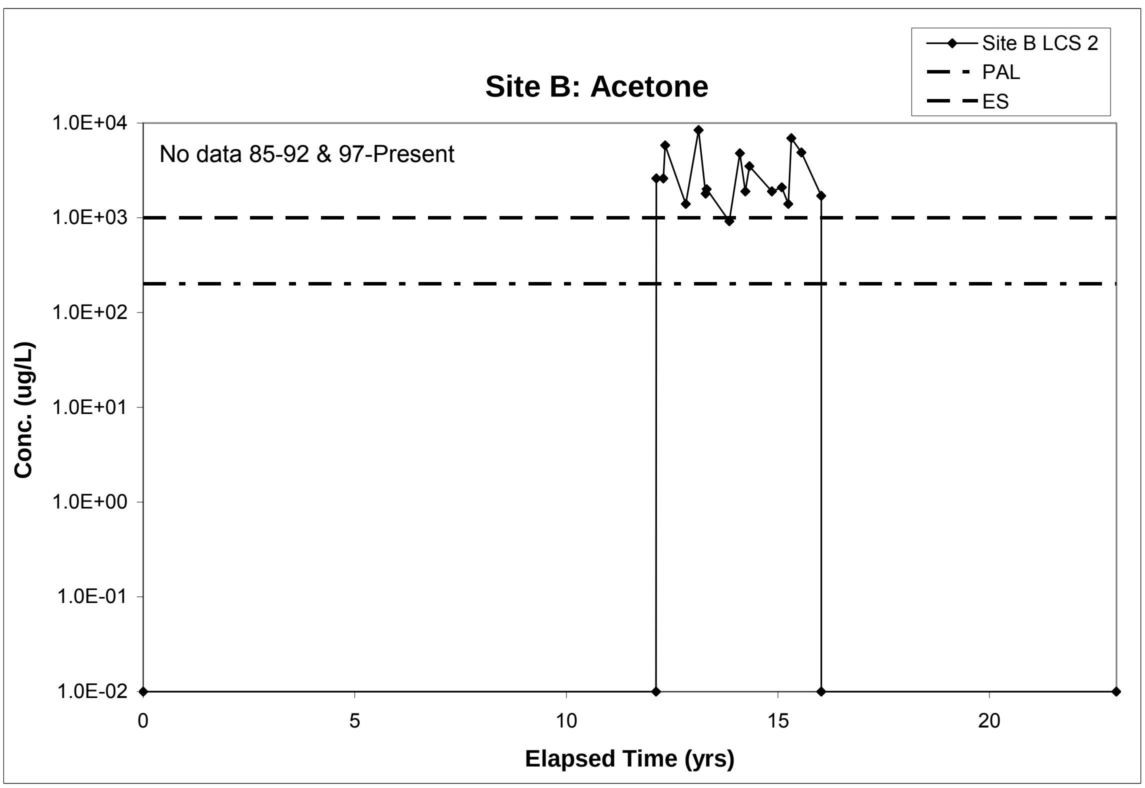

Site HH: 1,1-Dichloroethane
Site HH LCS 1
PAL
ES
Nondetects: 02-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

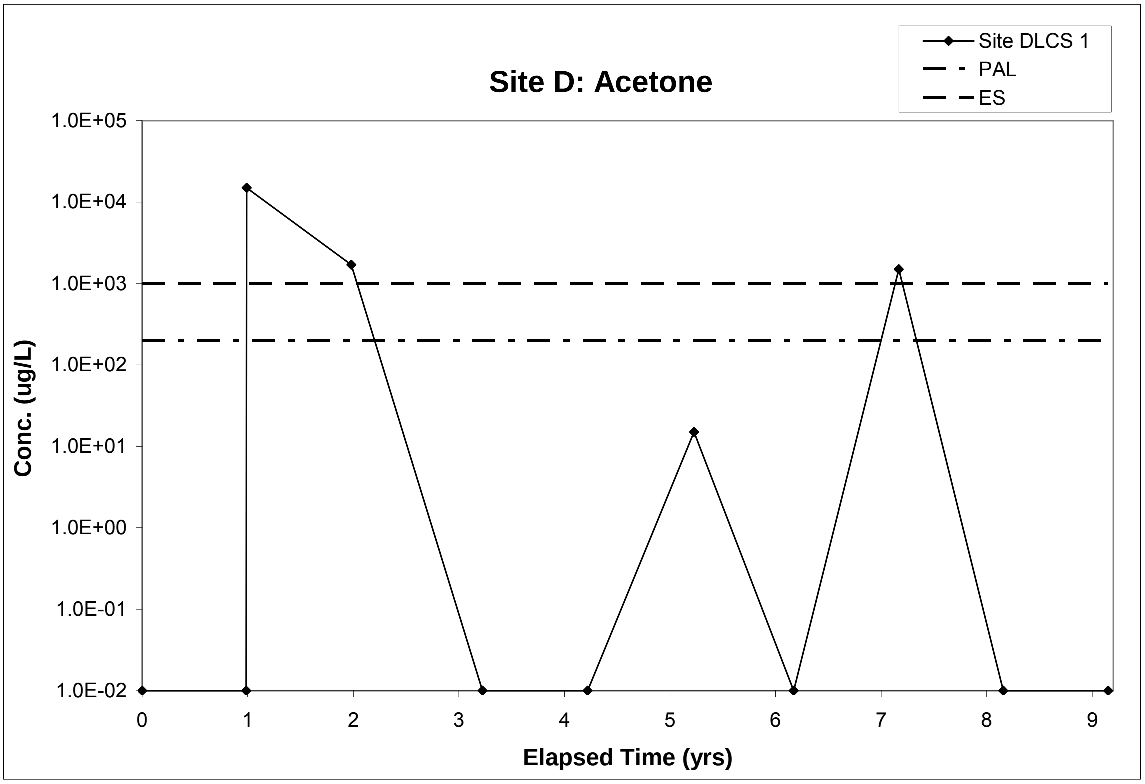

Site B: 1,2-Dichloropropane
Site B LCS 1
PAL
MCL
Nondetects: 93-95 & 97-present
Fill Date = 6/7/1980
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

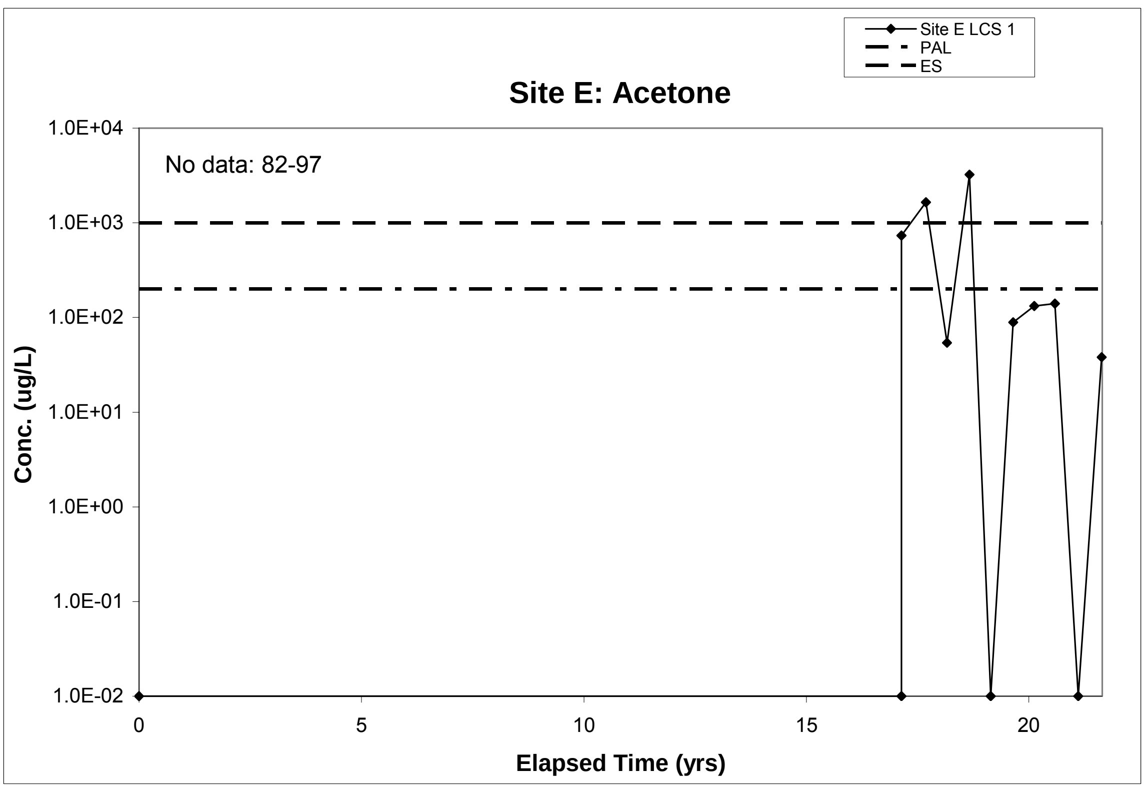

Site W: 1,2-Dichloropropane
Site W LCS 1
PAL
MCL
Nondetects: 90-94 & 02-present
Fill Date = 9/18/1988
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

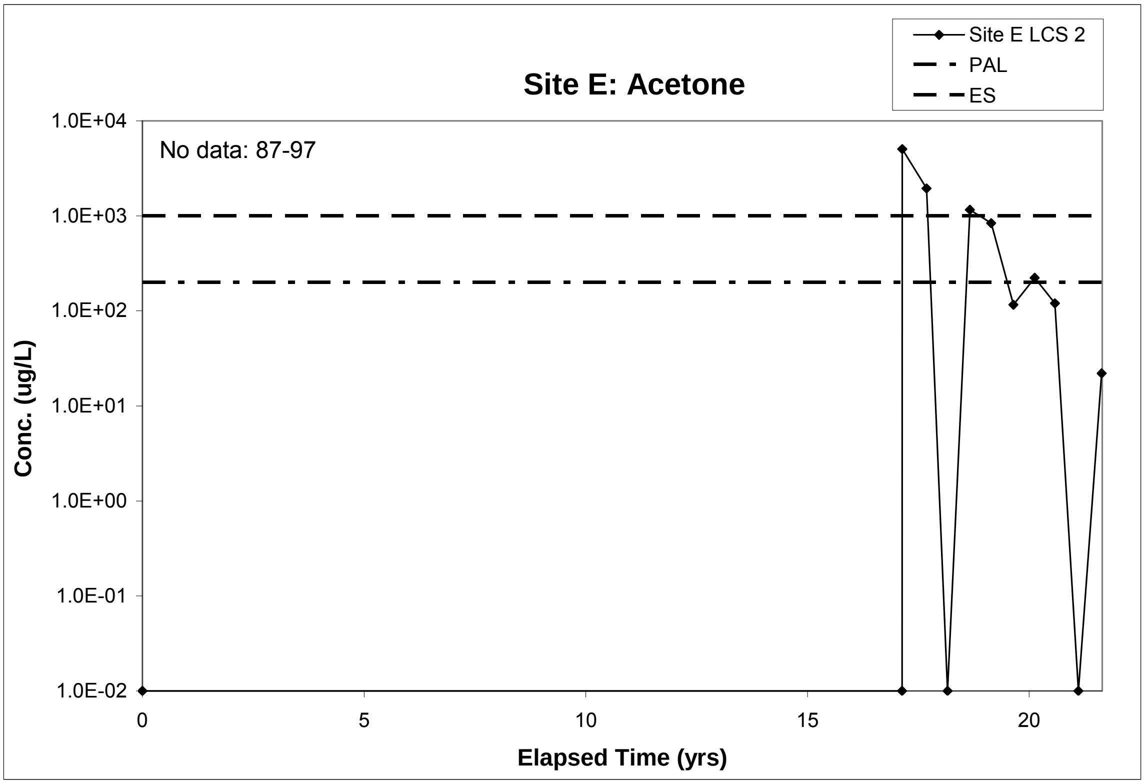

Site W: 1,2-Dichloropropane
Site W LCS 2
PAL
MCL
Nondetects: 88-91 & 99-present
Fill Date = 9/18/1988
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

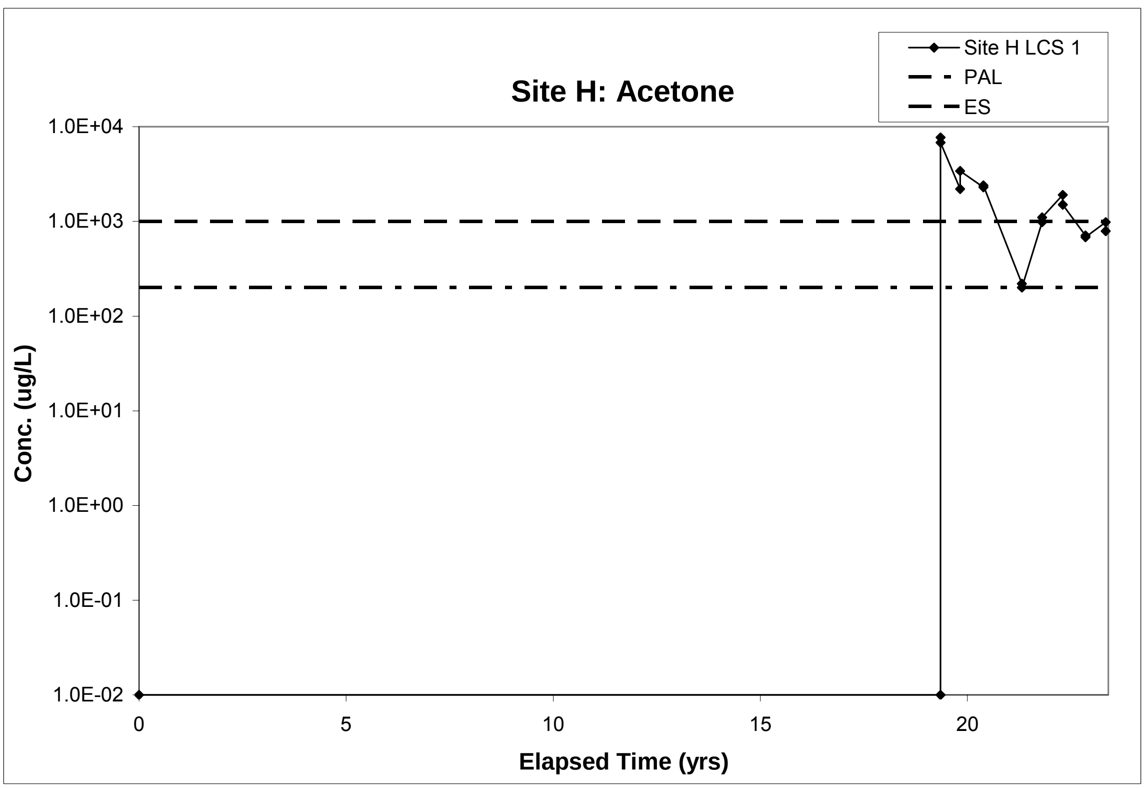

Site B: Acetone
Site B LCS 1
PAL
ES
No data 99-02
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

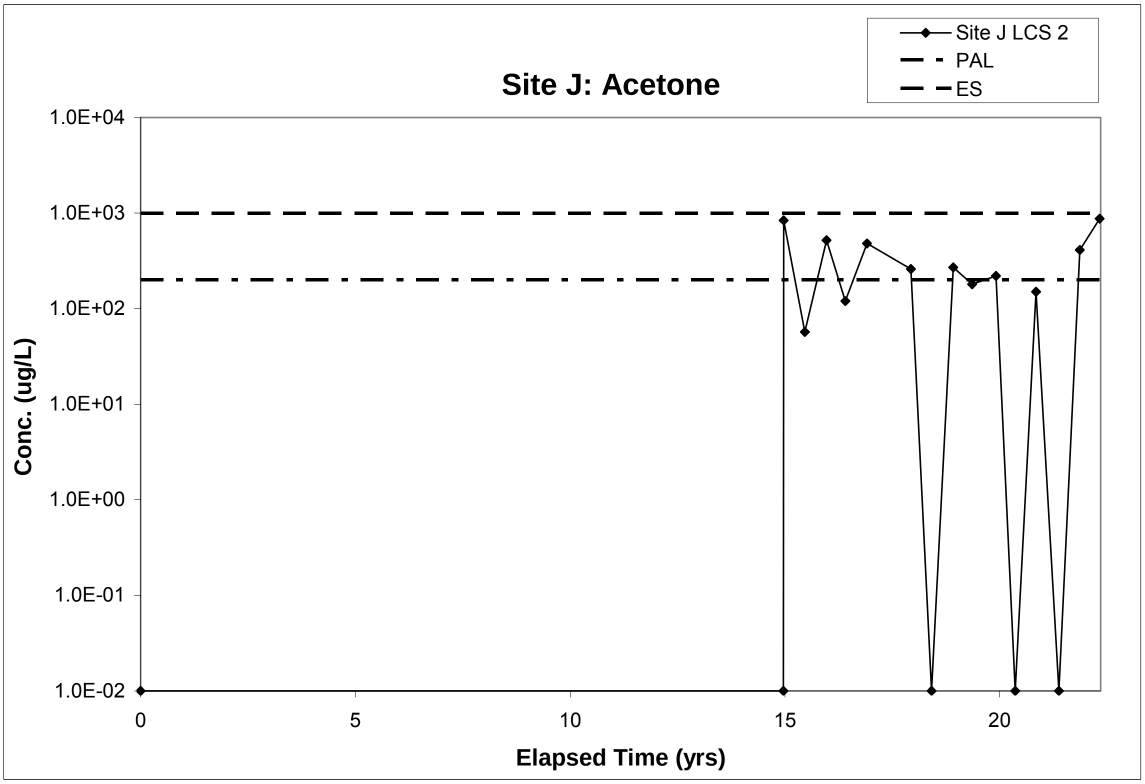

Site B: Acetone
Site B LCS 2
PAL
ES
No data 85-92 & 97-Present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

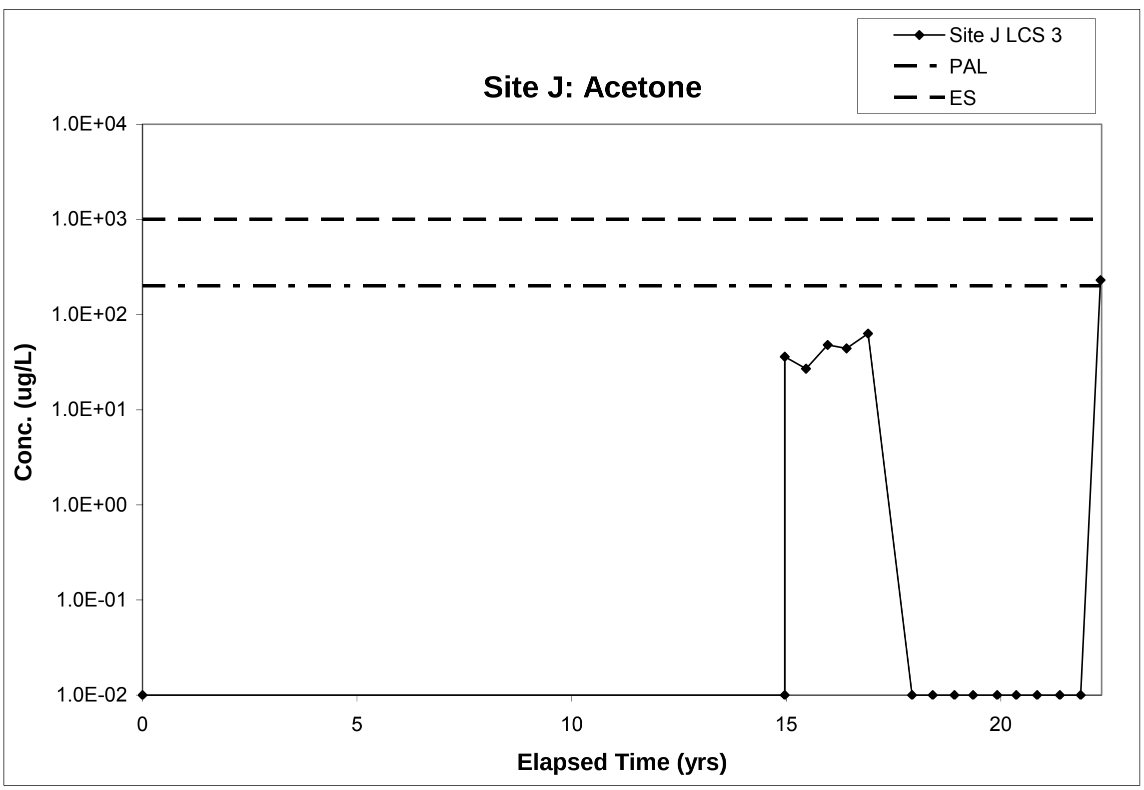

Site D: Acetone
Site DLCS 1
PAL
ES
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0 1 2 3 4 5 6 7 8 9
Elapsed Time (yrs)

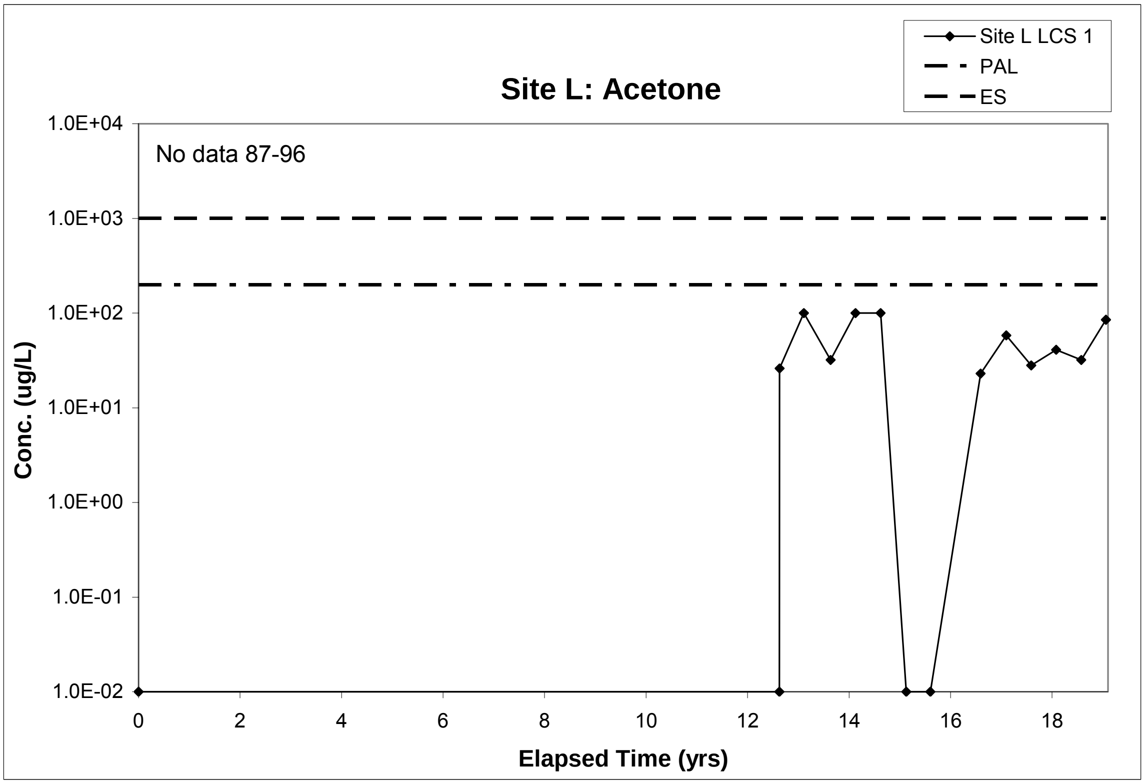

Site E: Acetone
Site E LCS 1
PAL
ES
No data: 82-97
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0 5 10 15 20
Elapsed Time (yrs)

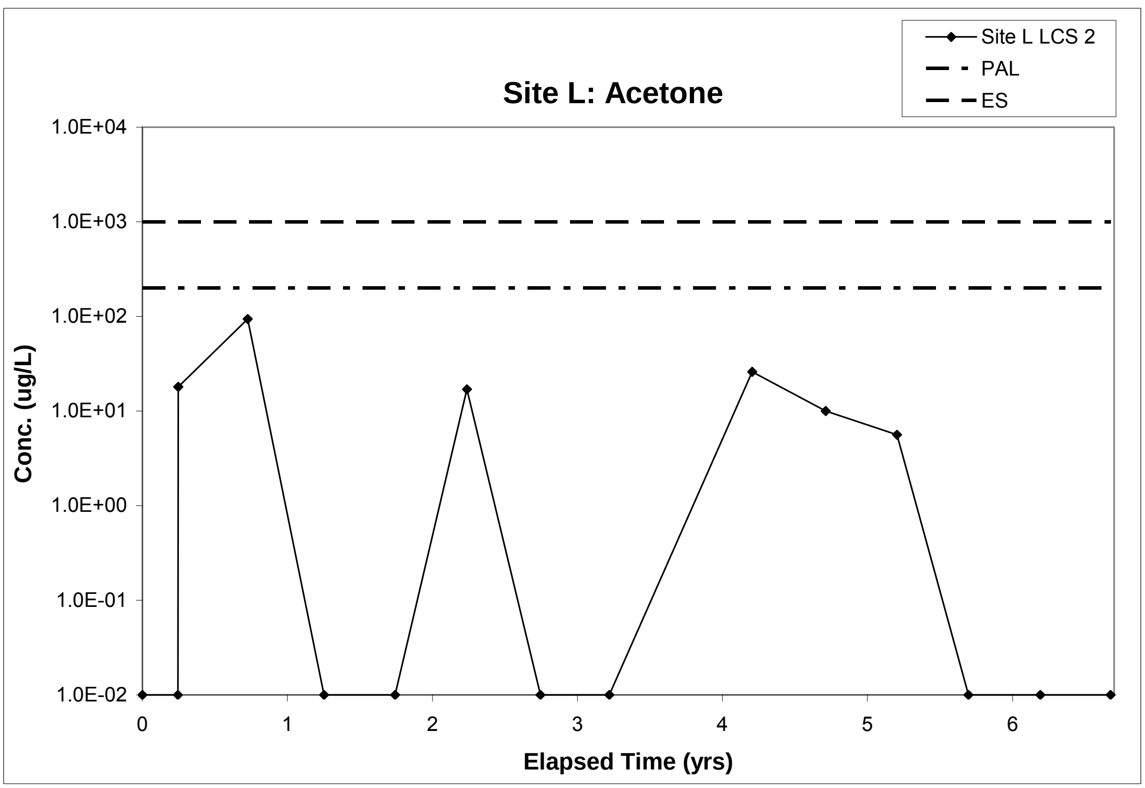

Site E: Acetone
Site E LCS 2
PAL
ES
No data: 87-97
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

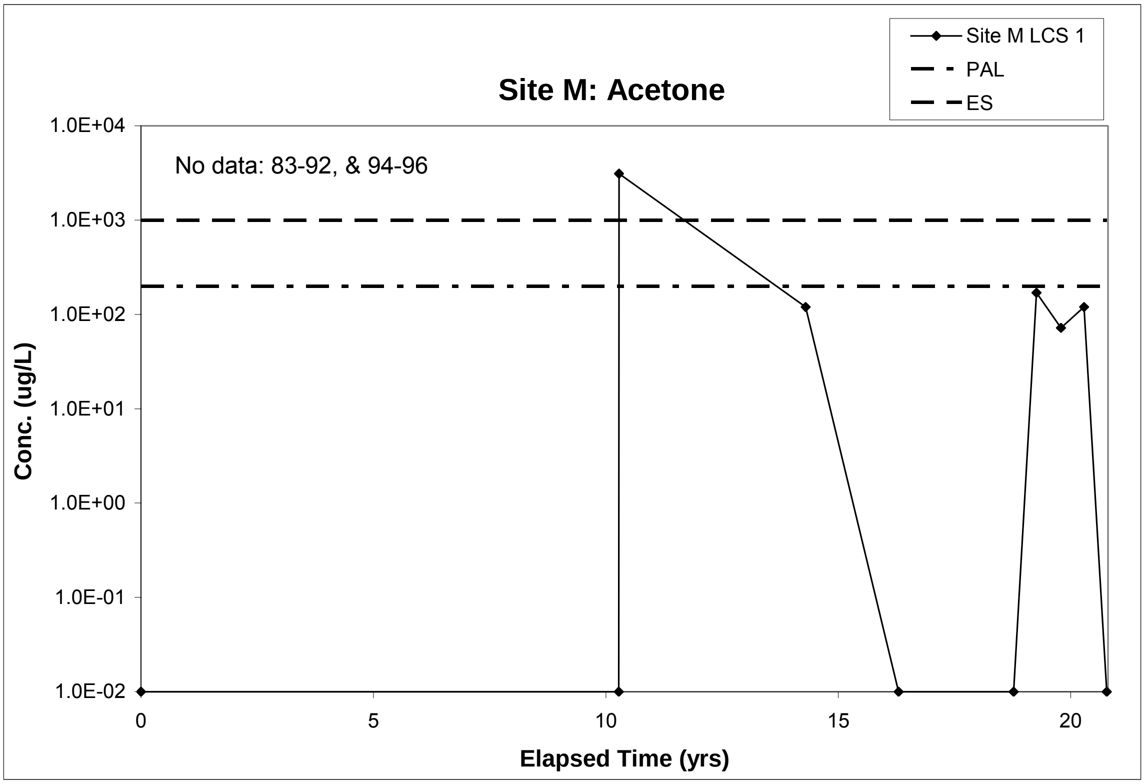

Site H: Acetone
Site H LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

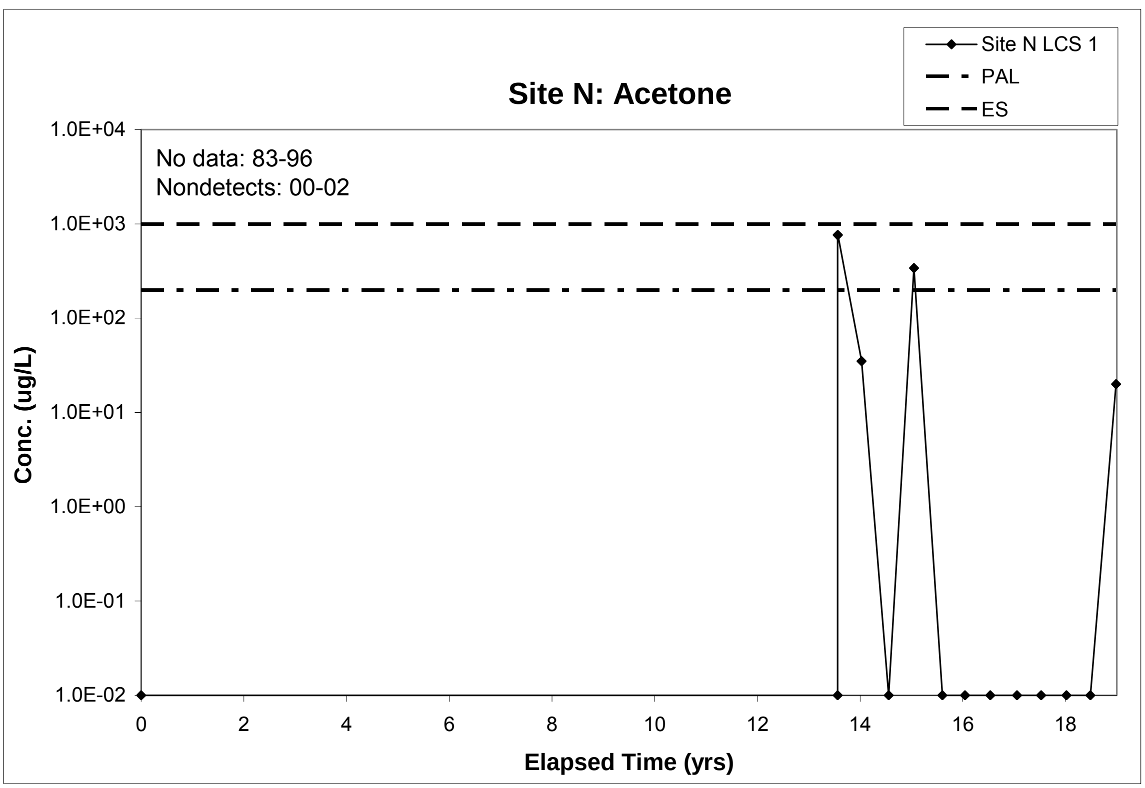

Site J: Acetone
Site J LCS 2
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

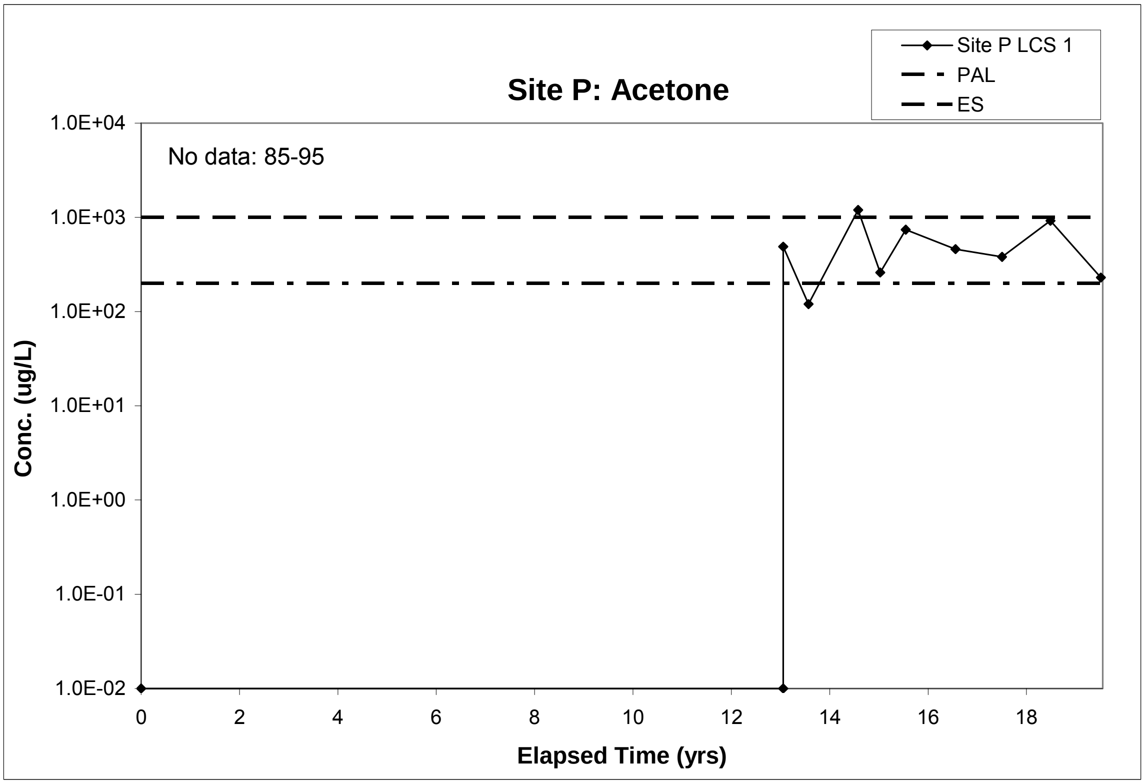

Site J: Acetone
Site J LCS 3
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

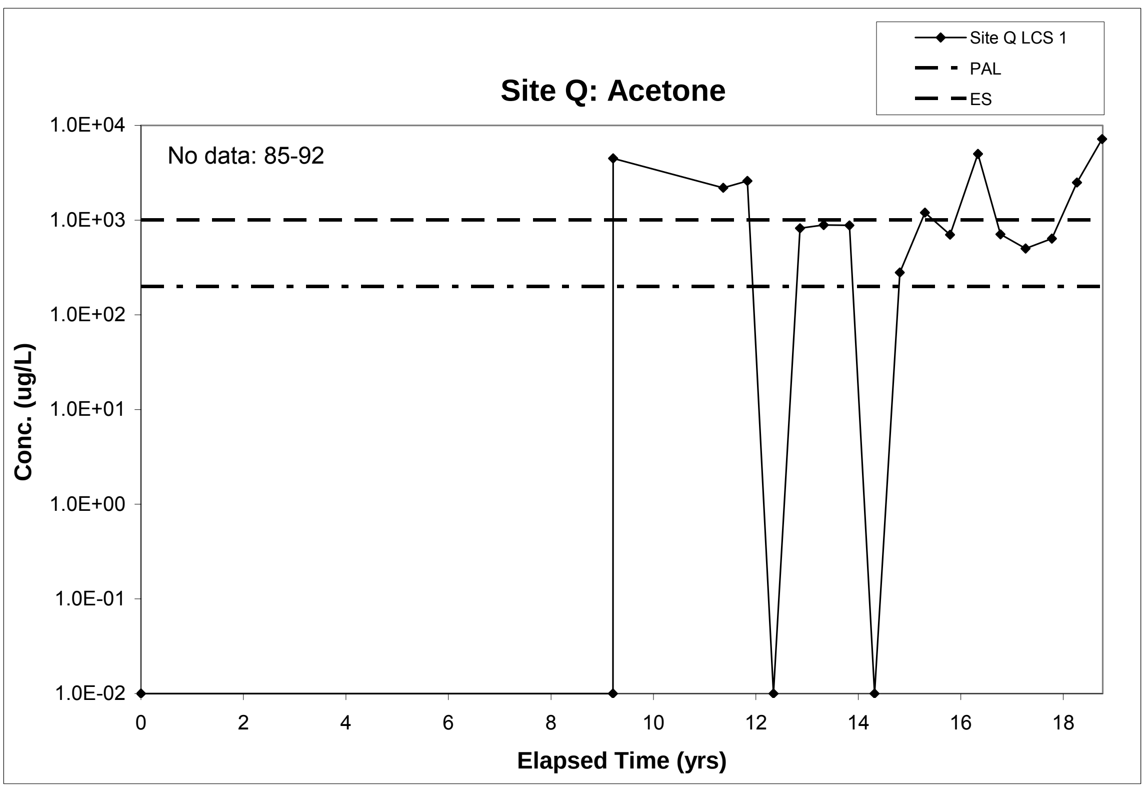

Site L: Acetone
Site L LCS 1
PAL
ES
No data 87-96
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

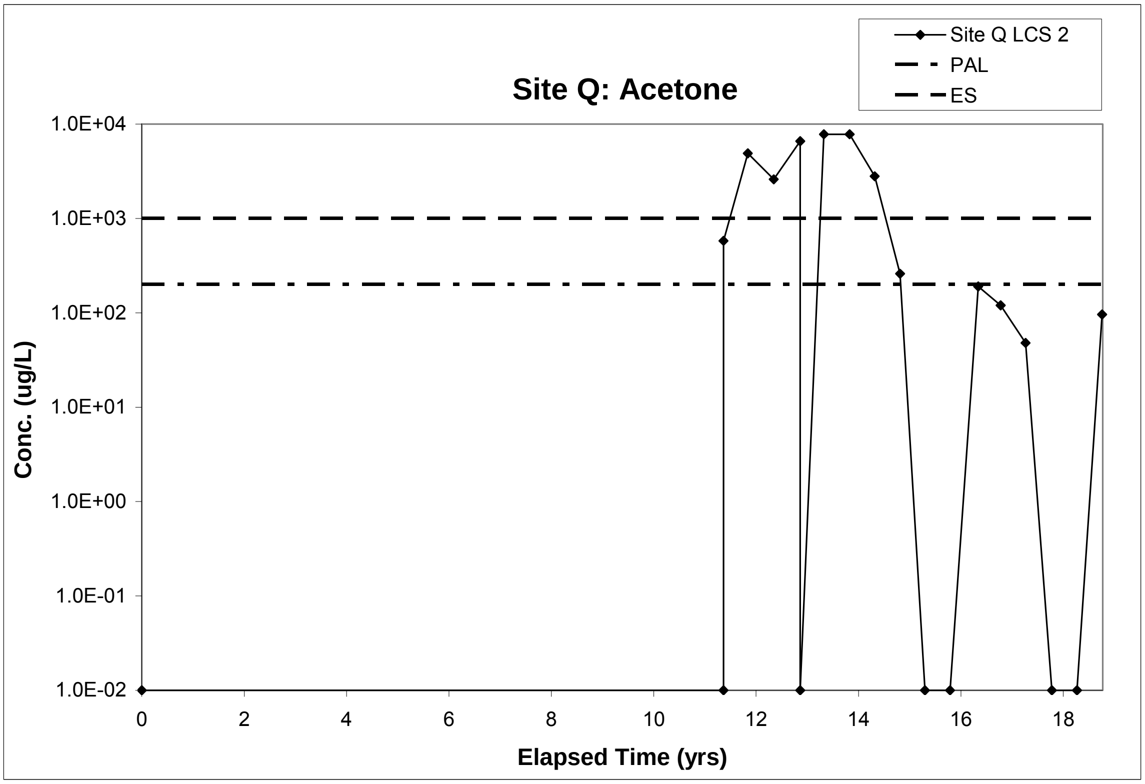

Site L: Acetone
Site L LCS 2
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
Elapsed Time (yrs)

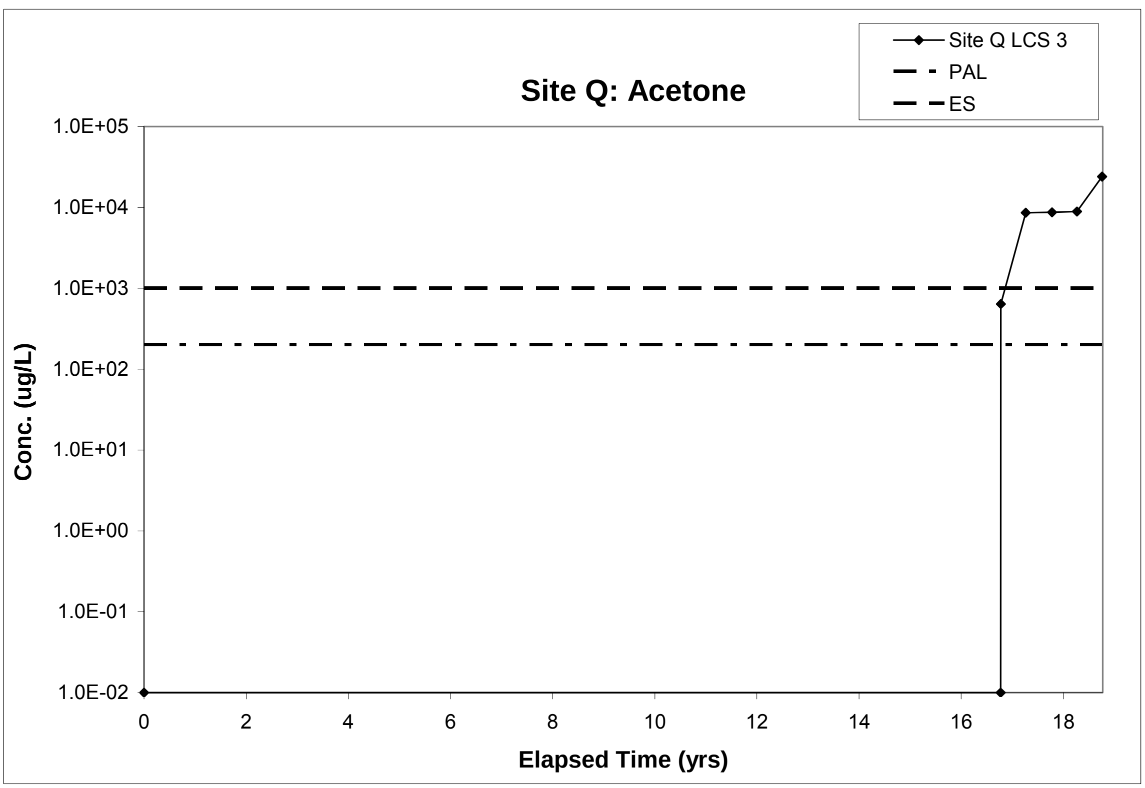

Site M: Acetone
Site M LCS 1
PAL
ES
No data: 83-92, & 94-96
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

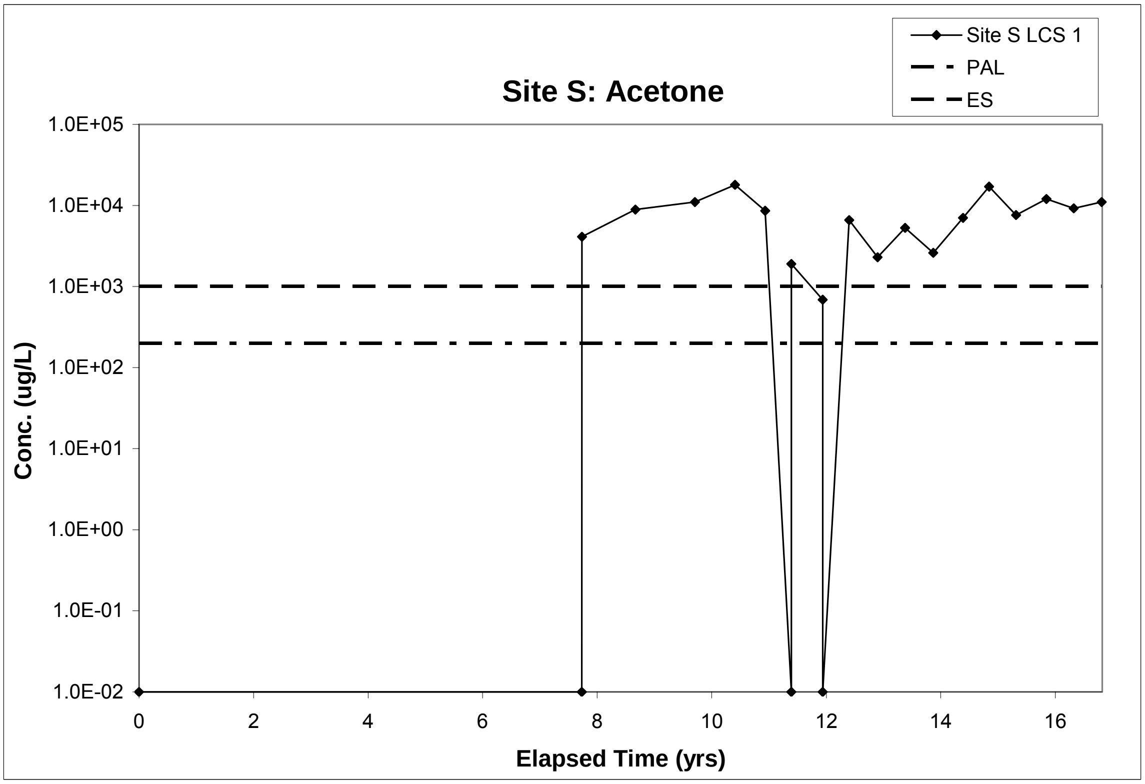

Site N: Acetone
Site N LCS 1
PAL
ES
No data: 83-96
Nondetects: 00-02
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

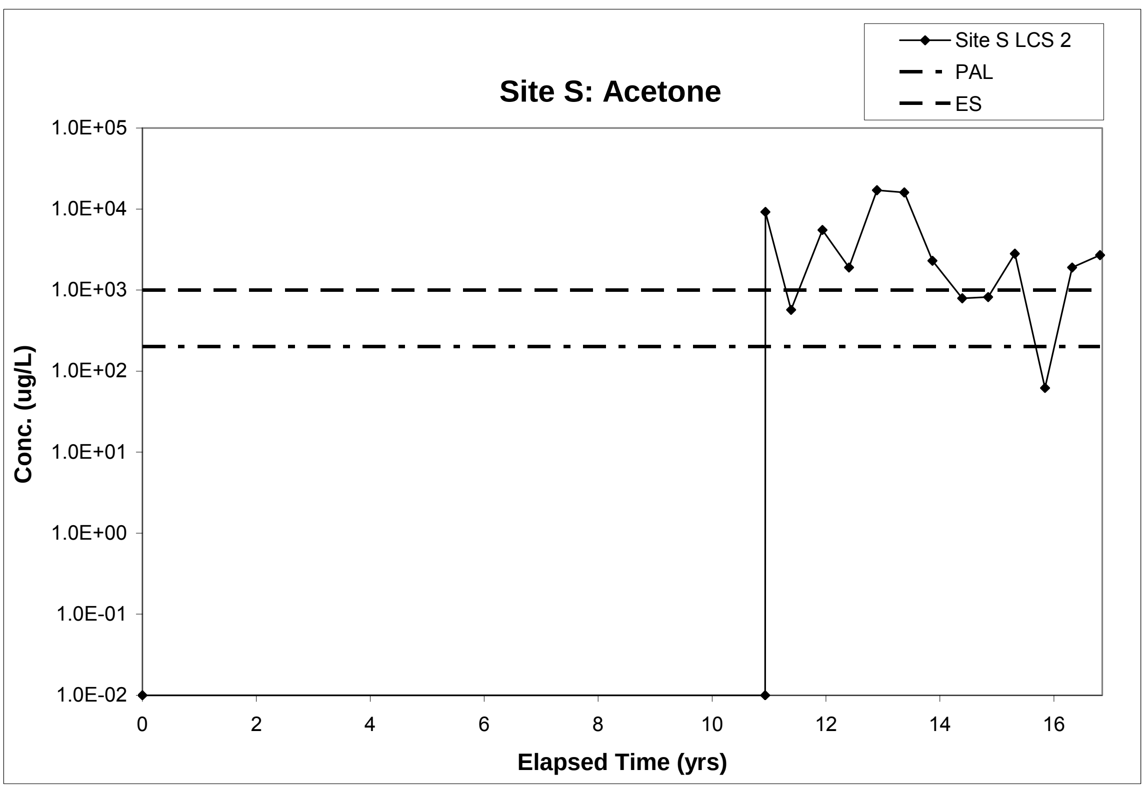

Site P: Acetone
Site P LCS 1
PAL
ES
No data: 85-95
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

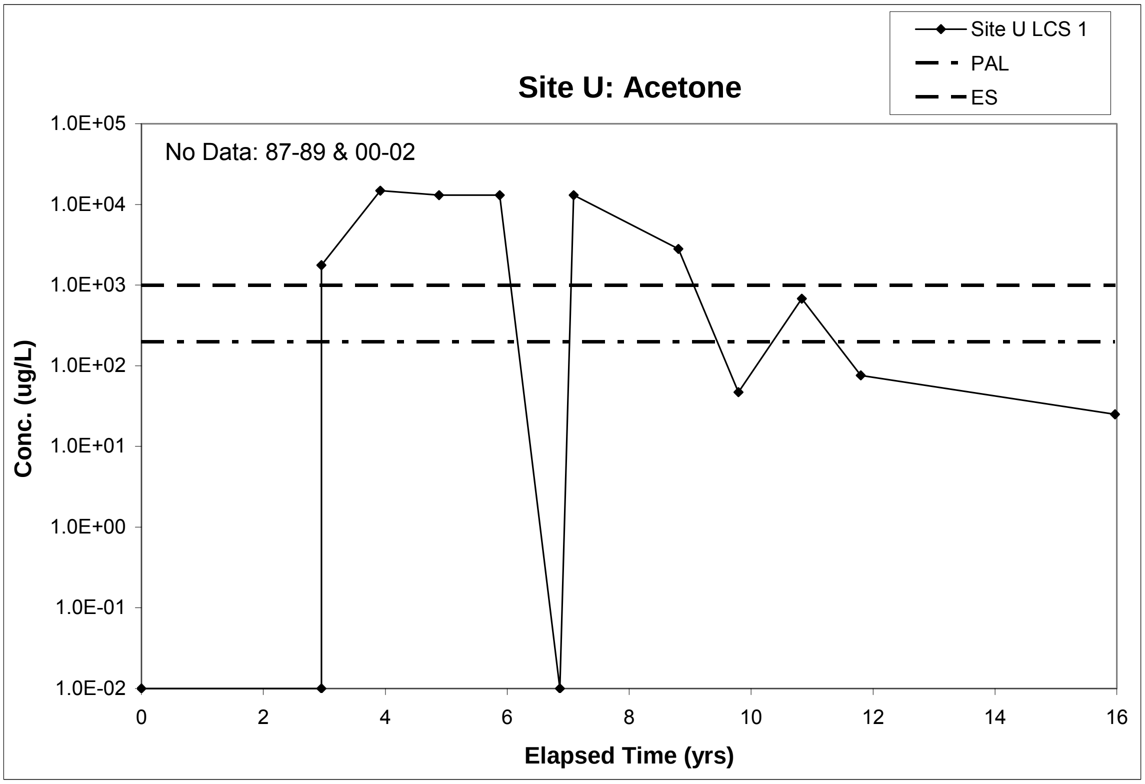

Site Q: Acetone
Site Q LCS 1
PAL
ES
No data: 85-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

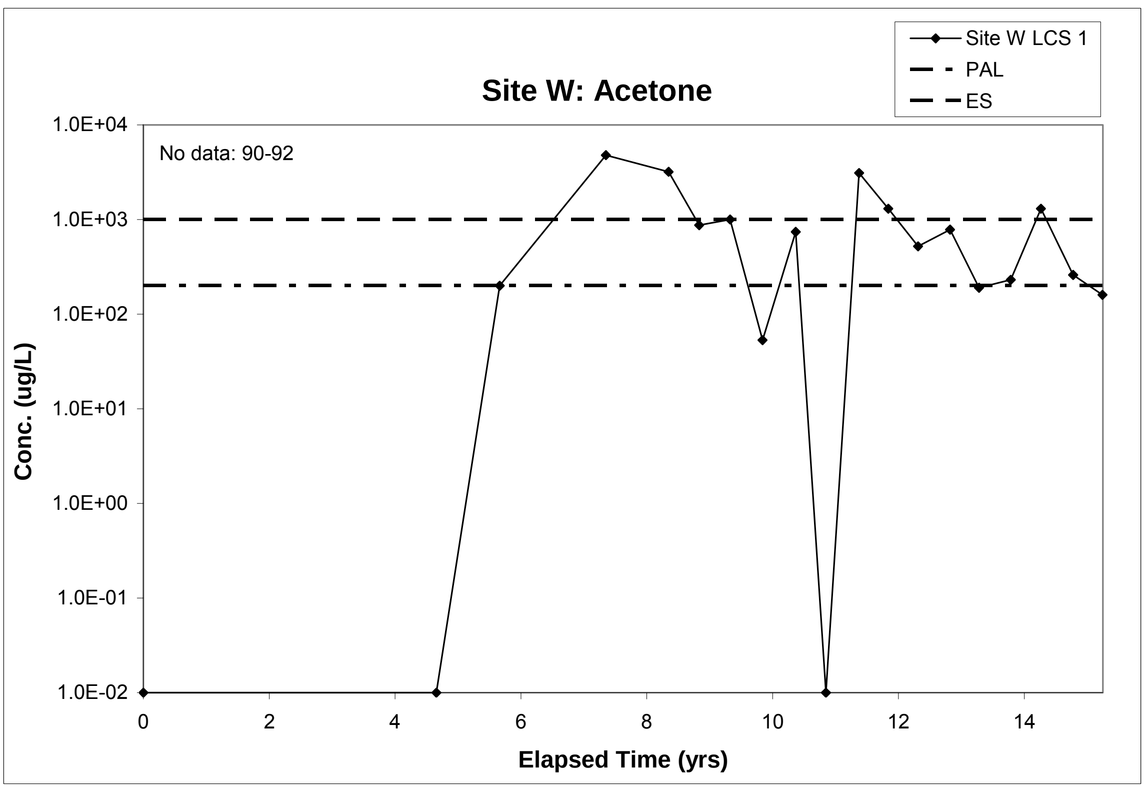

Site Q LCS 2
PAL
ES
Site Q: Acetone
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

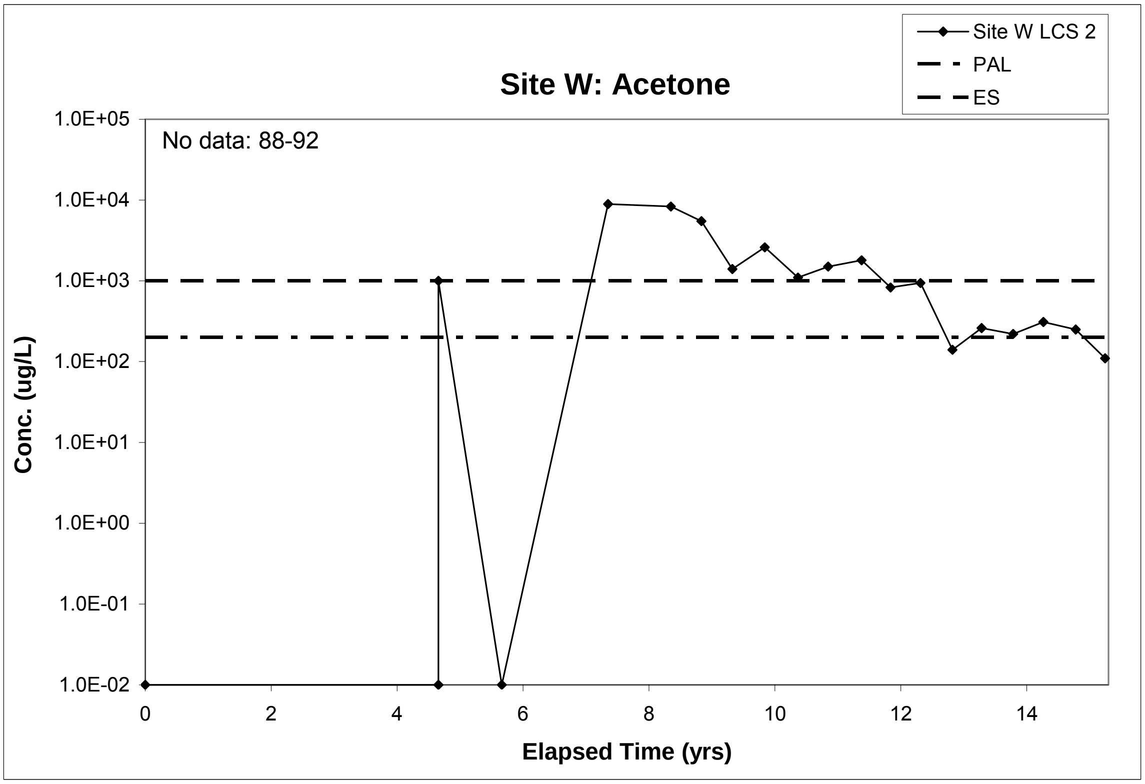

Site Q LCS 3
PAL
ES
Site Q: Acetone
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

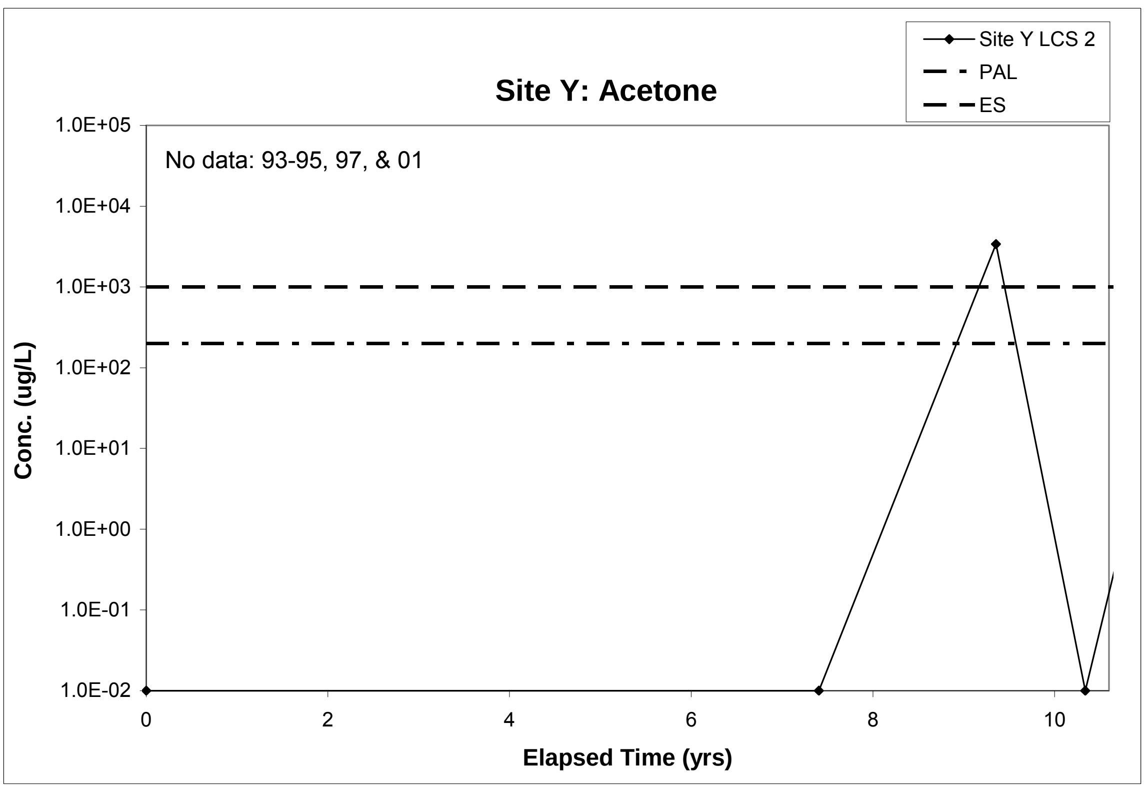

Site S: Acetone
Site S LCS 1
PAL
ES
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

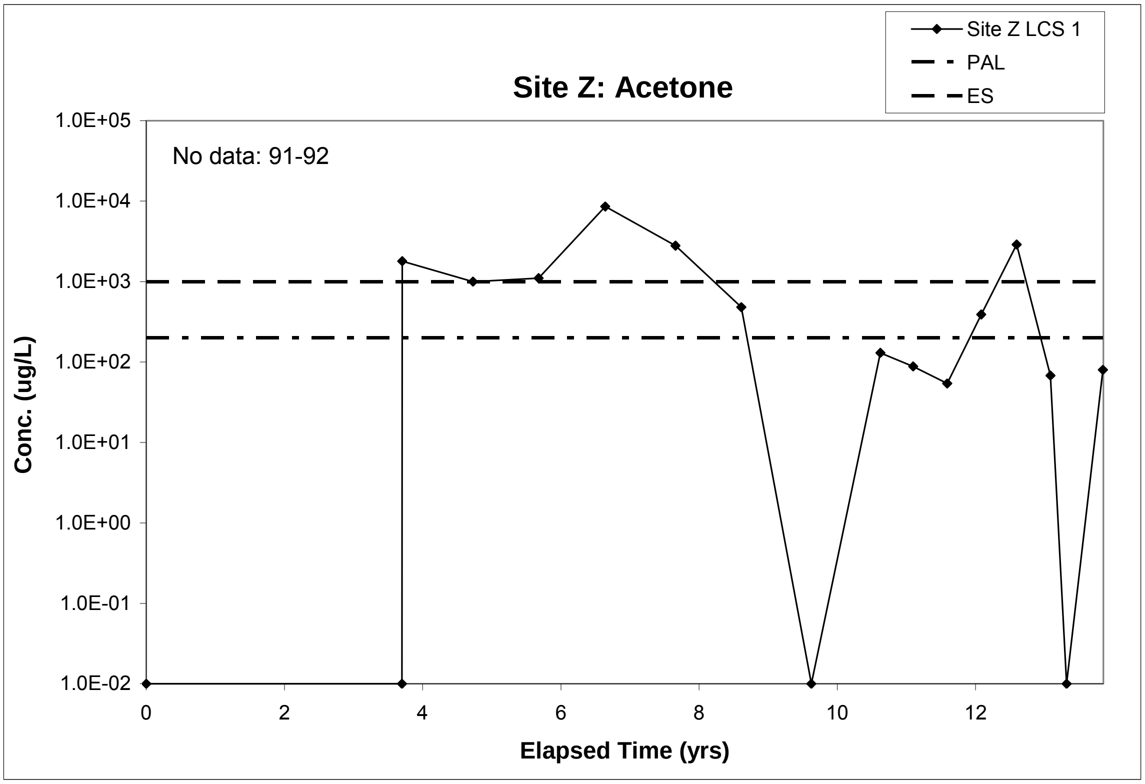

Site S: Acetone
Site S LCS 2
PAL
ES
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

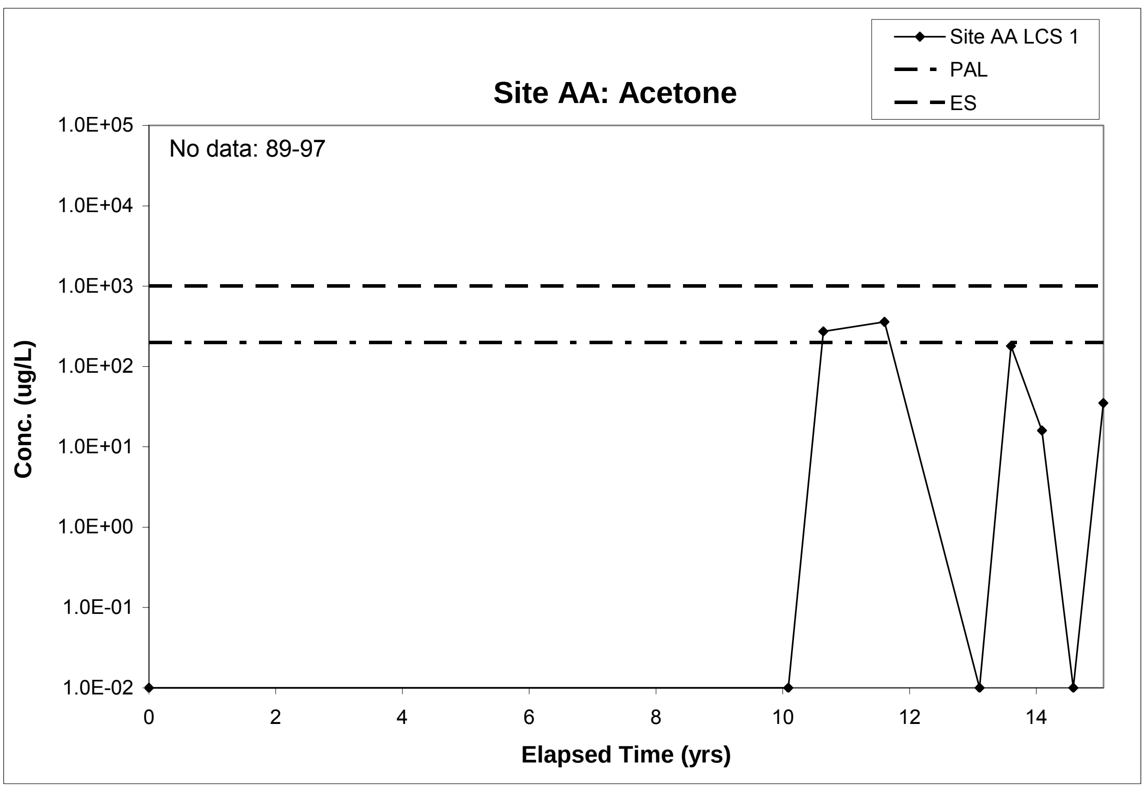

Site U LCS 1
PAL
ES
Site U: Acetone
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
No Data: 87-89 & 00-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

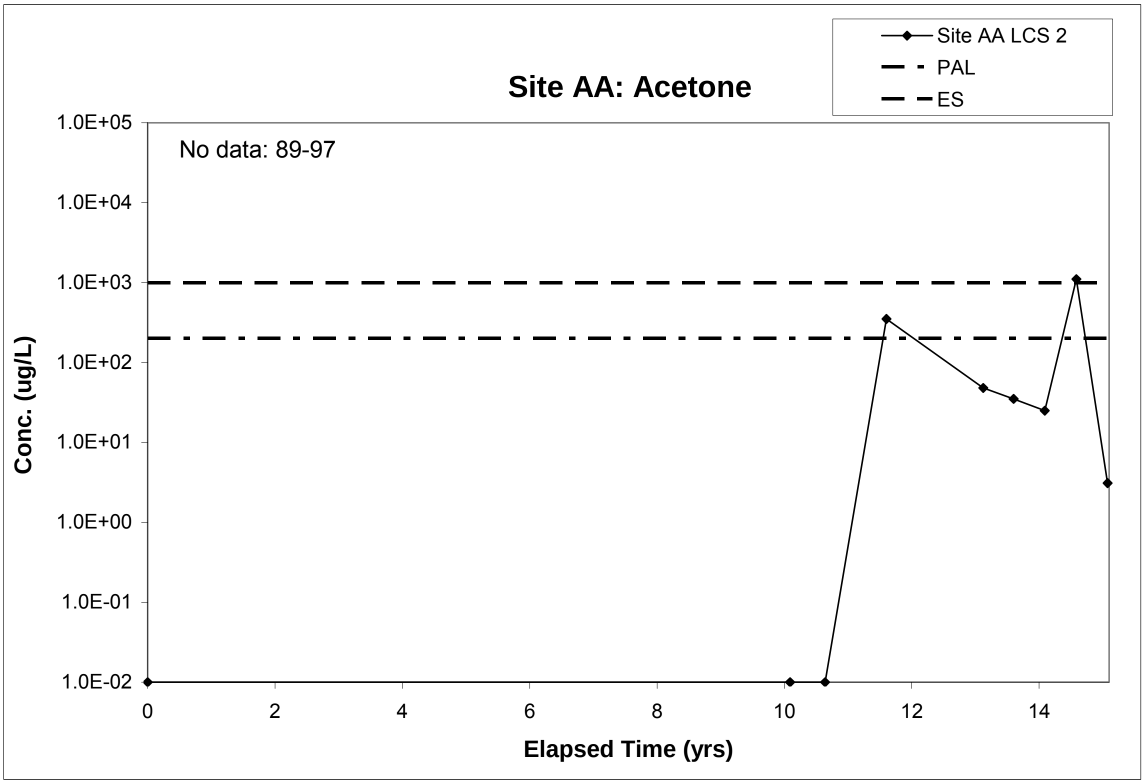

Site W LCS 1
PAL
ES
Site W: Acetone
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
No data: 90-92
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

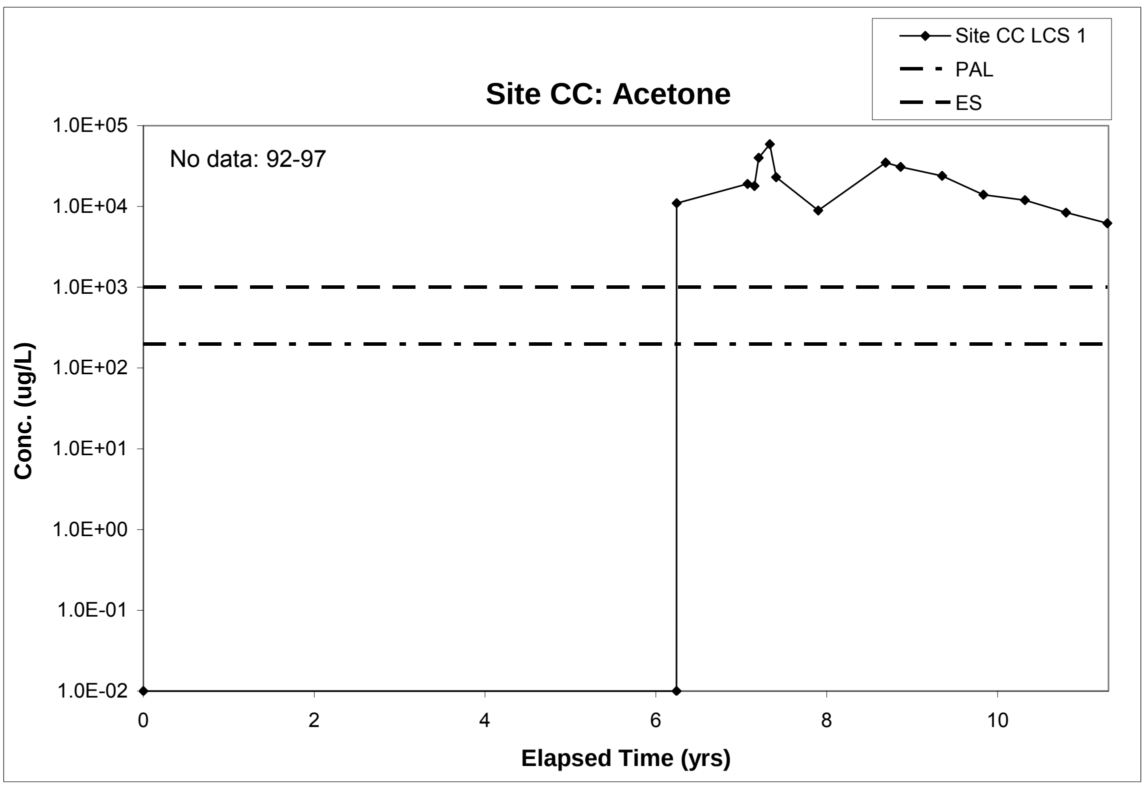

Site W: Acetone
Site W LCS 2
PAL
ES
No data: 88-92
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

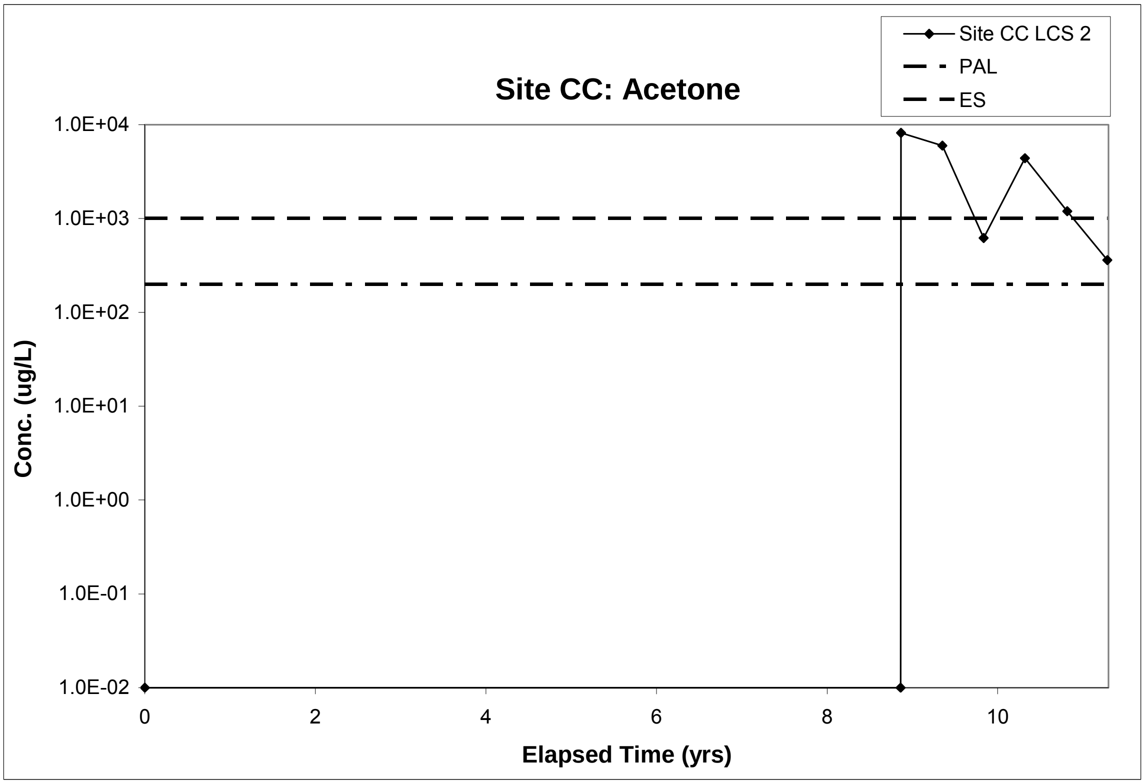

Site Y: Acetone
Site Y LCS 2
PAL
ES
No data: 93-95, 97, & 01
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

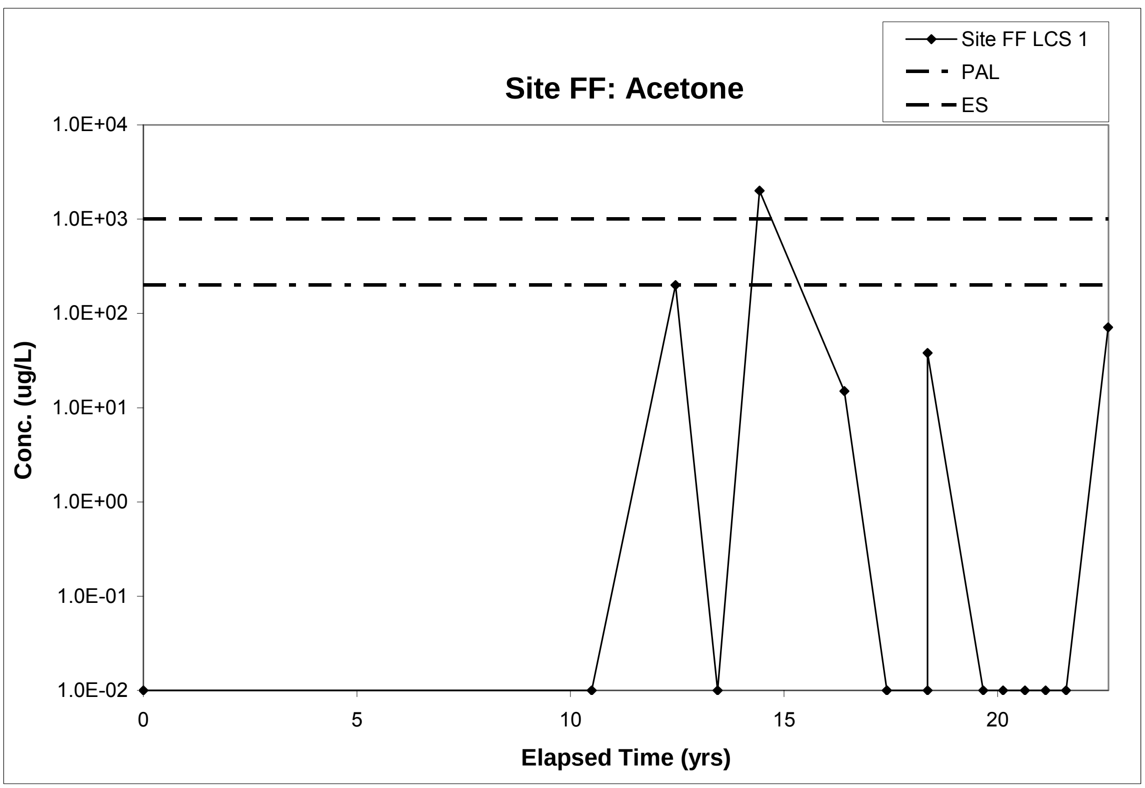

Site Z: Acetone
Site Z LCS 1
PAL
ES
No data: 91-92
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

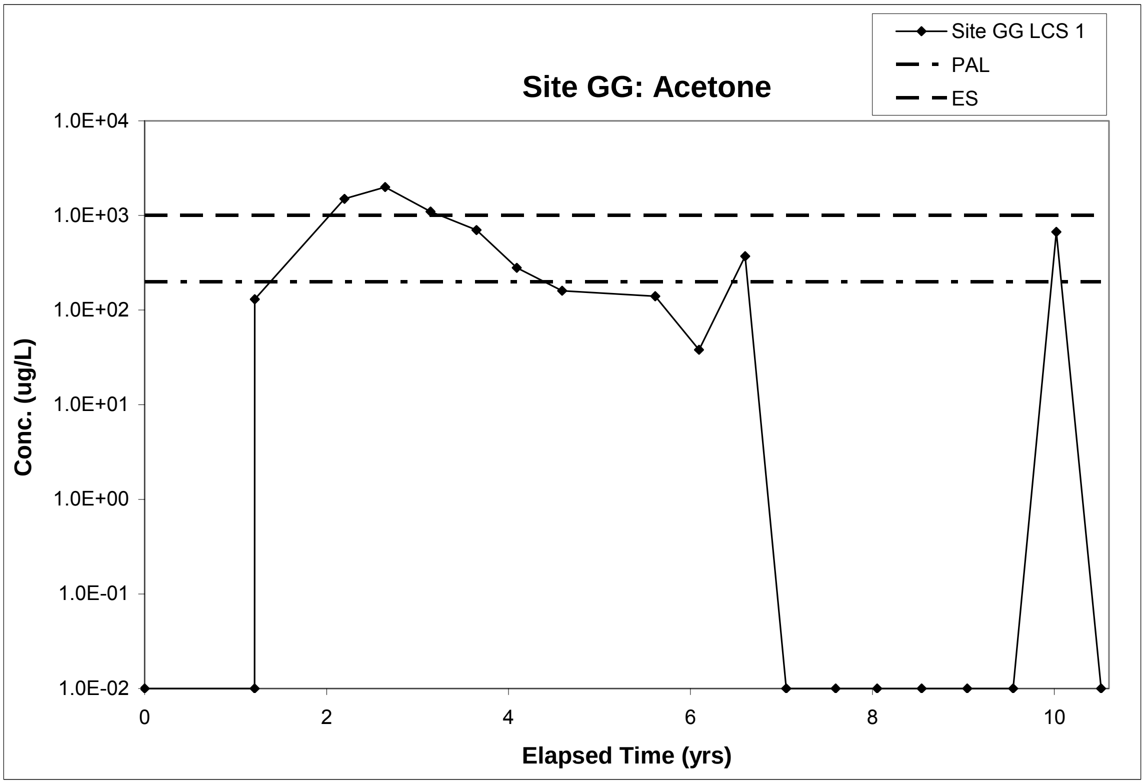

Site AA: Acetone
Site AA LCS 1
PAL
ES
No data: 89-97
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

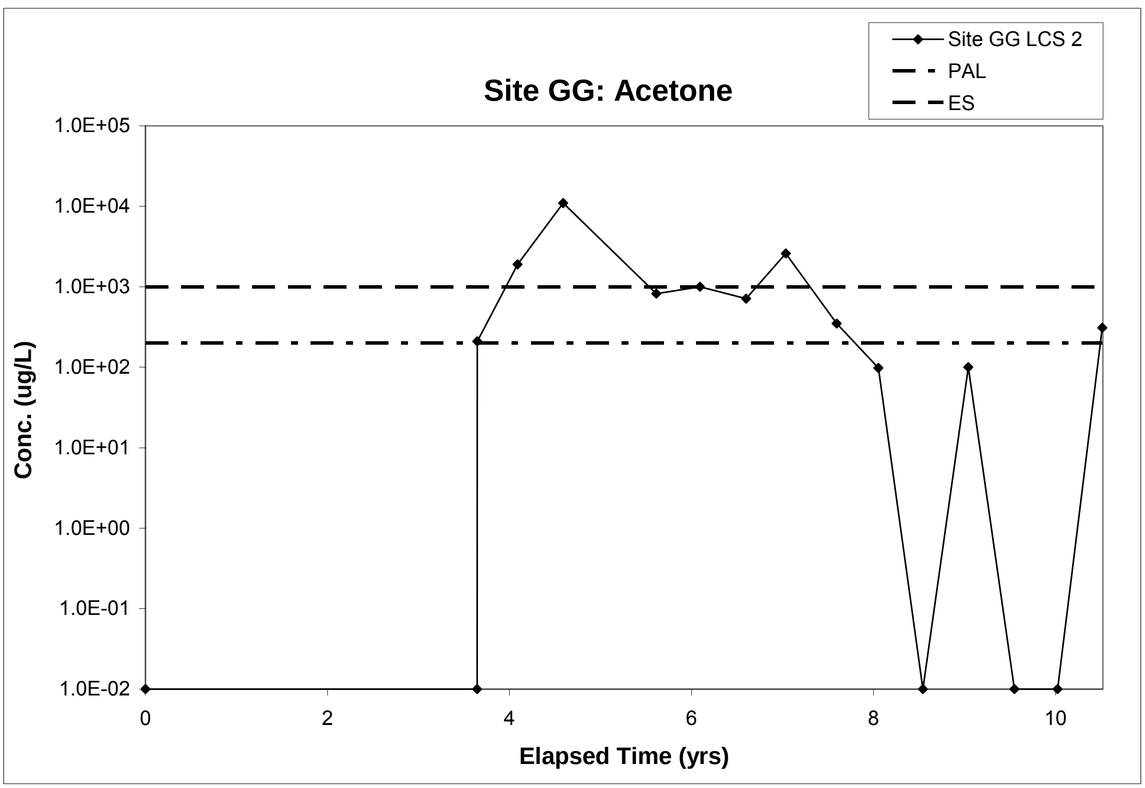

Site AA: Acetone
Site AA LCS 2
PAL
ES
No data: 89-97
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)


Site CC: Acetone
Site CC LCS 1
PAL
ES
No data: 92-97
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

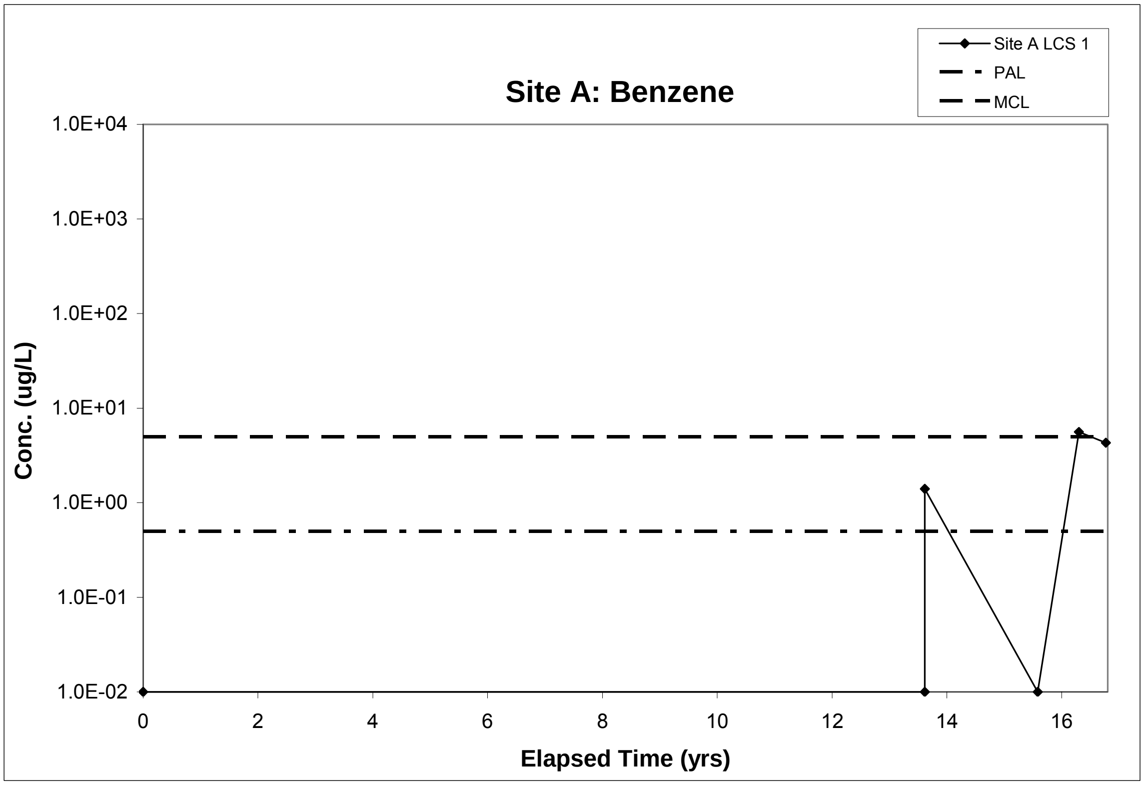

Site CC LCS 2
PAL
ES
Site CC: Acetone
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

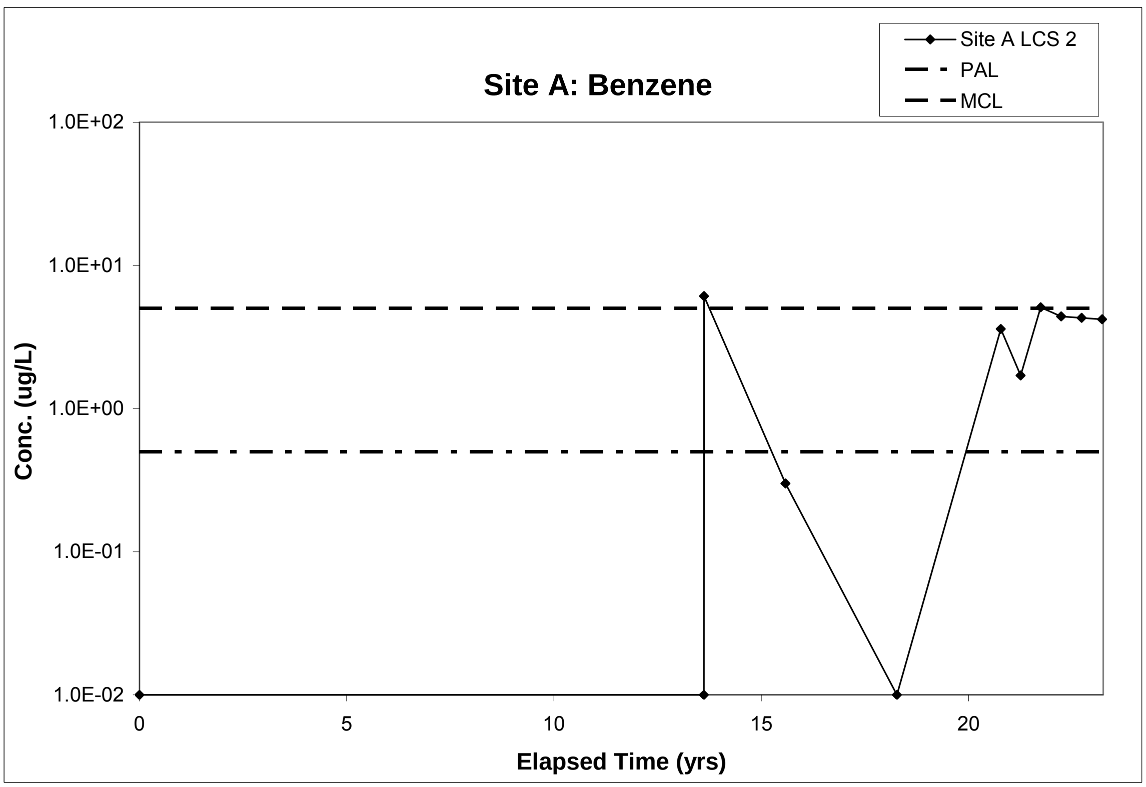

Site FF LCS 1
PAL
ES
Site FF: Acetone
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

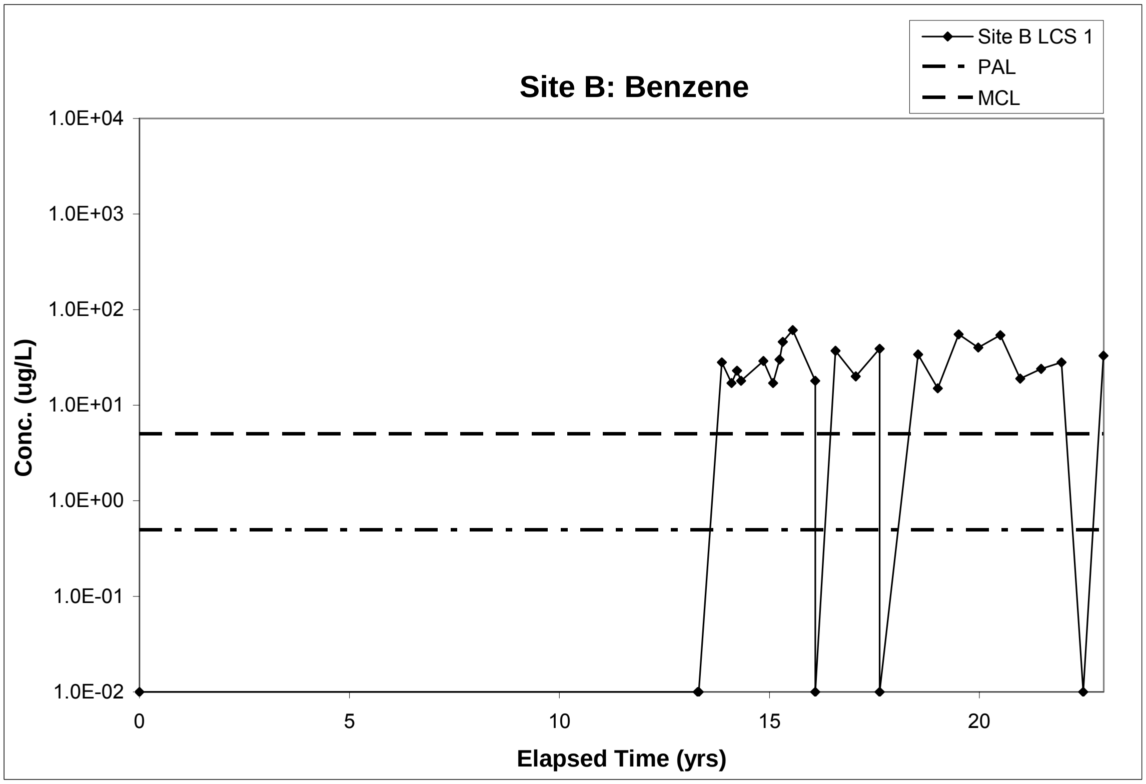

Site GG: Acetone
Site GG LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

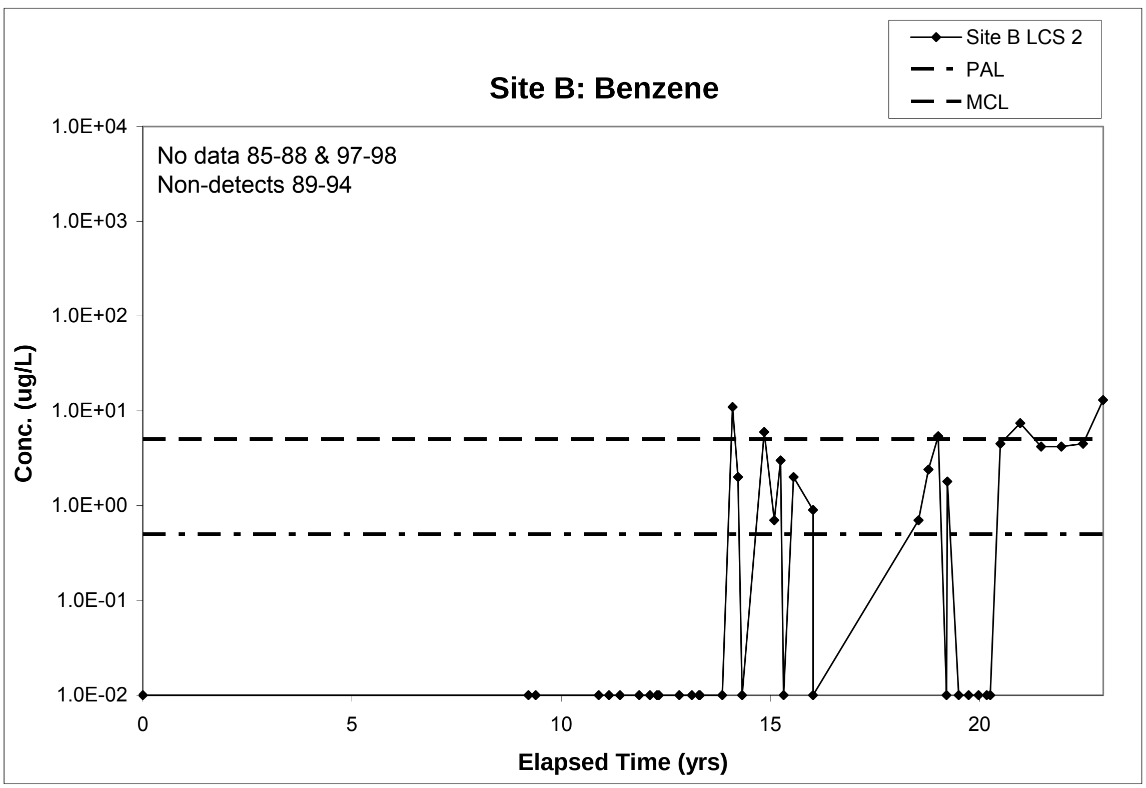

Site GG: Acetone
Site GG LCS 2
PAL
ES
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

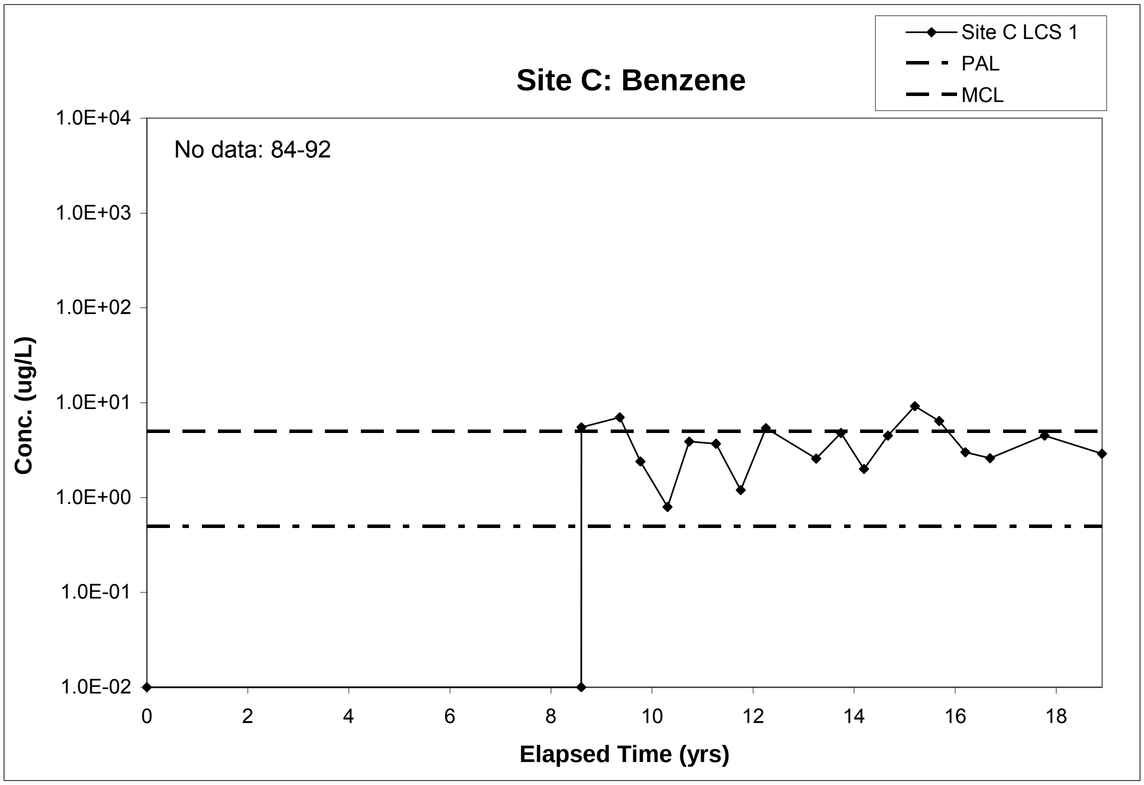
Site HH LCS 1
PAL
ES
Site HH: Acetone
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

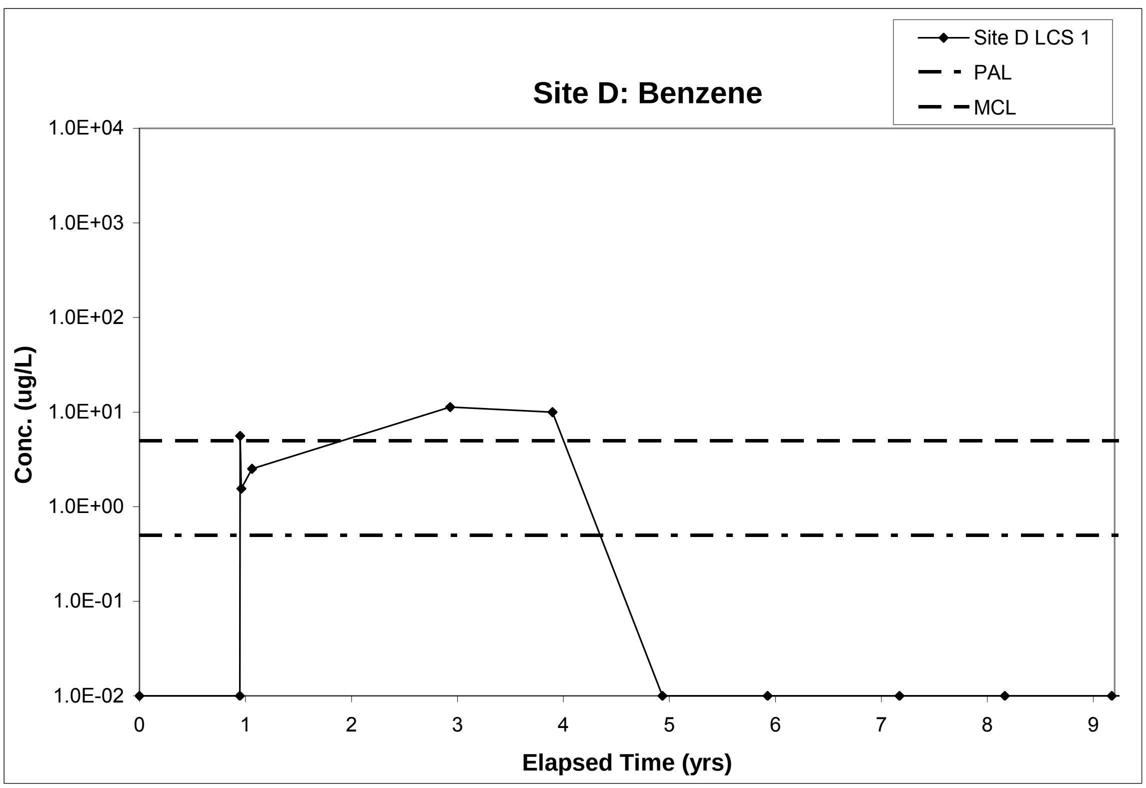

Site A: Benzene
Site A LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

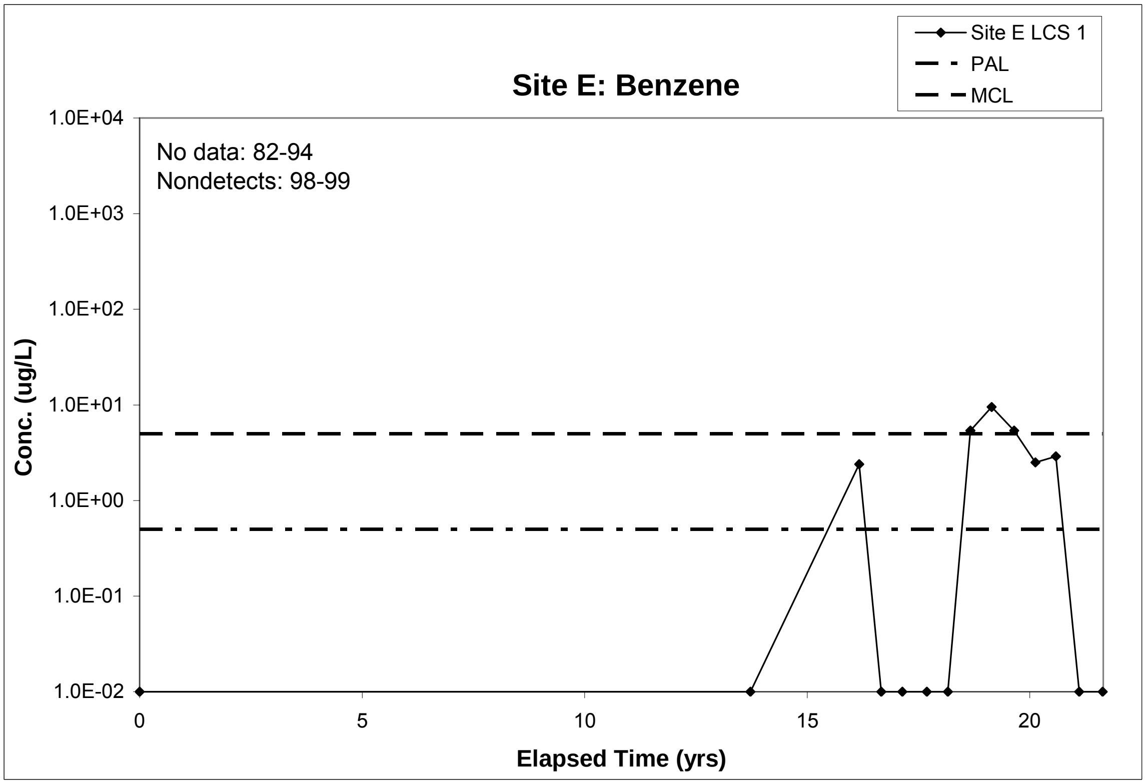

Site A: Benzene
Site A LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

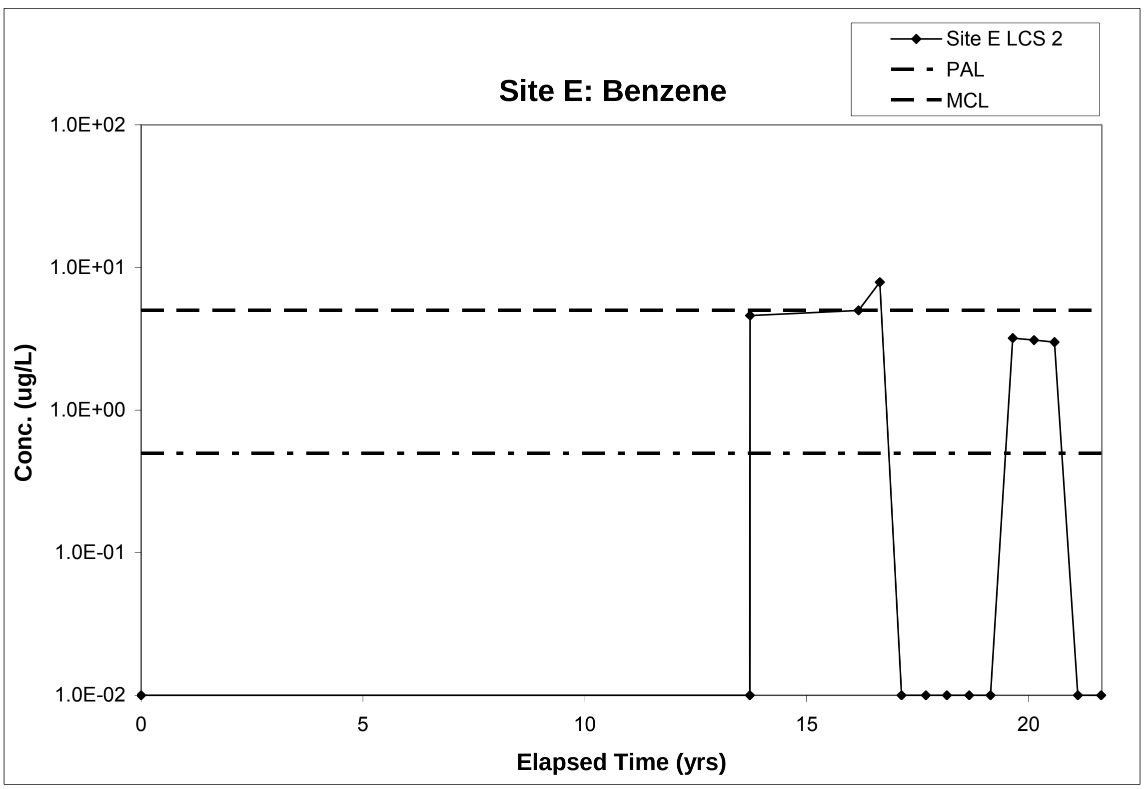

Site B: Benzene
Site B LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

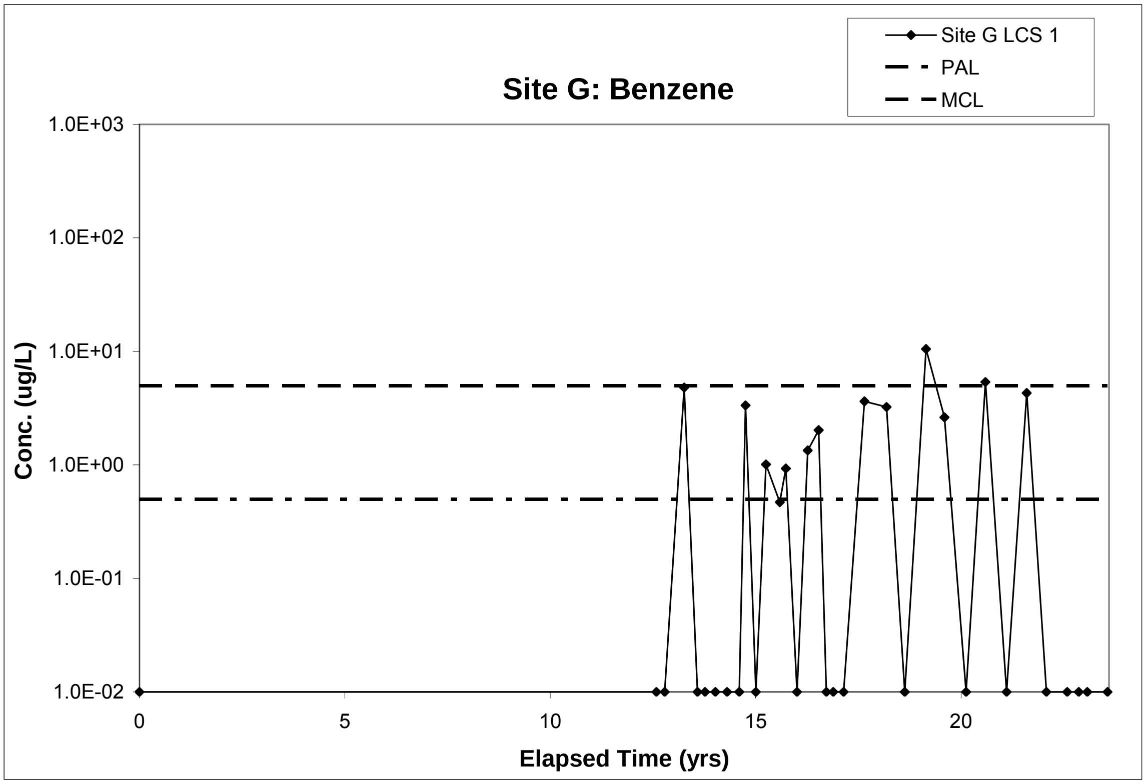

Site B: Benzene
Site B LCS 2
PAL
MCL
No data 85-88 & 97-98
Non-detects 89-94
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

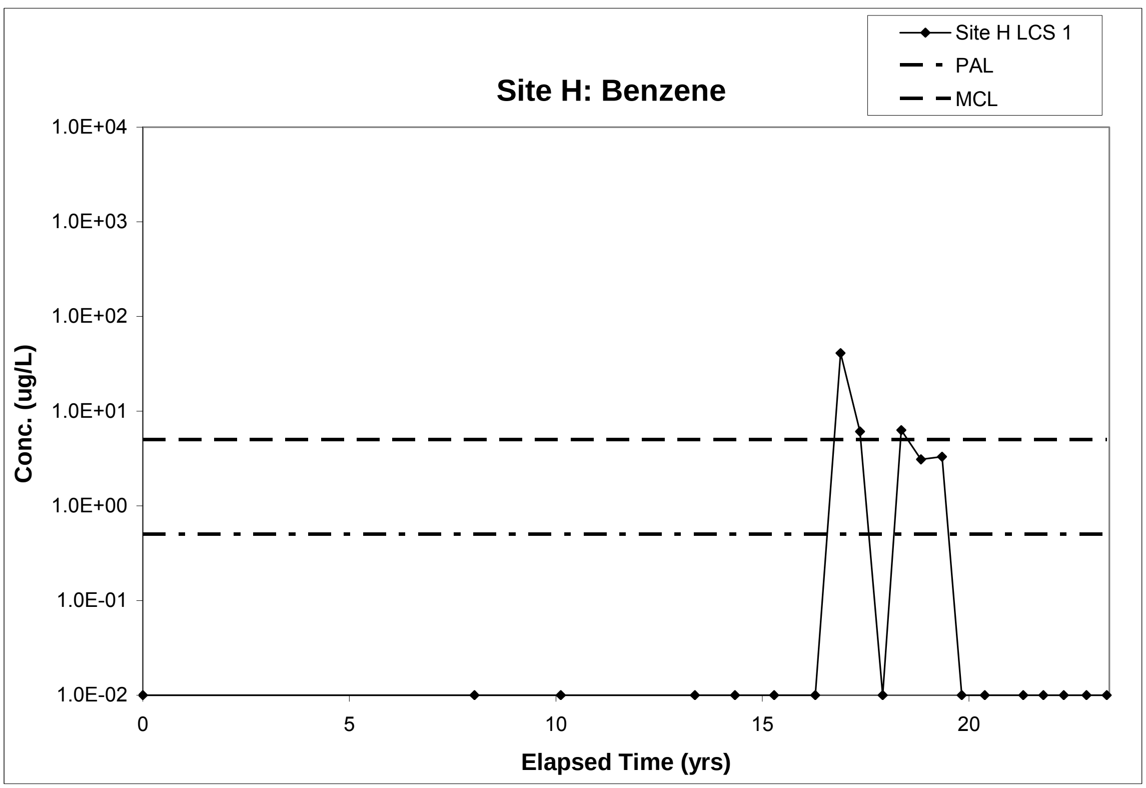

Site C: Benzene
Site C LCS 1
PAL
MCL
No data: 84-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

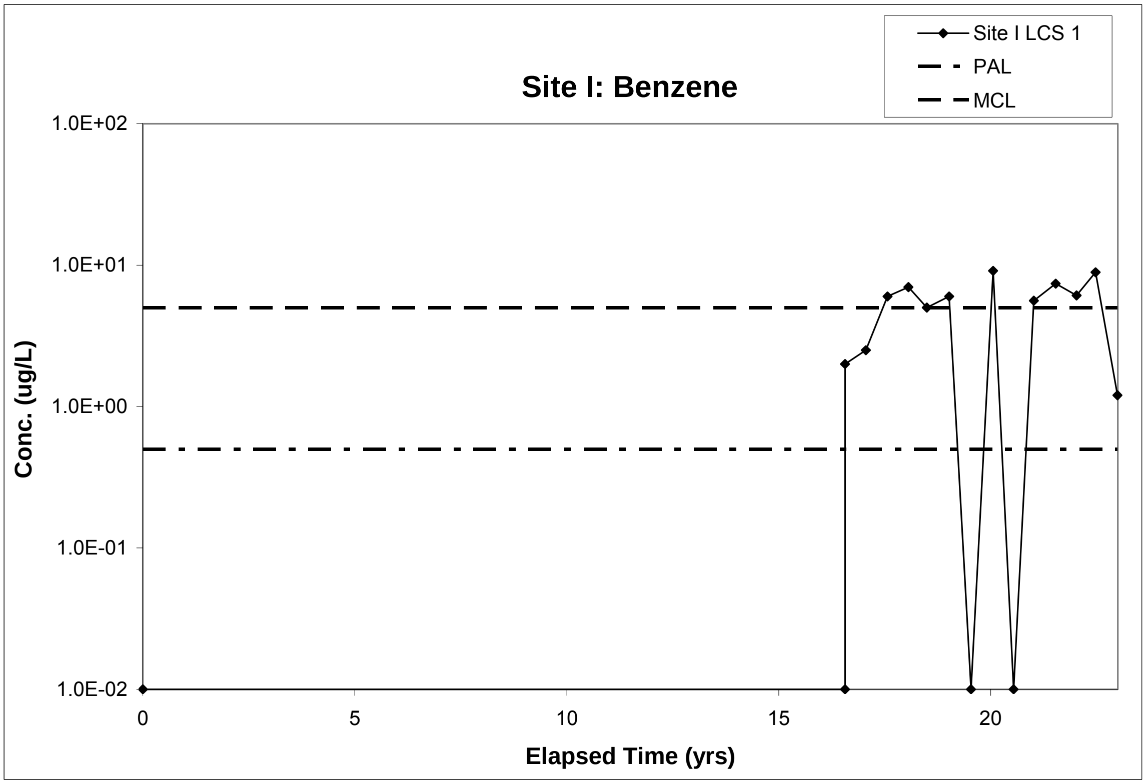

Site D: Benzene
Site D LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
9
Elapsed Time (yrs)

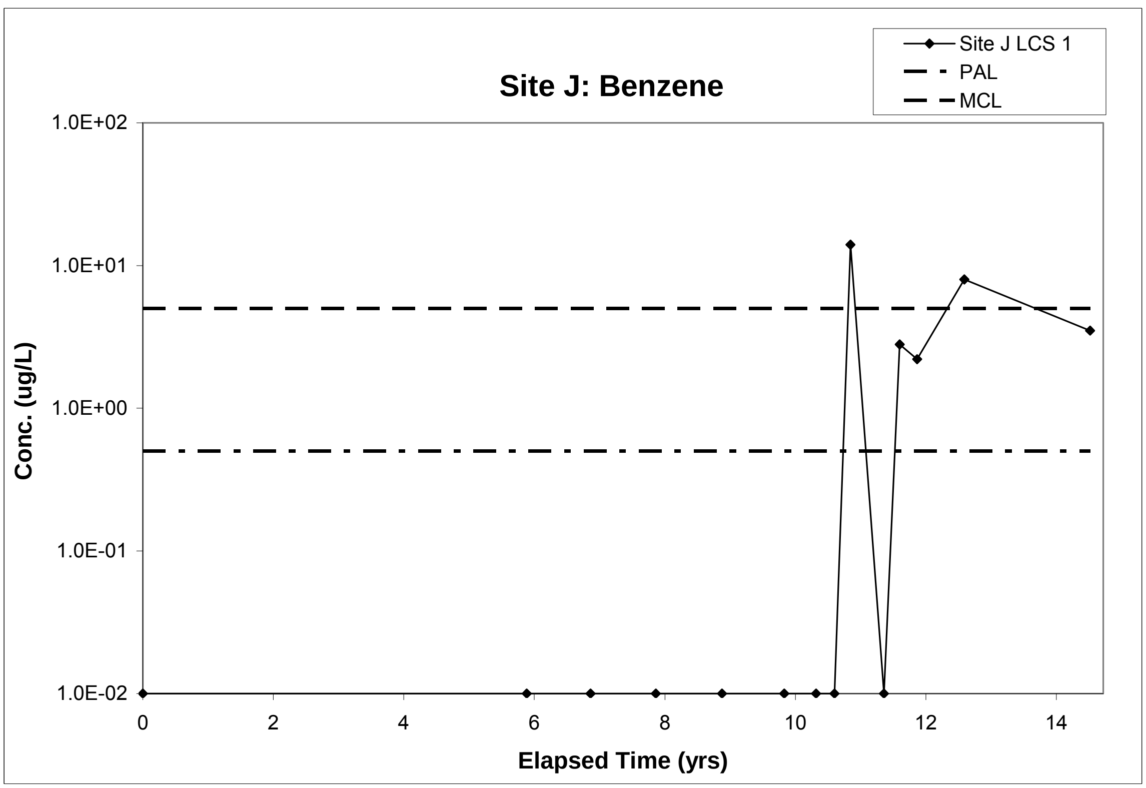

Site E: Benzene
Site E LCS 1
PAL
MCL
No data: 82-94
Nondetects: 98-99
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

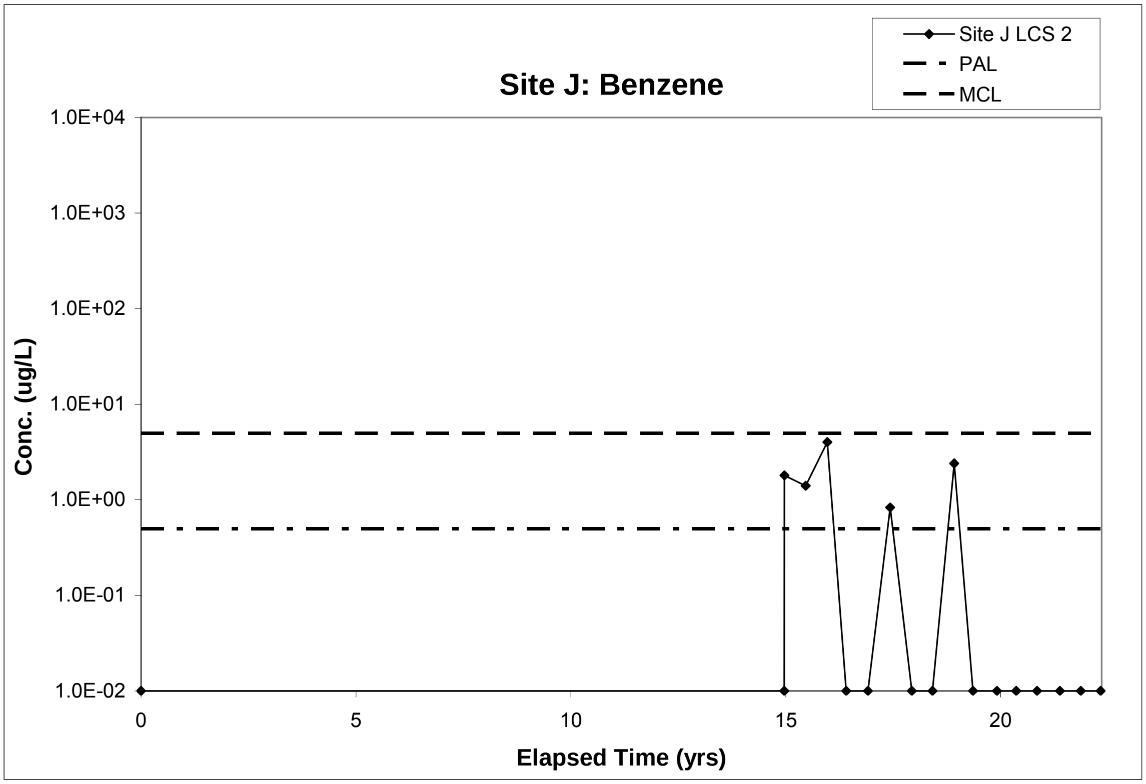

Site E: Benzene
Site E LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

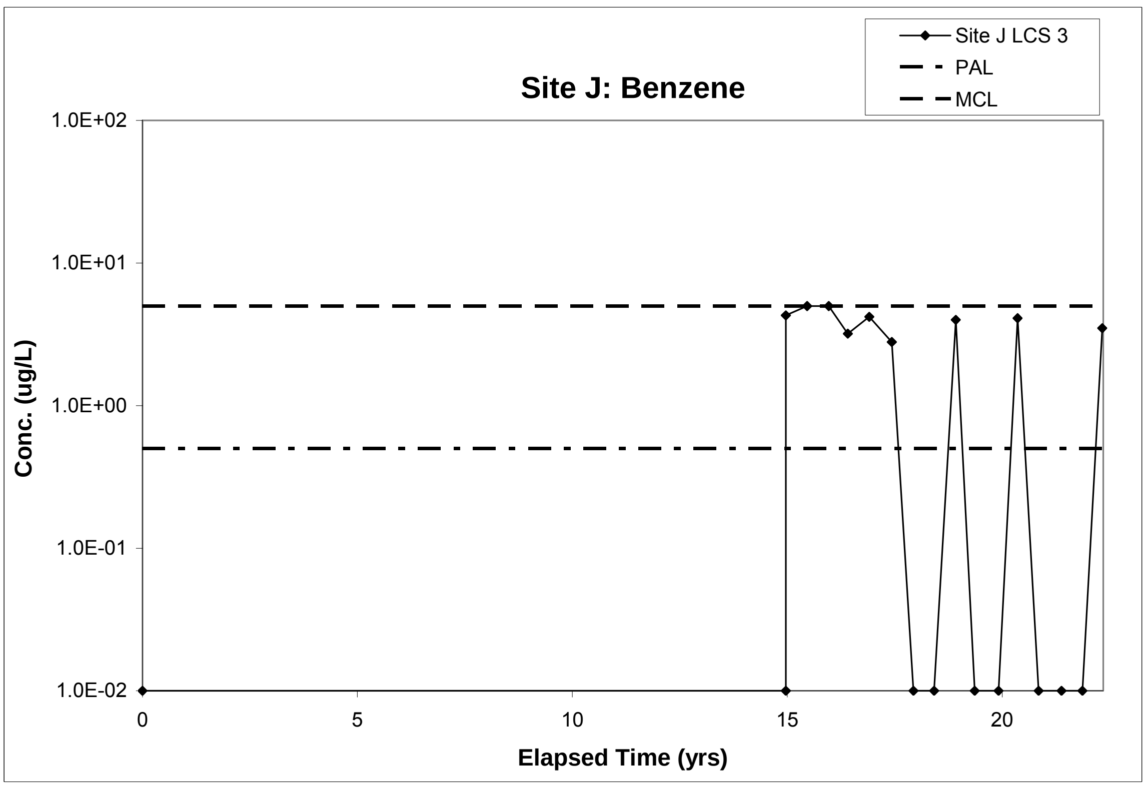

Site G LCS 1
PAL
MCL
Site G: Benzene
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

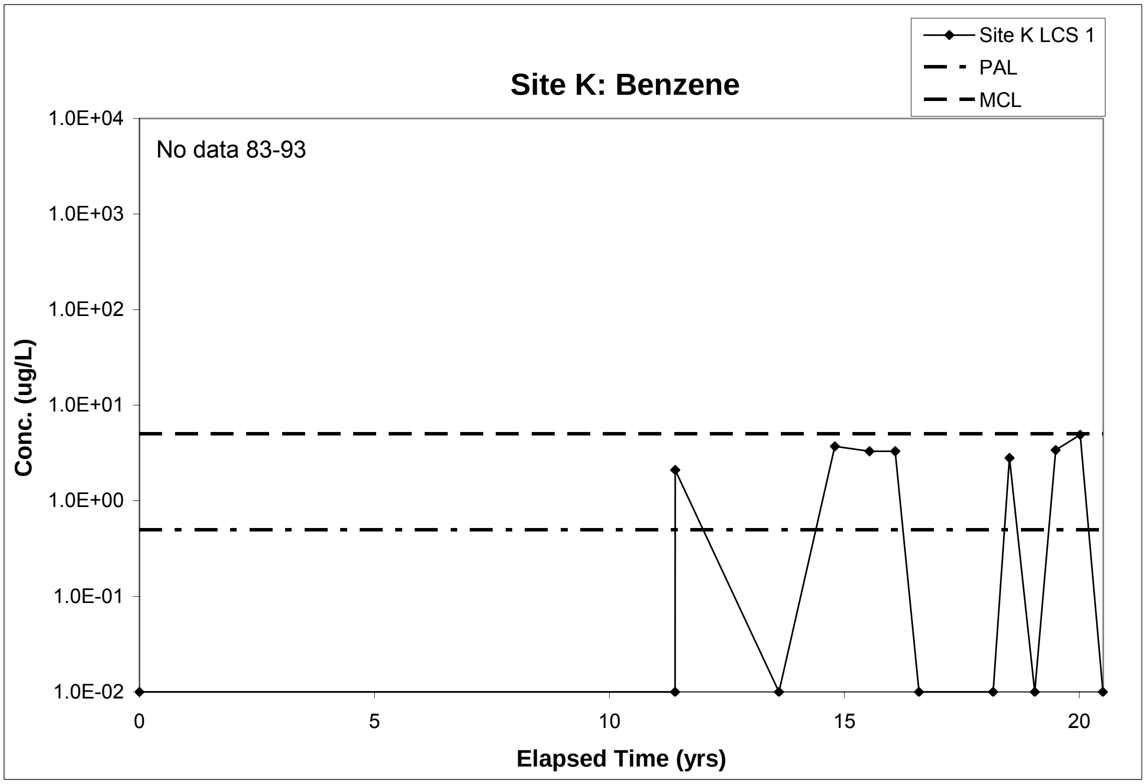

Site H LCS 1
PAL
MCL
Site H: Benzene
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

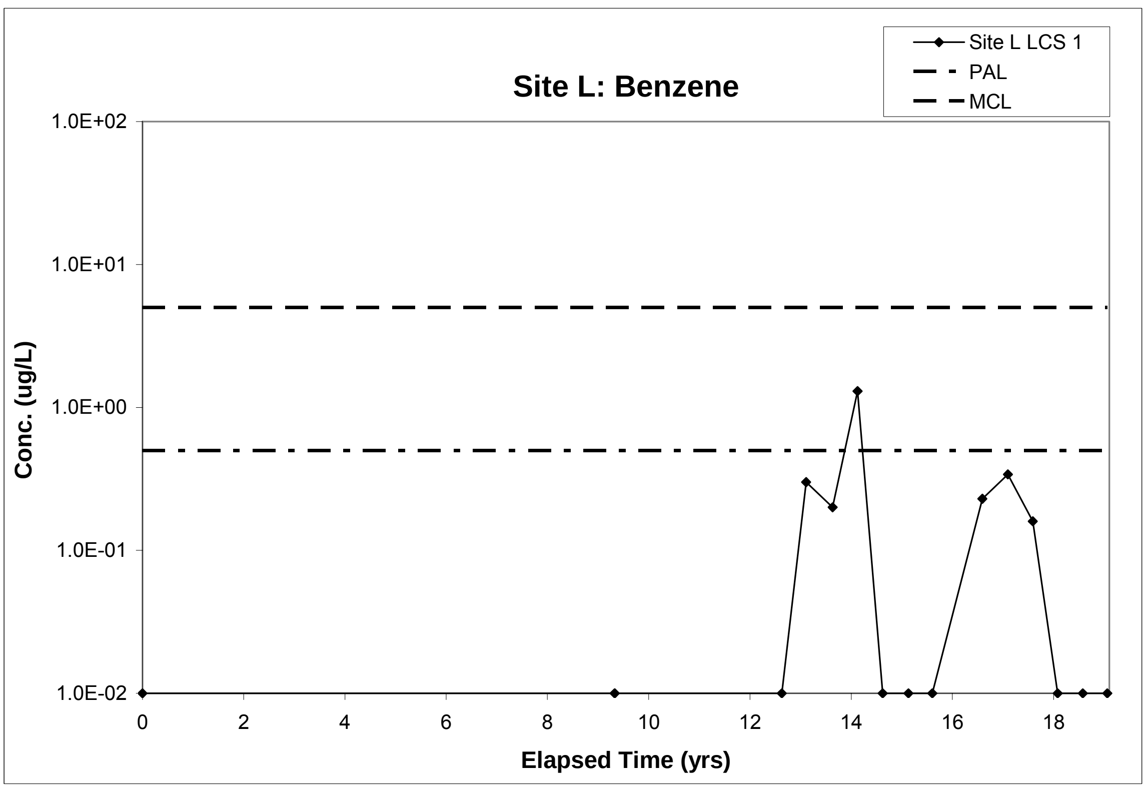

Site I: Benzene
Site I LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

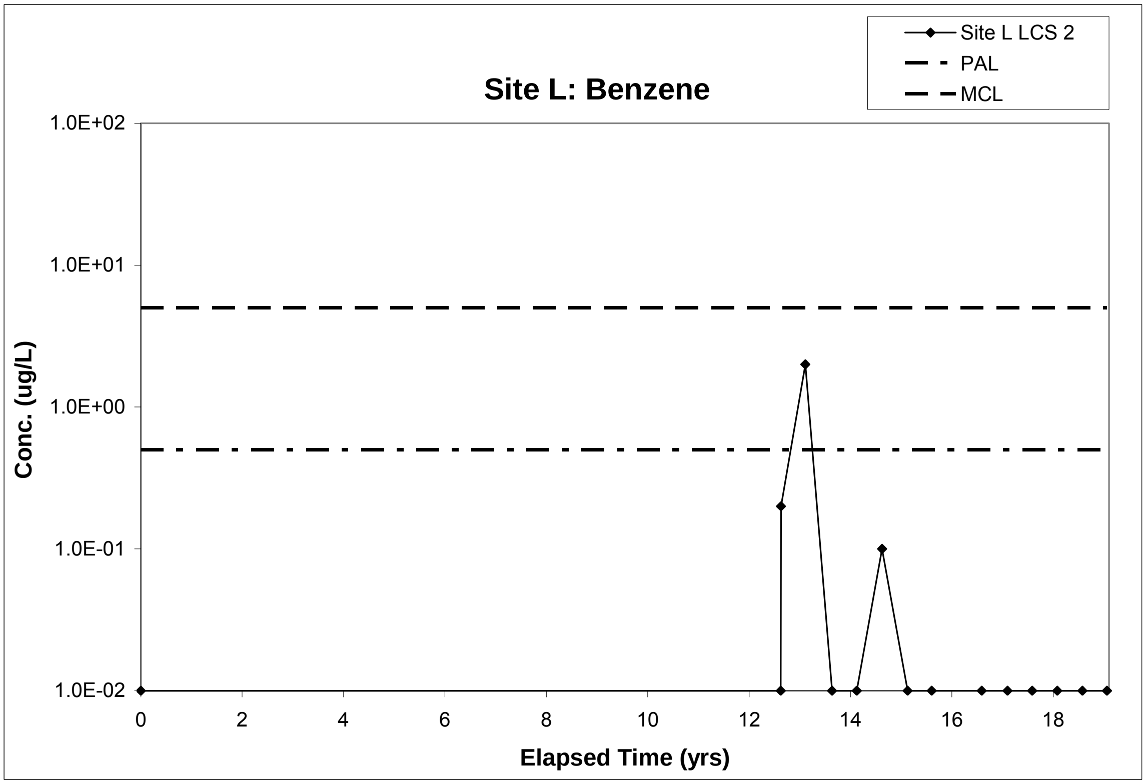

Site J: Benzene
Site J LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

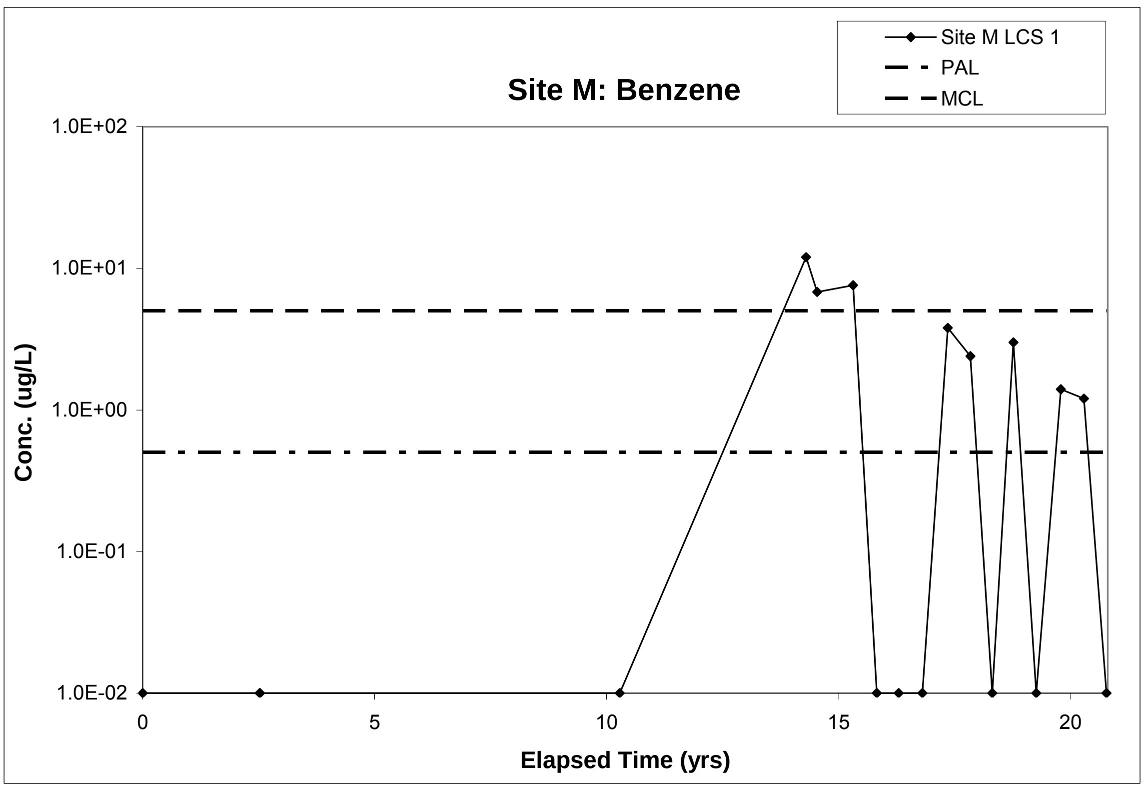

Site J LCS 2
PAL
MCL
Site J: Benzene
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

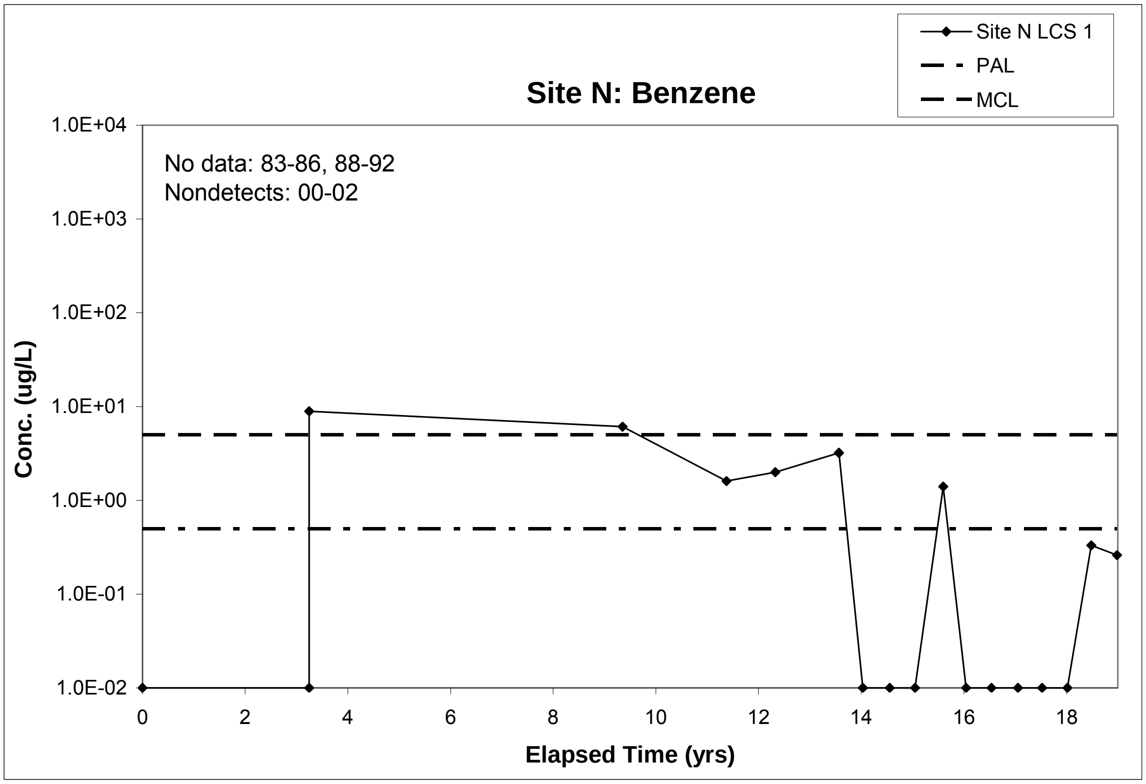

Site J LCS 3
PAL
MCL
Site J: Benzene
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

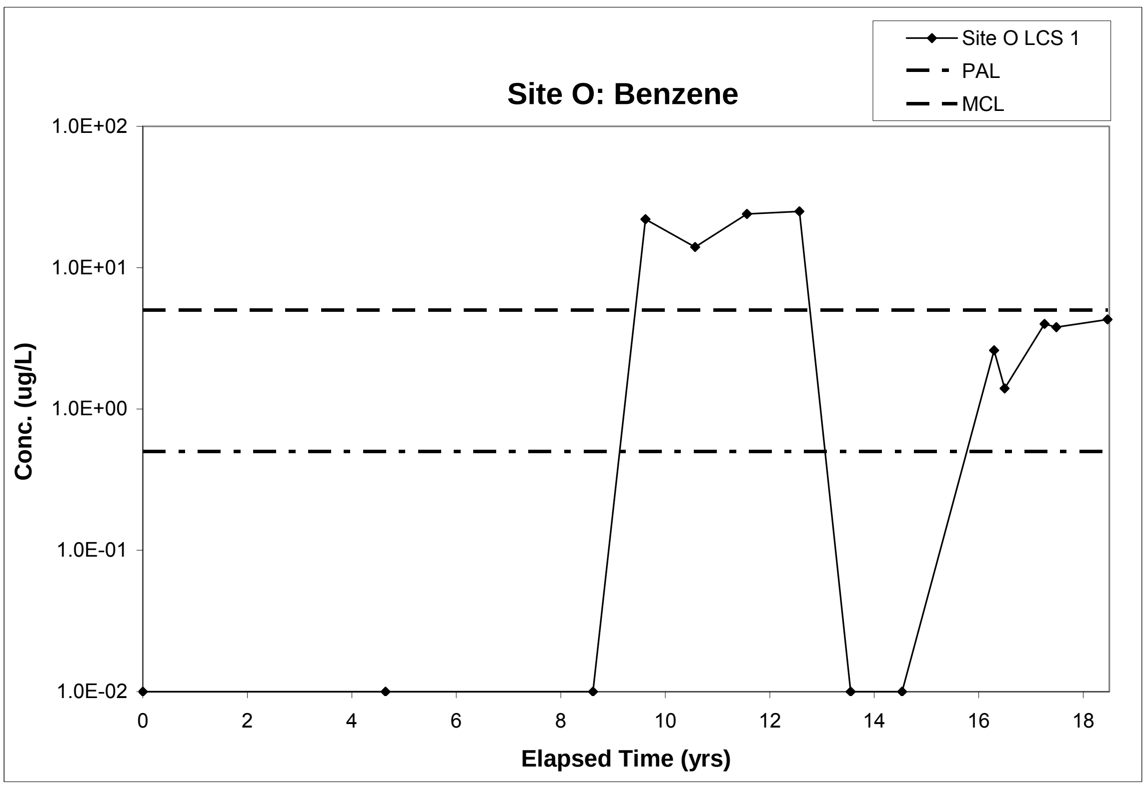

Site K: Benzene
Site K LCS 1
PAL
MCL
No data 83-93
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

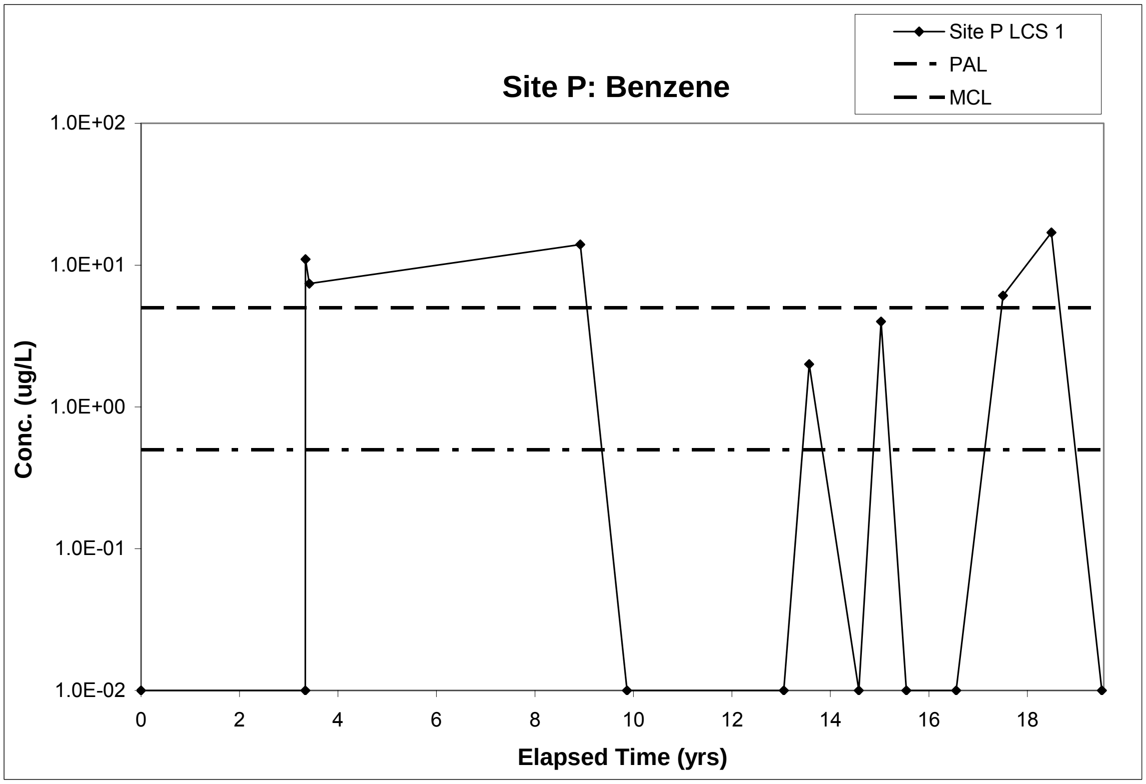

Site L: Benzene
Site L LCS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

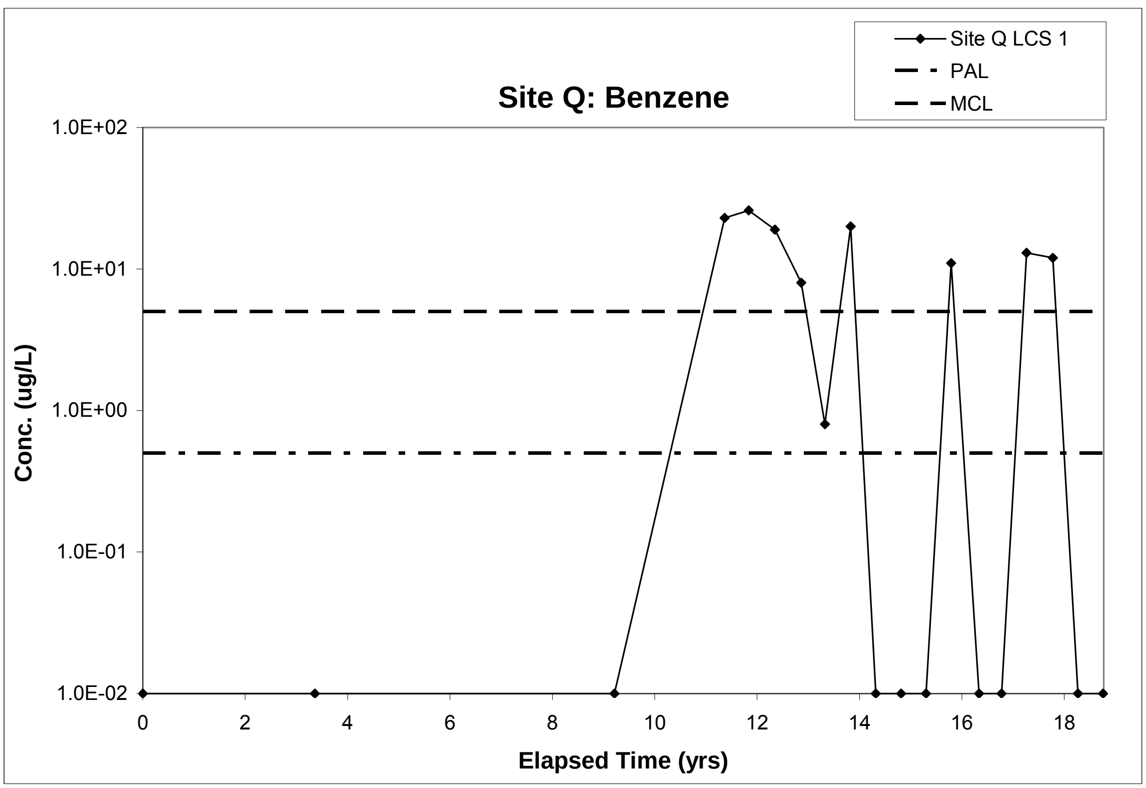

Site L LCS 2
PAL
MCL
Site L: Benzene
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

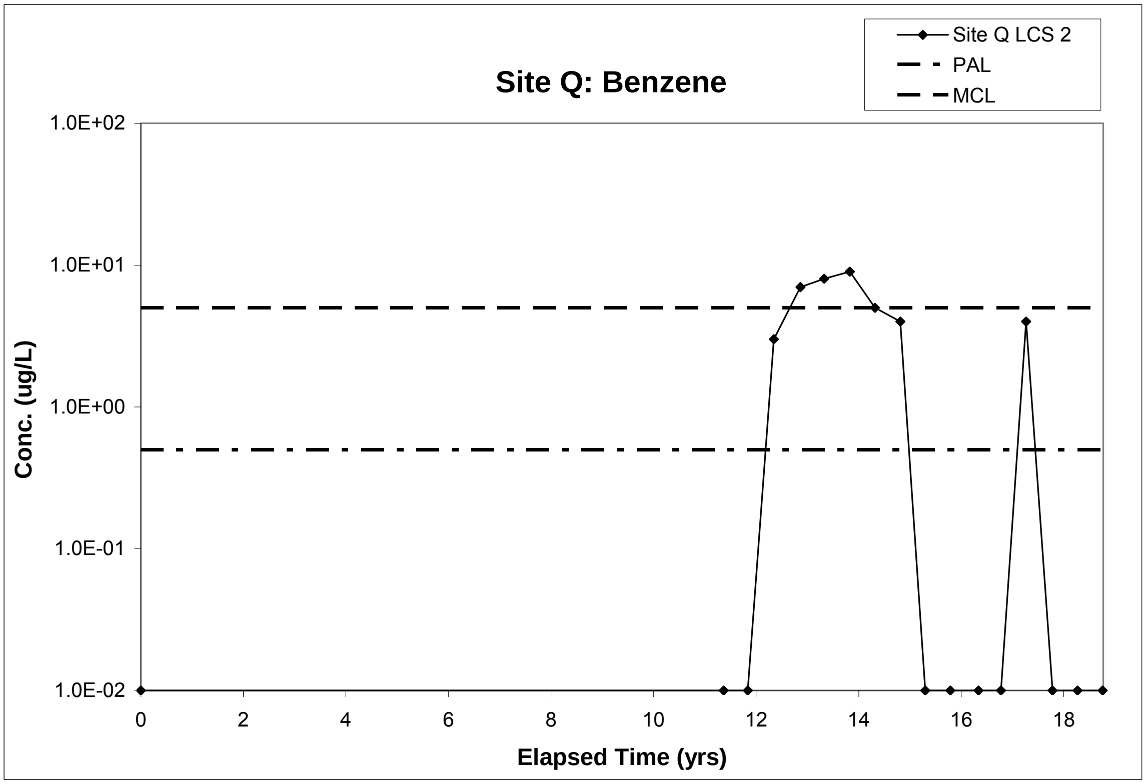

Site M LCS 1
PAL
MCL
Site M: Benzene
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

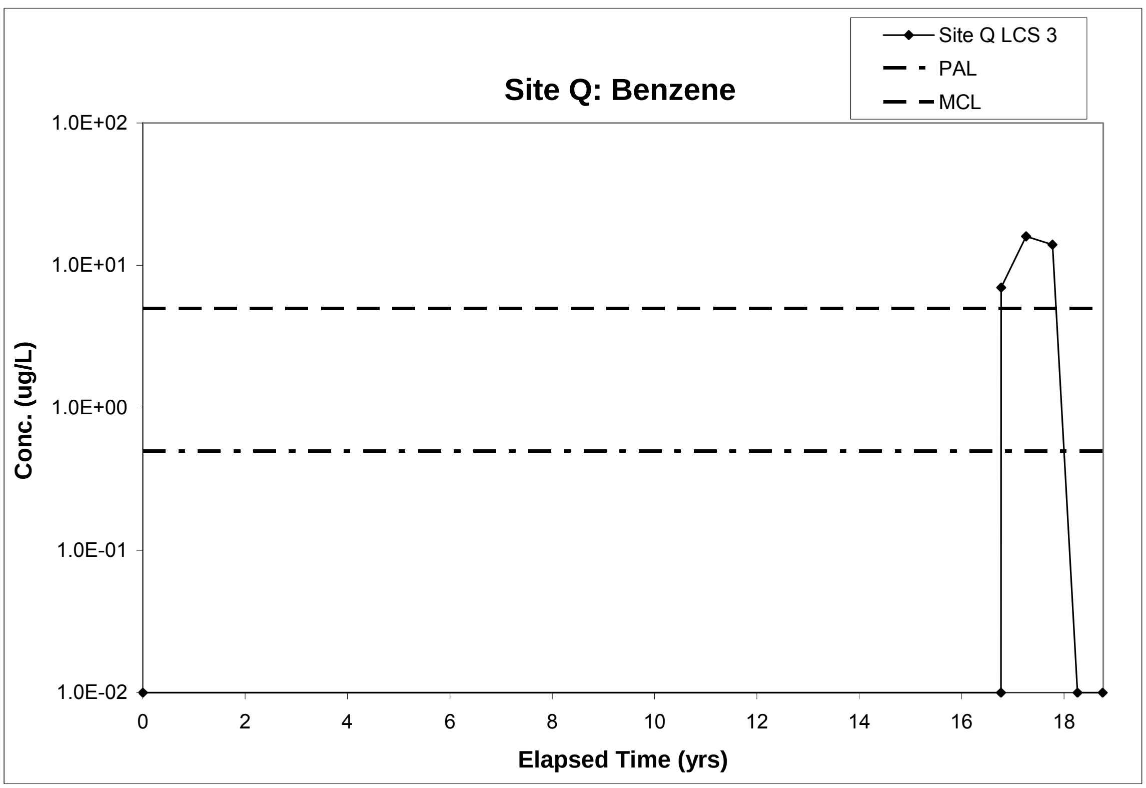

Site N: Benzene
Site N LCS 1
PAL
MCL
No data: 83-86, 88-92
Nondetects: 00-02
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

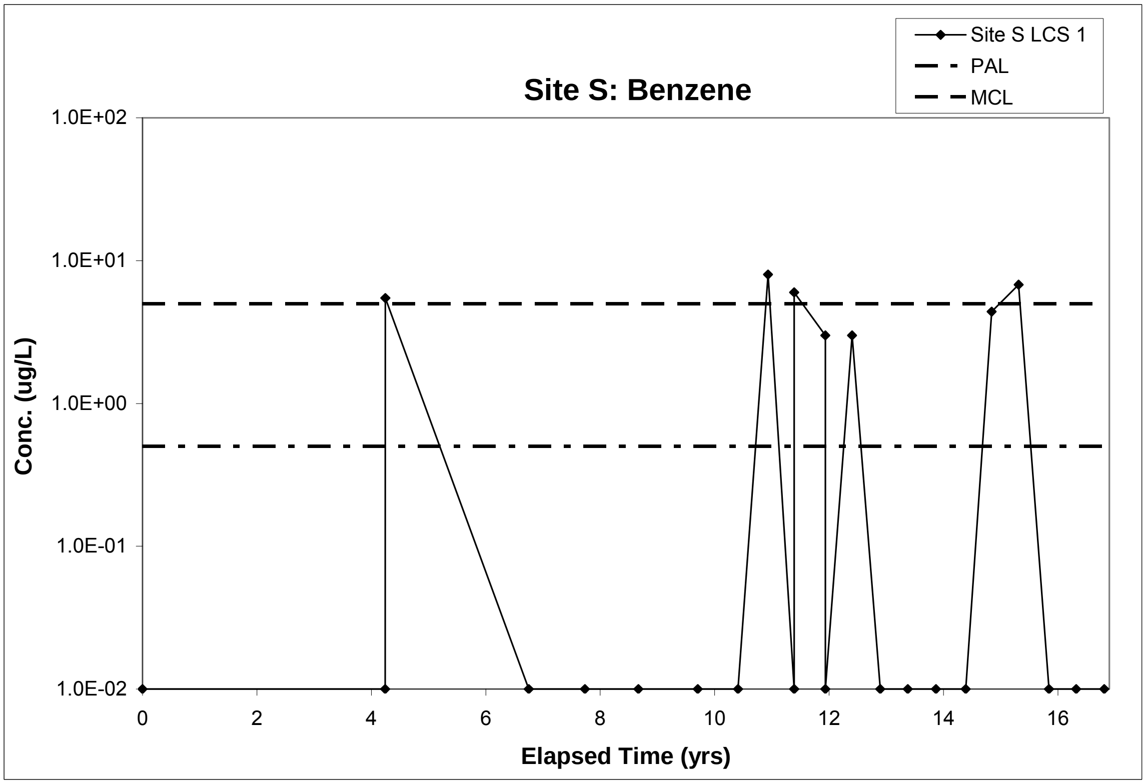

Site O: Benzene
Site O LCS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)


Site P: Benzene
Site P LCS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

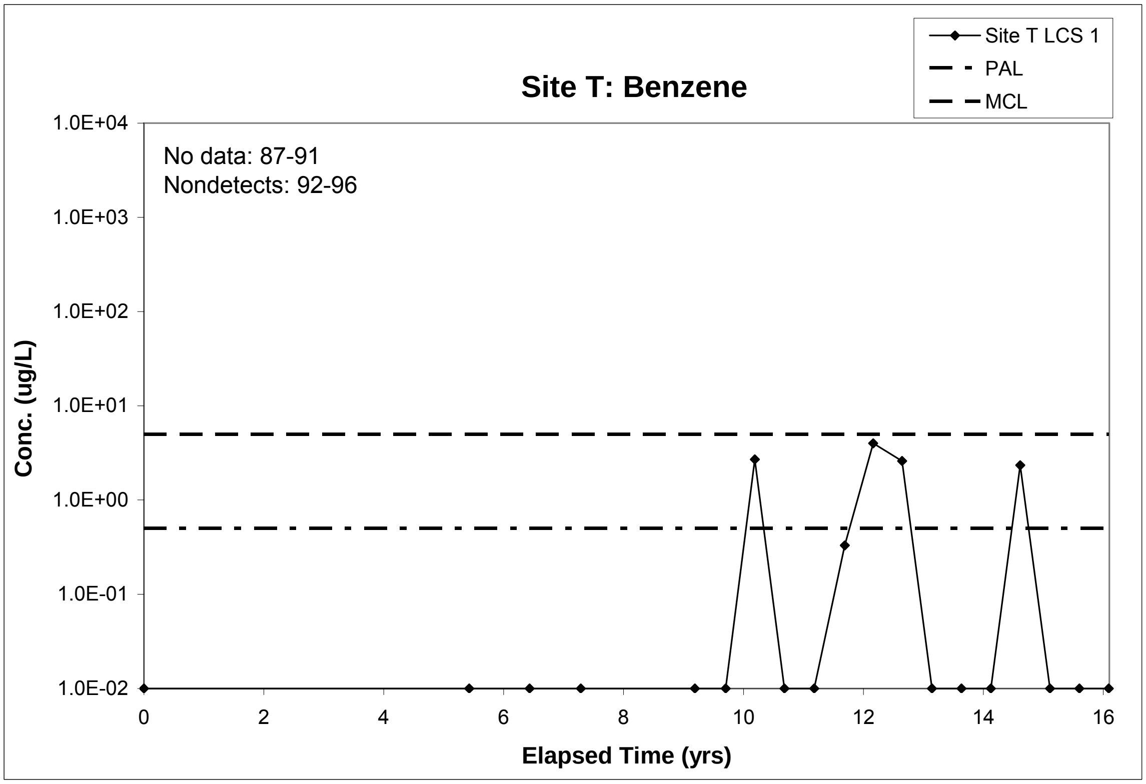

Site Q: Benzene
Site Q LCS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

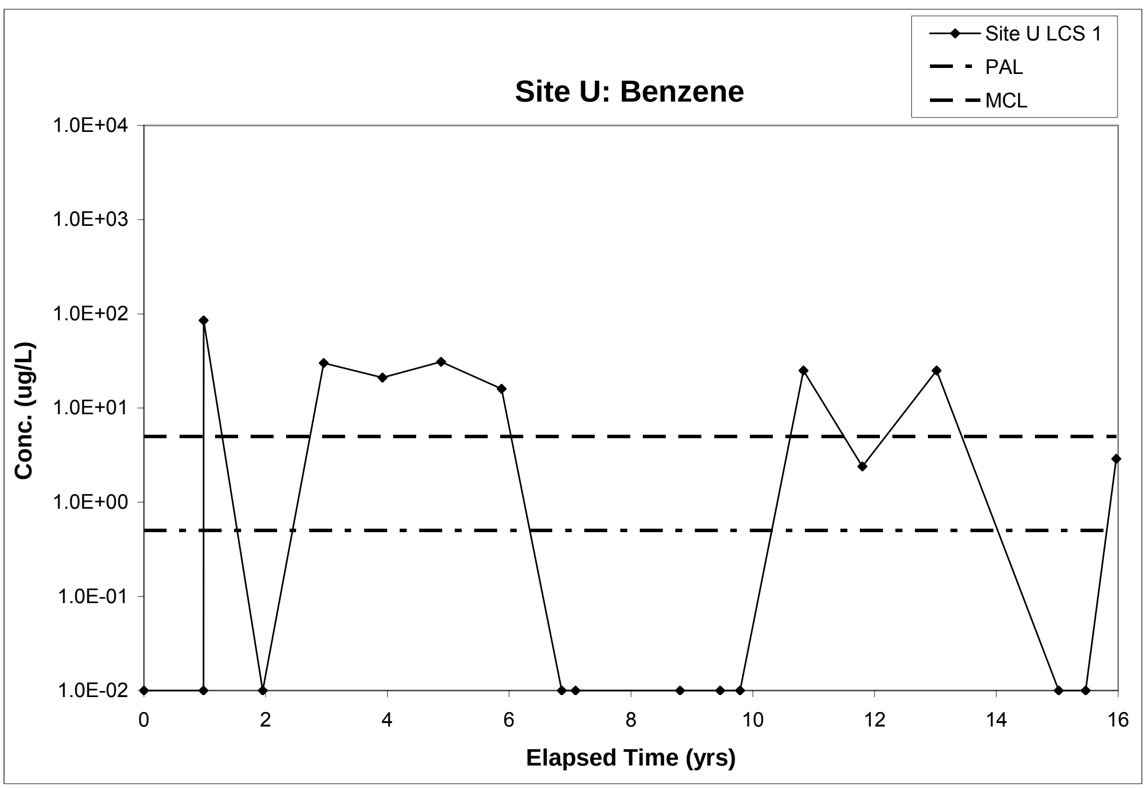

Site Q: Benzene
Site Q LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

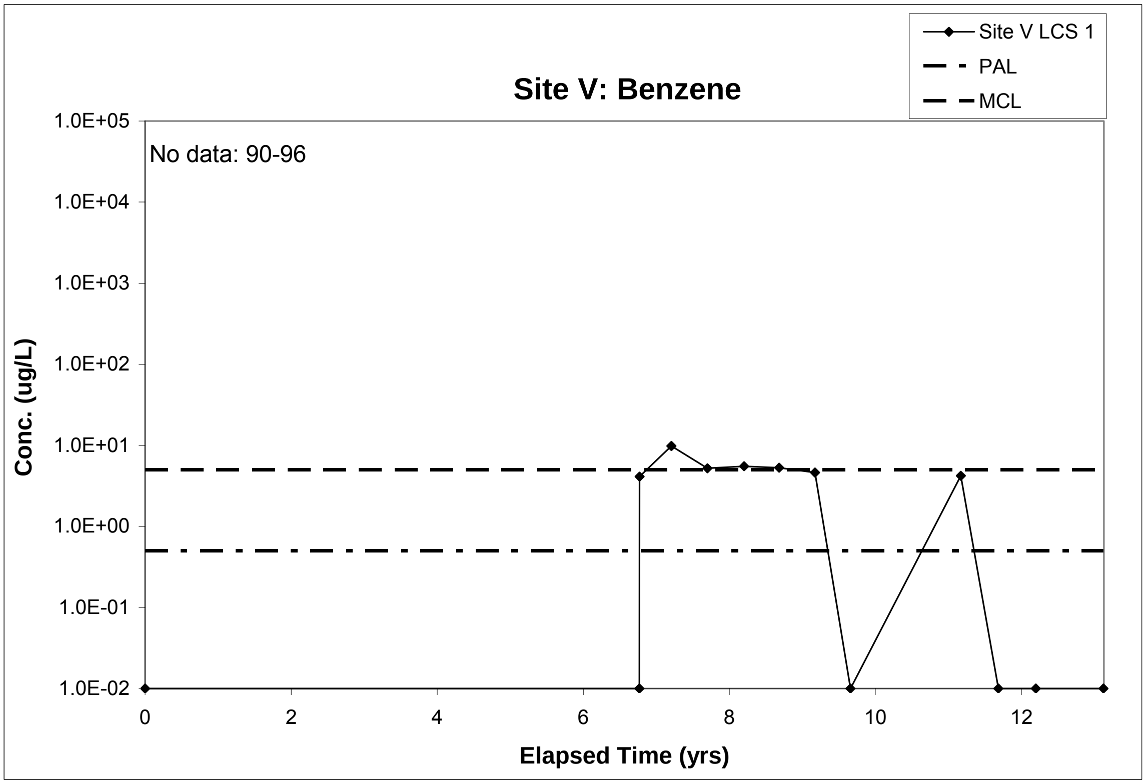

Site Q: Benzene
Site Q LCS 3
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

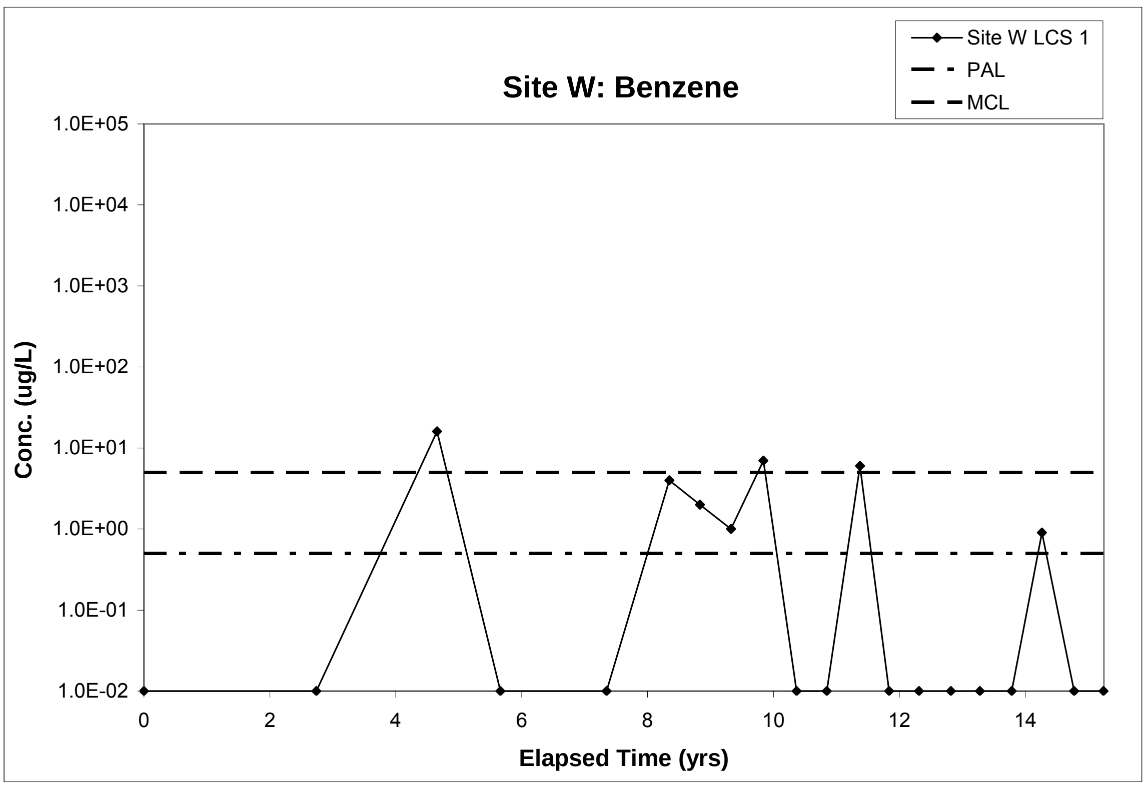

Site S: Benzene
Site S LCS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

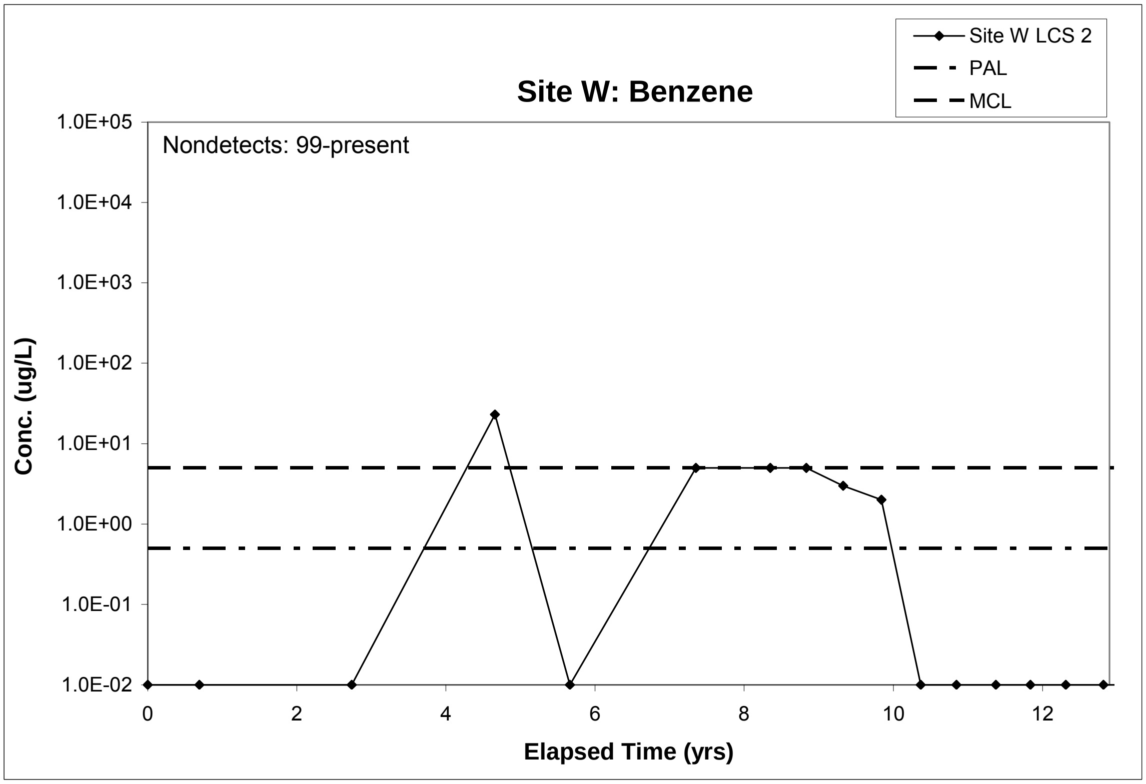

Site S: Benzene
Site S LCS 2
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

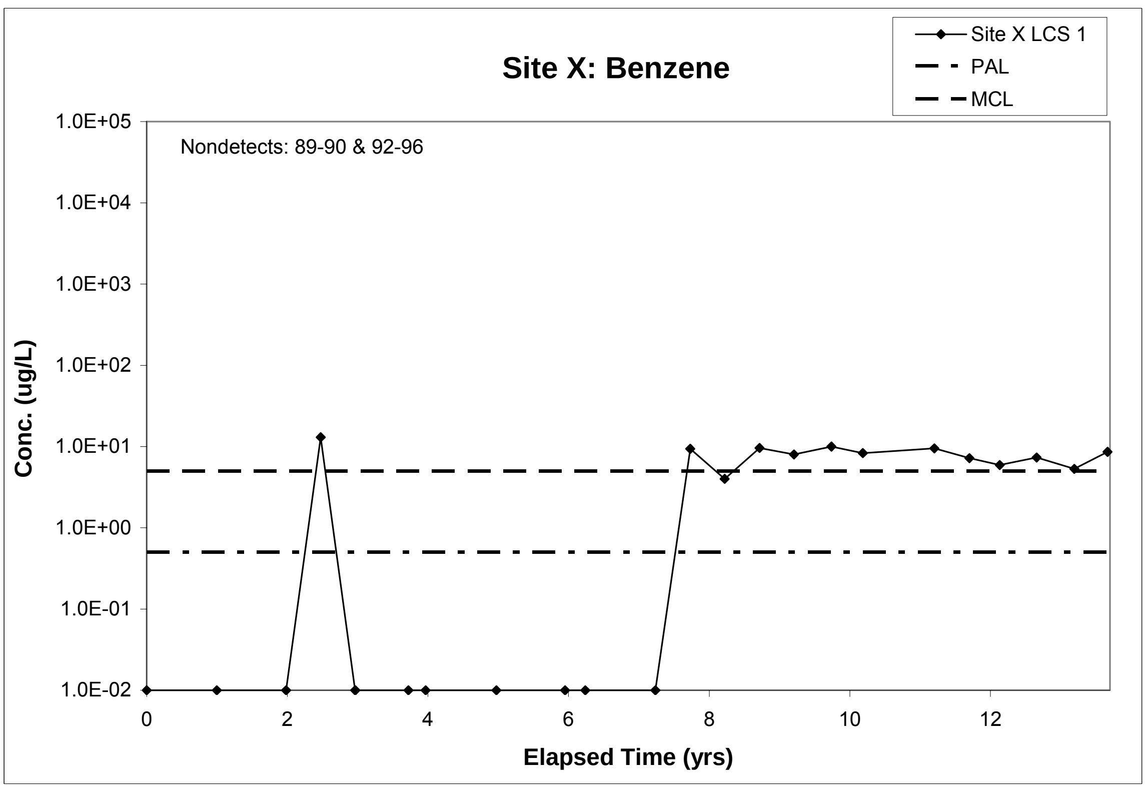

Site T: Benzene
Site T LCS 1
PAL
MCL
No data: 87-91
Nondetects: 92-96
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

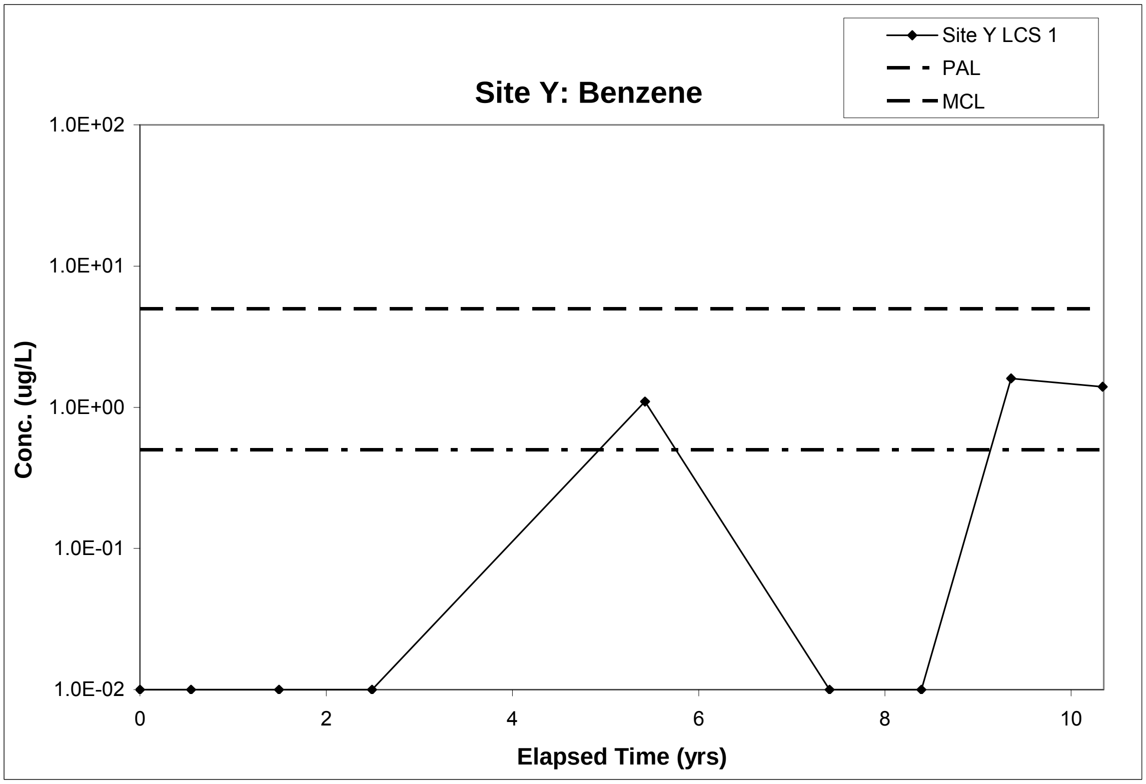

Site U: Benzene
Site U LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

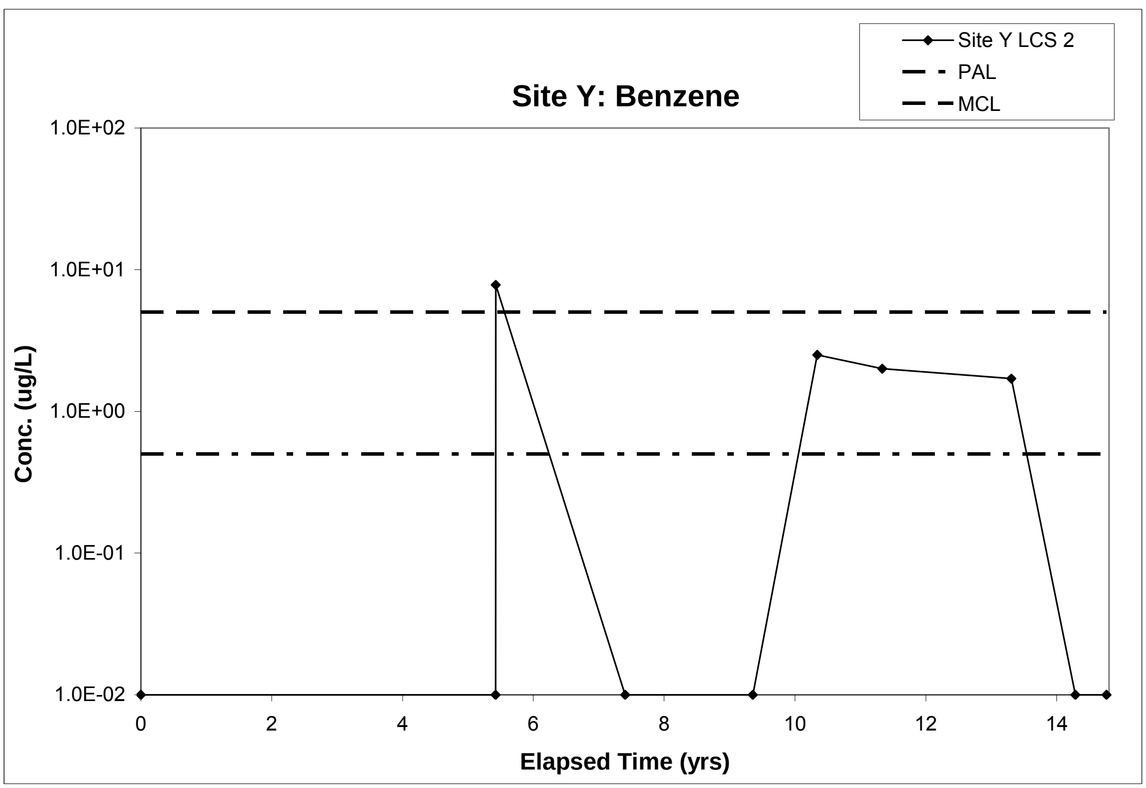

Site V: Benzene
Site V LCS 1
PAL
MCL
No data: 90-96
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

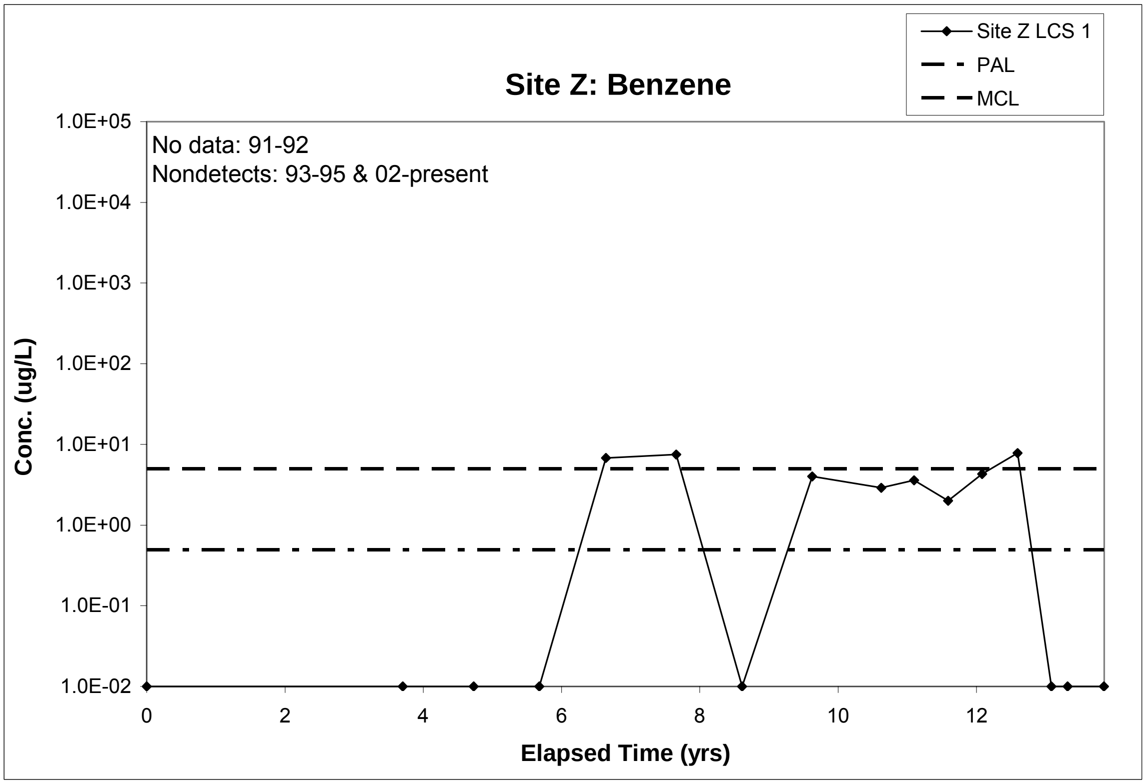

Site W: Benzene
Site W LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

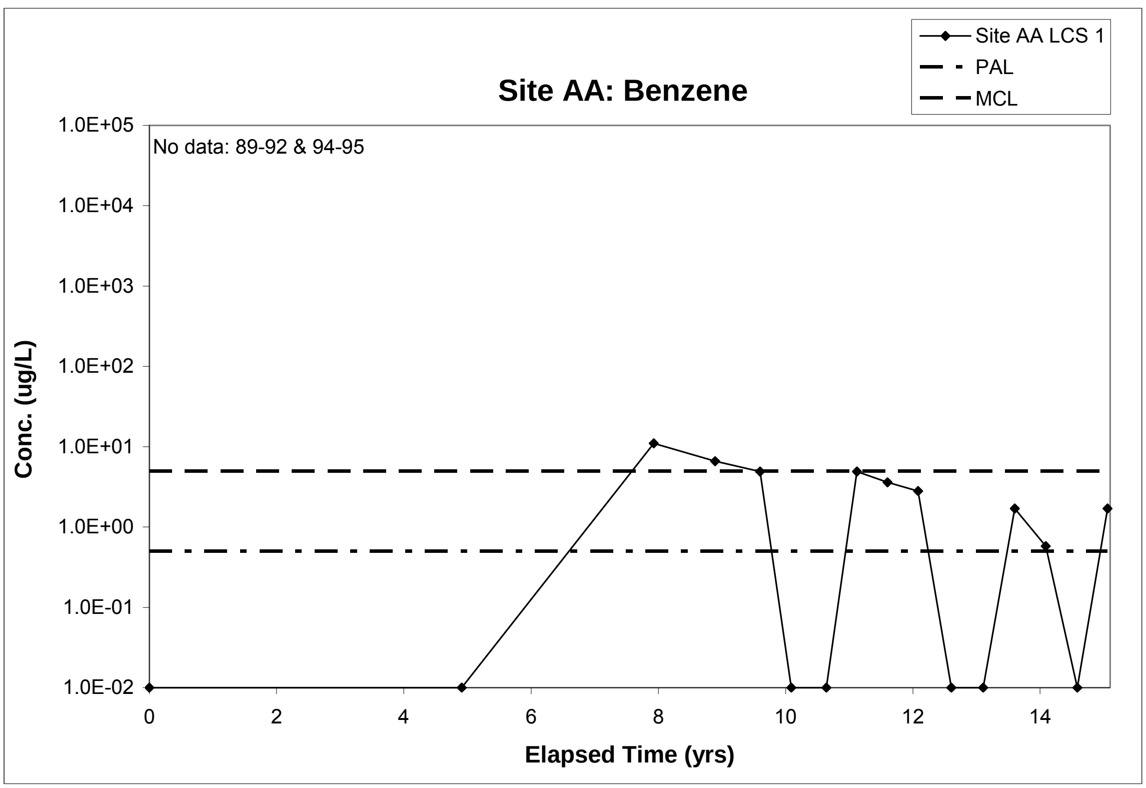

Site W: Benzene
Site W LCS 2
PAL
MCL
Nondetects: 99-present
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

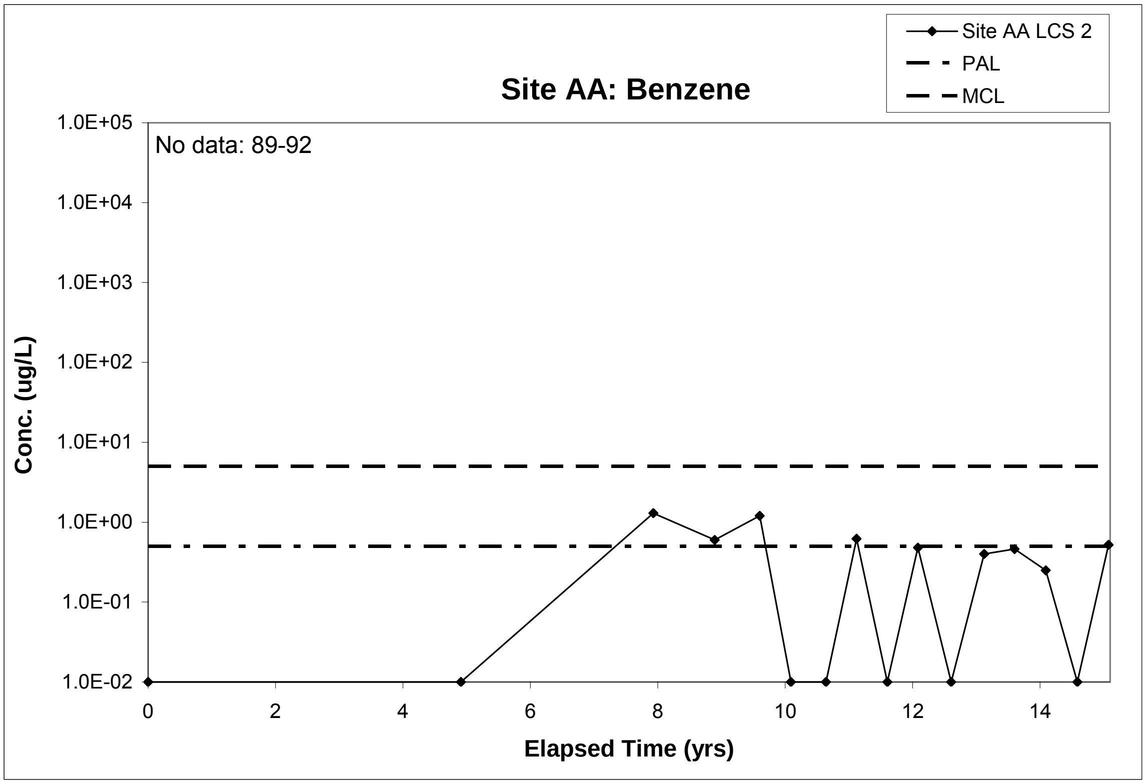

Site X: Benzene
Site X LCS 1
PAL
MCL
Nondetects: 89-90 & 92-96
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

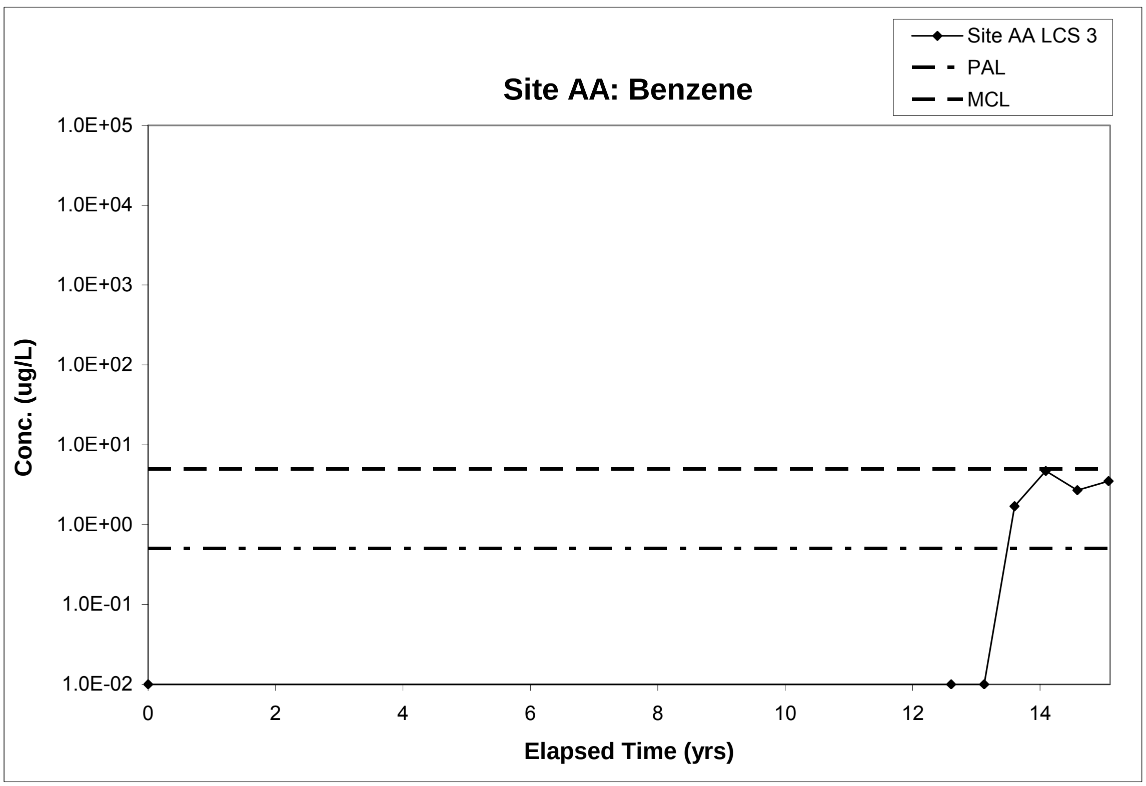

Site Y: Benzene
Site Y LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

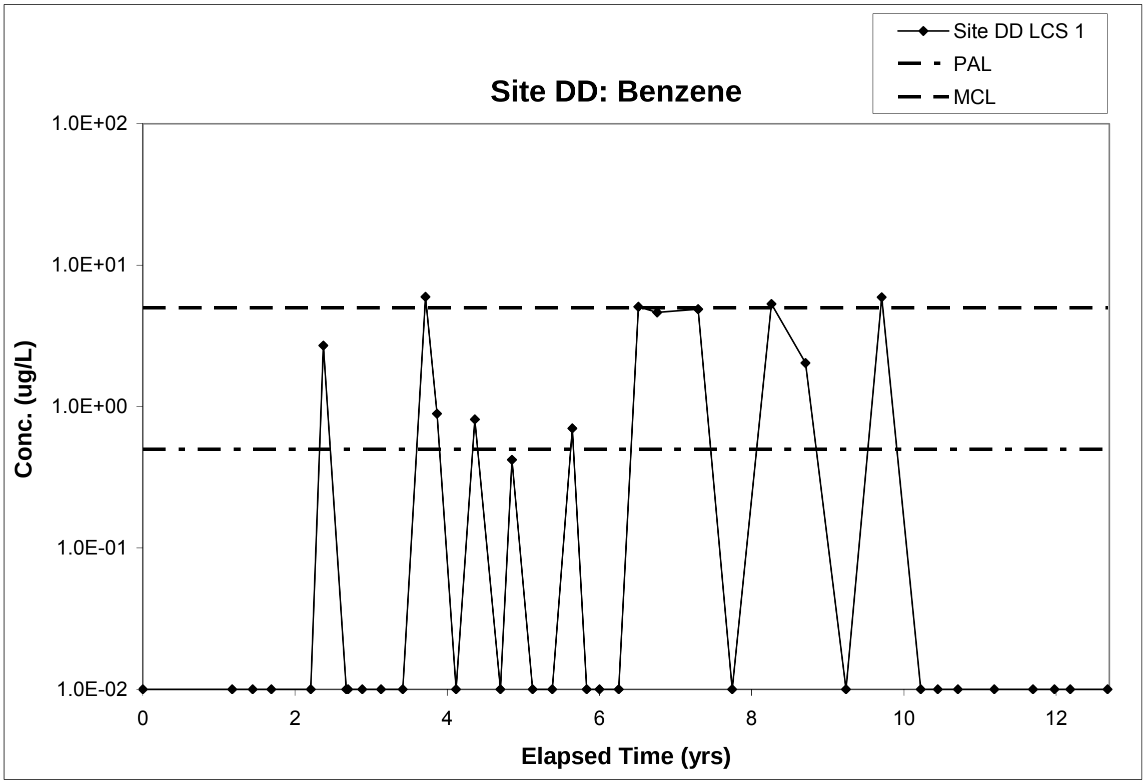

Site Y: Benzene
Site Y LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

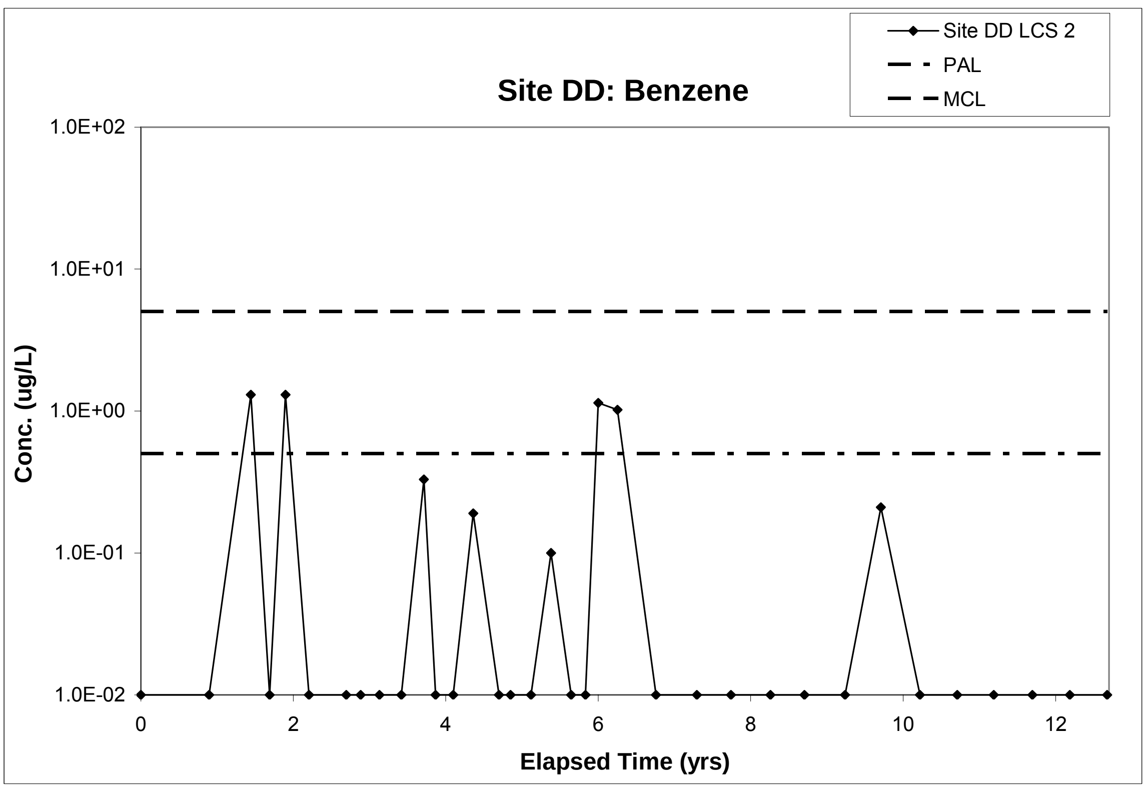

Site Z LCS 1
PAL
MCL
Site Z: Benzene
No data: 91-92
Nondetects: 93-95 & 02-present
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

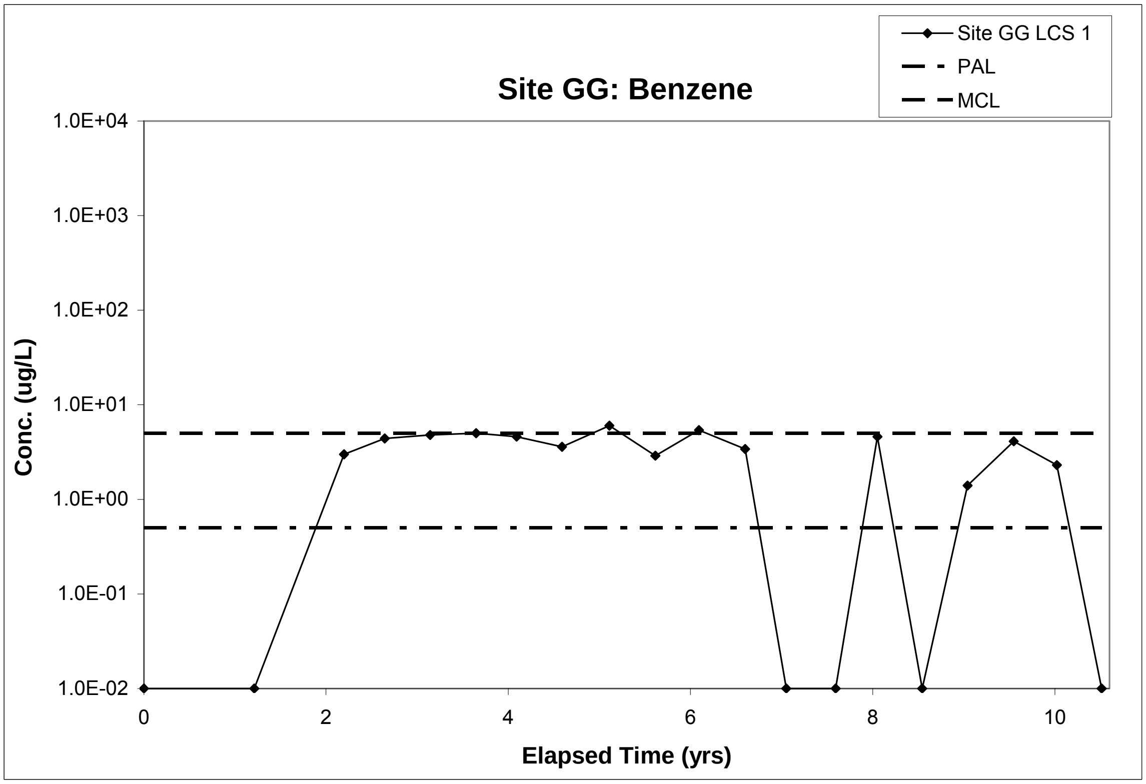

Site AA LCS 1
PAL
MCL
Site AA: Benzene
No data: 89-92 & 94-95
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

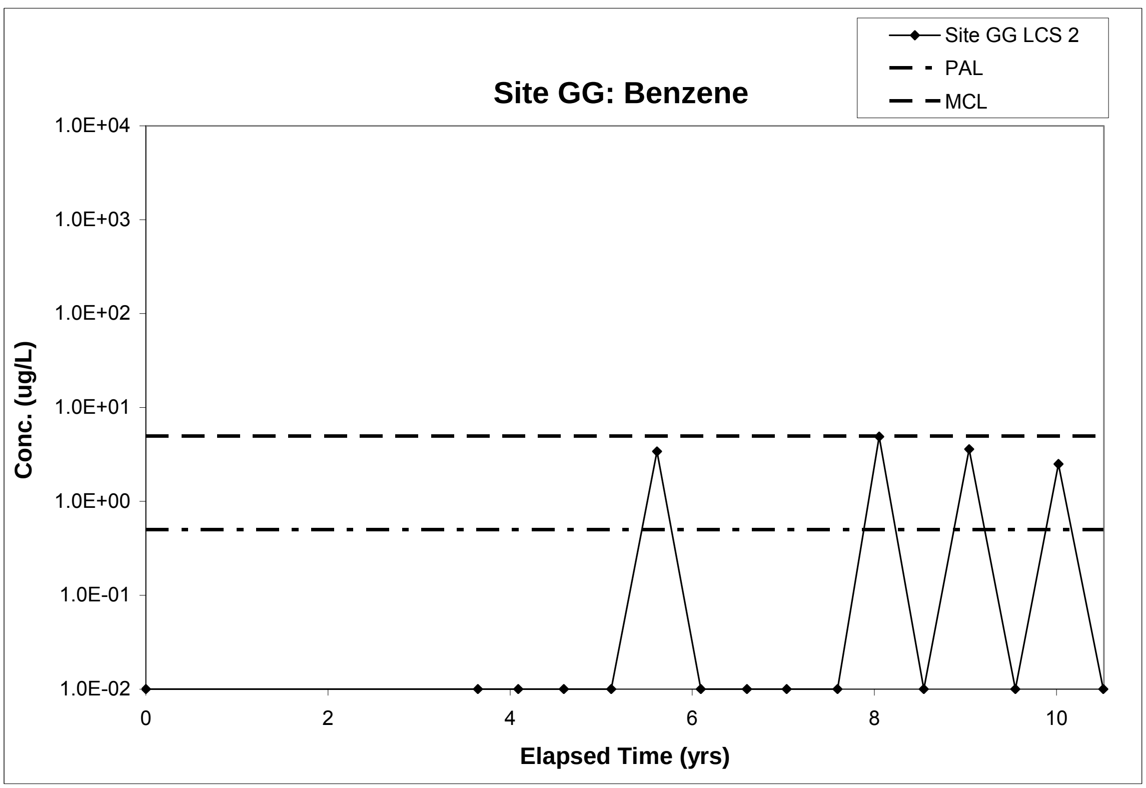

Site AA: Benzene
Site AA LCS 2
PAL
MCL
No data: 89-92
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

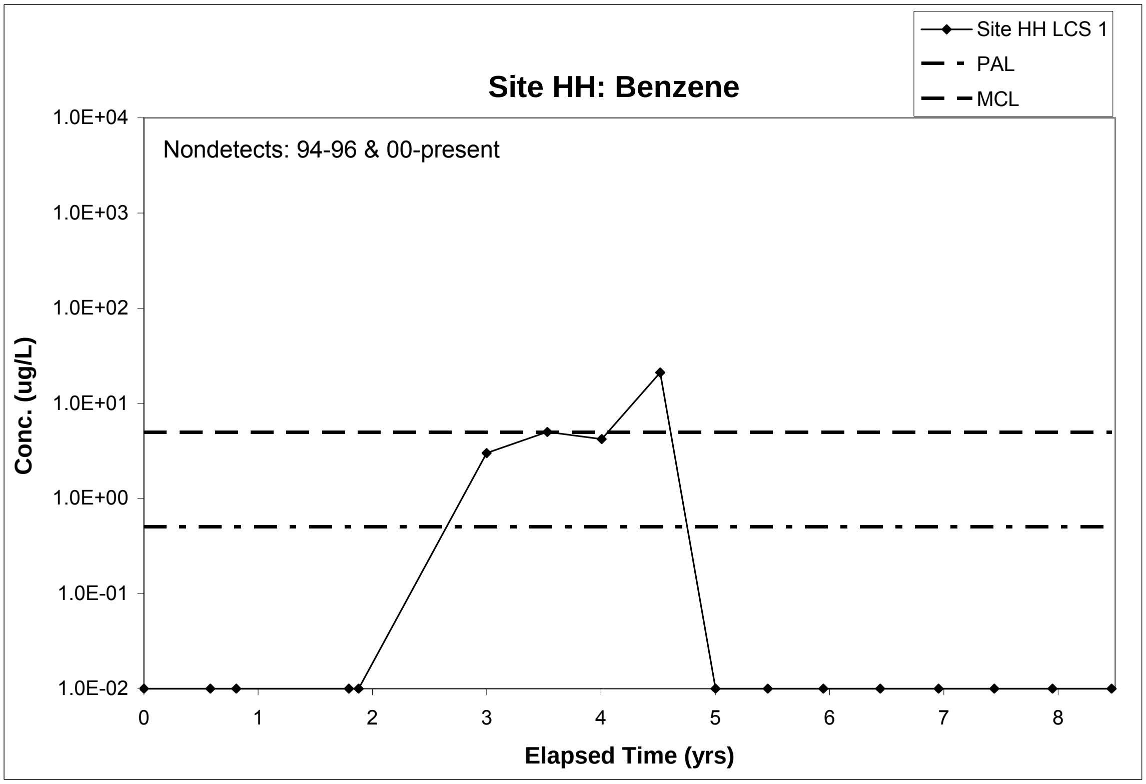

Site AA: Benzene
Site AA LCS 3
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

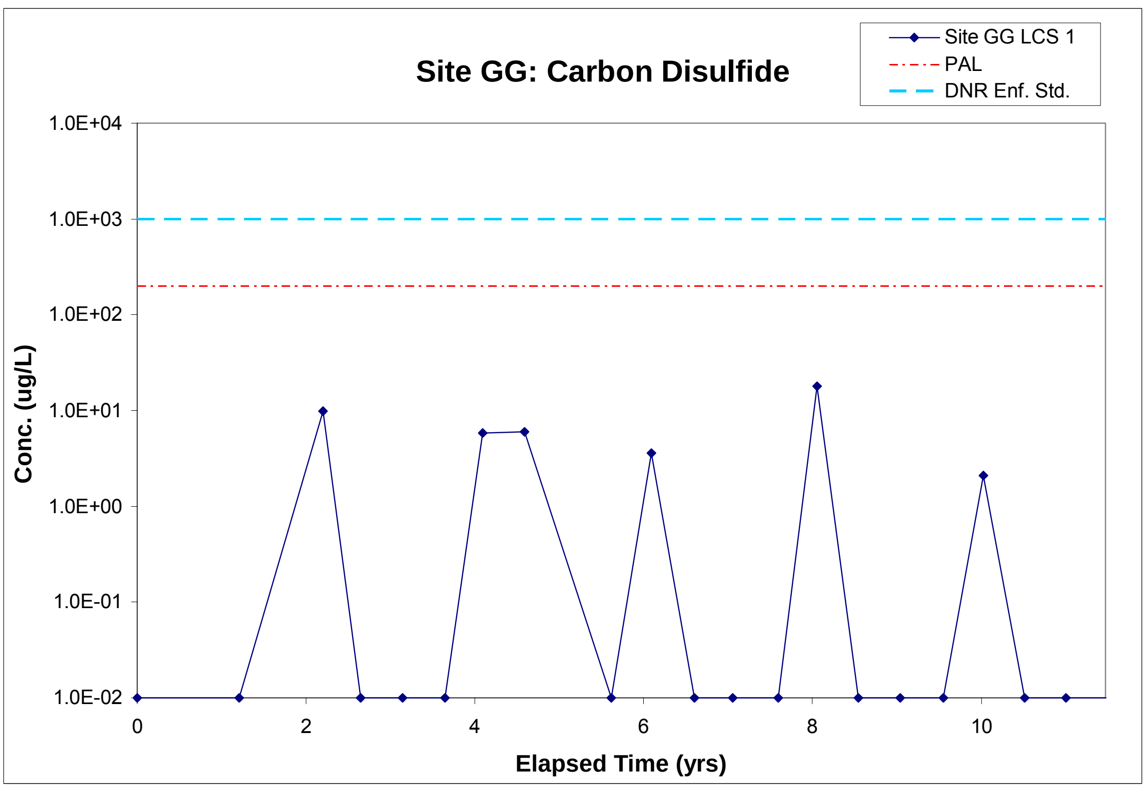

Site DD LCS 1
PAL
MCL
Site DD: Benzene
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

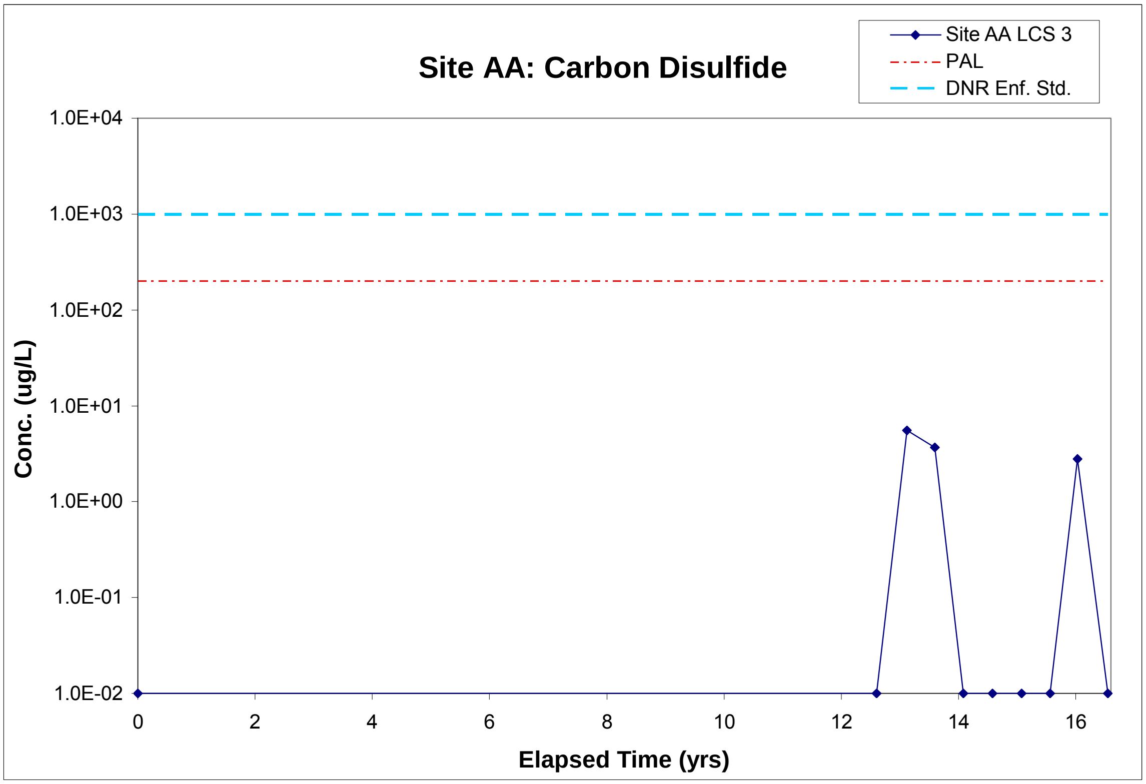

Site DD LCS 2
PAL
MCL
Site DD: Benzene
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

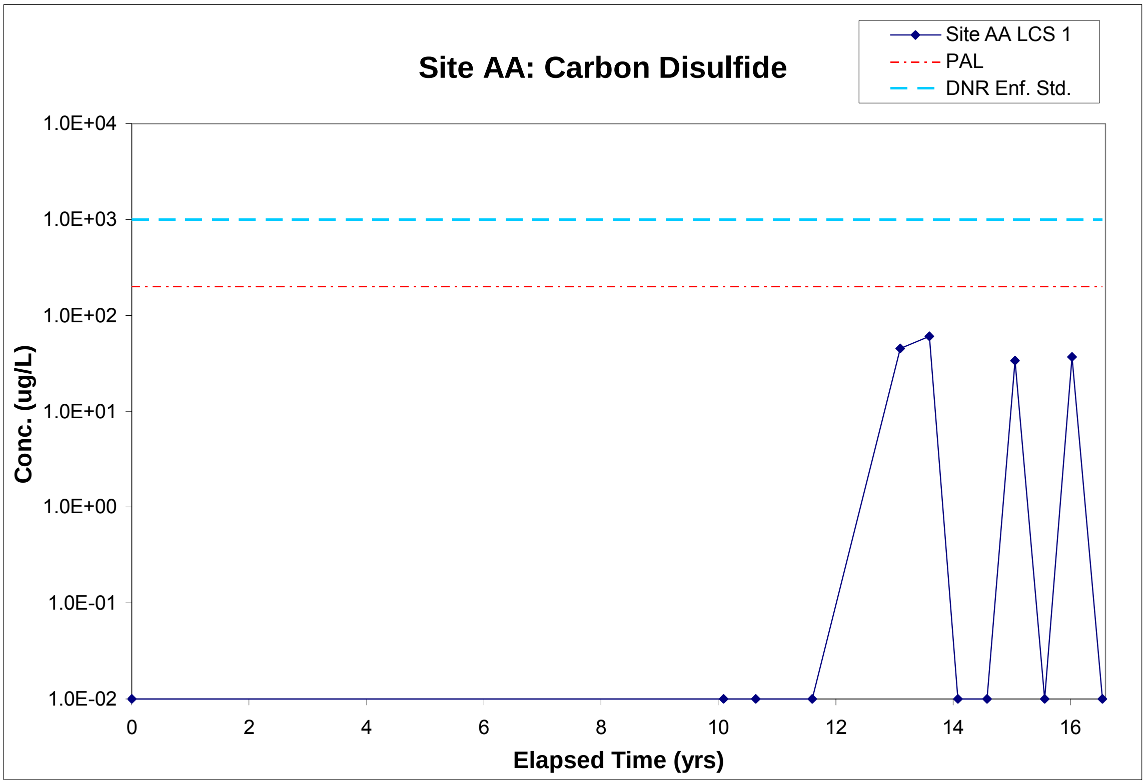

Site GG: Benzene
Site GG LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

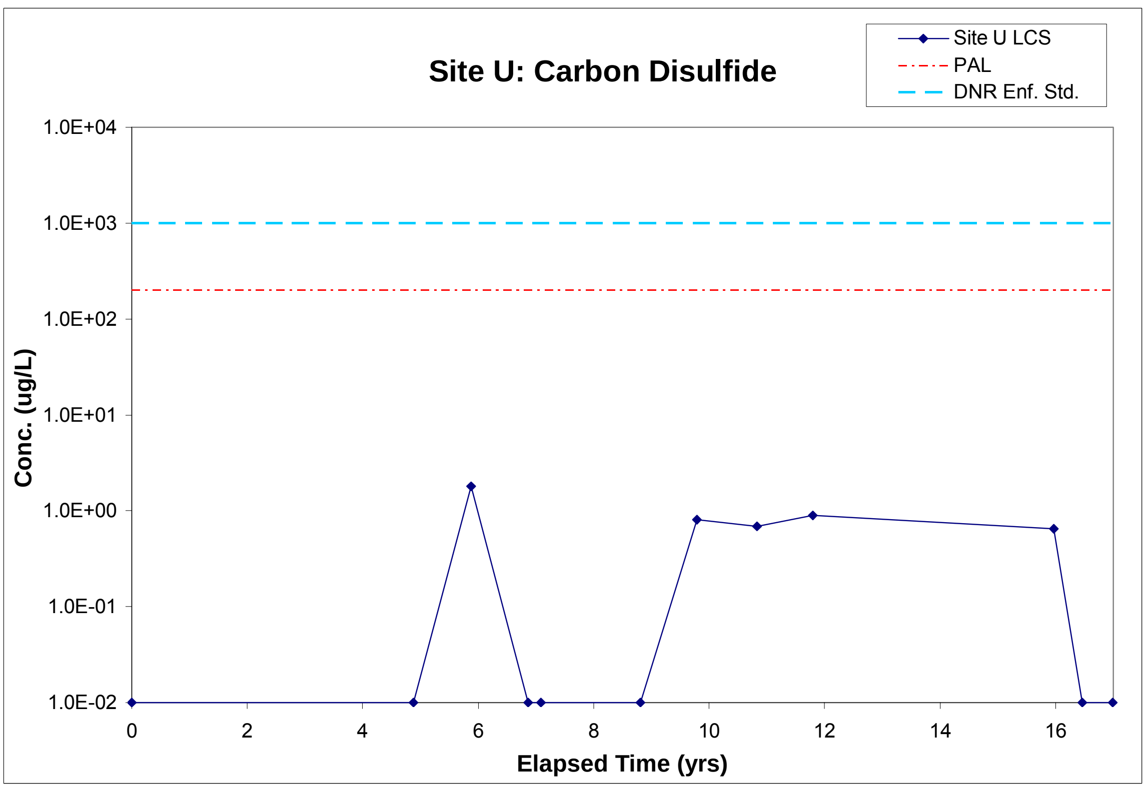

Site GG: Benzene
Site GG LCS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

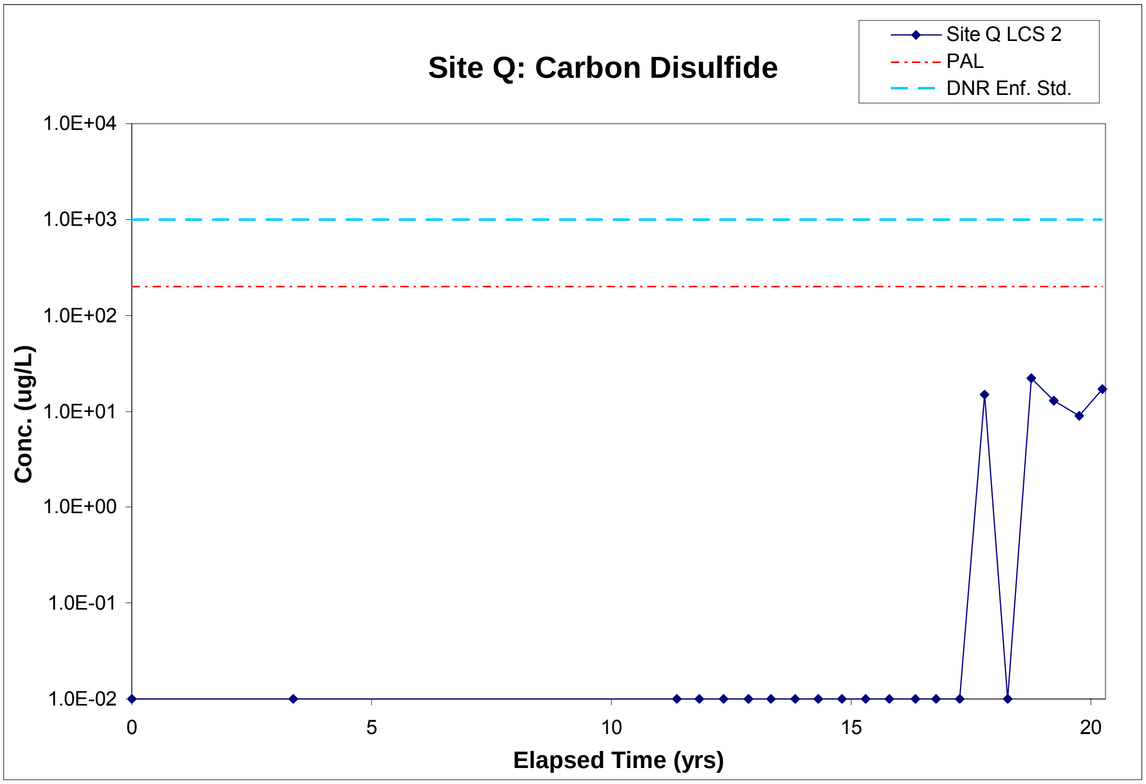

Site HH: Benzene
Site HH LCS 1
PAL
MCL
Nondetects: 94-96 & 00-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

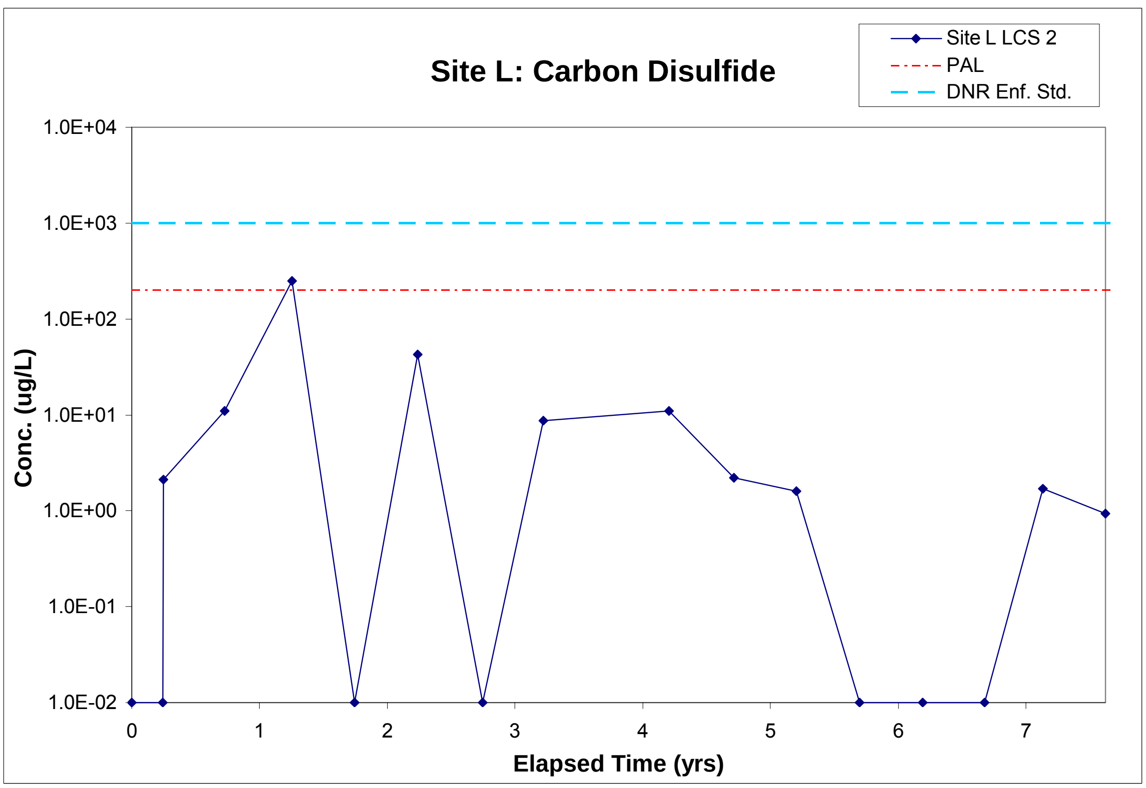

Site GG: Carbon Disulfide
Site GG LCS 1
PAL
DNR Enf. Std.
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

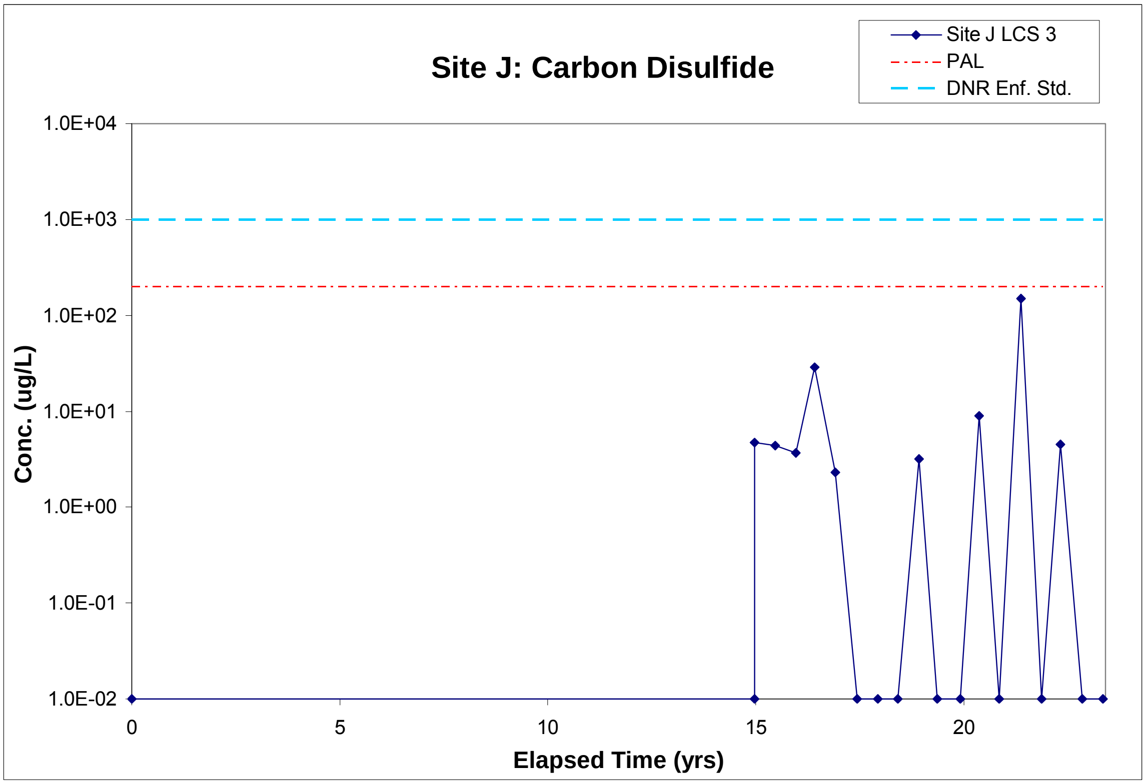

Site AA: Carbon Disulfide
Site AA LCS 3
PAL
DNR Enf. Std.
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

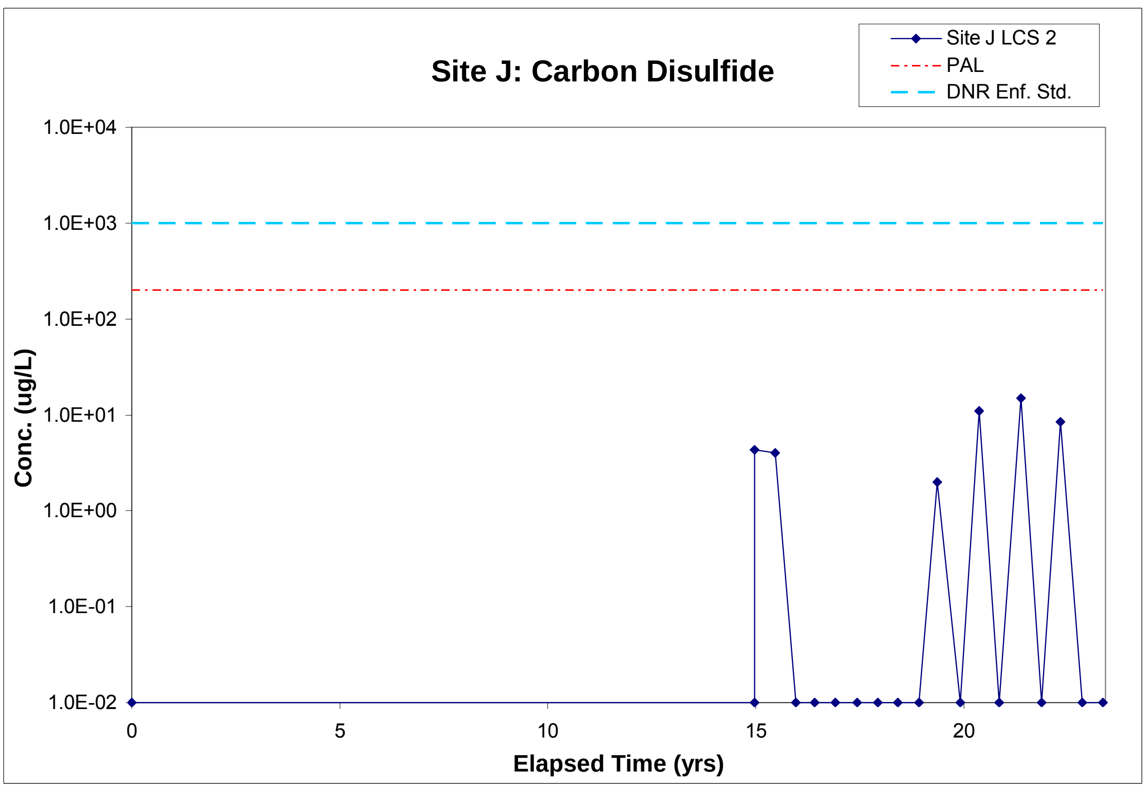

Site AA: Carbon Disulfide
Site AA LCS 1
PAL
DNR Enf. Std.
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

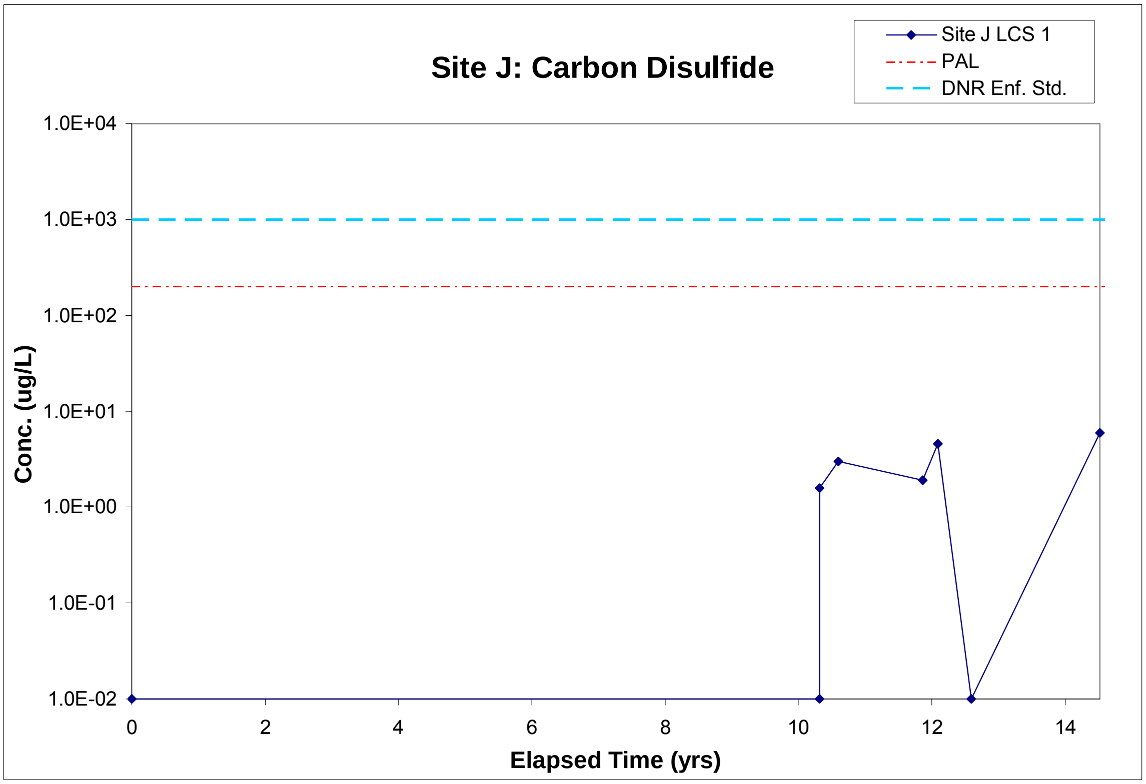

Site U: Carbon Disulfide
Site U LCS
PAL
DNR Enf. Std.
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

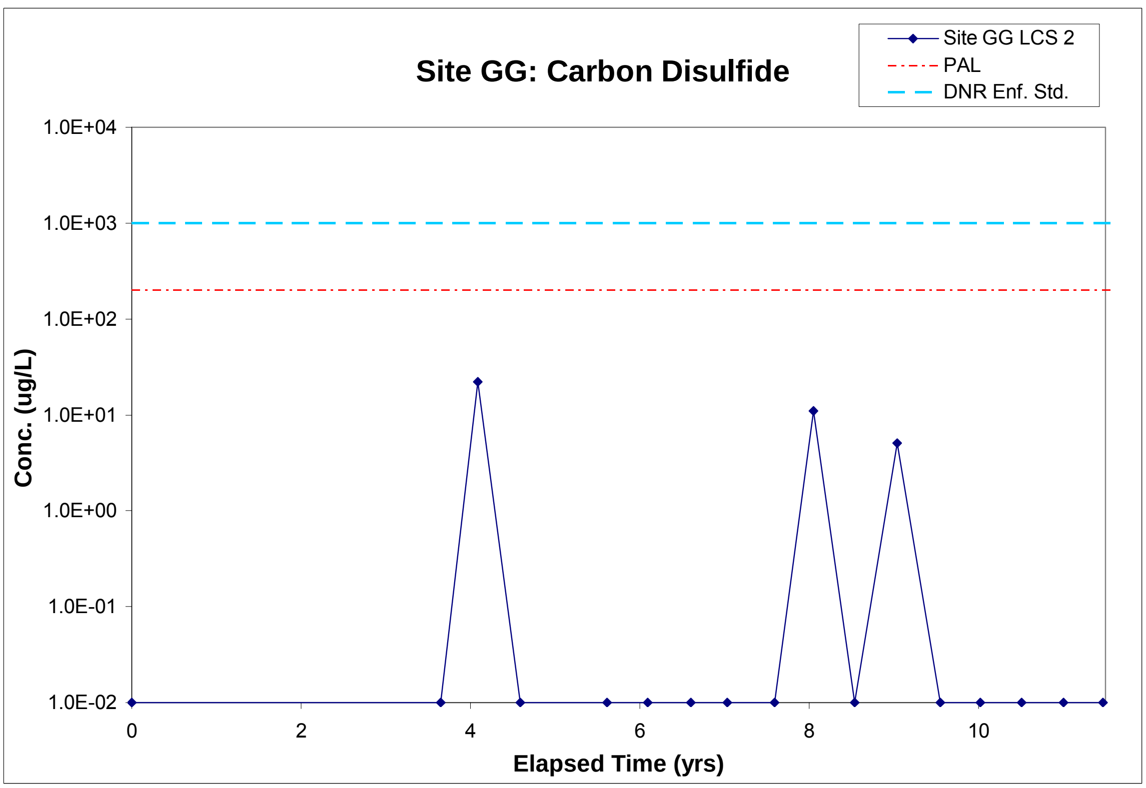

Site Q: Carbon Disulfide
Site Q LCS 2
PAL
DNR Enf. Std.
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

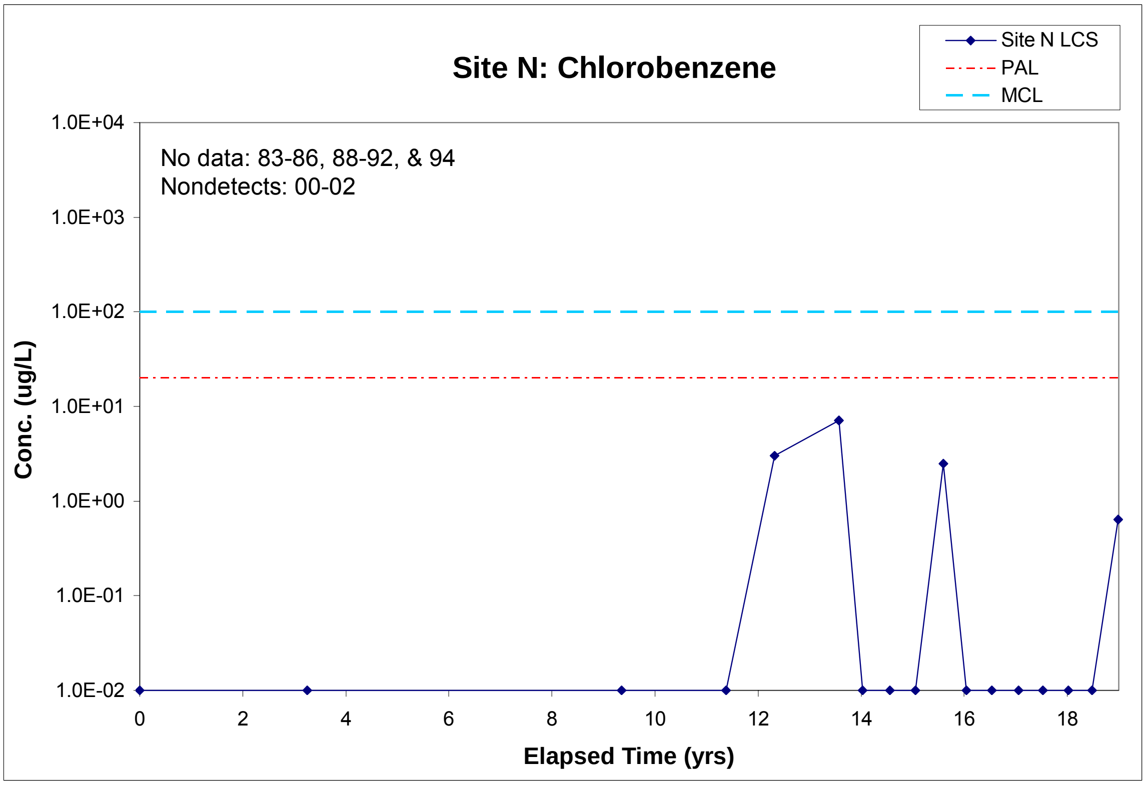

Site L: Carbon Disulfide
Site L LCS 2
PAL
DNR Enf. Std.
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
Elapsed Time (yrs)

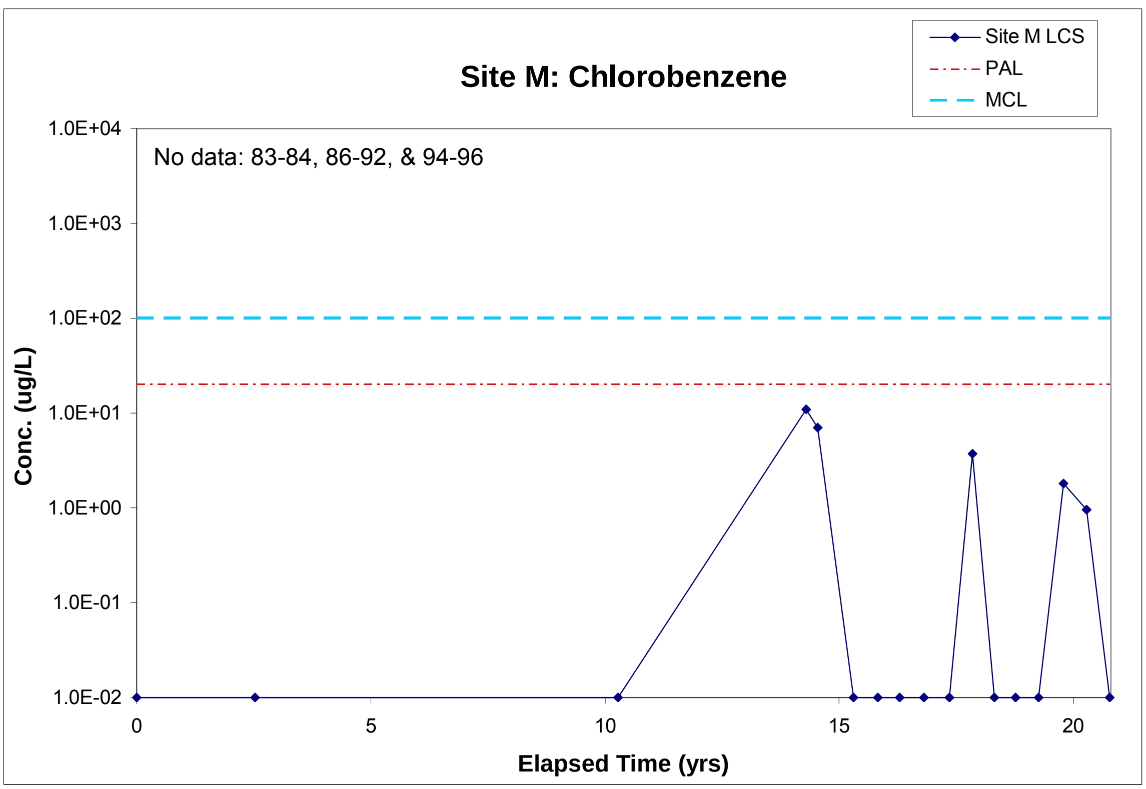

Site J: Carbon Disulfide
Site J LCS 3
PAL
DNR Enf. Std.
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

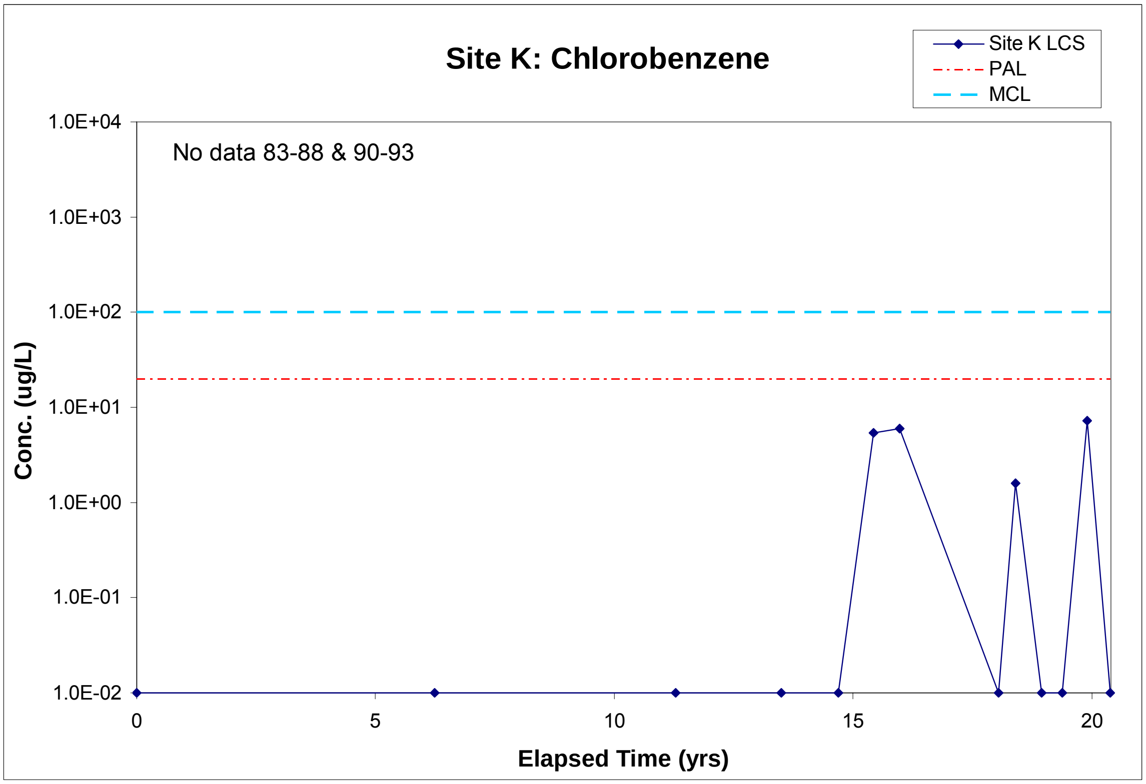

Site J: Carbon Disulfide
Site J LCS 2
PAL
DNR Enf. Std.
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

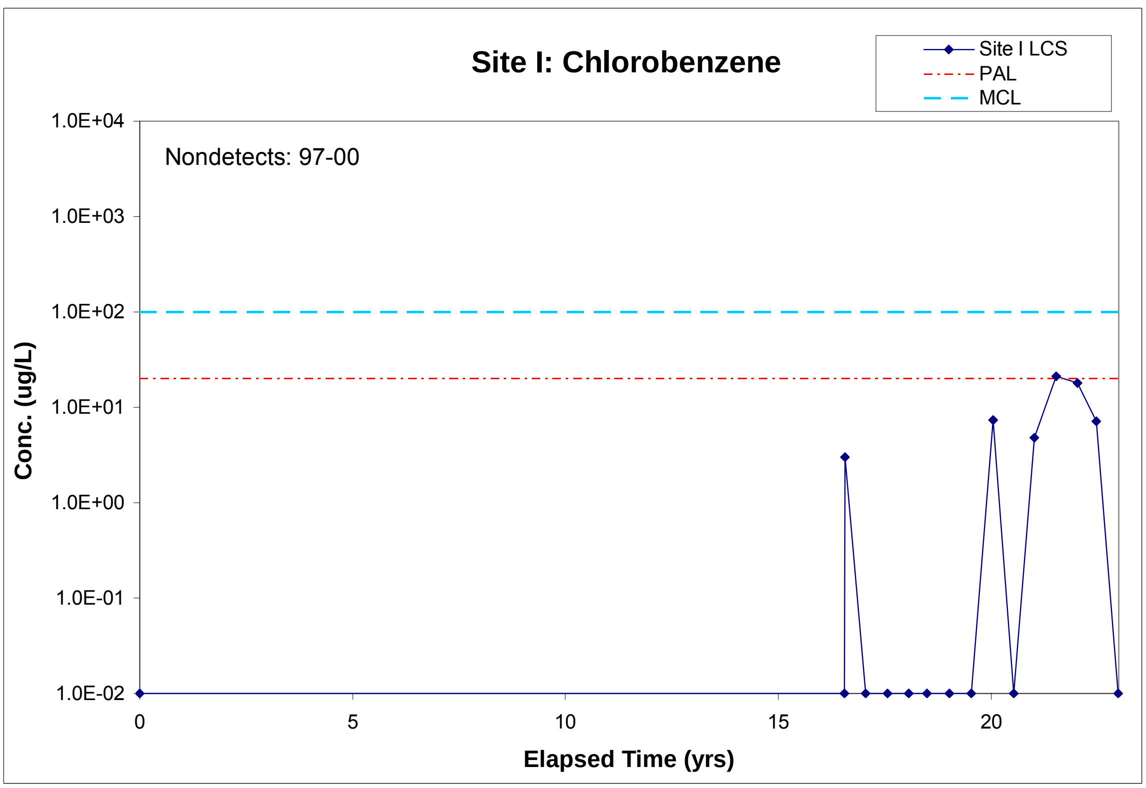

Site J: Carbon Disulfide
Site J LCS 1
PAL
DNR Enf. Std.
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

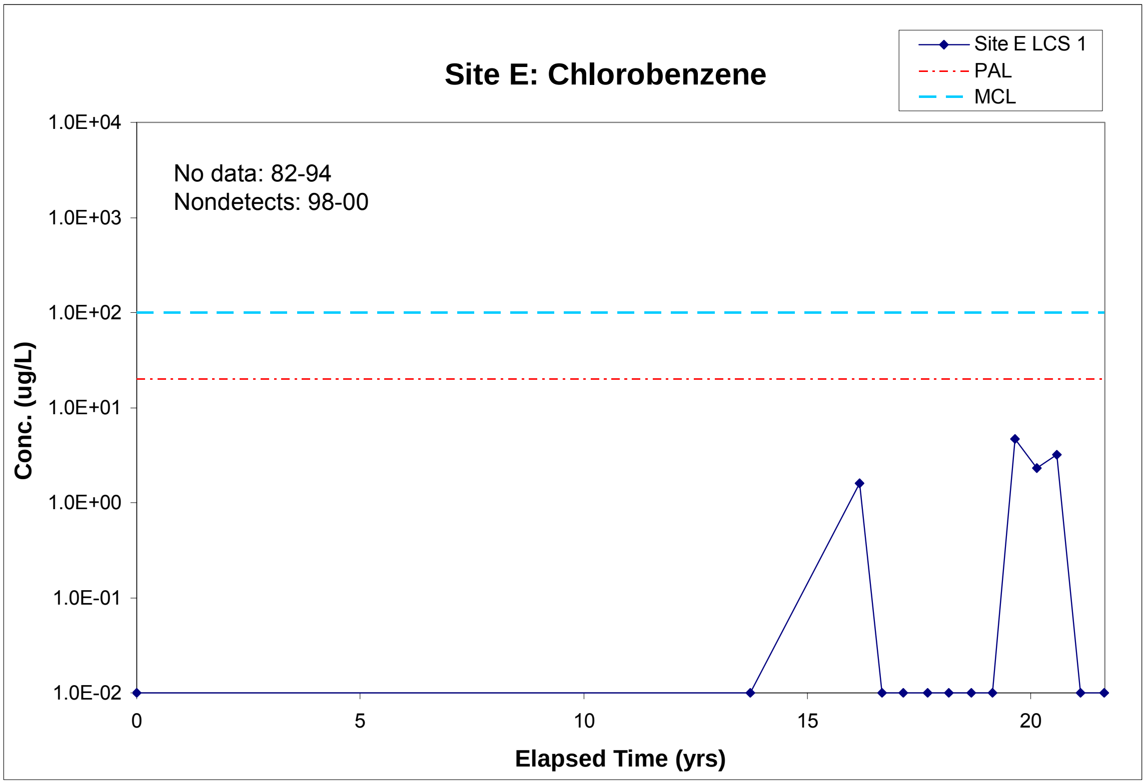

Site GG: Carbon Disulfide
Site GG LCS 2
PAL
DNR Enf. Std.
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

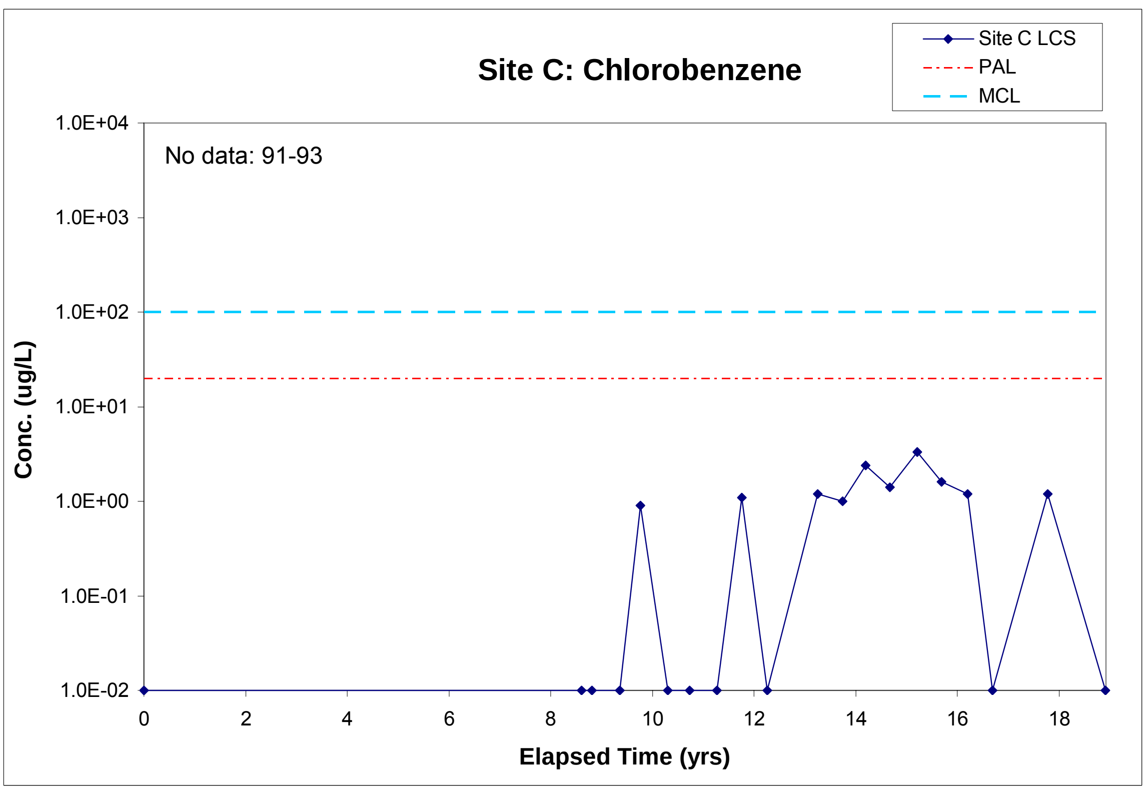

Site N: Chlorobenzene
Site N LCS
PAL
MCL
No data: 83-86, 88-92, & 94
Nondetects: 00-02
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

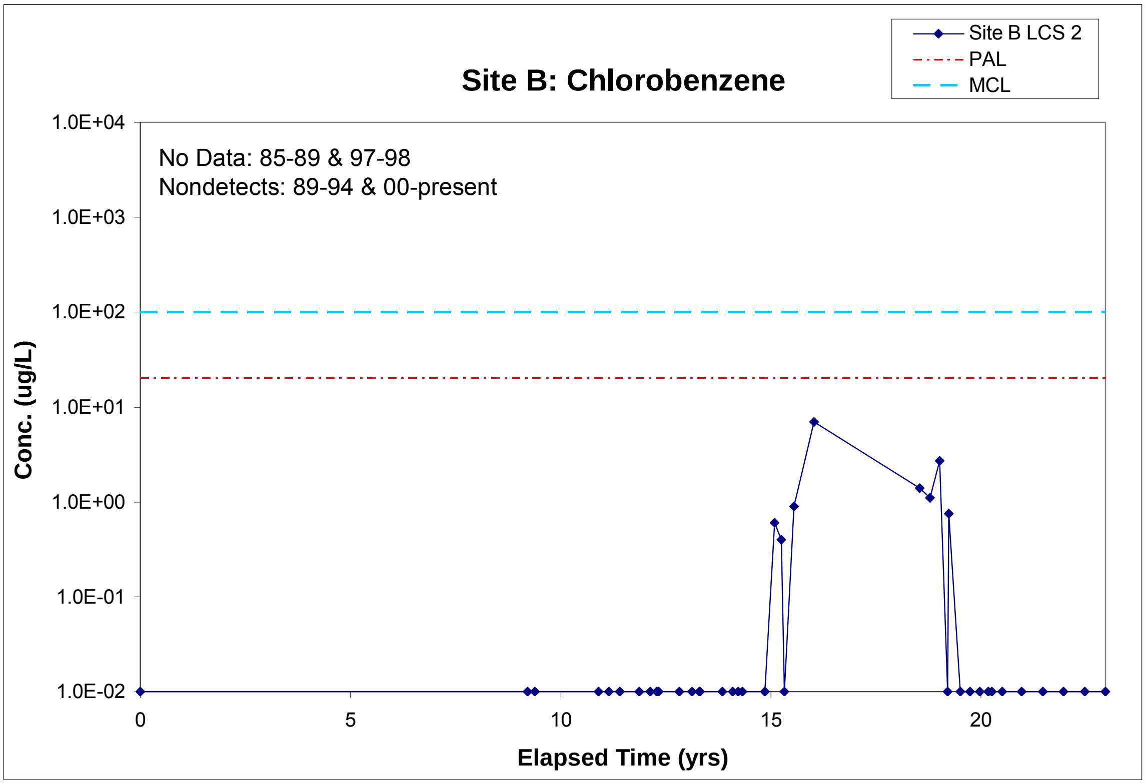

Site M: Chlorobenzene
Site M LCS
PAL
MCL
No data: 83-84, 86-92, & 94-96
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

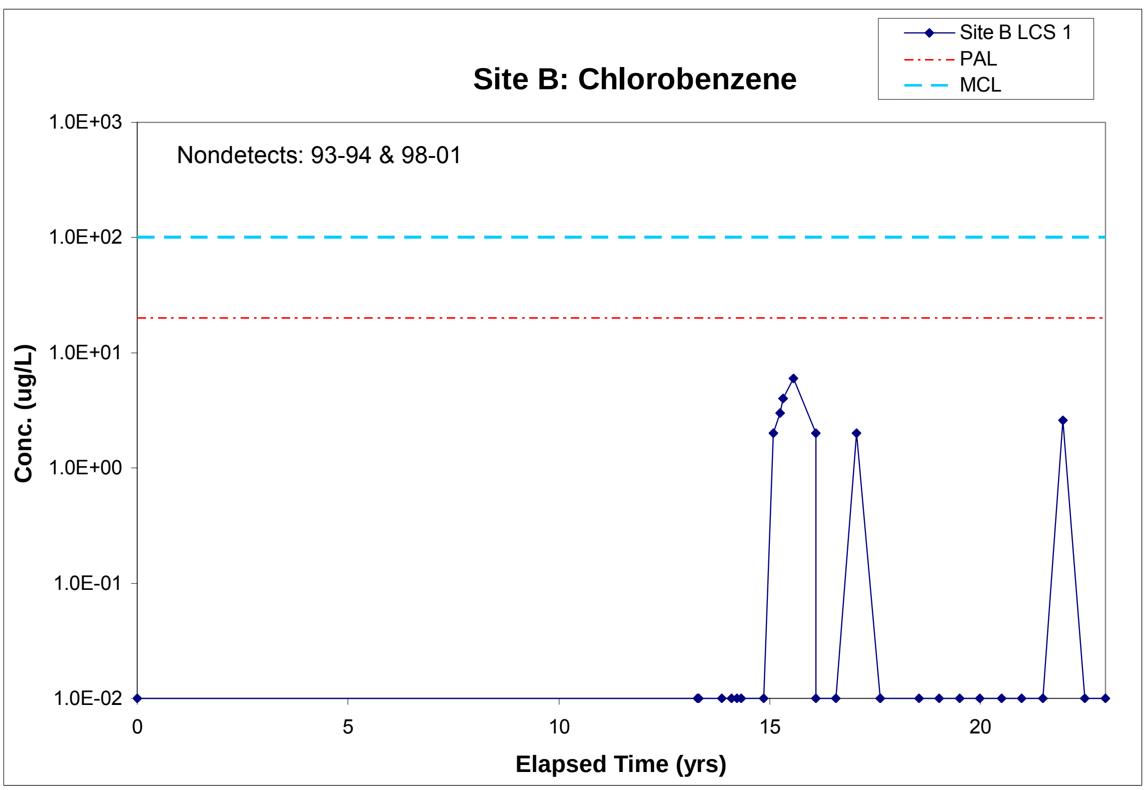

Site K: Chlorobenzene
Site K LCS
PAL
MCL
No data 83-88 & 90-93
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

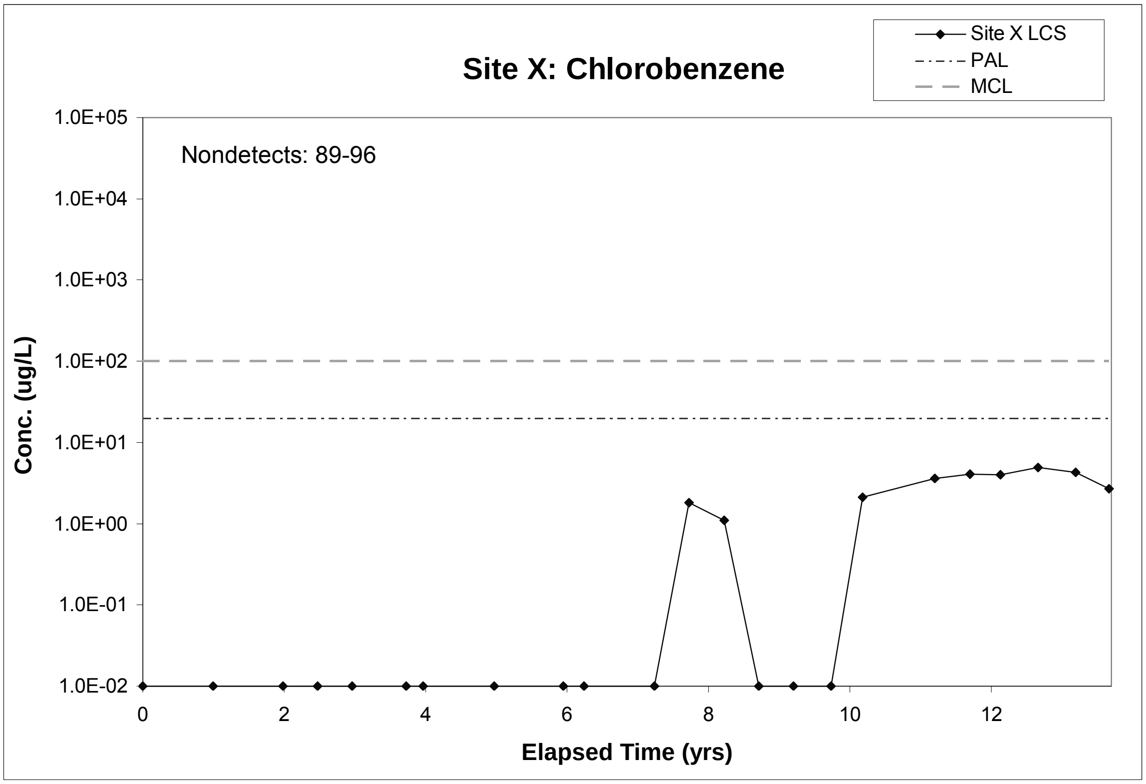

Site I: Chlorobenzene
Site I LCS
PAL
MCL
Nondetects: 97-00
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

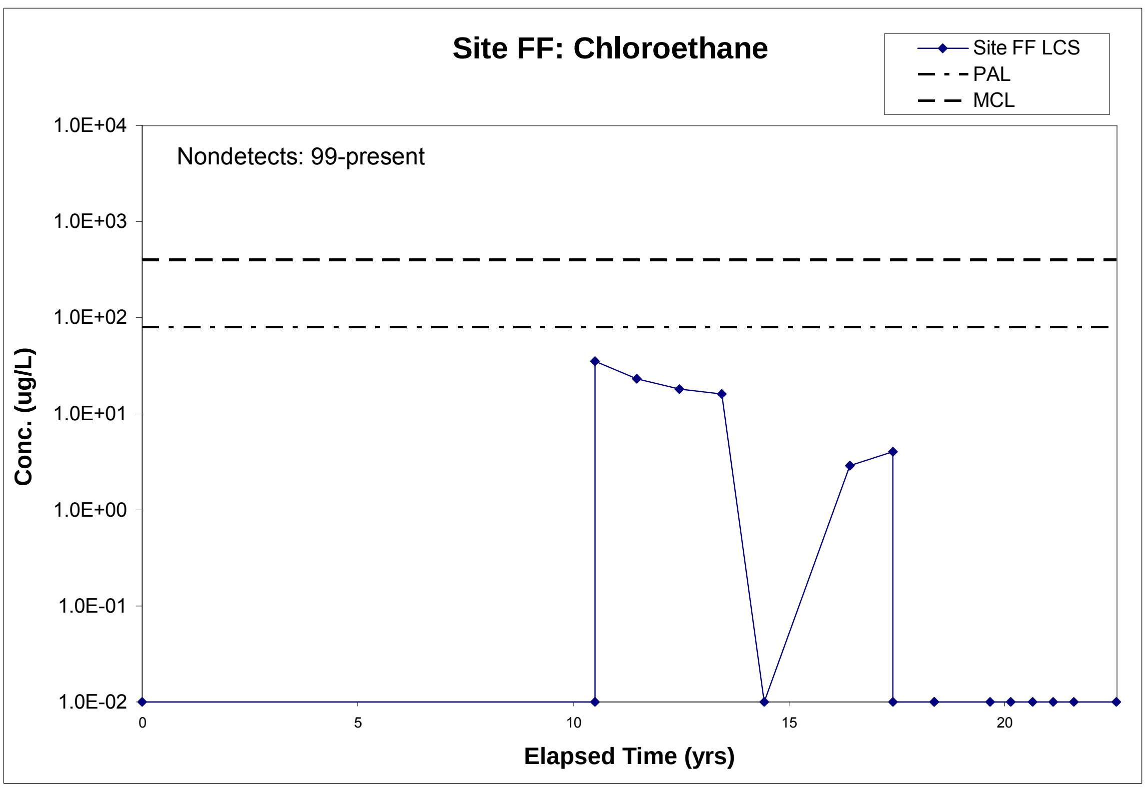

Site E: Chlorobenzene
Site E LCS 1
PAL
MCL
No data: 82-94
Nondetects: 98-00
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

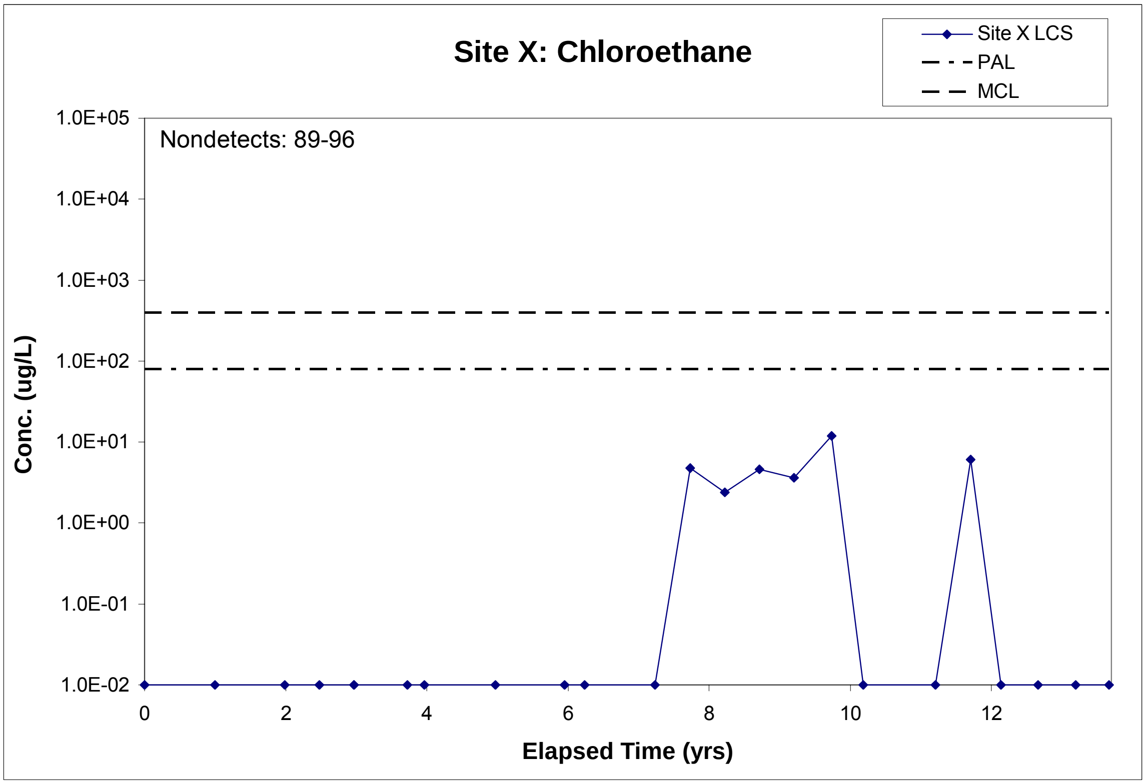

Site C: Chlorobenzene
Site C LCS
PAL
MCL
No data: 91-93
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

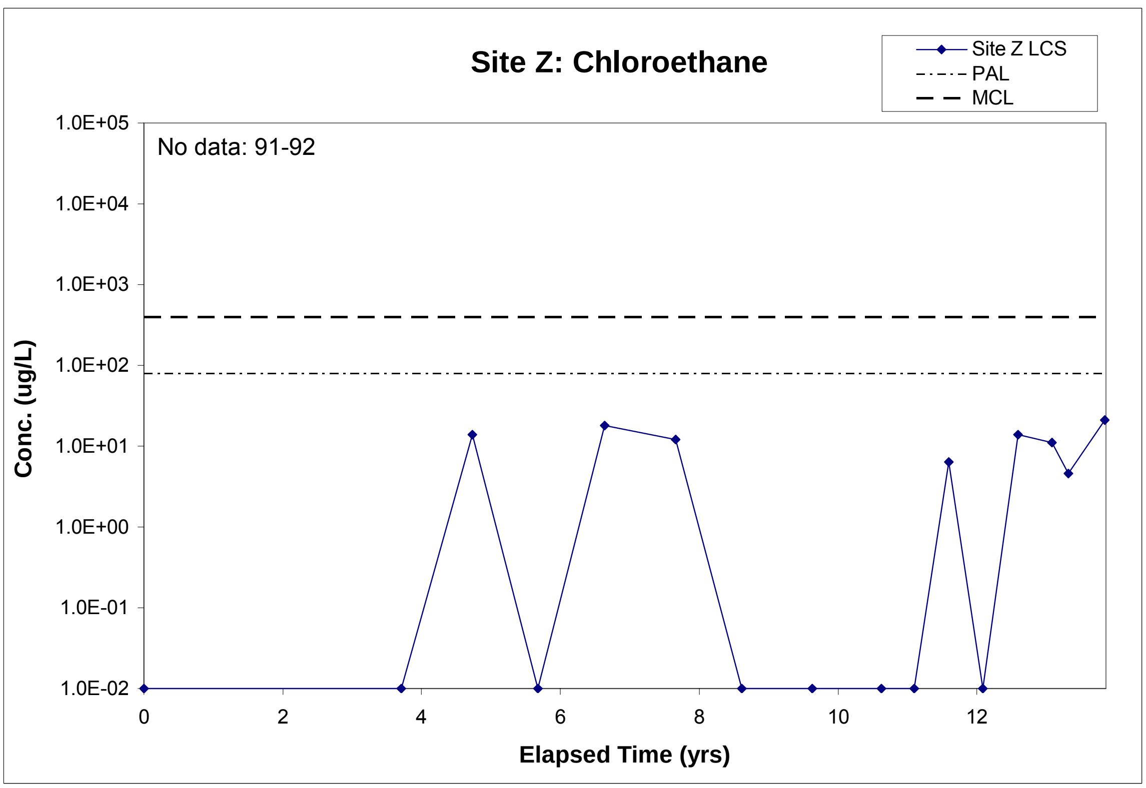

Site B: Chlorobenzene
Site B LCS 2
PAL
MCL
No Data: 85-89 & 97-98
Nondetects: 89-94 & 00-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

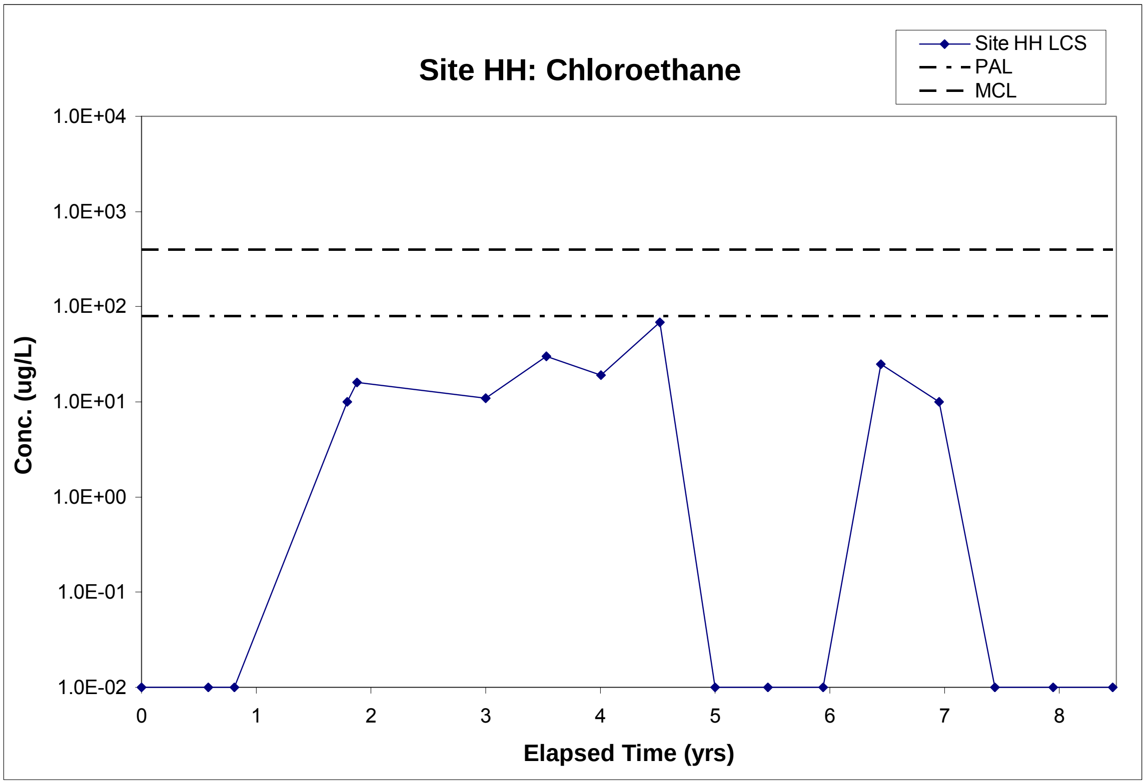

Site B: Chlorobenzene
Site B LCS 1
PAL
MCL
Nondetects: 93-94 & 98-01
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

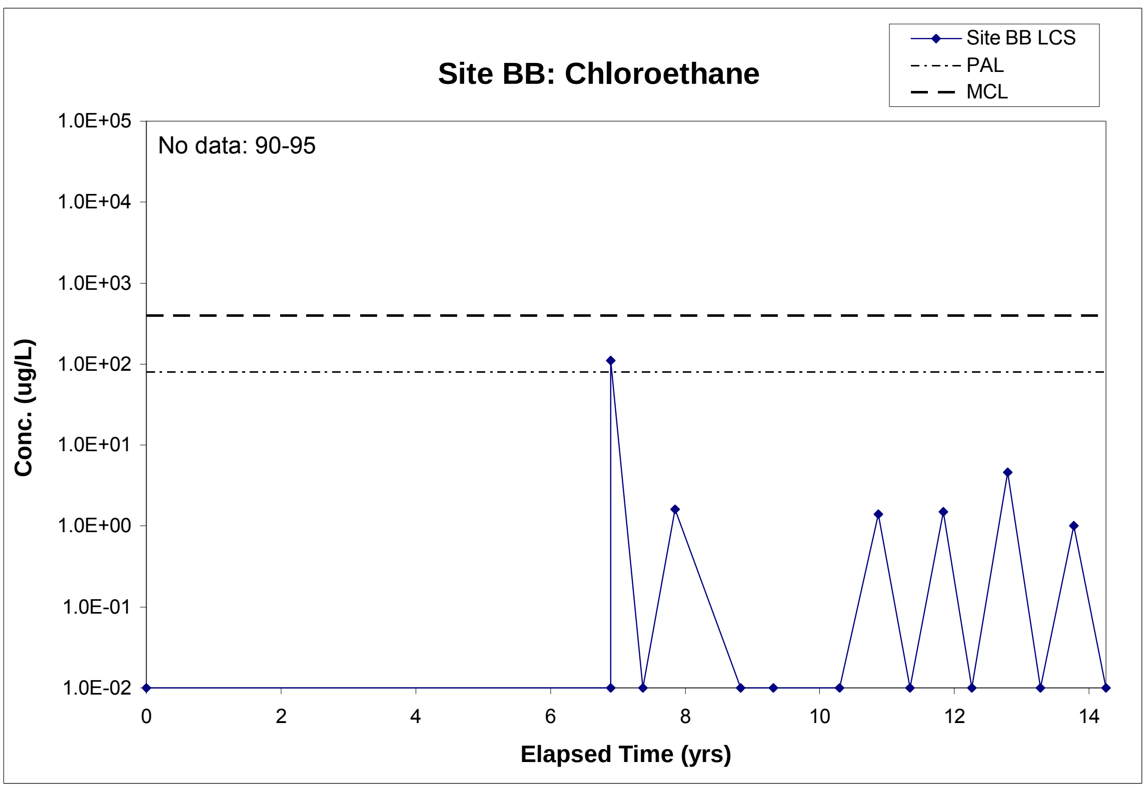

Site X: Chlorobenzene
Site X LCS
PAL
MCL
Nondetects: 89-96
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

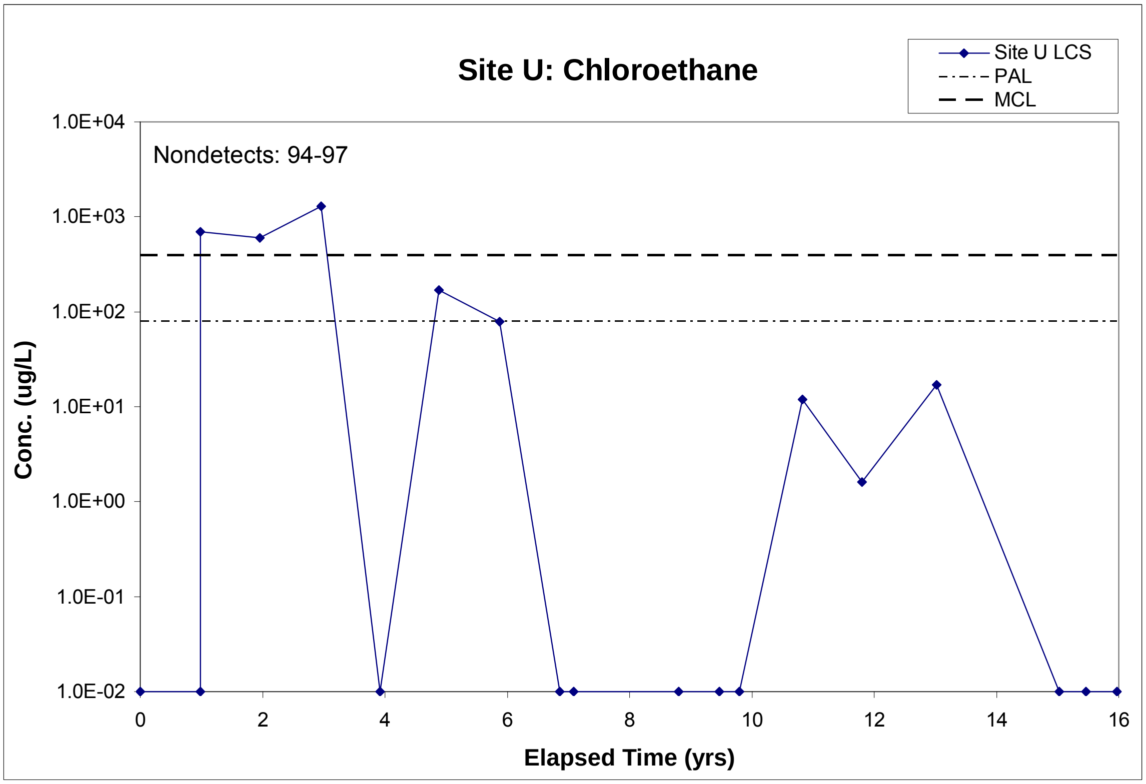

Site FF: Chloroethane
Site FF LCS
PAL
MCL
Nondetects: 99-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

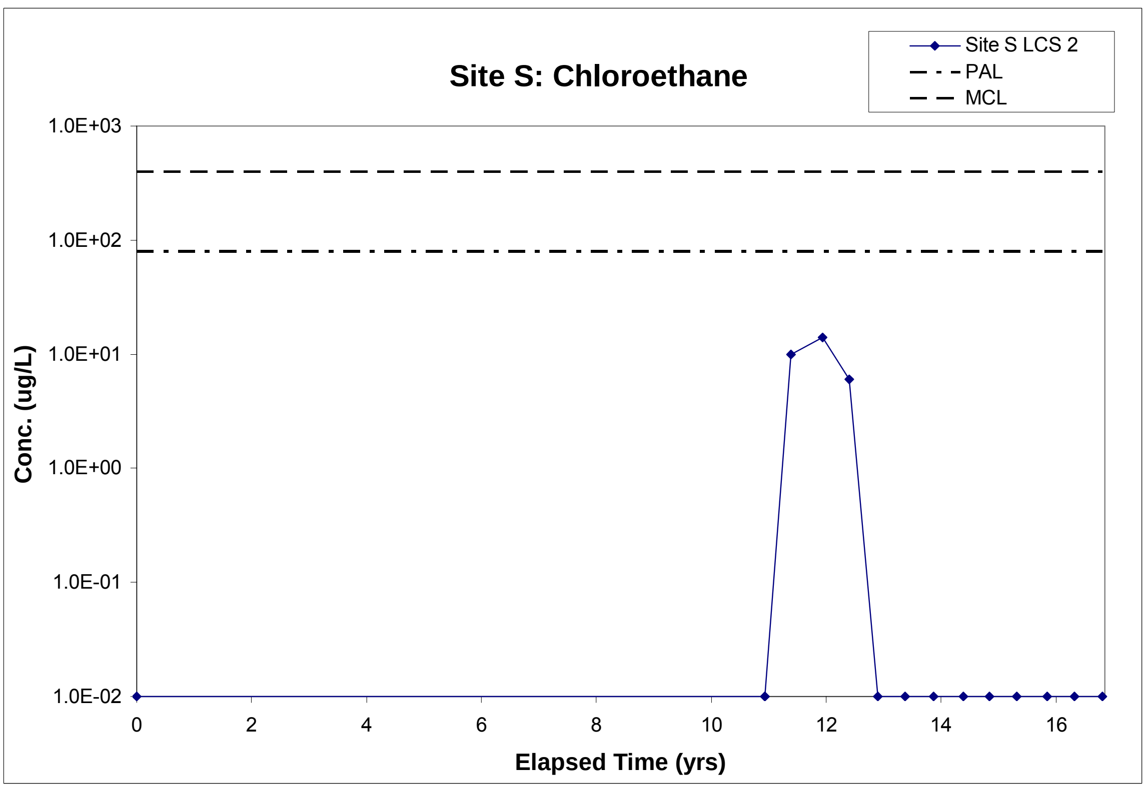

Site X: Chloroethane
Site X LCS
PAL
MCL
Nondetects: 89-96
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

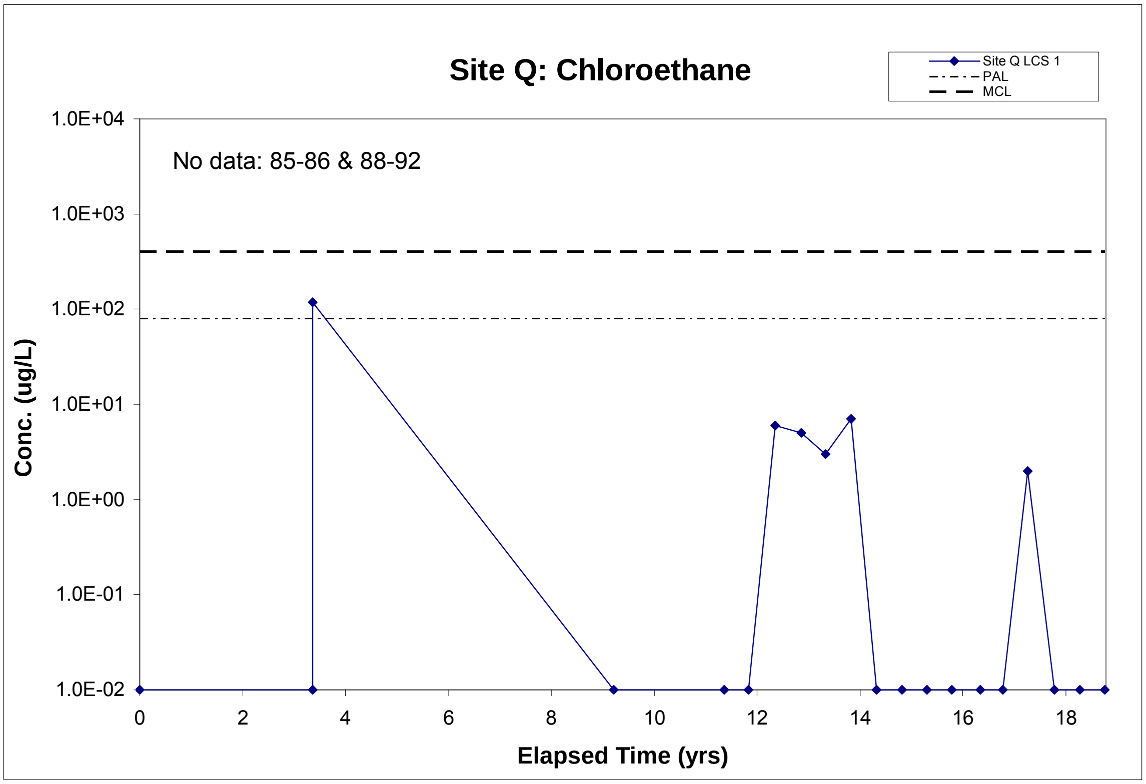

Site Z: Chloroethane
Site Z LCS
PAL
MCL
No data: 91-92
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

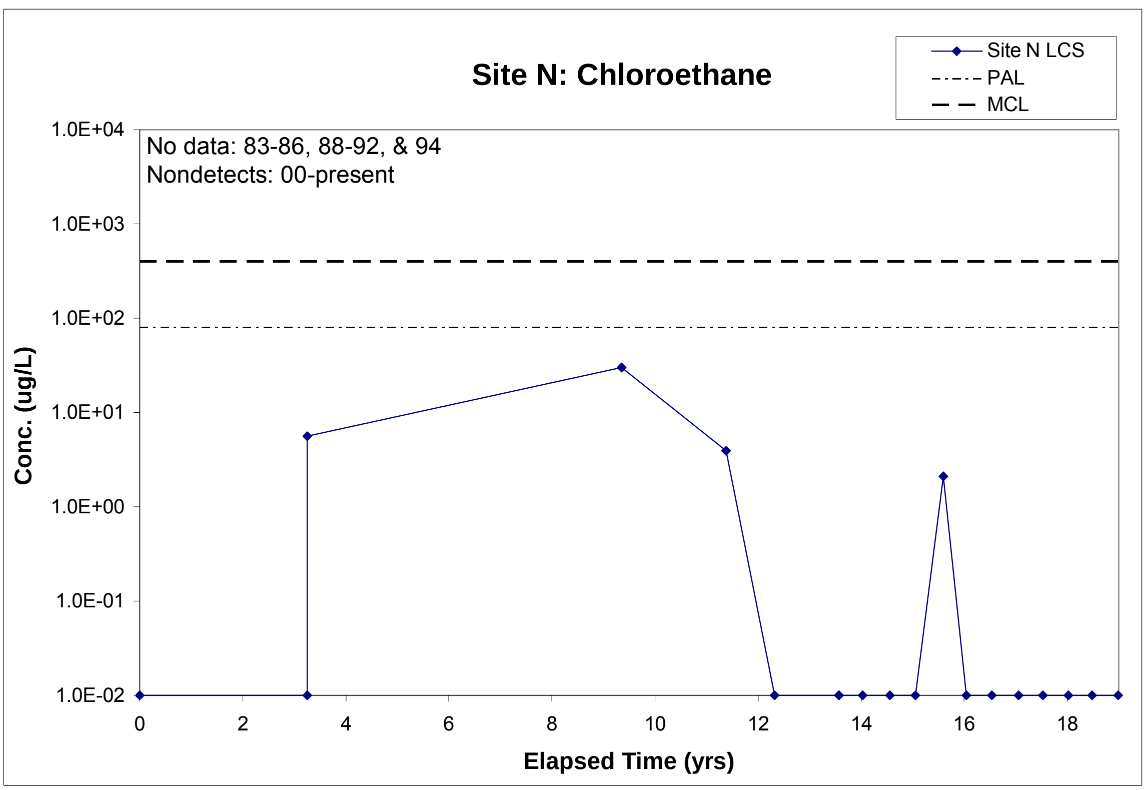

Site HH: Chloroethane
Site HH LCS
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

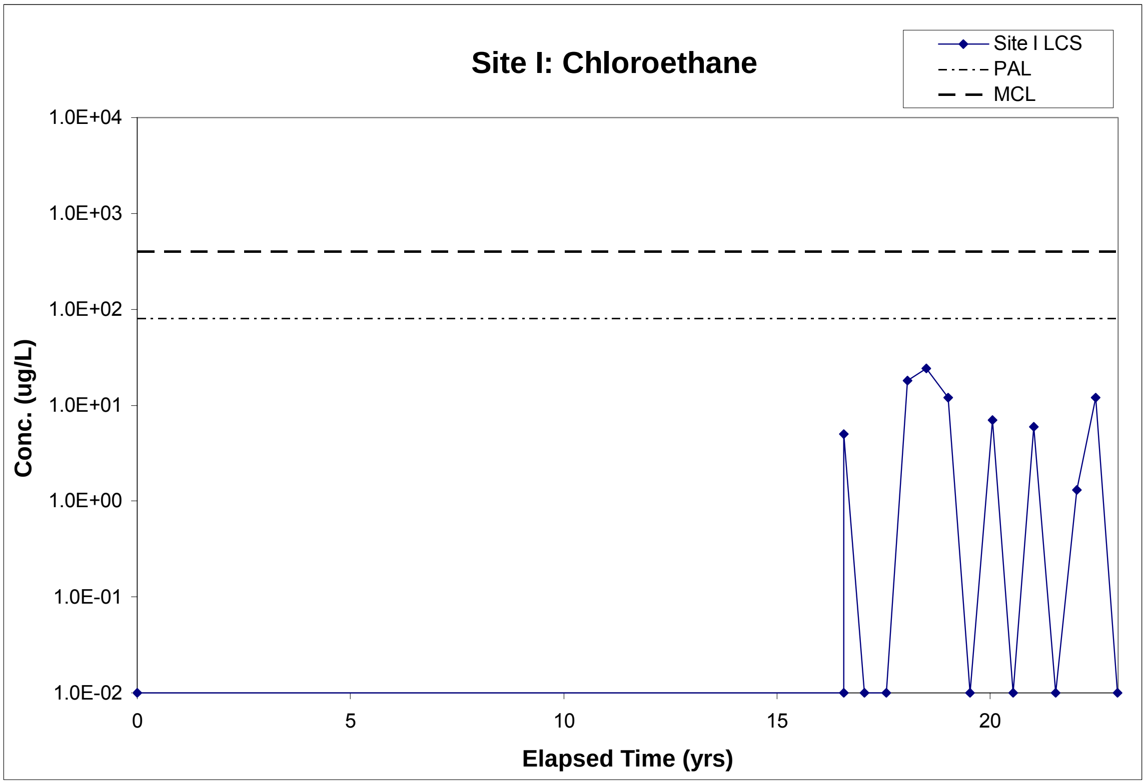

Site BB: Chloroethane
Site BB LCS
PAL
MCL
No data: 90-95
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

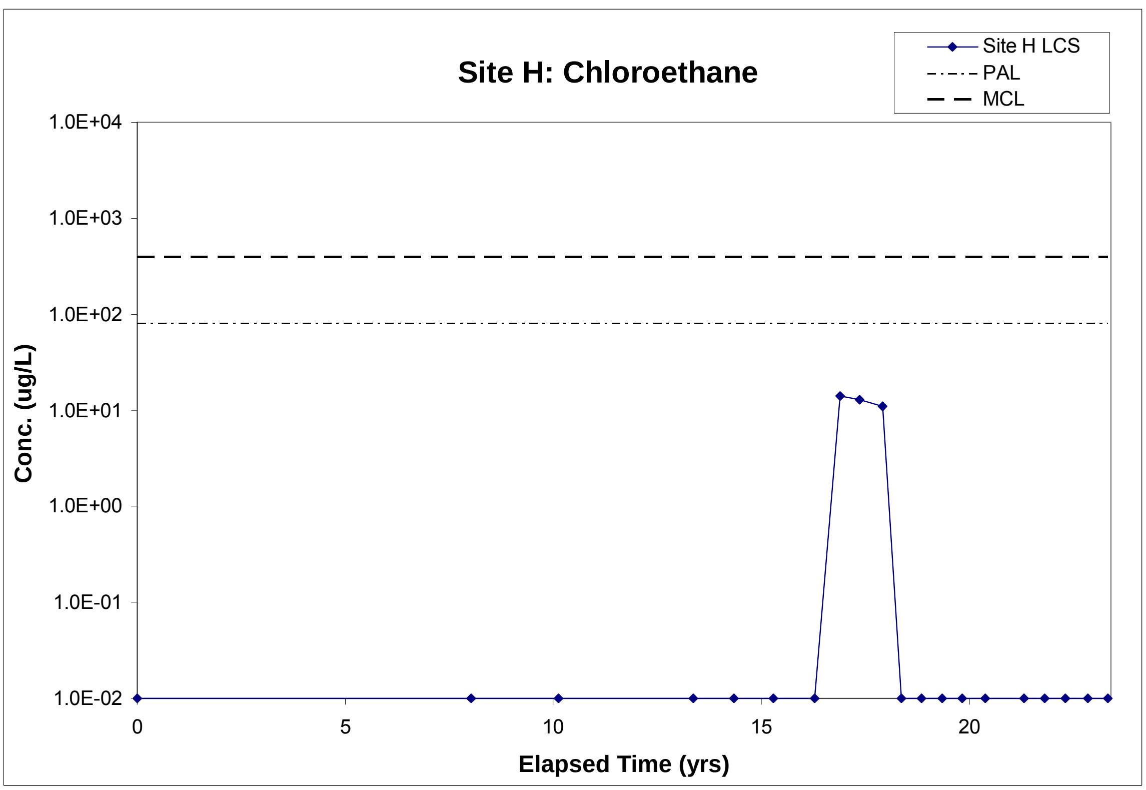

Site U: Chloroethane
Site U LCS
PAL
MCL
Nondetects: 94-97
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

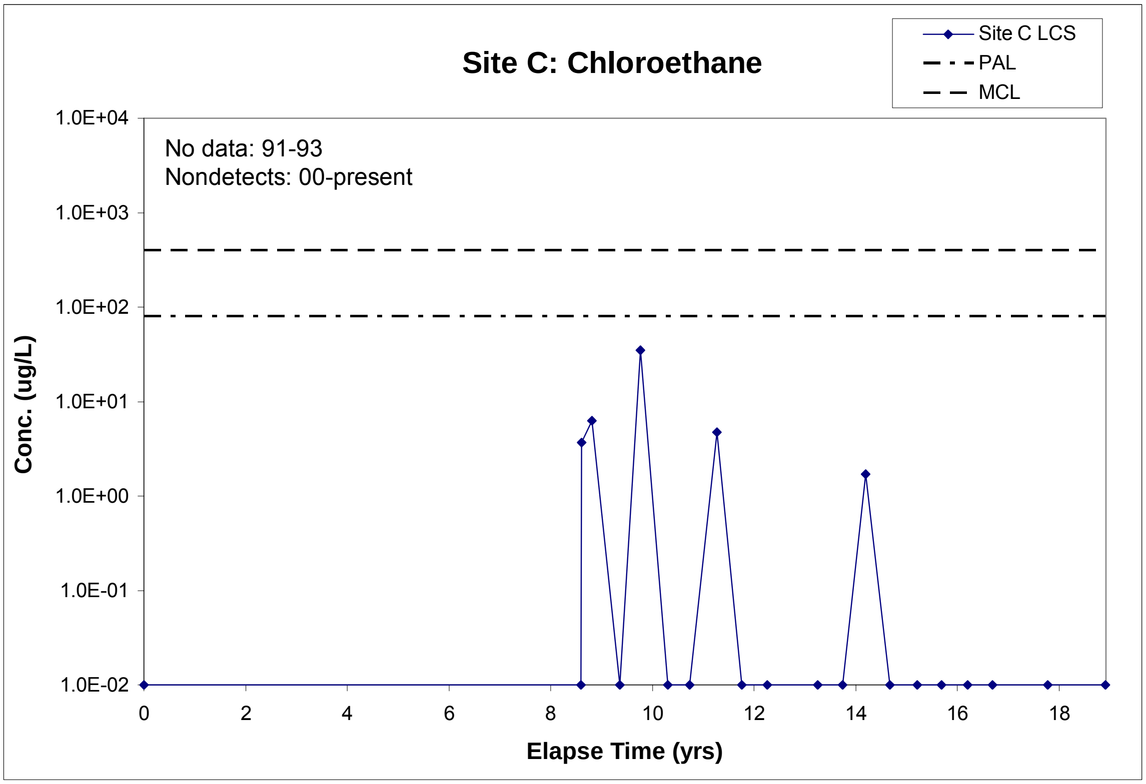

Site S: Chloroethane
Site S LCS 2
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

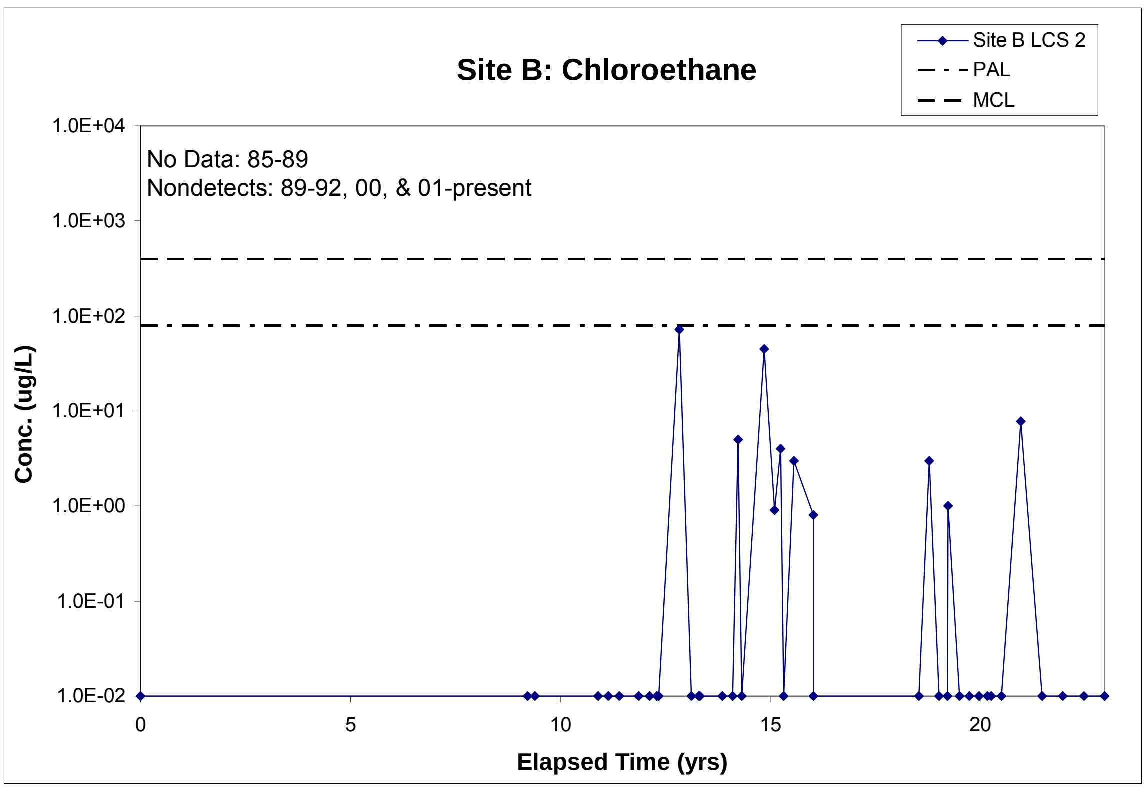

Site Q: Chloroethane
Site Q LCS 1
PAL
MCL
No data: 85-86 & 88-92
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

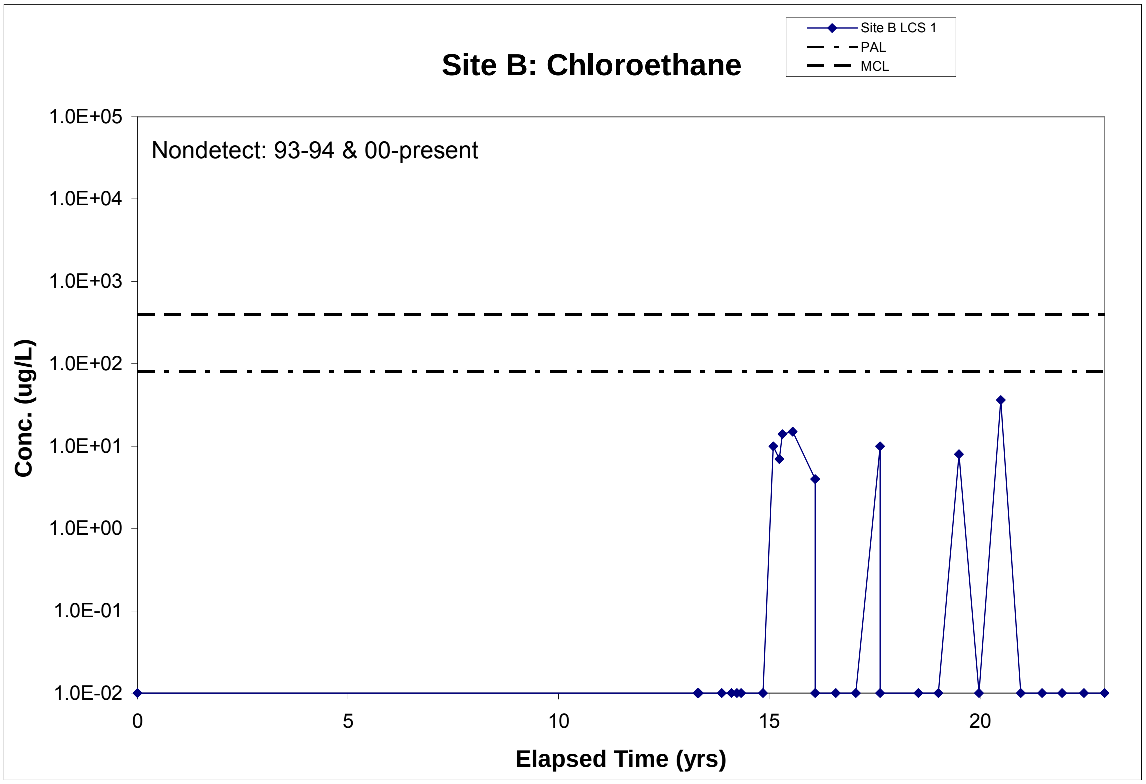

Site N: Chloroethane
Site N LCS
PAL
MCL
No data: 83-86, 88-92, & 94
Nondetects: 00-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

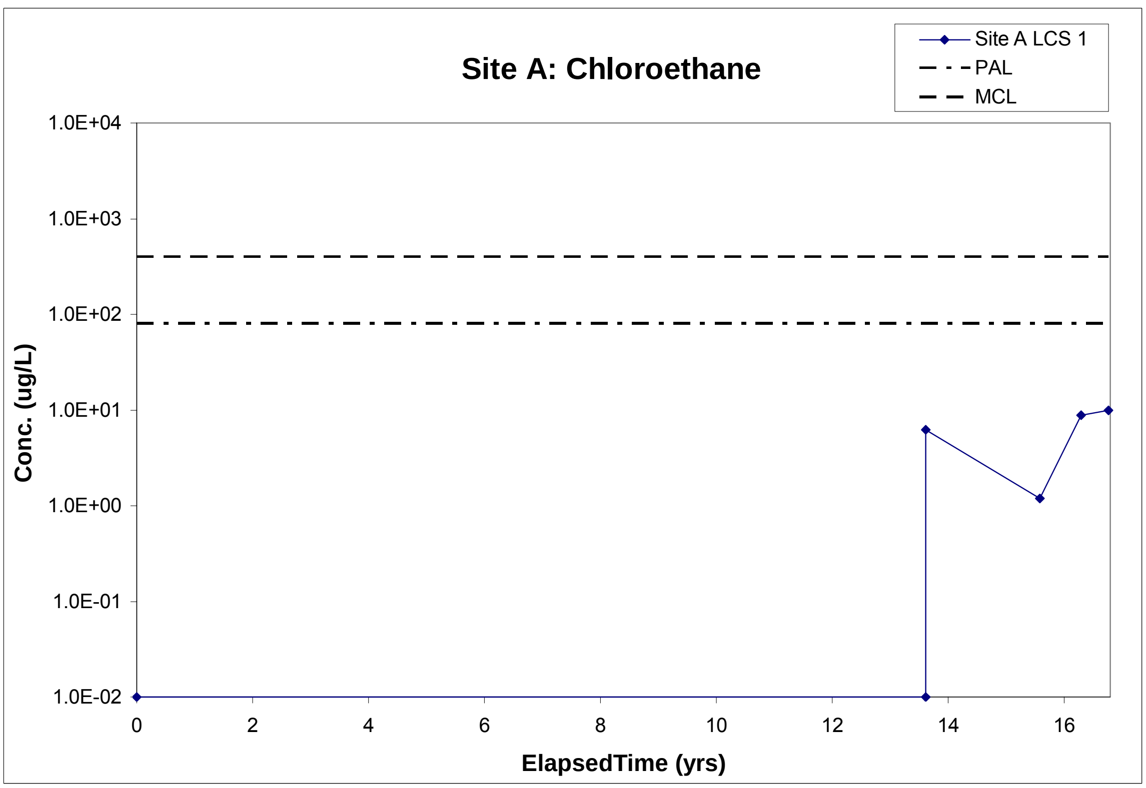

Site I: Chloroethane
Site I LCS
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

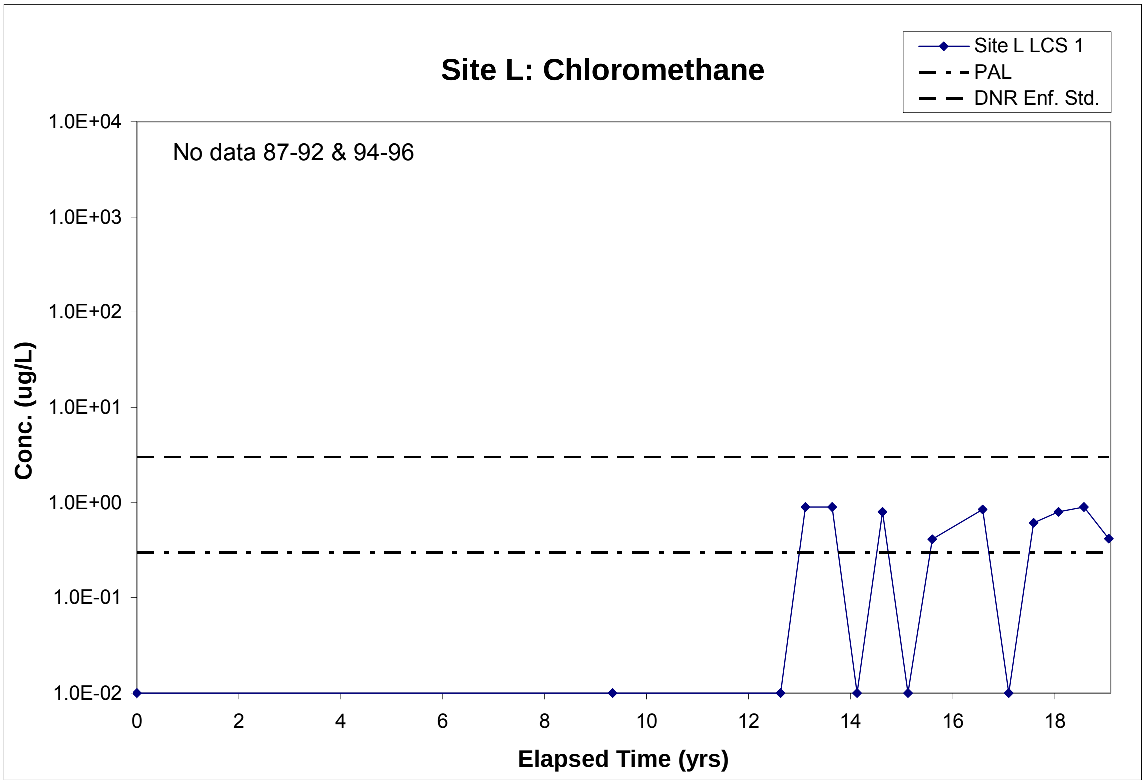

Site H: Chloroethane
Site H LCS
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

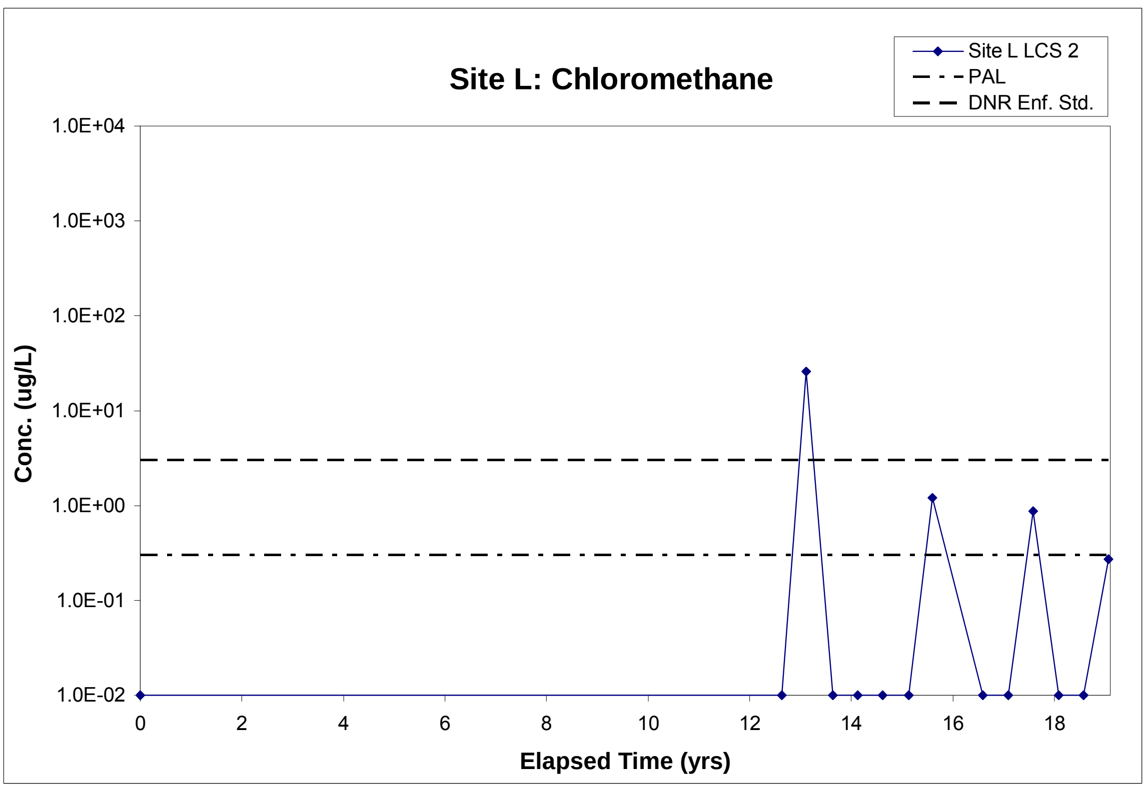

Site C: Chloroethane
Site C LCS
PAL
MCL
No data: 91-93
Nondetects: 00-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapse Time (yrs)

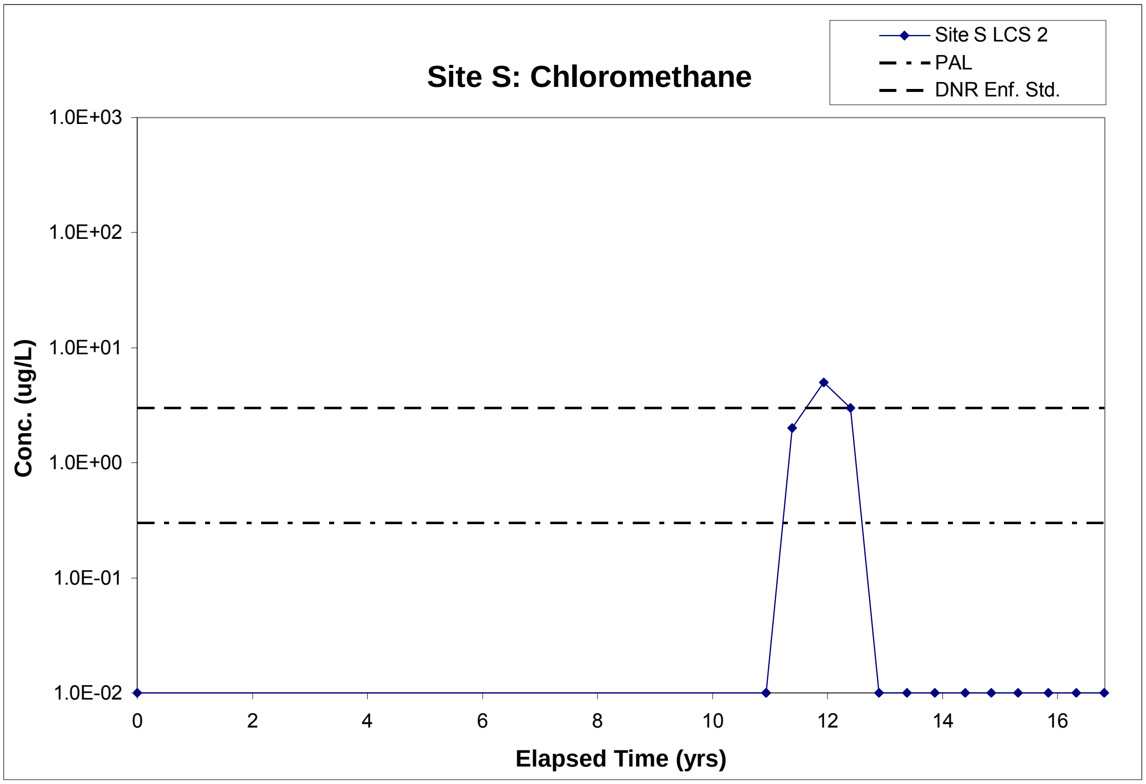

Site B: Chloroethane
Site B LCS 2
PAL
MCL
No Data: 85-89
Nondetects: 89-92, 00, & 01-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

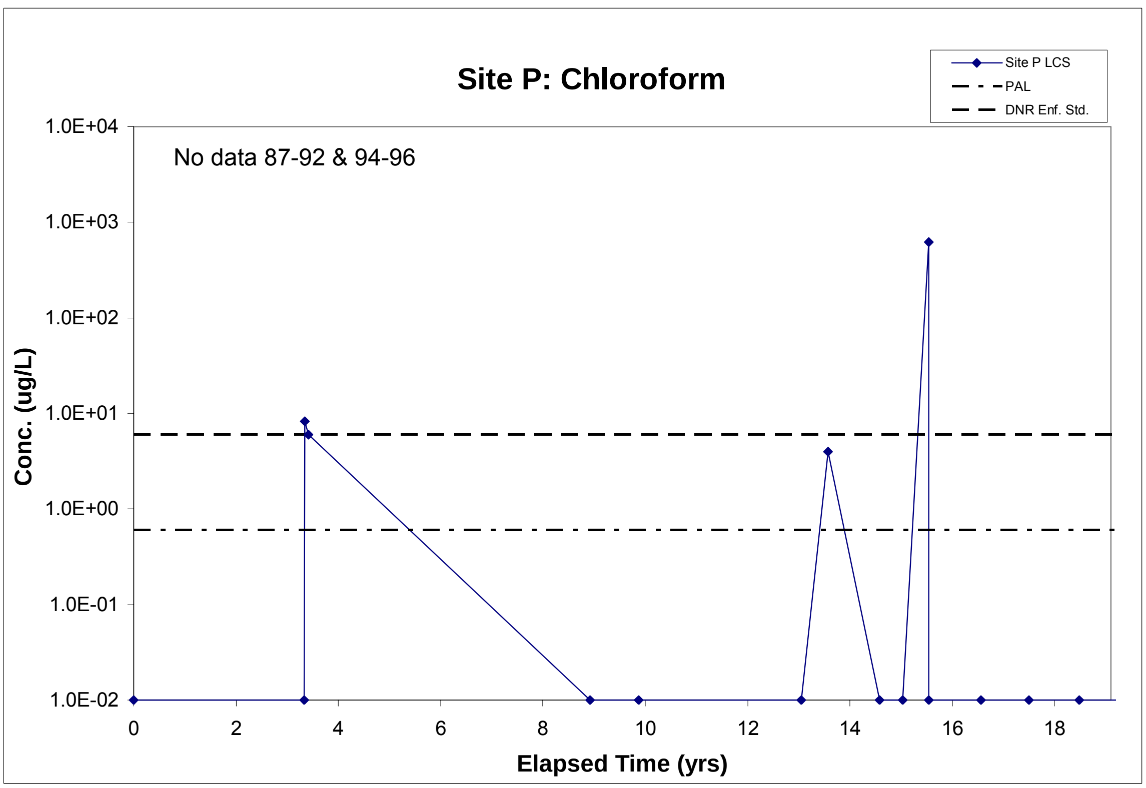

Site B: Chloroethane
Site B LCS 1
PAL
MCL
Nondetect: 93-94 & 00-present
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

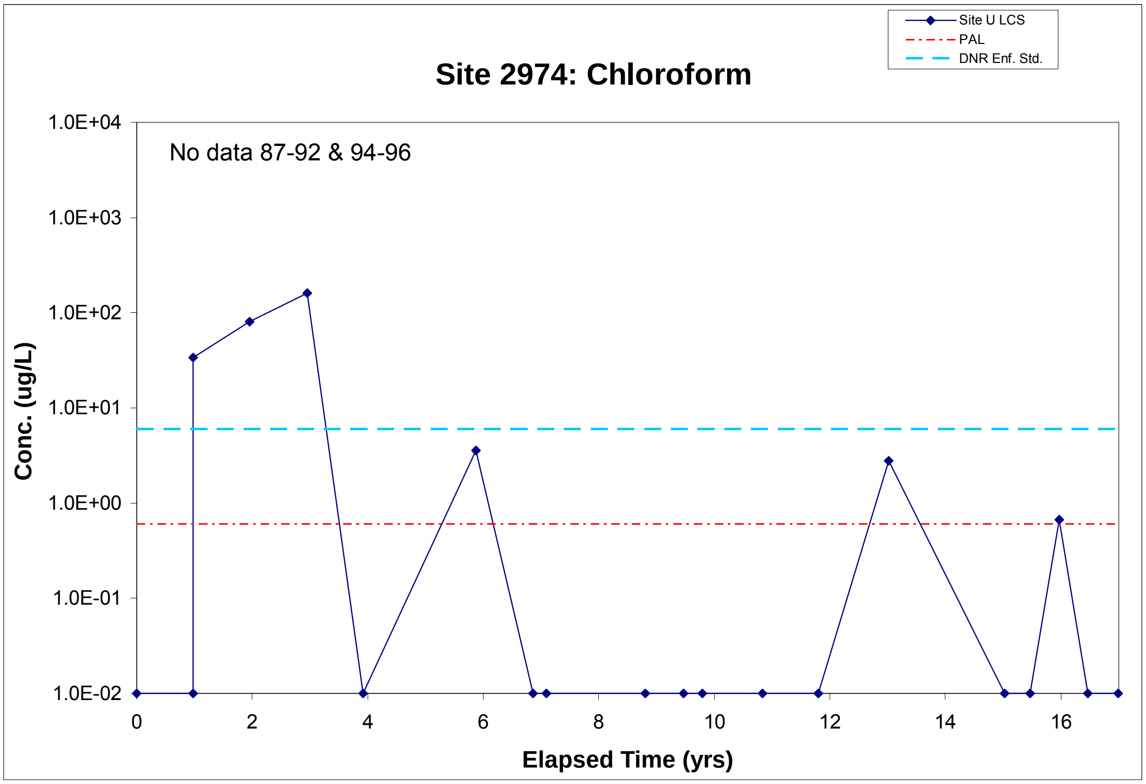

Site A: Chloroethane
Site A LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
ElapsedTime (yrs)


Site L: Chloromethane
Site L LCS 1
PAL
DNR Enf. Std.
No data 87-92 & 94-96
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

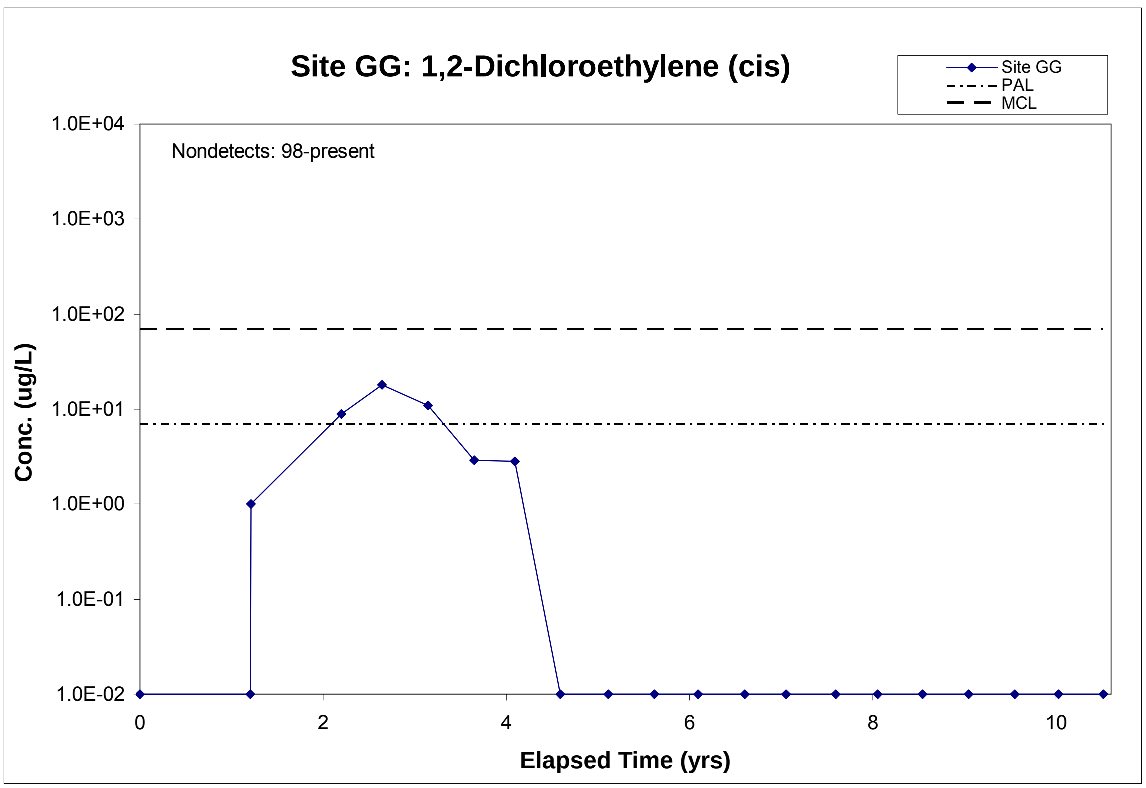

Site L: Chloromethane
Site L LCS 2
PAL
DNR Enf. Std.
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)


Site S: Chloromethane
Site S LCS 2
PAL
DNR Enf. Std.
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

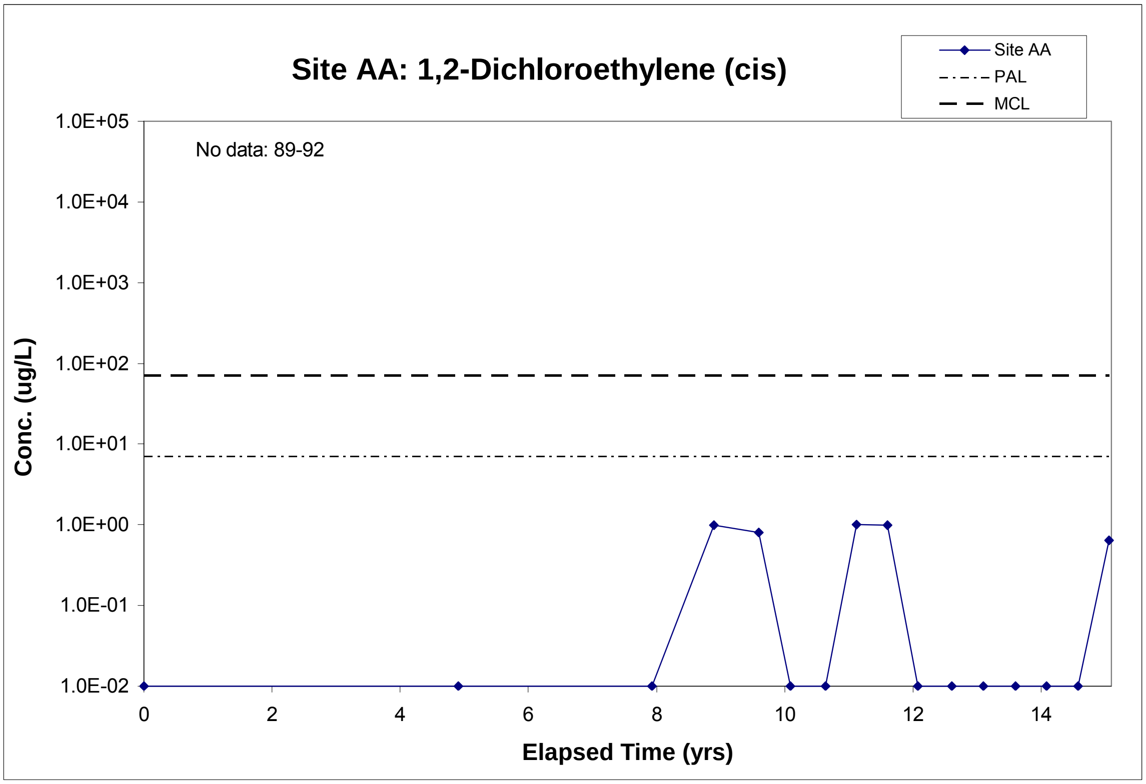

Site P: Chloroform
Site P LCS
PAL
DNR Enf. Std.
No data 87-92 & 94-96
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

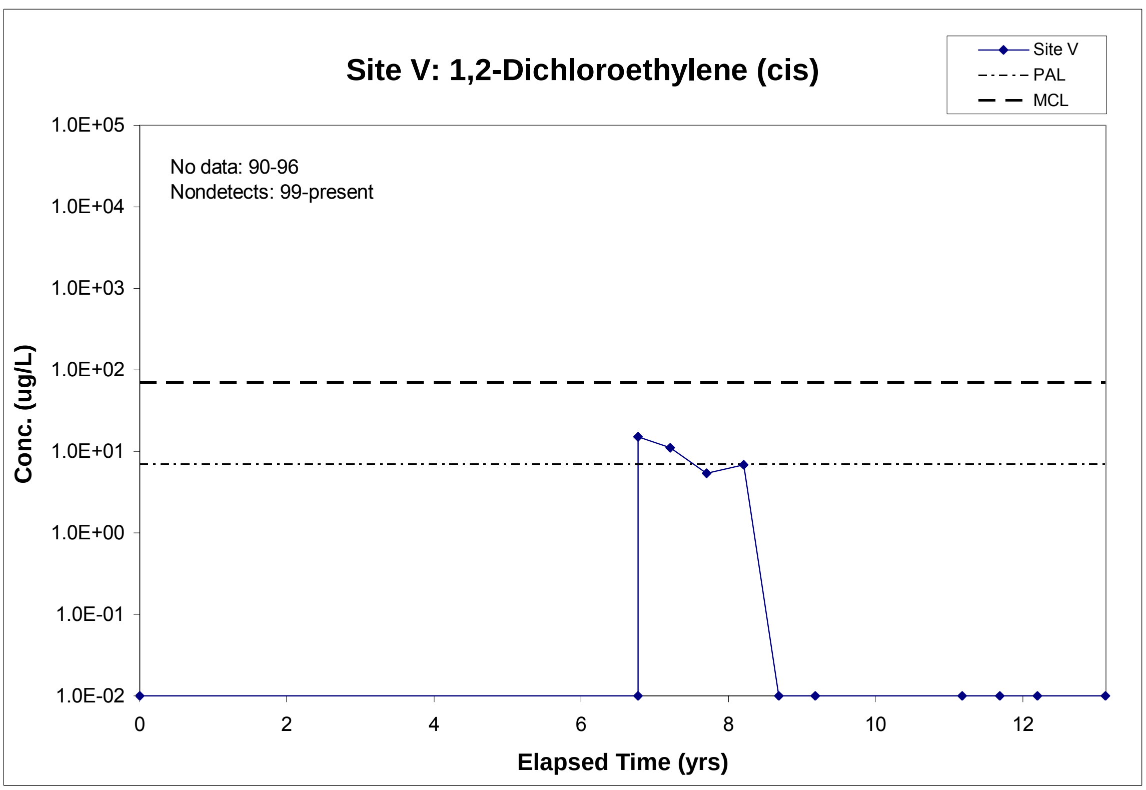


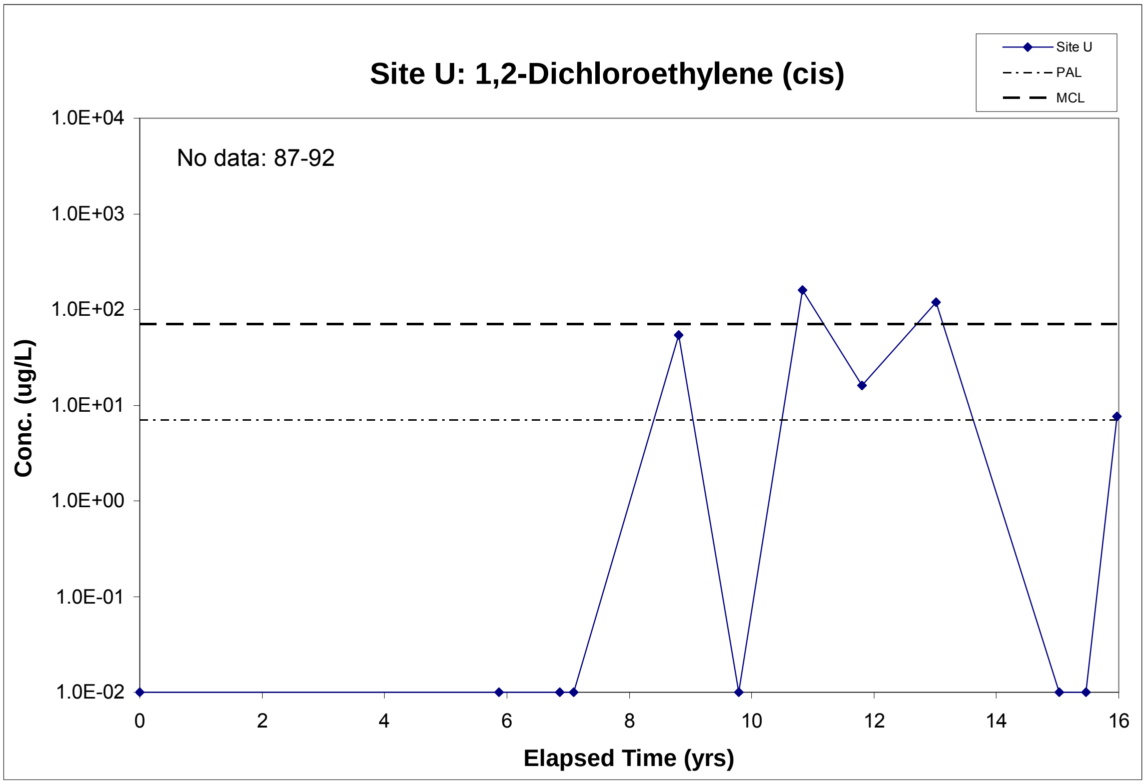
Site 2974: Chloroform
Site U LCS
PAL
DNR Enf. Std.
No data 87-92 & 94-96
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

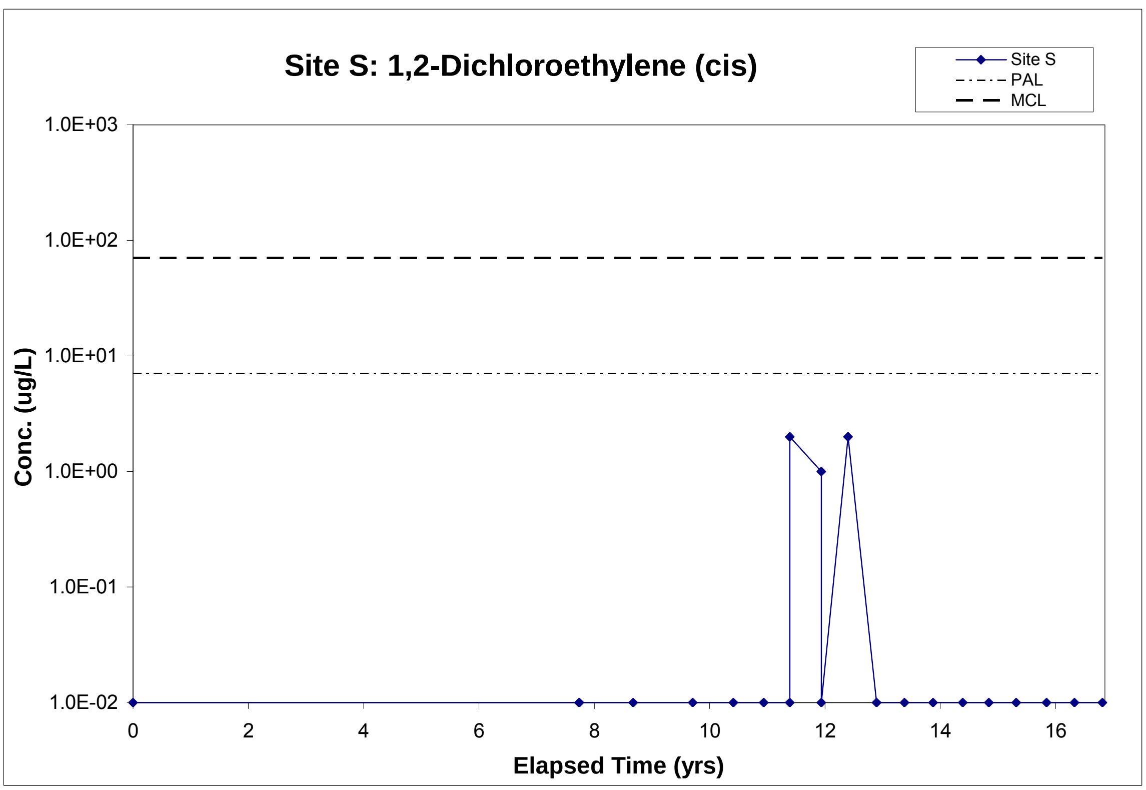


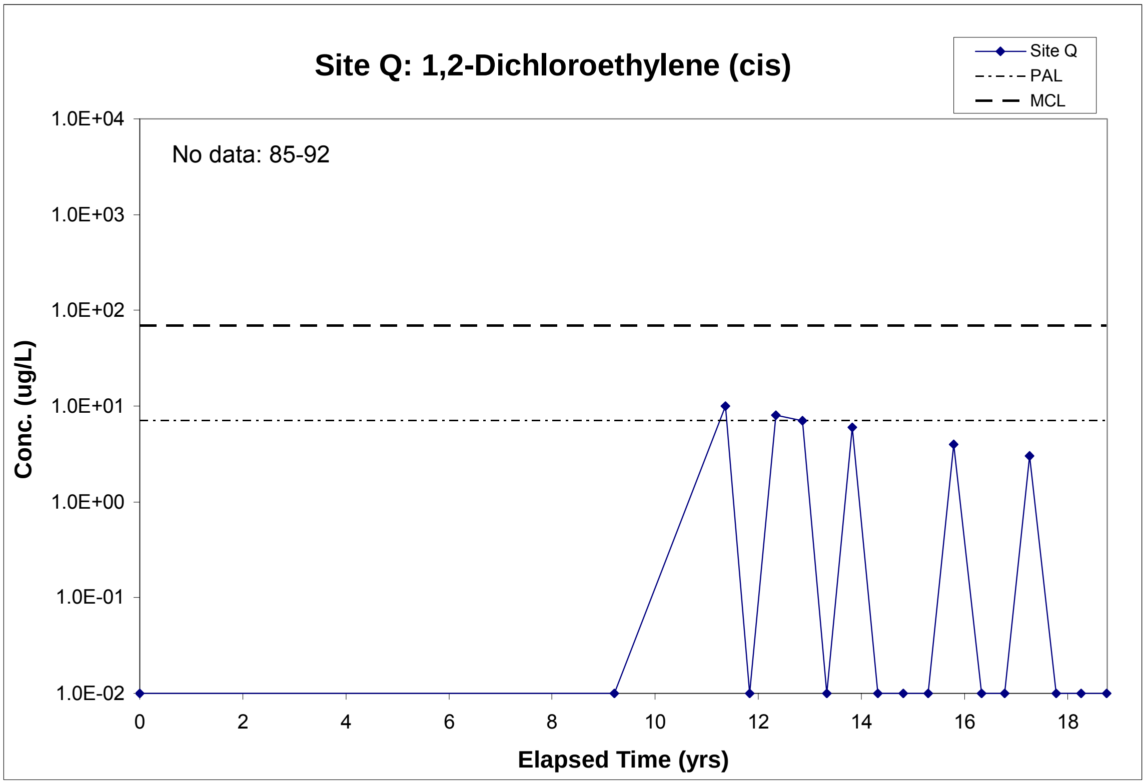
Site GG: 1,2-Dichloroethylene (cis)
Site GG
PAL
MCL
Nondetects: 98-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

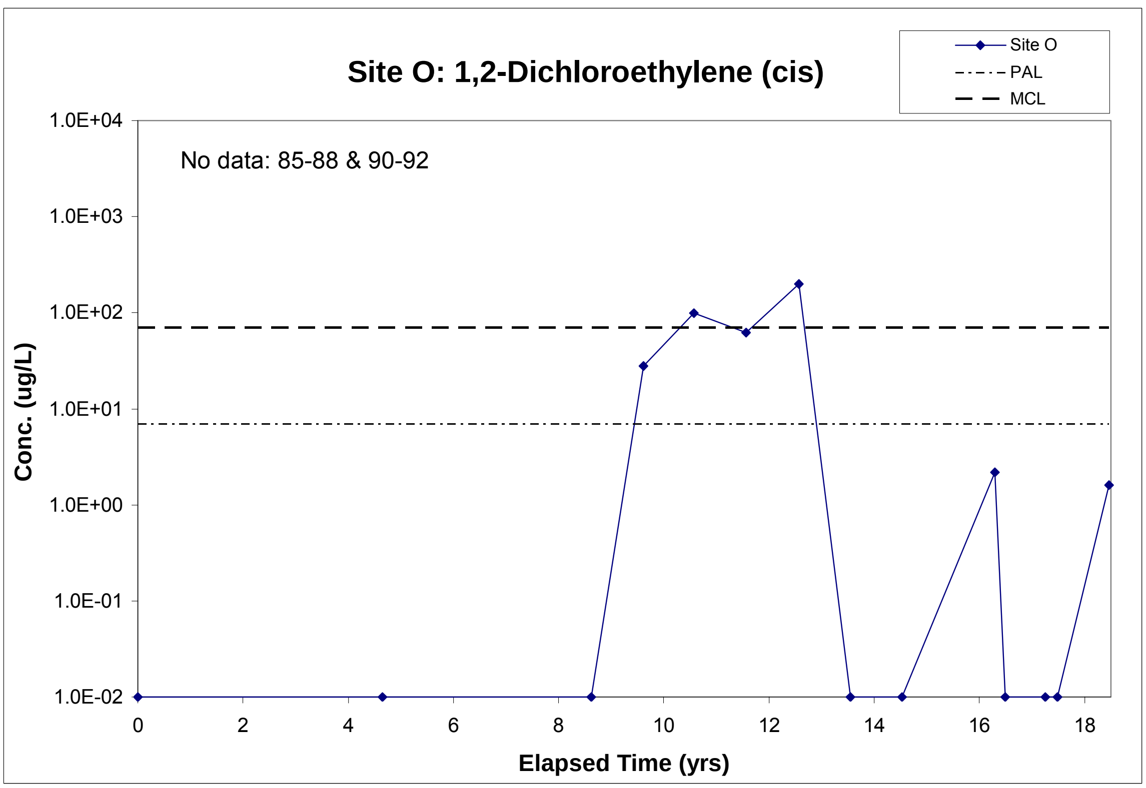

Site AA: 1,2-Dichloroethylene (cis)
Site AA
PAL
MCL
No data: 89-92
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

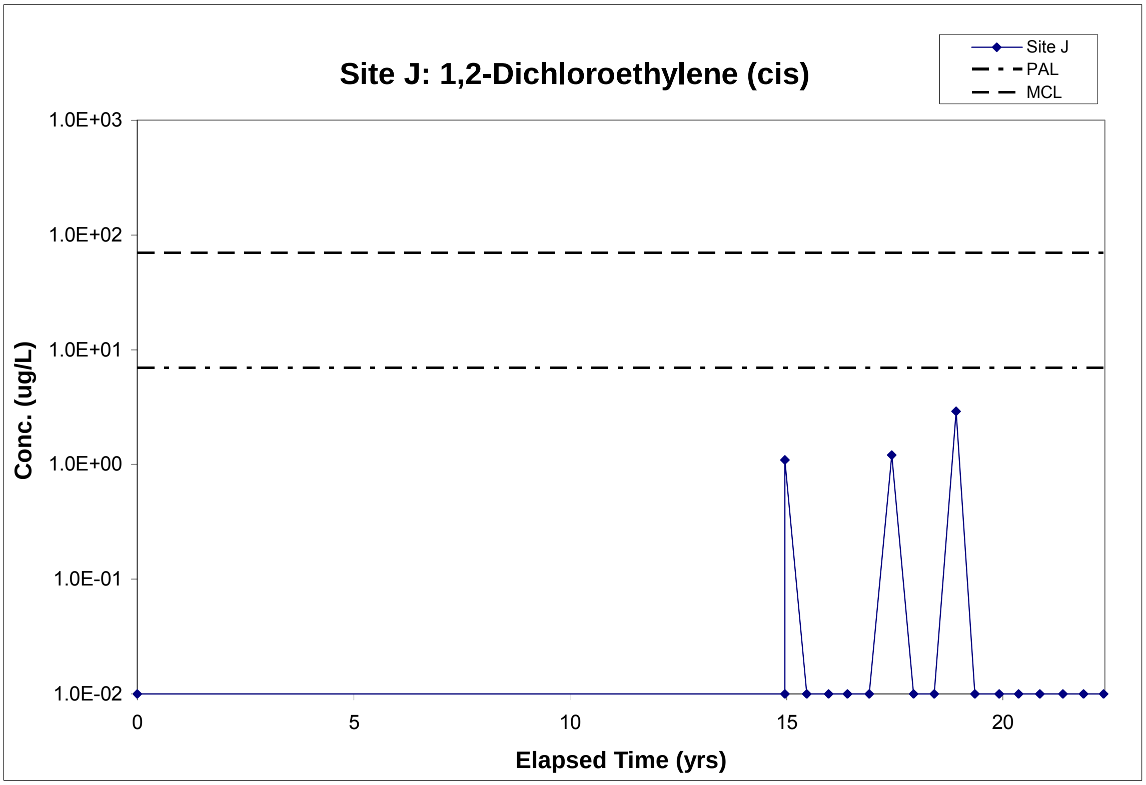

Site V: 1,2-Dichloroethylene (cis)
Site V
PAL
MCL
No data: 90-96
Nondetects: 99-present
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

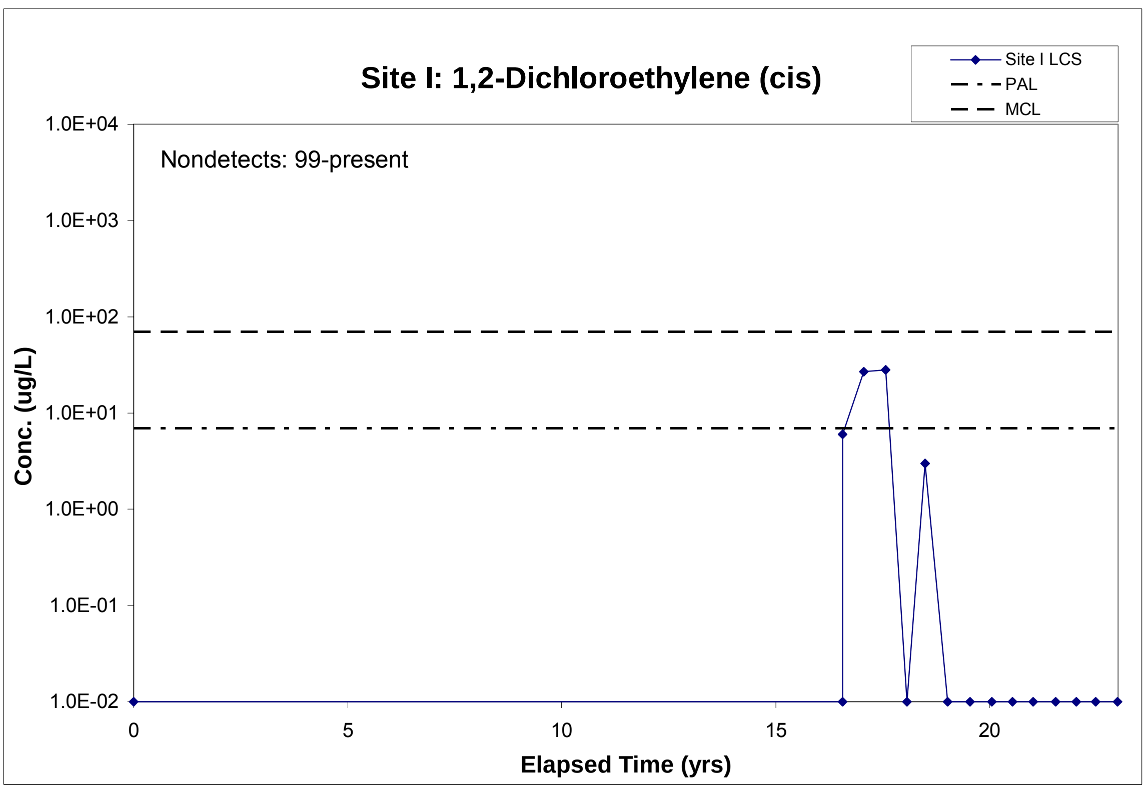

Site U: 1,2-Dichloroethylene (cis)
Site U
PAL
MCL
No data: 87-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

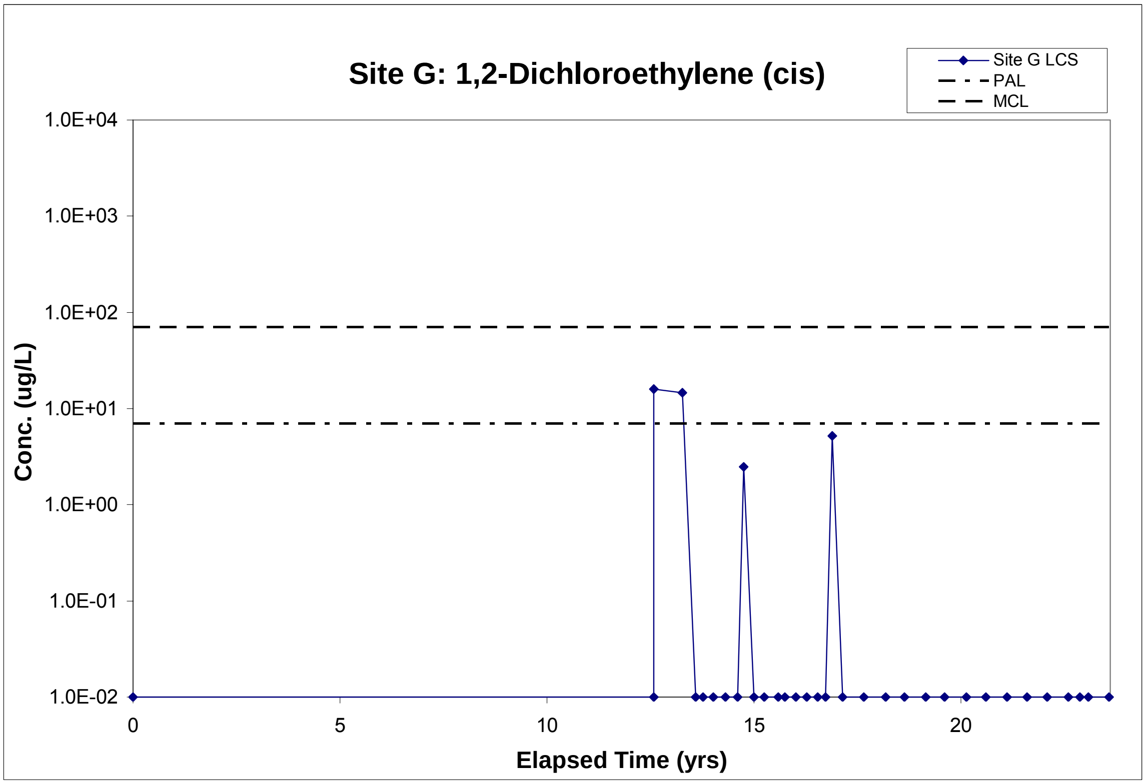

Site S: 1,2-Dichloroethylene (cis)
Site S
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

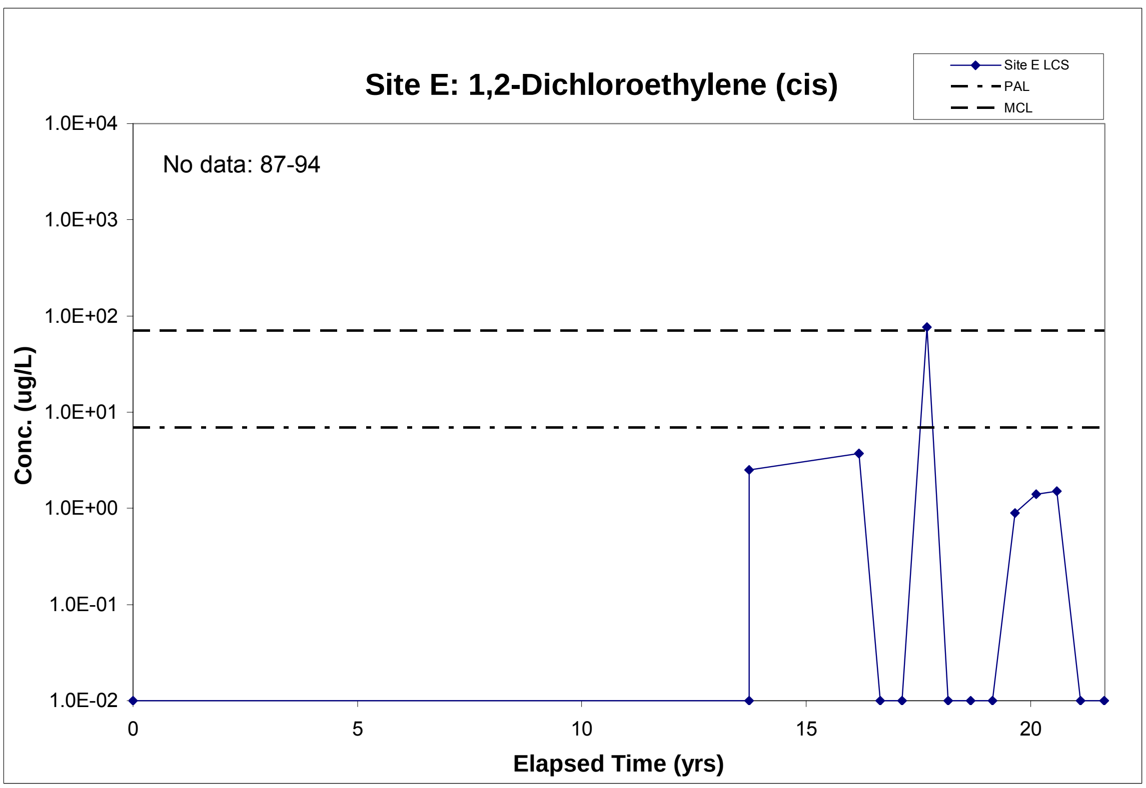

Site Q: 1,2-Dichloroethylene (cis)
Site Q
PAL
MCL
No data: 85-92
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

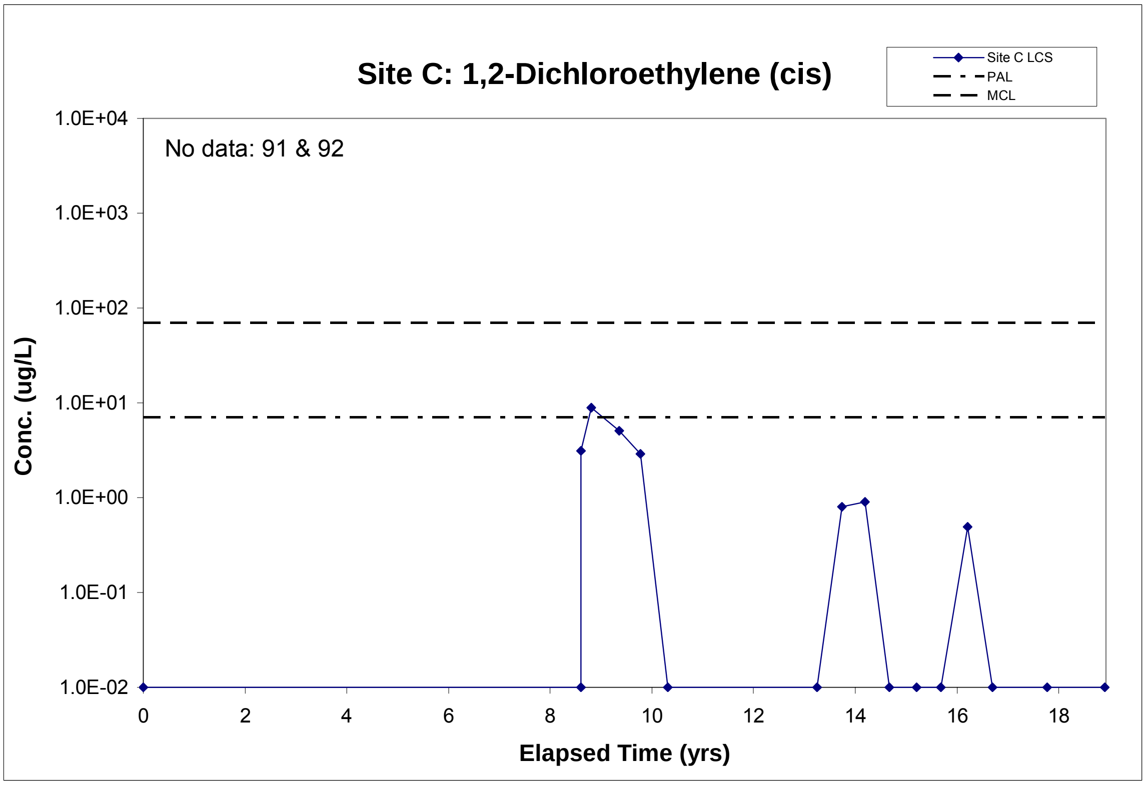

Site O: 1,2-Dichloroethylene (cis)
Site O
PAL
MCL
No data: 85-88 & 90-92
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

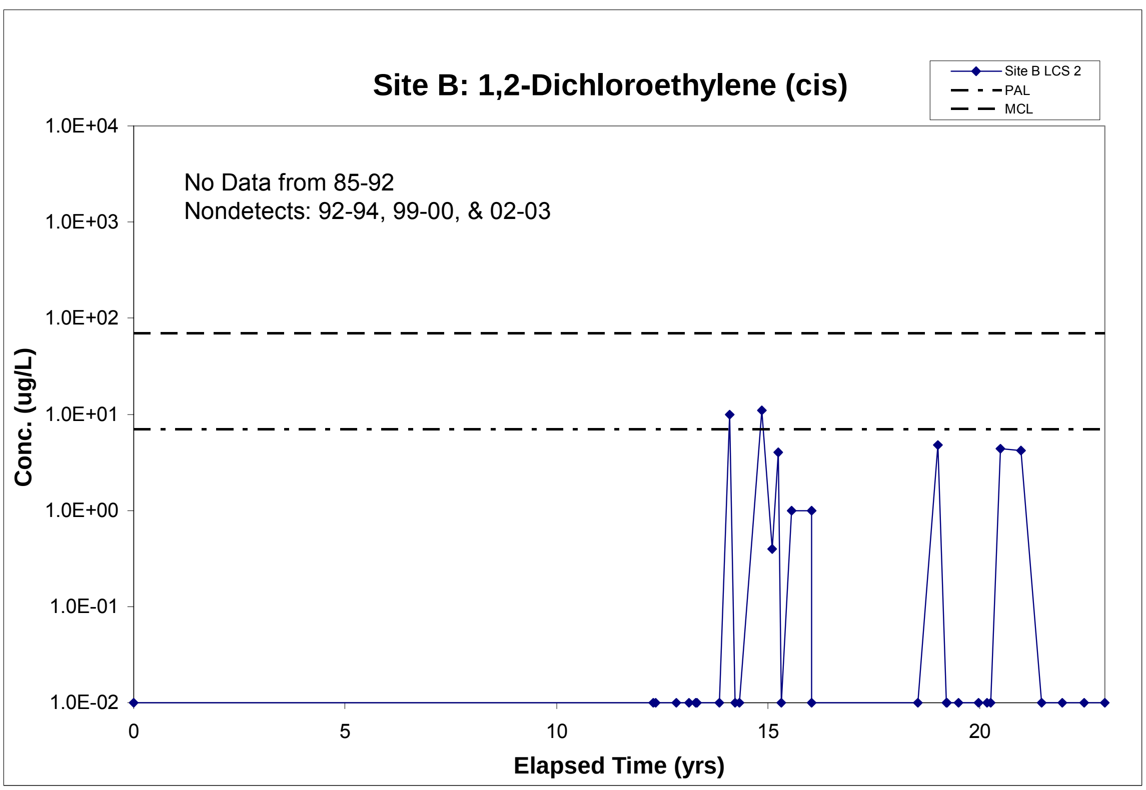

Site J: 1,2-Dichloroethylene (cis)
Site J
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

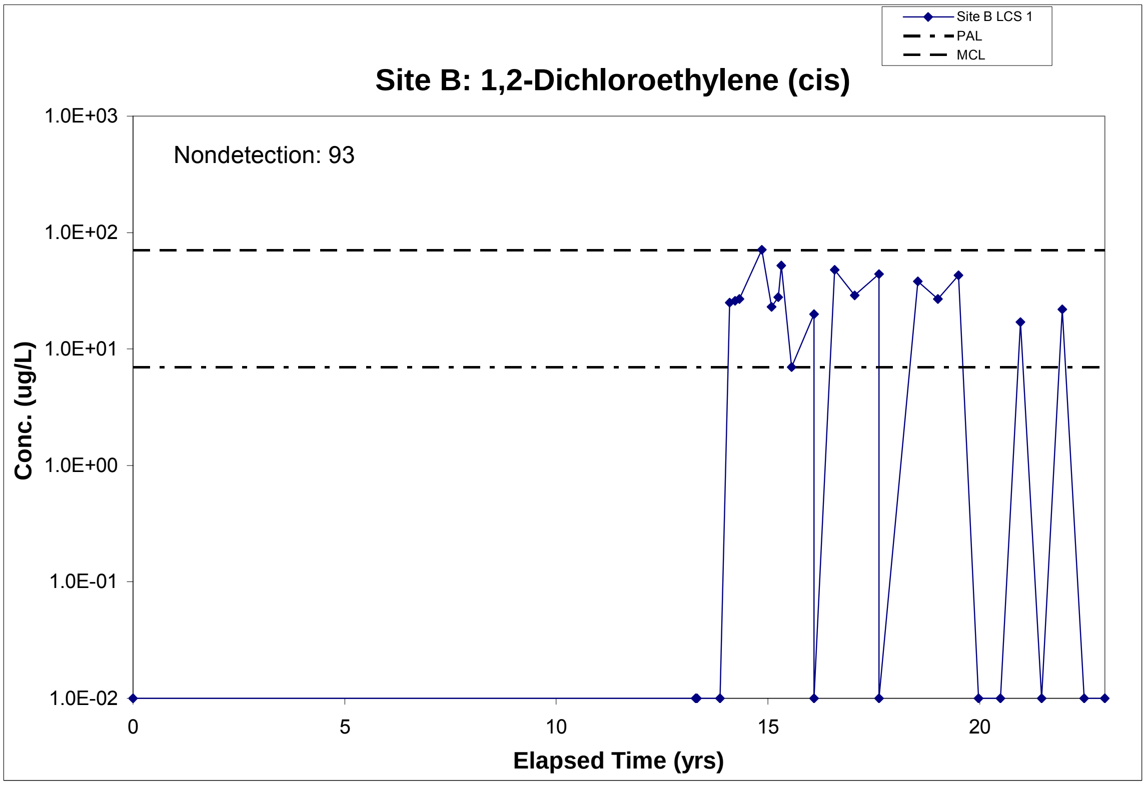

Site I: 1,2-Dichloroethylene (cis)
Site I LCS
PAL
MCL
Nondetects: 99-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

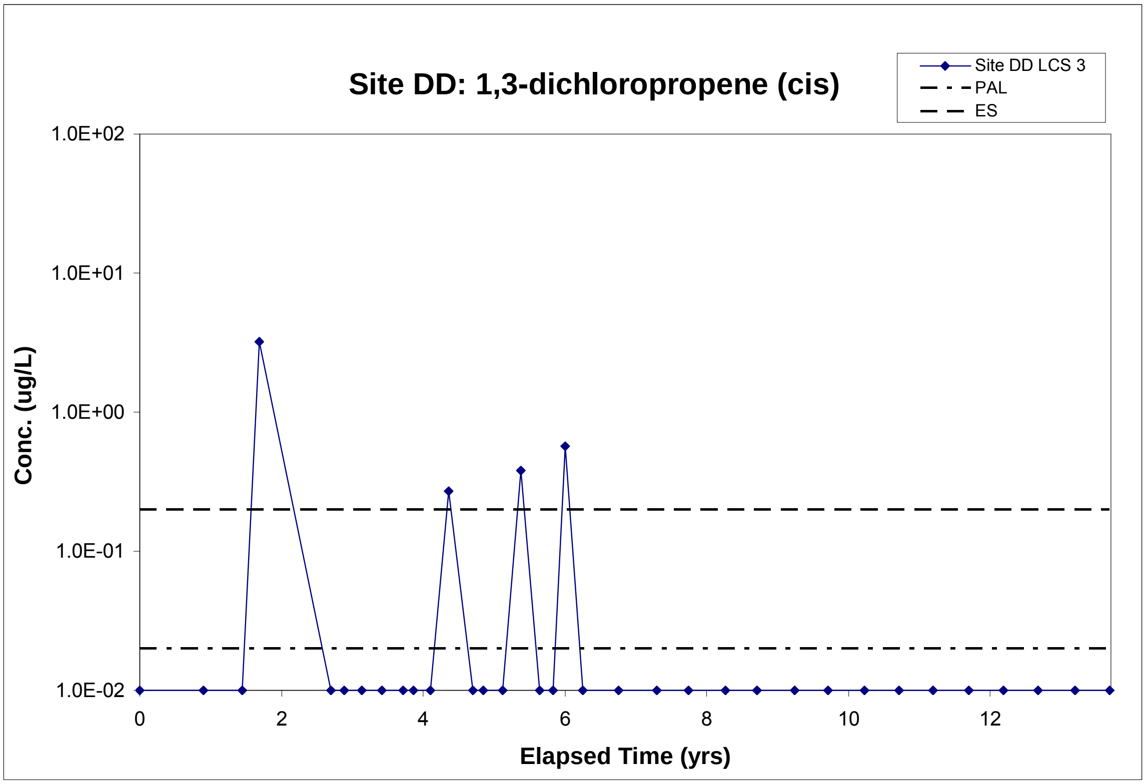

Site G: 1,2-Dichloroethylene (cis)
Site G LCS
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

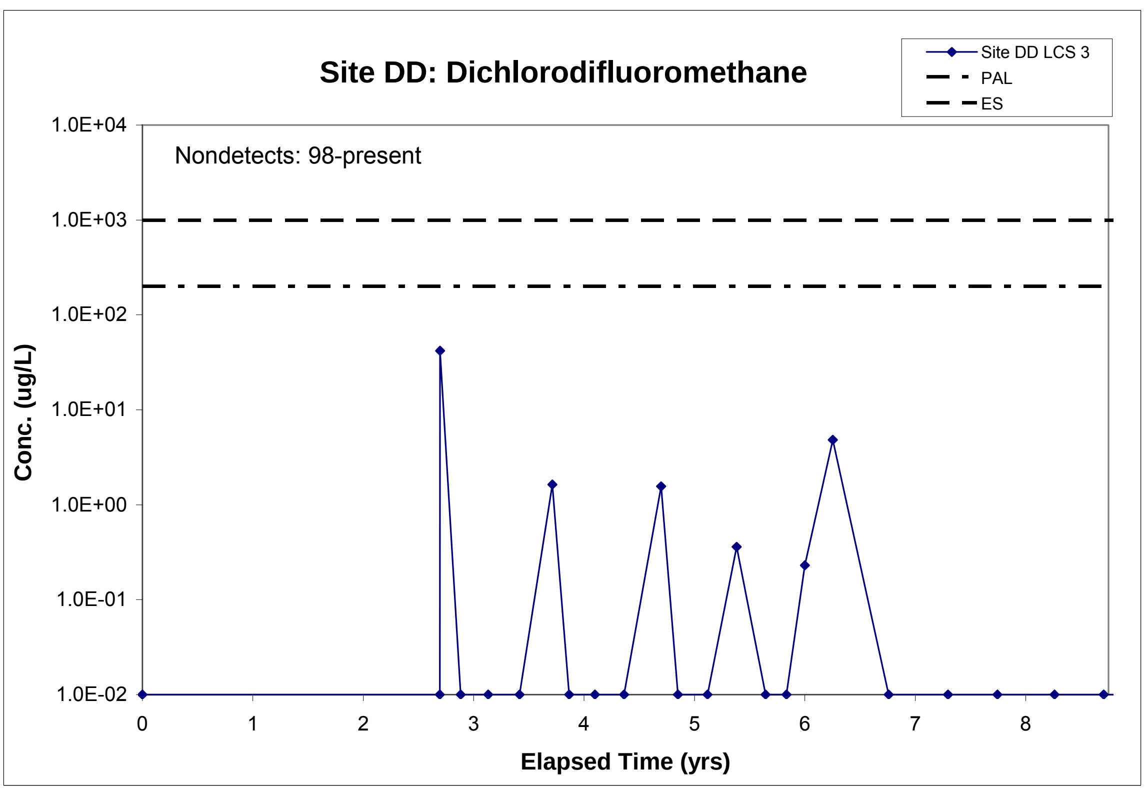

Site E: 1,2-Dichloroethylene (cis)
Site E LCS
PAL
MCL
No data: 87-94
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

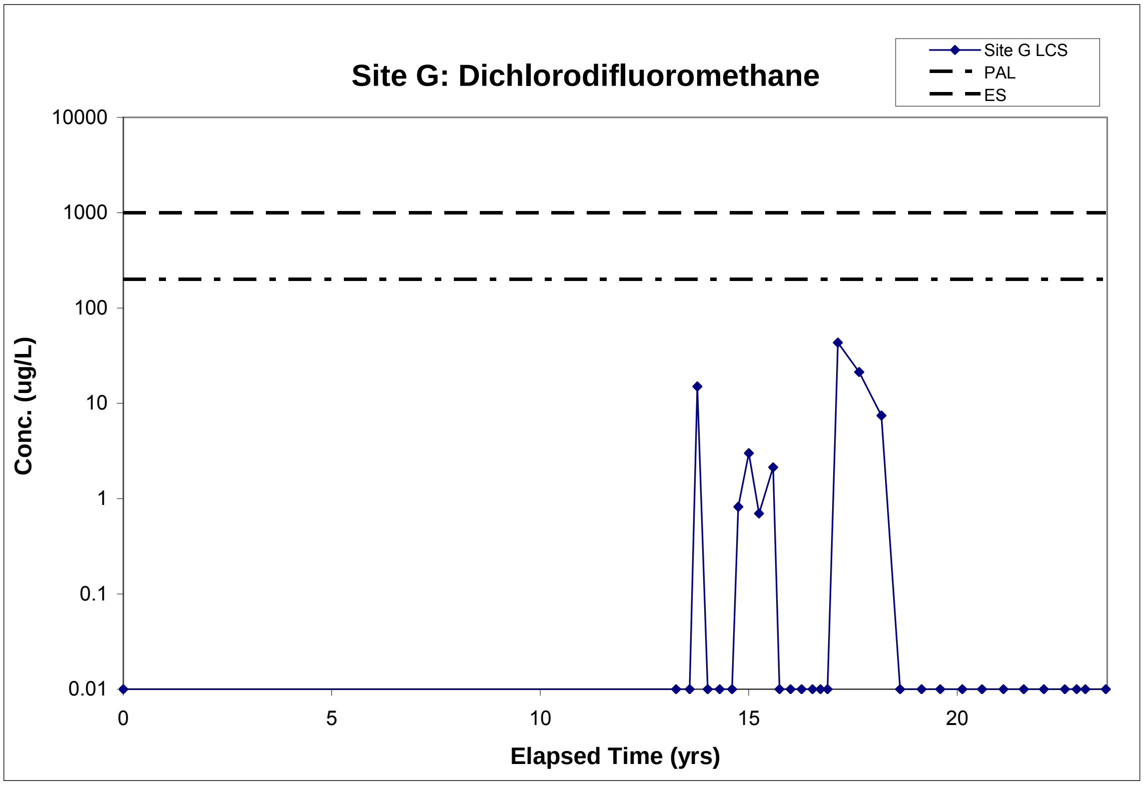

Site C: 1,2-Dichloroethylene (cis)
Site C LCS
PAL
MCL
No data: 91 & 92
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)


Site B: 1,2-Dichloroethylene (cis)
Site B LCS 2
PAL
MCL
No Data from 85-92
Nondetects: 92-94, 99-00, & 02-03
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

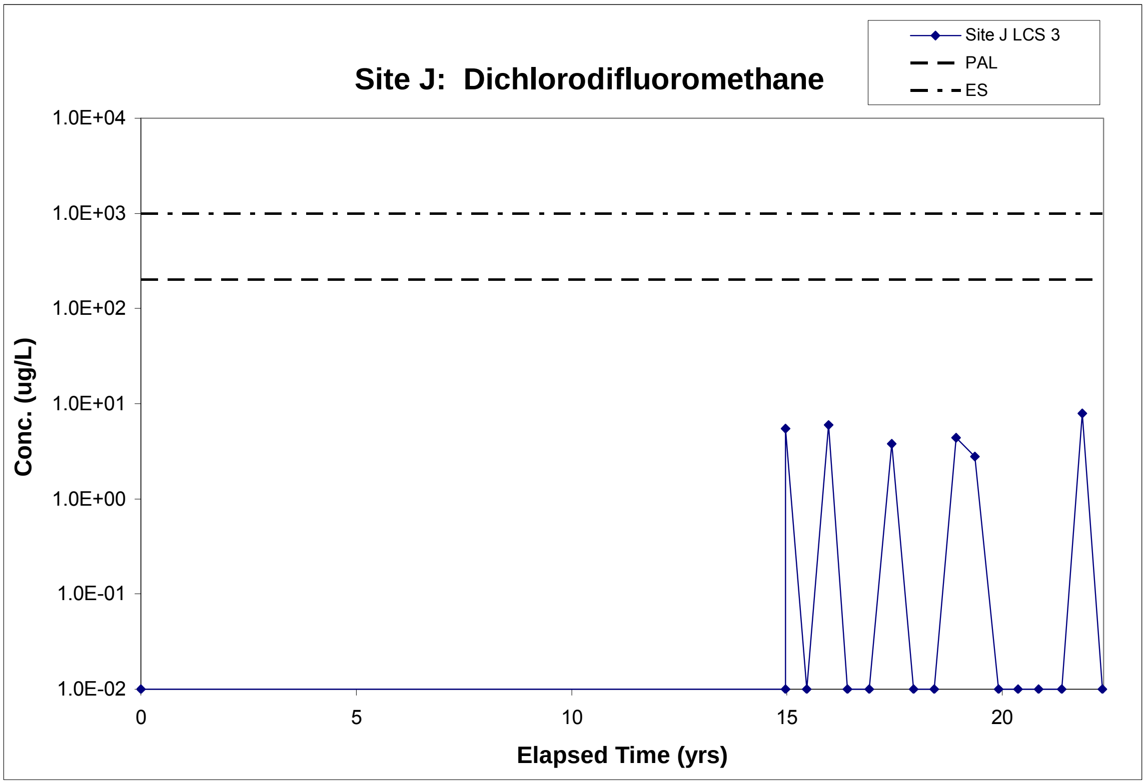

Site B LCS 1
PAL
MCL
Site B: 1,2-Dichloroethylene (cis)
Nondetection: 93
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

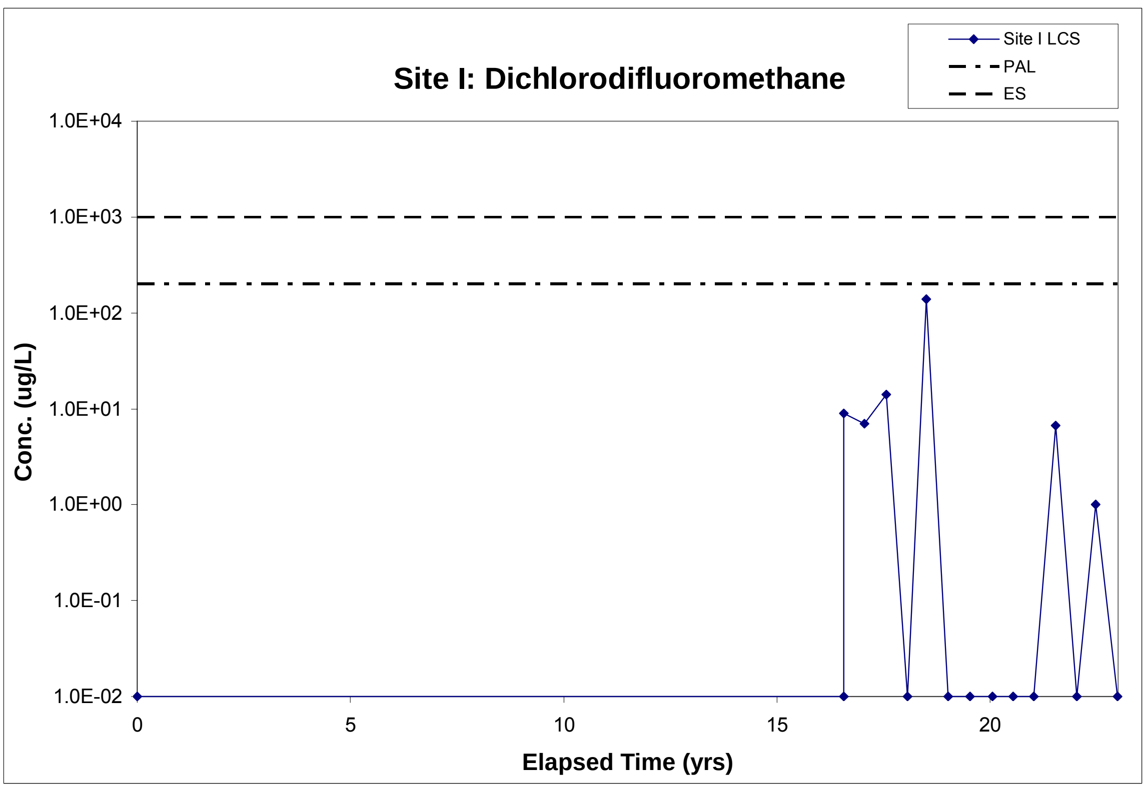

Site DD: 1,3-dichloropropene (cis)
Site DD LCS 3
PAL
ES
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

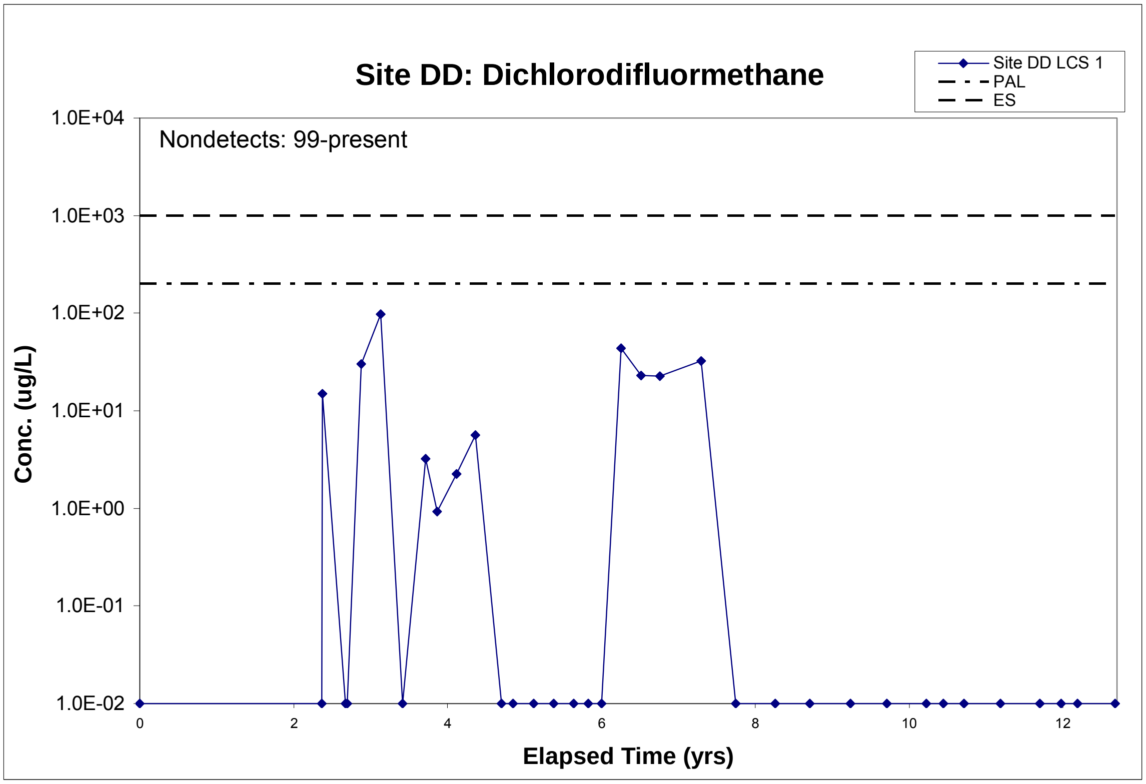

Site DD: Dichlorodifluoromethane
Site DD LCS 3
PAL
ES
Nondetects: 98-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)



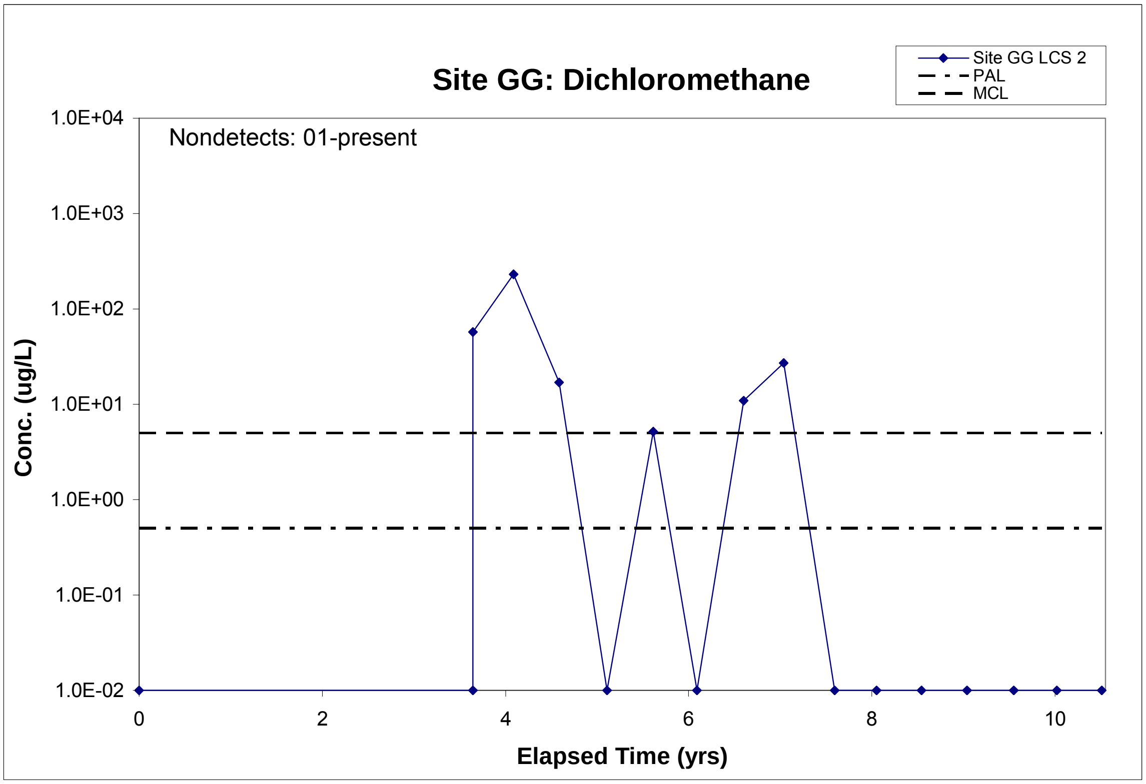
Site G: Dichlorodifluoromethane
Site G LCS
PAL
ES
Conc. (ug/L)
10000
1000
100
10
1
0.1
0.01
0
5
10
15
20
Elapsed Time (yrs)

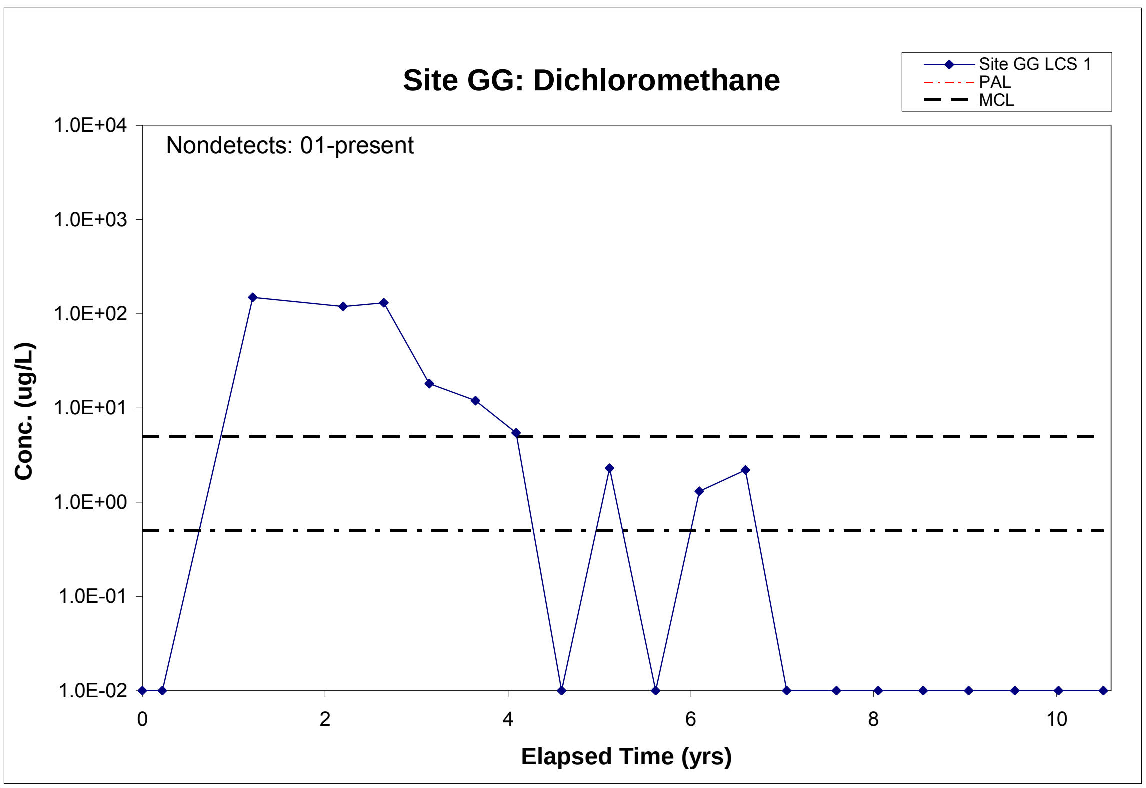

Site J: Dichlorodifluoromethane
Site J LCS 3
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

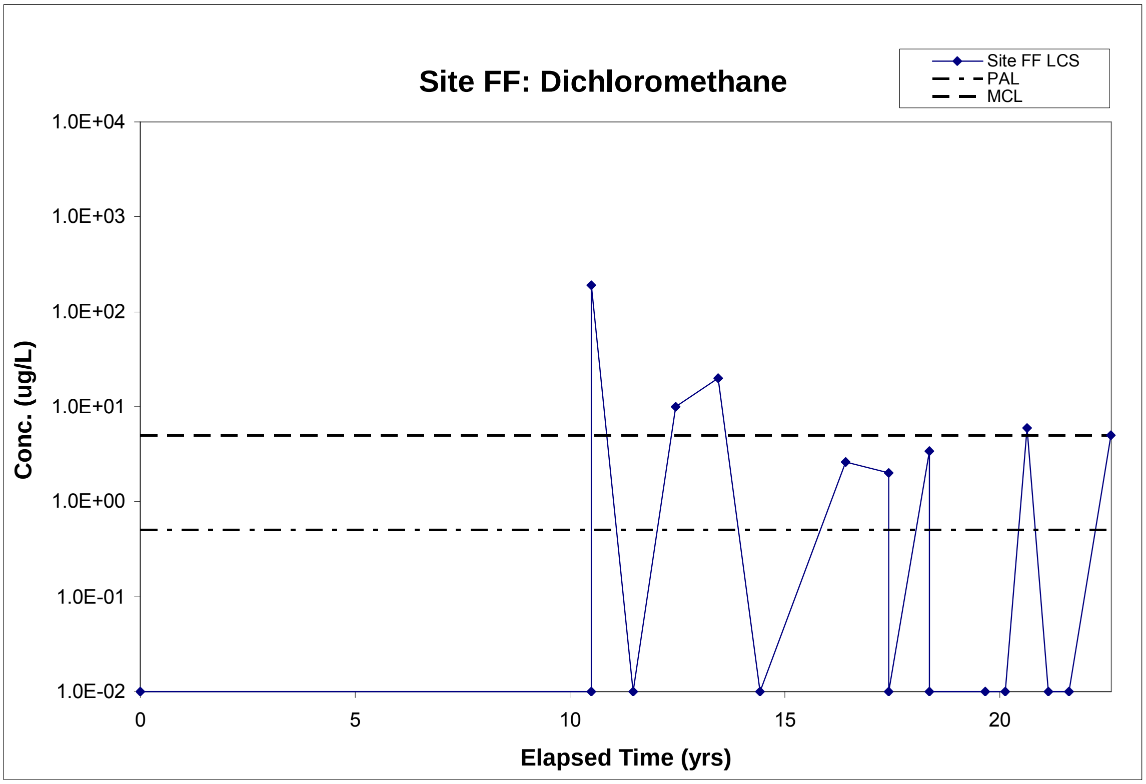

Site I: Dichlorodifluoromethane
Site I LCS
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

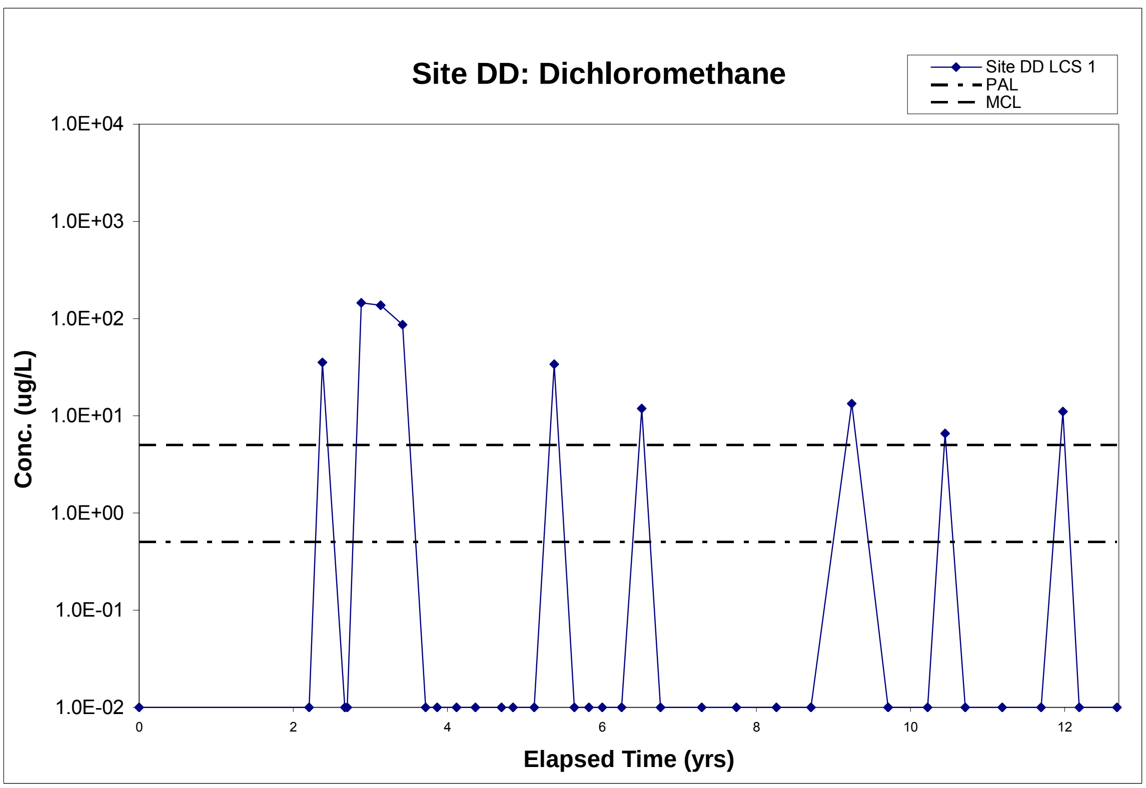


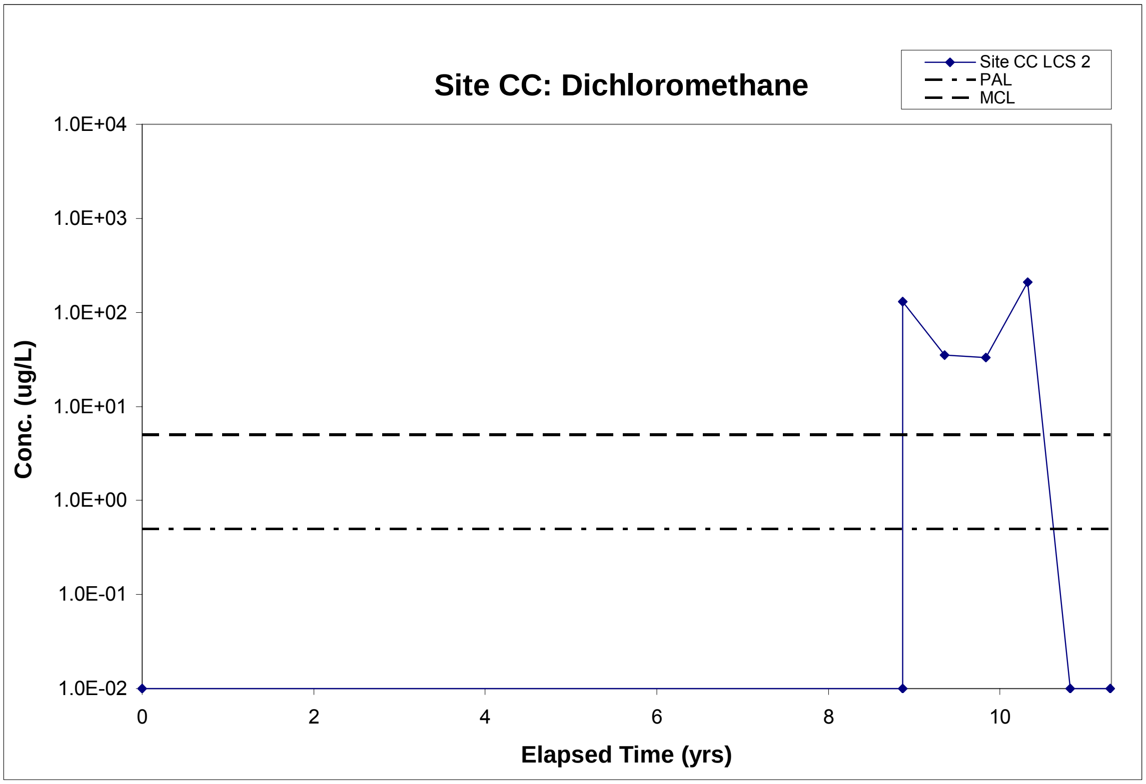
Site DD: Dichlorodifluormethane
Site DD LCS 1
PAL
ES
Nondetects: 99-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

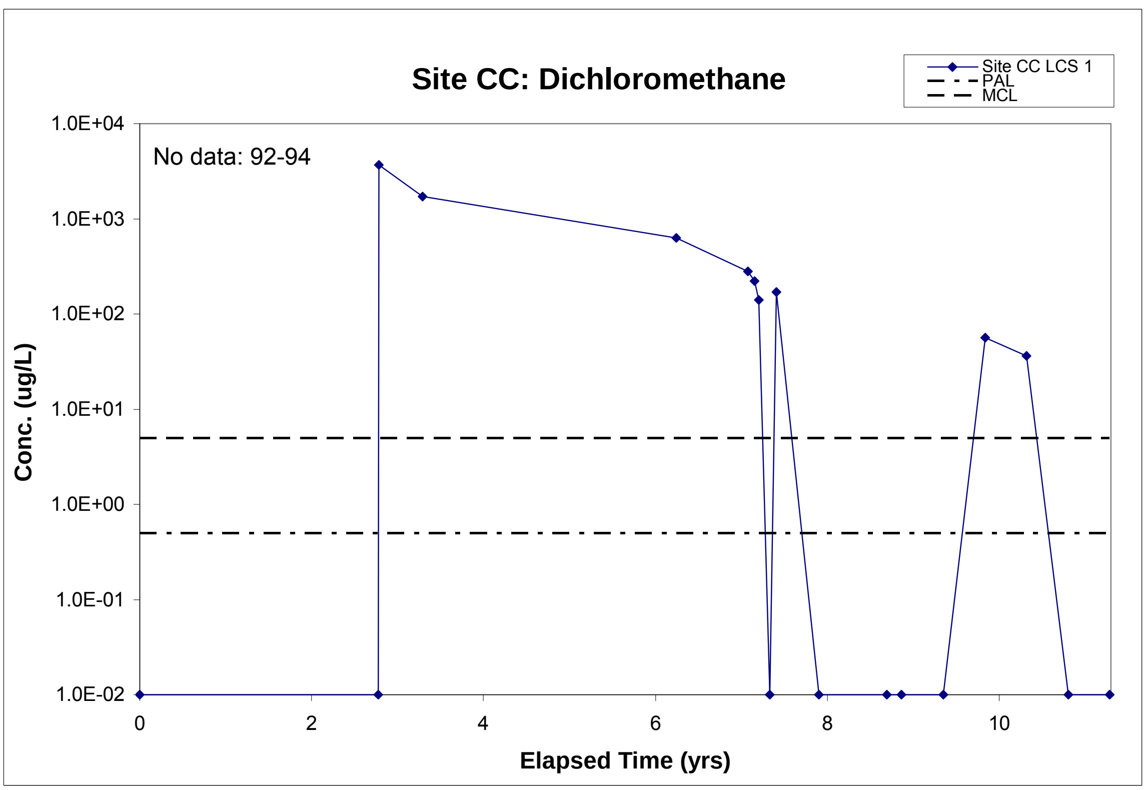

Site GG: Dichloromethane
Site GG LCS 2
PAL
MCL
Nondetects: 01-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

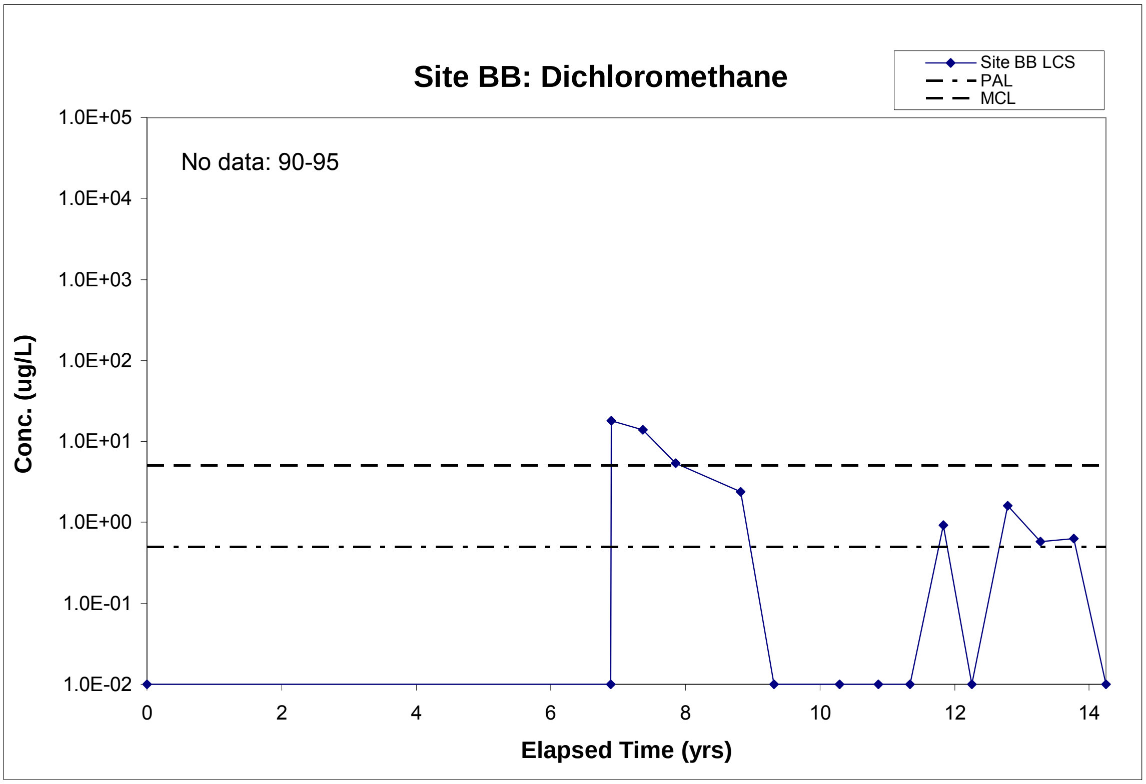

Site GG: Dichloromethane
Site GG LCS 1
PAL
MCL
Nondetects: 01-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

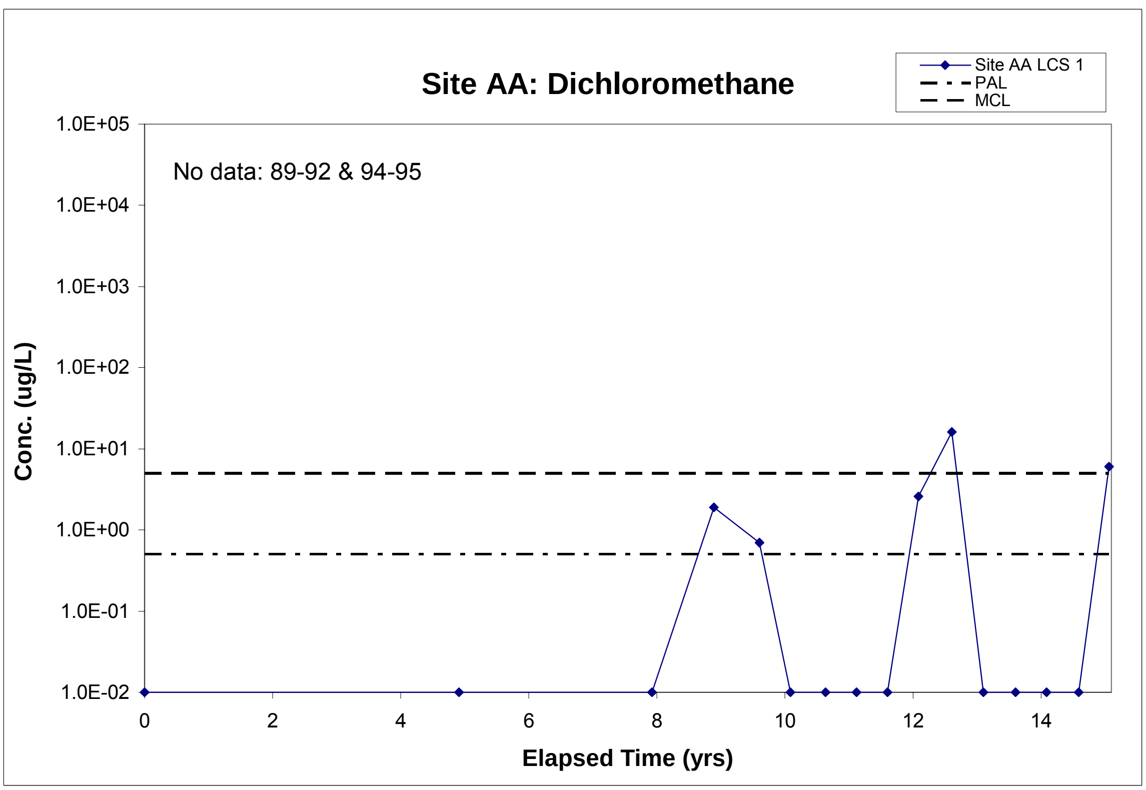

Site FF: Dichloromethane
Site FF LCS
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

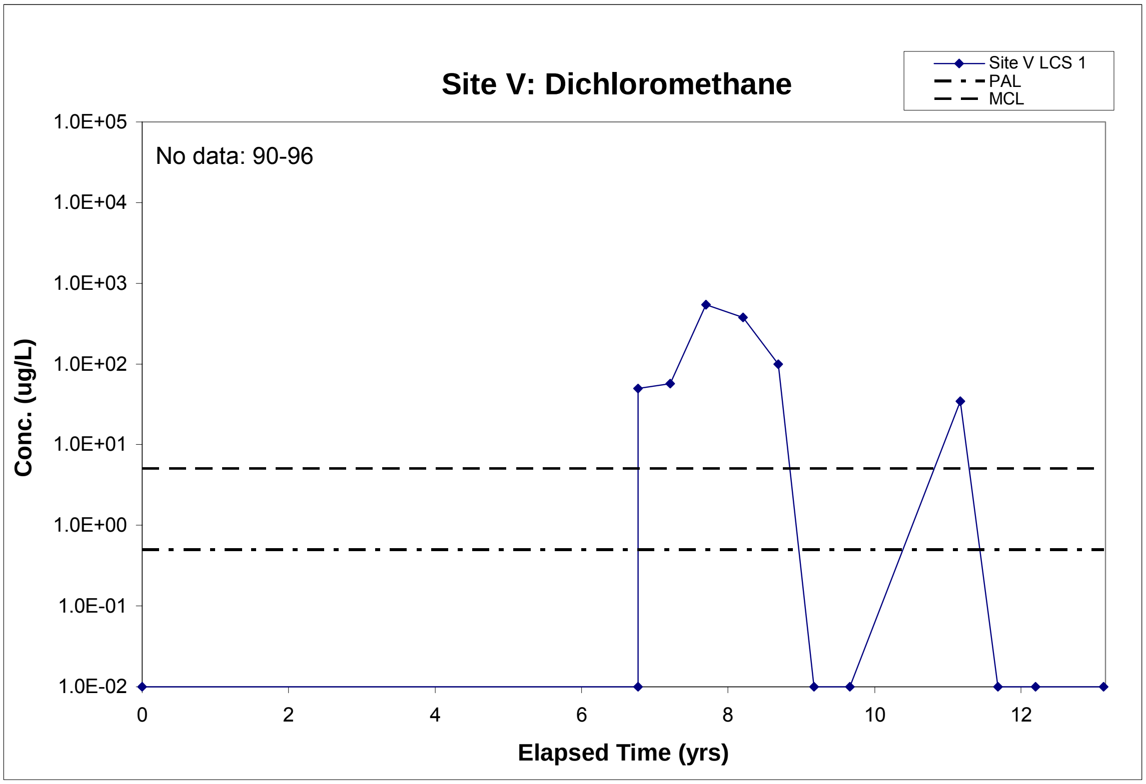

Site DD: Dichloromethane
Site DD LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

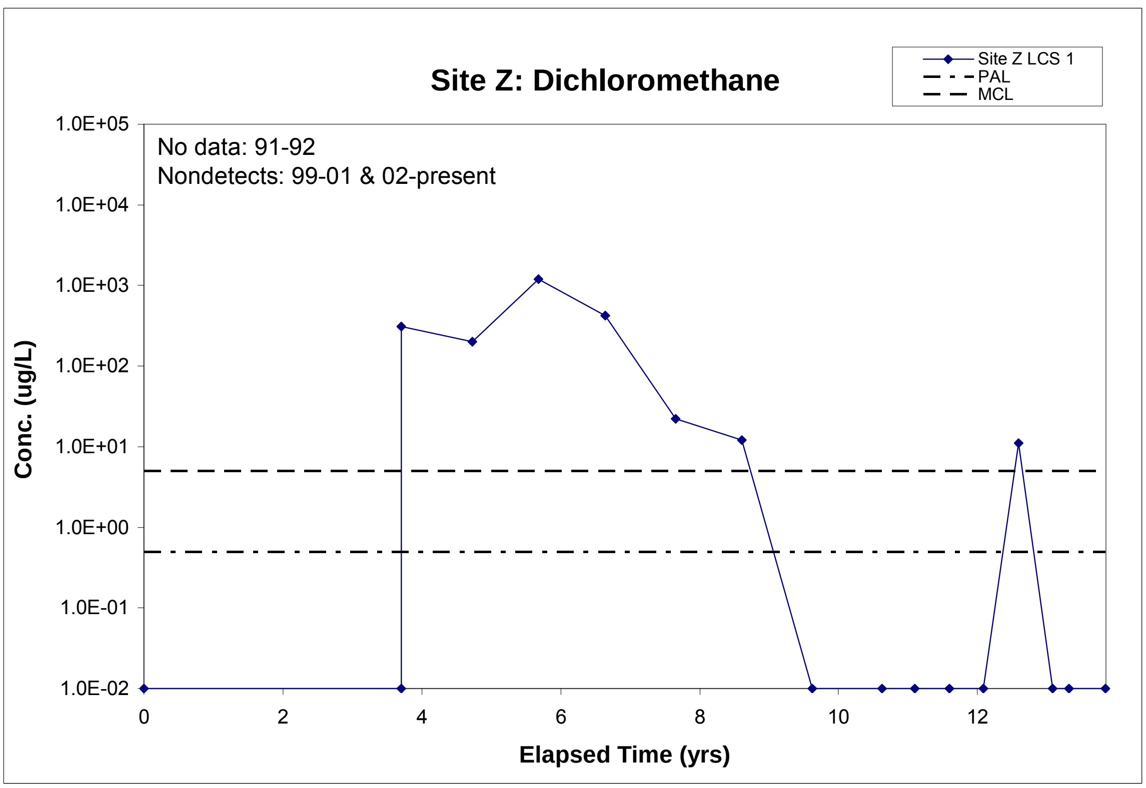

Site CC: Dichloromethane
Site CC LCS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

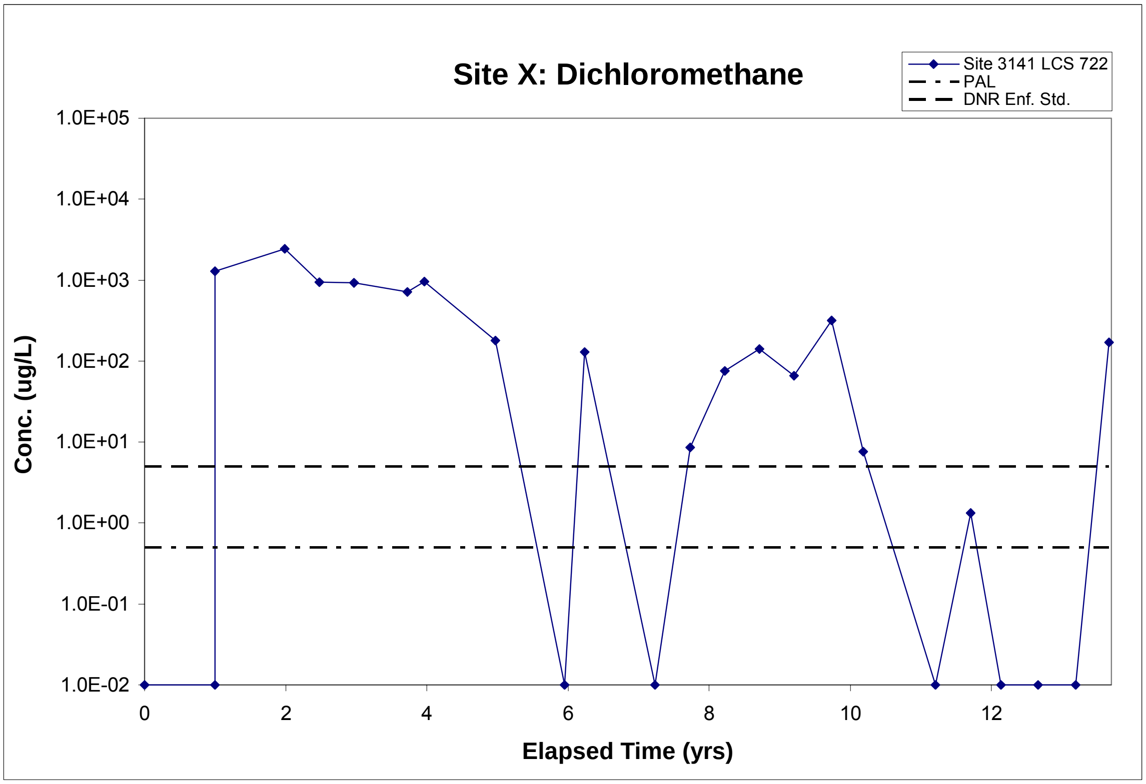

Site CC: Dichloromethane
Site CC LCS 1
PAL
MCL
No data: 92-94
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

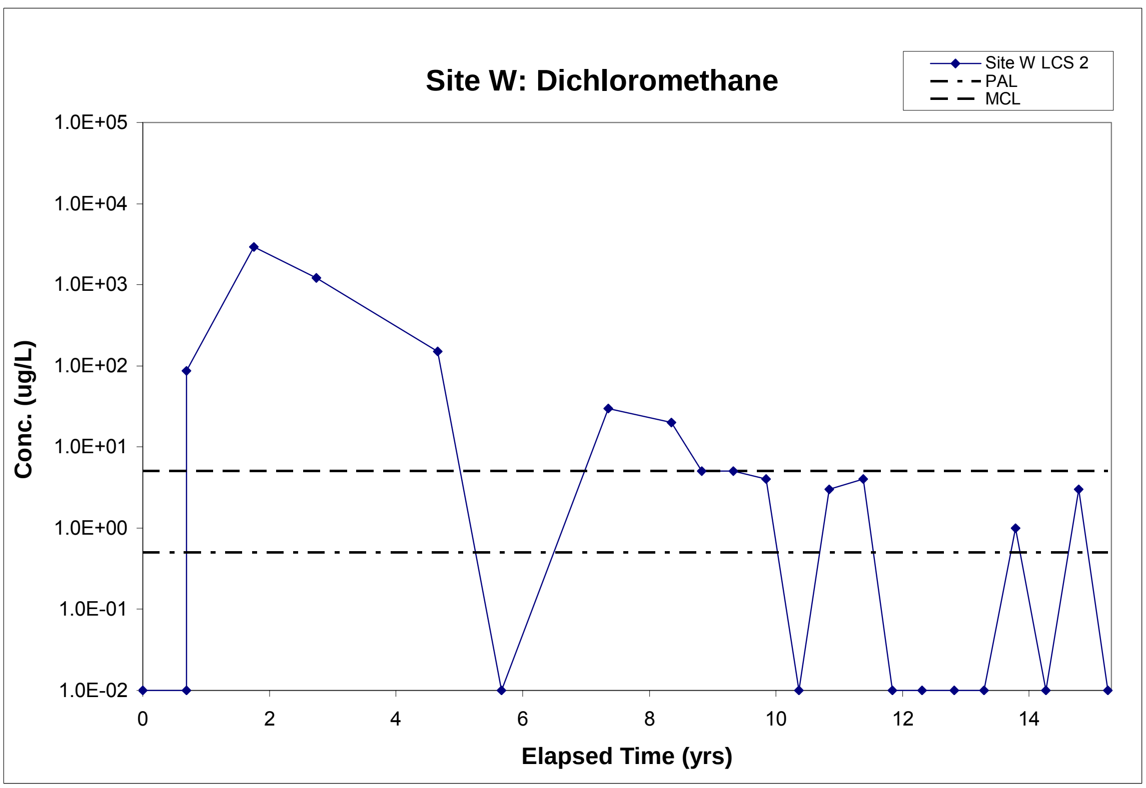

Site BB: Dichloromethane
Site BB LCS
PAL
MCL
No data: 90-95
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

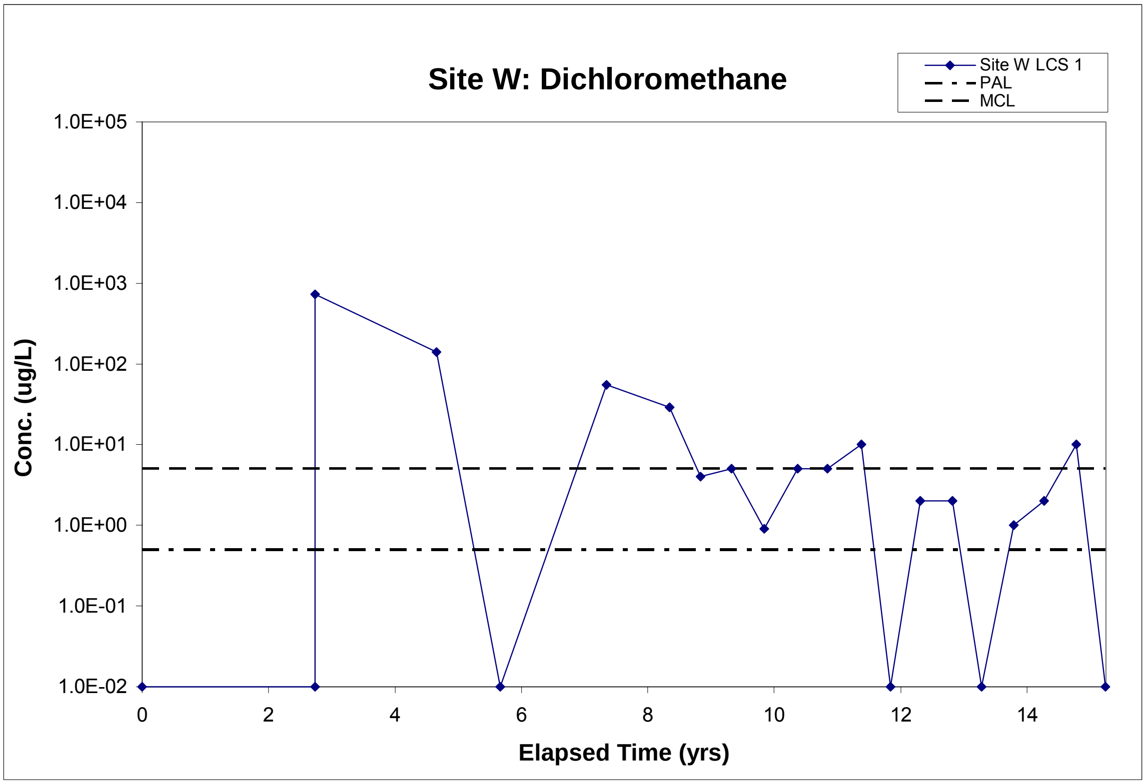

Site AA: Dichloromethane
Site AA LCS 1
PAL
MCL
No data: 89-92 & 94-95
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

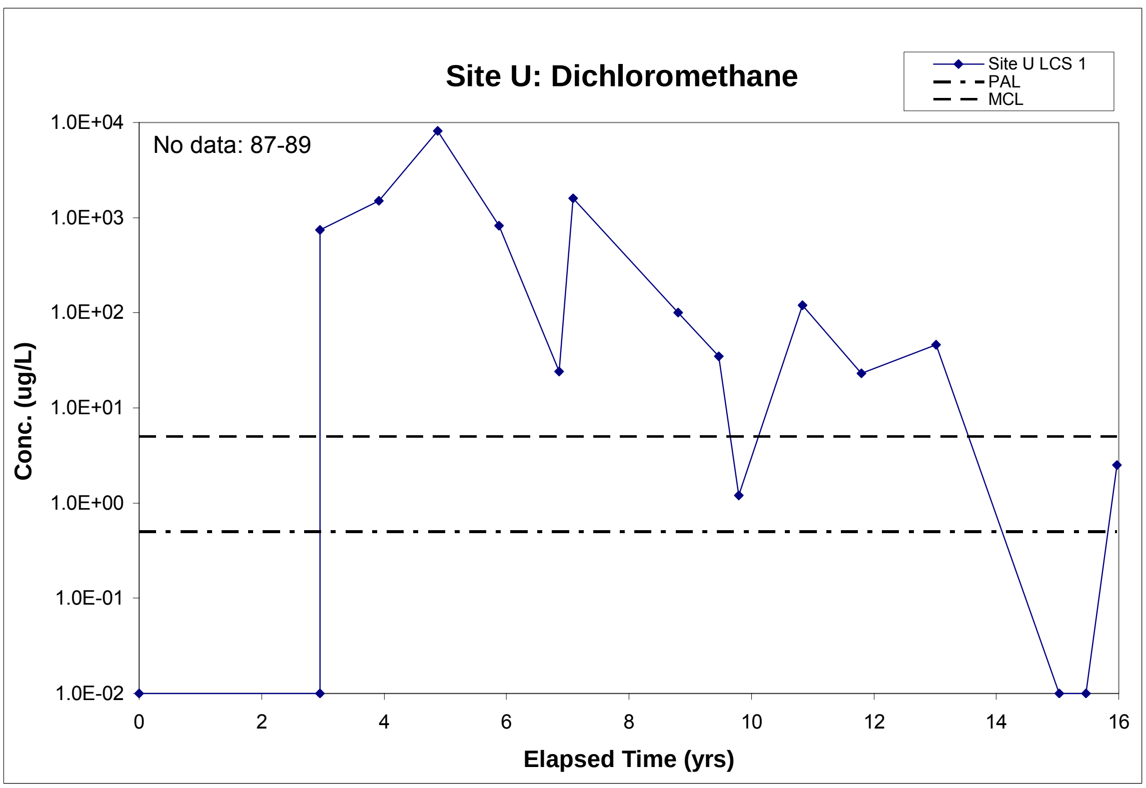

Site V: Dichloromethane
Site V LCS 1
PAL
MCL
No data: 90-96
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

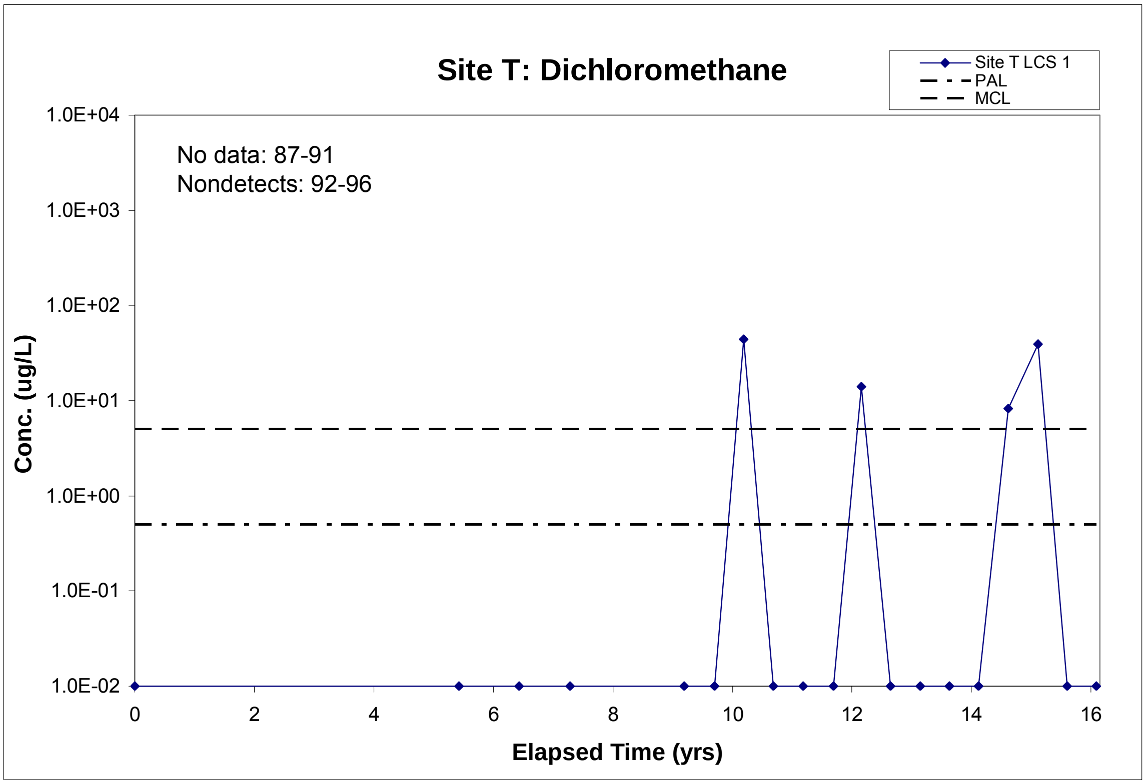

Site Z: Dichloromethane
Site Z LCS 1
PAL
MCL
No data: 91-92
Nondetects: 99-01 & 02-present
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

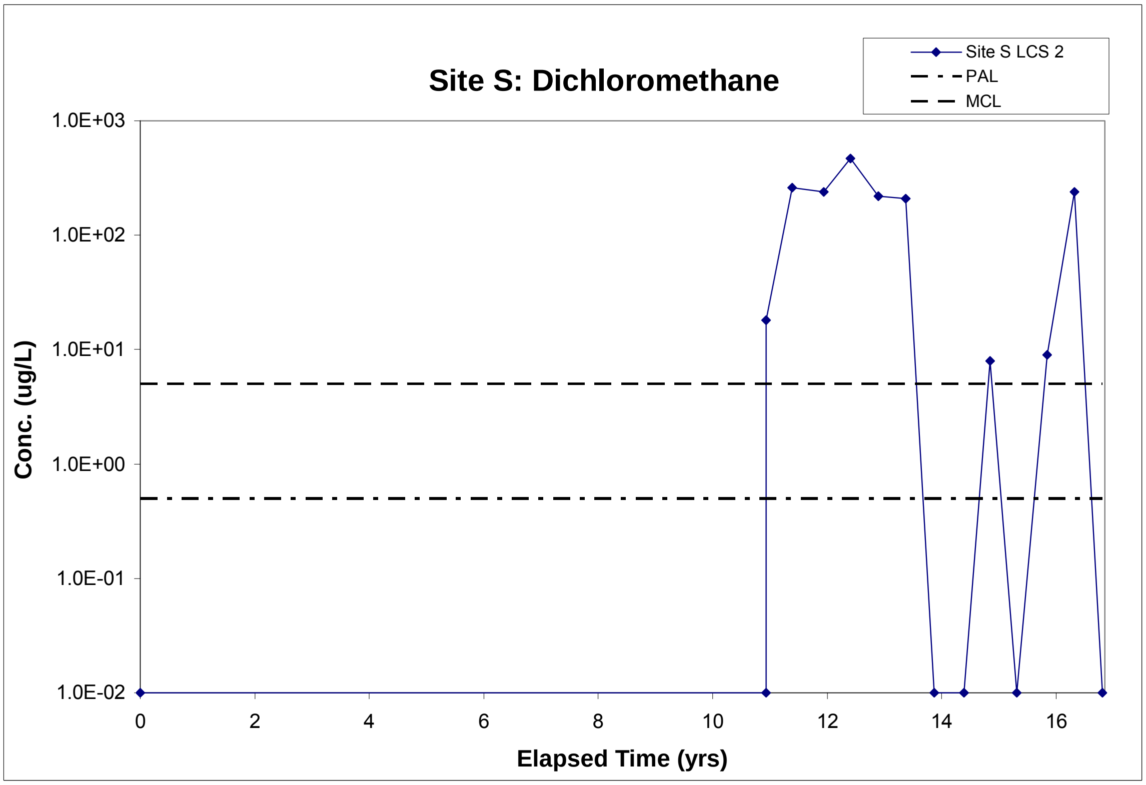

Site X: Dichloromethane
Site 3141 LCS 722
PAL
DNR Enf. Std.
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

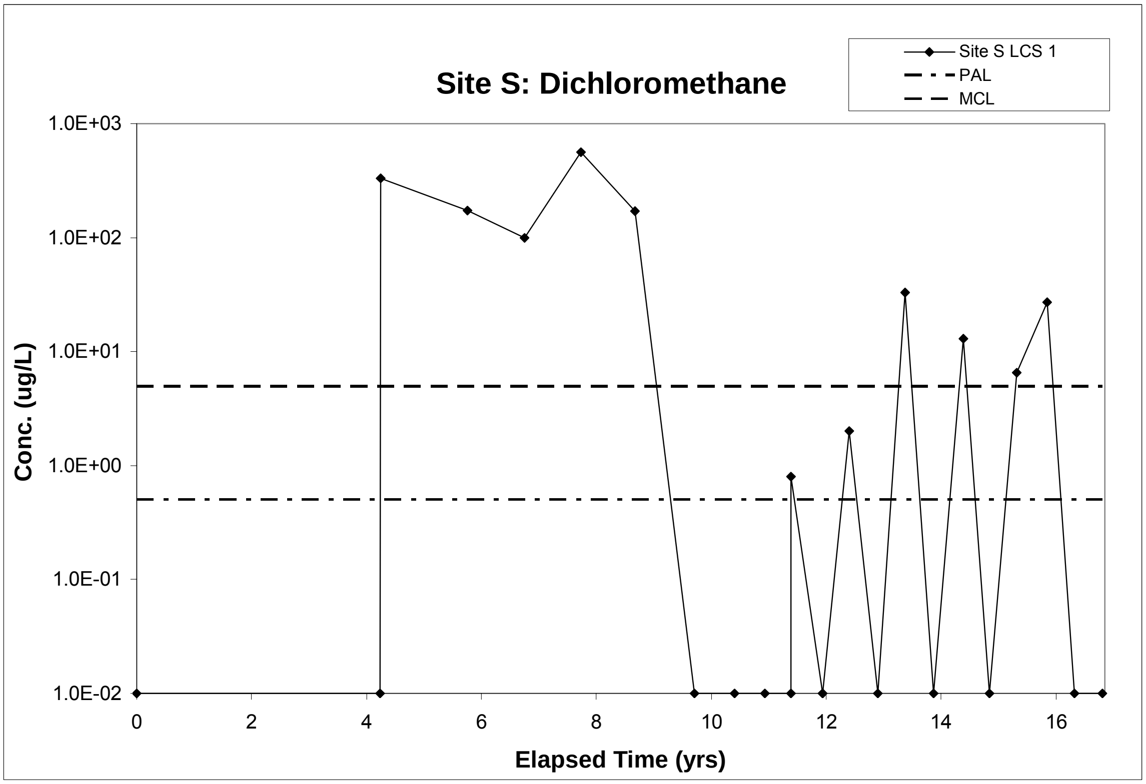

Site W: Dichloromethane
Site W LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

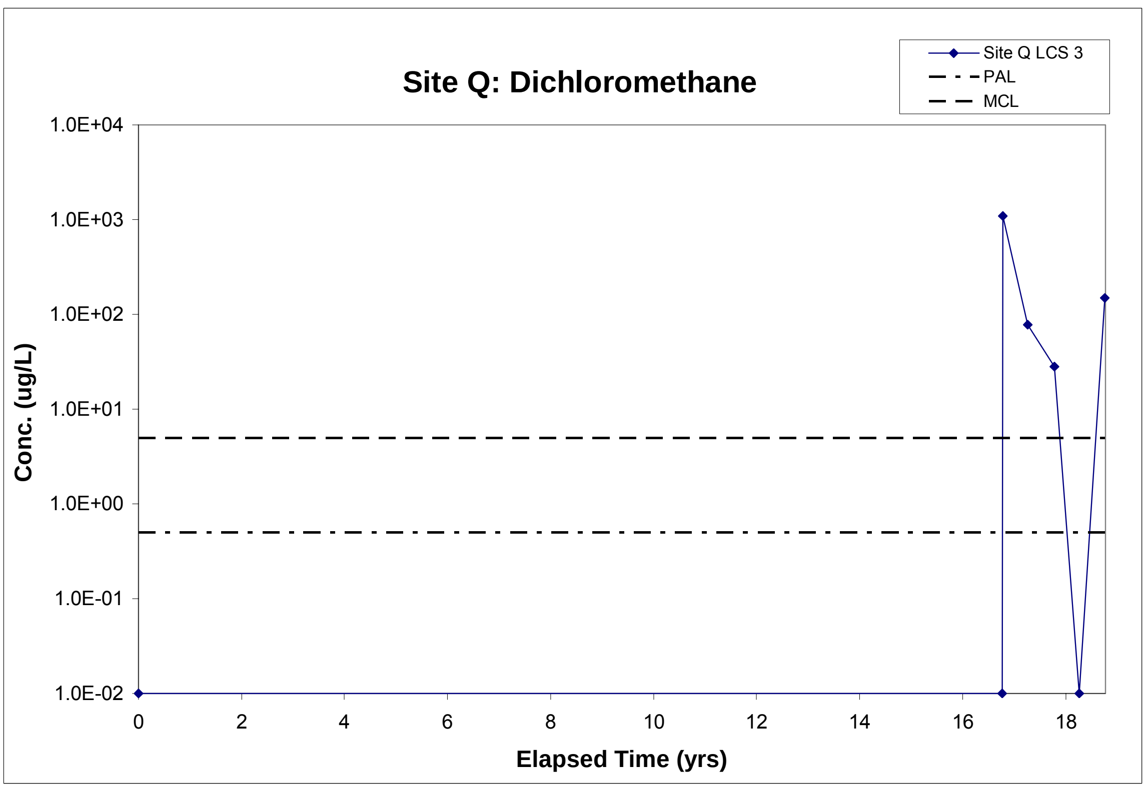

Site W: Dichloromethane
Site W LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

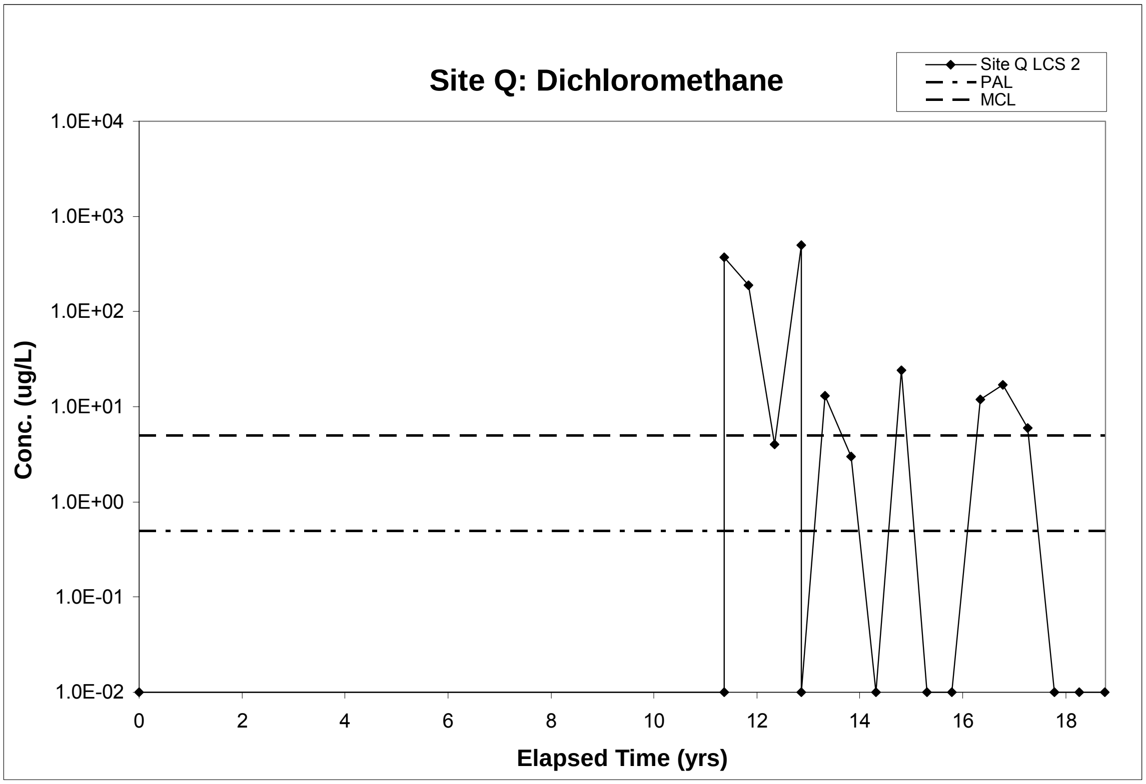

Site U: Dichloromethane
Site U LCS 1
PAL
MCL
No data: 87-89
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

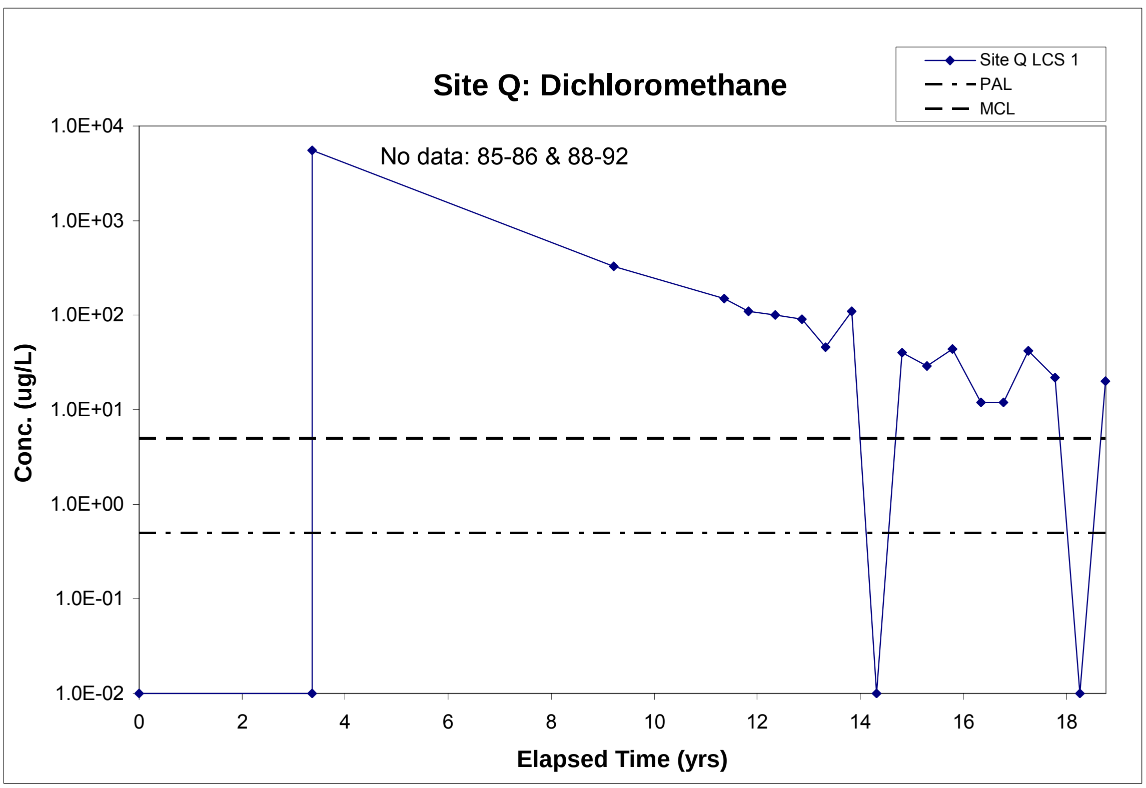

Site T: Dichloromethane
Site T LCS 1
PAL
MCL
No data: 87-91
Nondetects: 92-96
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

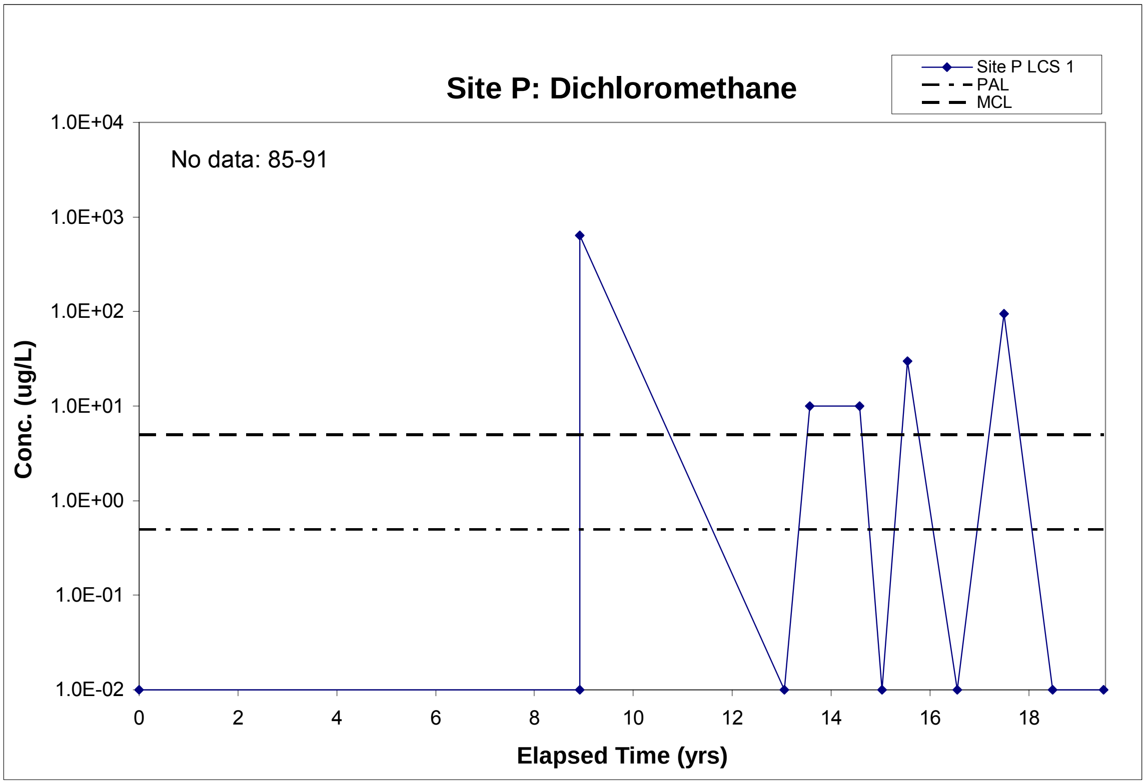

Site S: Dichloromethane
Site S LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

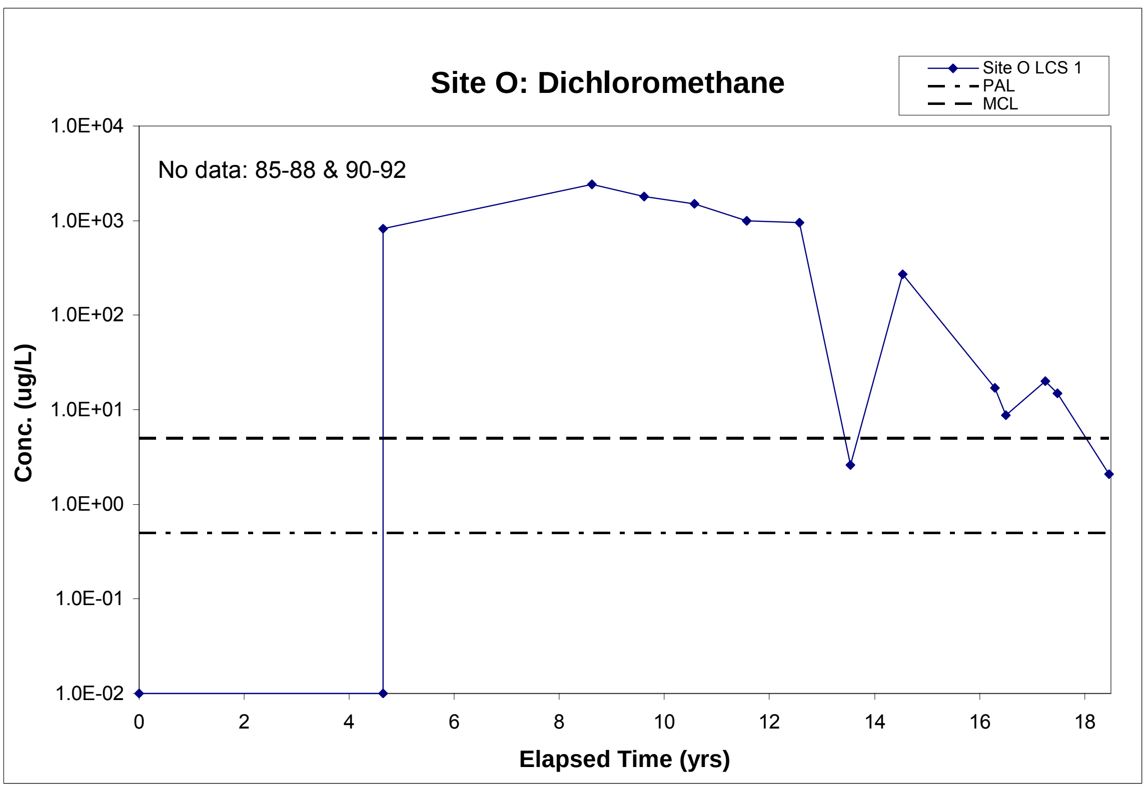

Site S: Dichloromethane
Site S LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

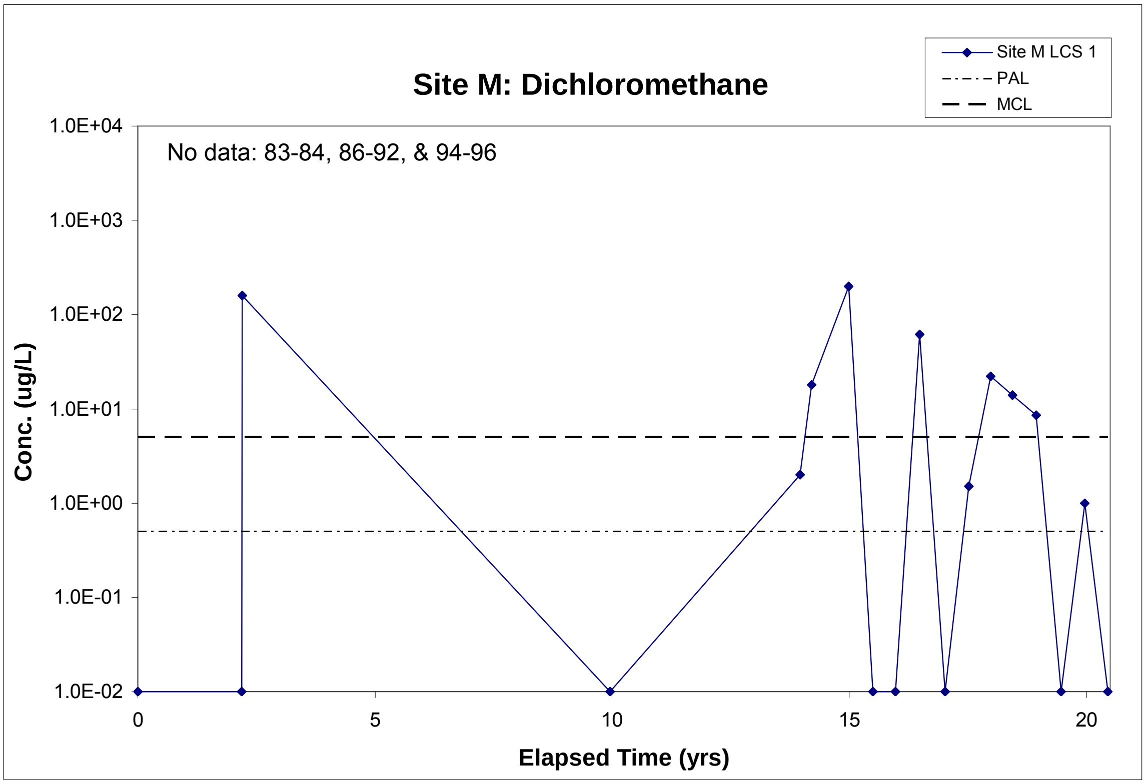

Site Q: Dichloromethane
Site Q LCS 3
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

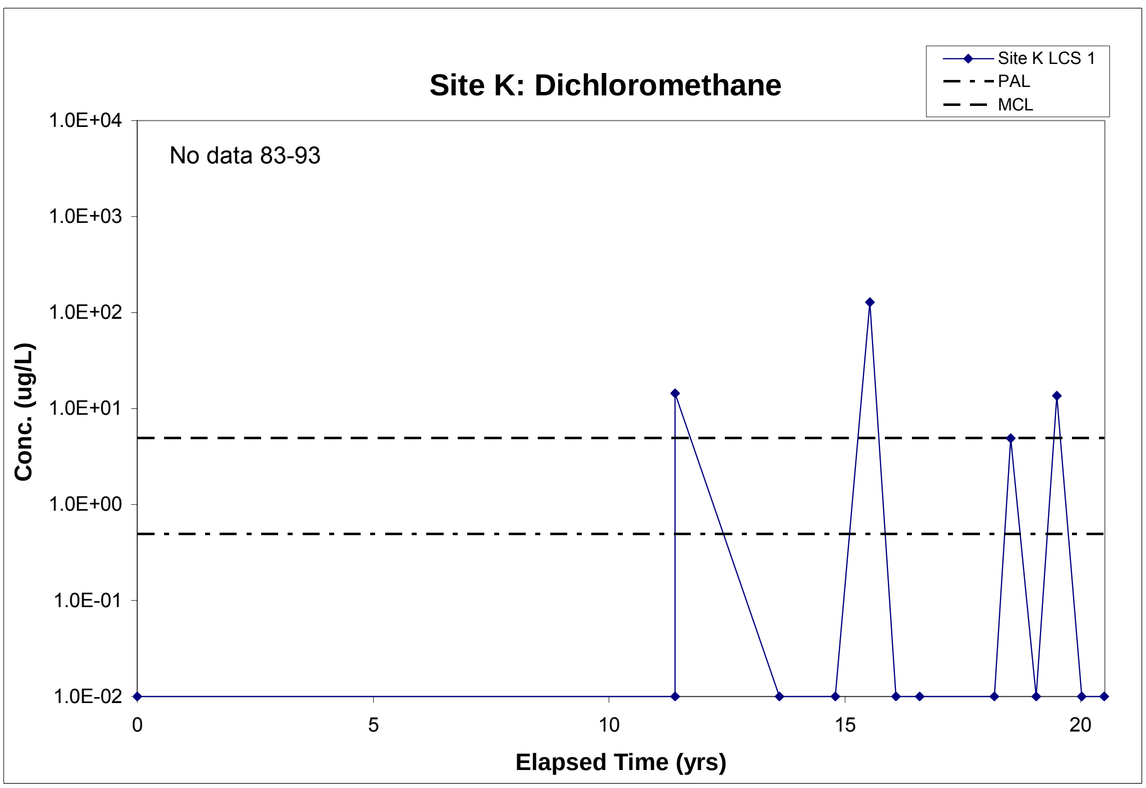

Site Q: Dichloromethane
Site Q LCS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

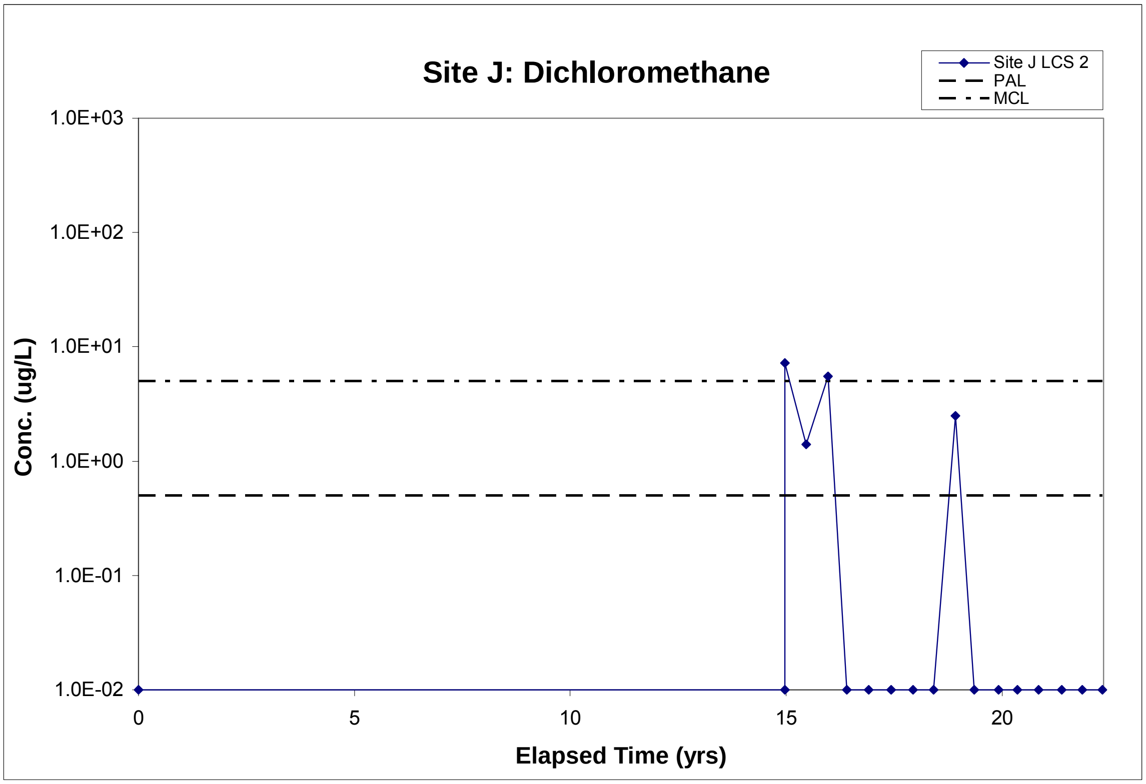

Site Q: Dichloromethane
Site Q LCS 1
PAL
MCL
No data: 85-86 & 88-92
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

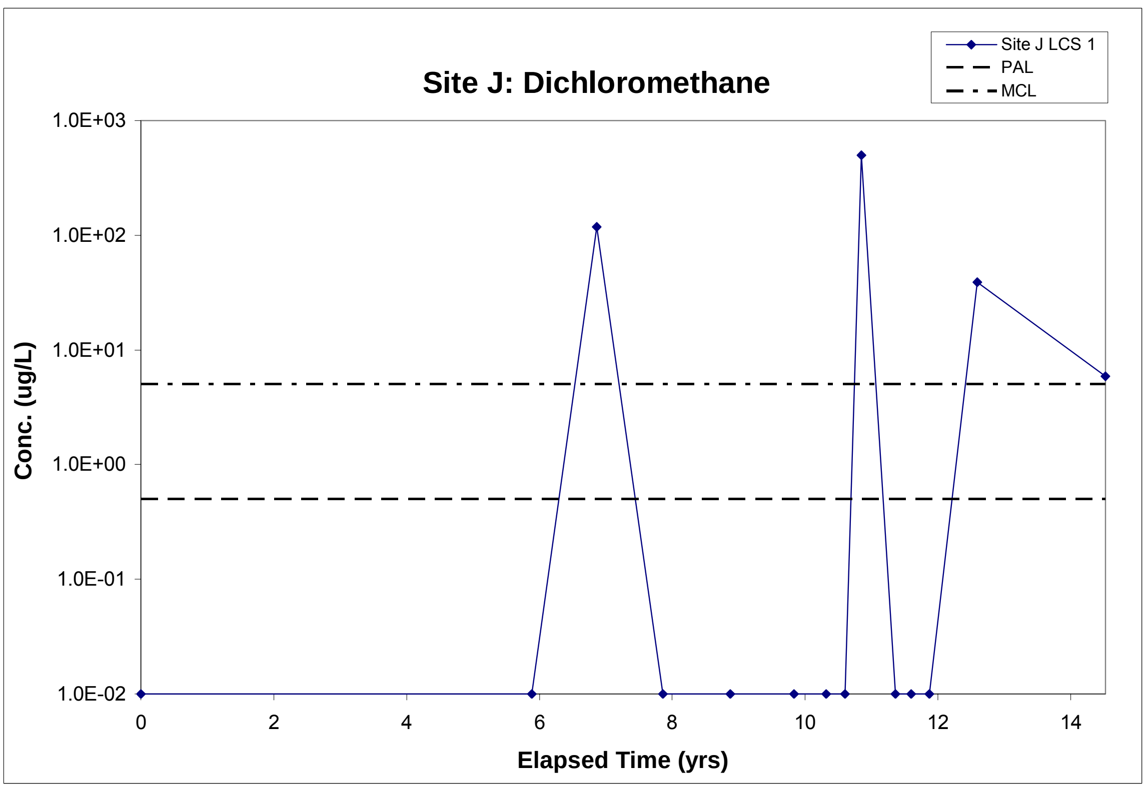

Site P: Dichloromethane
Site P LCS 1
PAL
MCL
No data: 85-91
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

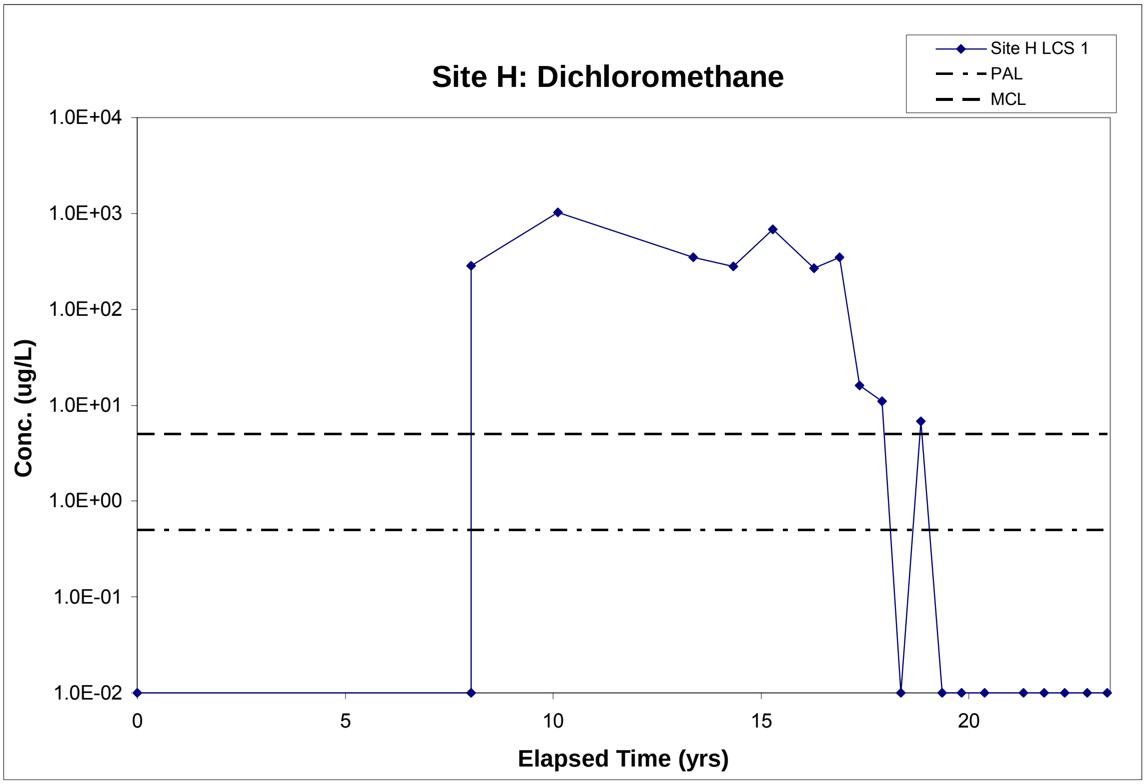

Site O: Dichloromethane
Site O LCS 1
PAL
MCL
No data: 85-88 & 90-92
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

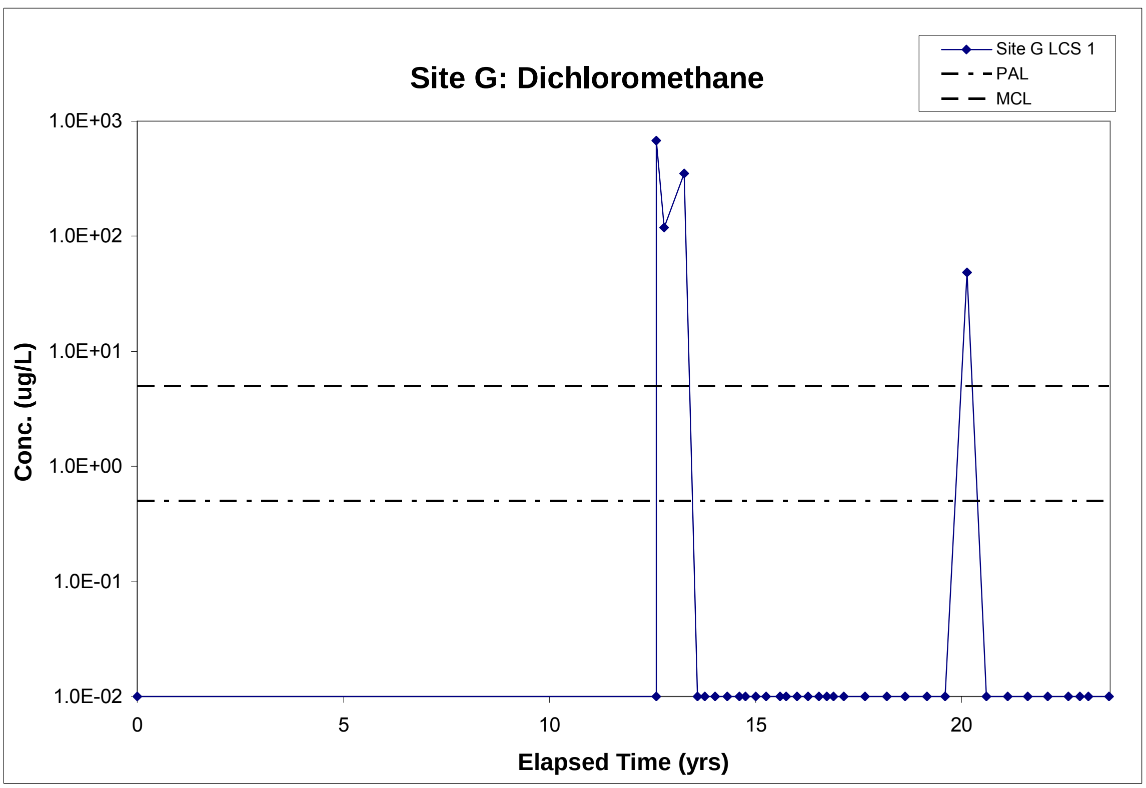

Site M: Dichloromethane
Site M LCS 1
PAL
MCL
No data: 83-84, 86-92, & 94-96
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

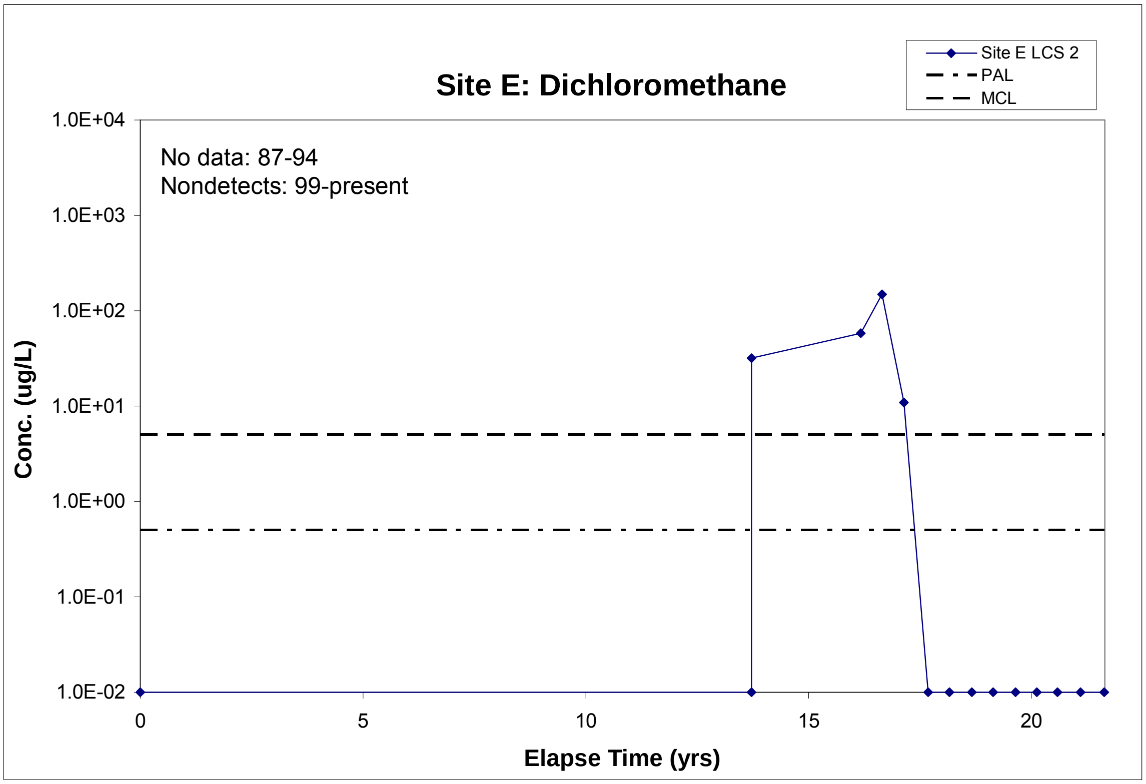

Site K: Dichloromethane
Site K LCS 1
PAL
MCL
No data 83-93
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

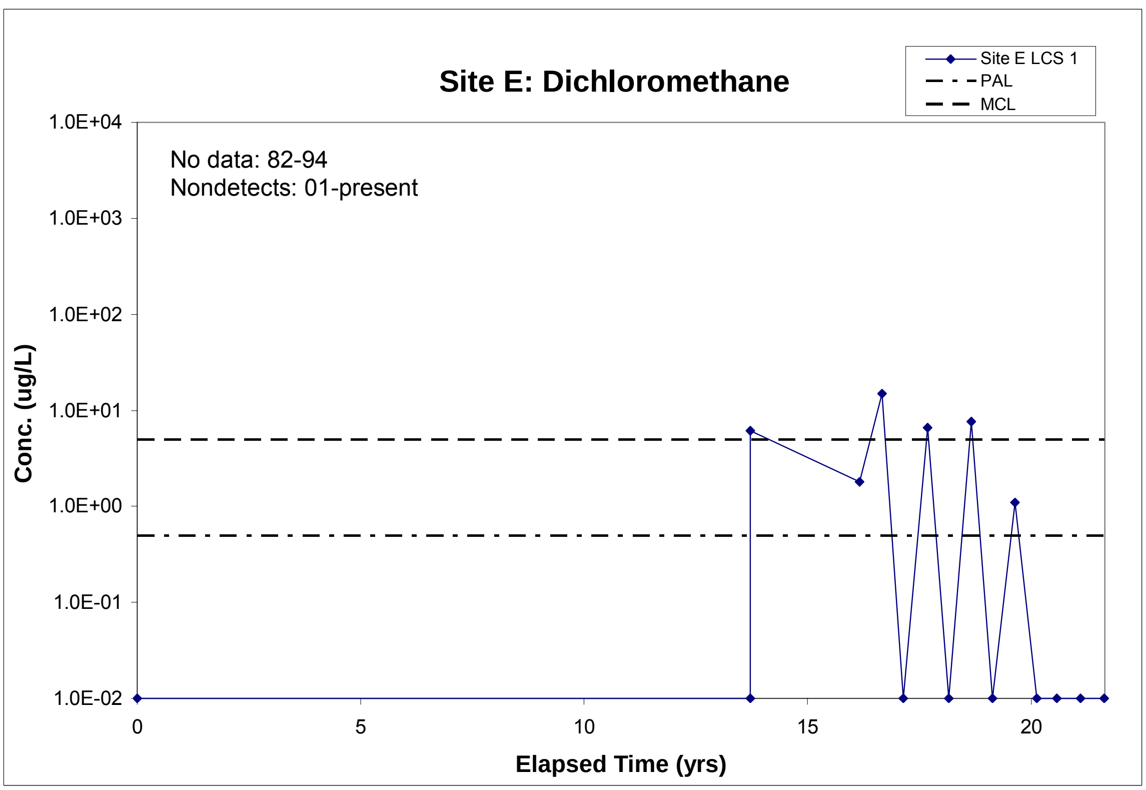

Site J: Dichloromethane
Site J LCS 2
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

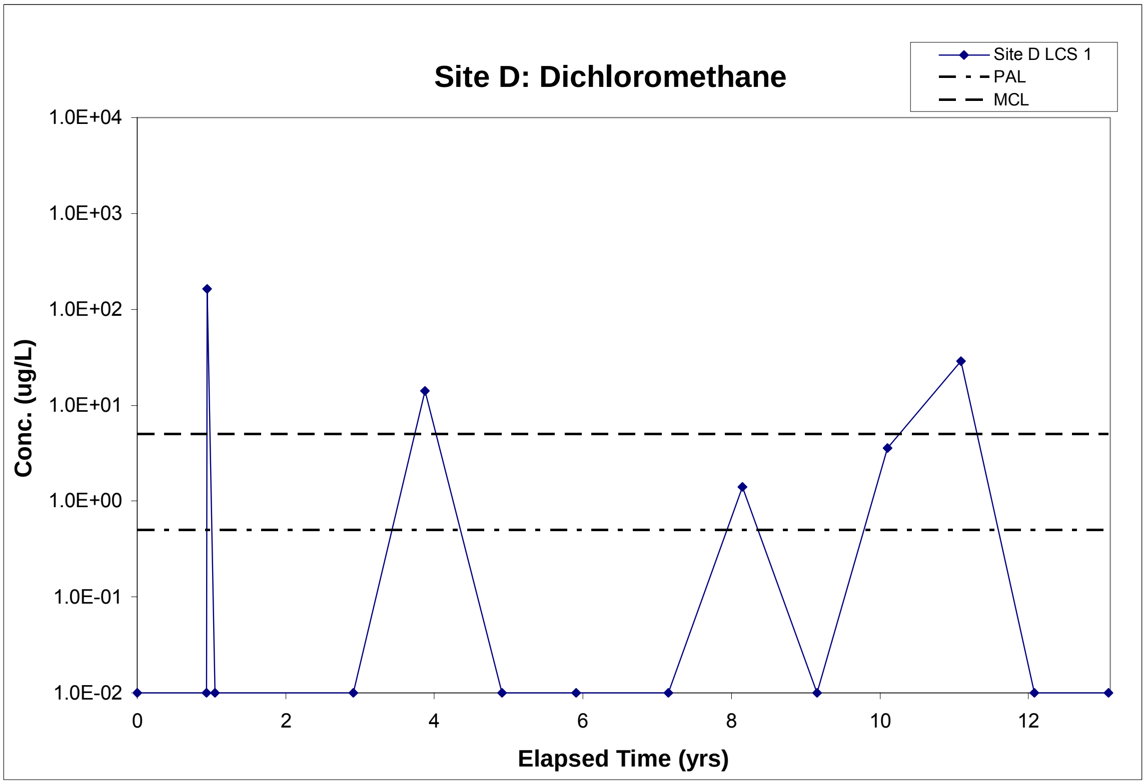

Site J: Dichloromethane
Site J LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

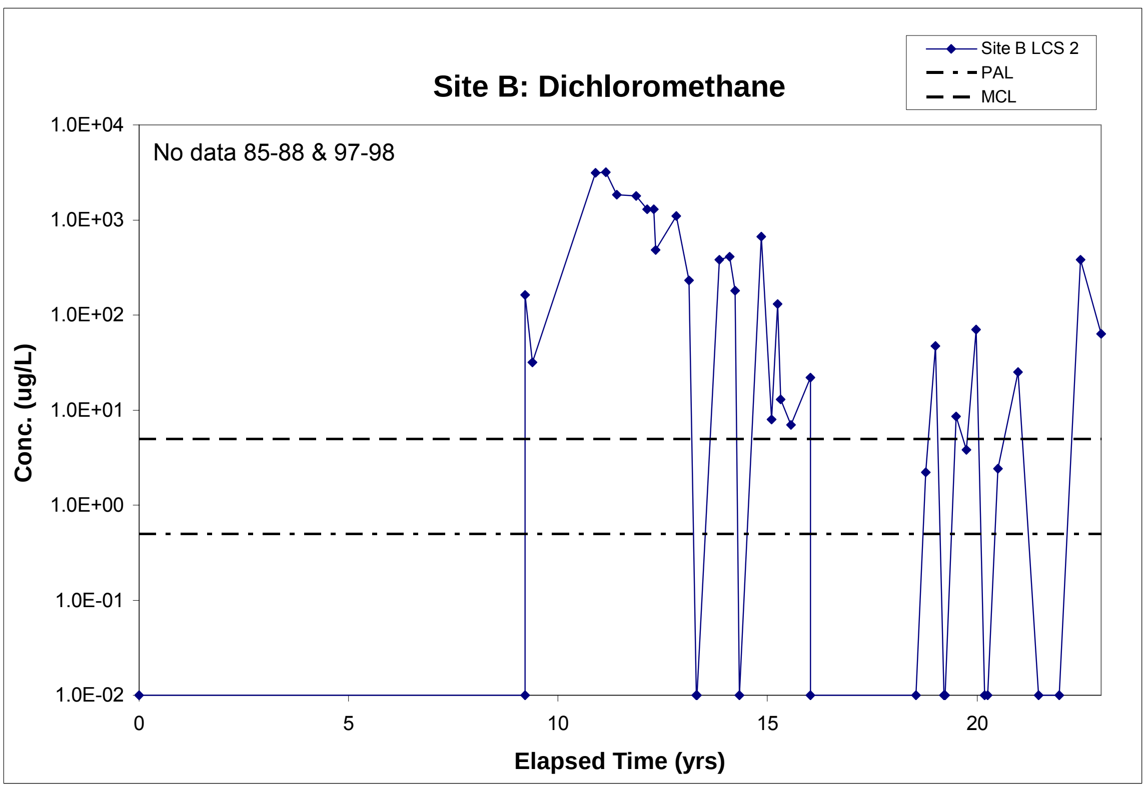

Site H: Dichloromethane
Site H LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

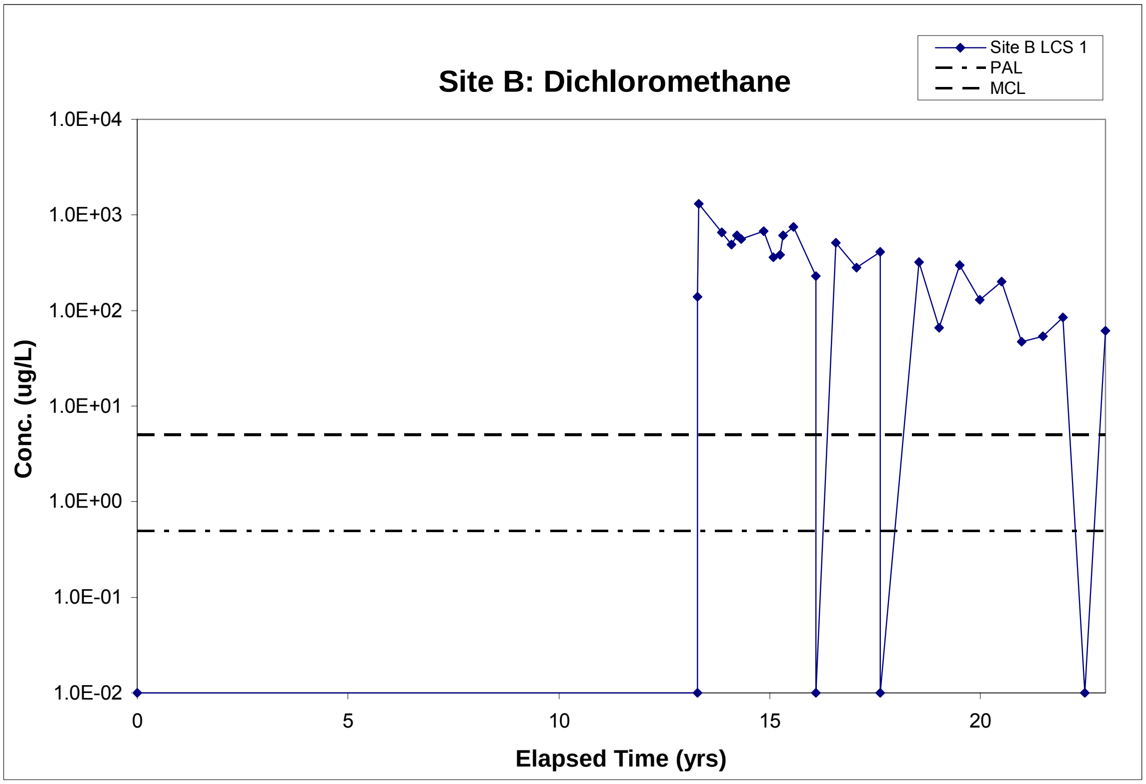

Site G: Dichloromethane
Site G LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

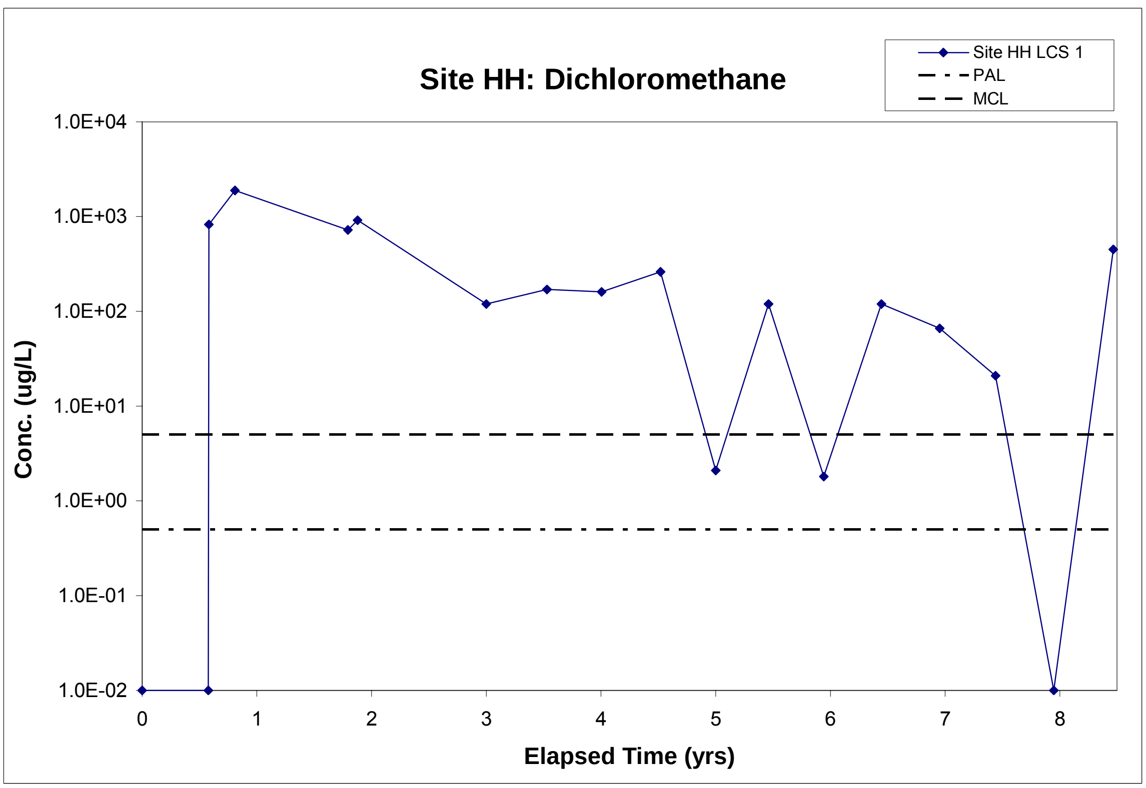

Site E: Dichloromethane
Site E LCS 2
PAL
MCL
No data: 87-94
Nondetects: 99-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapse Time (yrs)

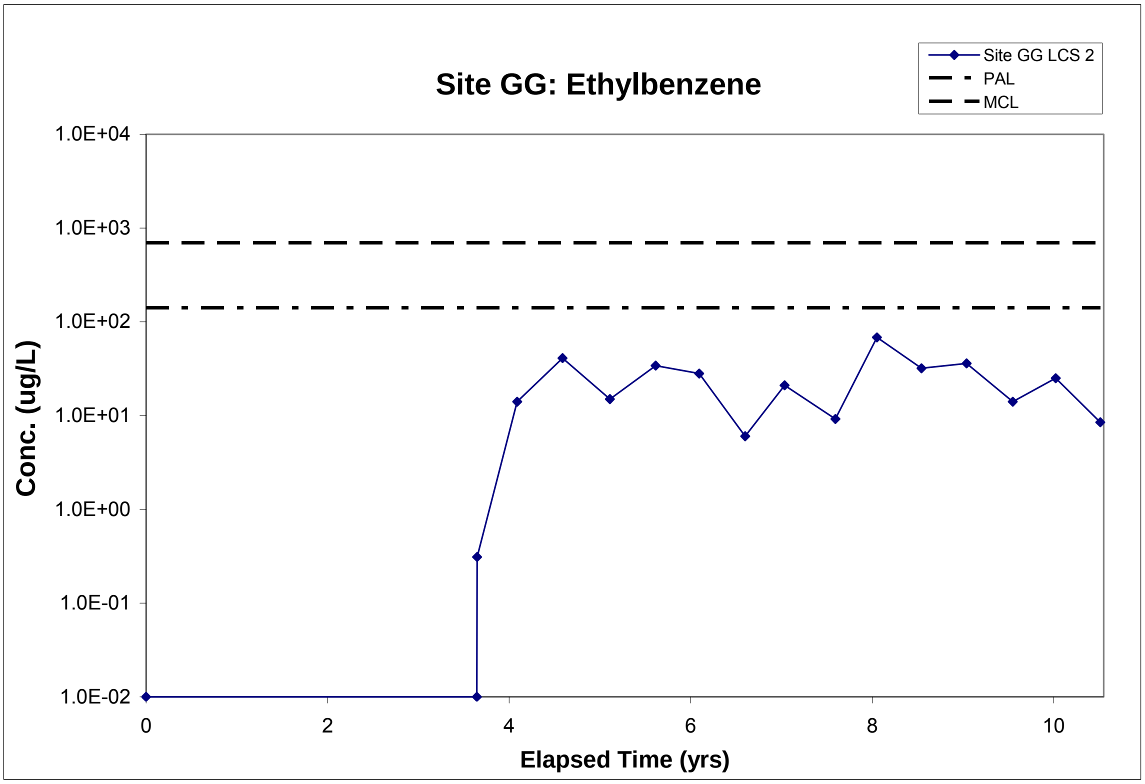

Site E: Dichloromethane
Site E LCS 1
PAL
MCL
No data: 82-94
Nondetects: 01-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

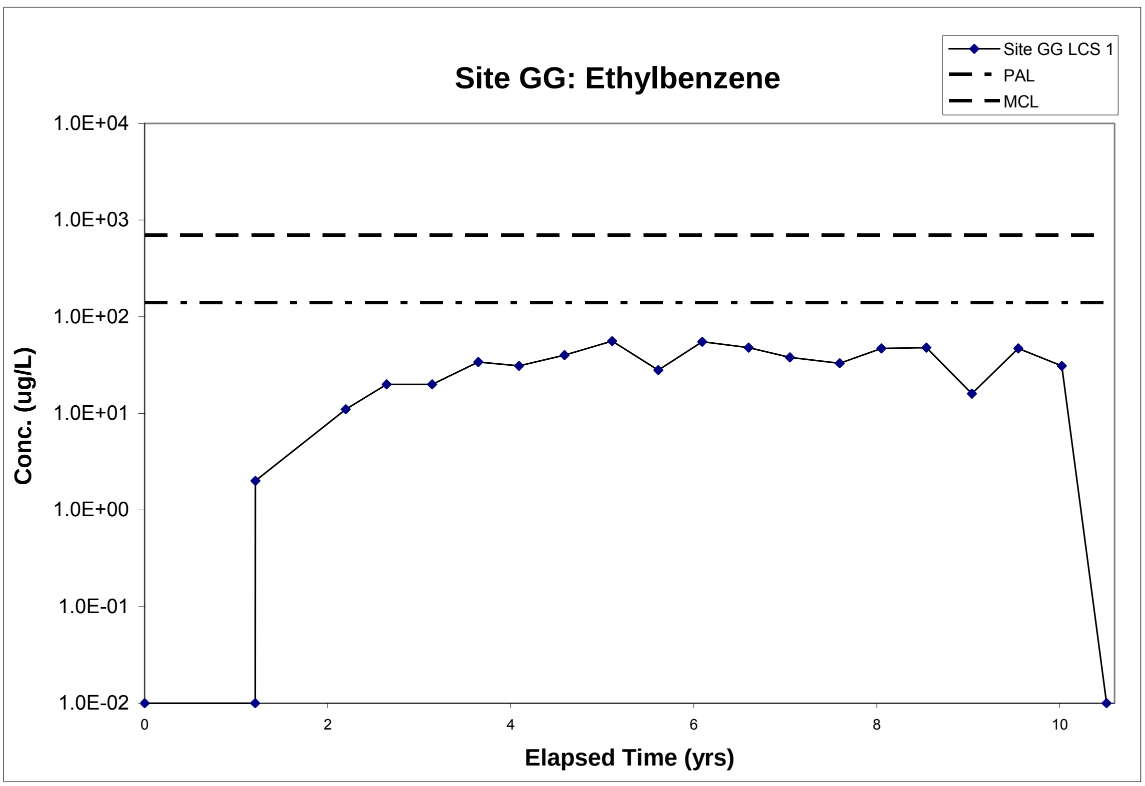

Site D: Dichloromethane
Site D LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

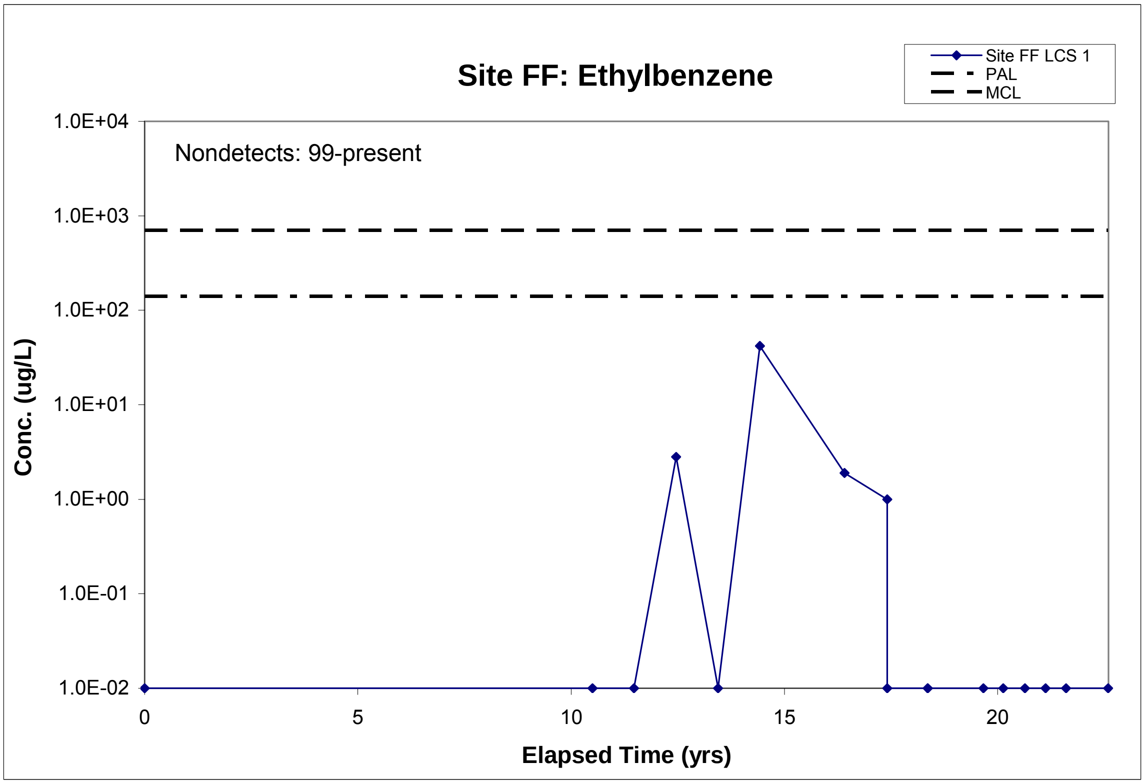

Site B: Dichloromethane
Site B LCS 2
PAL
MCL
No data 85-88 & 97-98
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

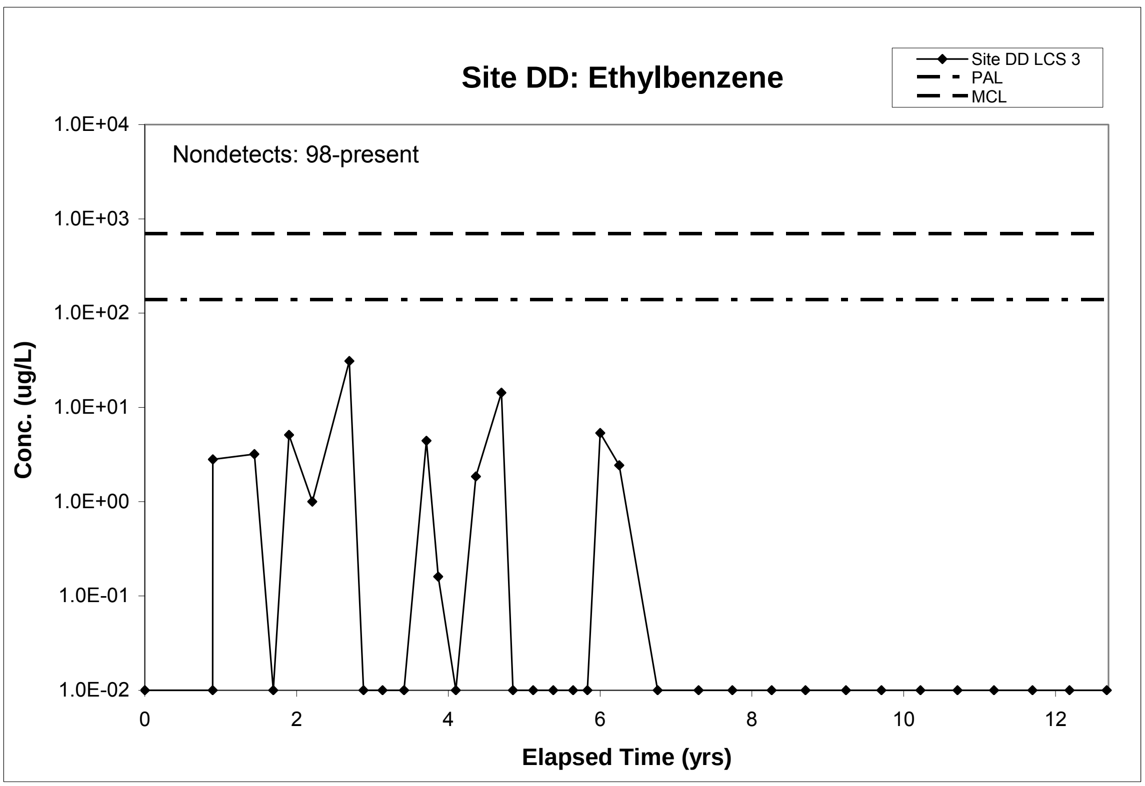

Site B: Dichloromethane
Site B LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

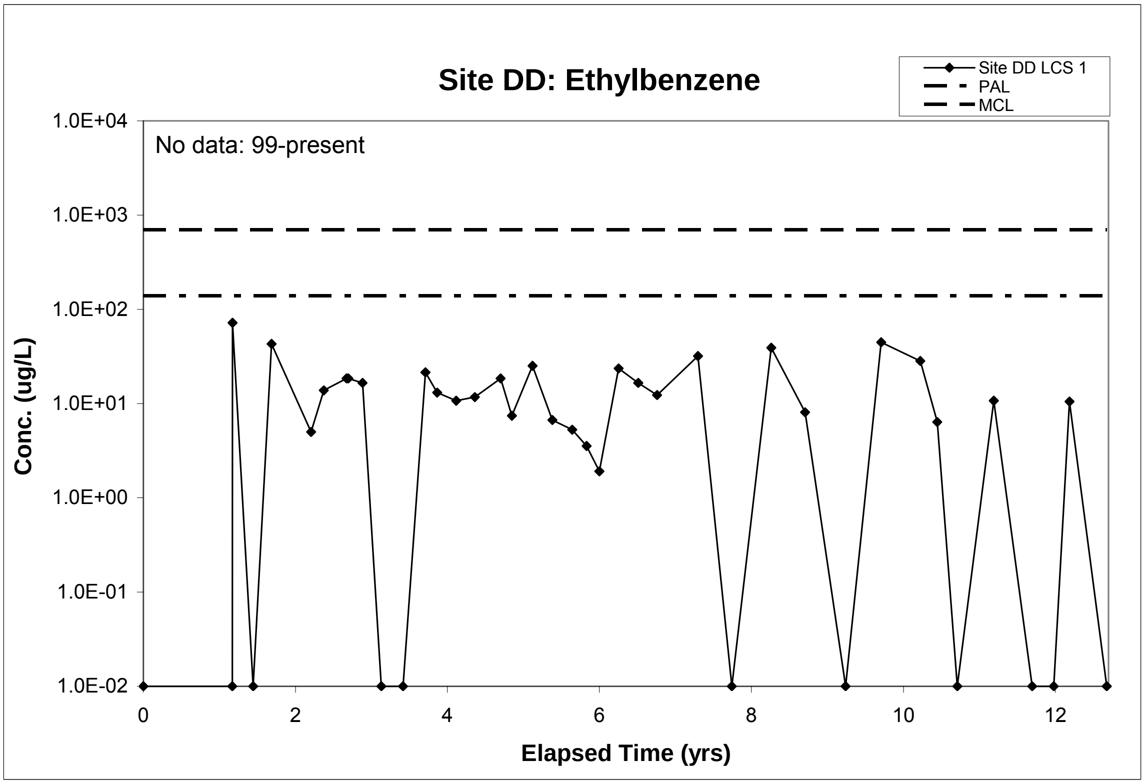

Site HH: Dichloromethane
Site HH LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

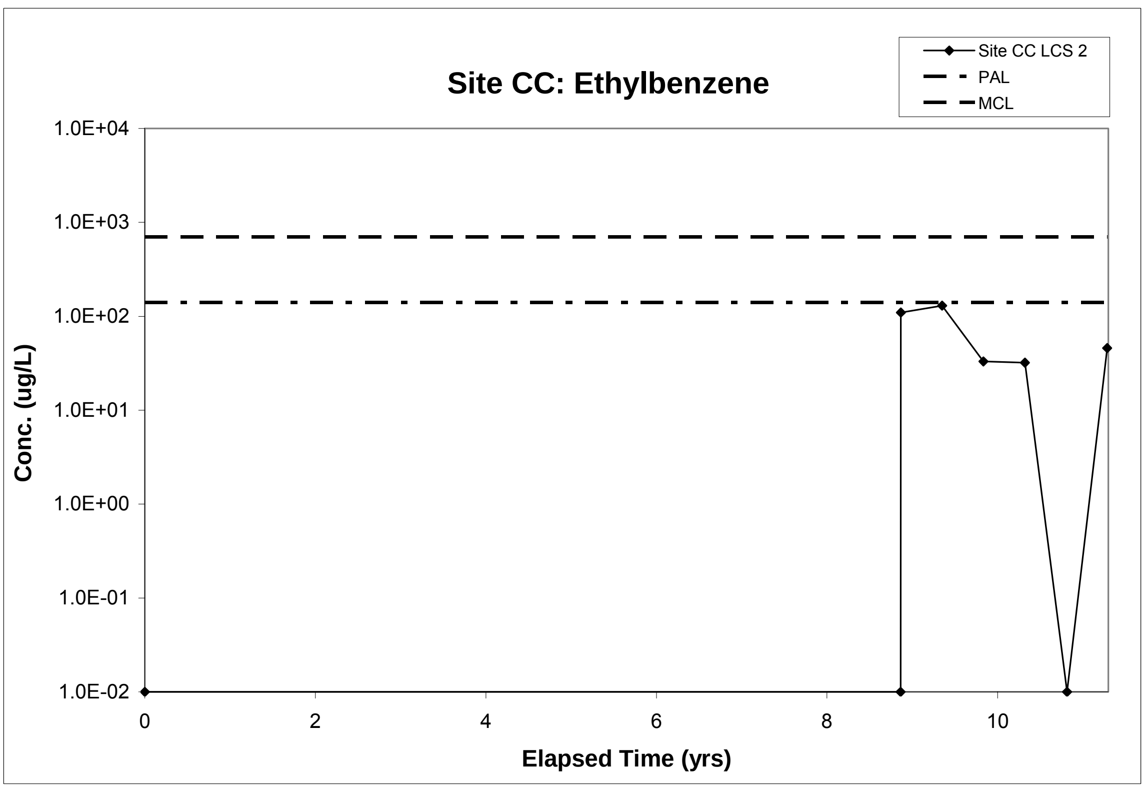

Site GG: Ethylbenzene
Site GG LCS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

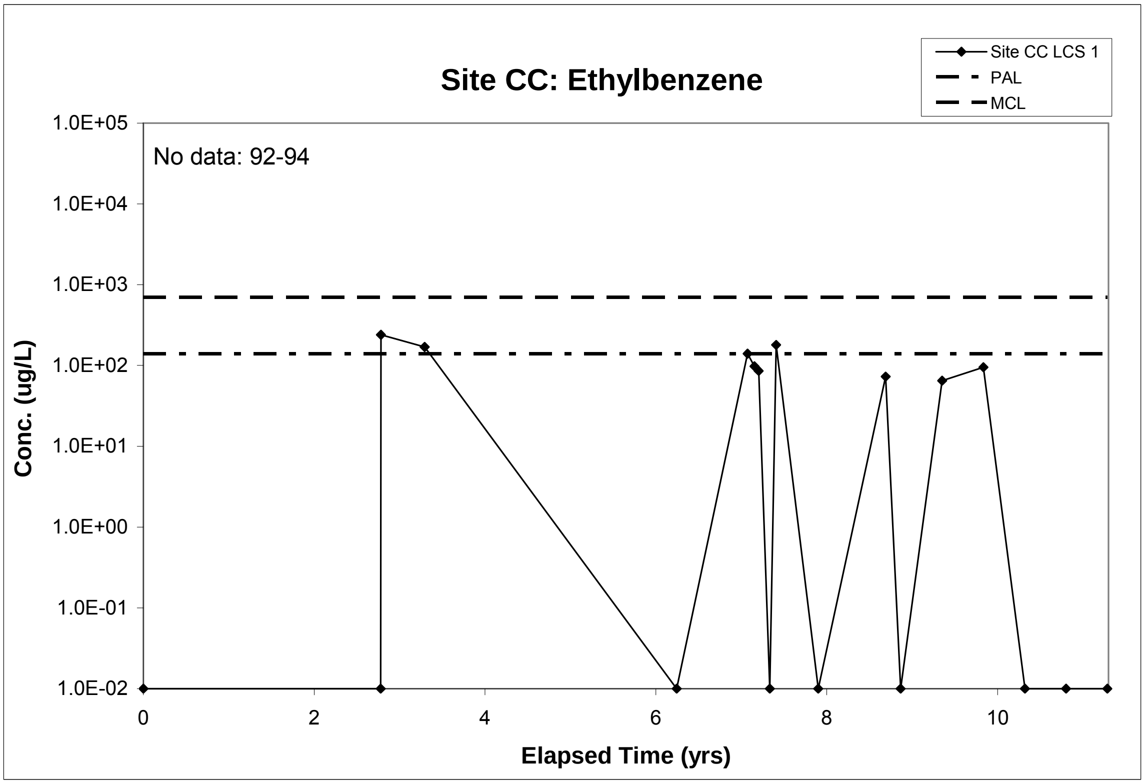

Site GG: Ethylbenzene
Site GG LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

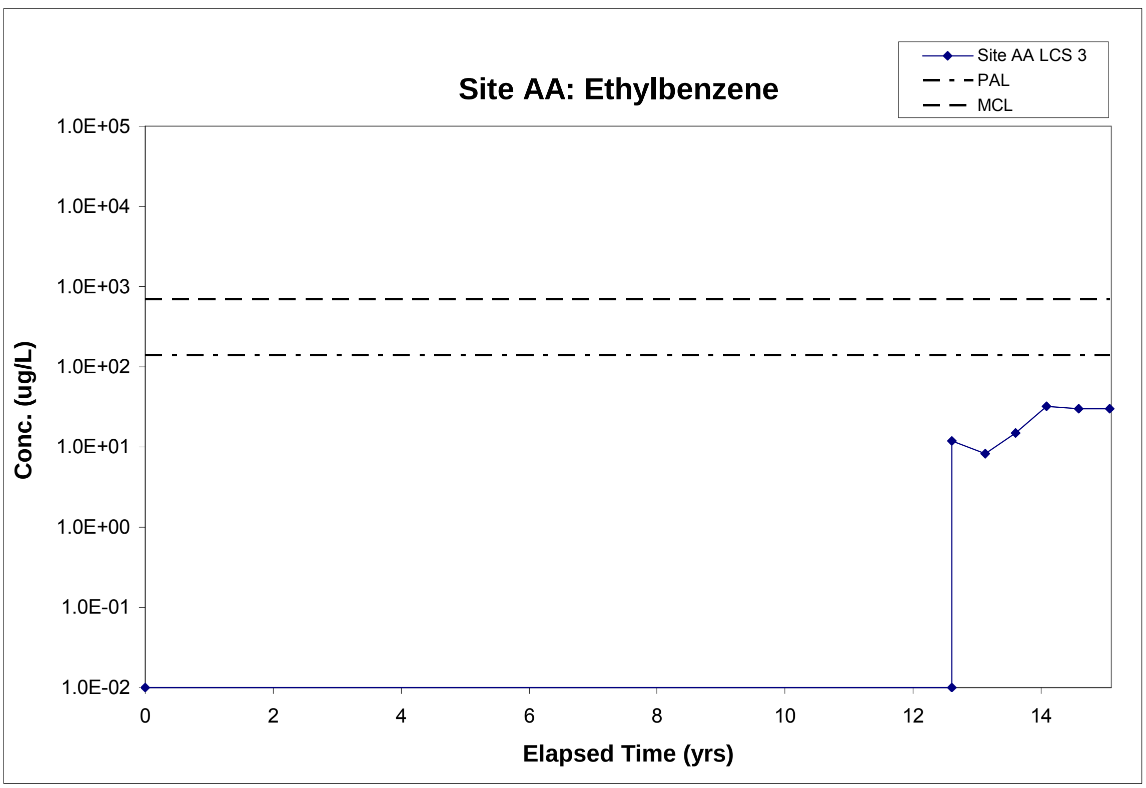

Site FF: Ethylbenzene
Site FF LCS 1
PAL
MCL
Nondetects: 99-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

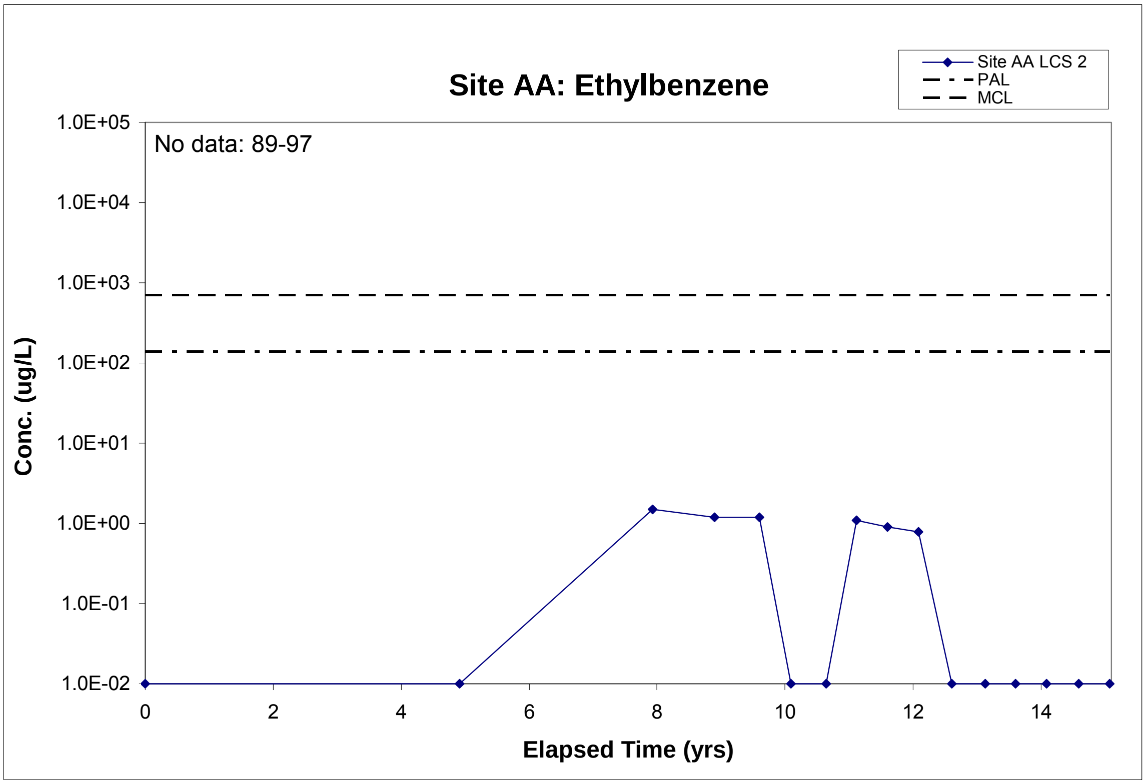

Site DD: Ethylbenzene
Site DD LCS 3
PAL
MCL
Nondetects: 98-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

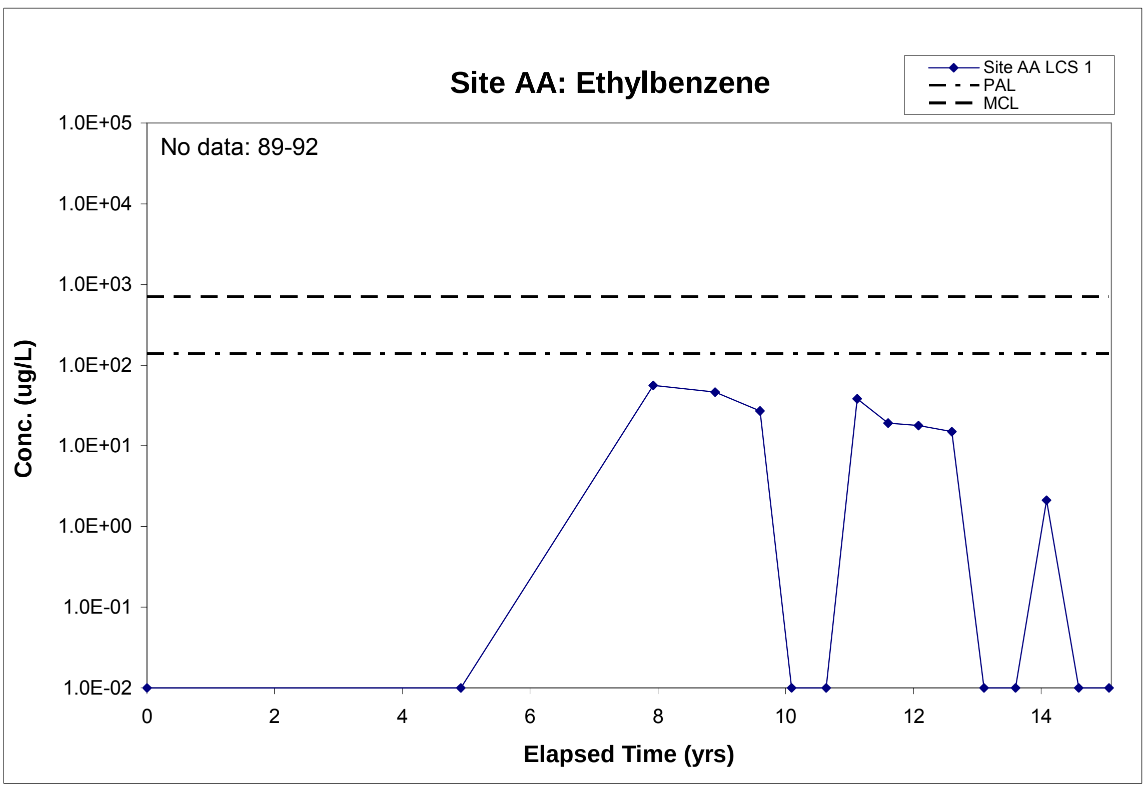

Site DD: Ethylbenzene
Site DD LCS 1
PAL
MCL
No data: 99-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

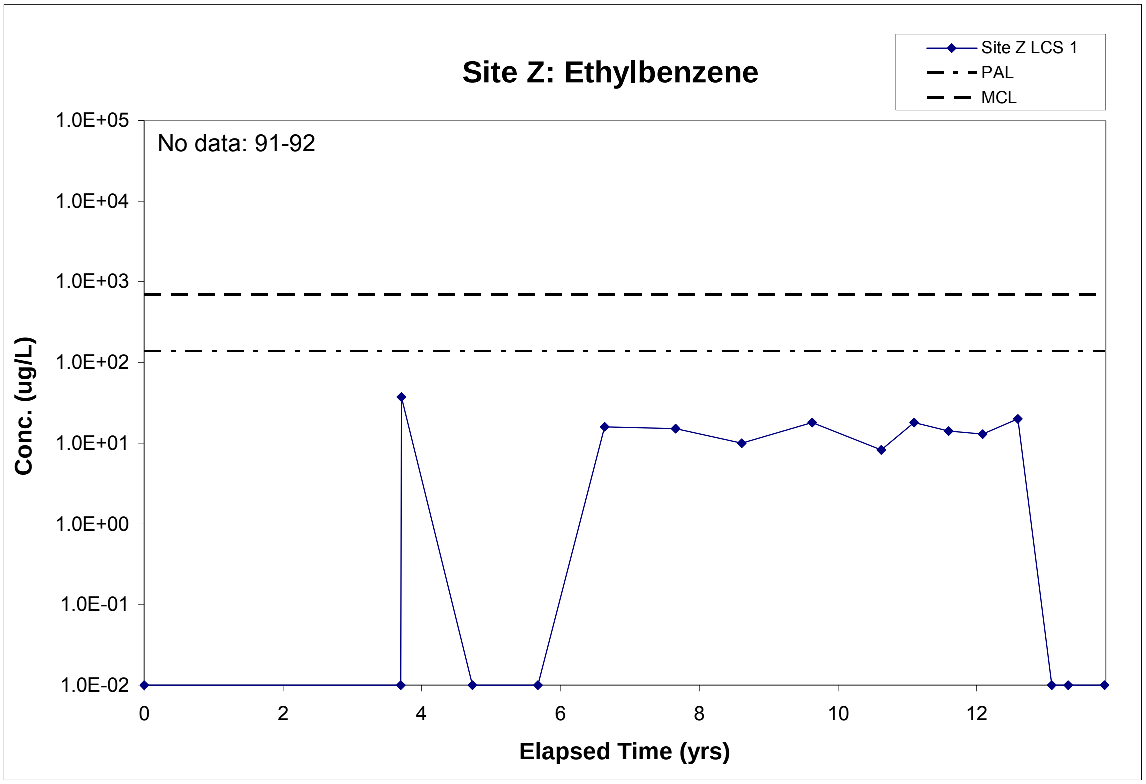

Site CC: Ethylbenzene
Site CC LCS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

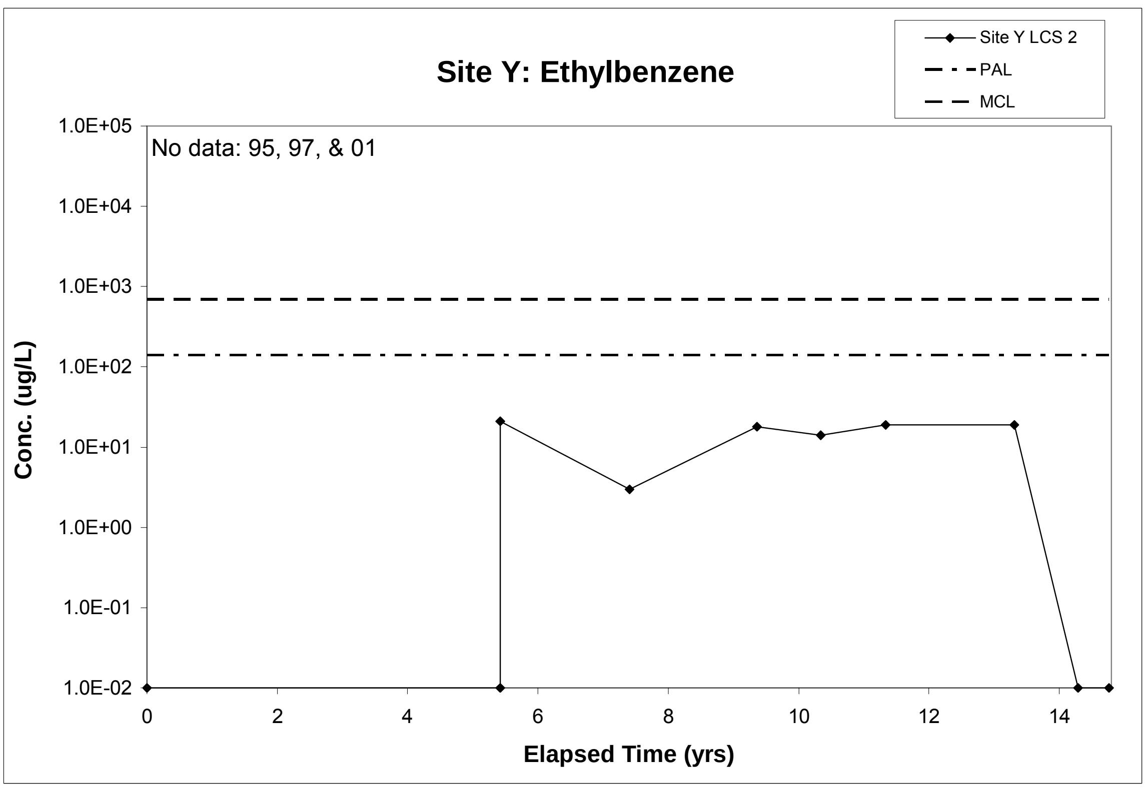

Site CC: Ethylbenzene
Site CC LCS 1
PAL
MCL
No data: 92-94
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

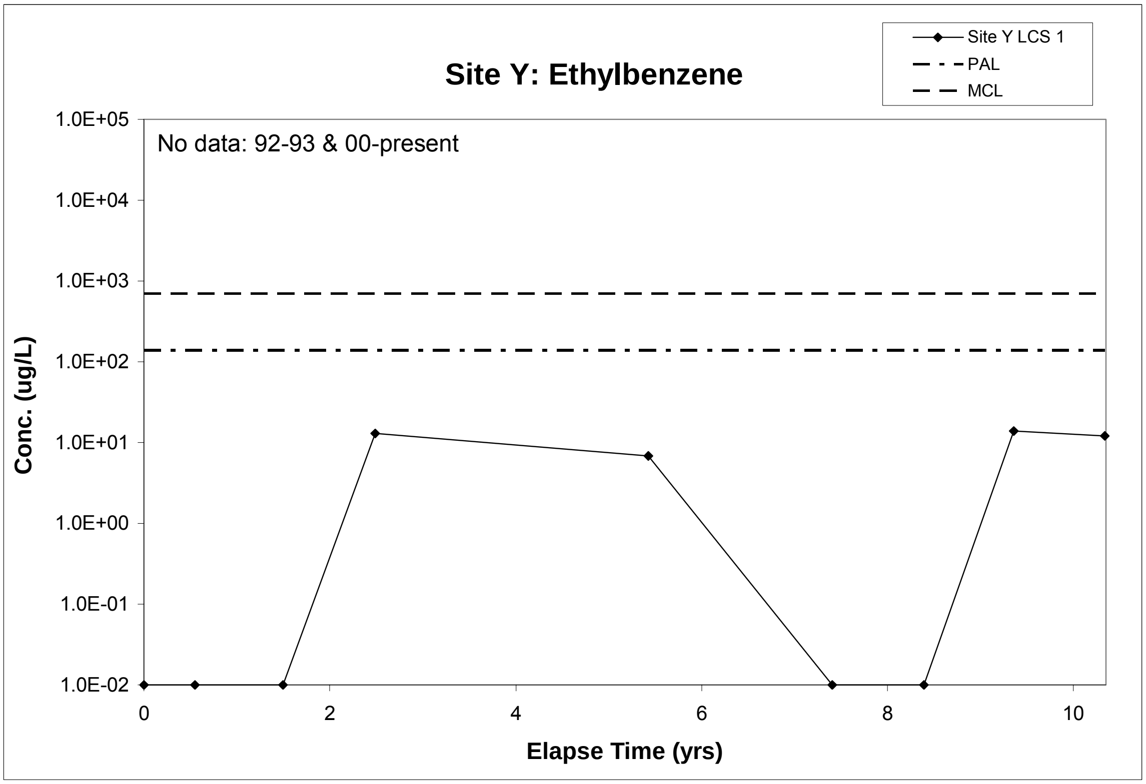

Site AA: Ethylbenzene
Site AA LCS 3
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

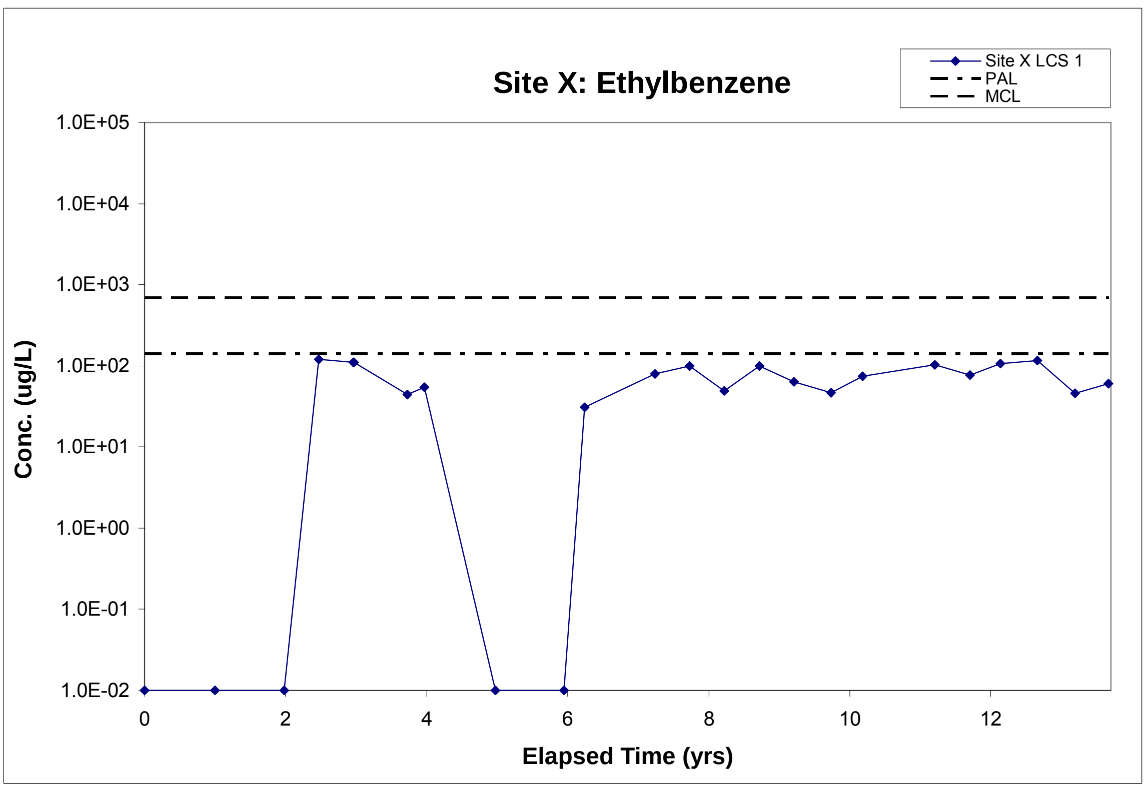

Site AA: Ethylbenzene
Site AA LCS 2
PAL
MCL
No data: 89-97
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

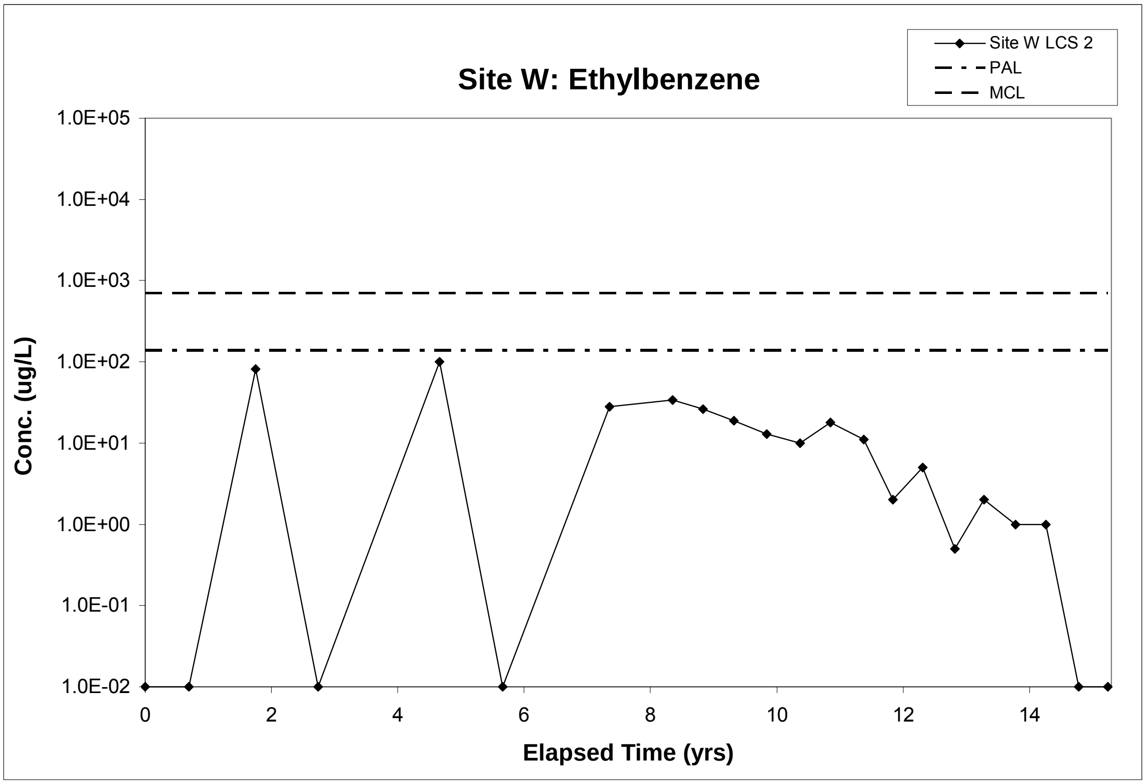

Site AA: Ethylbenzene
Site AA LCS 1
PAL
MCL
No data: 89-92
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

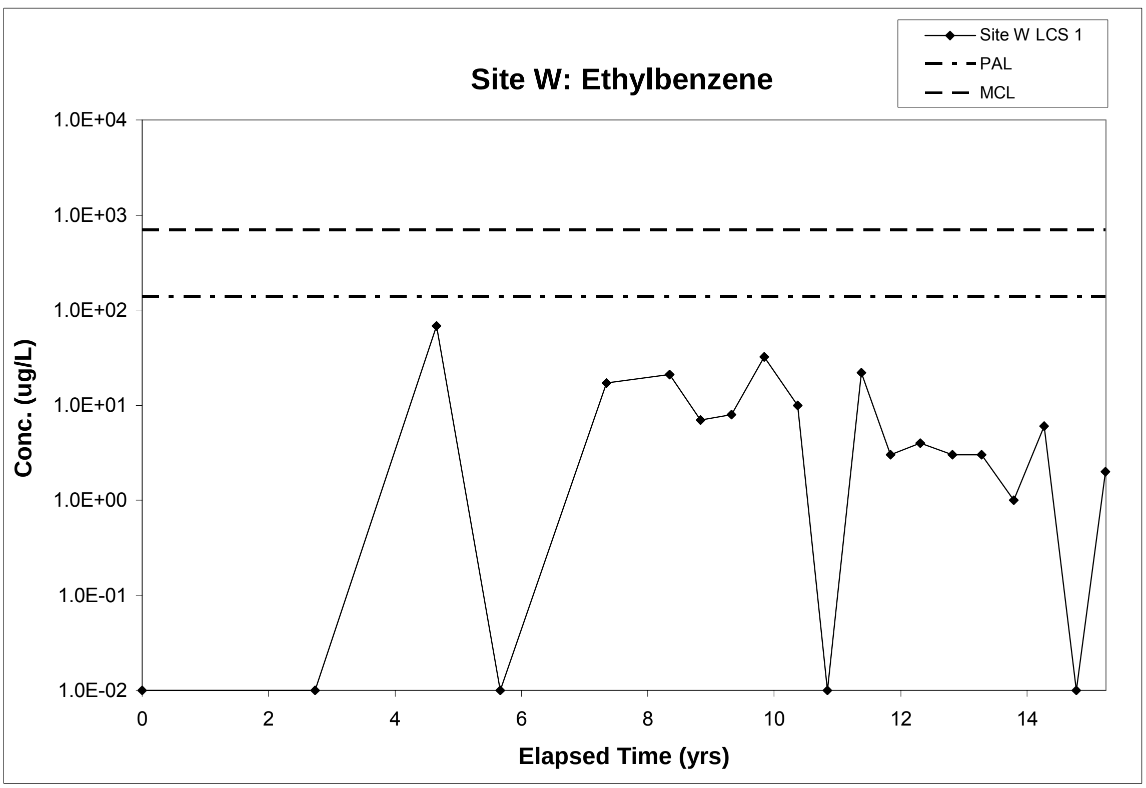

Site Z: Ethylbenzene
Site Z LCS 1
PAL
MCL
No data: 91-92
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

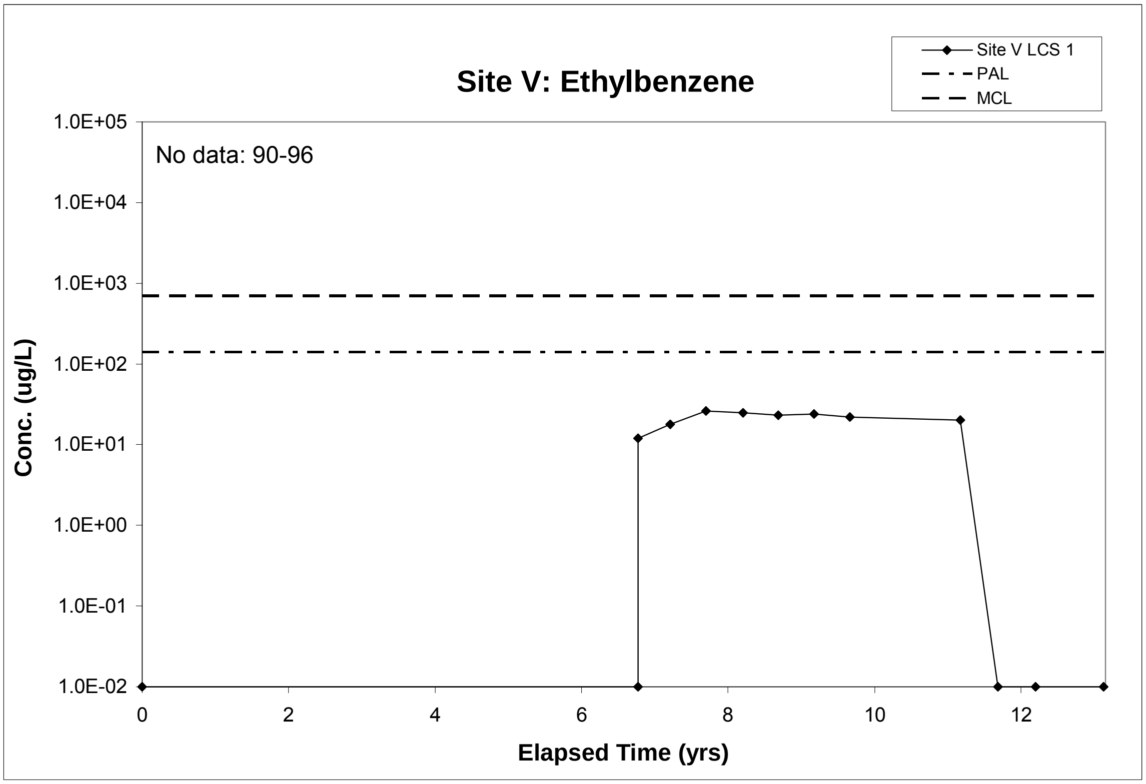

Site Y: Ethylbenzene
Site Y LCS 2
PAL
MCL
No data: 95, 97, & 01
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

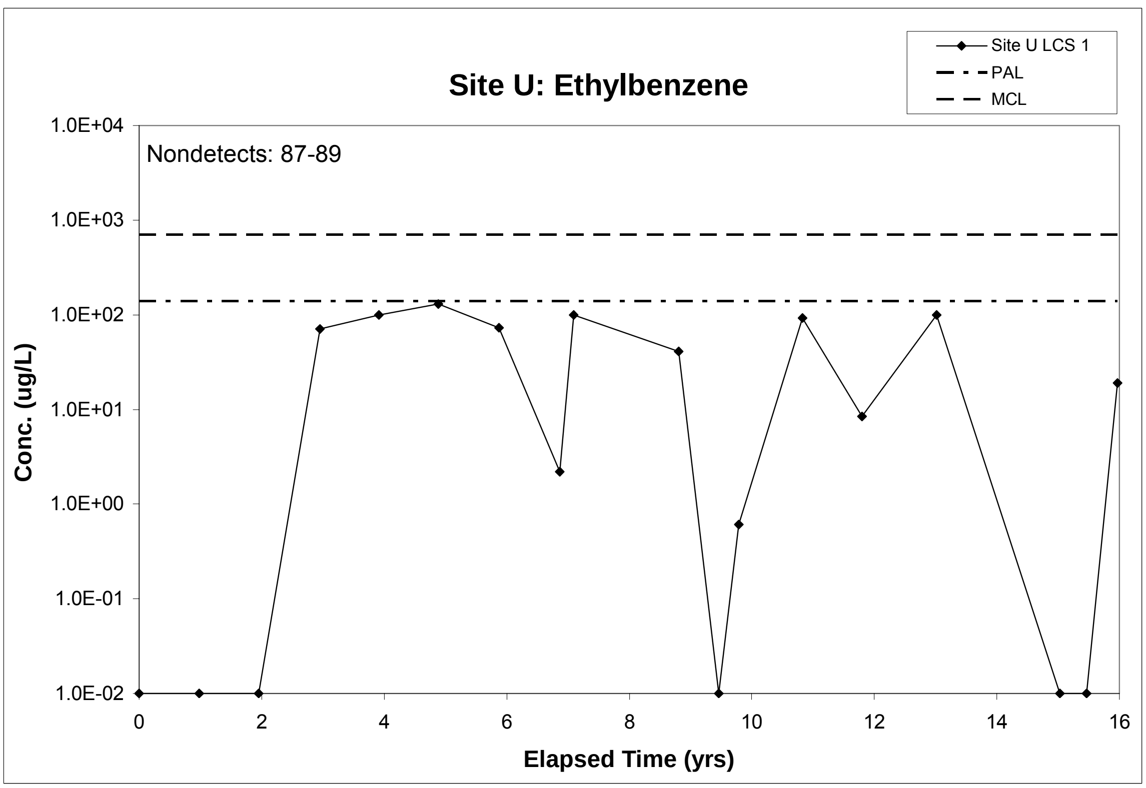

Site Y: Ethylbenzene
Site Y LCS 1
PAL
MCL
No data: 92-93 & 00-present
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapse Time (yrs)

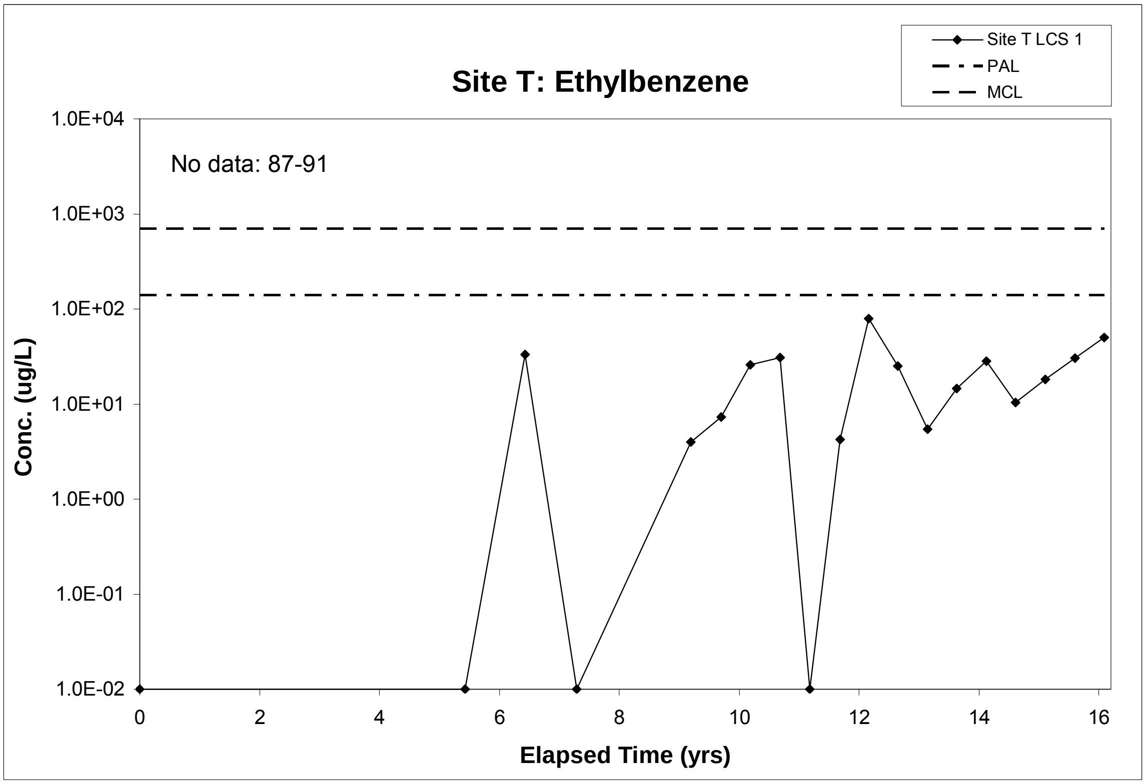

Site X: Ethylbenzene
Site X LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

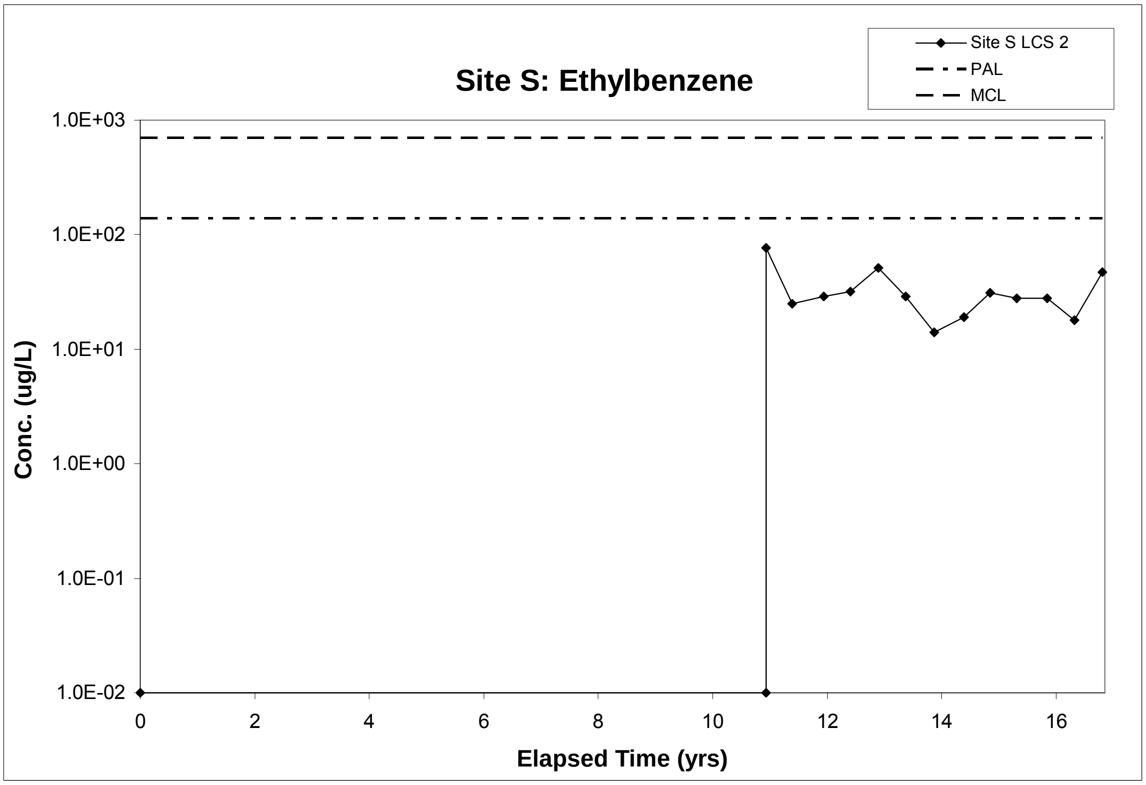

Site W: Ethylbenzene
Site W LCS 2
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

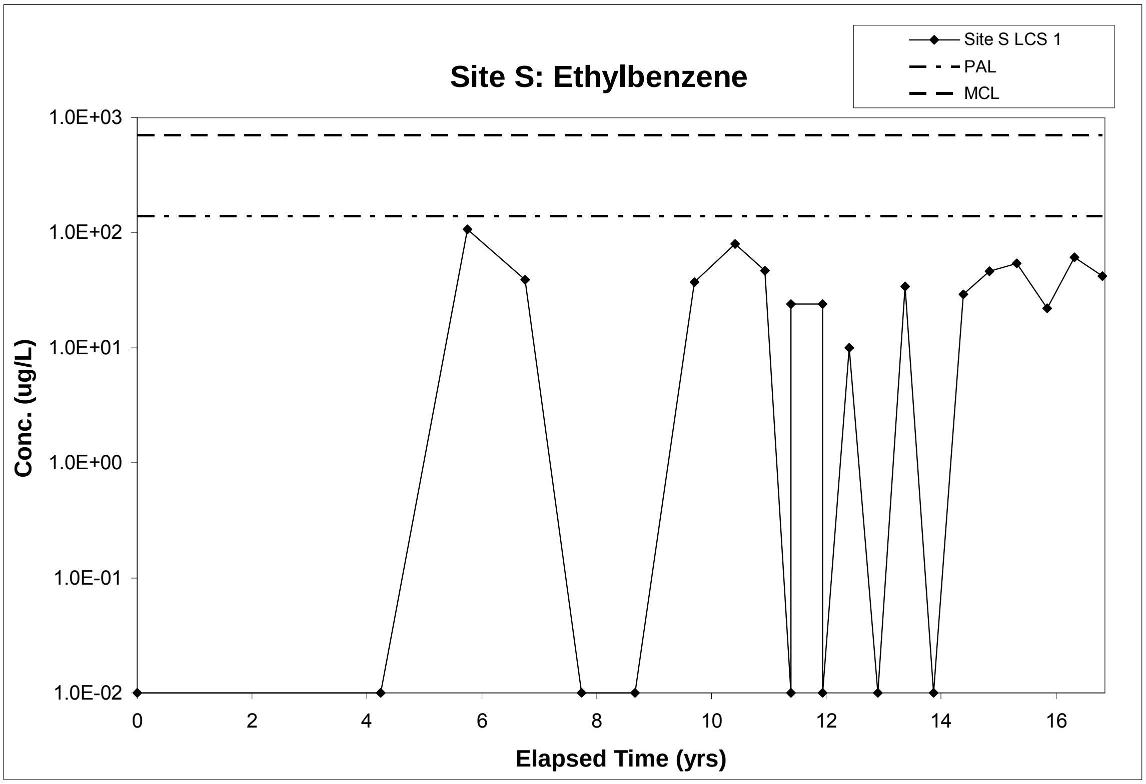

Site W: Ethylbenzene
Site W LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

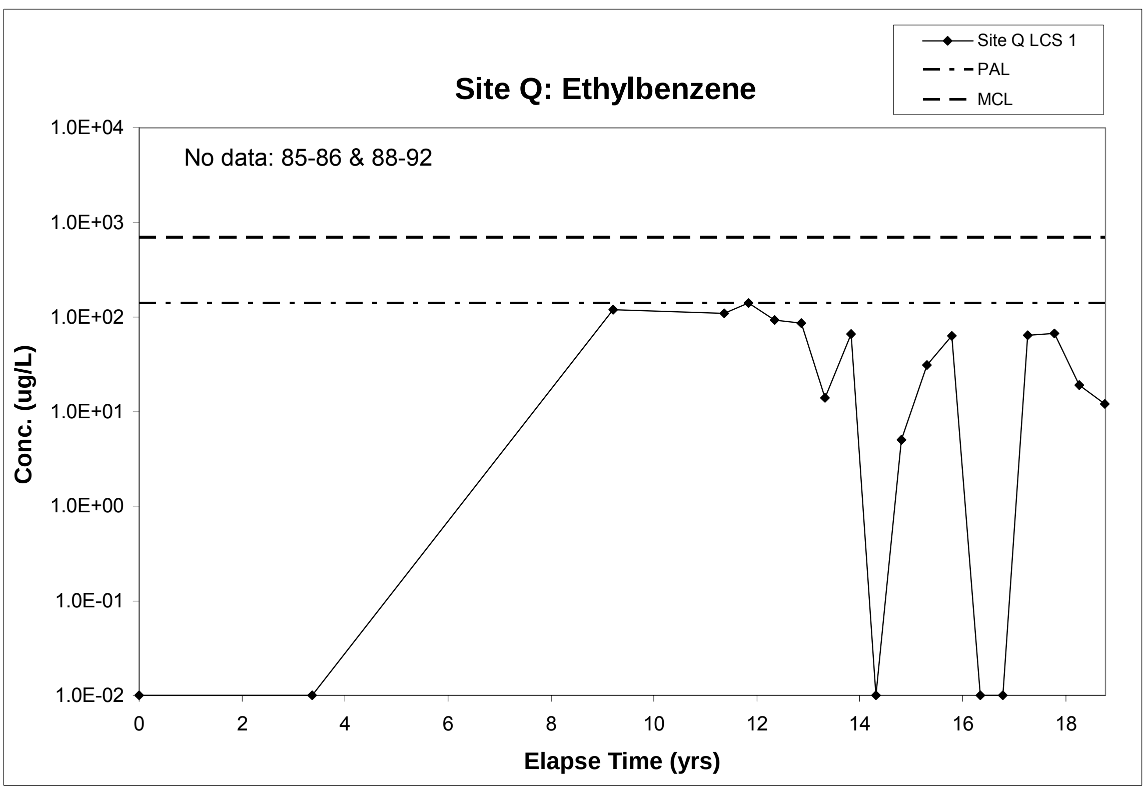

Site V: Ethylbenzene
Site V LCS 1
PAL
MCL
No data: 90-96
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

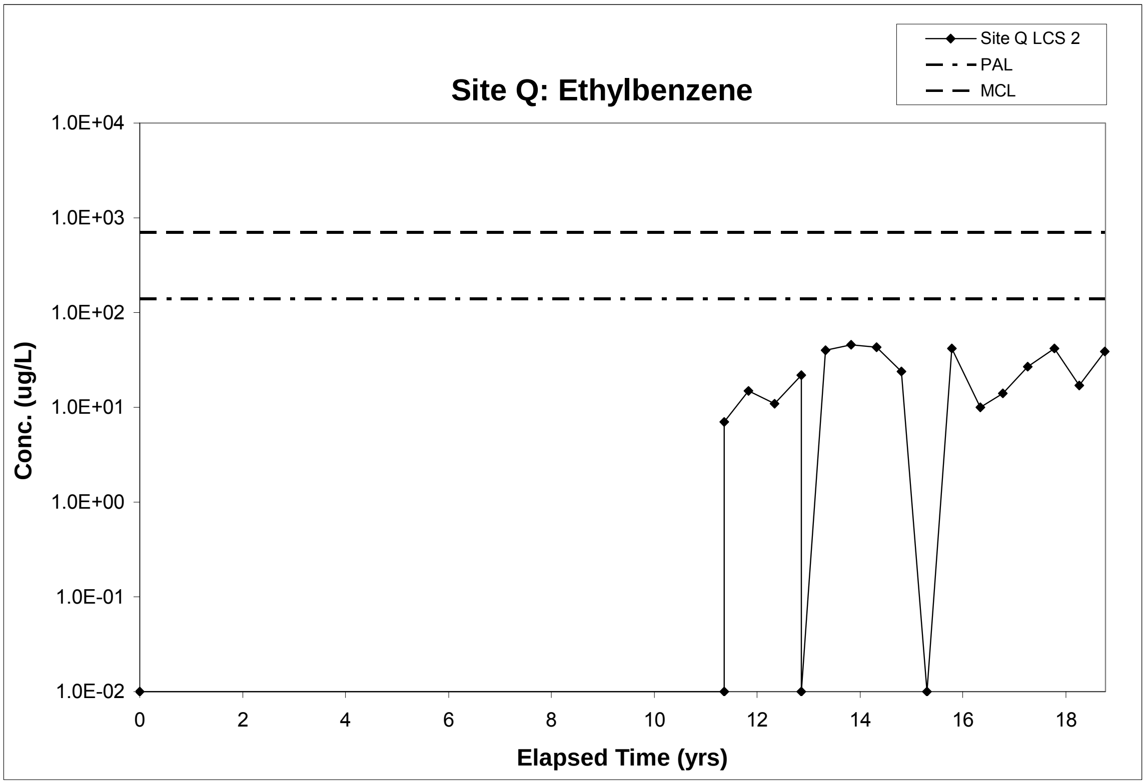

Site U: Ethylbenzene
Site U LCS 1
PAL
MCL
Nondetects: 87-89
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

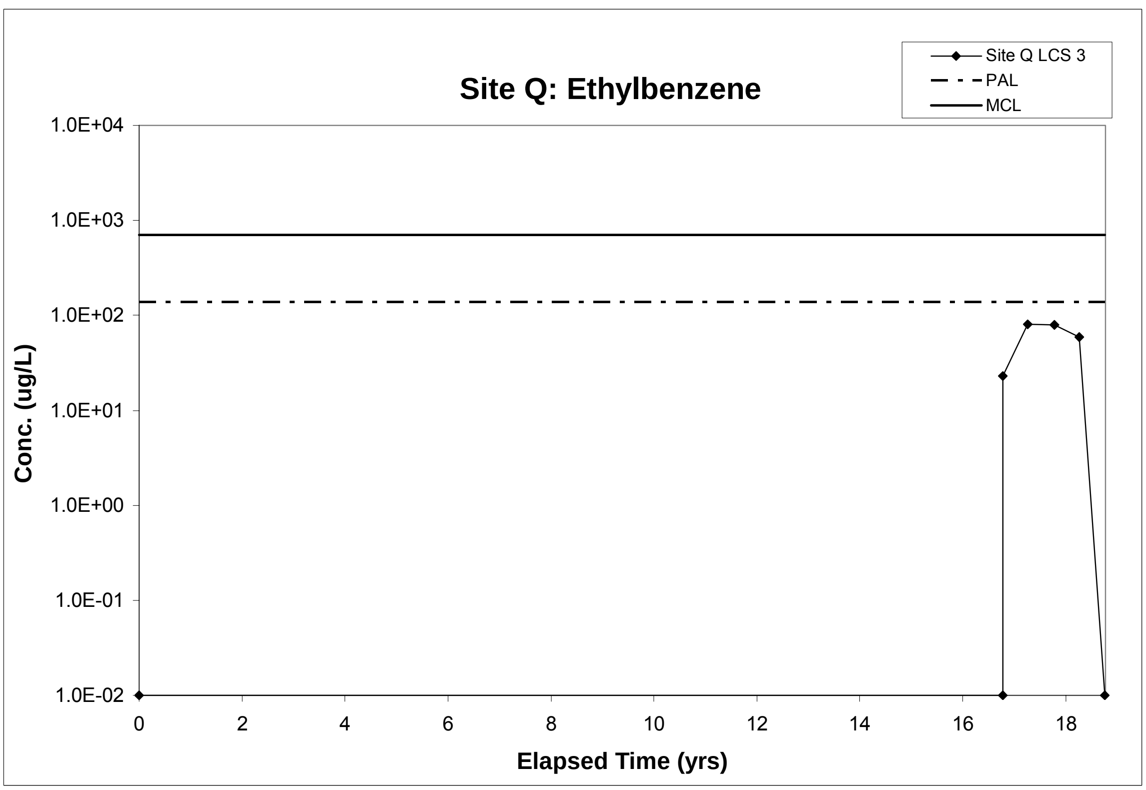

Site T: Ethylbenzene
Site T LCS 1
PAL
MCL
No data: 87-91
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

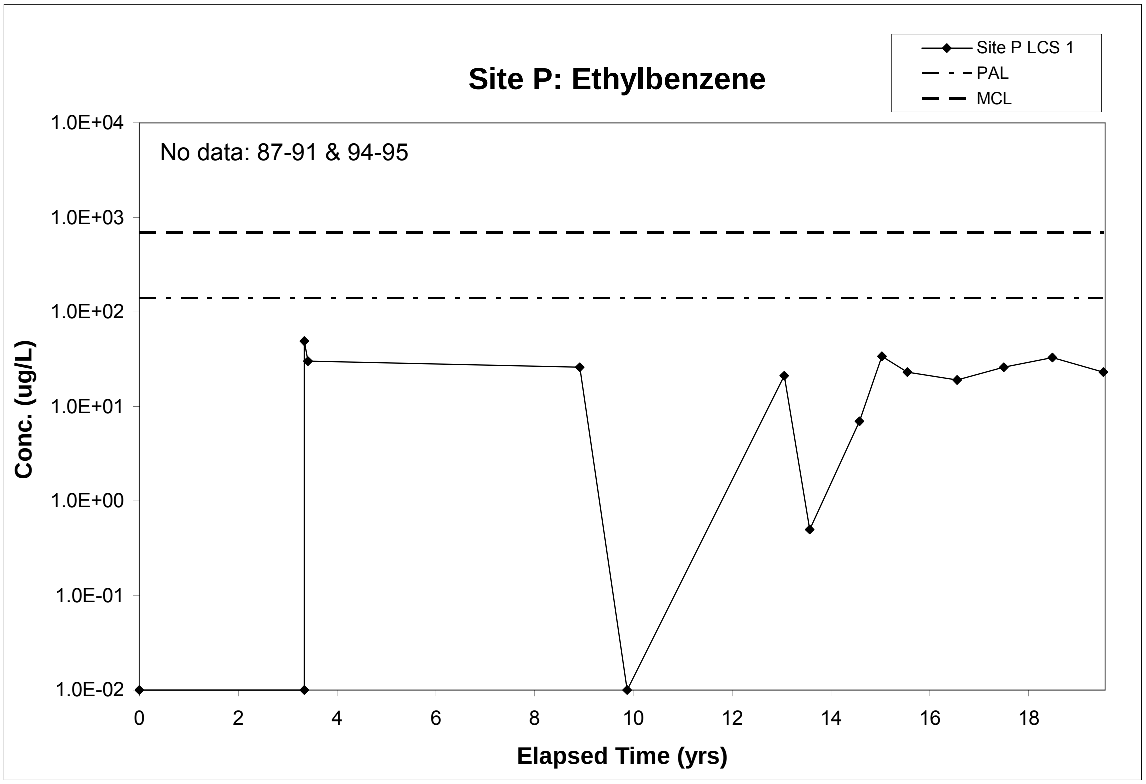

Site S: Ethylbenzene
Site S LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

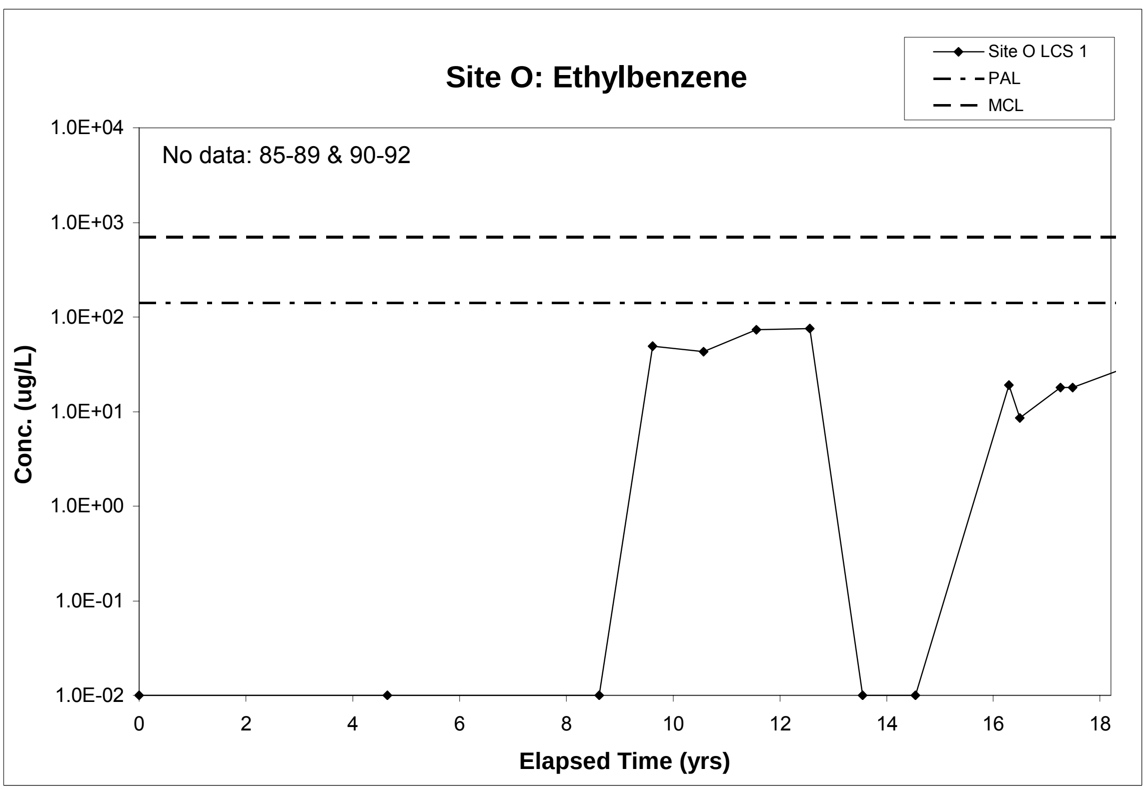

Site S: Ethylbenzene
Site S LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

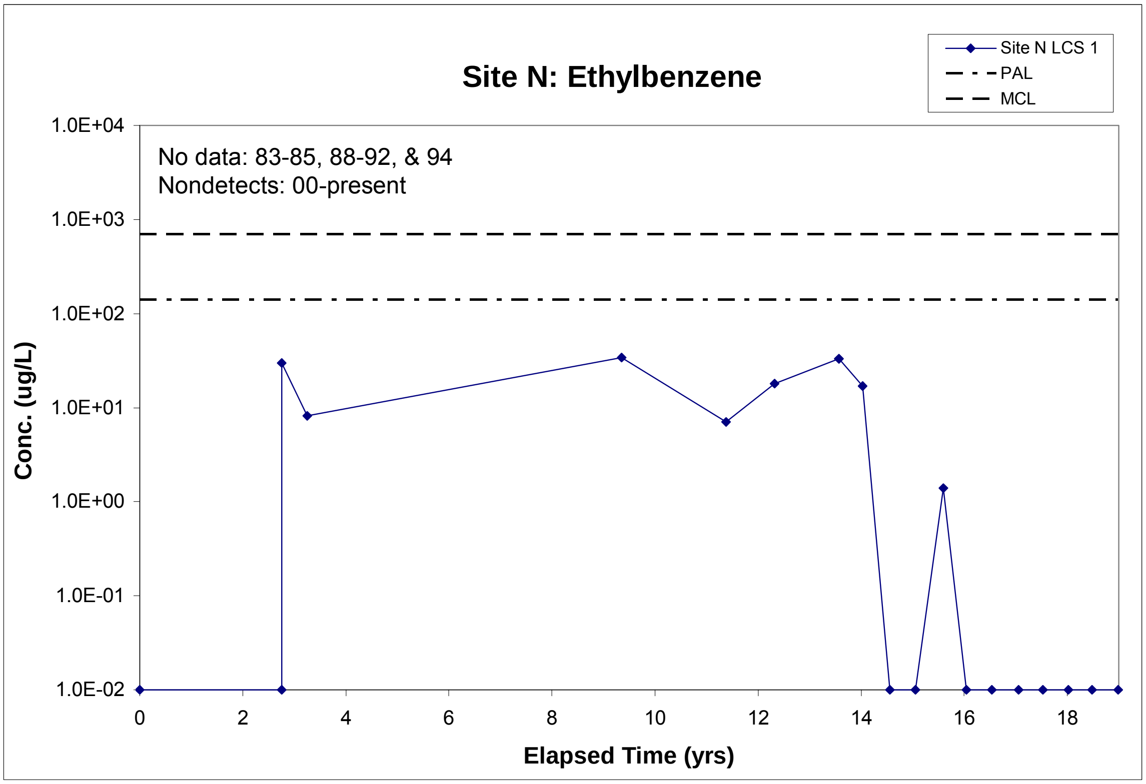

Site Q: Ethylbenzene
Site Q LCS 1
PAL
MCL
No data: 85-86 & 88-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapse Time (yrs)

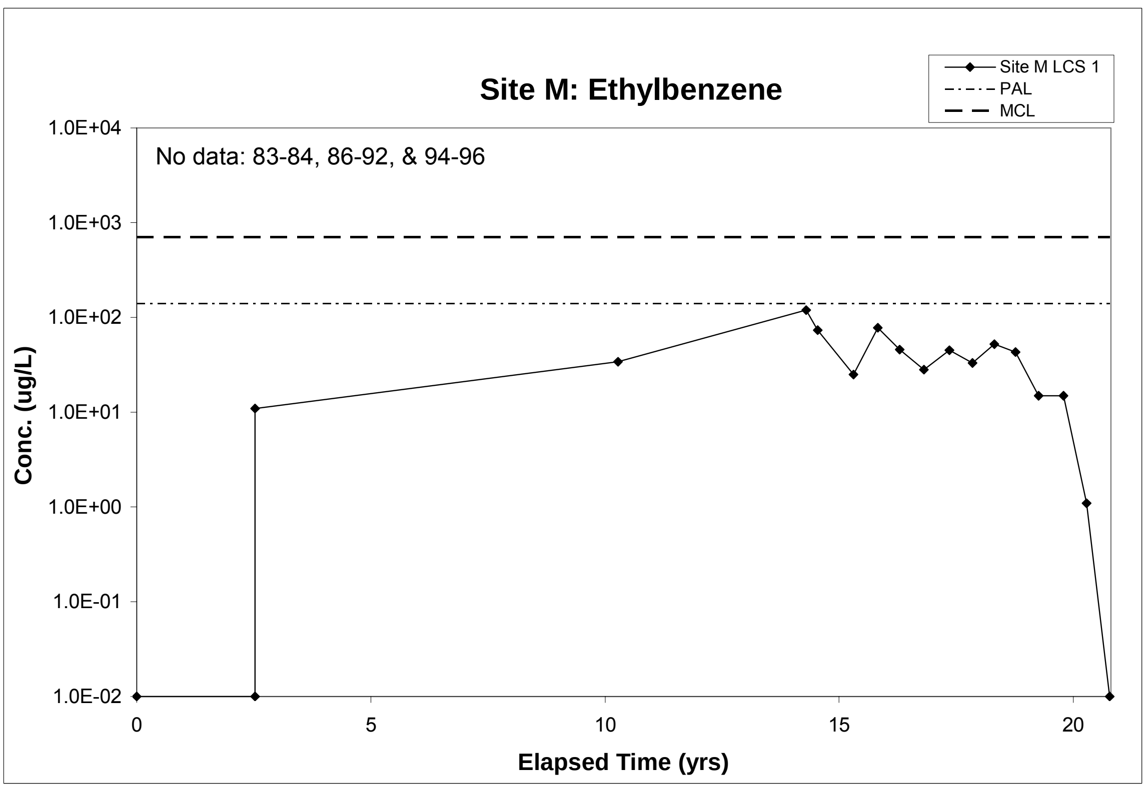

Site Q LCS 2
PAL
MCL
Site Q: Ethylbenzene
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

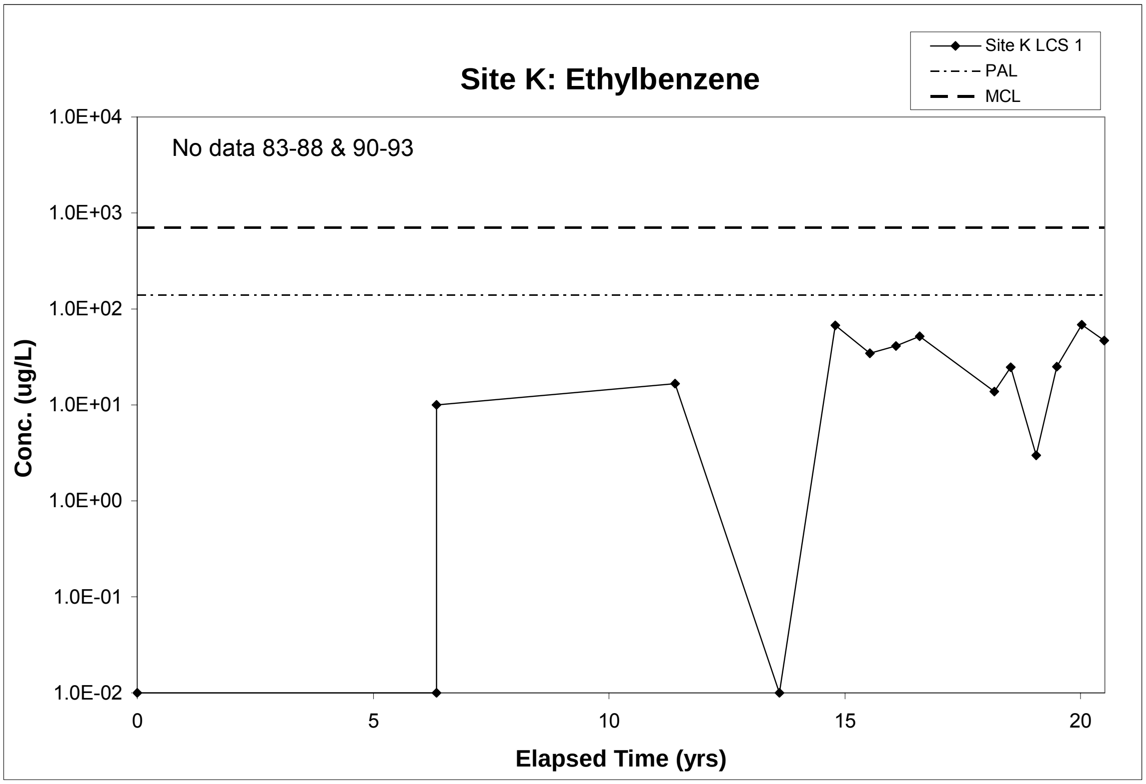

Site Q LCS 3
PAL
MCL
Site Q: Ethylbenzene
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

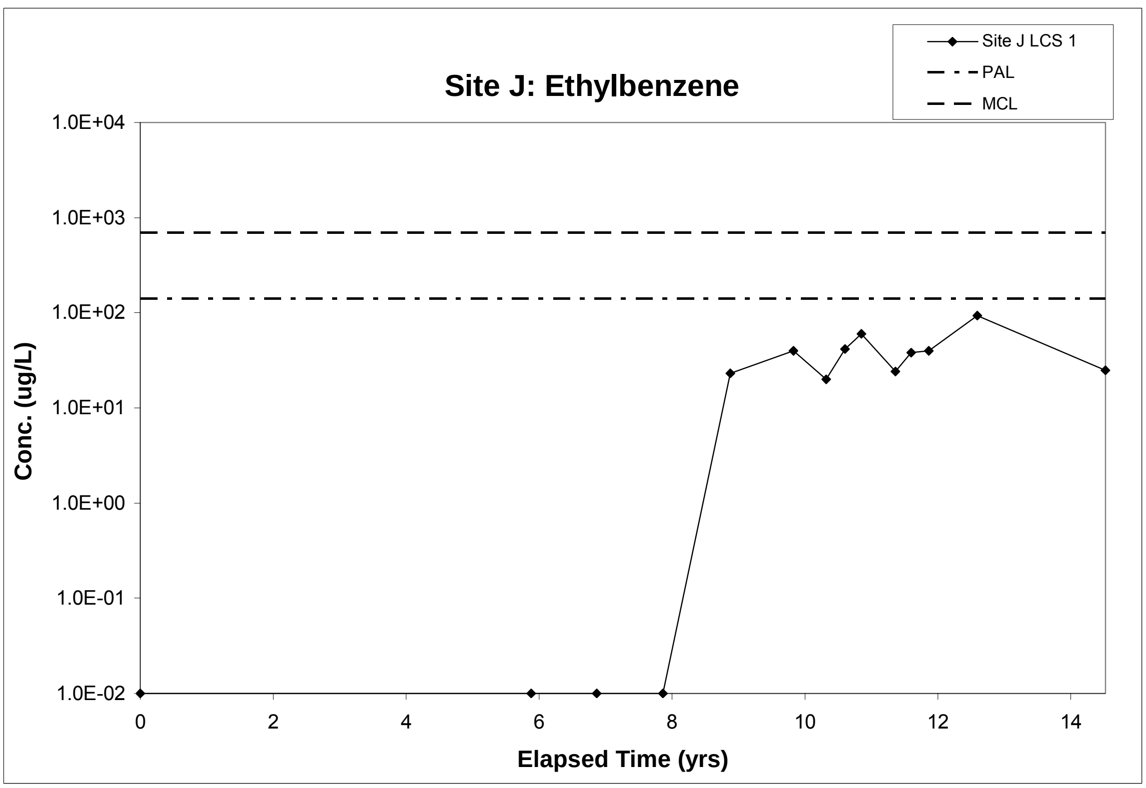

Site P: Ethylbenzene
Site P LCS 1
PAL
MCL
No data: 87-91 & 94-95
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

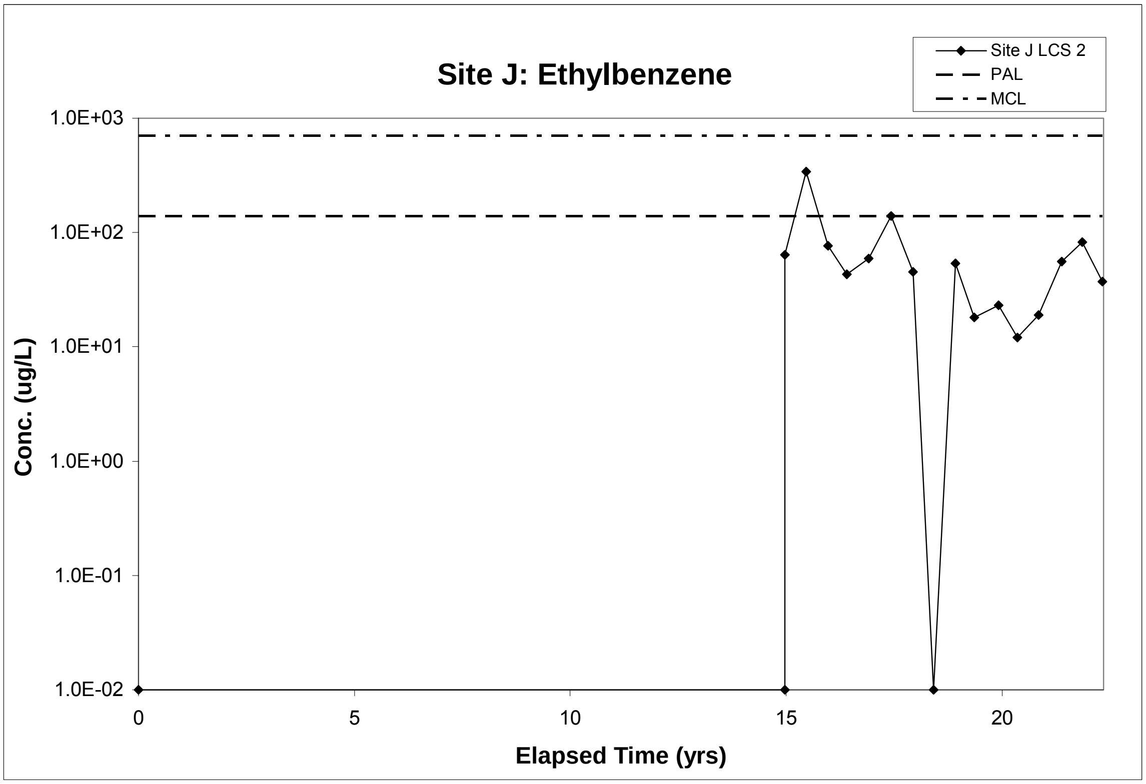

Site O: Ethylbenzene
Site O LCS 1
PAL
MCL
No data: 85-89 & 90-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)


Site N: Ethylbenzene
Site N LCS 1
PAL
MCL
No data: 83-85, 88-92, & 94
Nondetects: 00-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

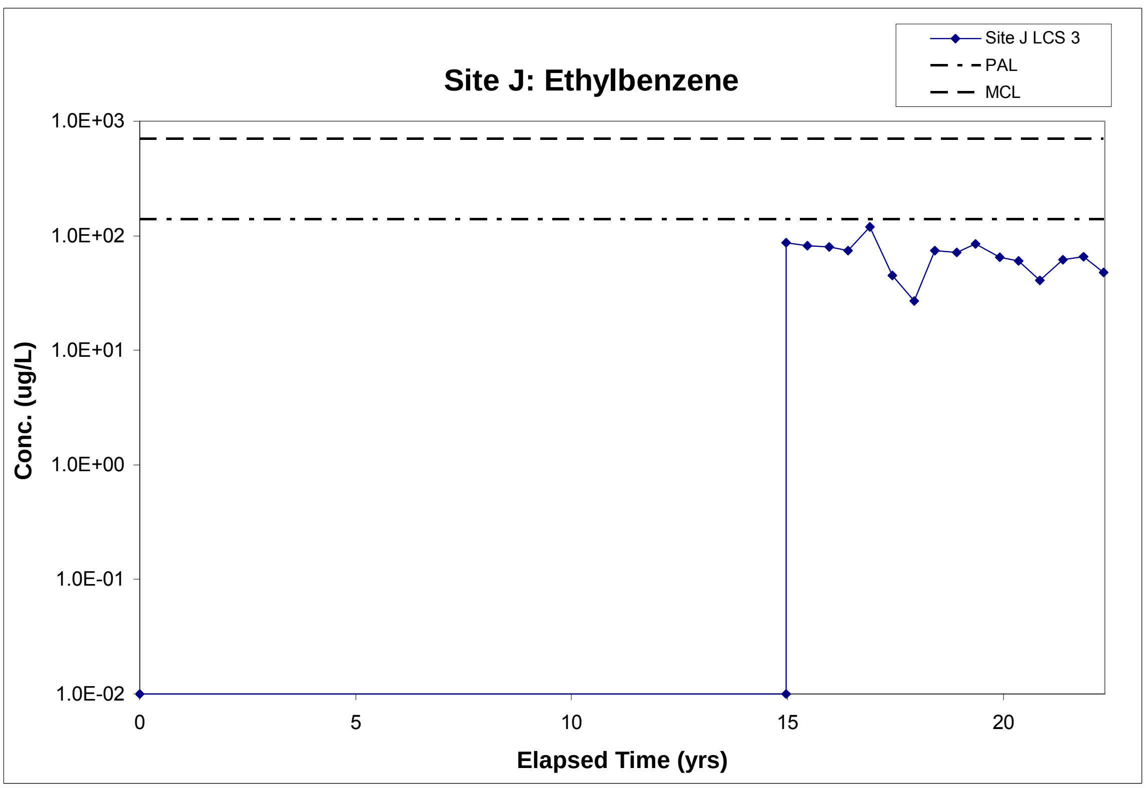

Site M: Ethylbenzene
Site M LCS 1
PAL
MCL
No data: 83-84, 86-92, & 94-96
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)


Site K: Ethylbenzene
Site K LCS 1
PAL
MCL
No data 83-88 & 90-93
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

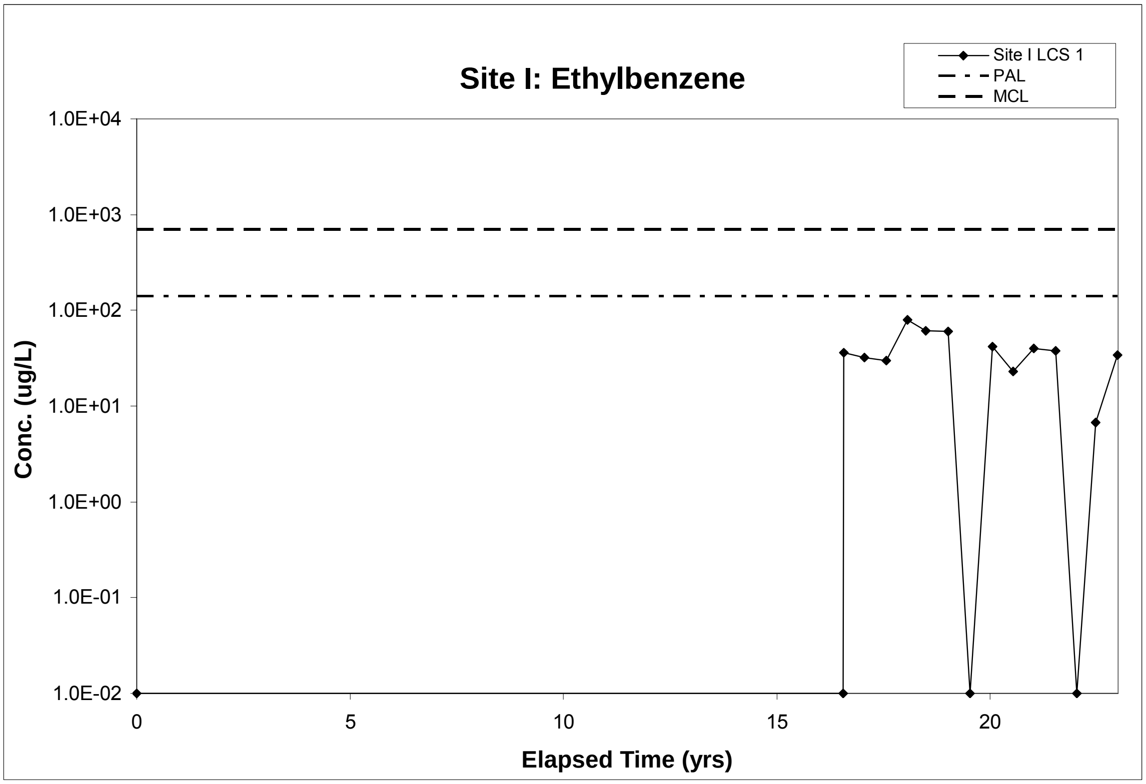

Site J: Ethylbenzene
Site J LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

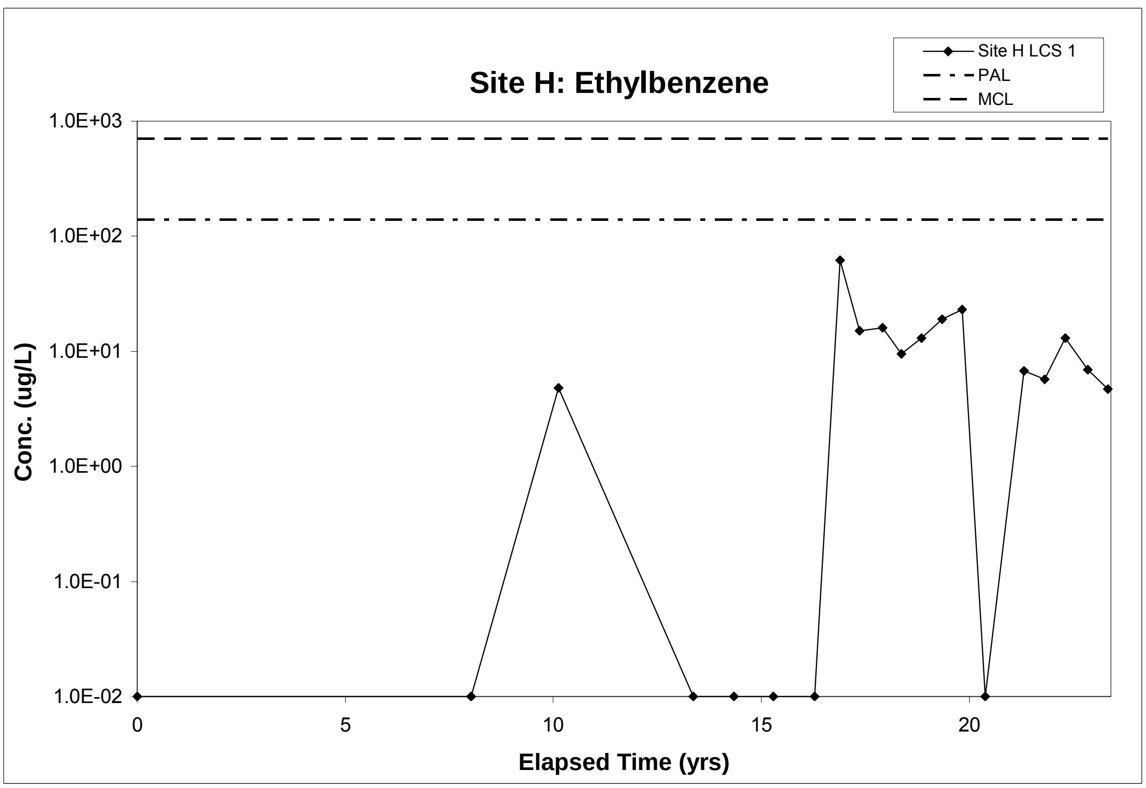


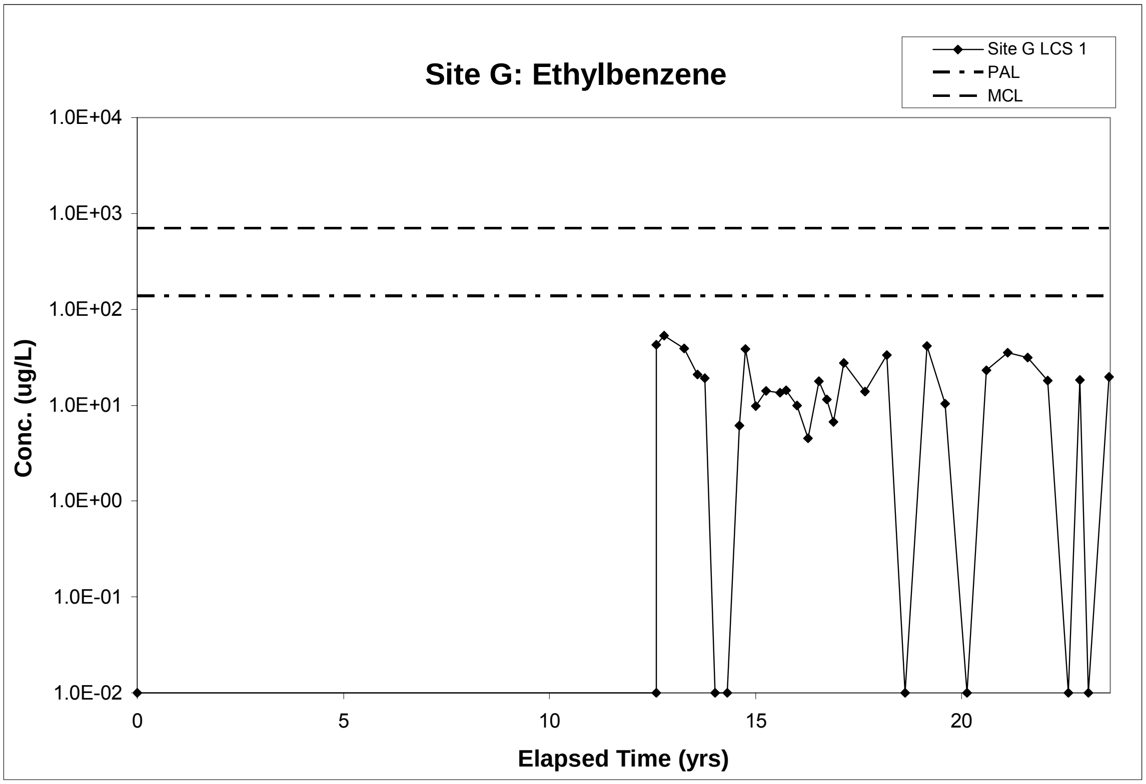
Site J: Ethylbenzene
Site J LCS 2
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

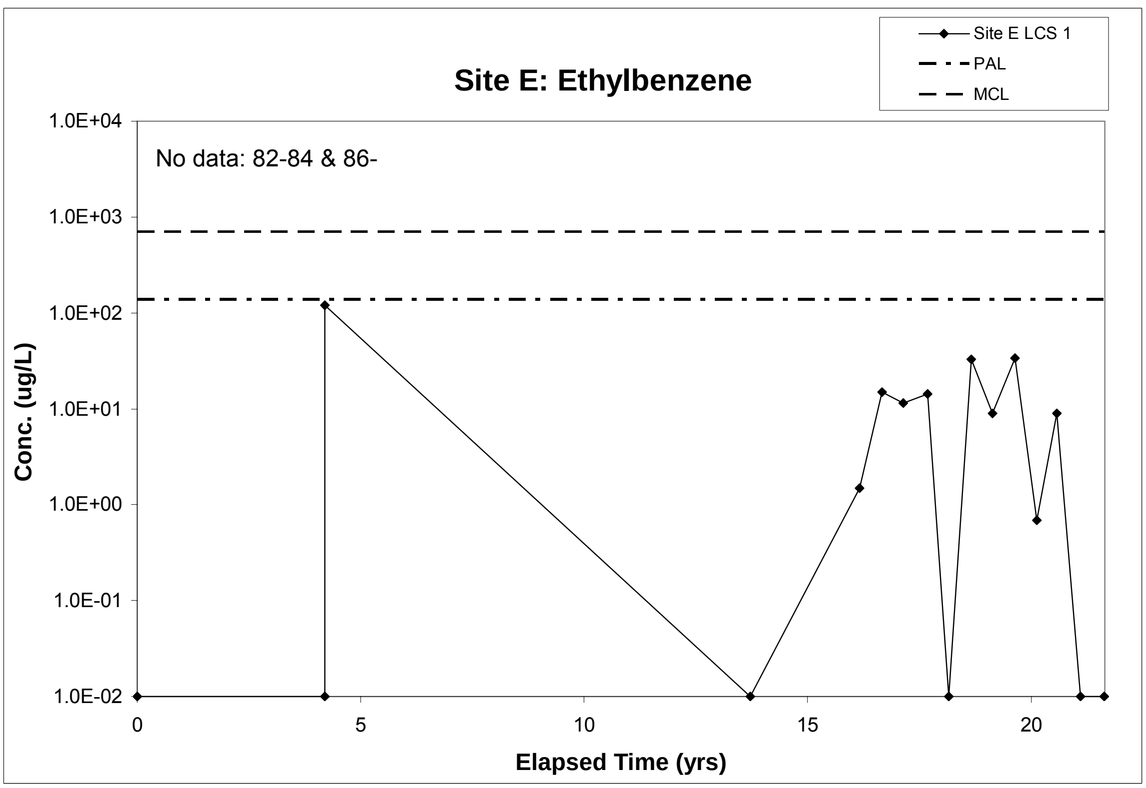


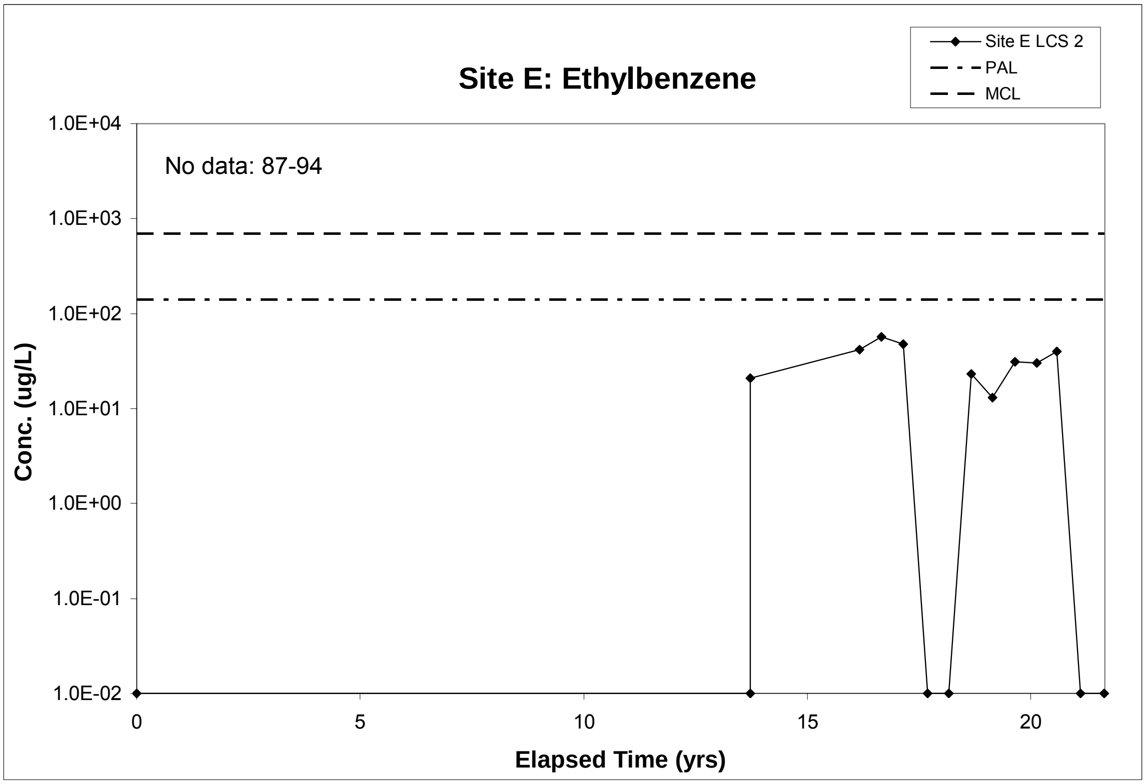
Site J: Ethylbenzene
Site J LCS 3
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

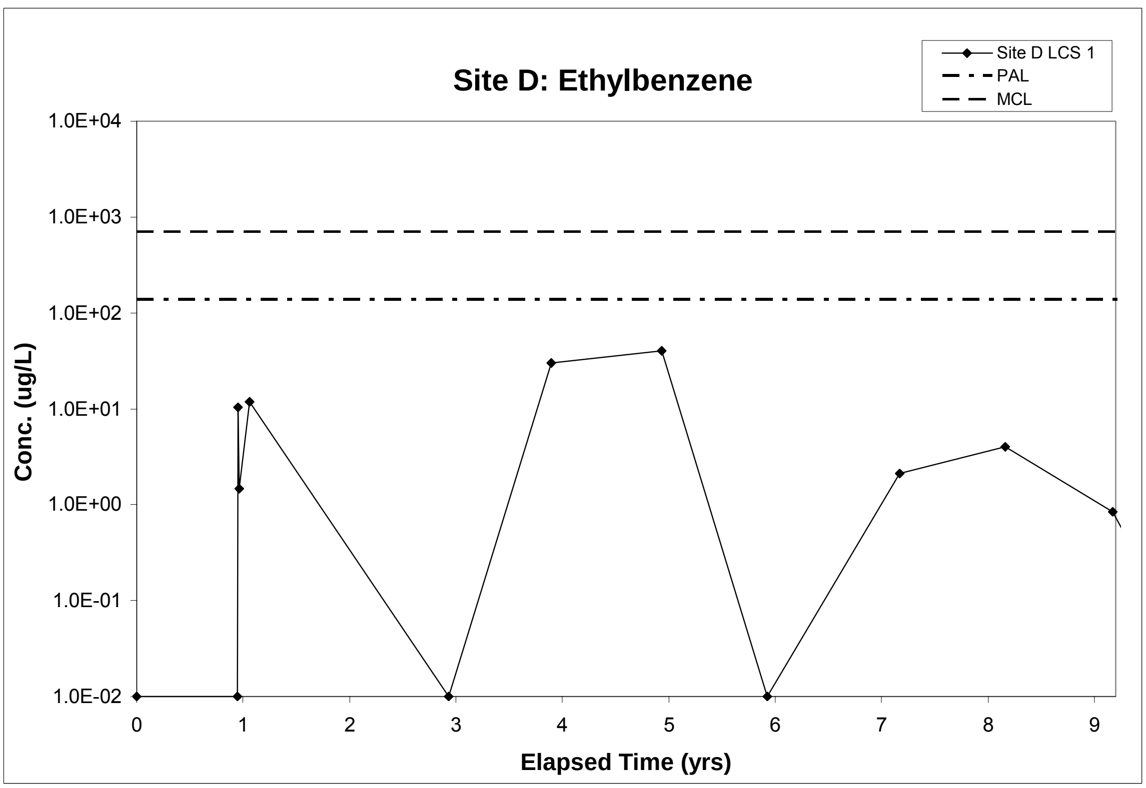

Site I: Ethylbenzene
Site I LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

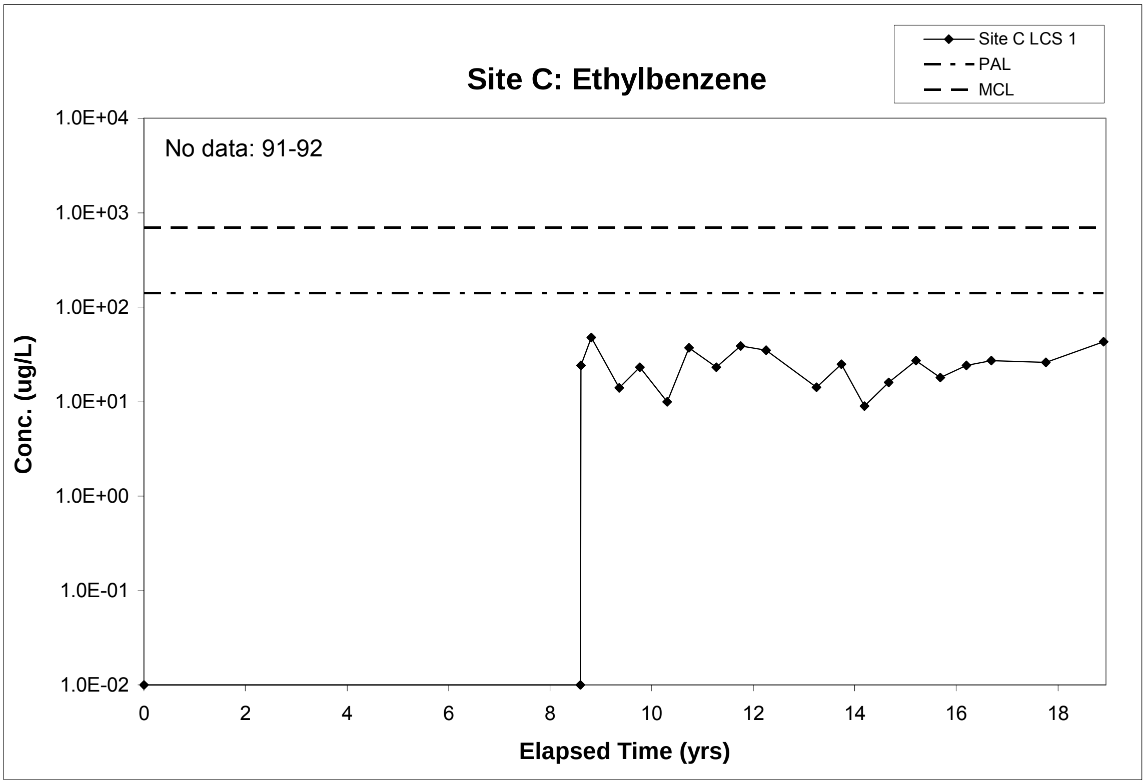

Site H: Ethylbenzene
Site H LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

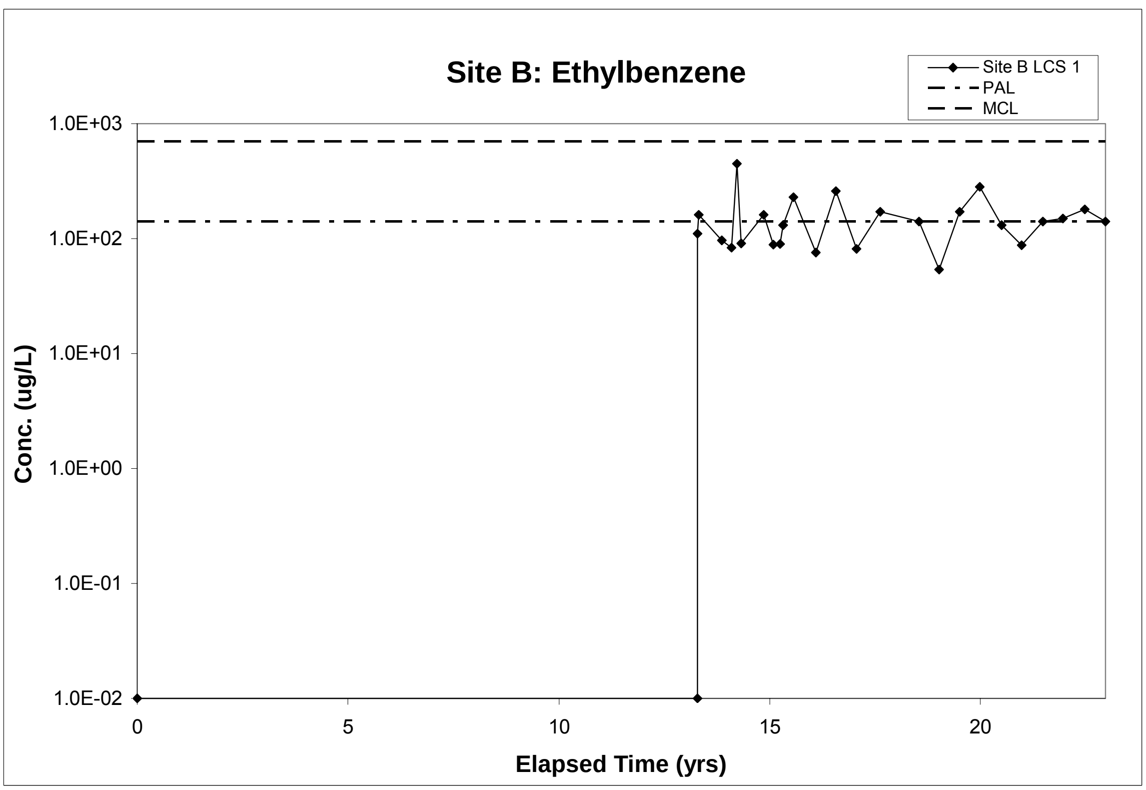

Site G: Ethylbenzene
Site G LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

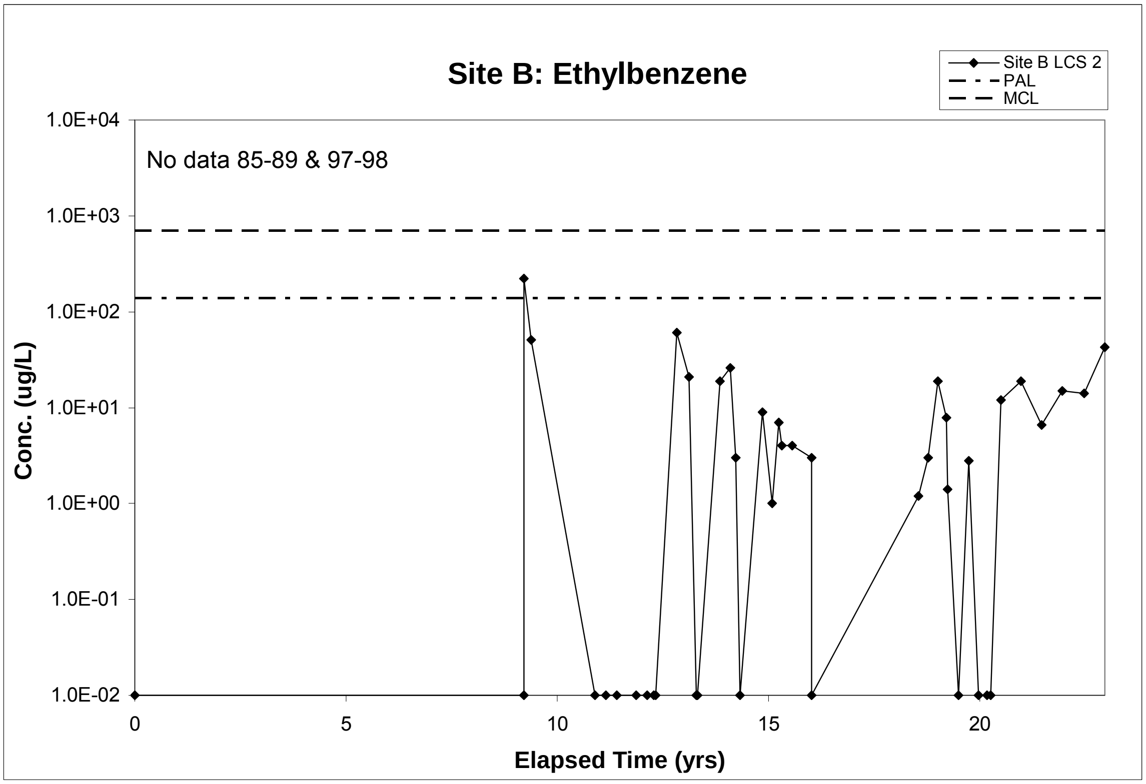

Site E: Ethylbenzene
Site E LCS 1
PAL
MCL
No data: 82-84 & 86-
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

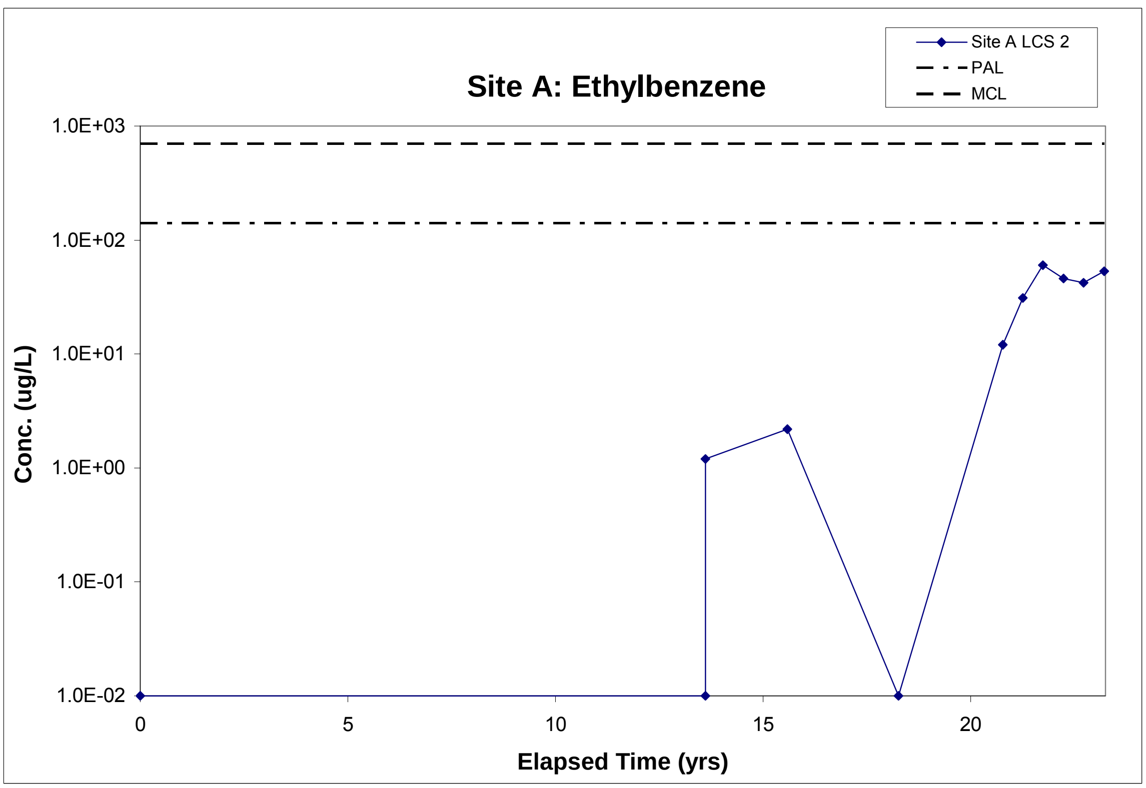

Site E: Ethylbenzene
Site E LCS 2
PAL
MCL
No data: 87-94
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

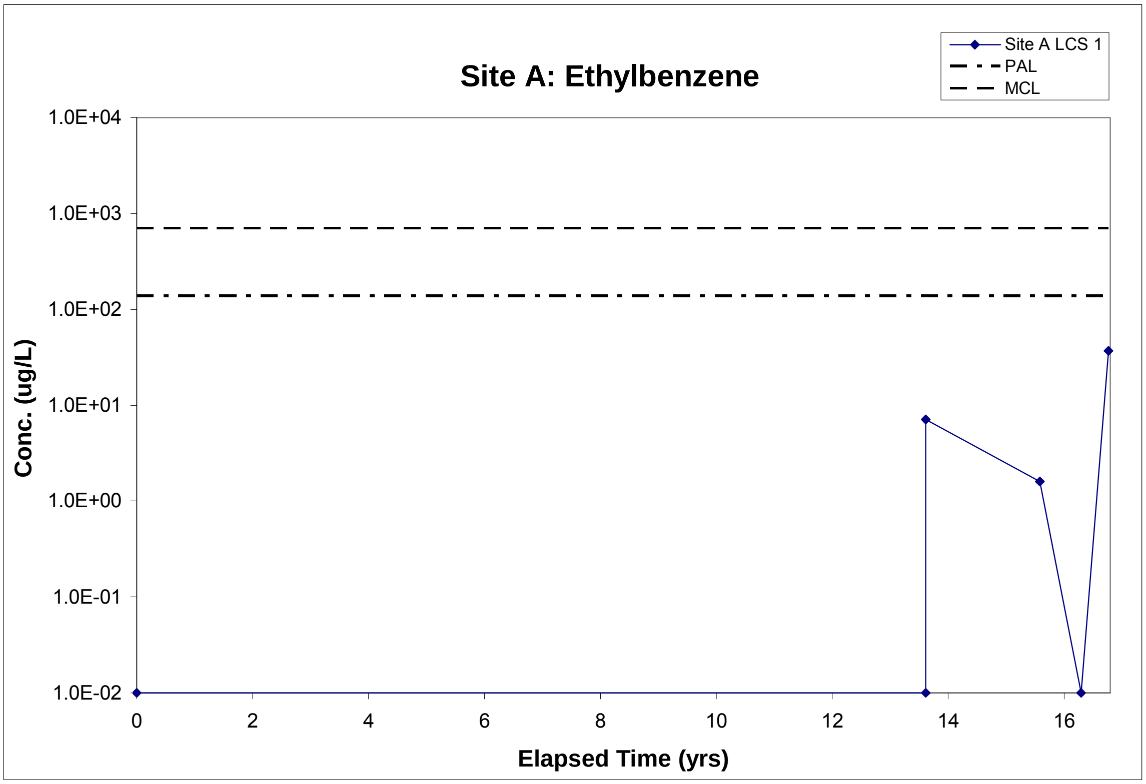

Site D: Ethylbenzene
Site D LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
9
Elapsed Time (yrs)

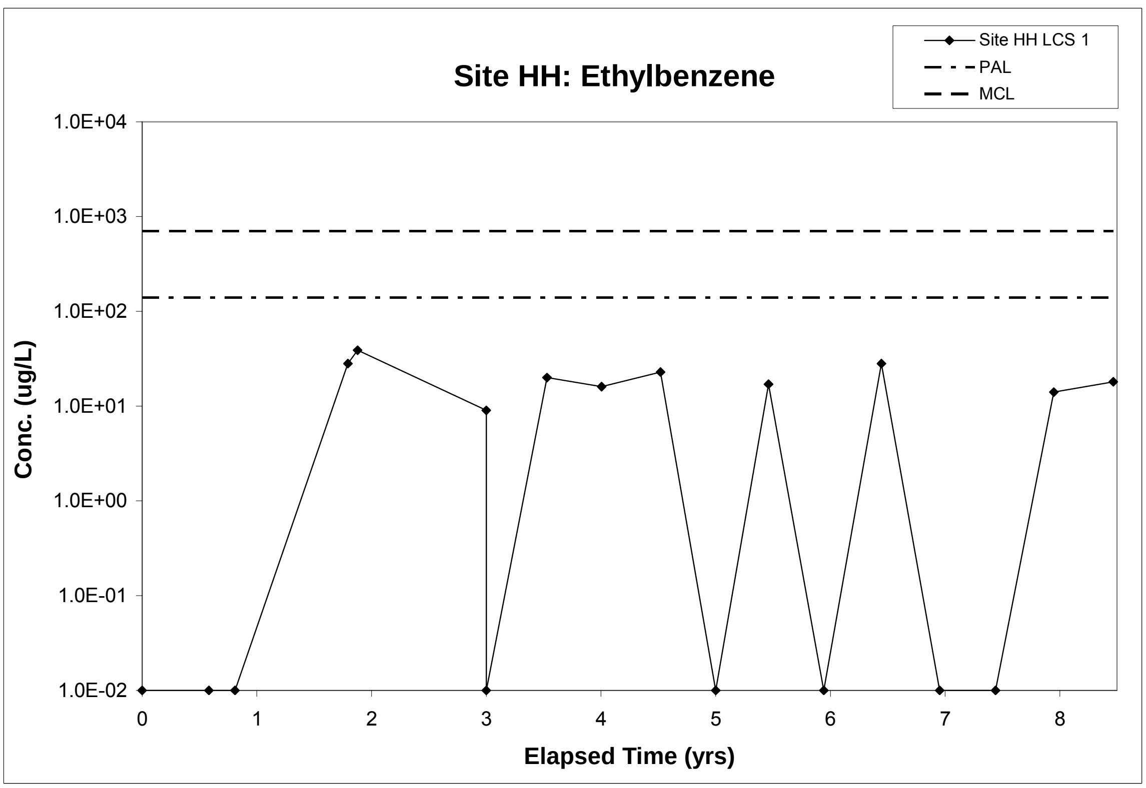

Site C: Ethylbenzene
Site C LCS 1
PAL
MCL
No data: 91-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

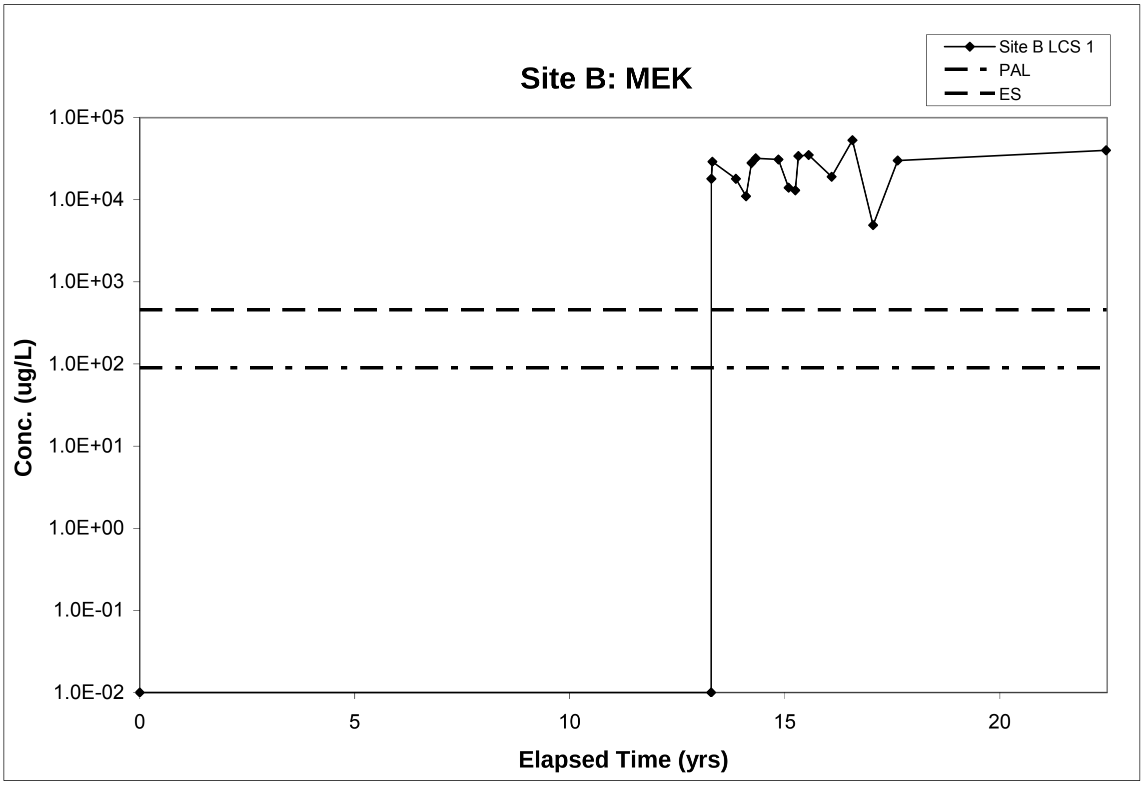

Site B: Ethylbenzene
Site B LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

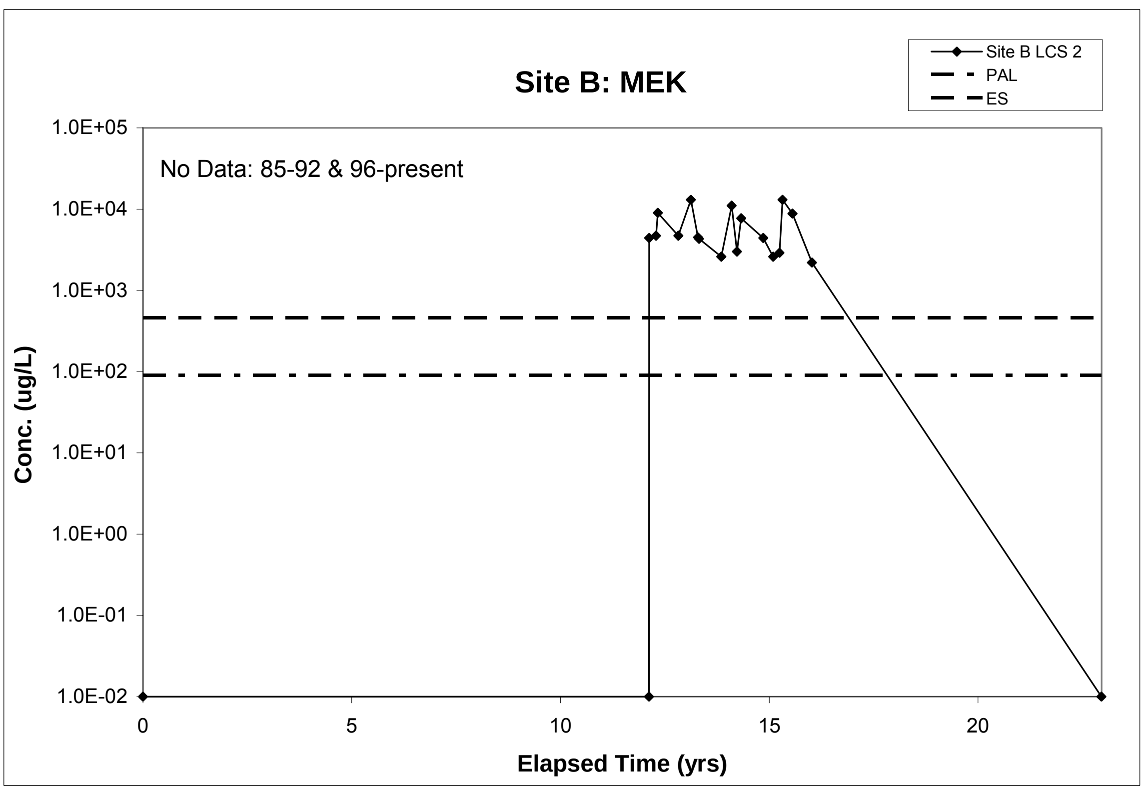

Site B: Ethylbenzene
Site B LCS 2
PAL
MCL
No data 85-89 & 97-98
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

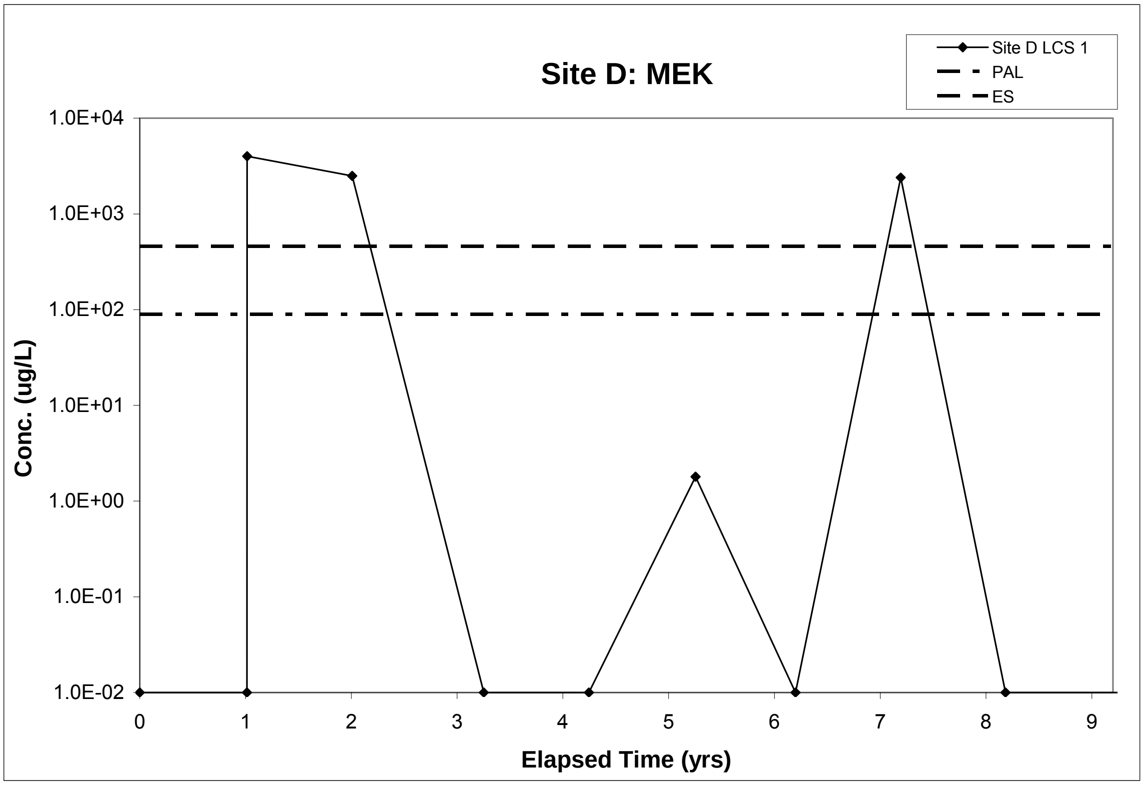

Site A: Ethylbenzene
Site A LCS 2
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

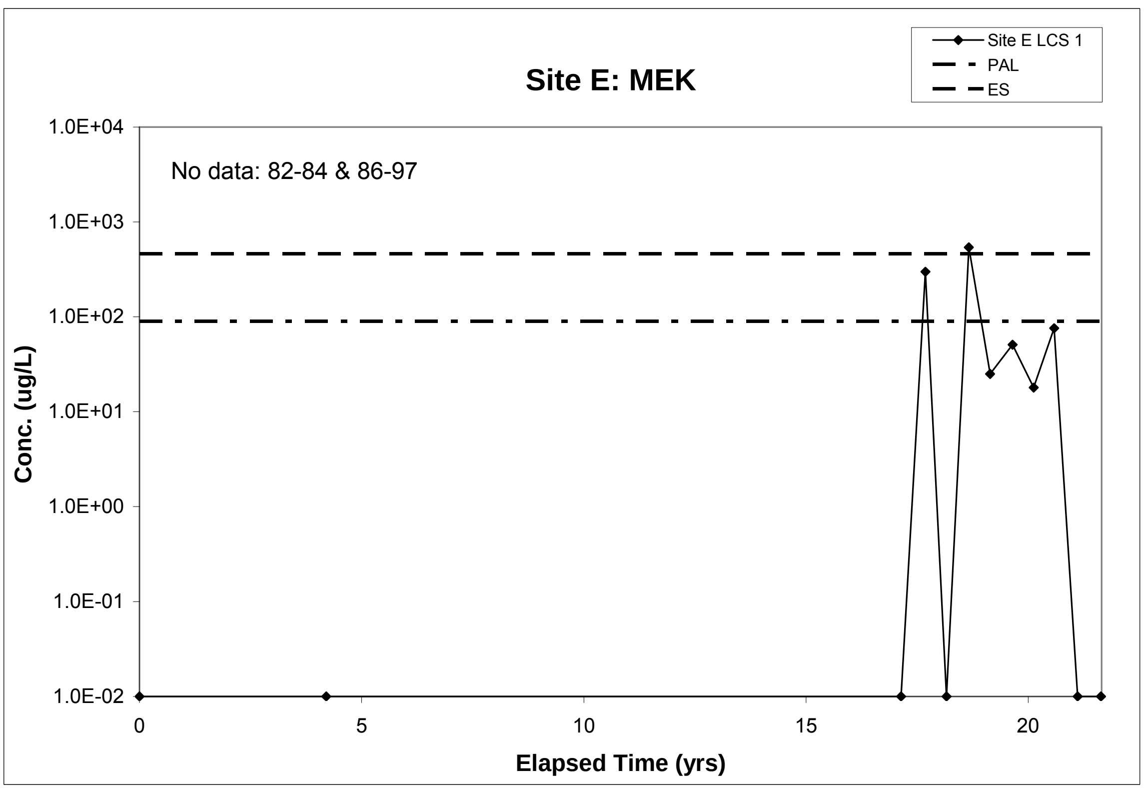

Site A: Ethylbenzene
Site A LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

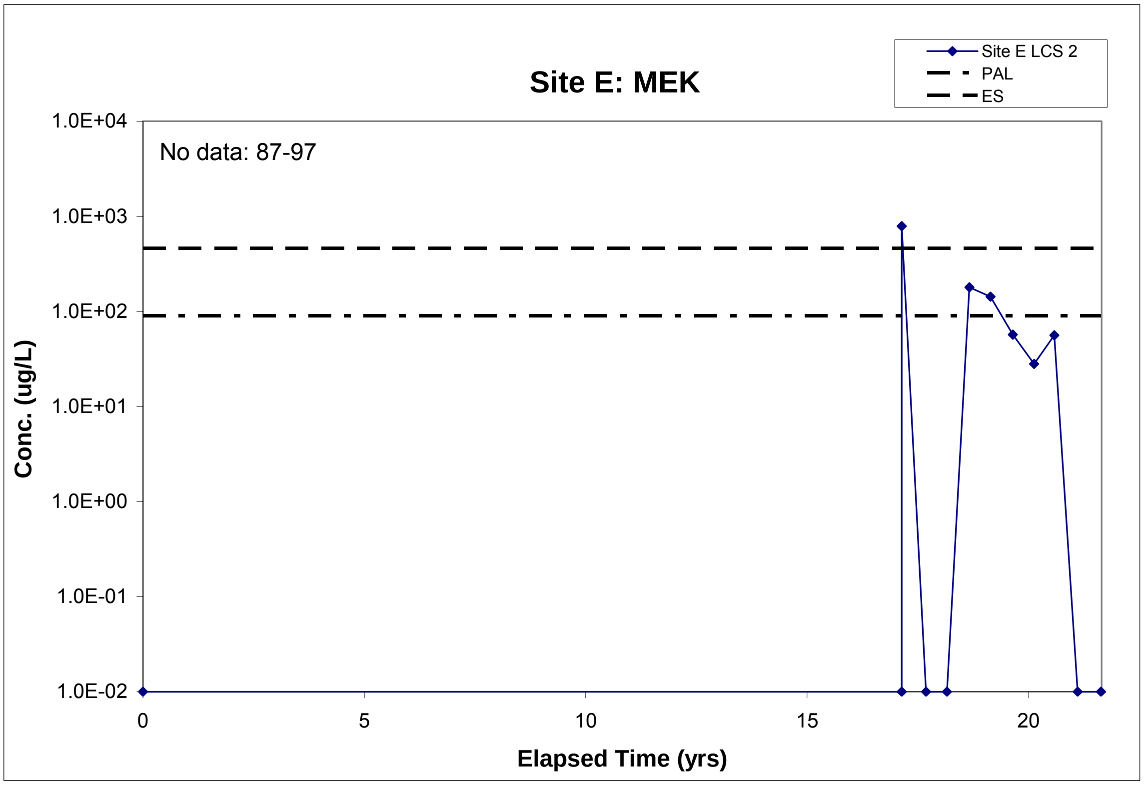

Site HH: Ethylbenzene
Site HH LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

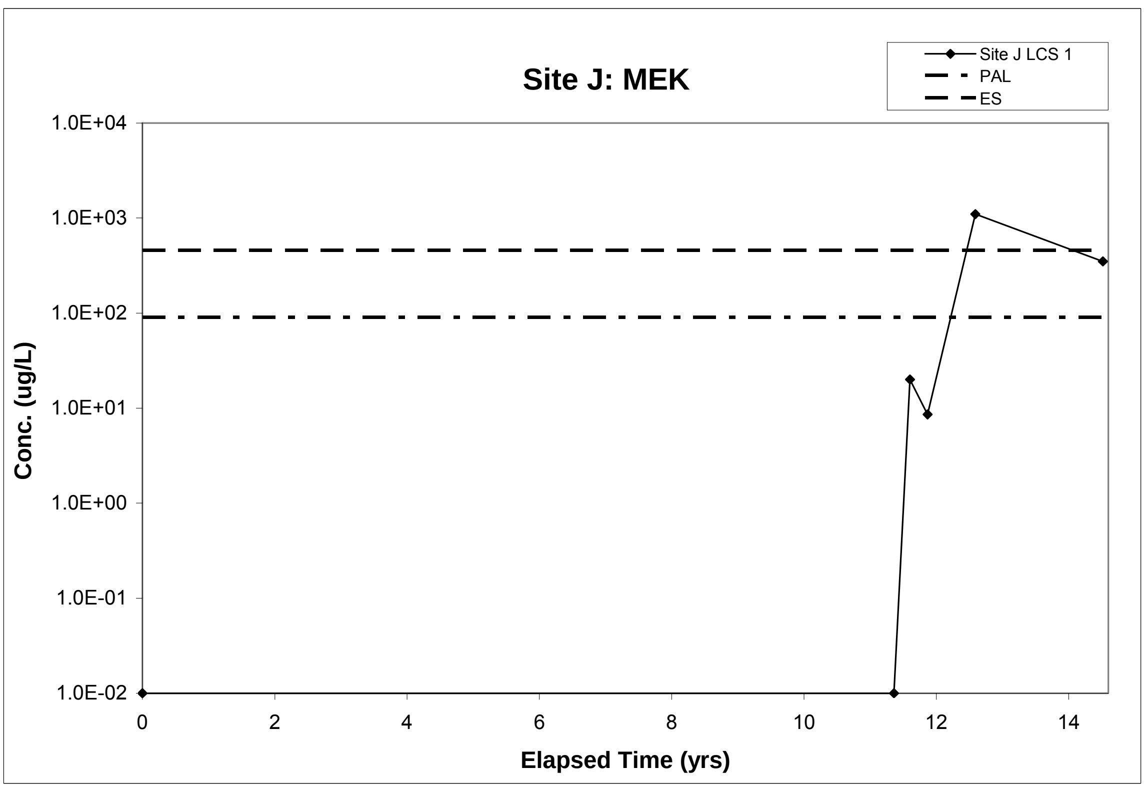

Site B: MEK
Site B LCS 1
PAL
ES
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

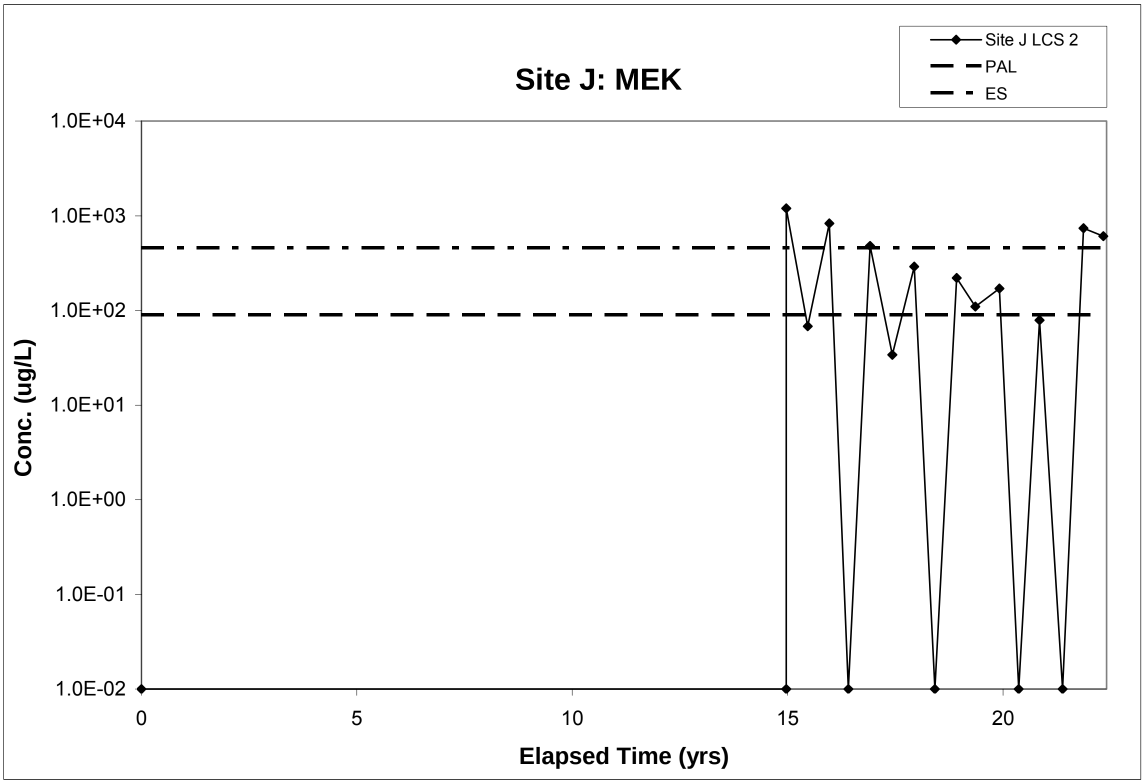

Site B: MEK
Site B LCS 2
PAL
ES
No Data: 85-92 & 96-present
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

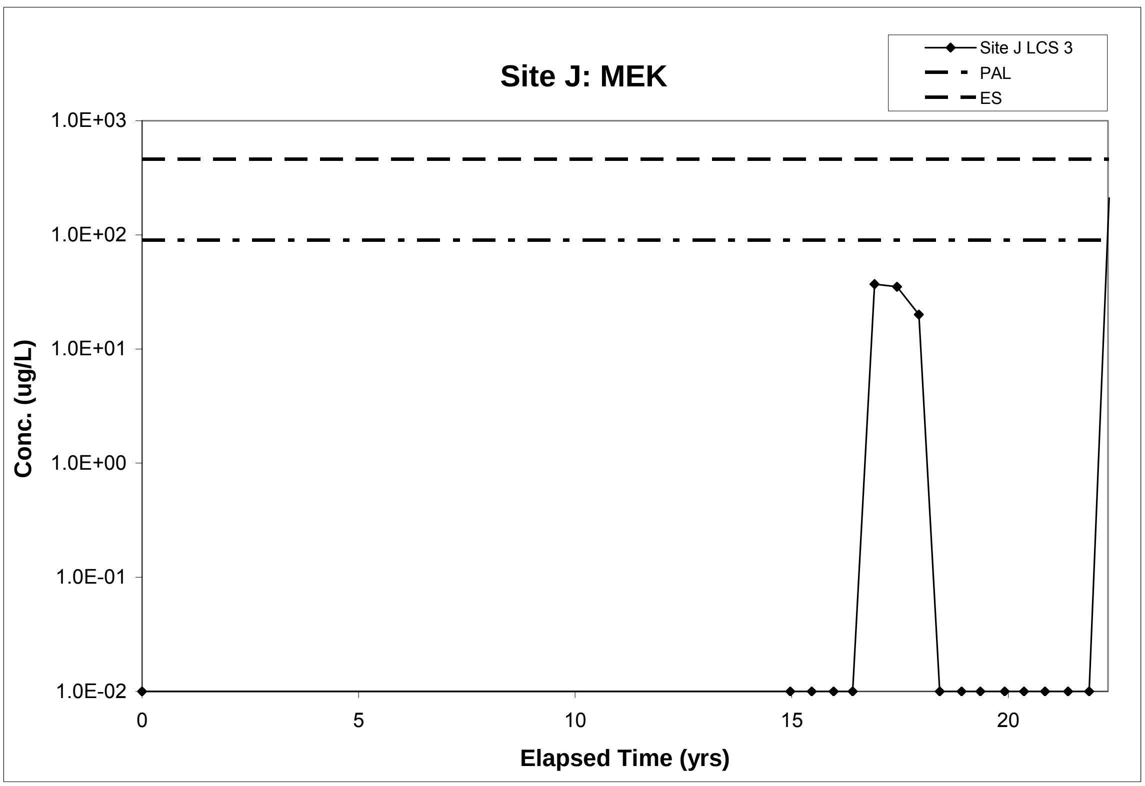

Site D: MEK
Site D LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
9
Elapsed Time (yrs)

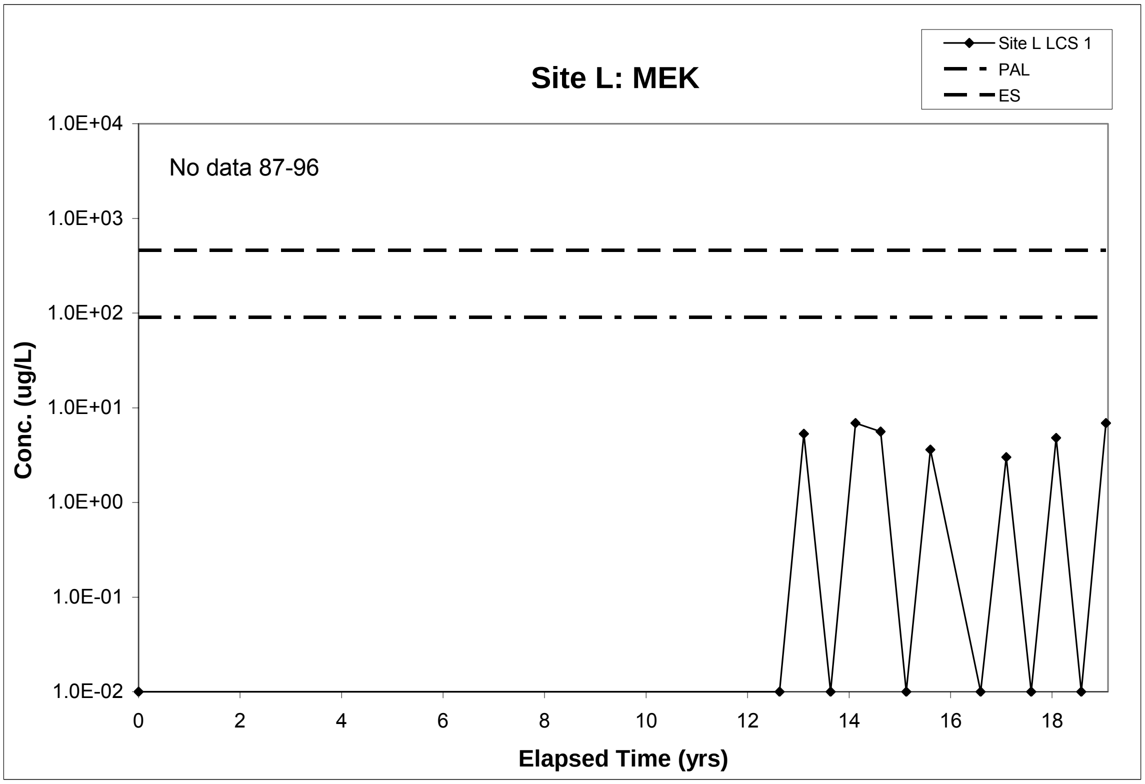

Site E: MEK
Site E LCS 1
PAL
ES
No data: 82-84 & 86-97
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

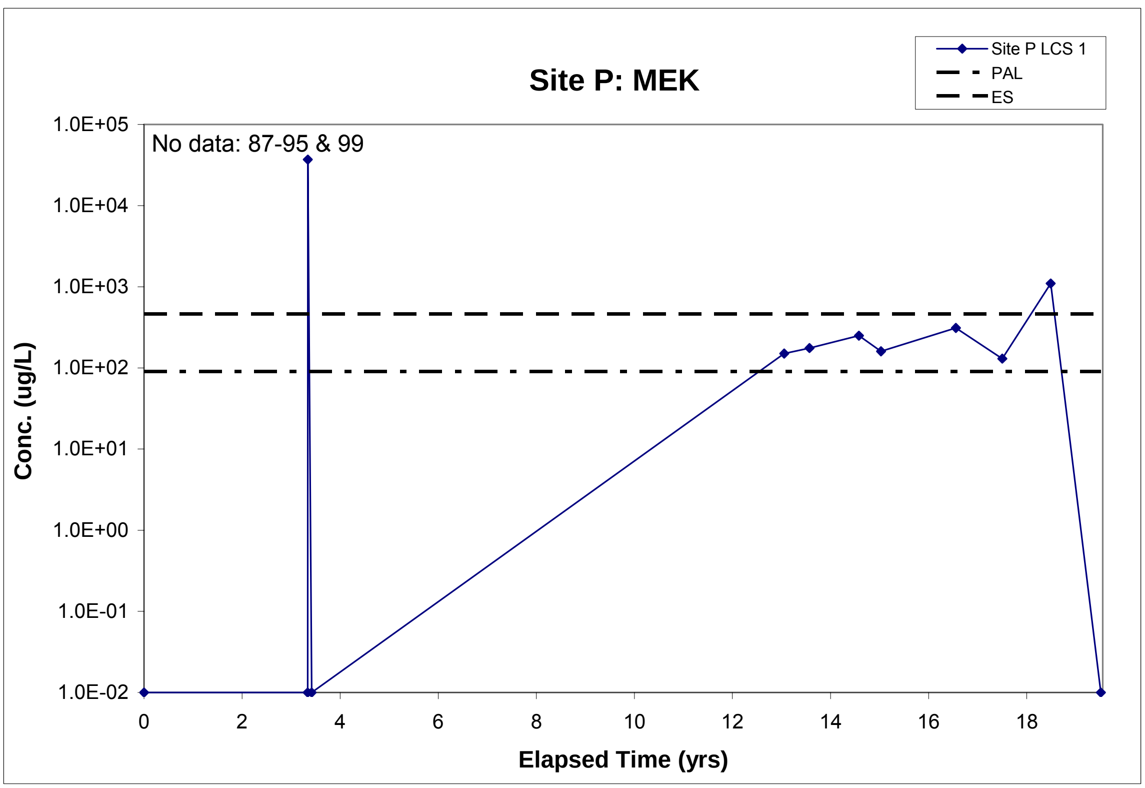

Site E: MEK
Site E LCS 2
PAL
ES
No data: 87-97
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

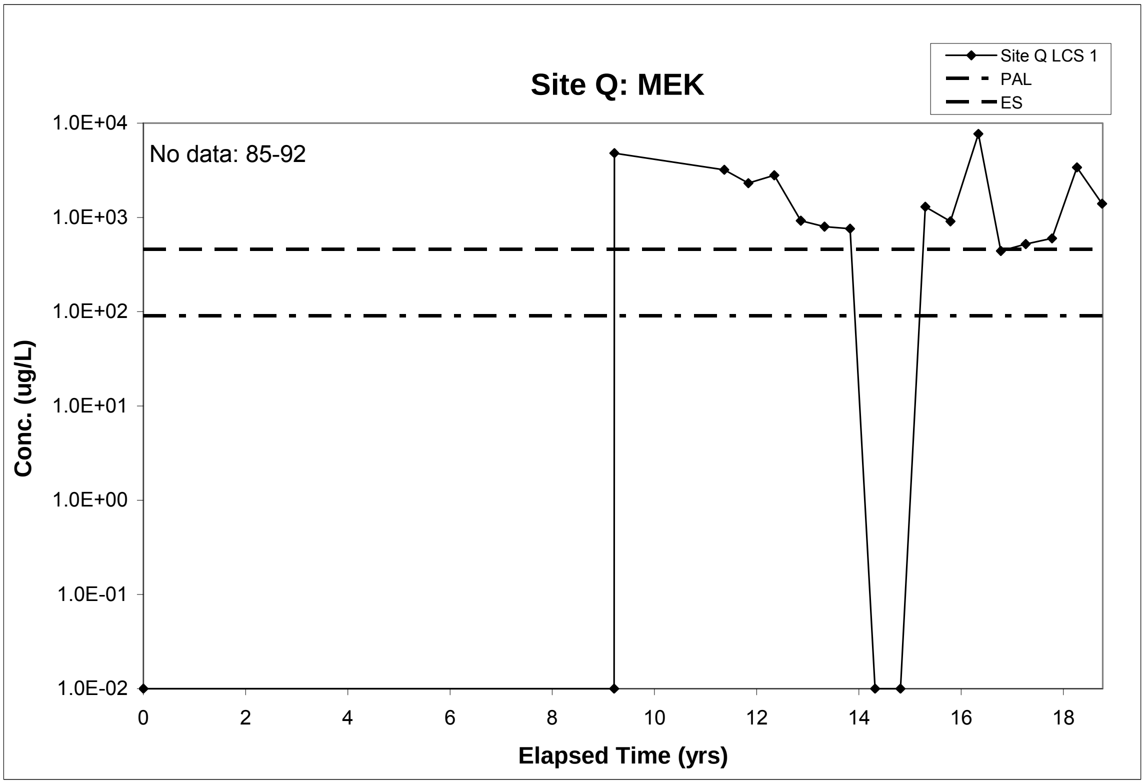

Site J: MEK
Site J LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

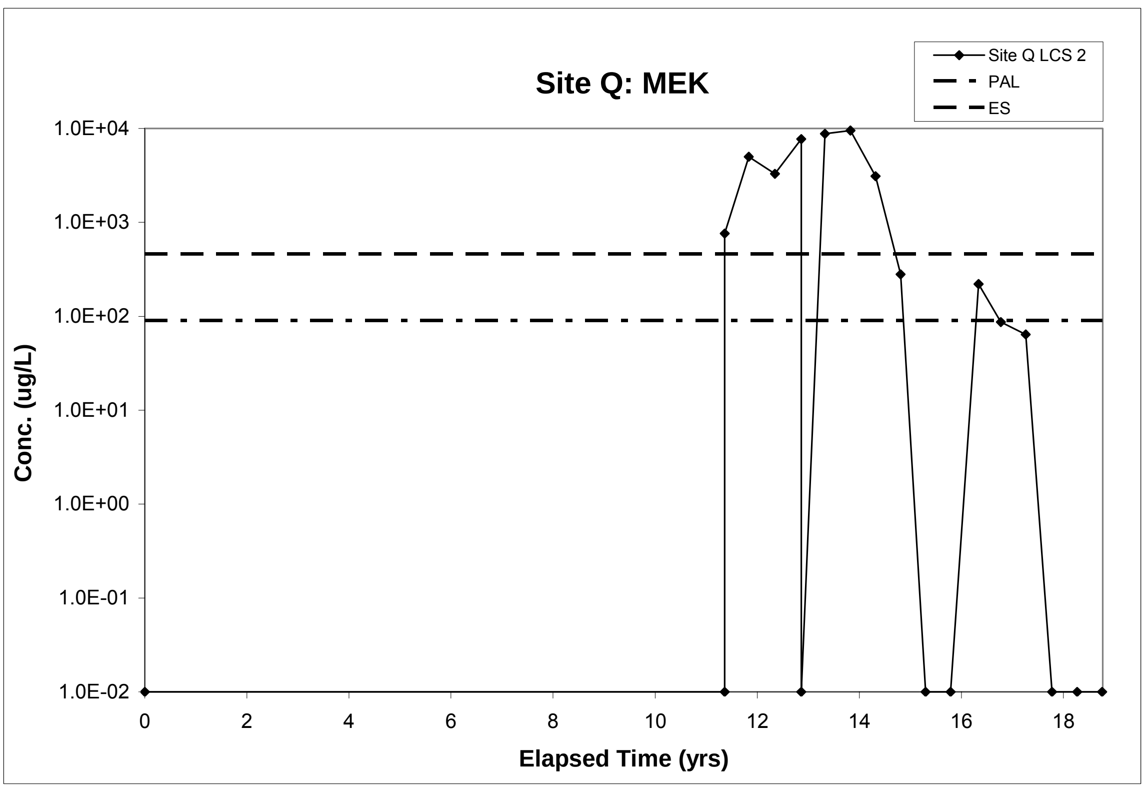

Site J: MEK
Site J LCS 2
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

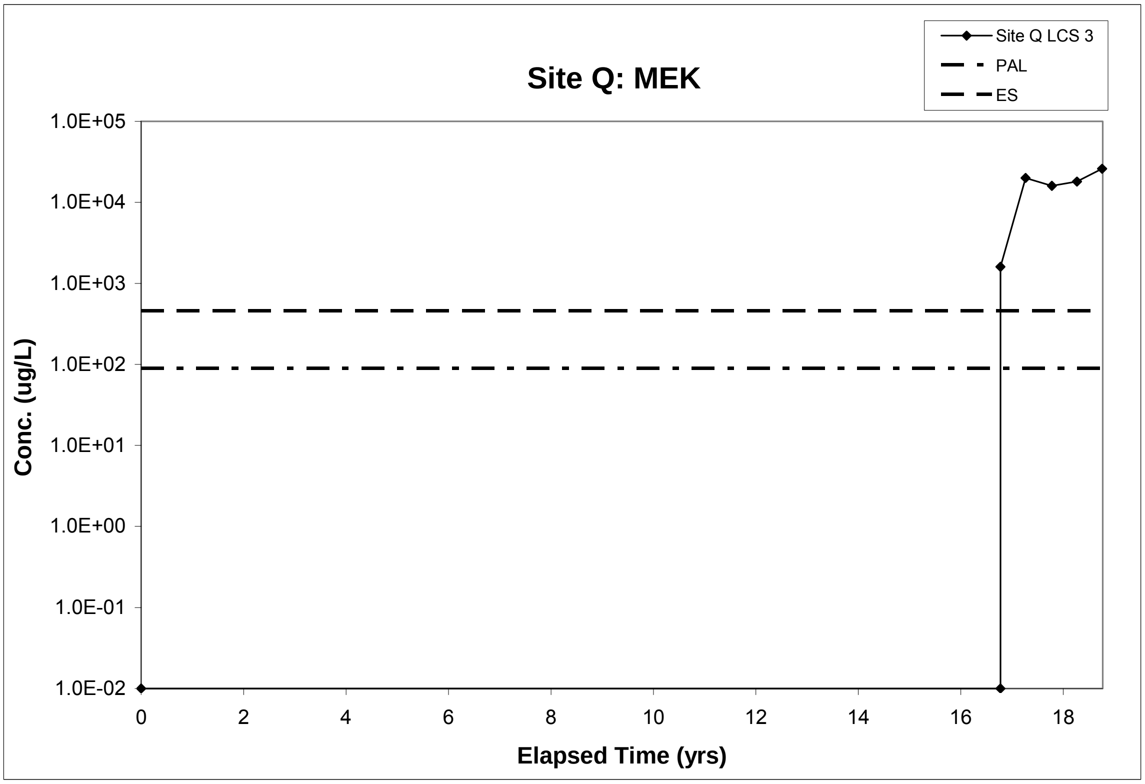

Site J: MEK
Site J LCS 3
PAL
ES
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

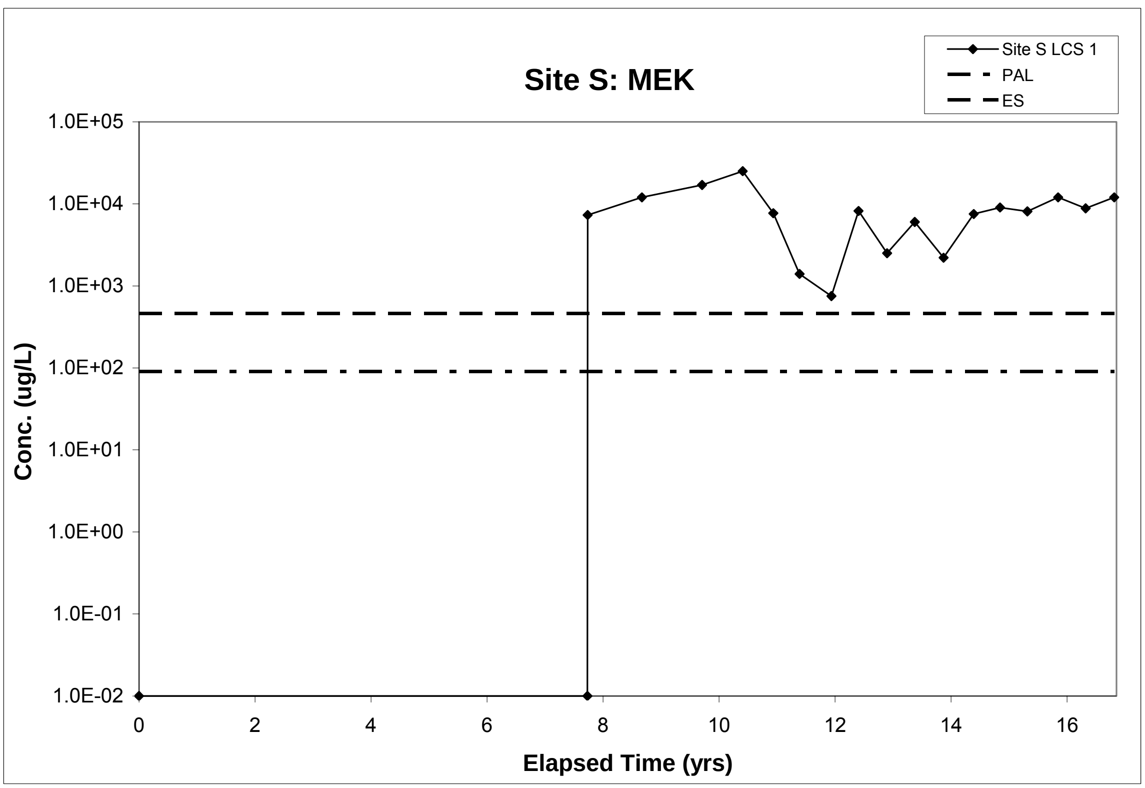

Site L: MEK
Site L LCS 1
PAL
ES
No data 87-96
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

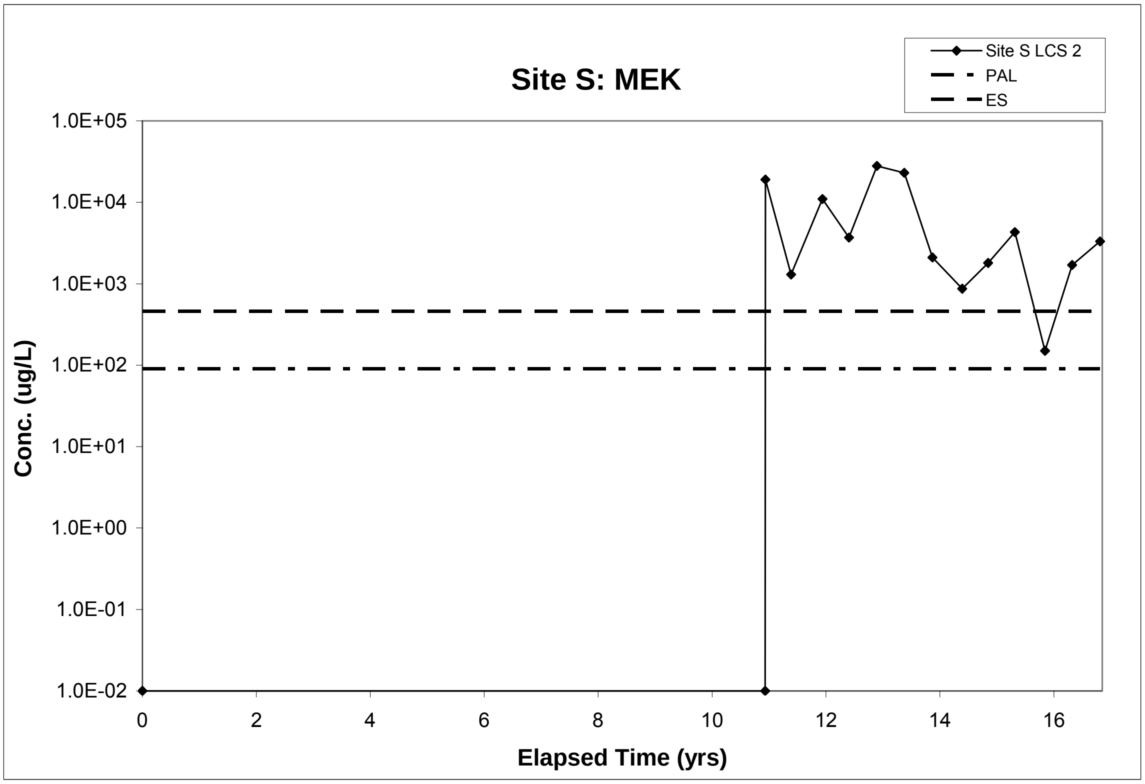

Site P: MEK
Site P LCS 1
PAL
ES
No data: 87-95 & 99
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

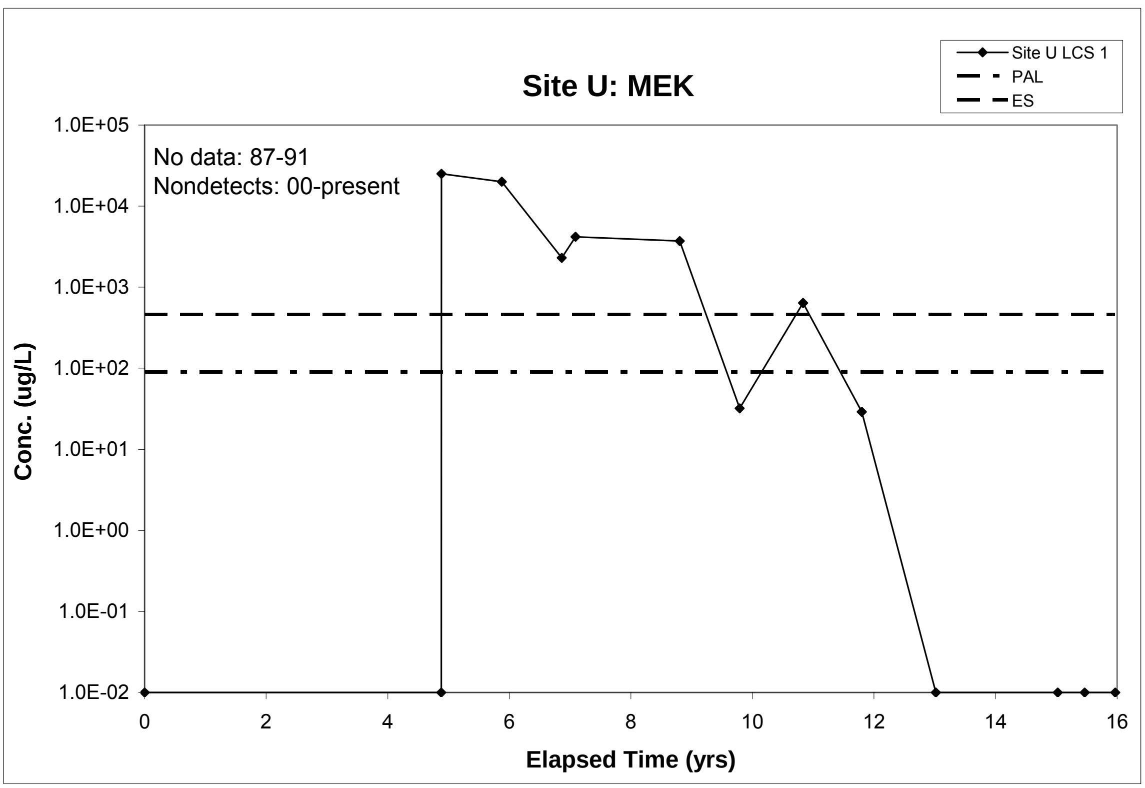

Site Q: MEK
Site Q LCS 1
PAL
ES
No data: 85-92
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

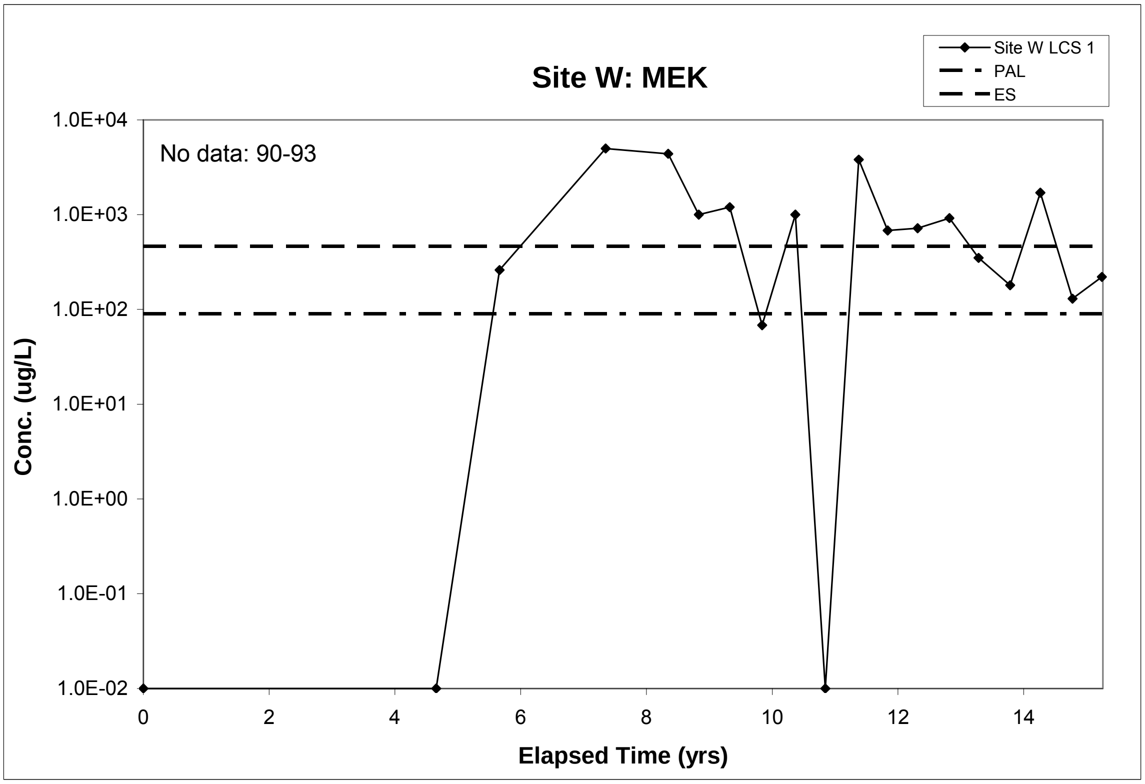

Site Q: MEK
Site Q LCS 2
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

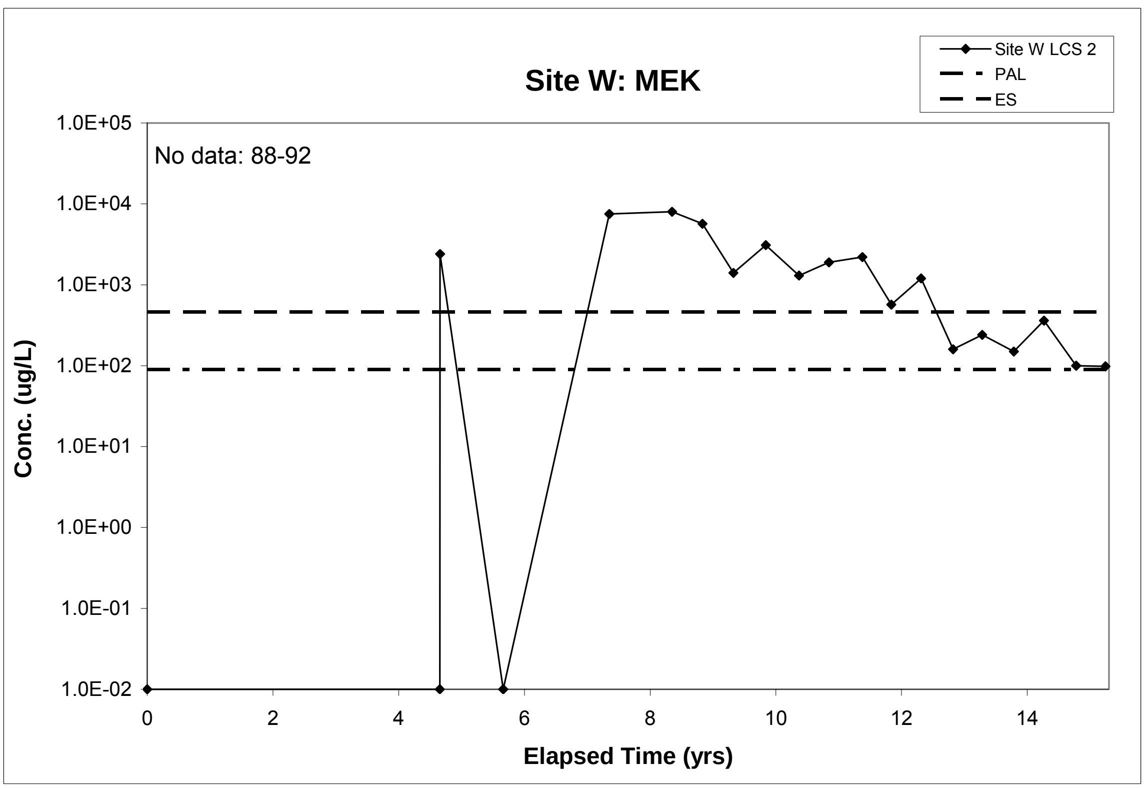

Site Q: MEK
Site Q LCS 3
PAL
ES
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

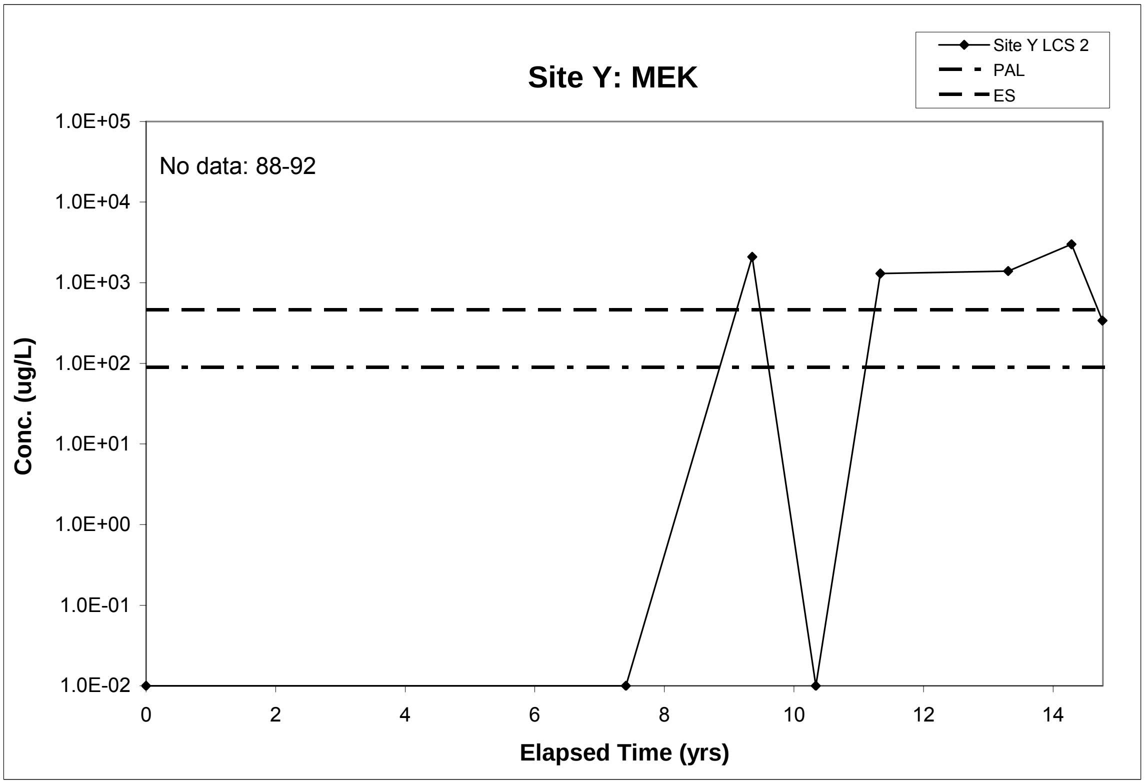

Site S: MEK
Site S LCS 1
PAL
ES
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

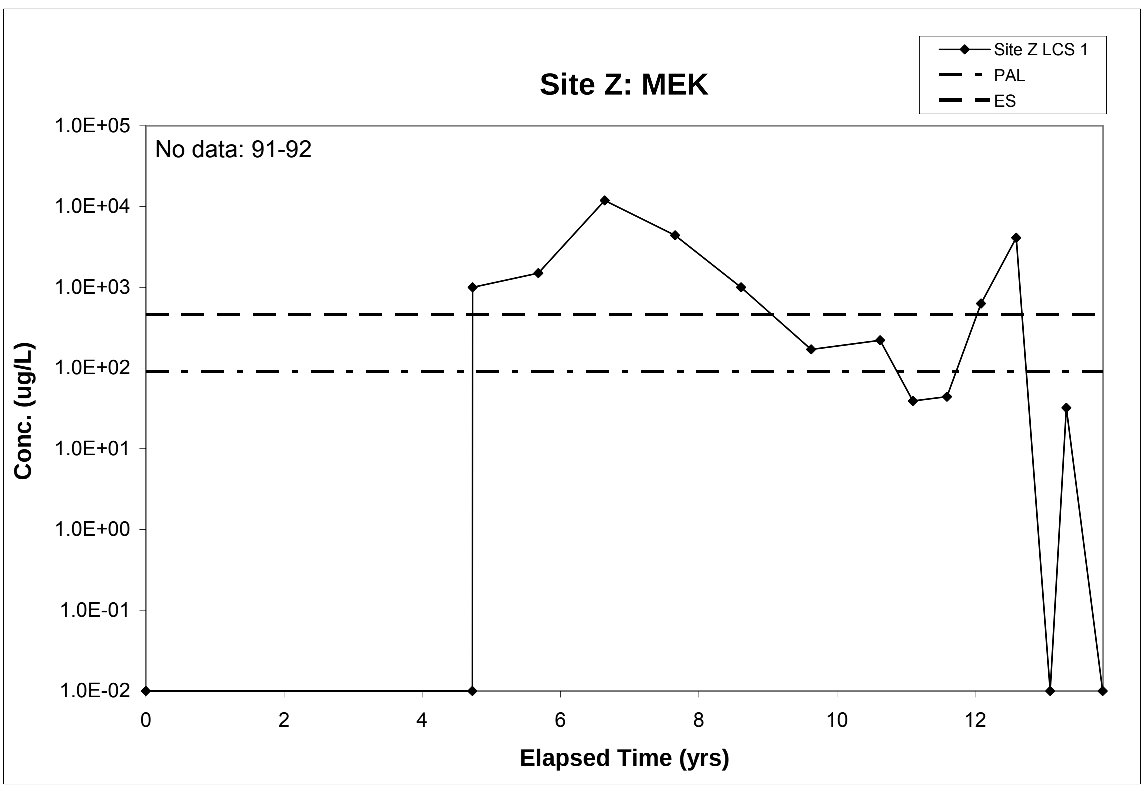

Site S: MEK
Site S LCS 2
PAL
ES
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

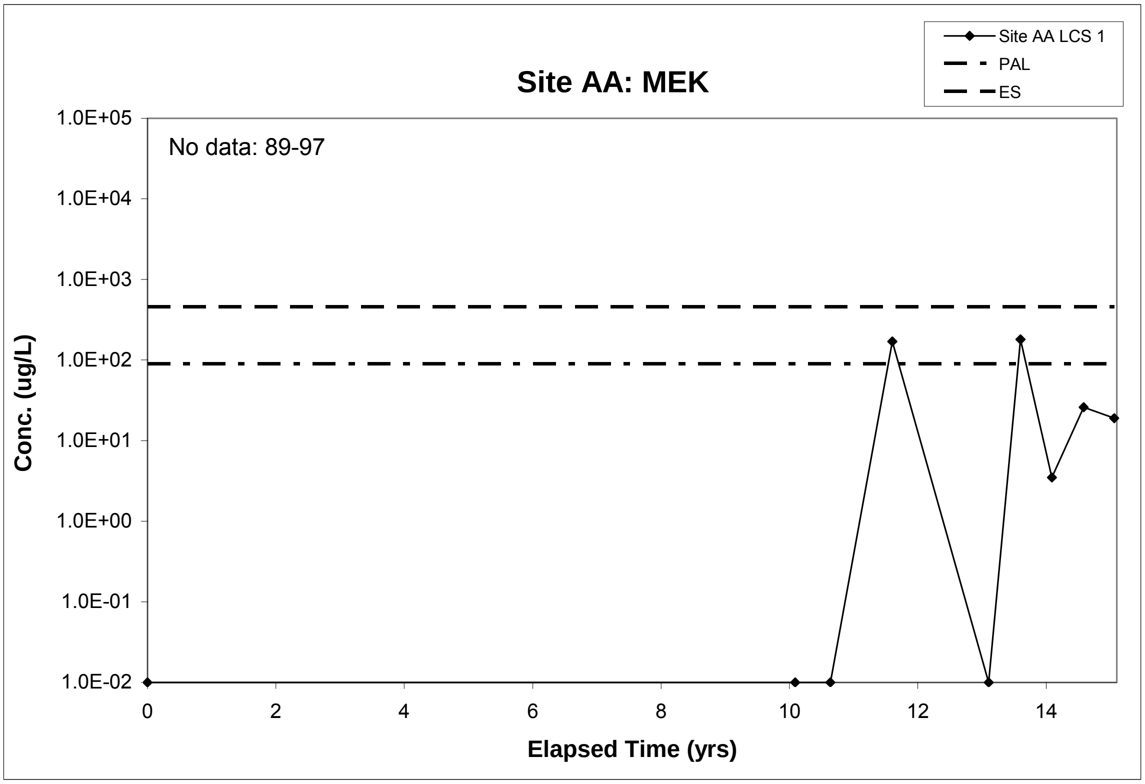

Site U: MEK
Site U LCS 1
PAL
ES
No data: 87-91
Nondetects: 00-present
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

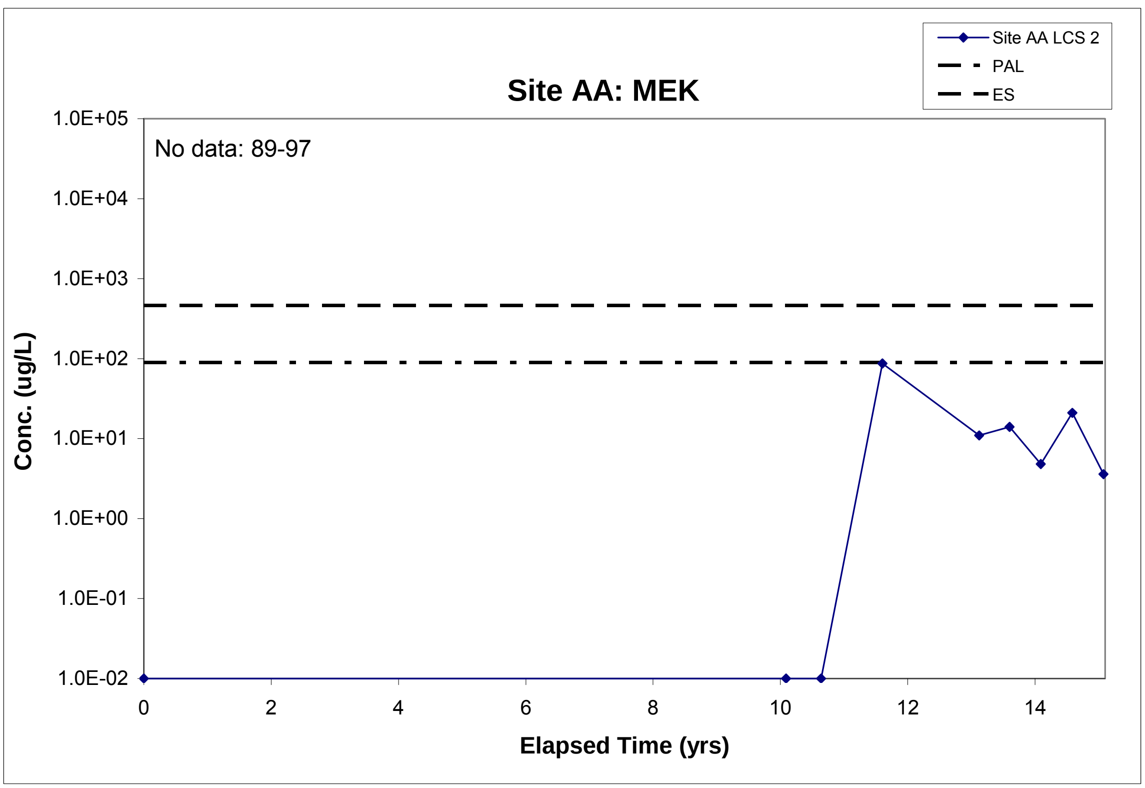

Site W: MEK
Site W LCS 1
PAL
ES
No data: 90-93
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Conc. (ug/L)
Elapsed Time (yrs)

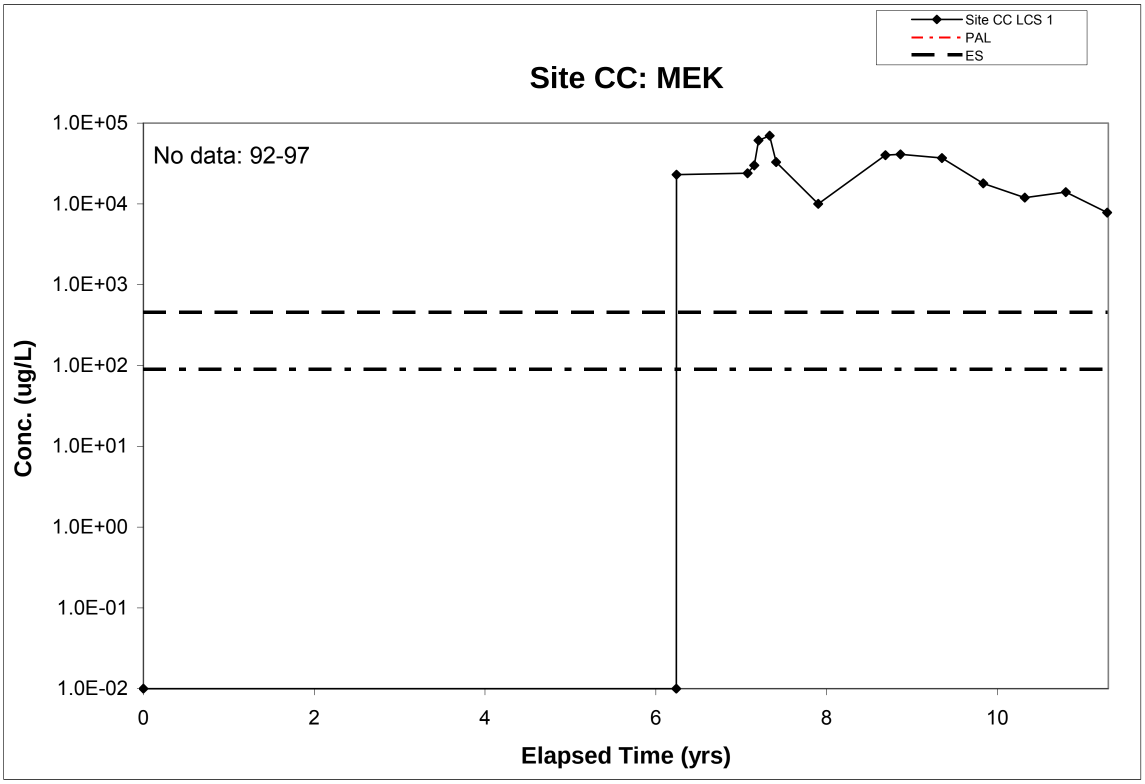

Site W: MEK
Site W LCS 2
PAL
ES
No data: 88-92
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Conc. (ug/L)
Elapsed Time (yrs)

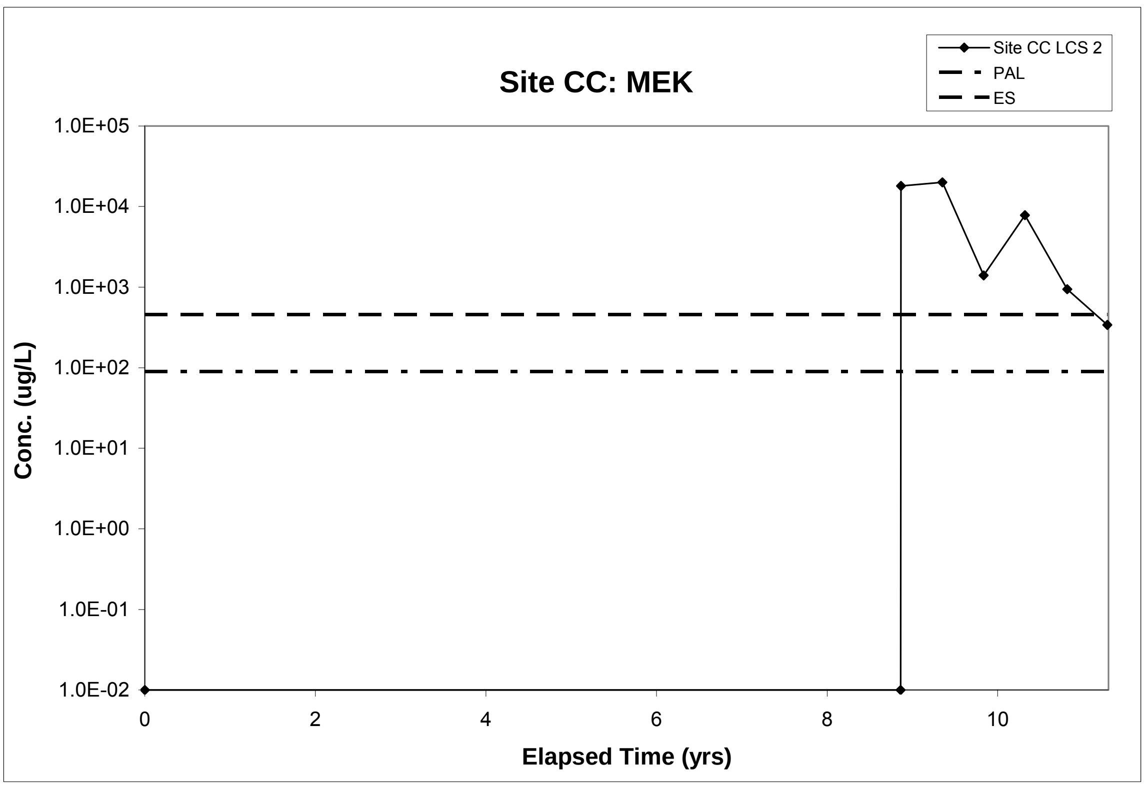

Site Y: MEK
Site Y LCS 2
PAL
ES
No data: 88-92
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

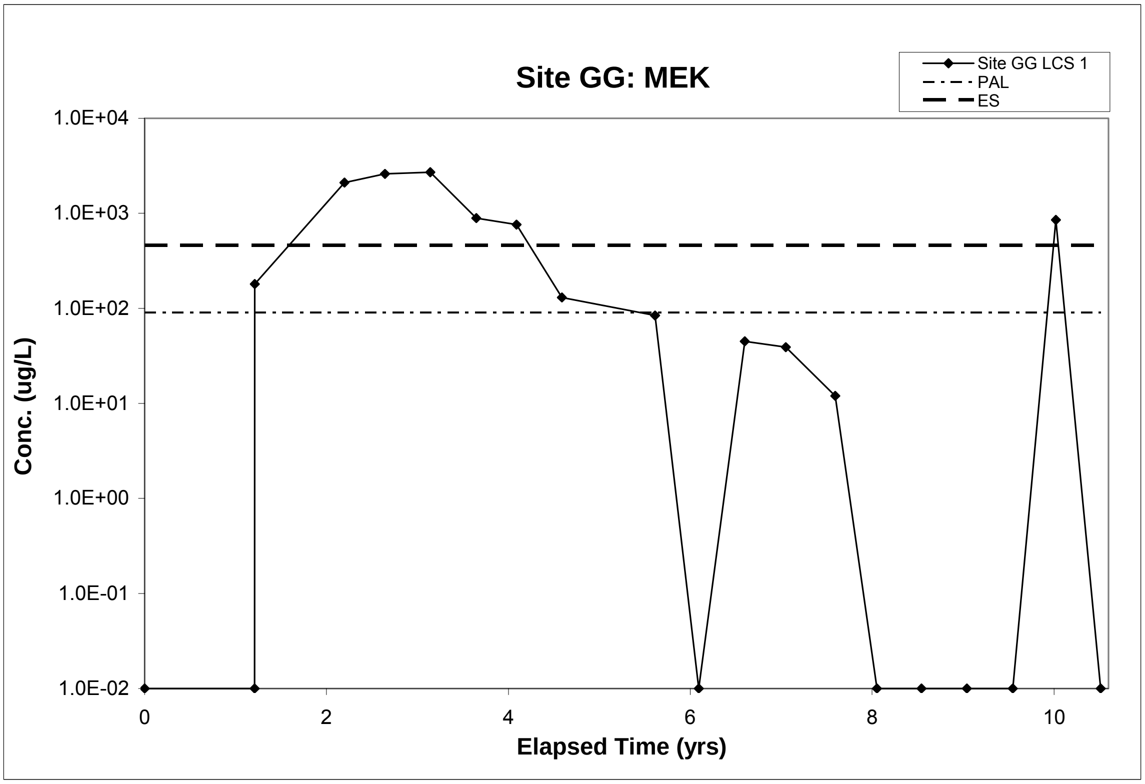

Site Z: MEK
Site Z LCS 1
PAL
ES
No data: 91-92
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

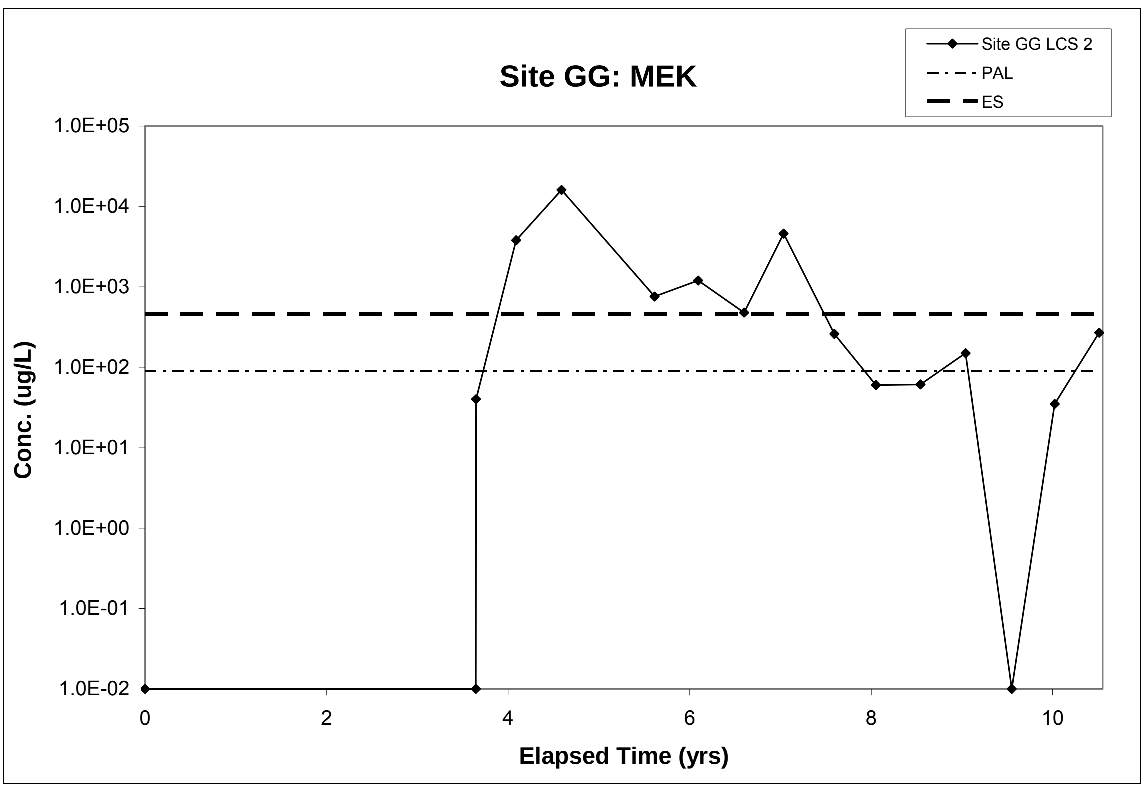

Site AA: MEK
Site AA LCS 1
PAL
ES
No data: 89-97
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

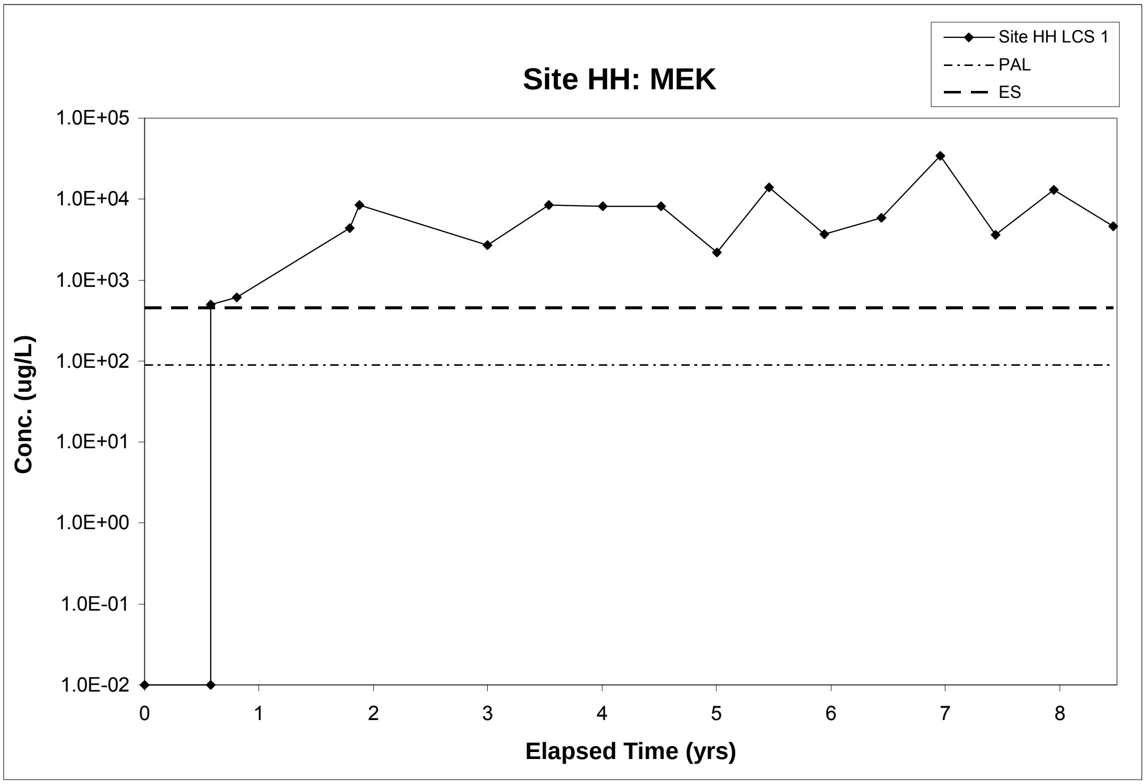

Site AA: MEK
Site AA LCS 2
PAL
ES
No data: 89-97
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

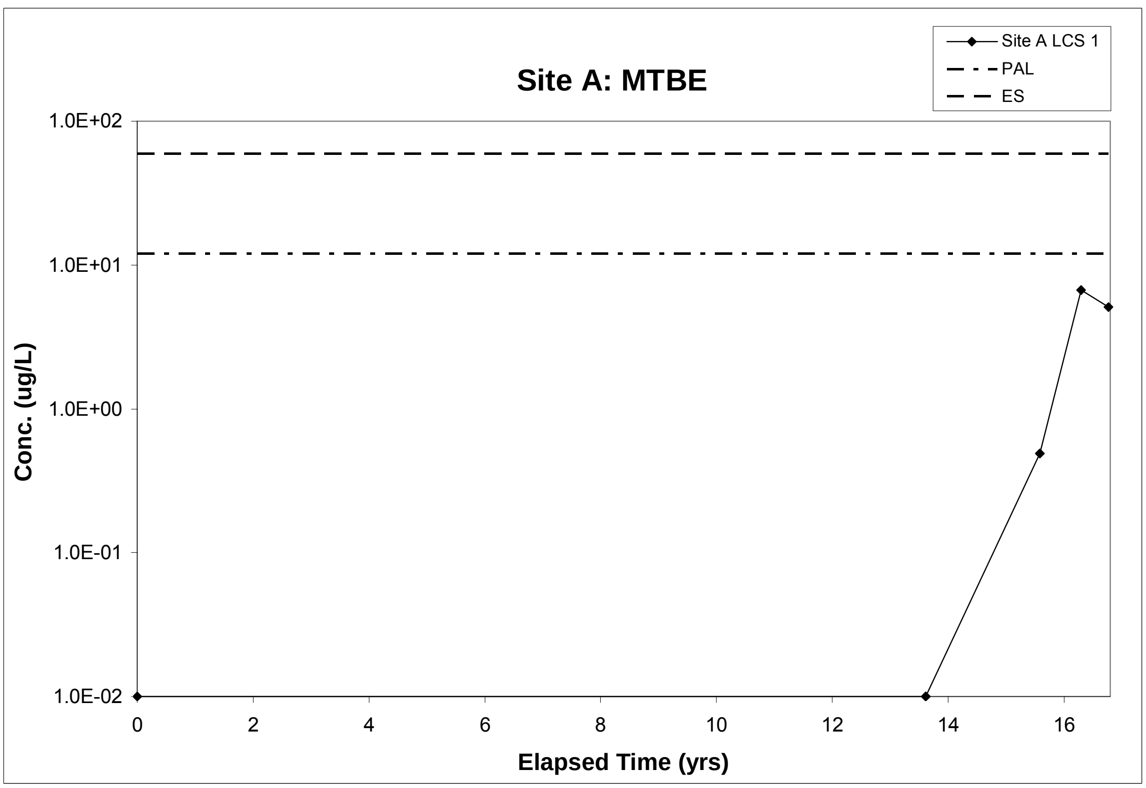

Site CC LCS 1
PAL
ES
Site CC: MEK
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
No data: 92-97
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

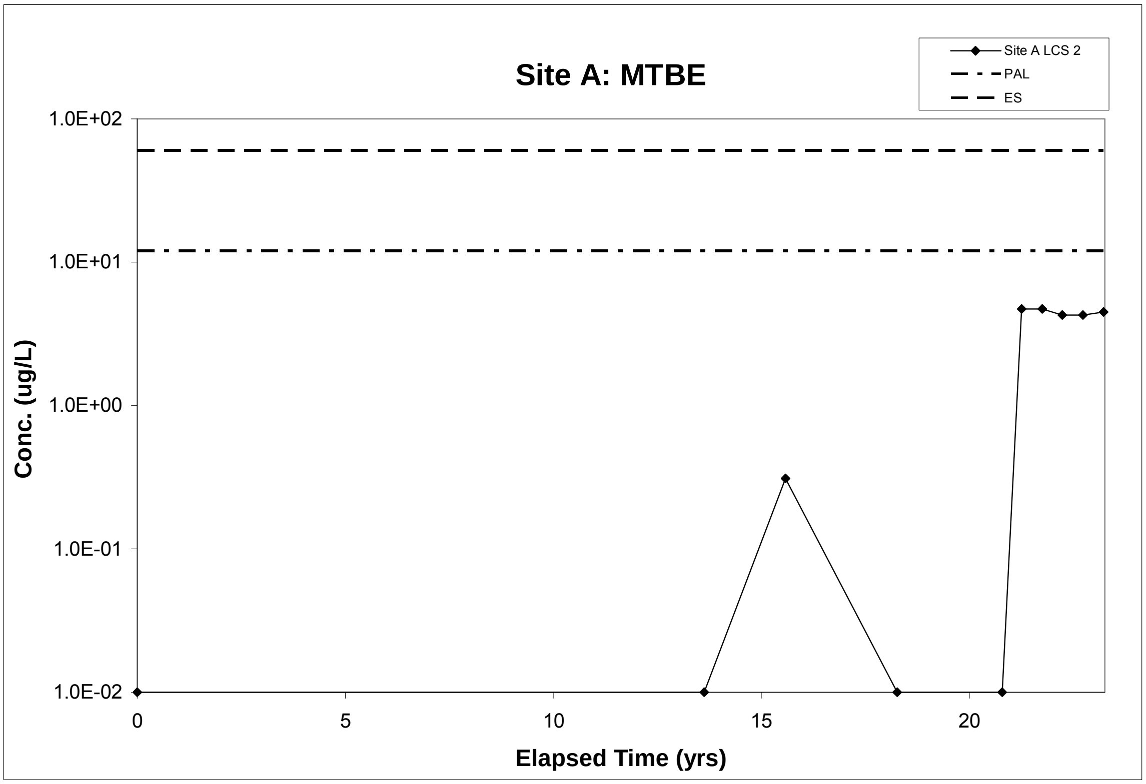

Site CC LCS 2
PAL
ES
Site CC: MEK
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

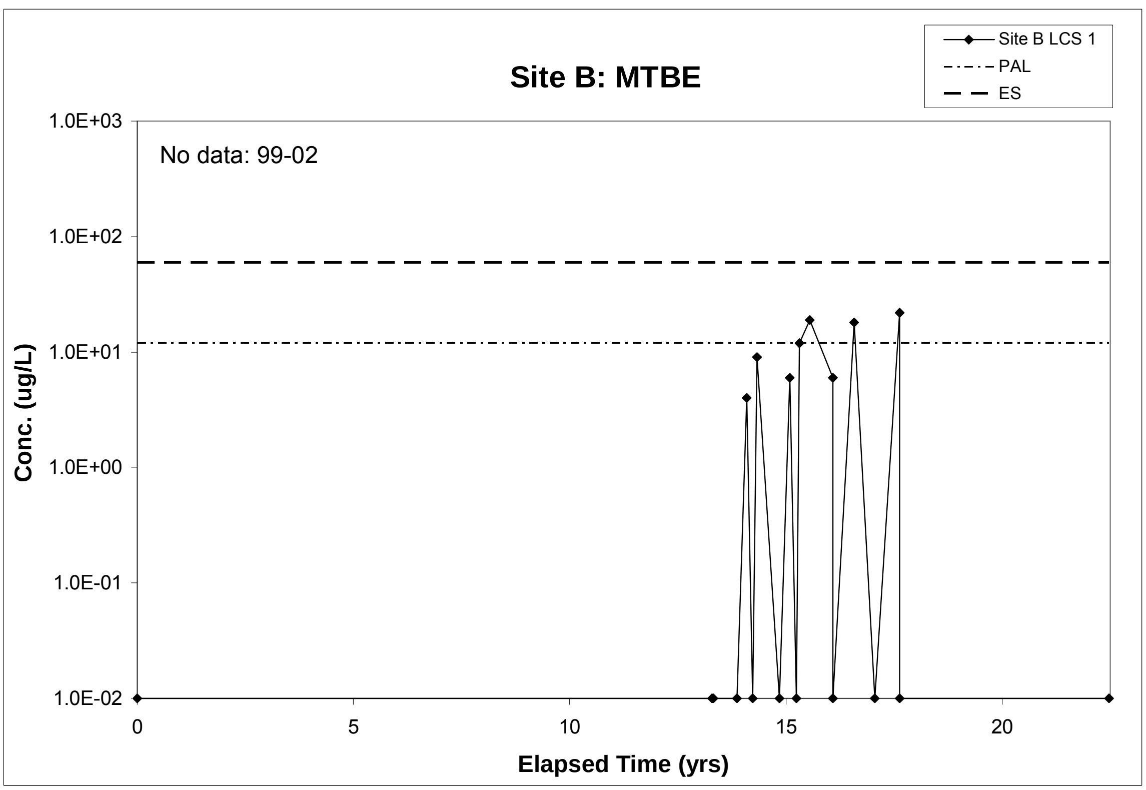

Site GG: MEK
Site GG LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

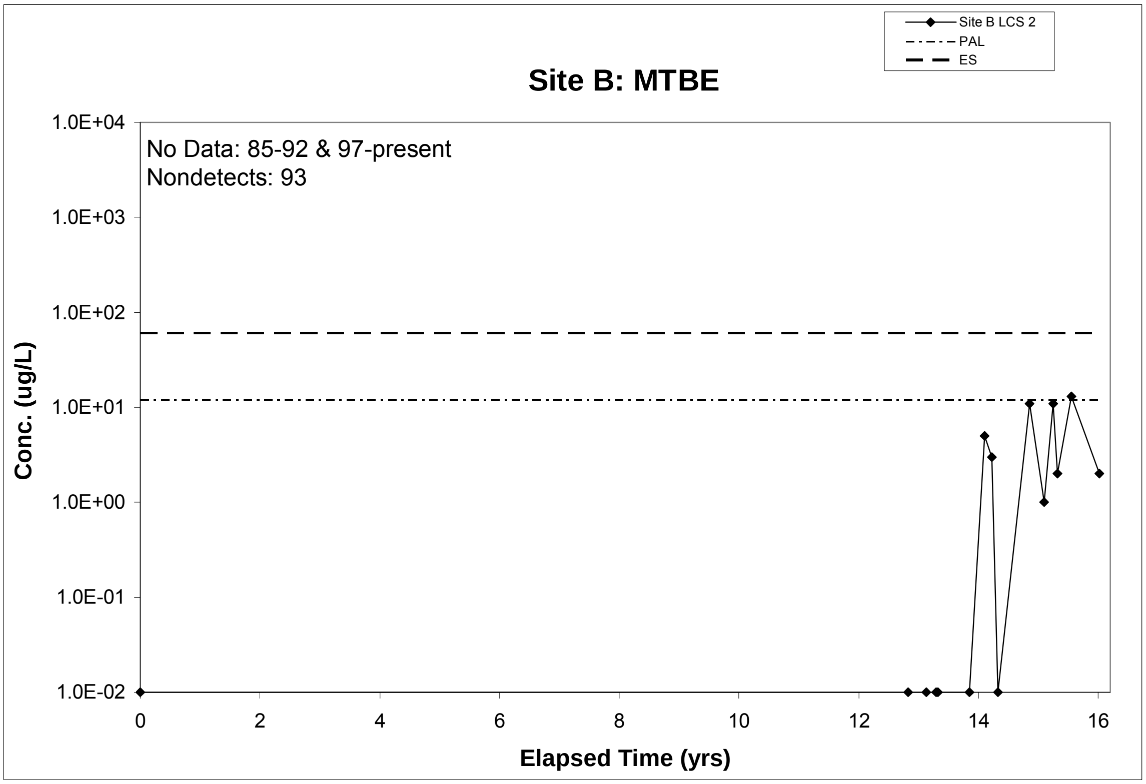

Site GG: MEK
Site GG LCS 2
PAL
ES
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

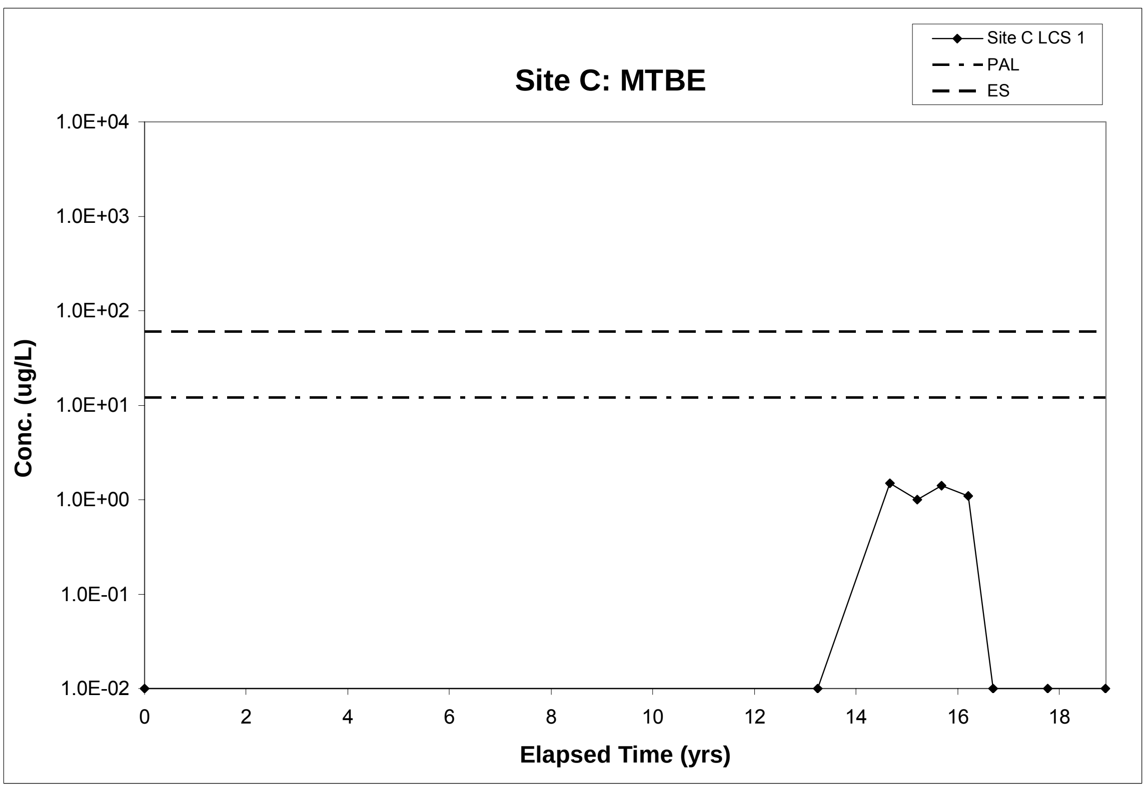

Site HH: MEK
Site HH LCS 1
PAL
ES
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

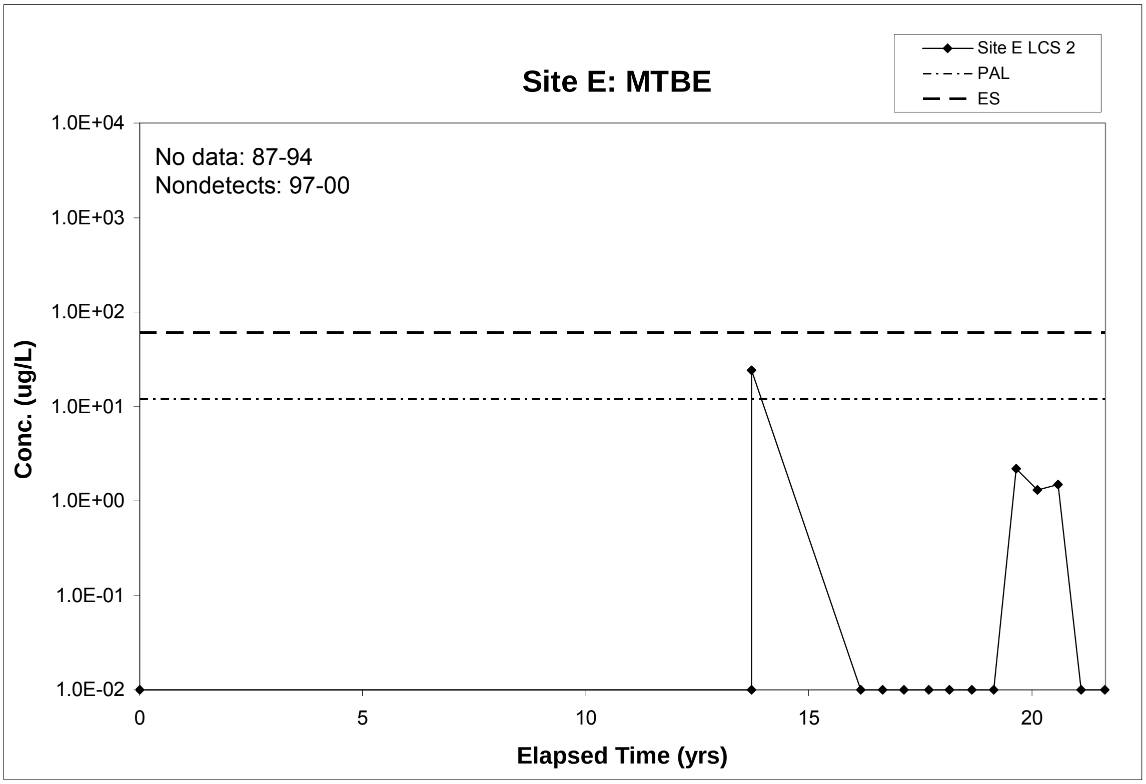

Site A: MTBE
Site A LCS 1
PAL
ES
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

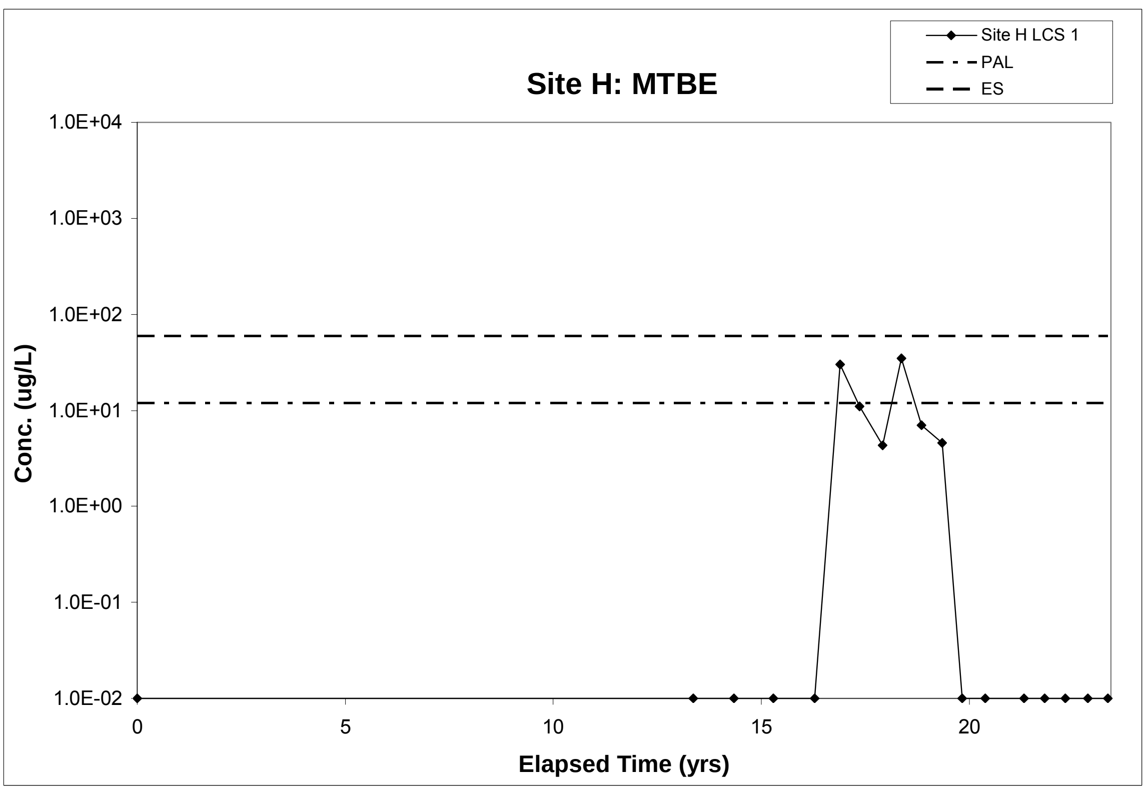

Site A: MTBE
Site A LCS 2
PAL
ES
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

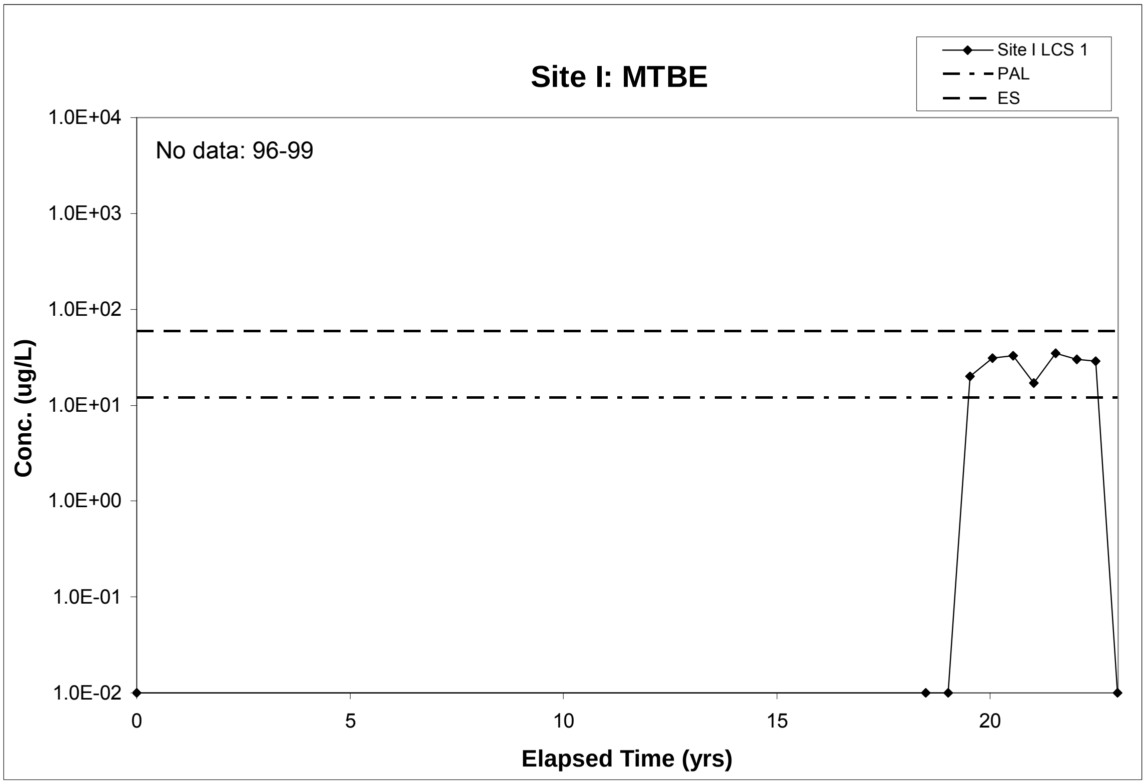

Site B: MTBE
Site B LCS 1
PAL
ES
No data: 99-02
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

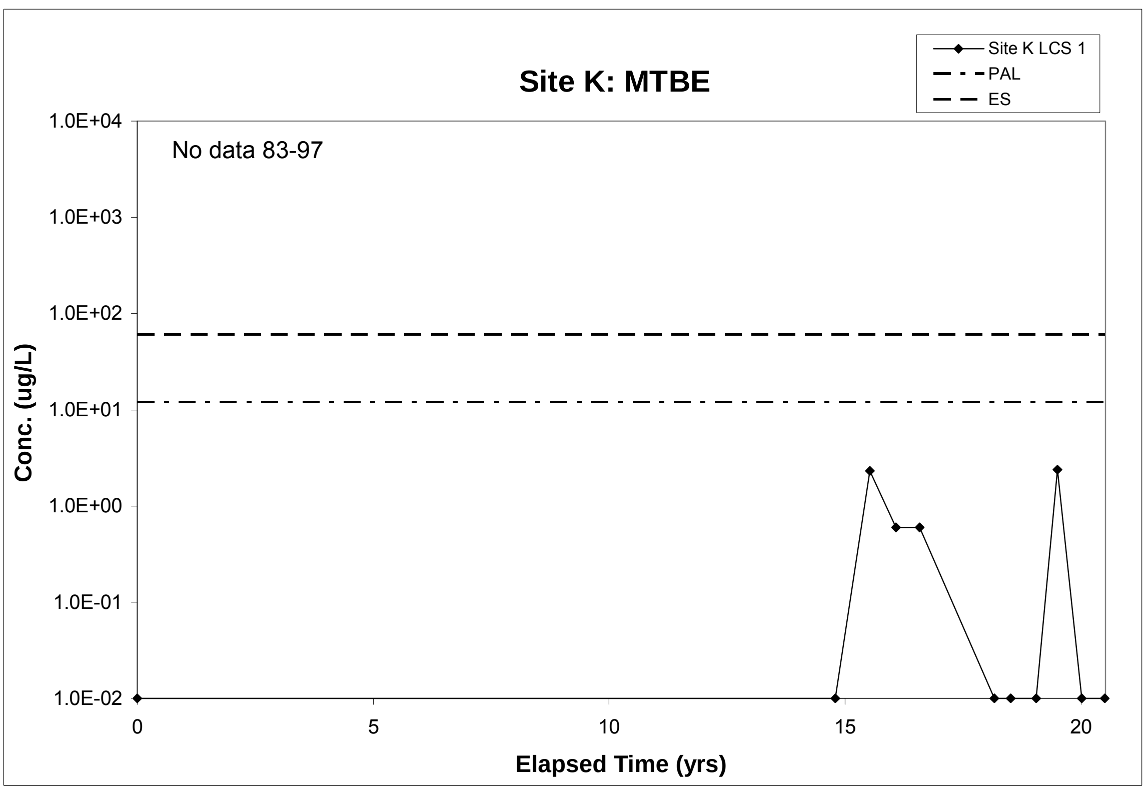

Site B LCS 2
PAL
ES
Site B: MTBE
No Data: 85-92 & 97-present
Nondetects: 93
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

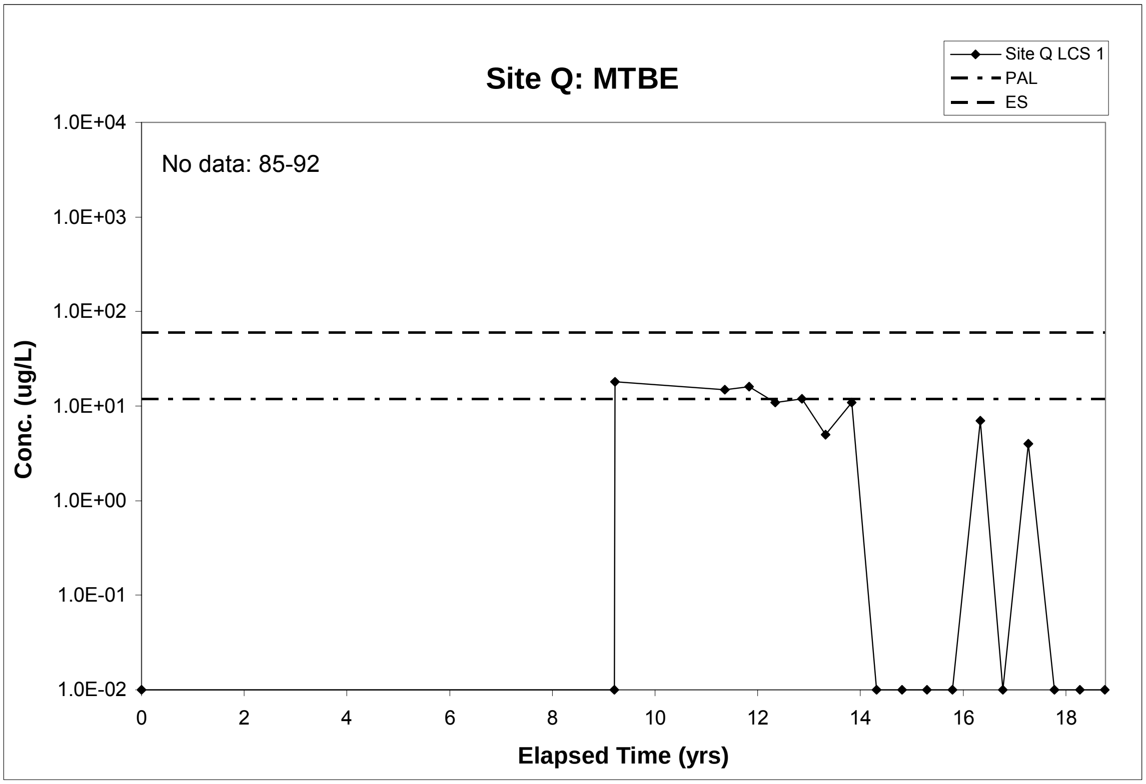

Site C LCS 1
PAL
ES
Site C: MTBE
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

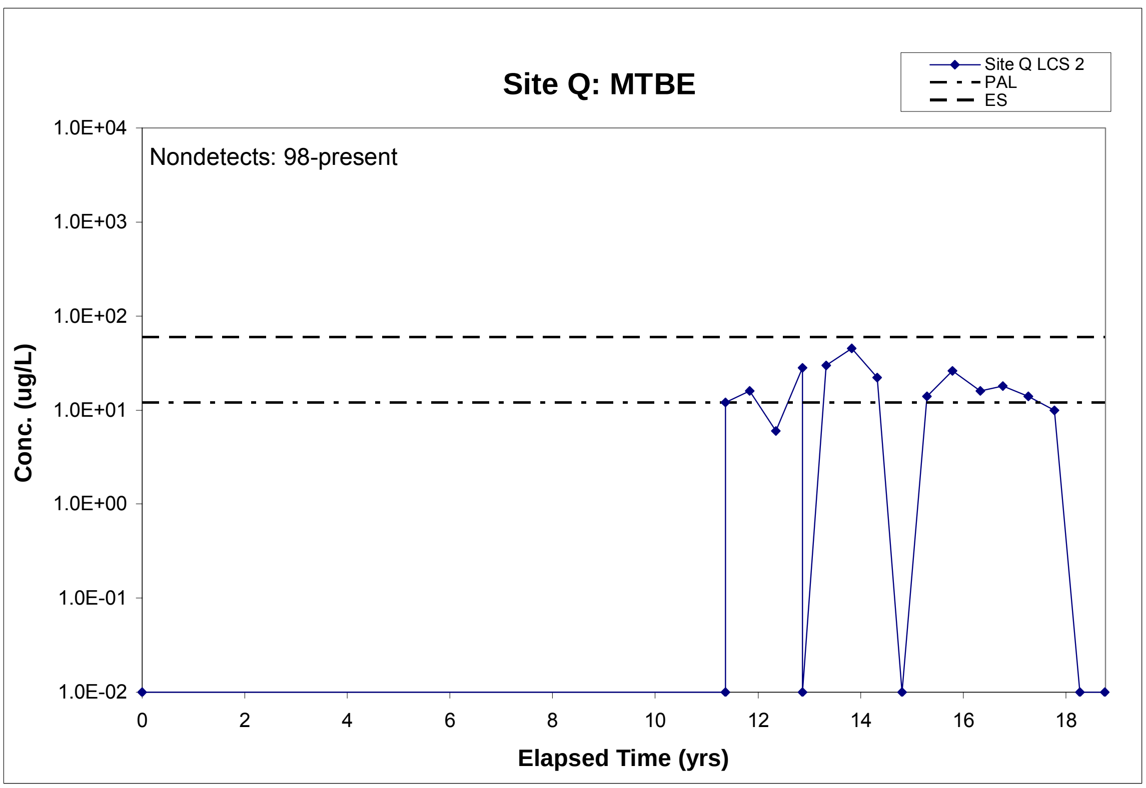

Site E: MTBE
Site E LCS 2
PAL
ES
No data: 87-94
Nondetects: 97-00
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

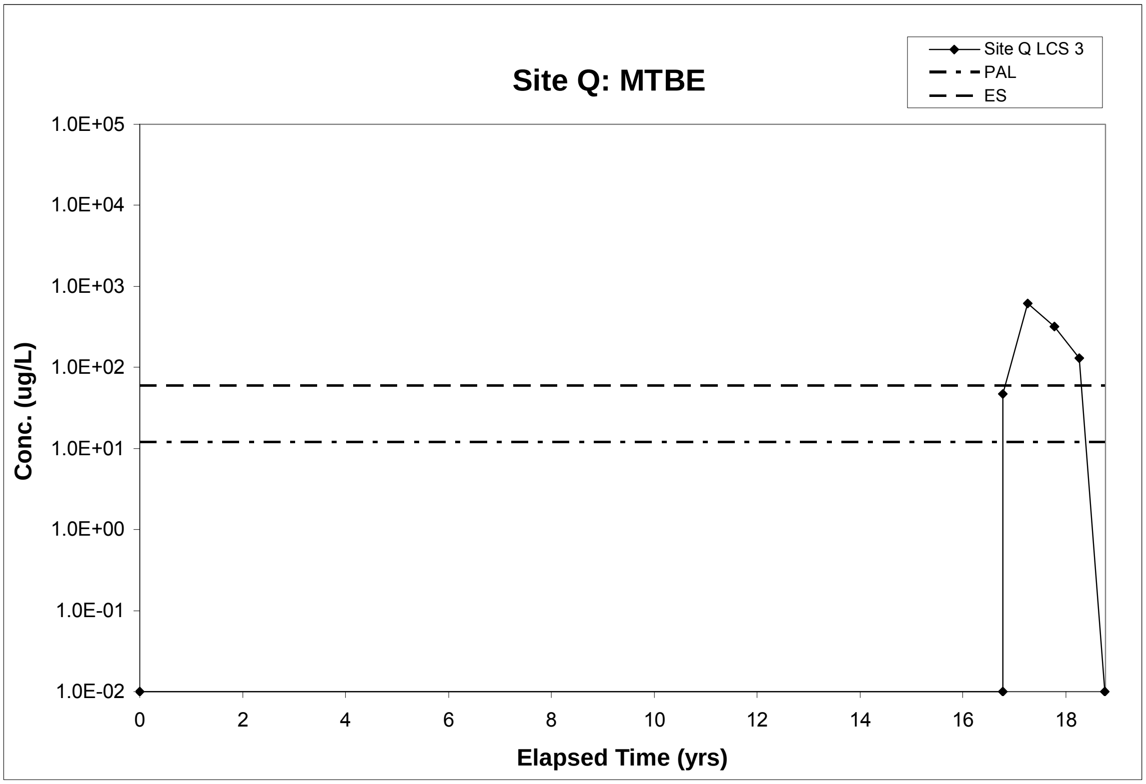

Site H: MTBE
Site H LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

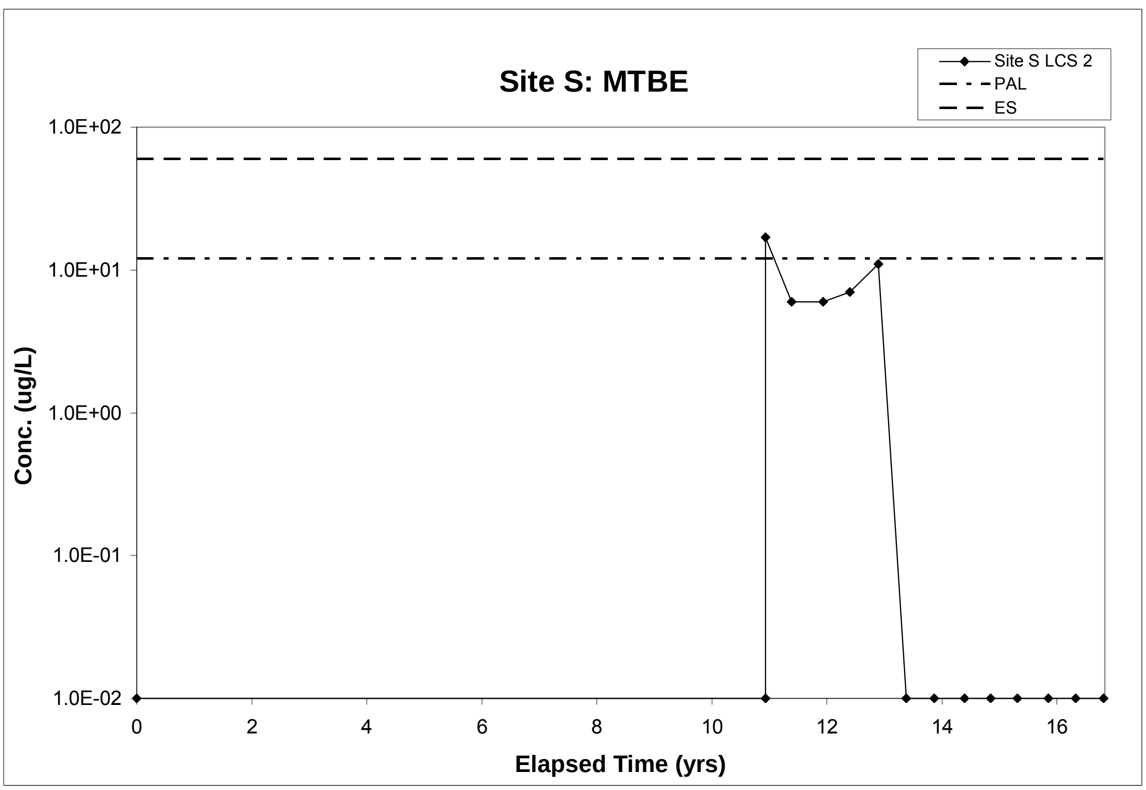

Site I: MTBE
Site I LCS 1
PAL
ES
No data: 96-99
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

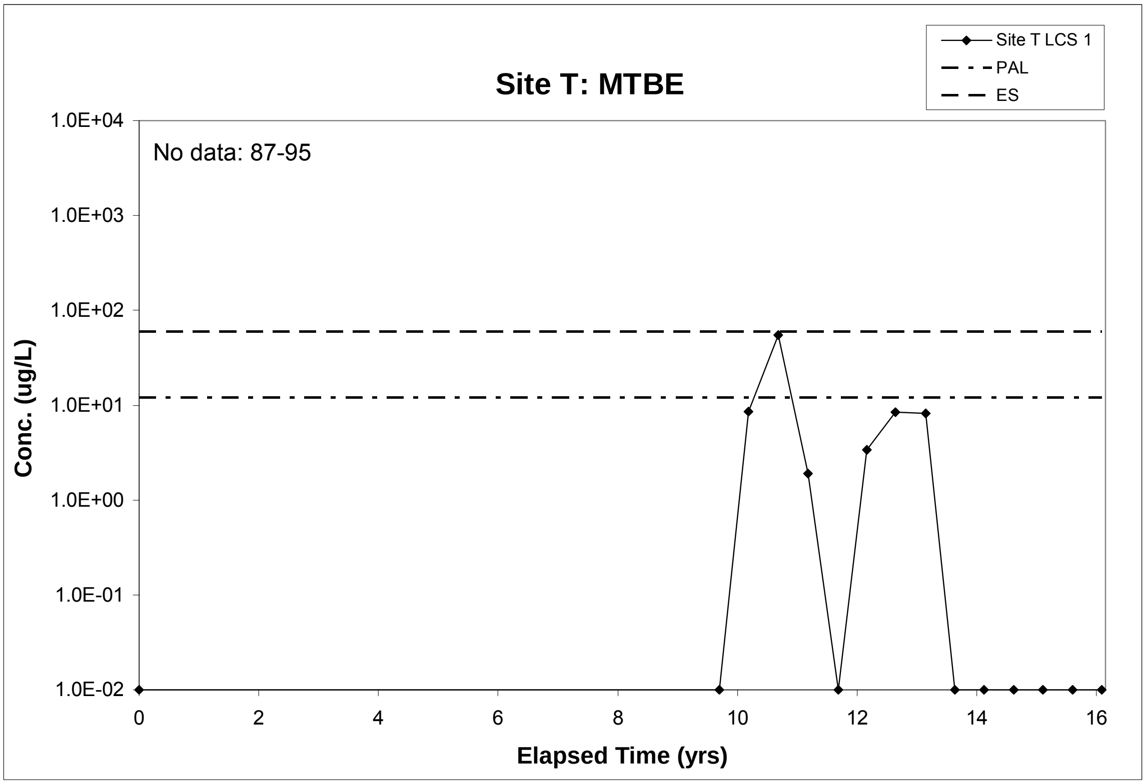

Site K: MTBE
Site K LCS 1
PAL
ES
No data 83-97
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

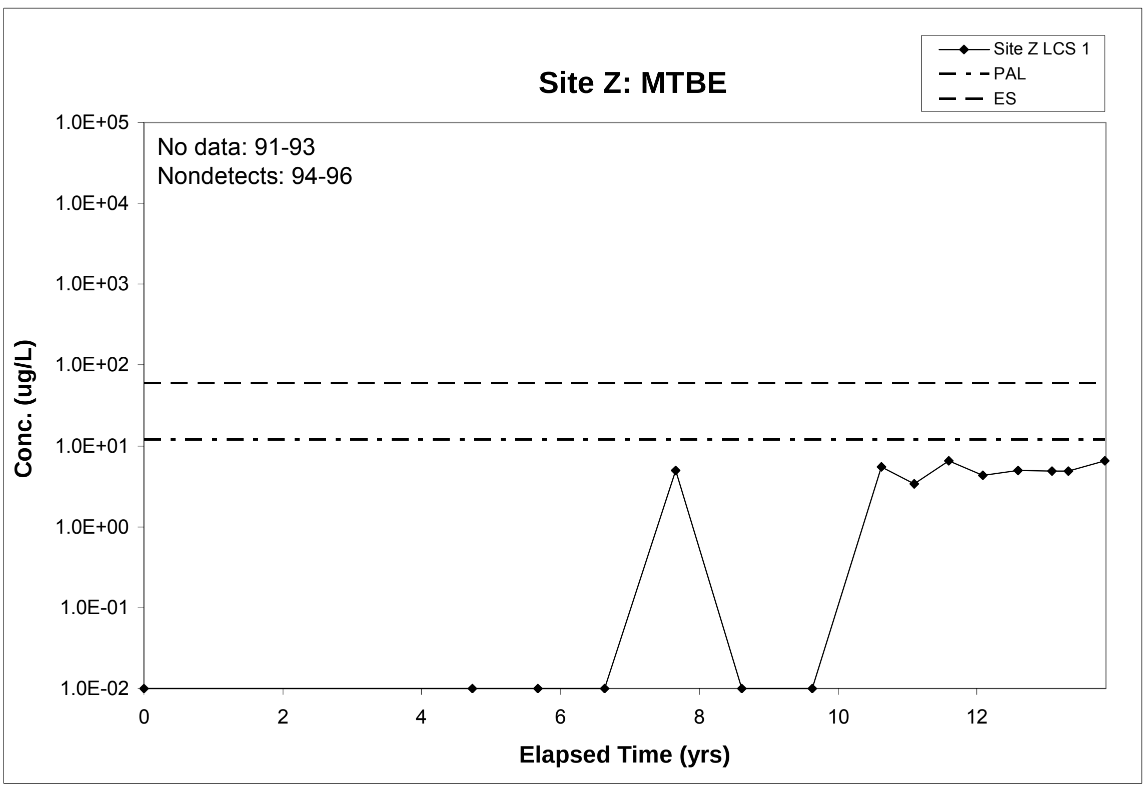

Site Q: MTBE
Site Q LCS 1
PAL
ES
No data: 85-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

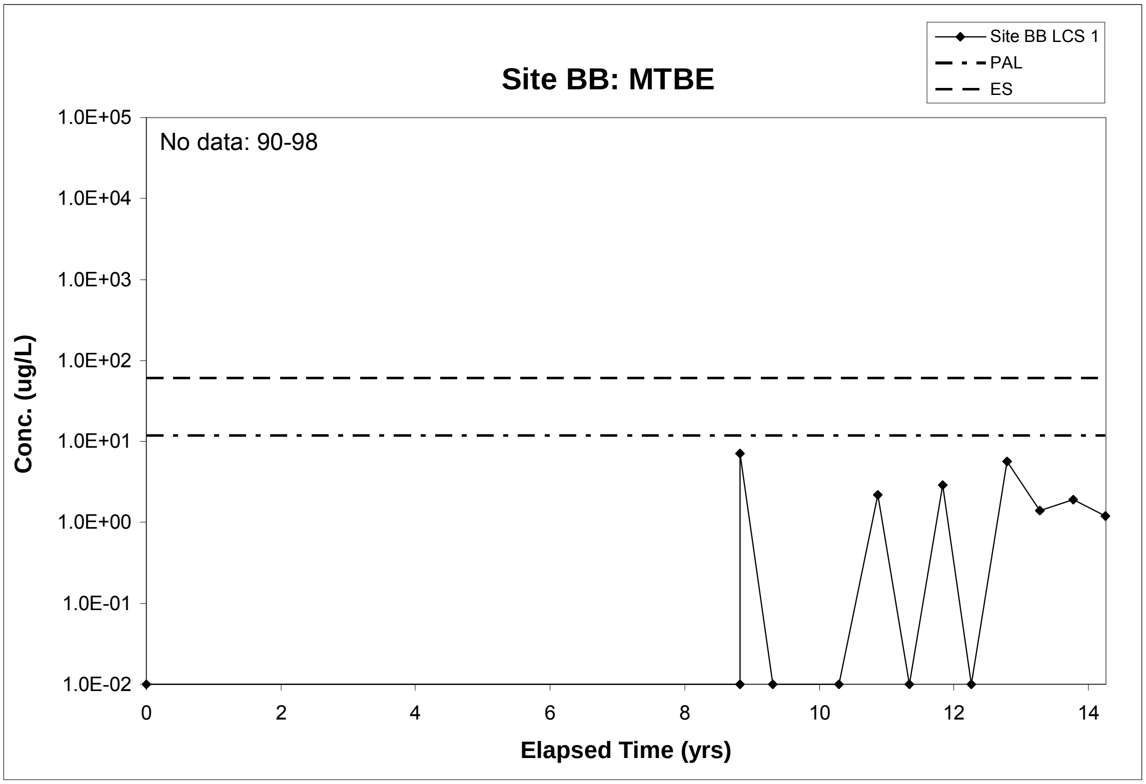

Site Q: MTBE
Site Q LCS 2
PAL
ES
Nondetects: 98-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

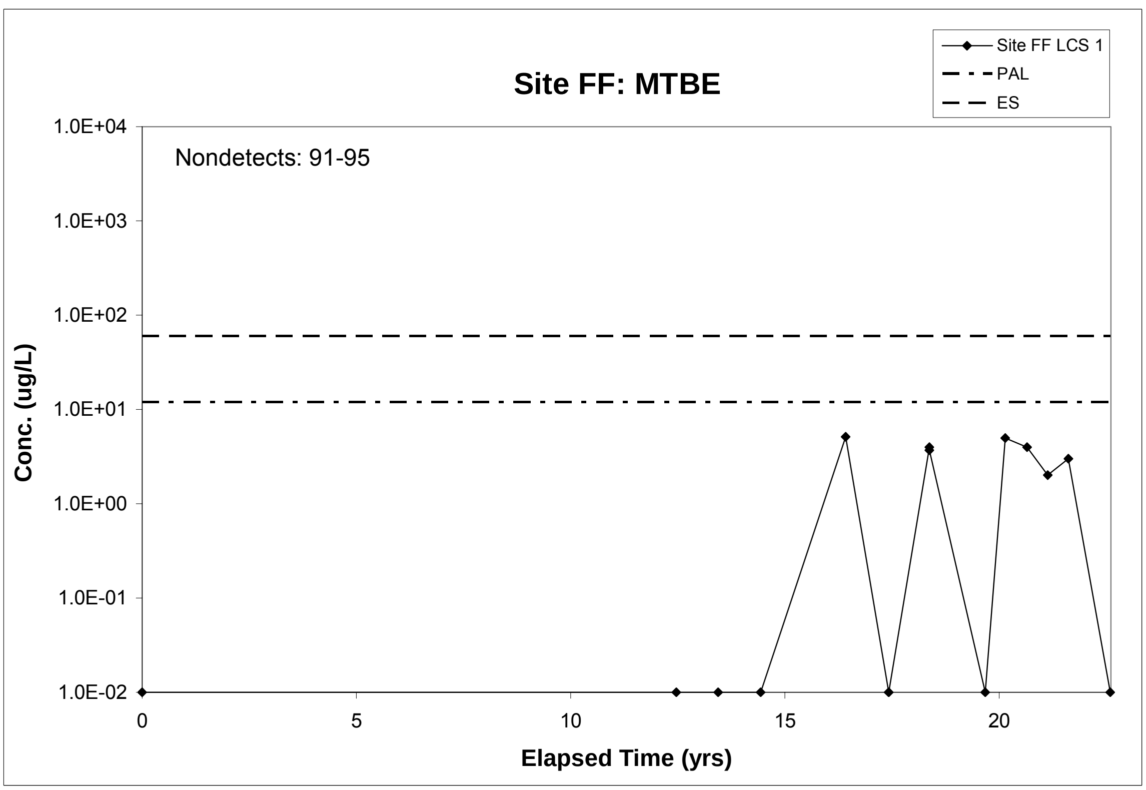

Site Q: MTBE
Site Q LCS 3
PAL
ES
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

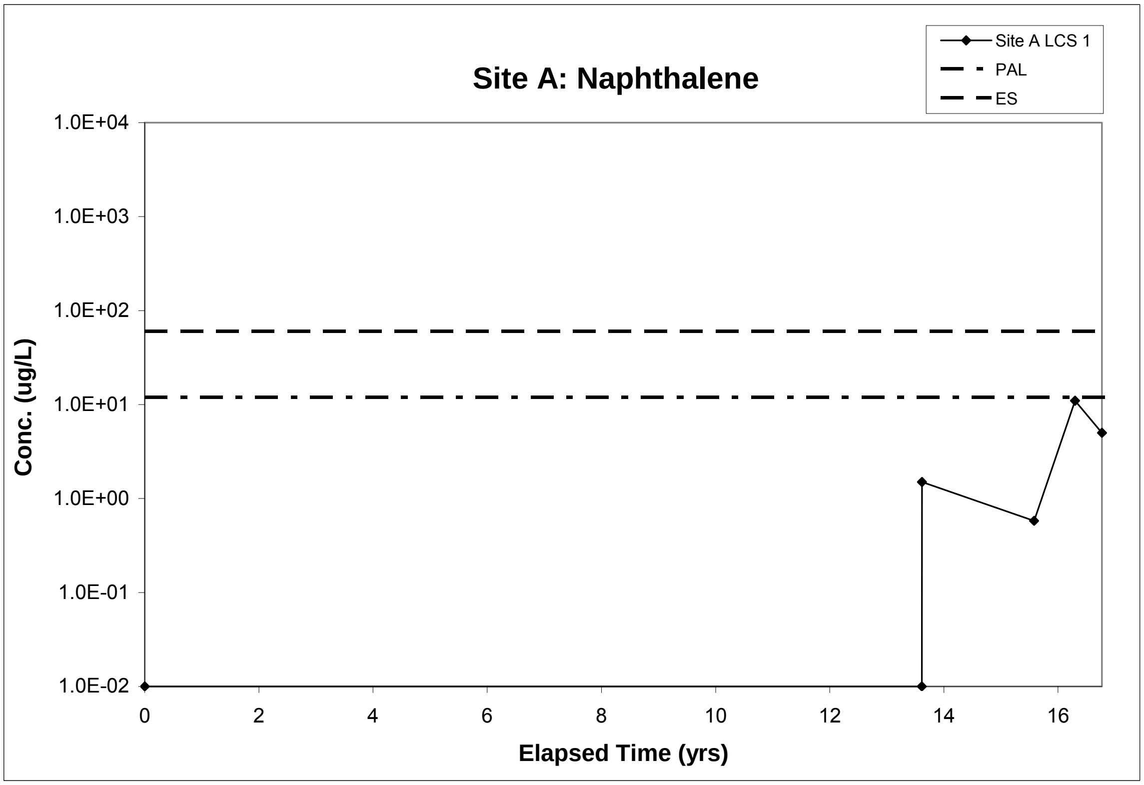

Site S: MTBE
Site S LCS 2
PAL
ES
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

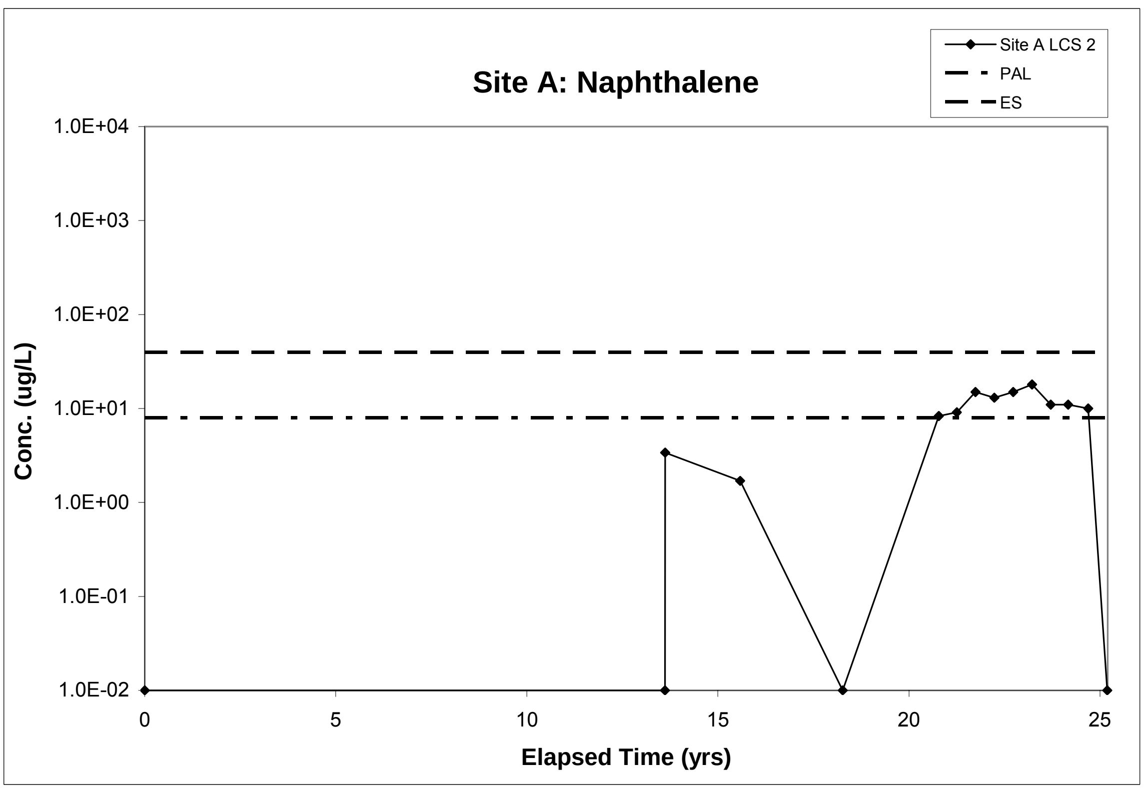

Site T: MTBE
Site T LCS 1
PAL
ES
No data: 87-95
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

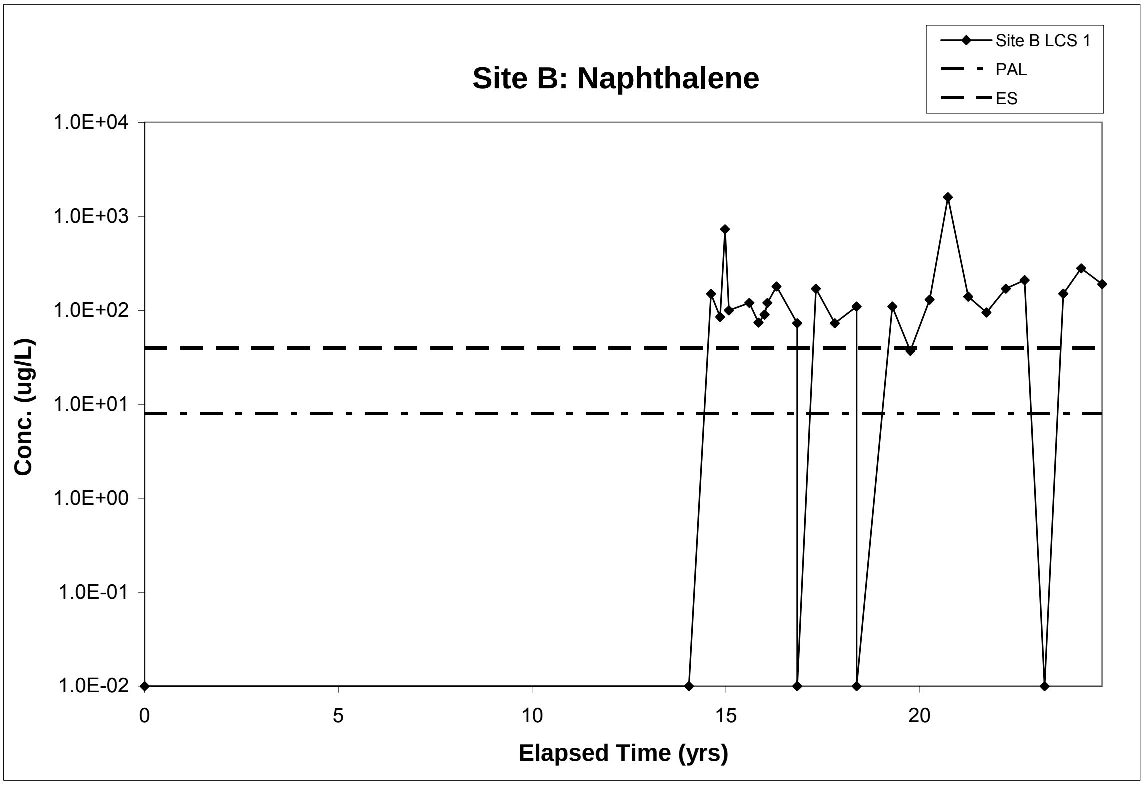

Site Z: MTBE
Site Z LCS 1
PAL
ES
No data: 91-93
Nondetects: 94-96
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

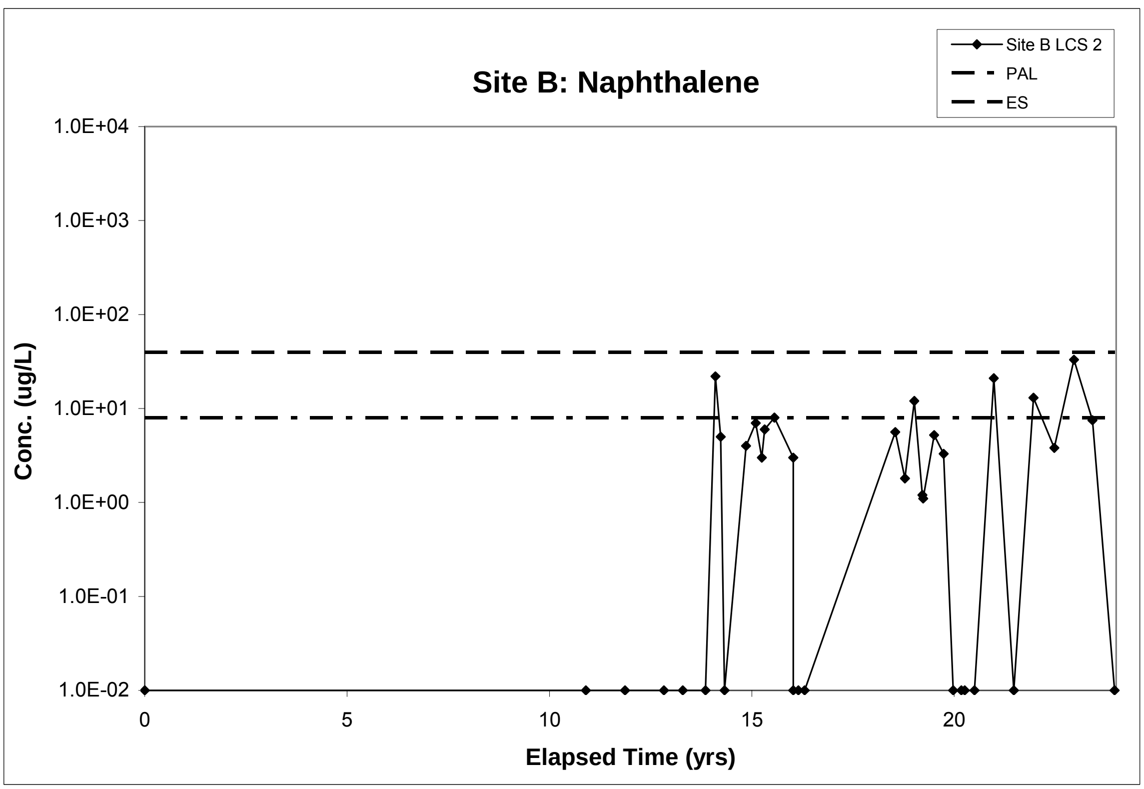

Site BB: MTBE
Site BB LCS 1
PAL
ES
No data: 90-98
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

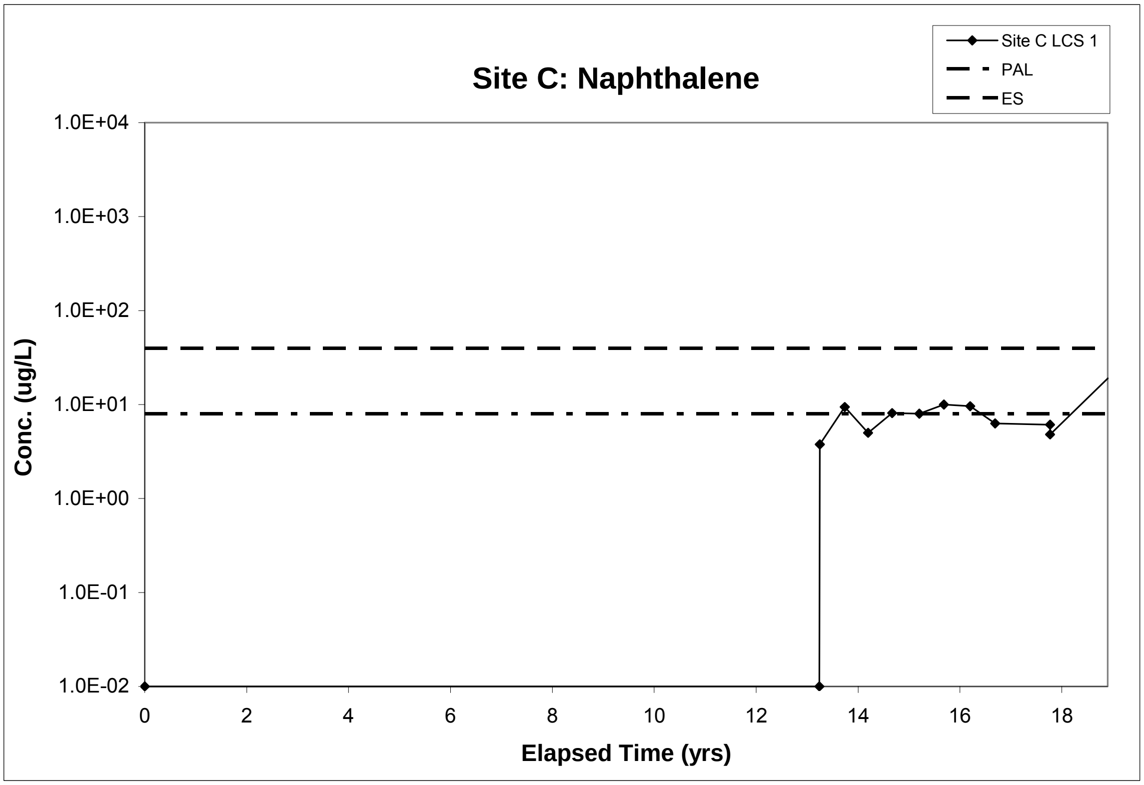

Site FF: MTBE
Site FF LCS 1
PAL
ES
Nondetects: 91-95
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

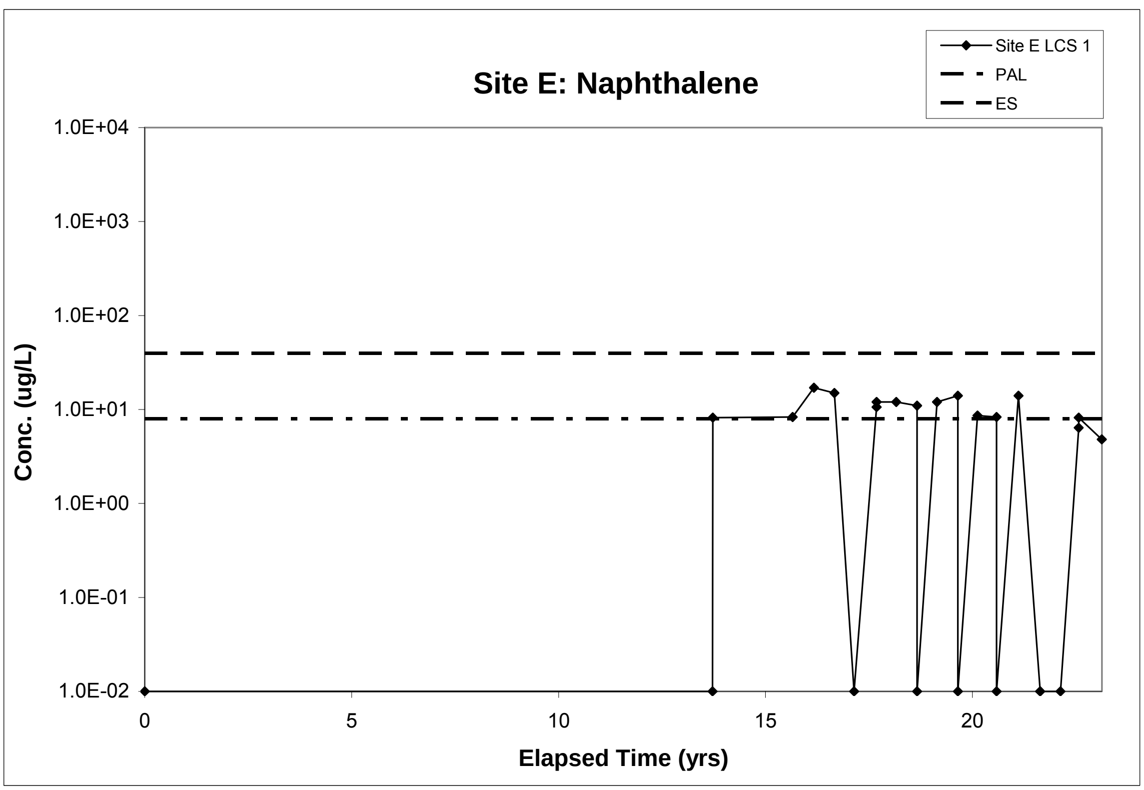

Site A: Naphthalene
Site A LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

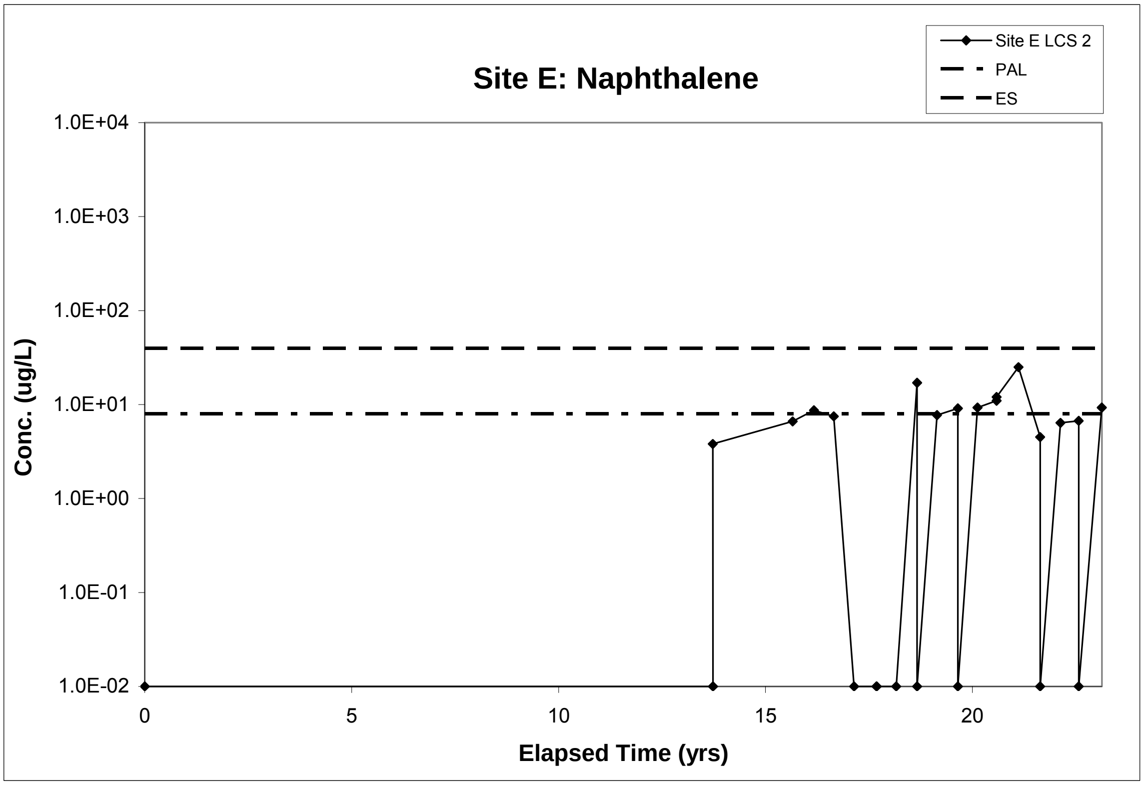

Site A: Naphthalene
Site A LCS 2
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
25
Elapsed Time (yrs)

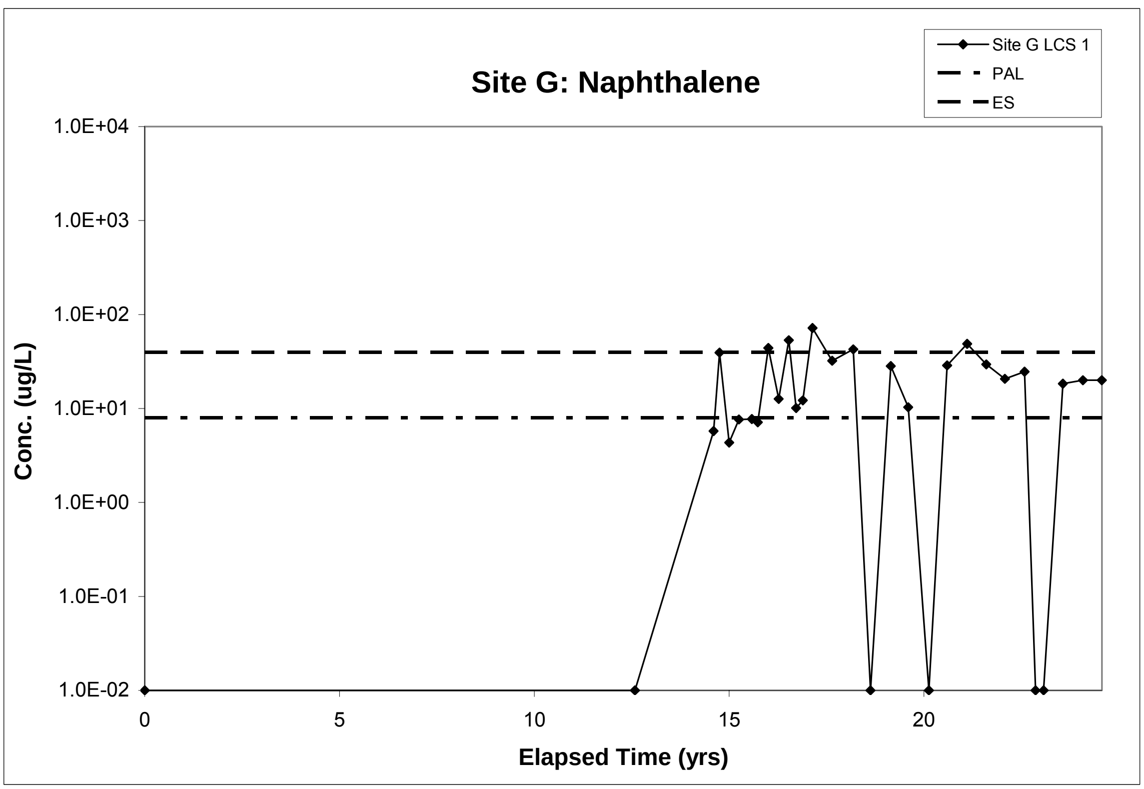

Site B: Naphthalene
Site B LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

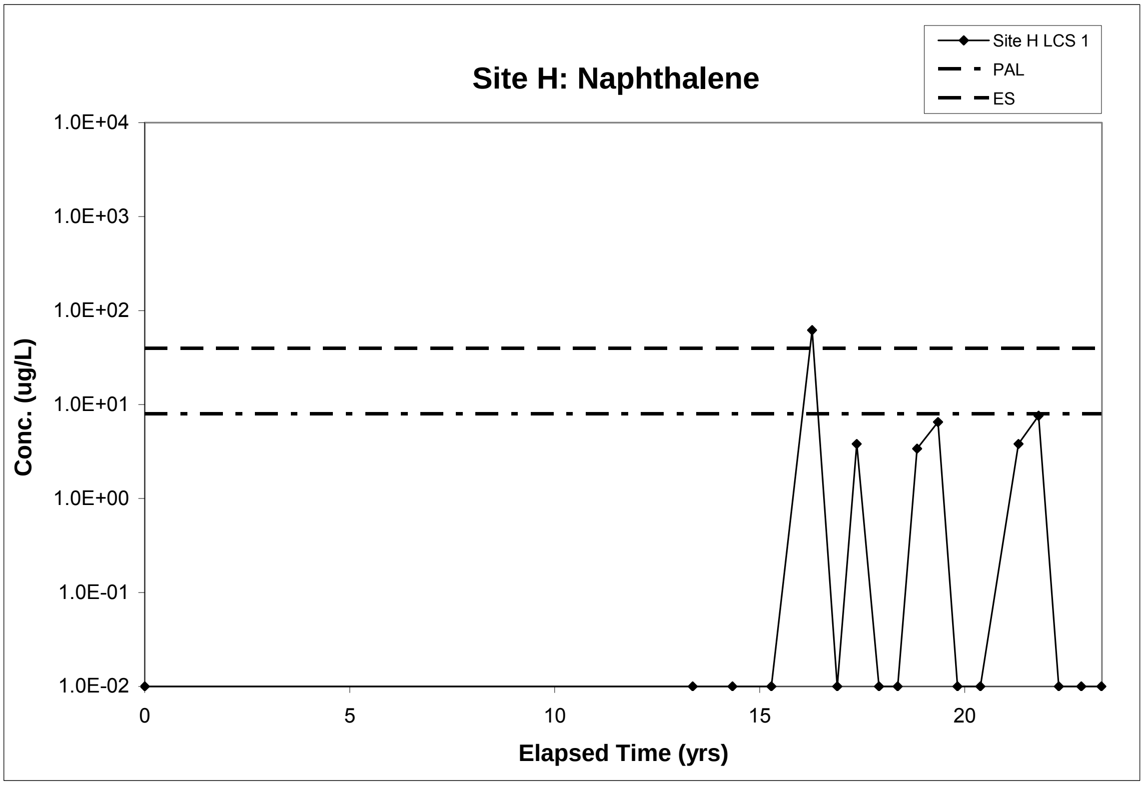

Site B: Naphthalene
Site B LCS 2
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

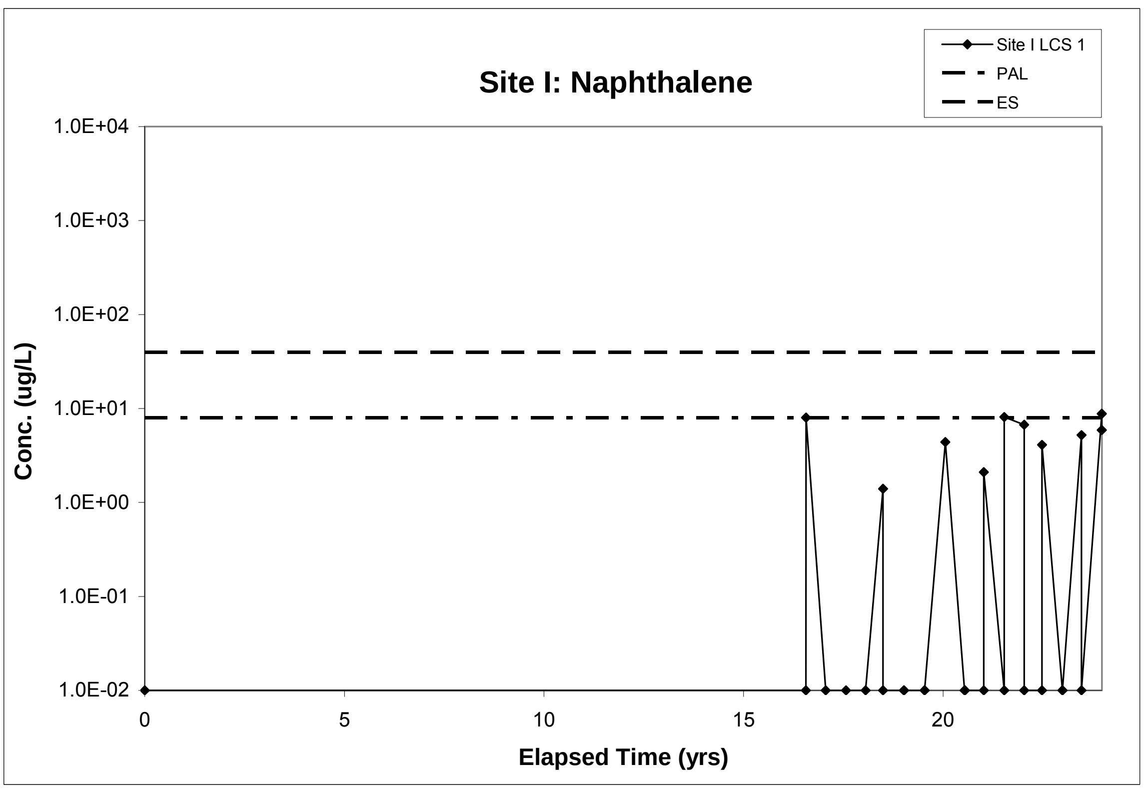

Site C: Naphthalene
Site C LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

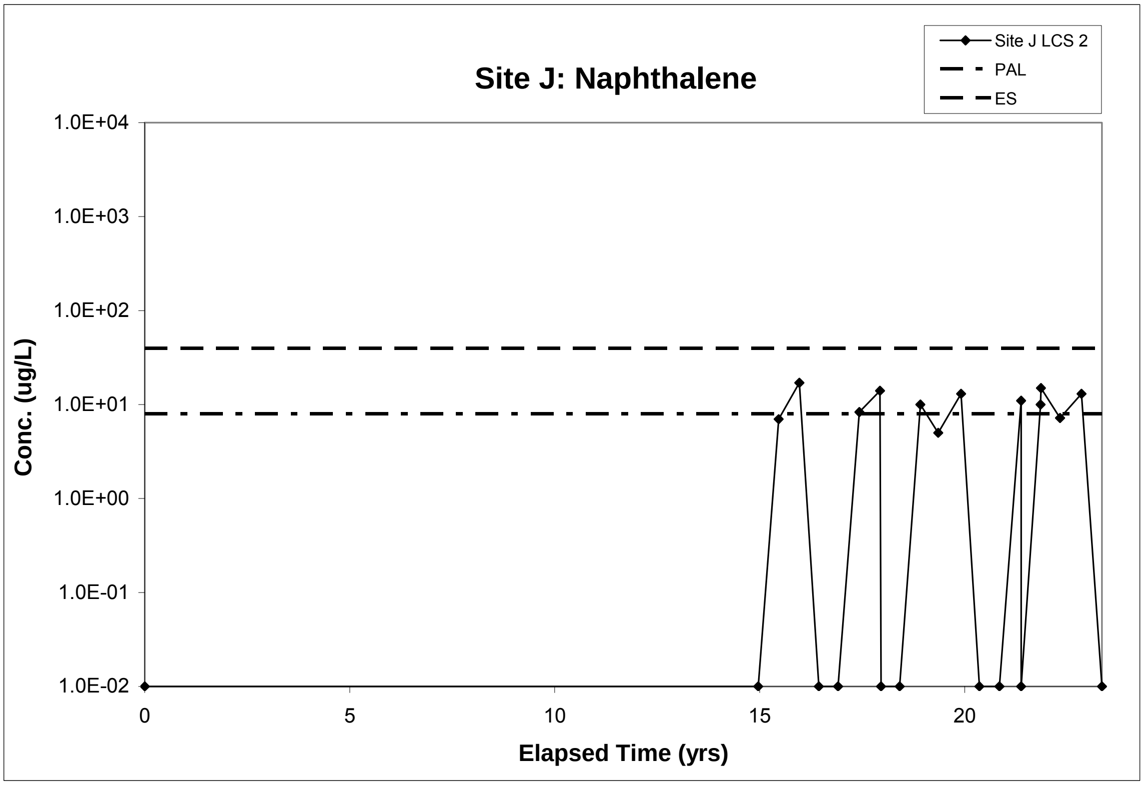

Site E: Naphthalene
Site E LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

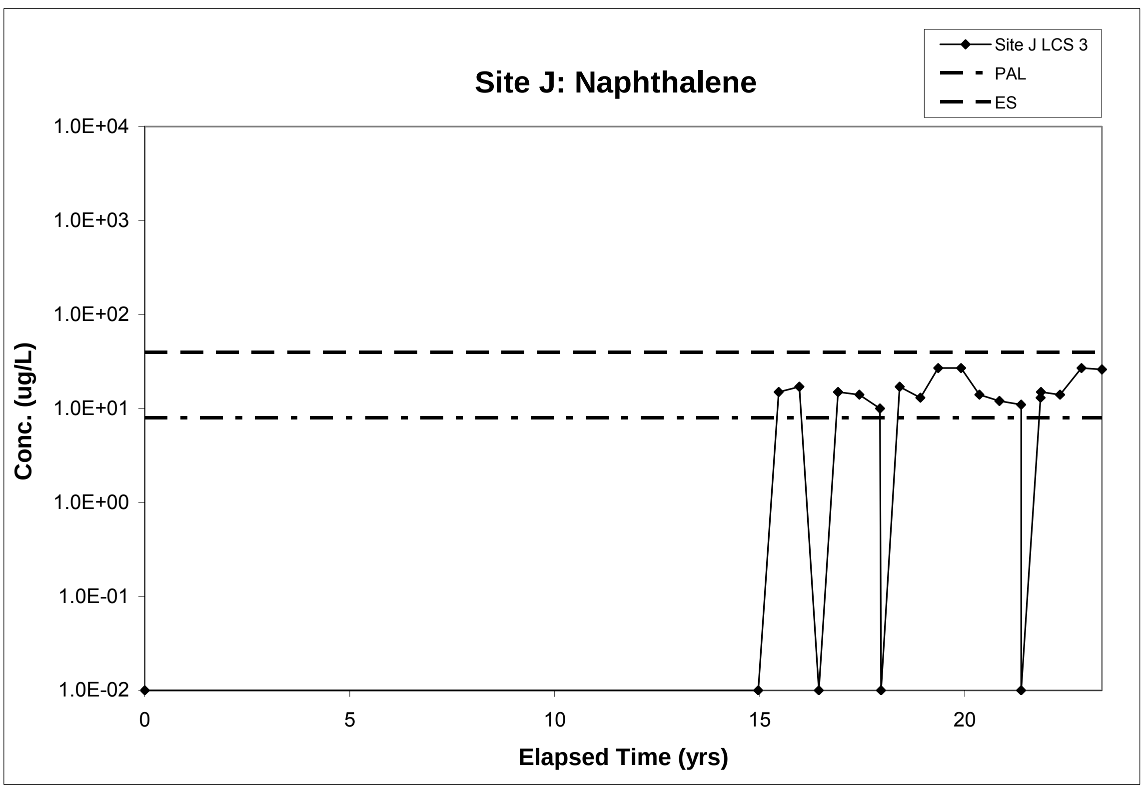

Site E: Naphthalene
Site E LCS 2
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

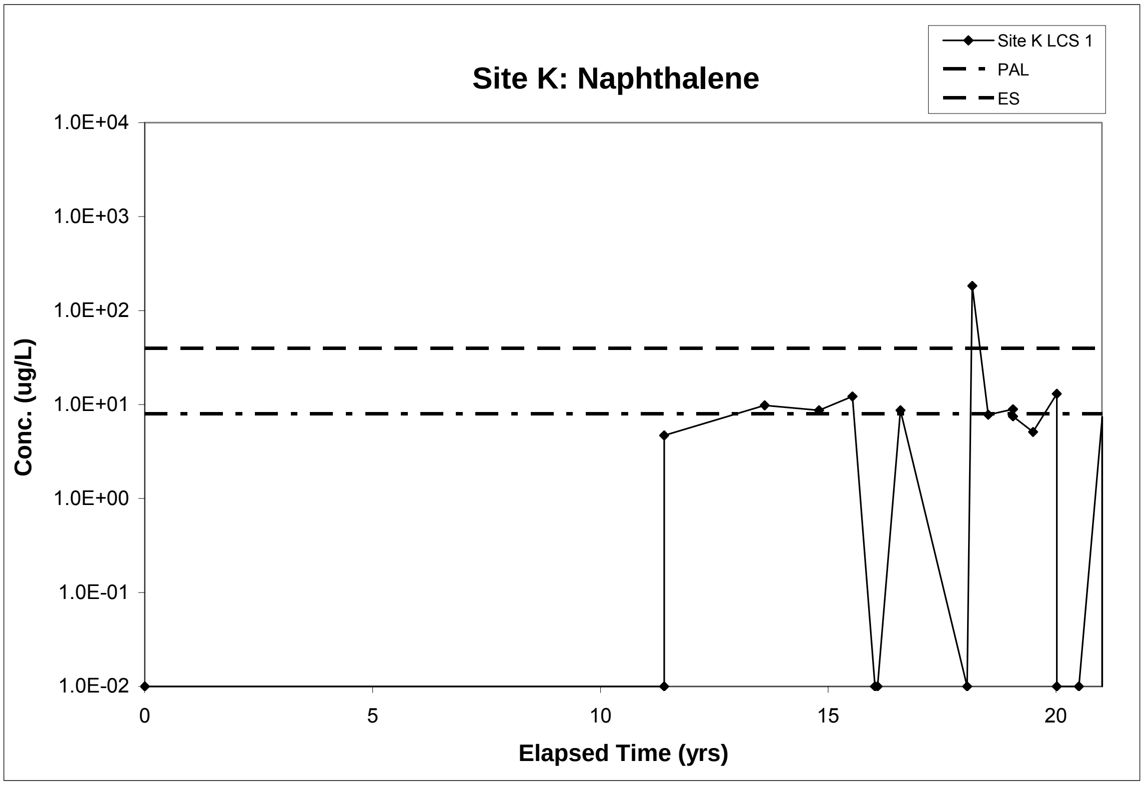

Site G: Naphthalene
Site G LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

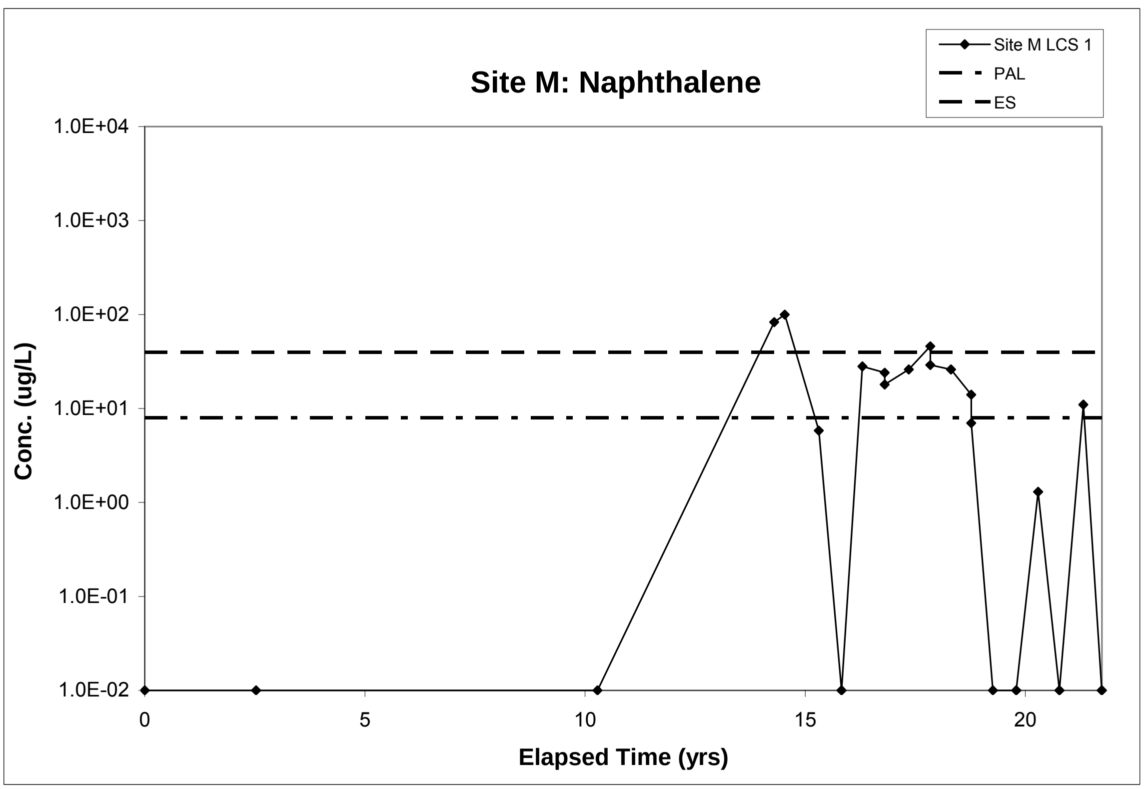

Site H: Naphthalene
Site H LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

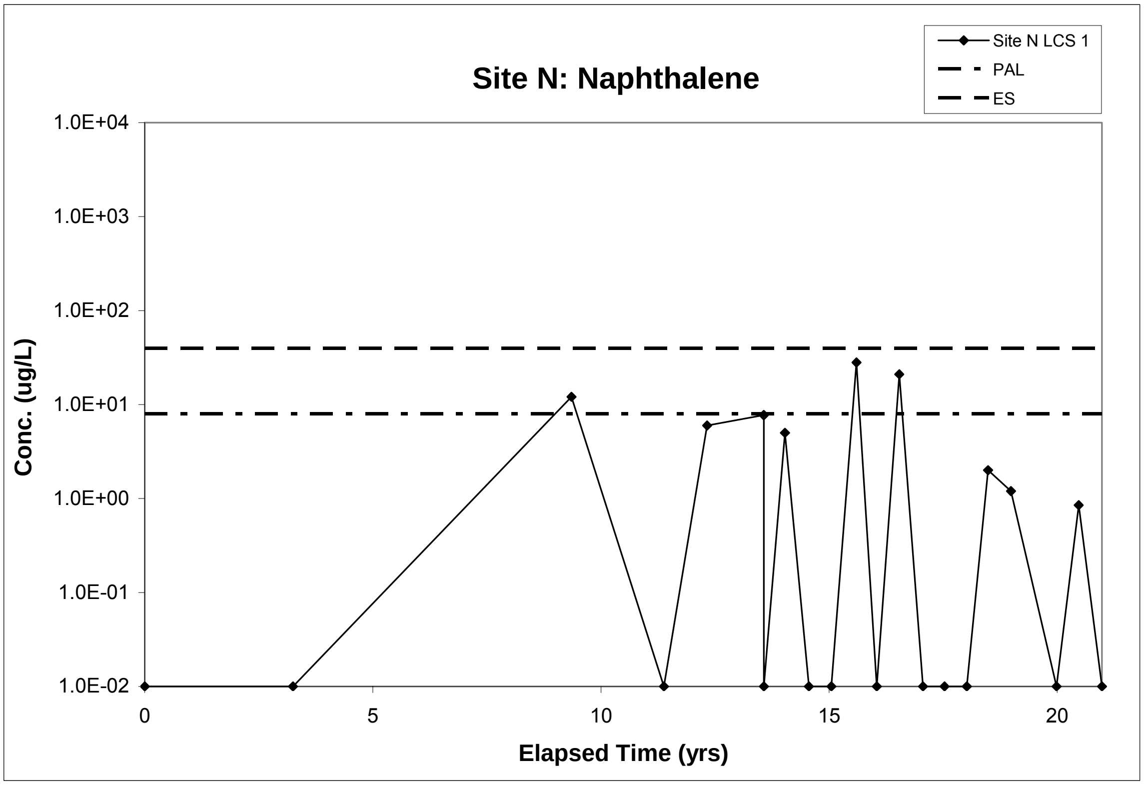

Site I: Naphthalene
Site I LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

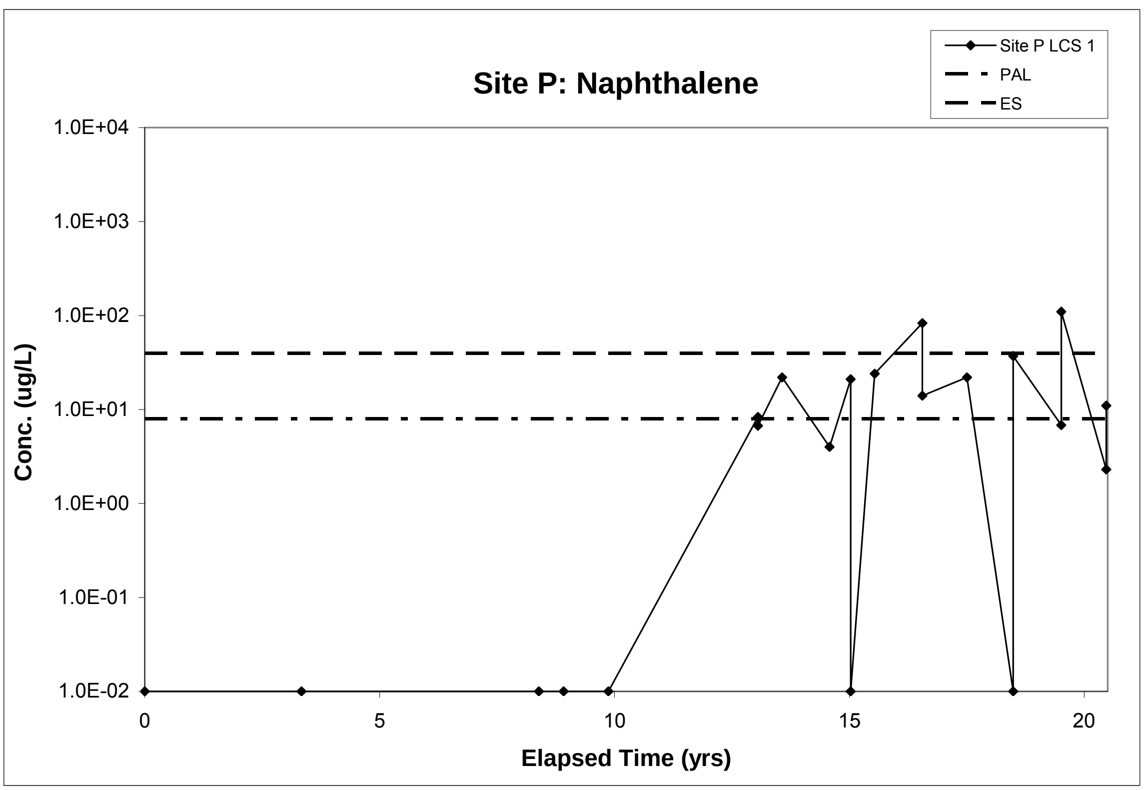

Site J: Naphthalene
Site J LCS 2
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

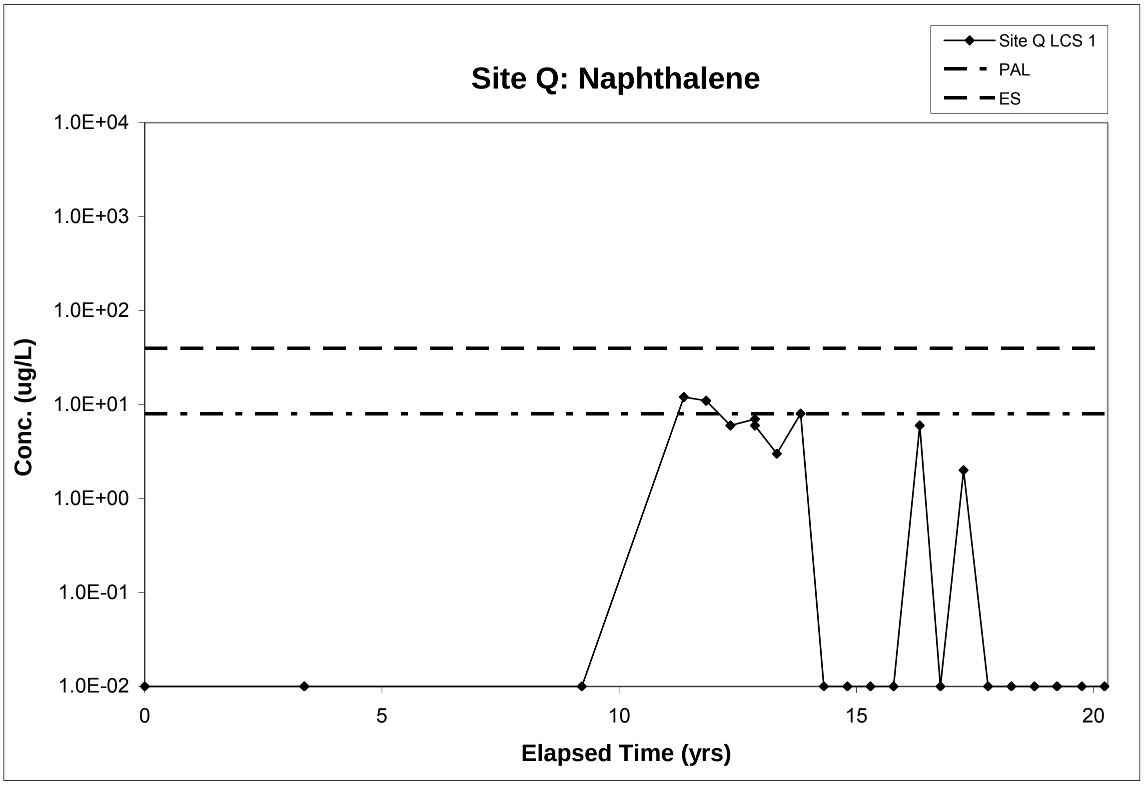

Site J: Naphthalene
Site J LCS 3
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

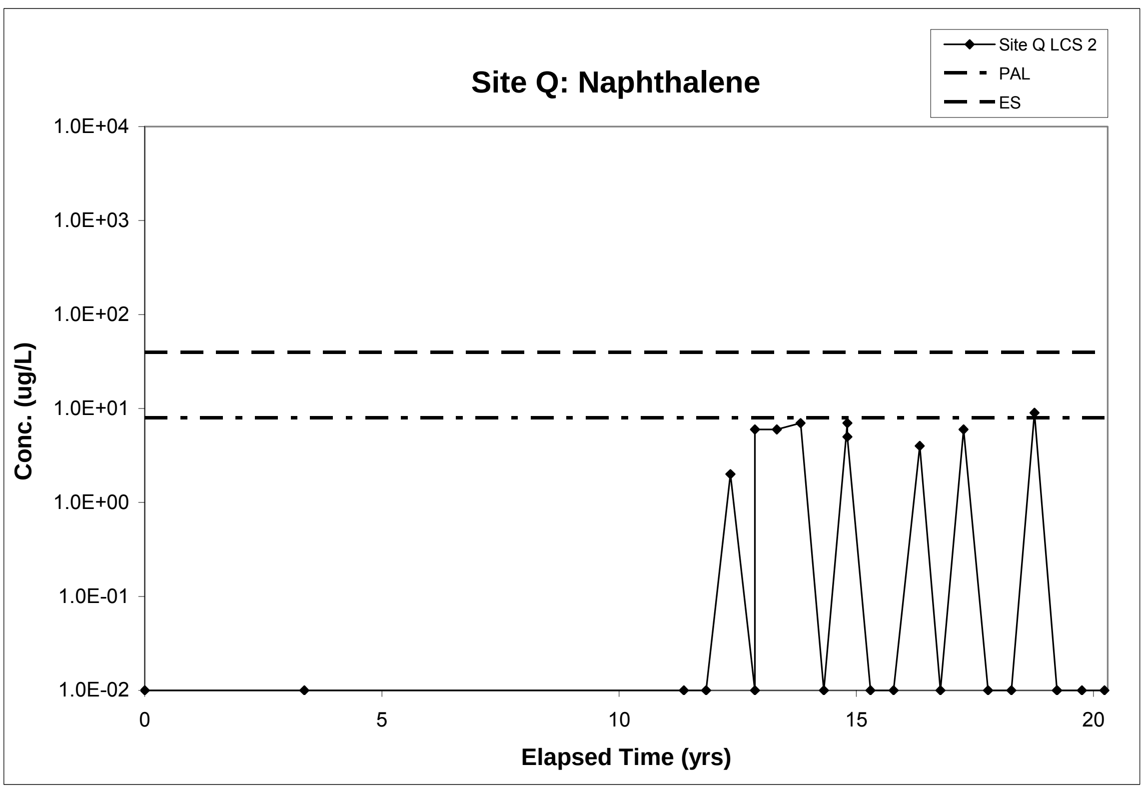

Site K: Naphthalene
Site K LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

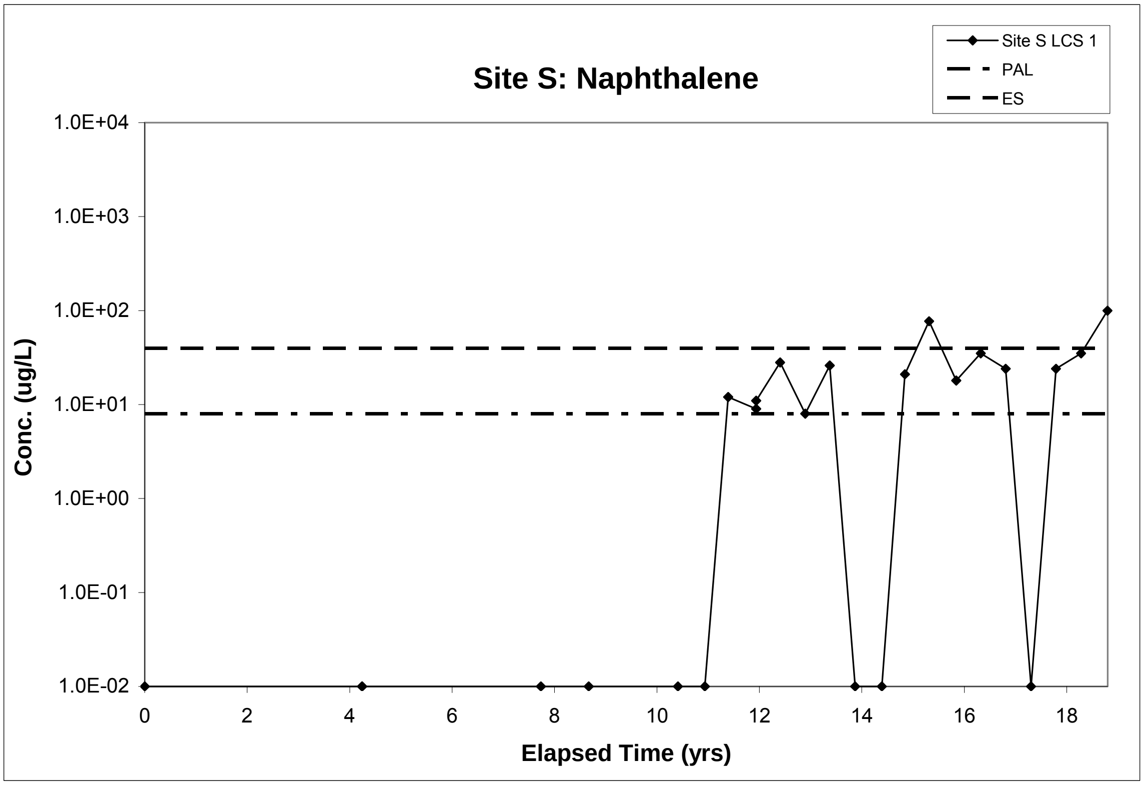

Site M: Naphthalene
Site M LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

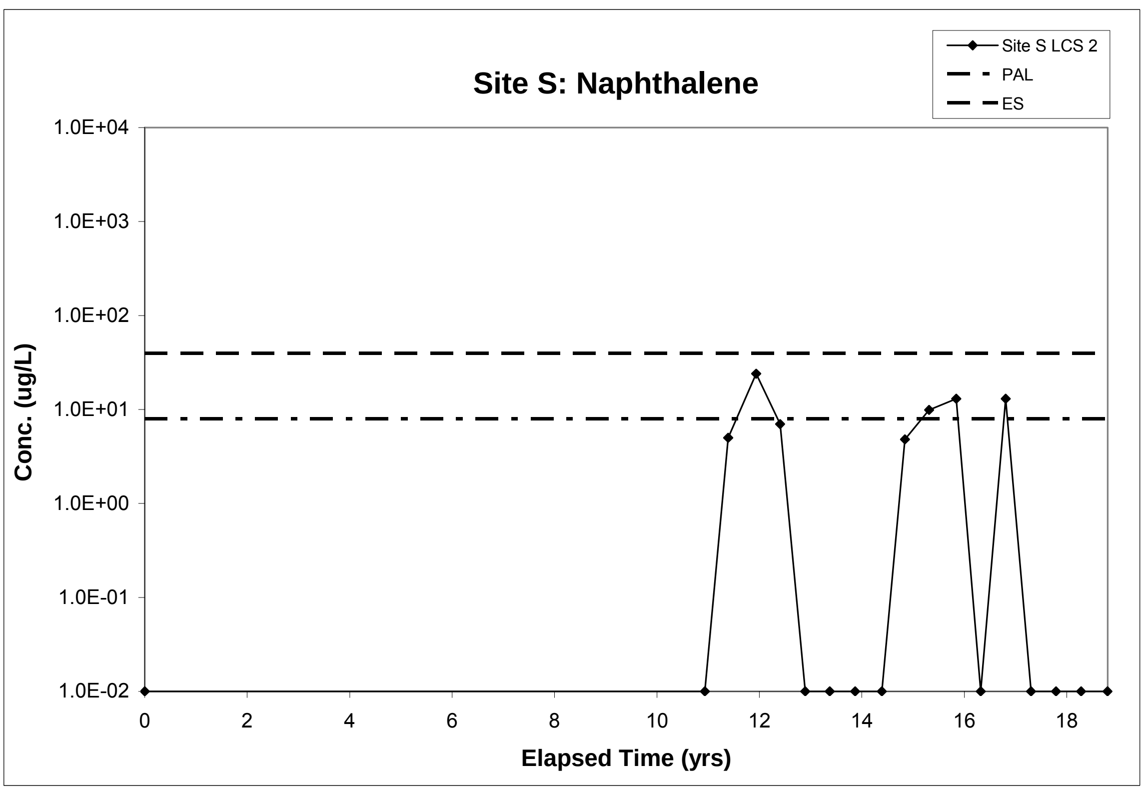

Site N: Naphthalene
Site N LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

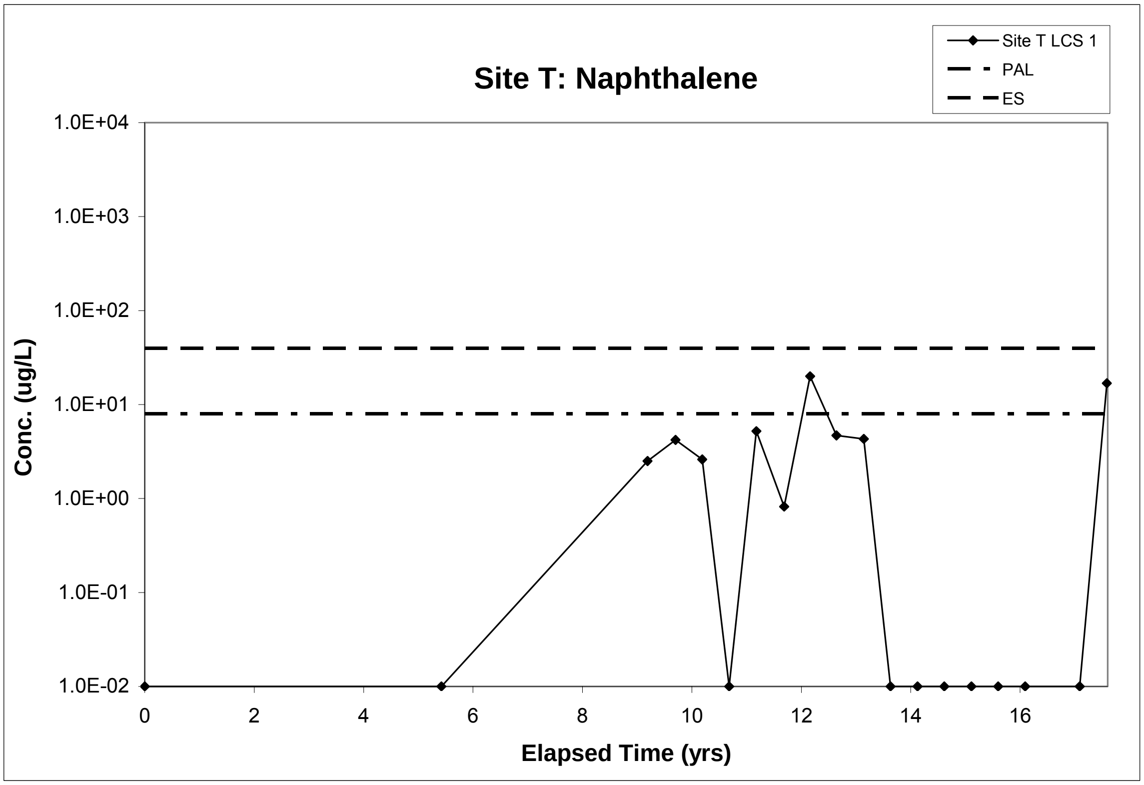

Site P: Naphthalene
Site P LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)


Site Q: Naphthalene
Site Q LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

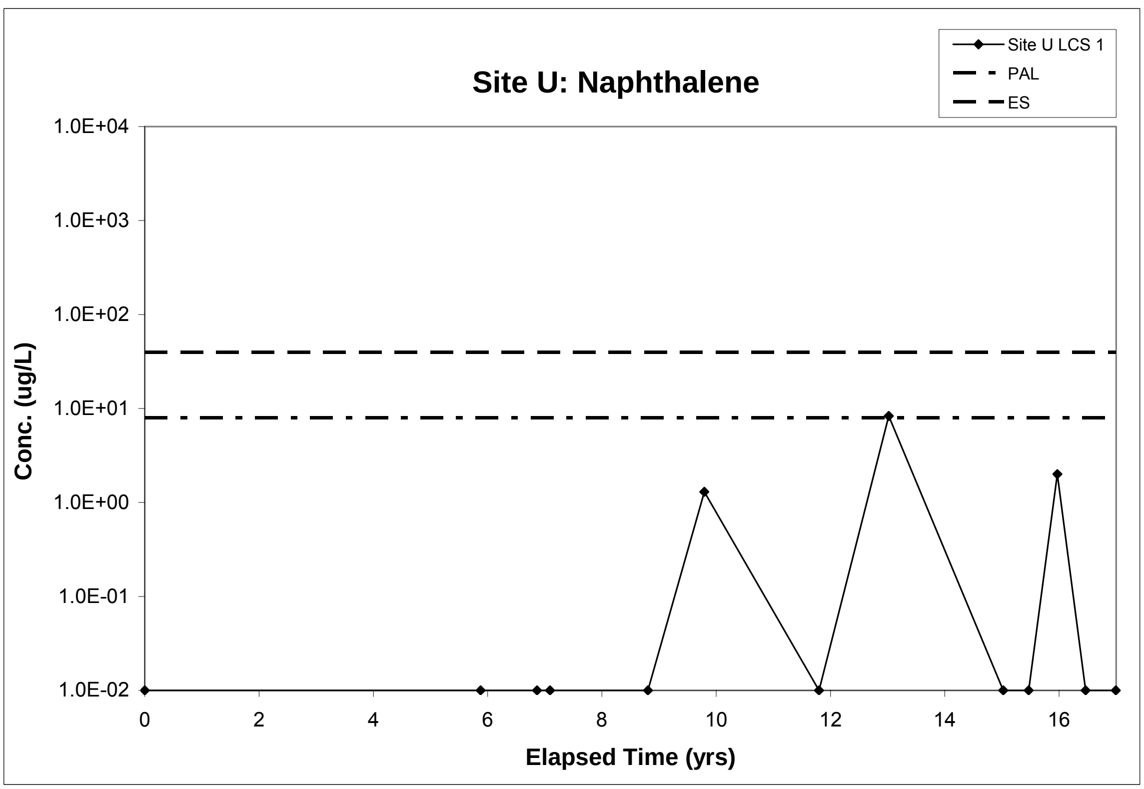

Site Q: Naphthalene
Site Q LCS 2
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)


Site S: Naphthalene
Site S LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

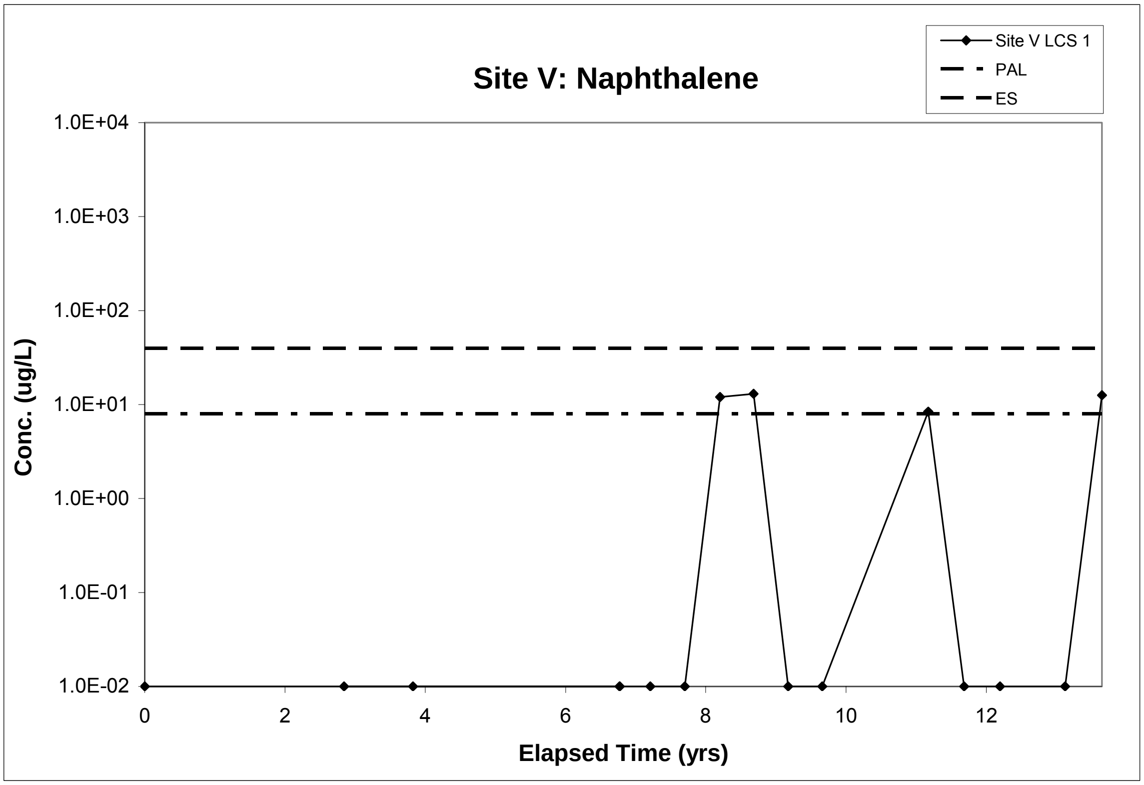

Site S: Naphthalene
Site S LCS 2
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

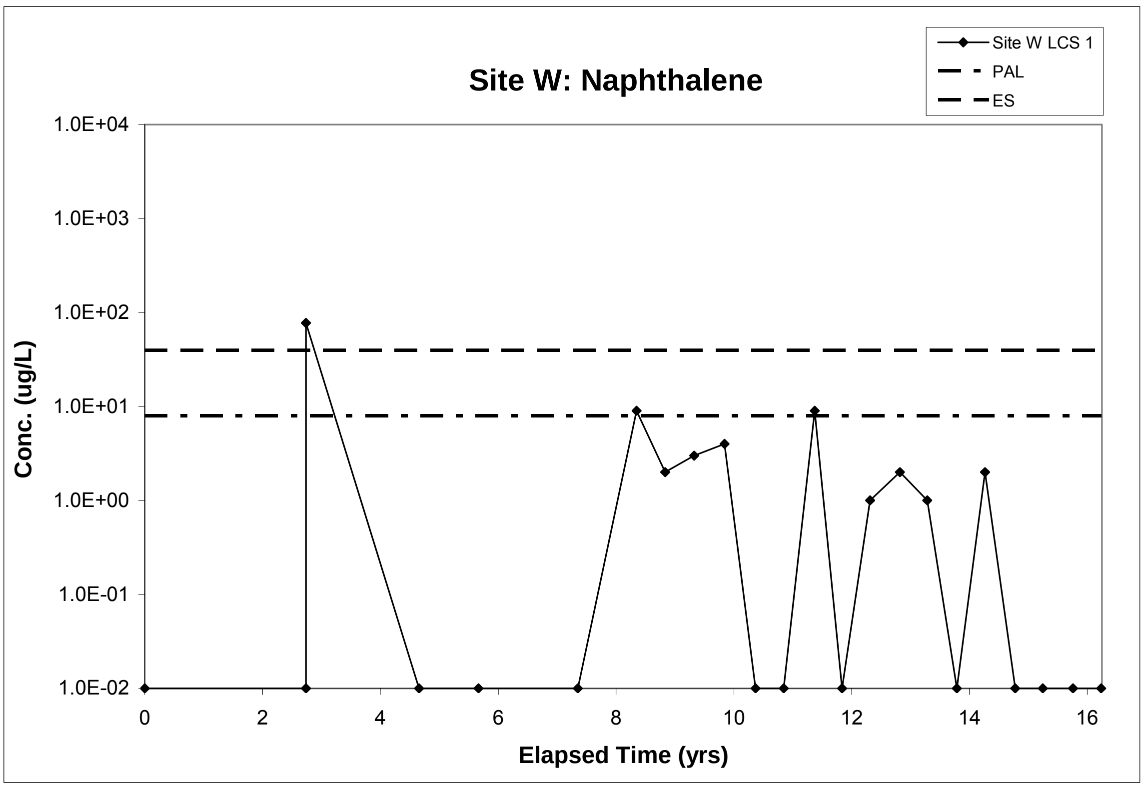


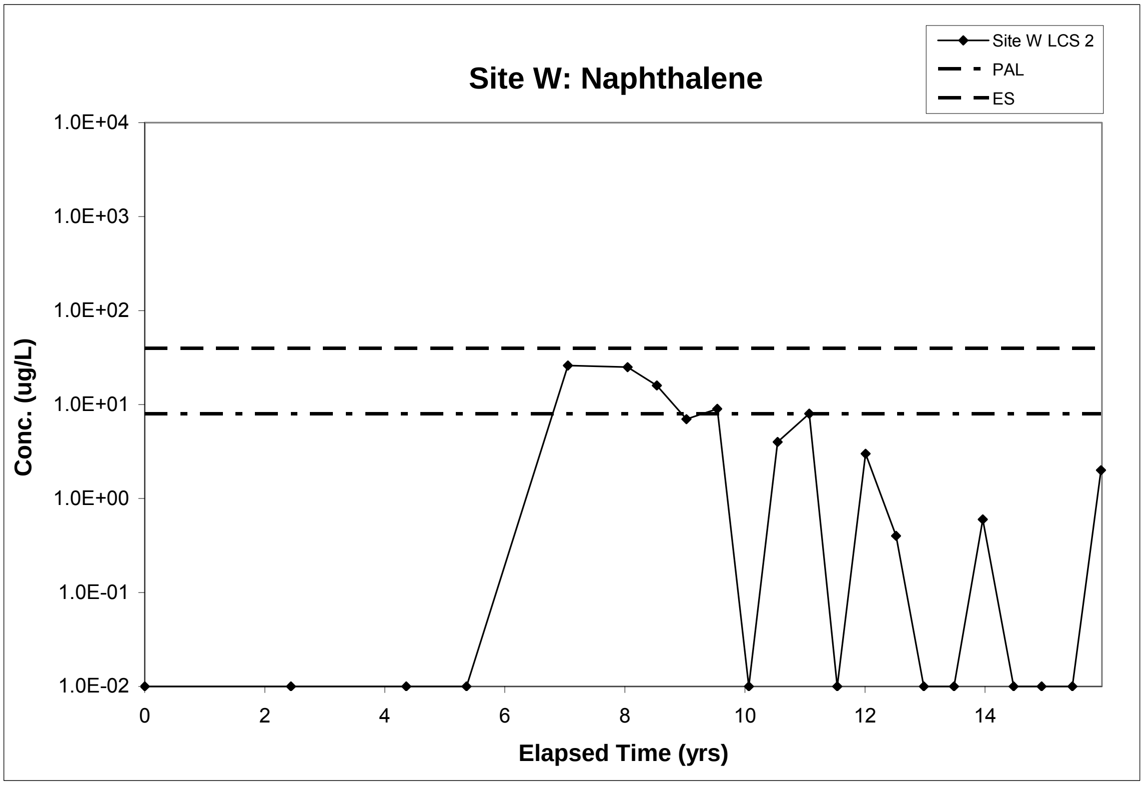
Site T: Naphthalene
Site T LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

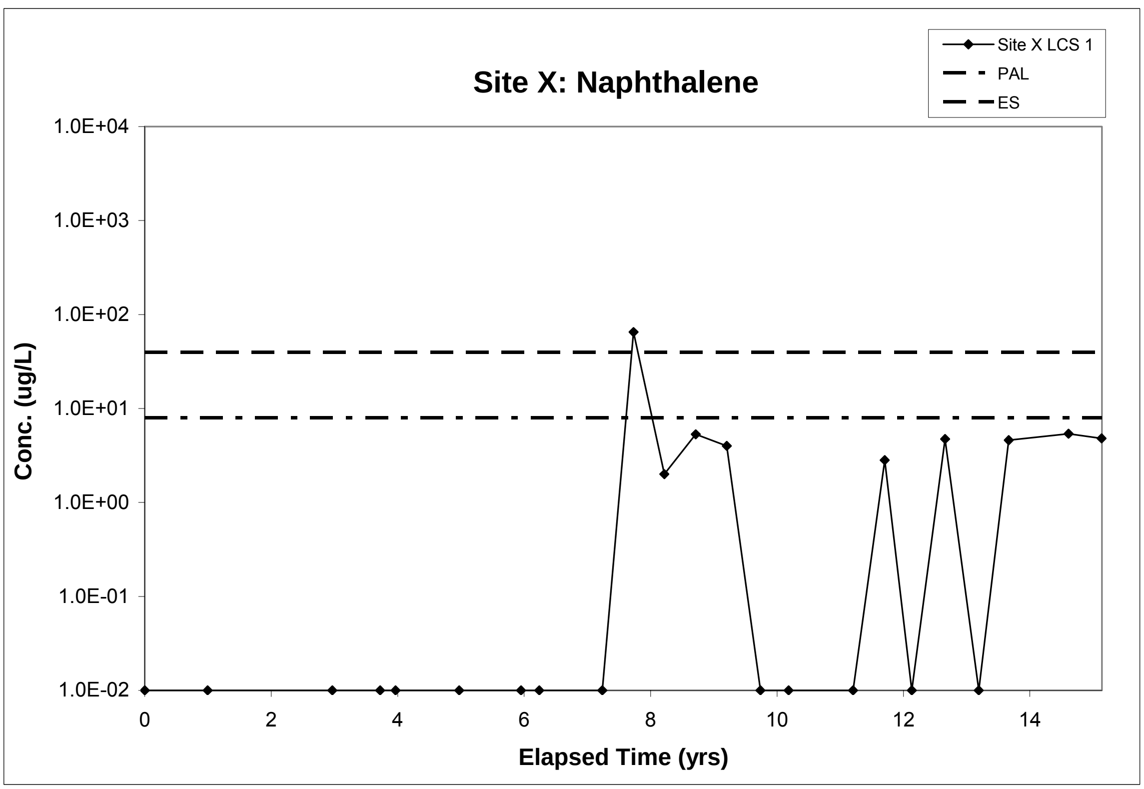


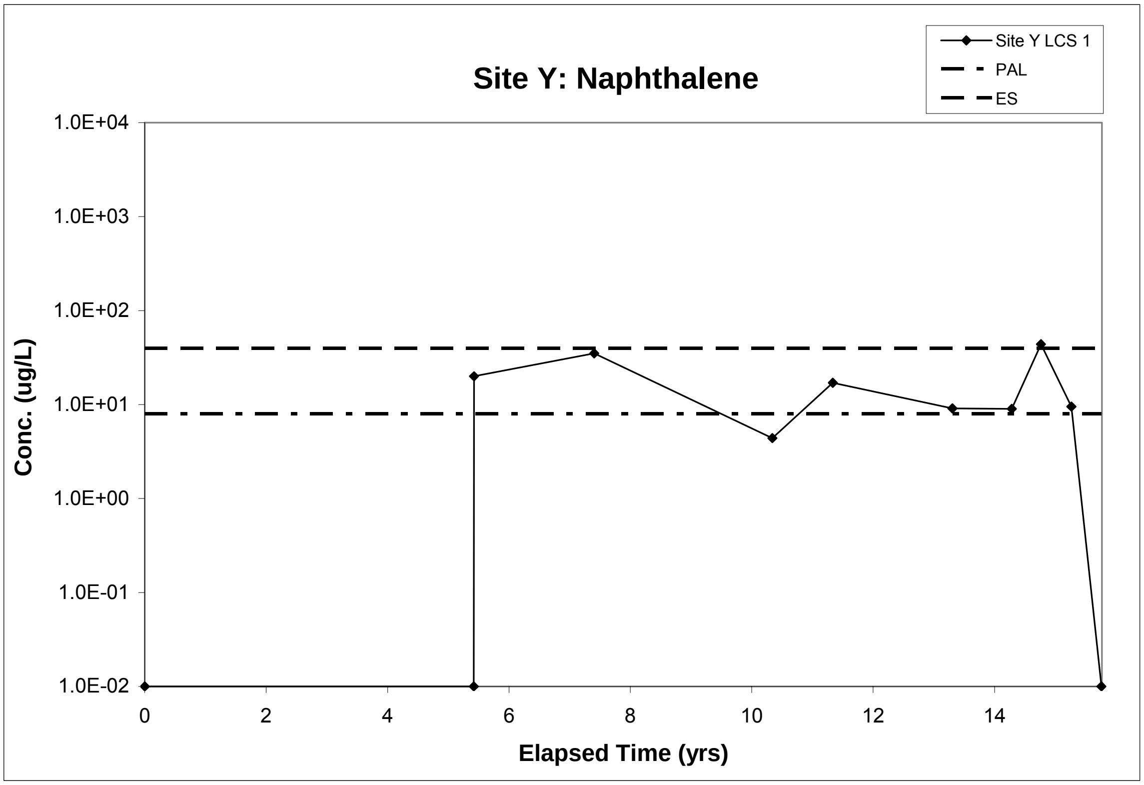
Site U: Naphthalene
Site U LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

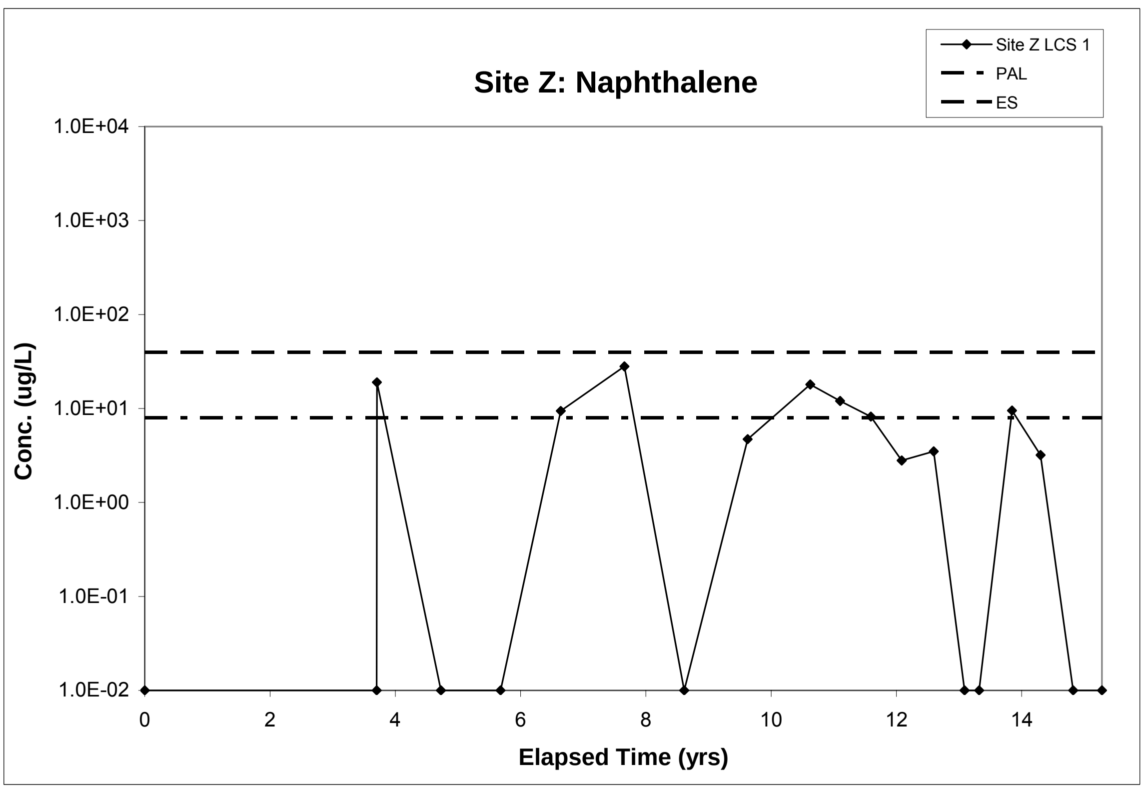

Site V: Naphthalene
Site V LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

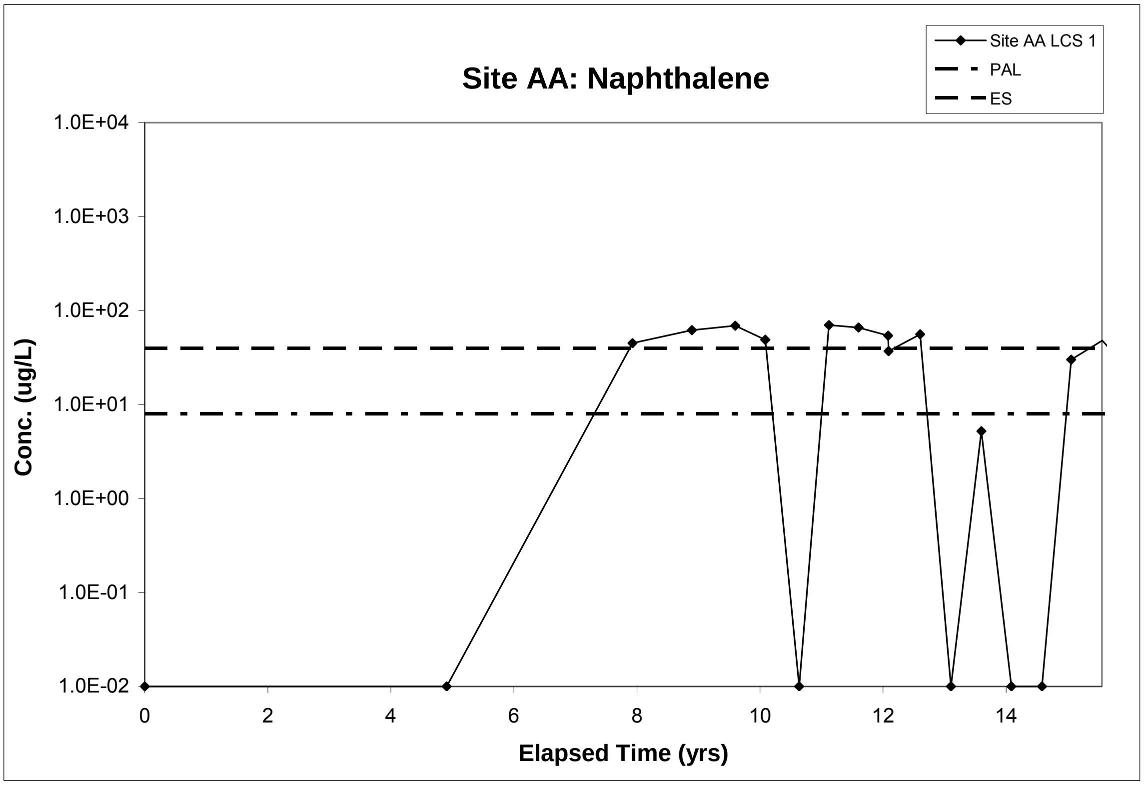

Site W: Naphthalene
Site W LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

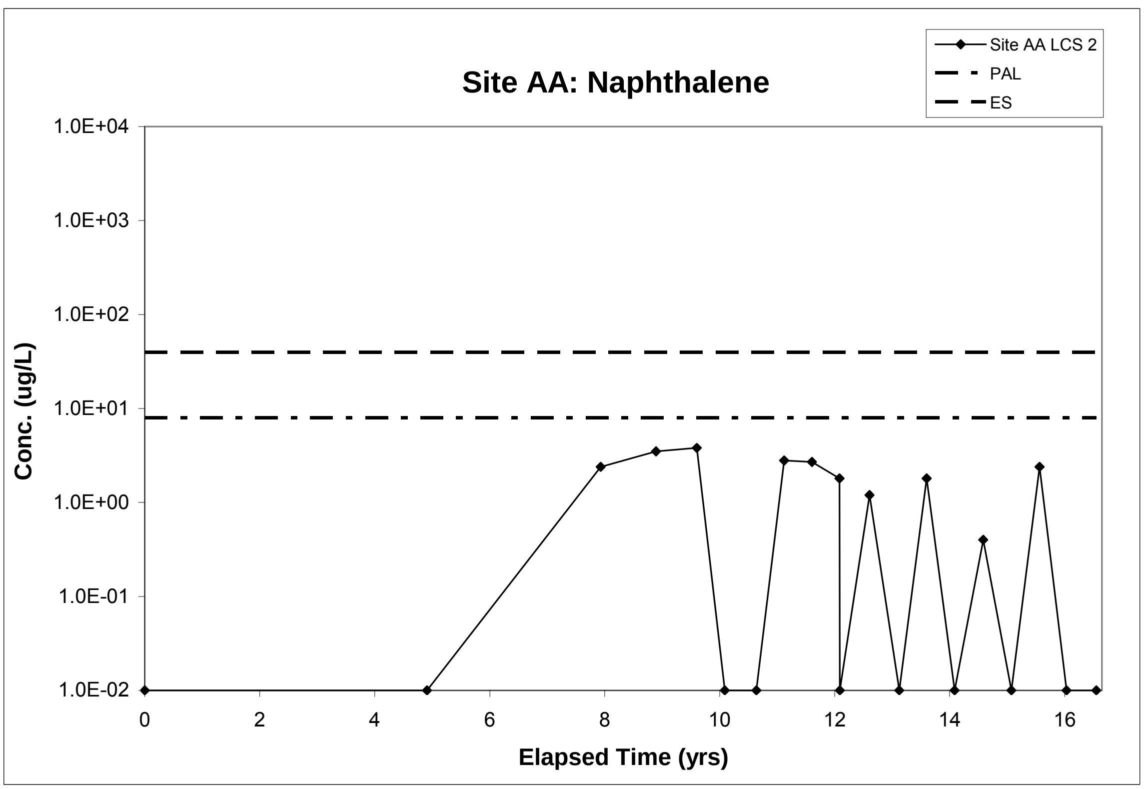

Site W: Naphthalene
Site W LCS 2
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

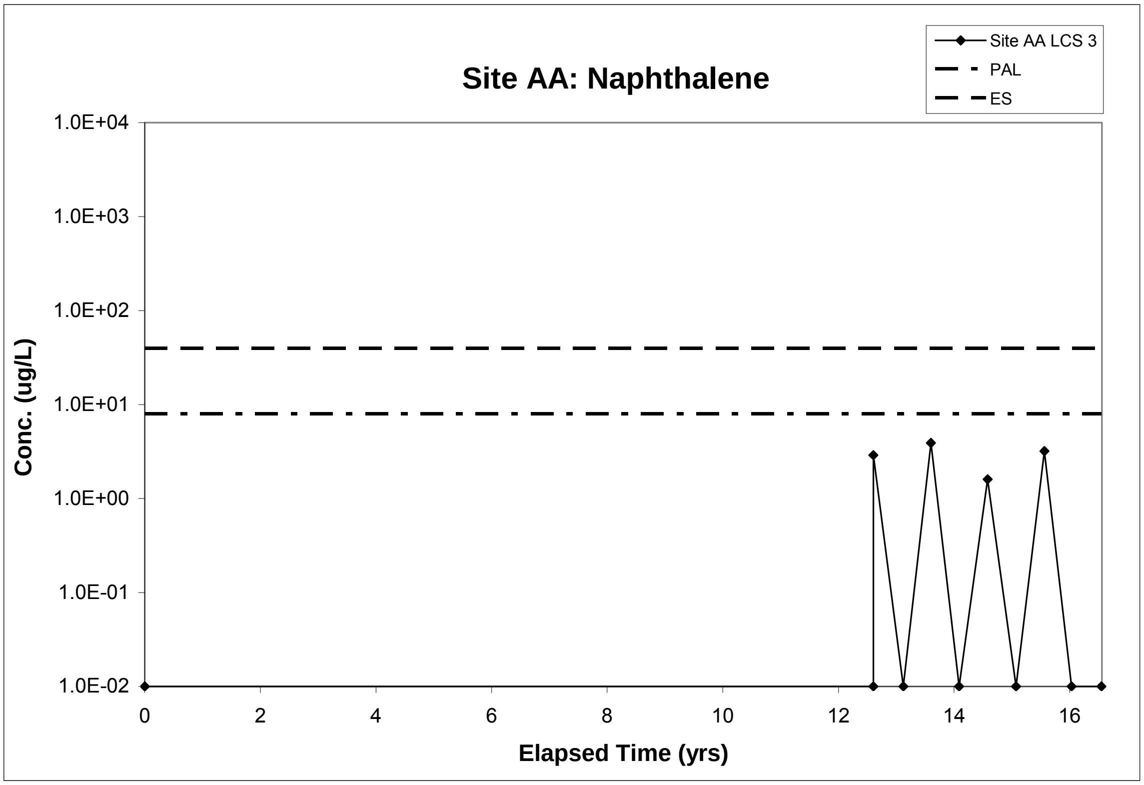

Site X: Naphthalene
Site X LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

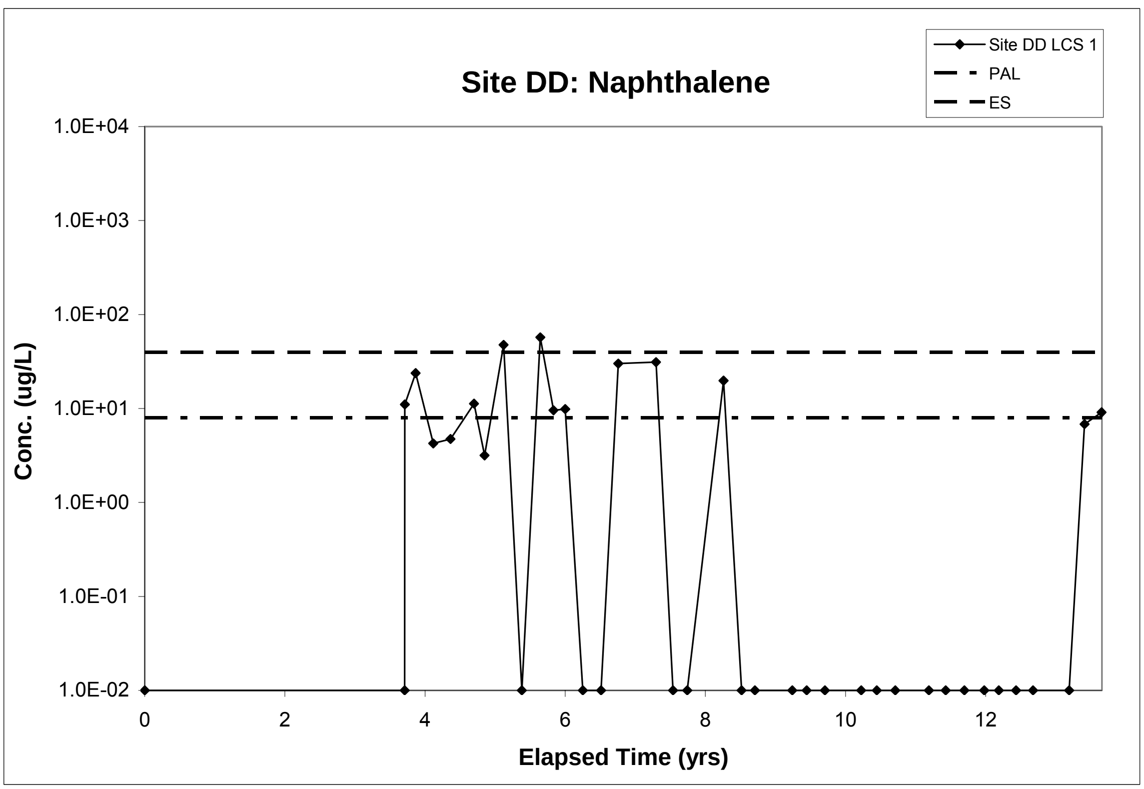

Site Y: Naphthalene
Site Y LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

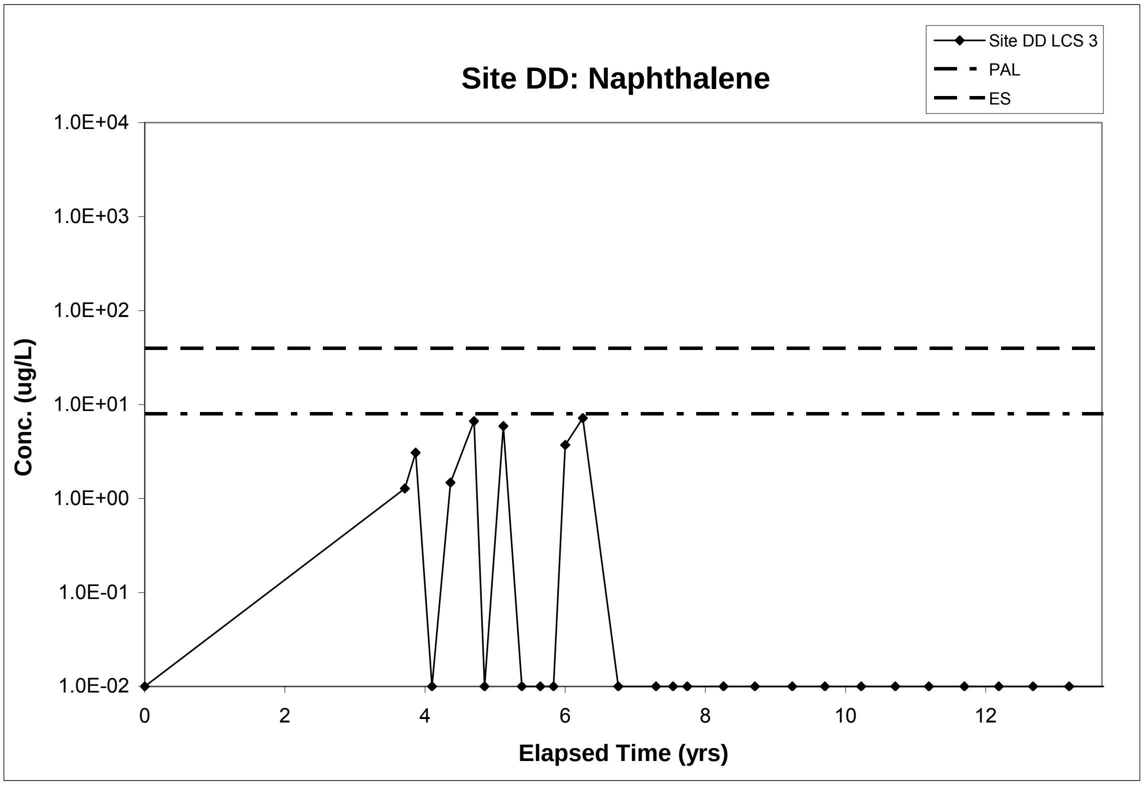

Site Z: Naphthalene
Site Z LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

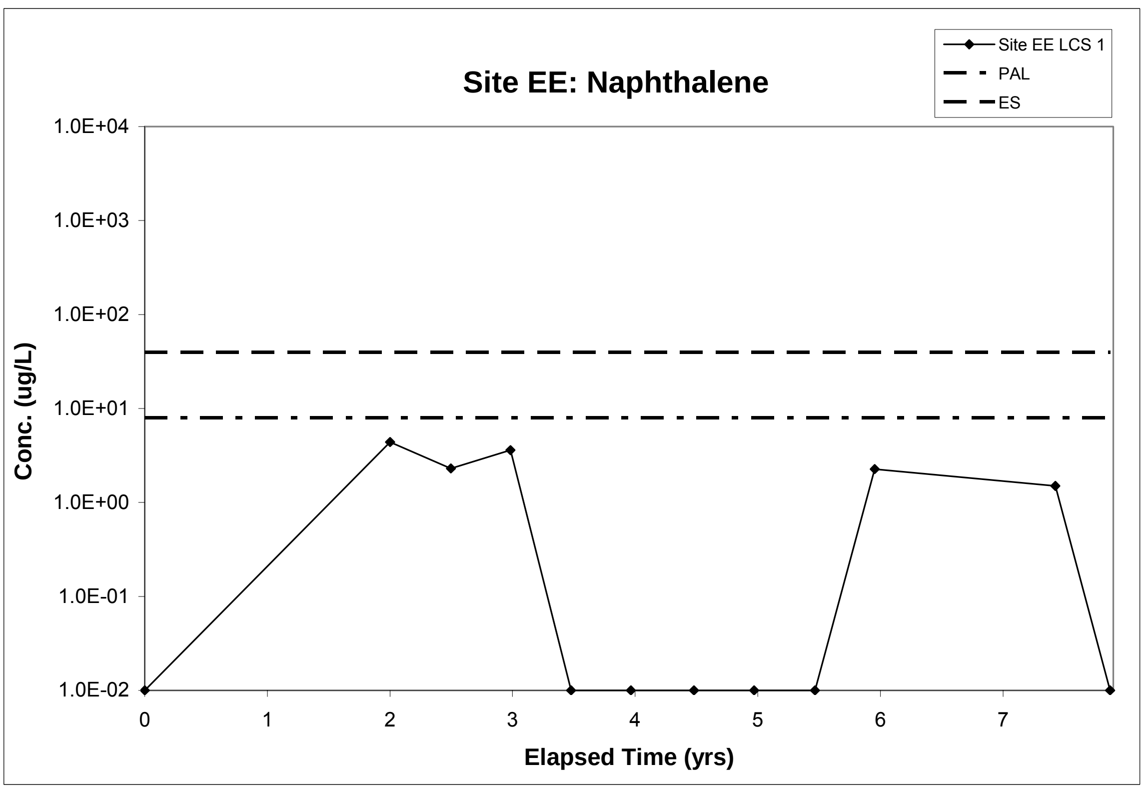

Site AA: Naphthalene
Site AA LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

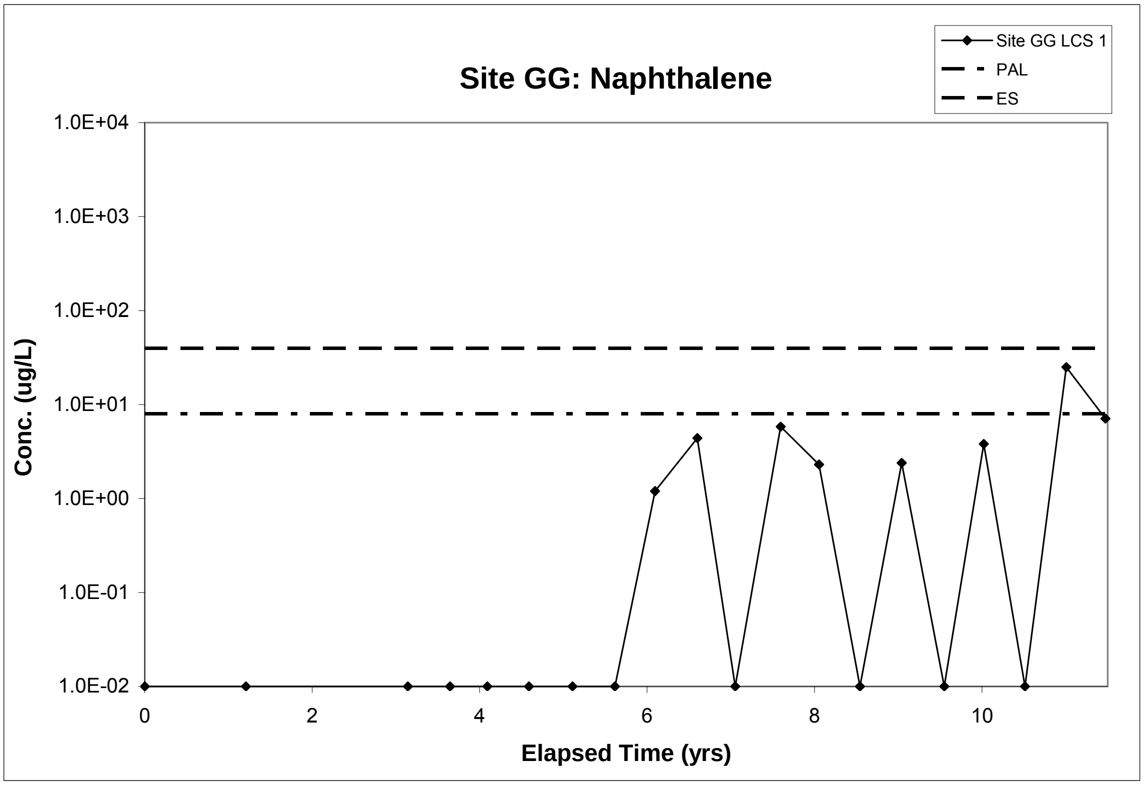

Site AA: Naphthalene
Site AA LCS 2
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

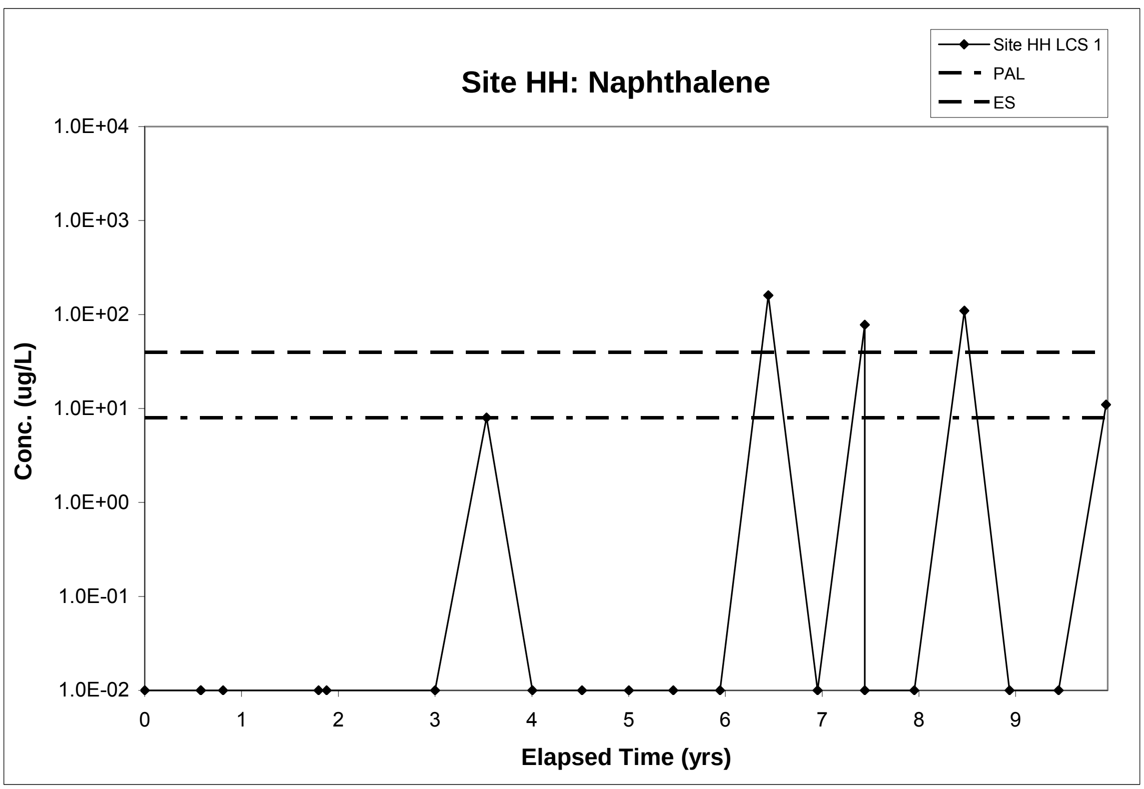

Site AA: Naphthalene
Site AA LCS 3
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

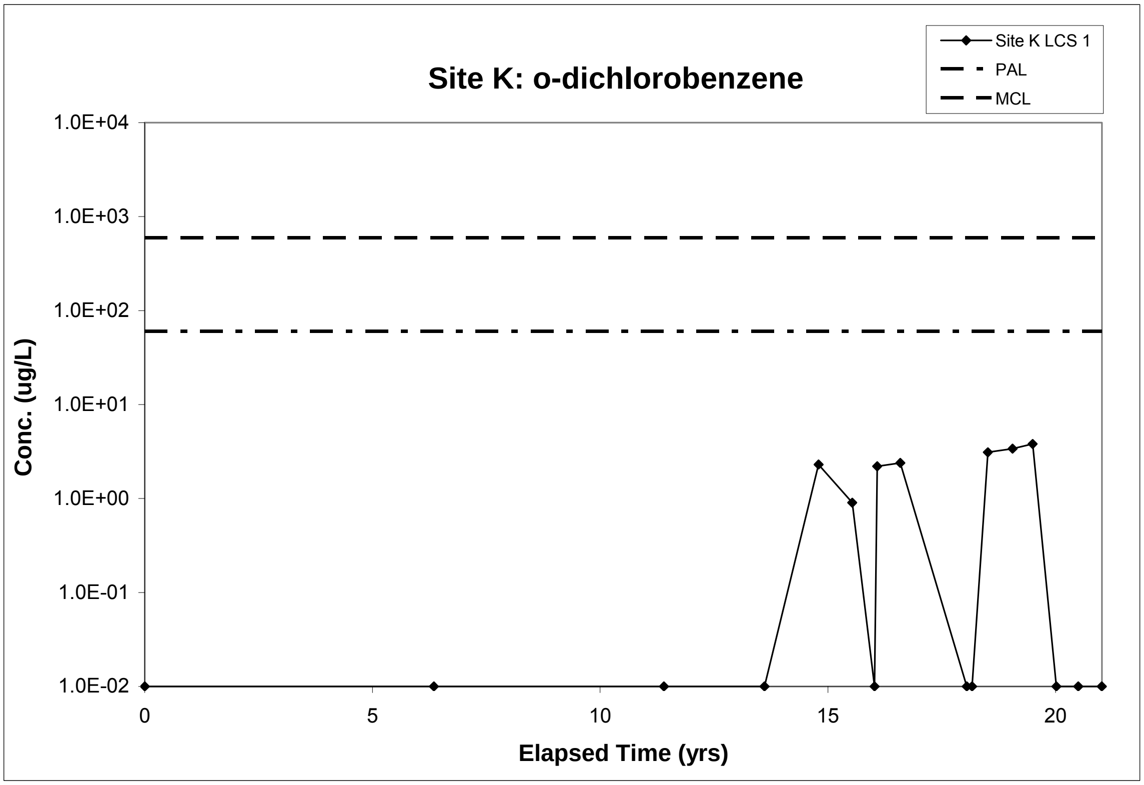

Site DD: Naphthalene
Site DD LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

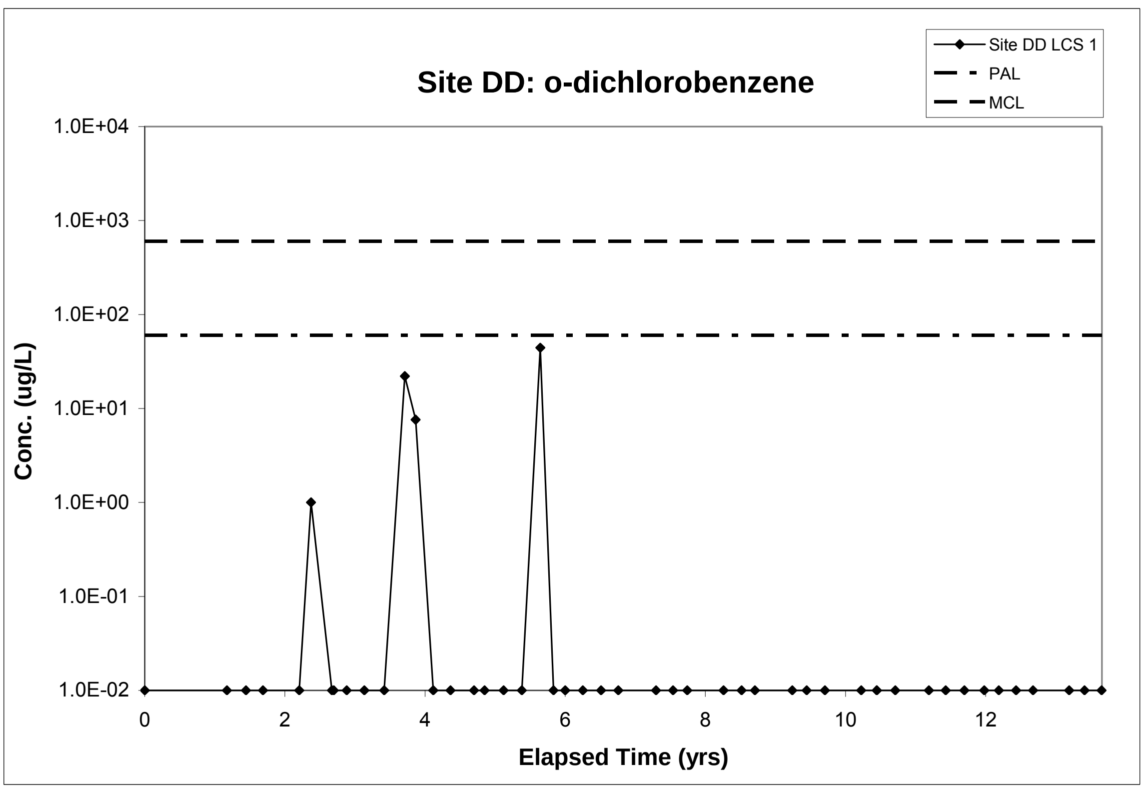

Site DD: Naphthalene
Site DD LCS 3
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

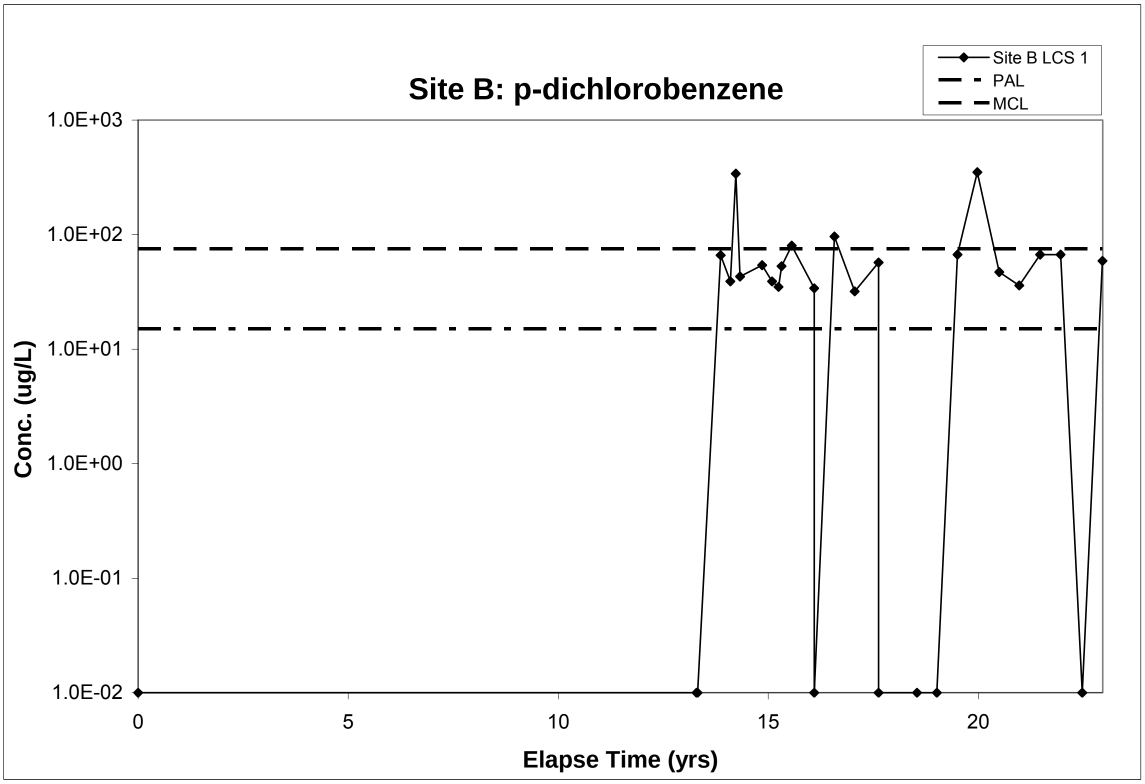

Site EE: Naphthalene
Site EE LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
Elapsed Time (yrs)

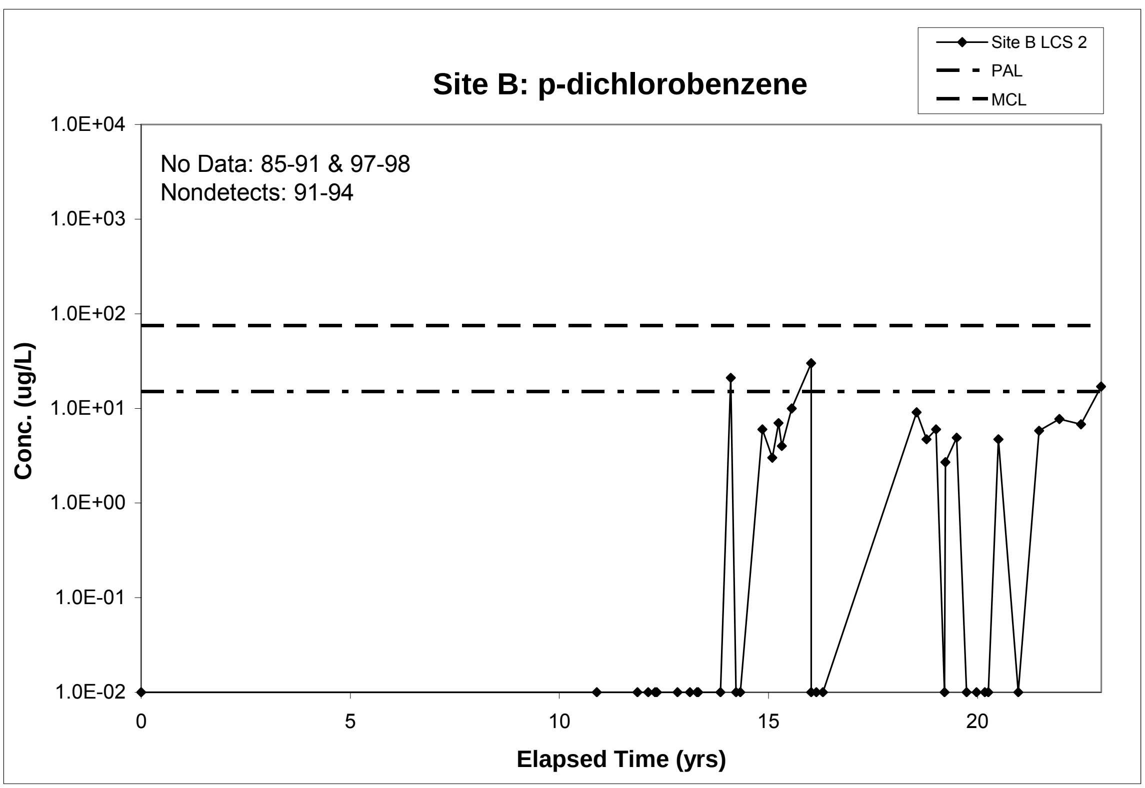

Site GG: Naphthalene
Site GG LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

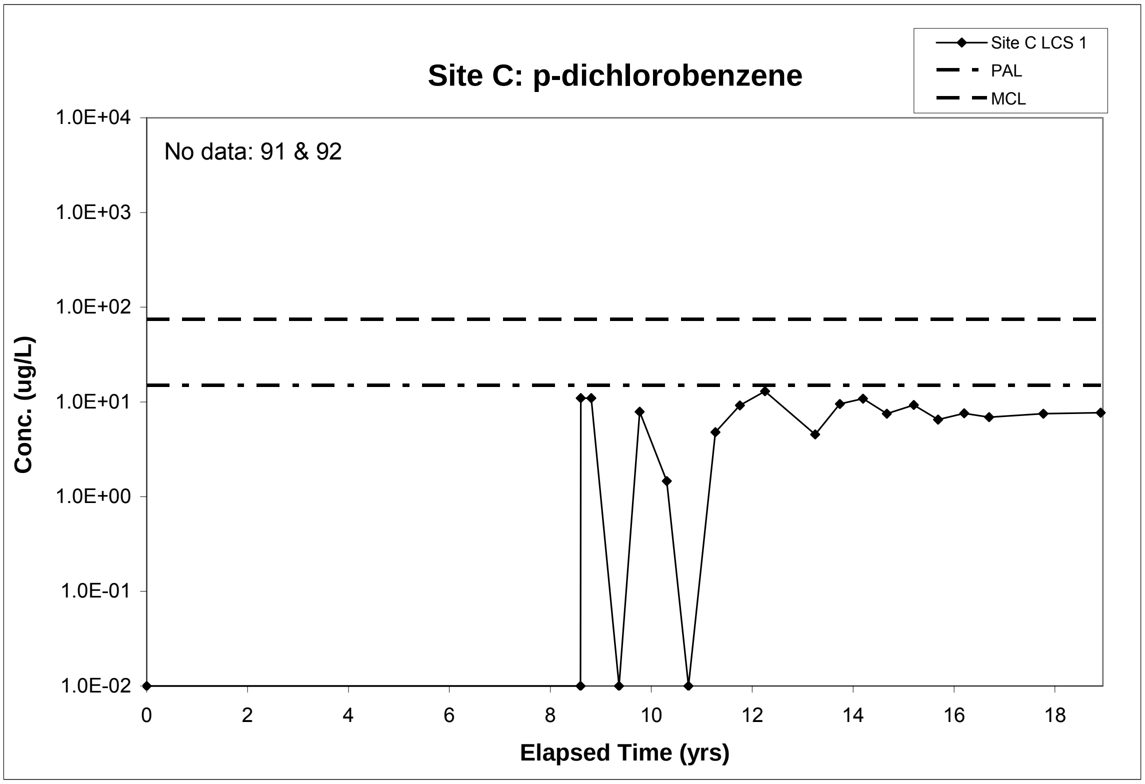

Site HH: Naphthalene
Site HH LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
9
Elapsed Time (yrs)

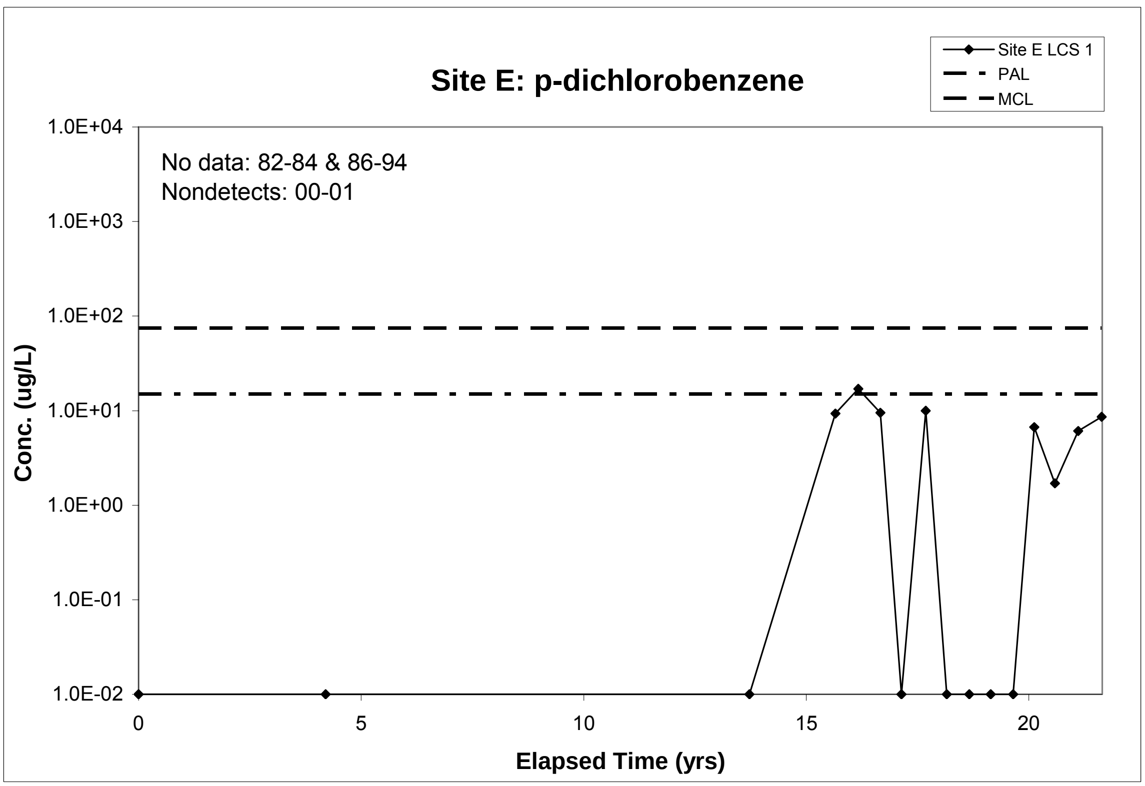

Site K: o-dichlorobenzene
Site K LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

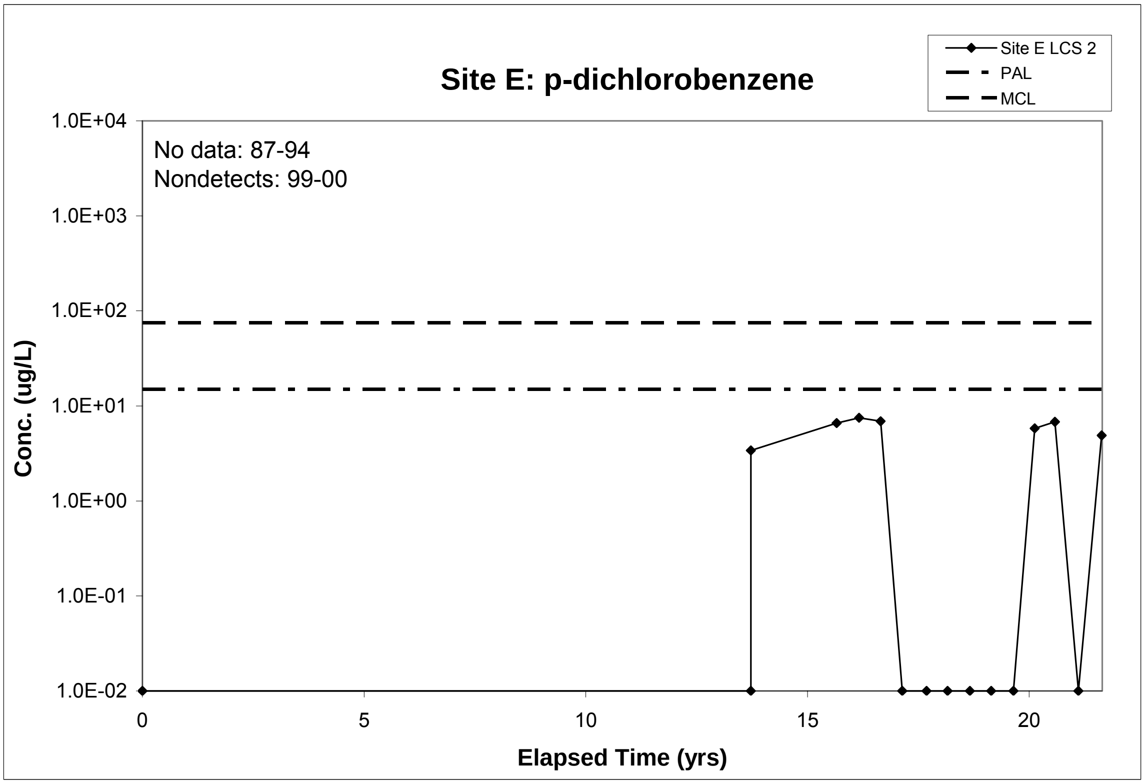

Site DD: o-dichlorobenzene
Site DD LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

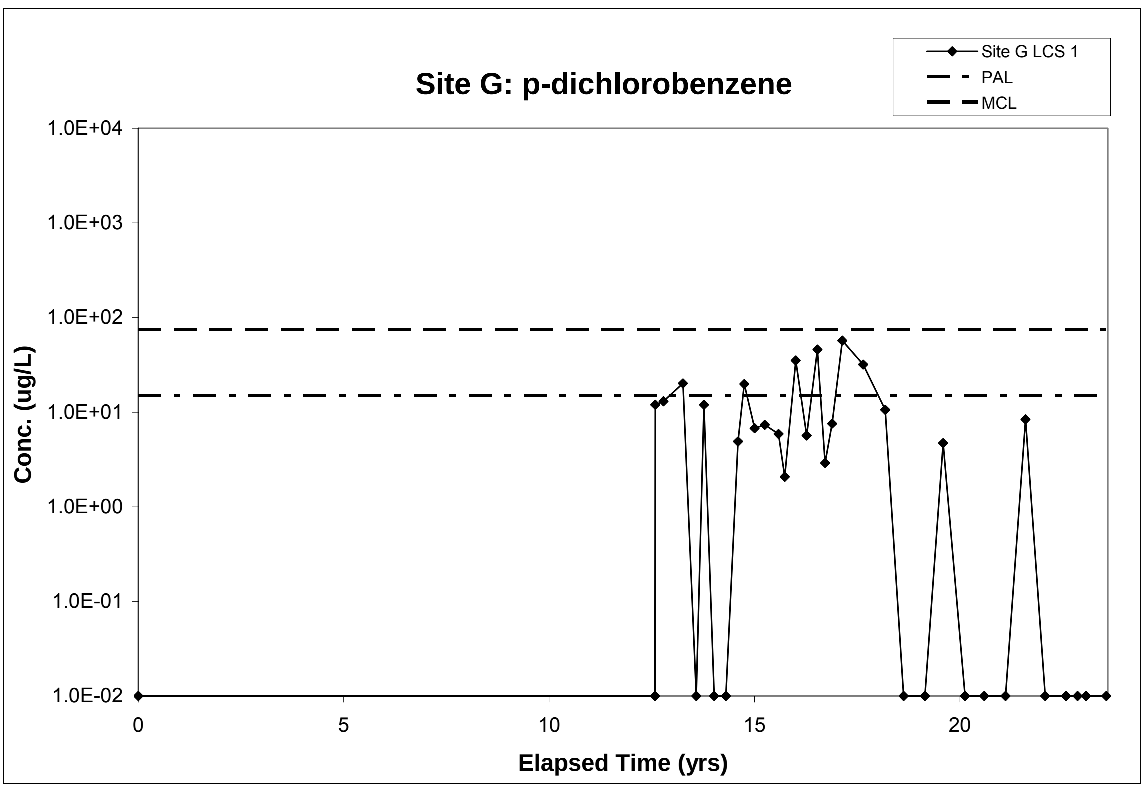

Site B: p-dichlorobenzene
Site B LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapse Time (yrs)

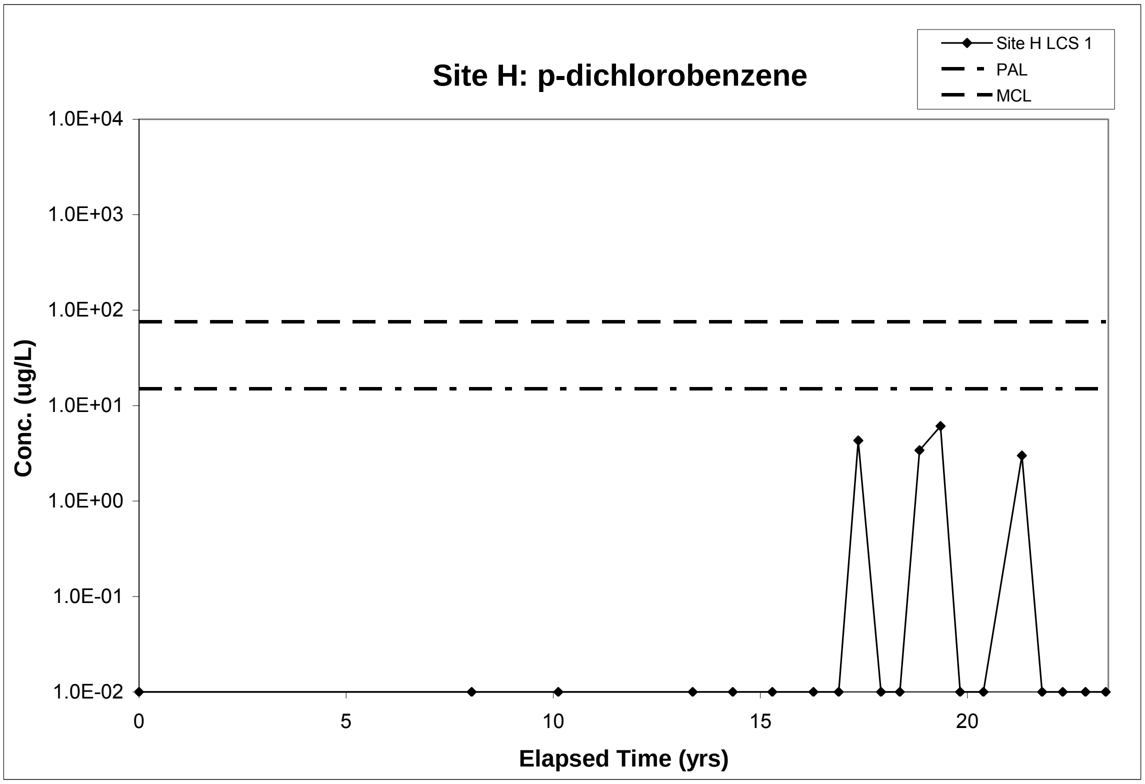

Site B: p-dichlorobenzene
Site B LCS 2
PAL
MCL
No Data: 85-91 & 97-98
Nondetects: 91-94
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

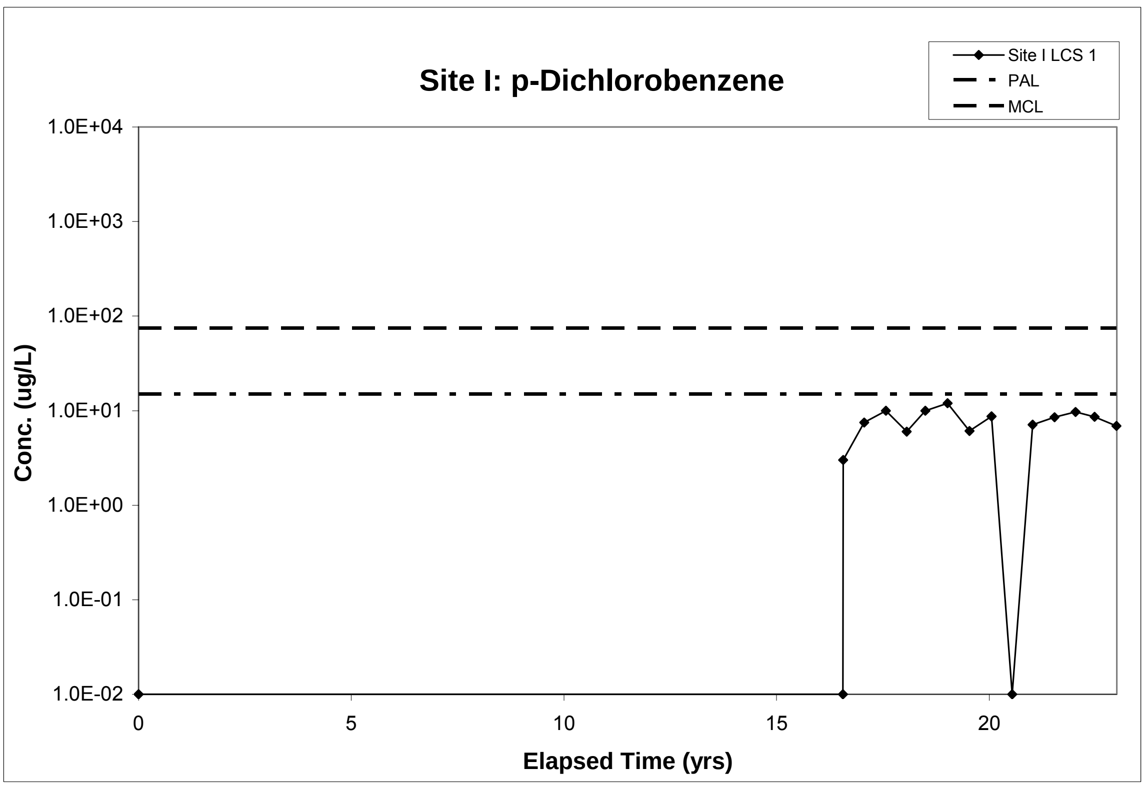

Site C: p-dichlorobenzene
Site C LCS 1
PAL
MCL
No data: 91 & 92
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

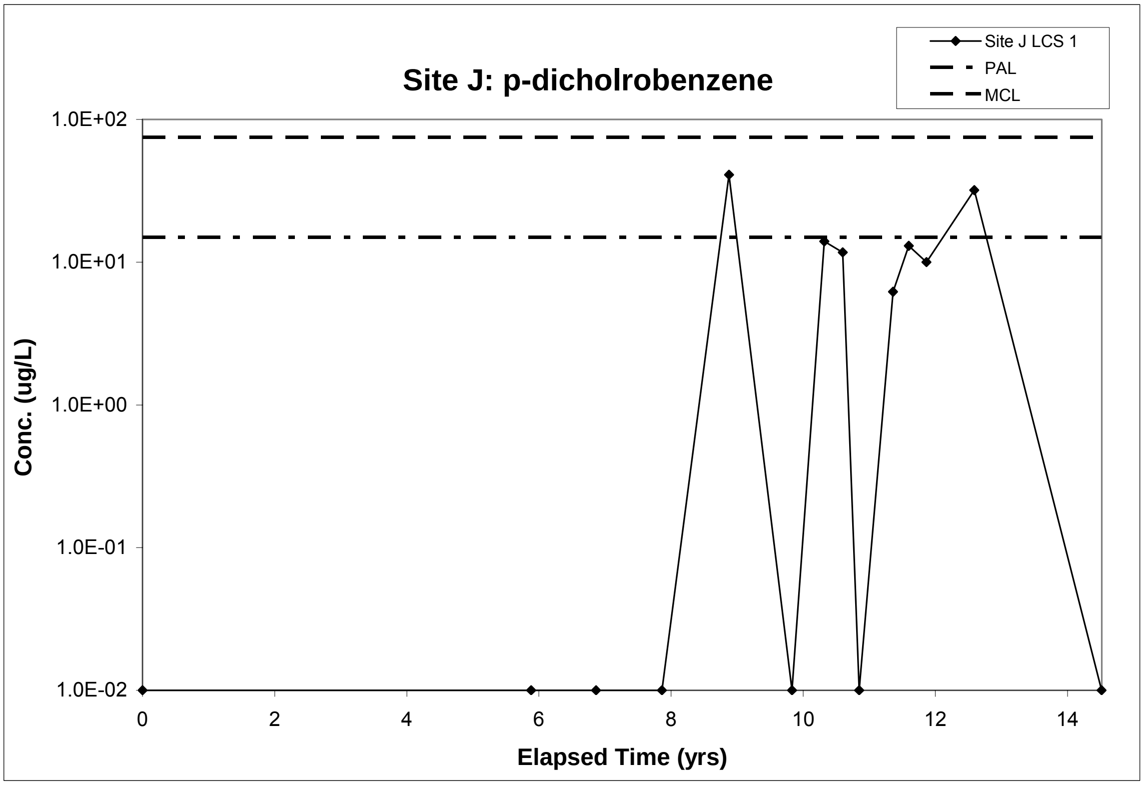

Site E: p-dichlorobenzene
Site E LCS 1
PAL
MCL
No data: 82-84 & 86-94
Nondetects: 00-01
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

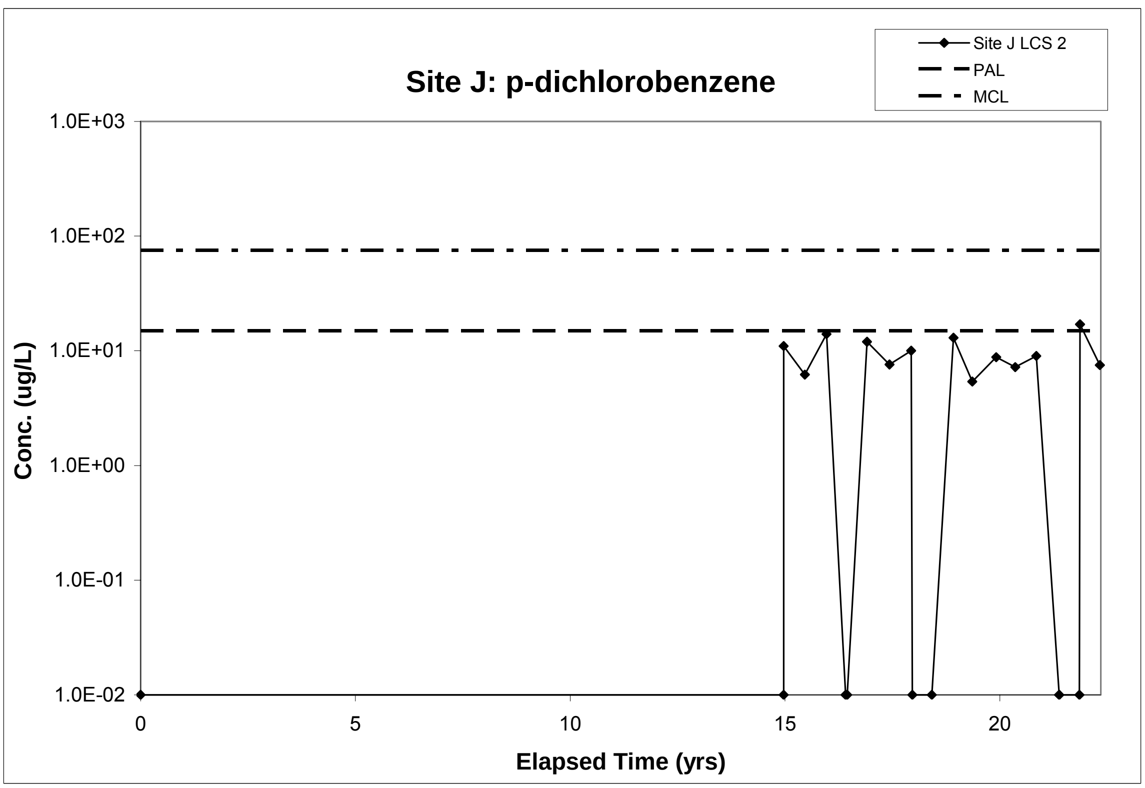

Site E: p-dichlorobenzene
Site E LCS 2
PAL
MCL
No data: 87-94
Nondetects: 99-00
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

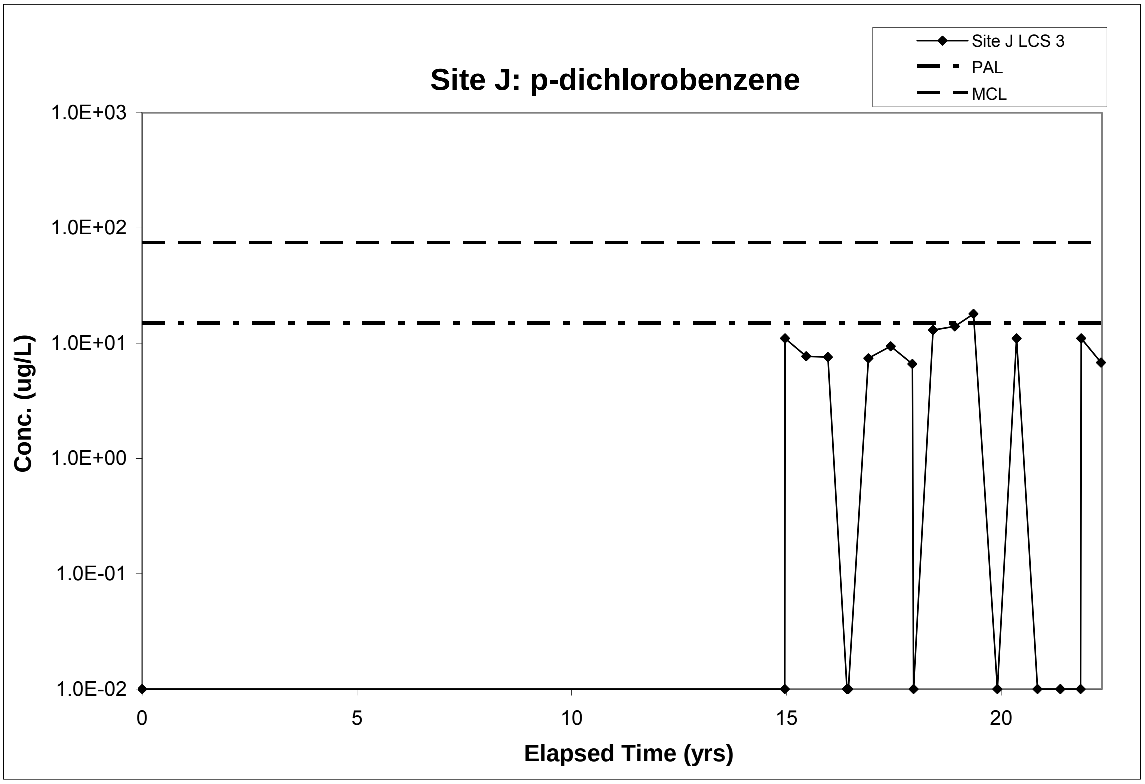

Site G: p-dichlorobenzene
Site G LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

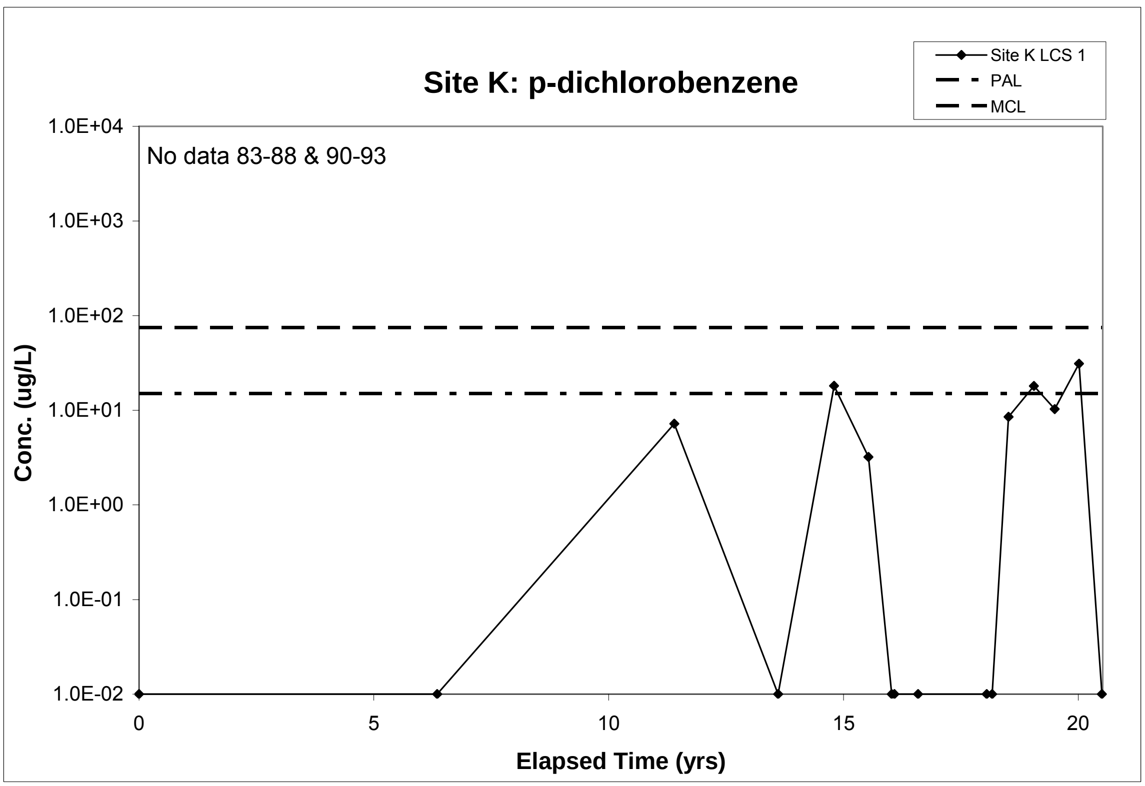

Site H: p-dichlorobenzene
Site H LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

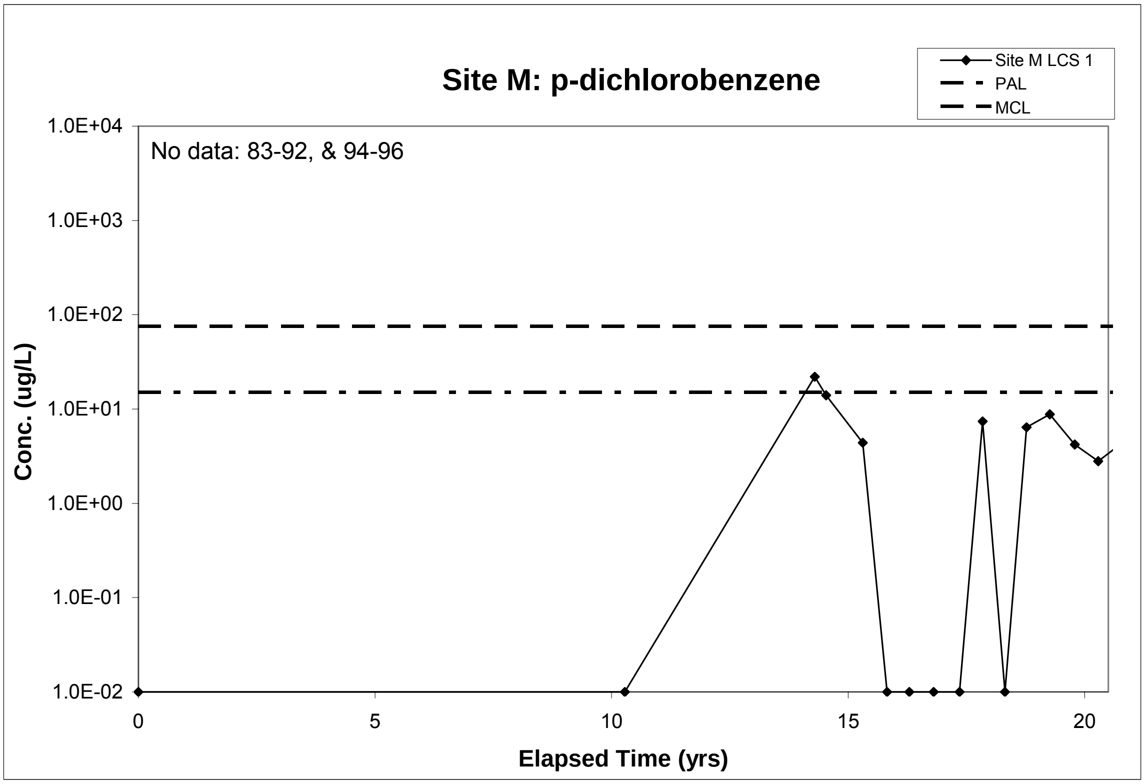

Site I: p-Dichlorobenzene
Site I LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

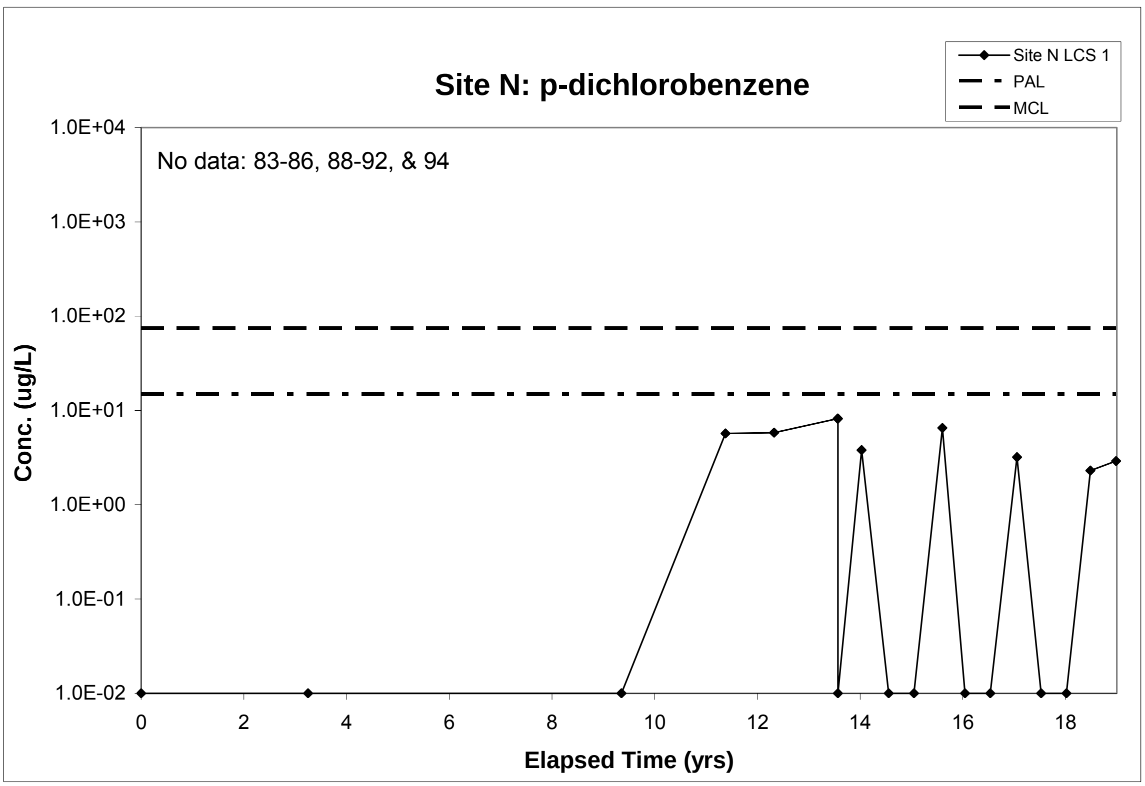

Site J: p-dicholrobenzene
Site J LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

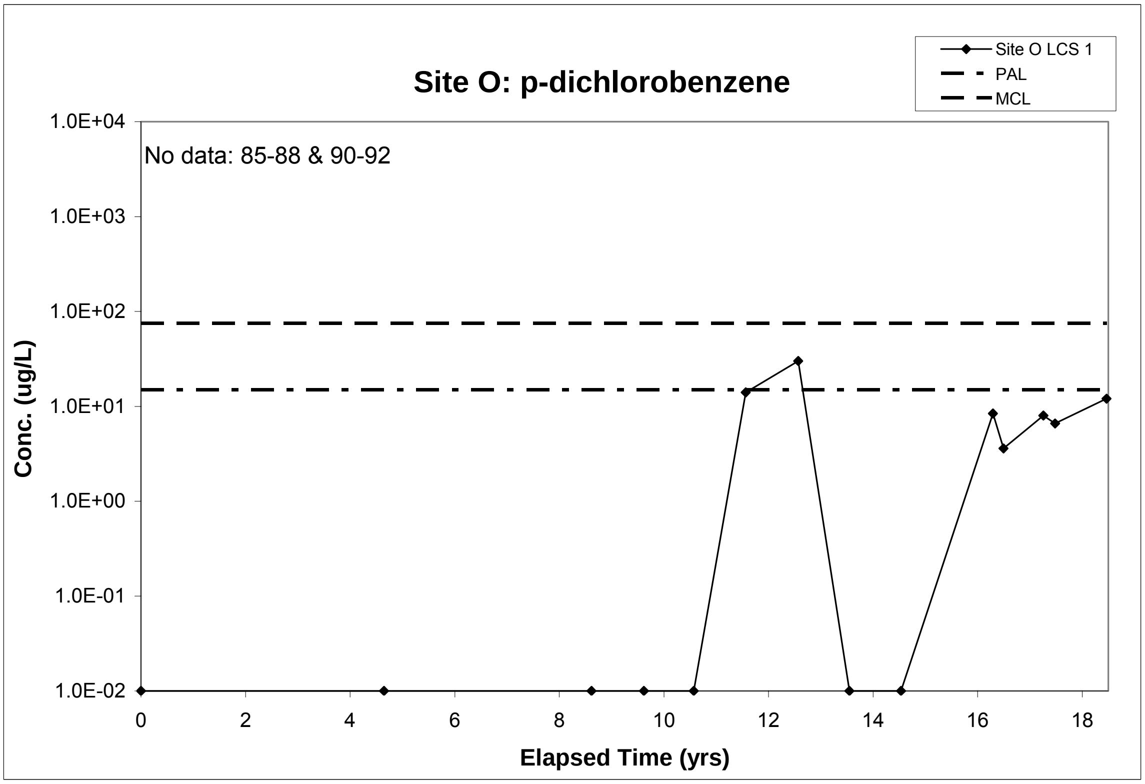

Site J: p-dichlorobenzene
Site J LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

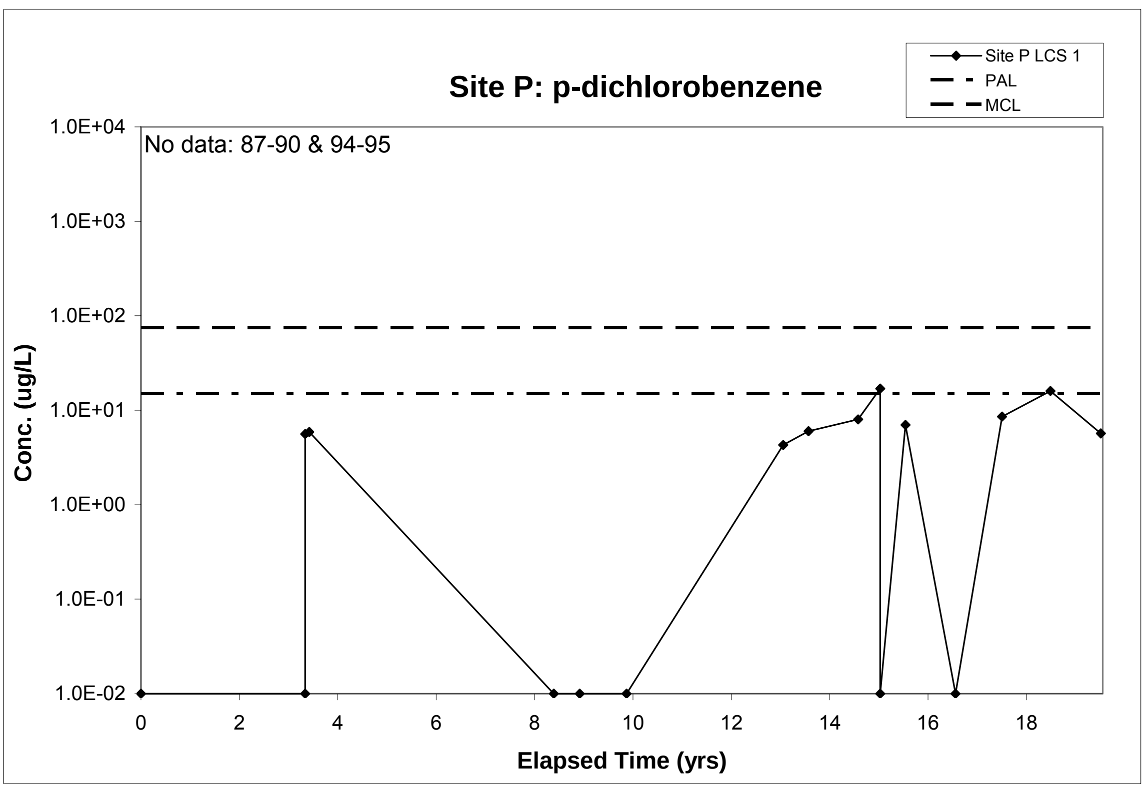

Site J: p-dichlorobenzene
Site J LCS 3
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

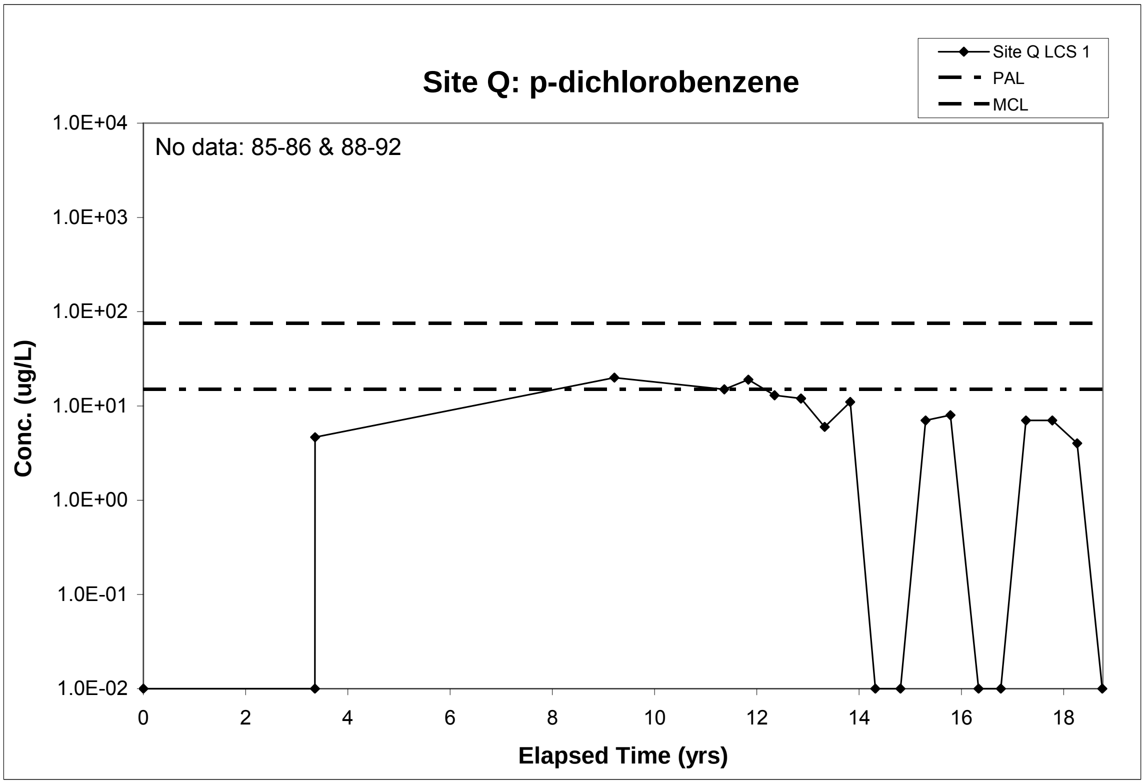

Site K: p-dichlorobenzene
Site K LCS 1
PAL
MCL
No data 83-88 & 90-93
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

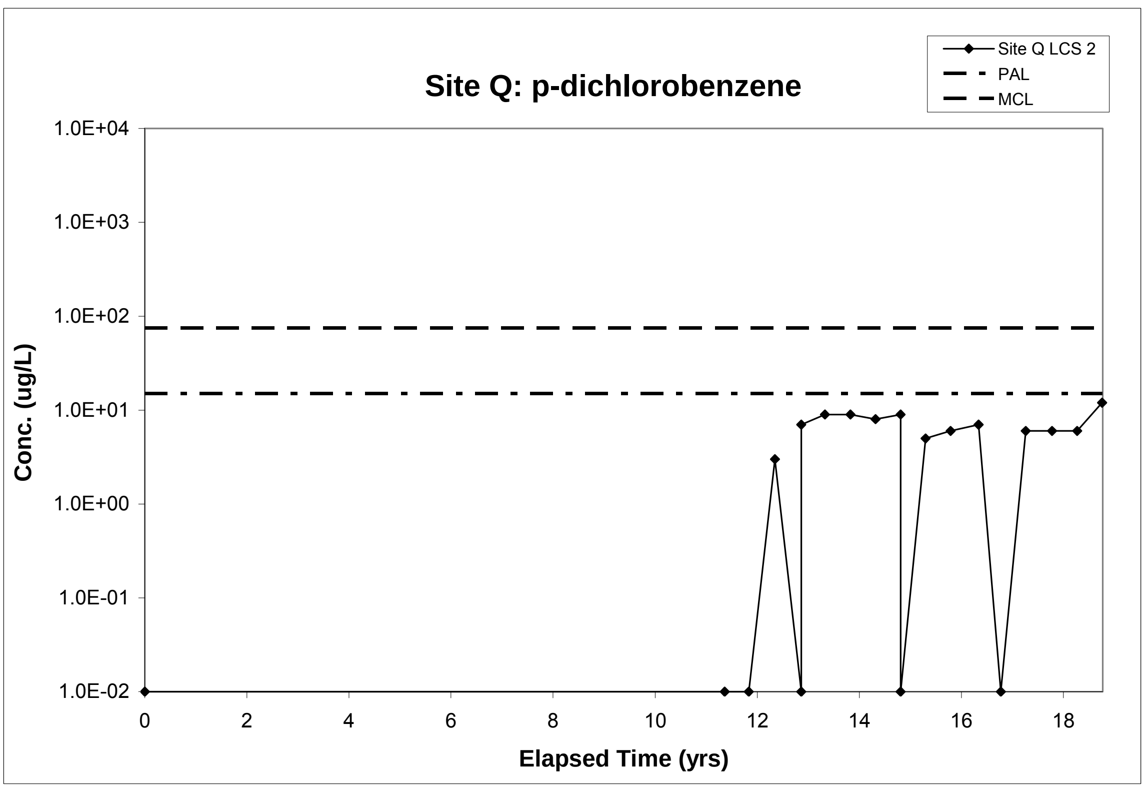

Site M: p-dichlorobenzene
Site M LCS 1
PAL
MCL
No data: 83-92, & 94-96
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

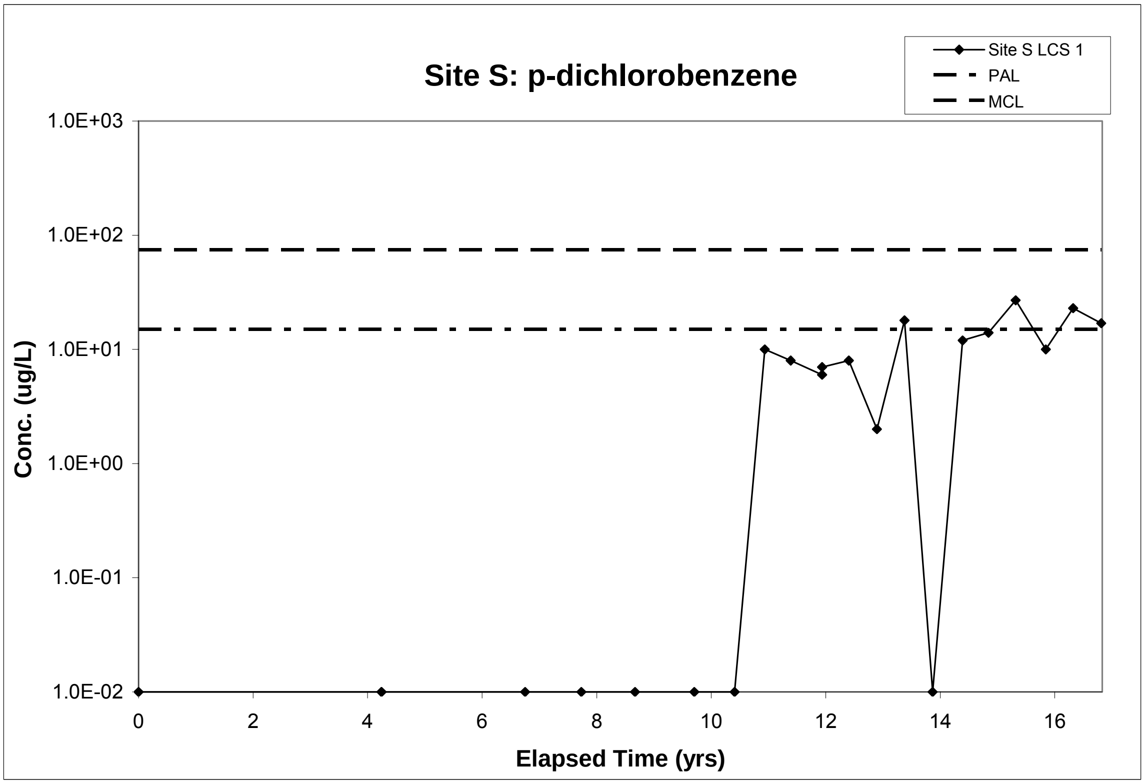

Site N: p-dichlorobenzene
Site N LCS 1
PAL
MCL
No data: 83-86, 88-92, & 94
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

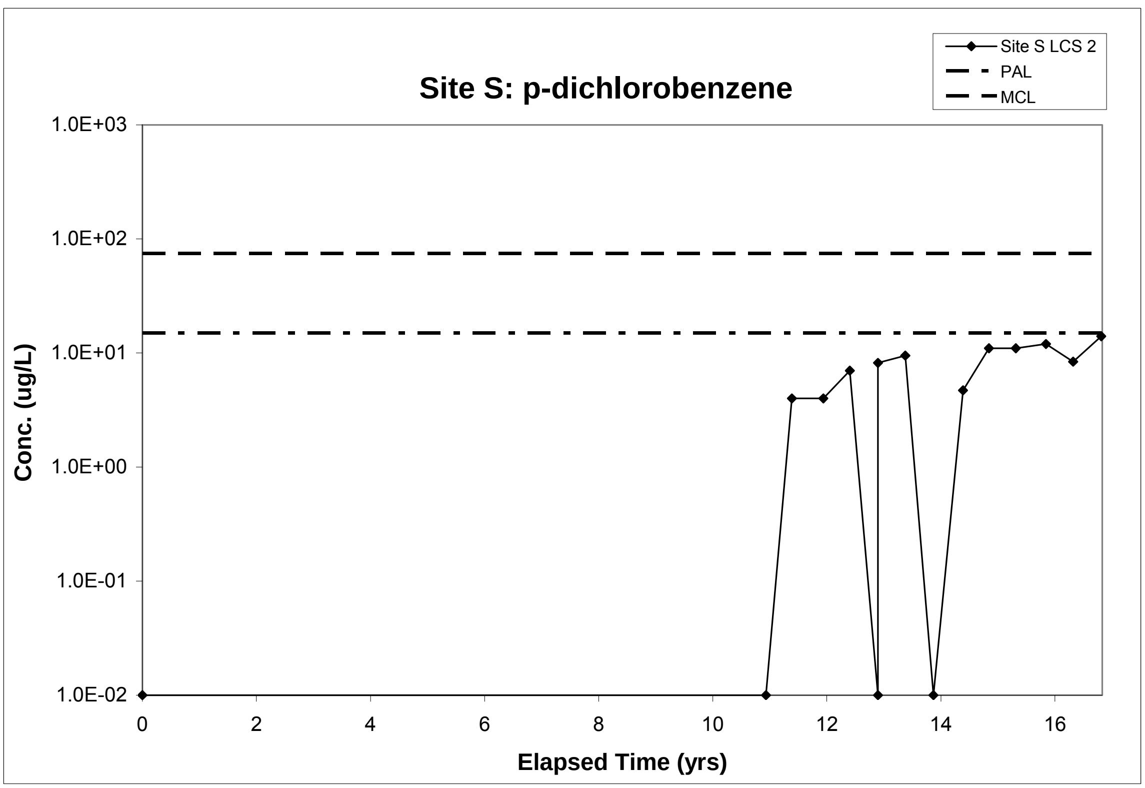

Site O: p-dichlorobenzene
Site O LCS 1
PAL
MCL
No data: 85-88 & 90-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

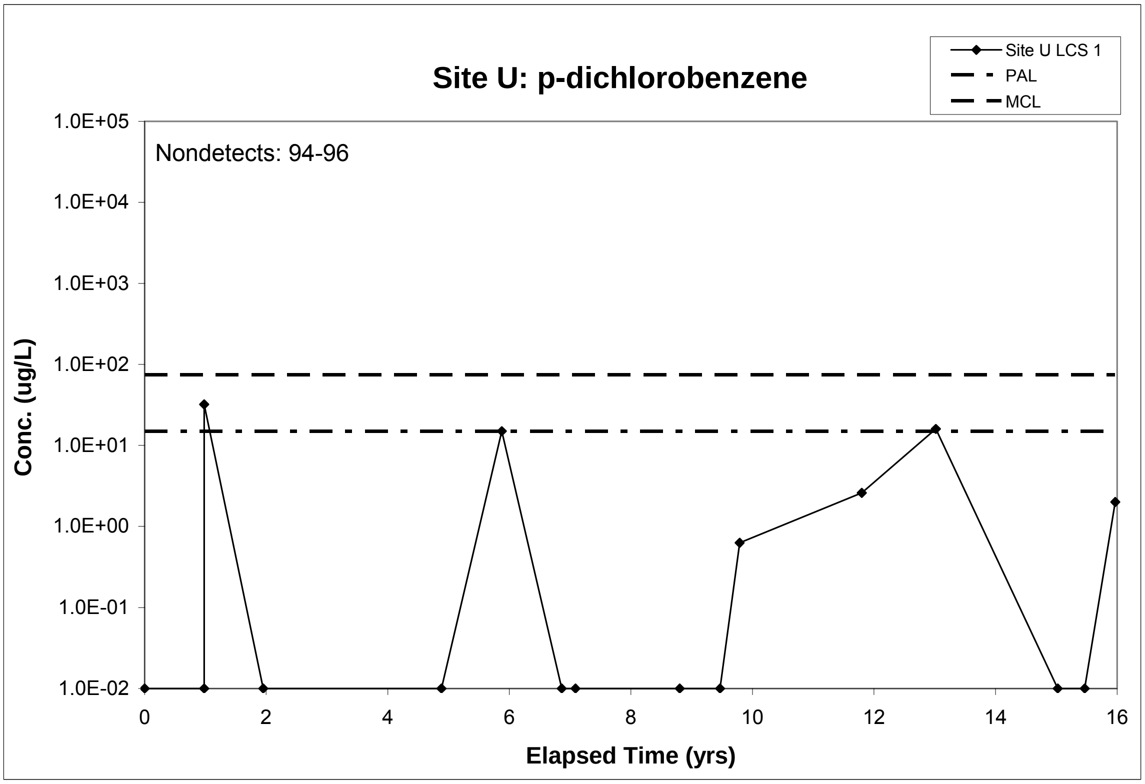

Site P: p-dichlorobenzene
Site P LCS 1
PAL
MCL
No data: 87-90 & 94-95
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

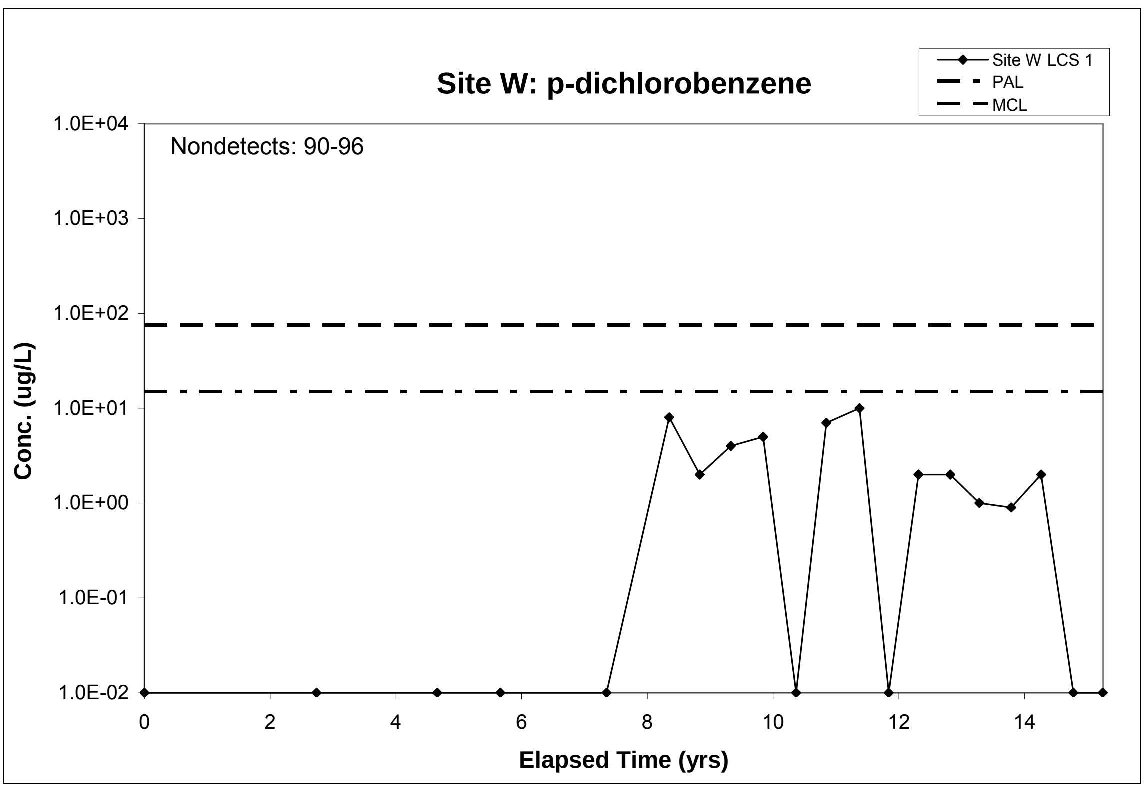

Site Q: p-dichlorobenzene
Site Q LCS 1
PAL
MCL
No data: 85-86 & 88-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

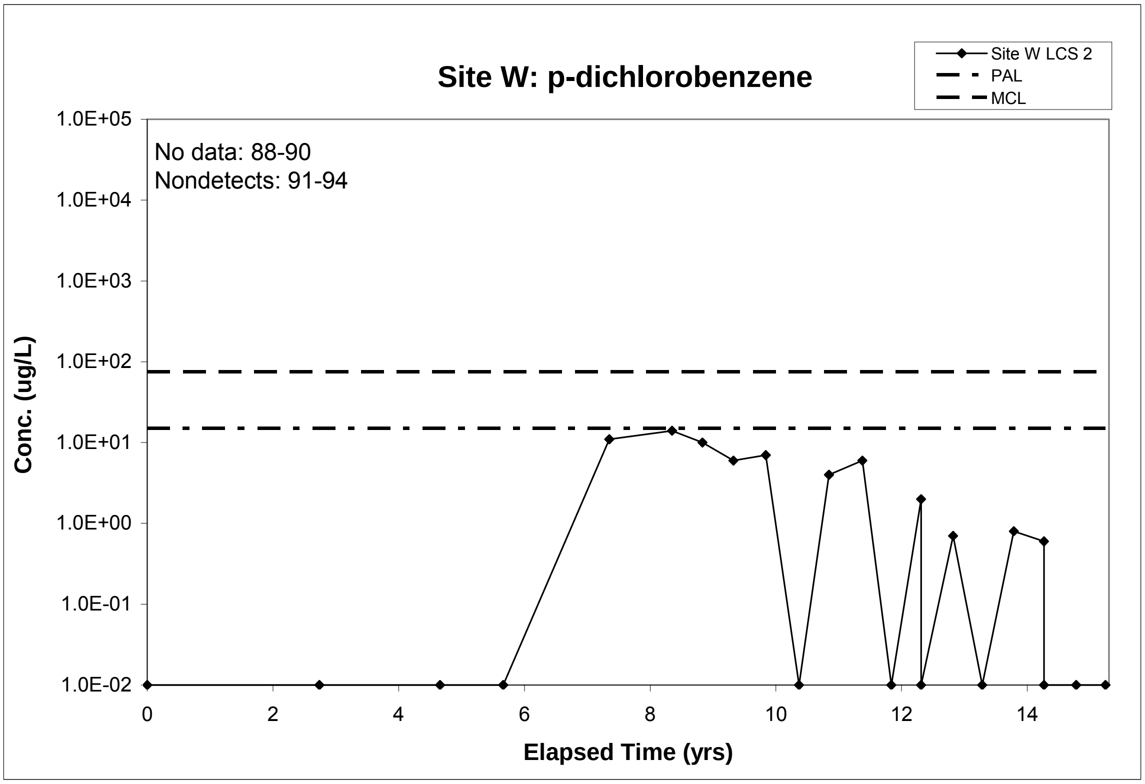

Site Q: p-dichlorobenzene
Site Q LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

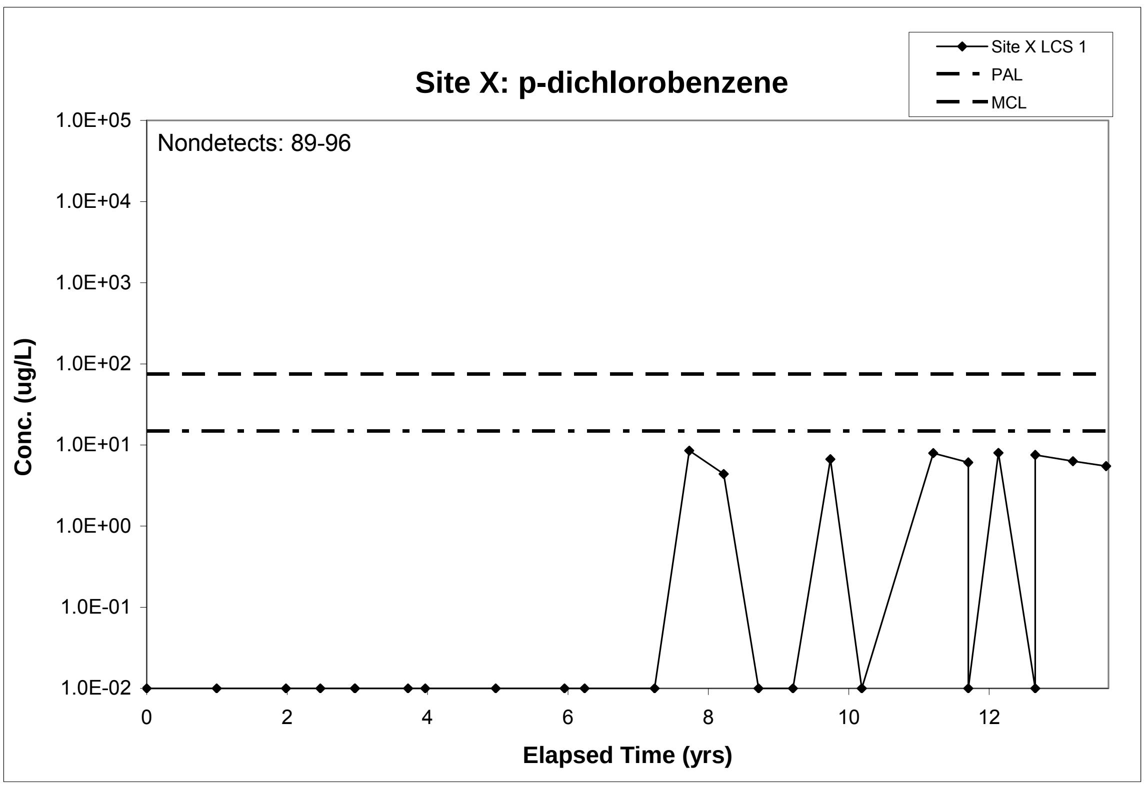

Site S: p-dichlorobenzene
Site S LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)


Site S: p-dichlorobenzene
Site S LCS 2
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

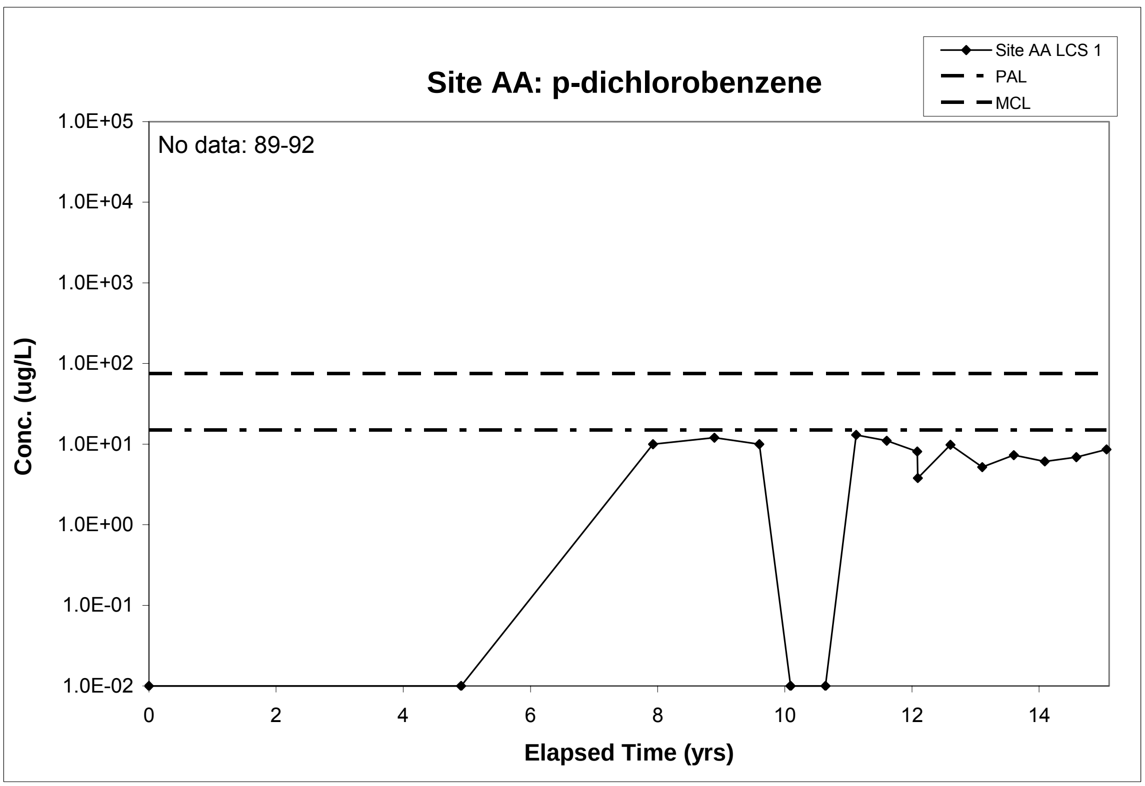

Site U: p-dichlorobenzene
Site U LCS 1
PAL
MCL
Nondetects: 94-96
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

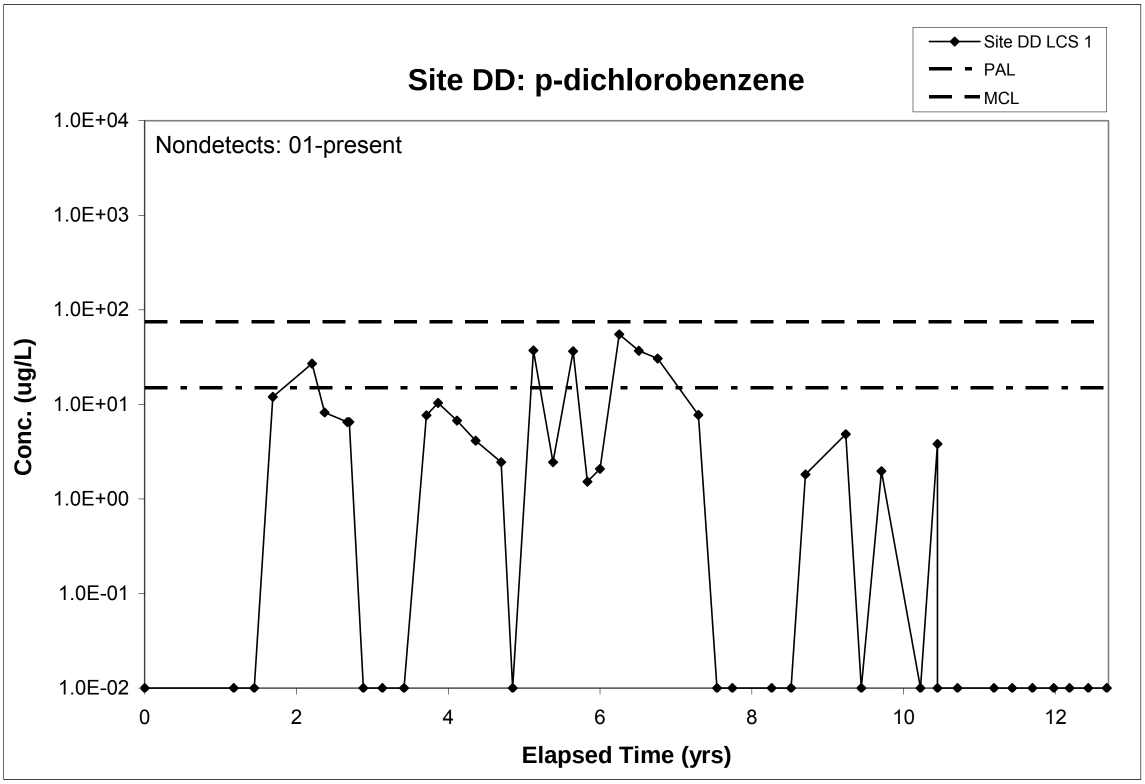

Site W: p-dichlorobenzene
Site W LCS 1
PAL
MCL
Nondetects: 90-96
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

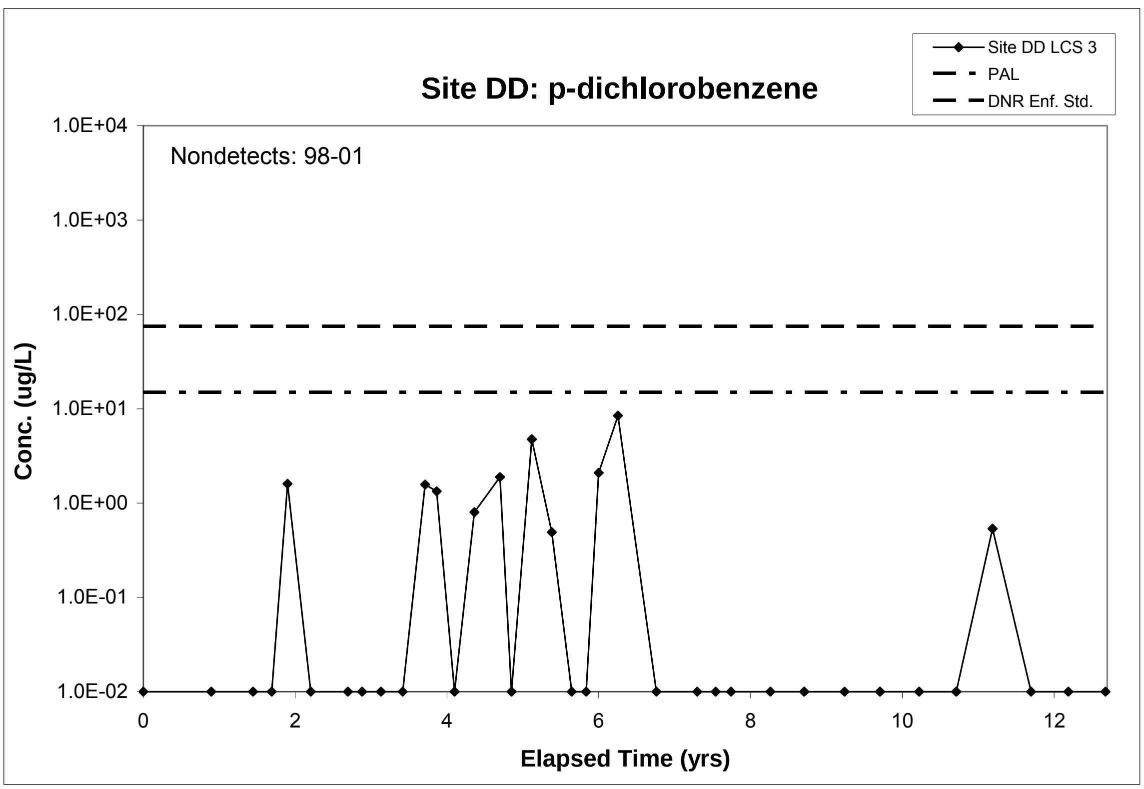

Site W: p-dichlorobenzene
Site W LCS 2
PAL
MCL
No data: 88-90
Nondetects: 91-94
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

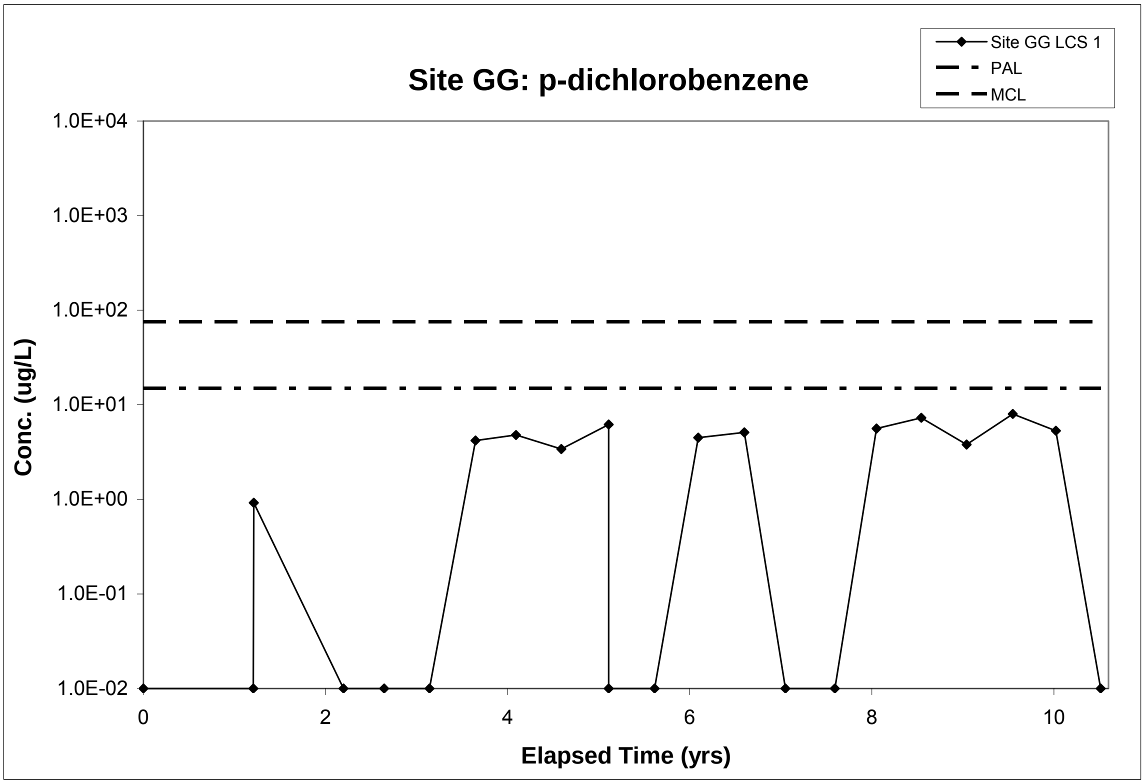

Site X: p-dichlorobenzene
Site X LCS 1
PAL
MCL
Nondetects: 89-96
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

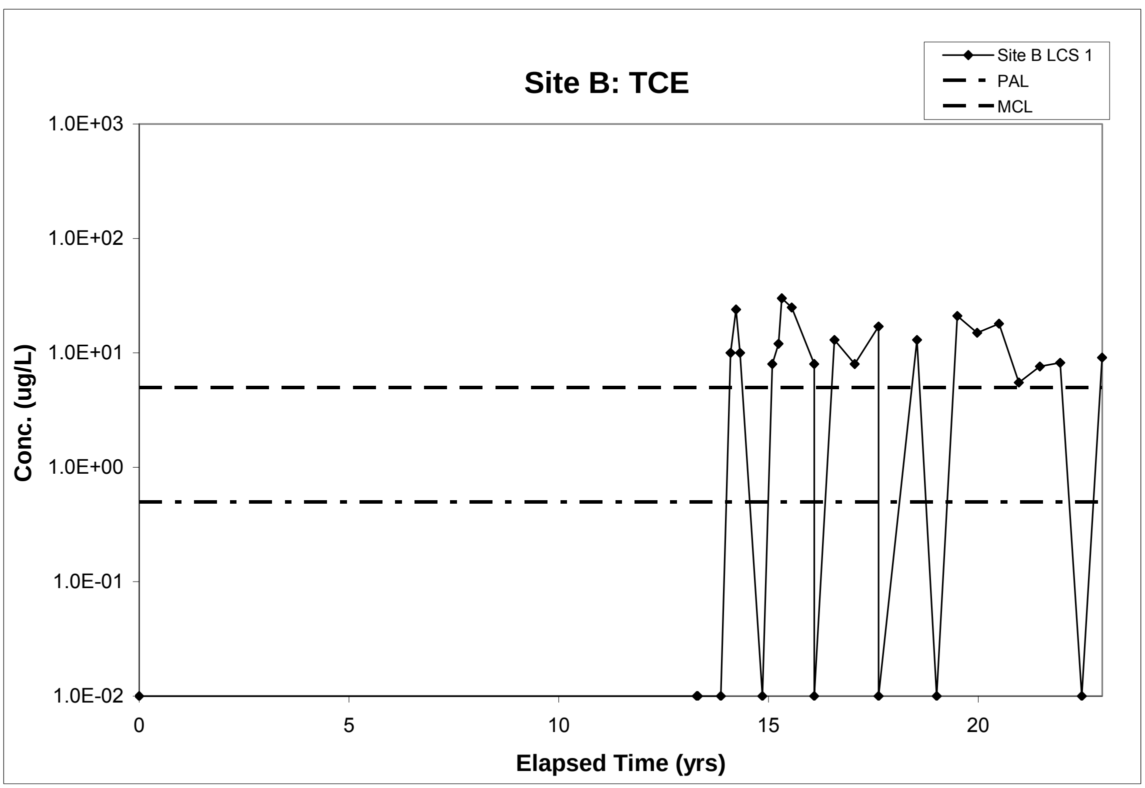

Site Z: p-dichlorobenzene
Site Z LCS 1
PAL
MCL
No data: 91-92
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

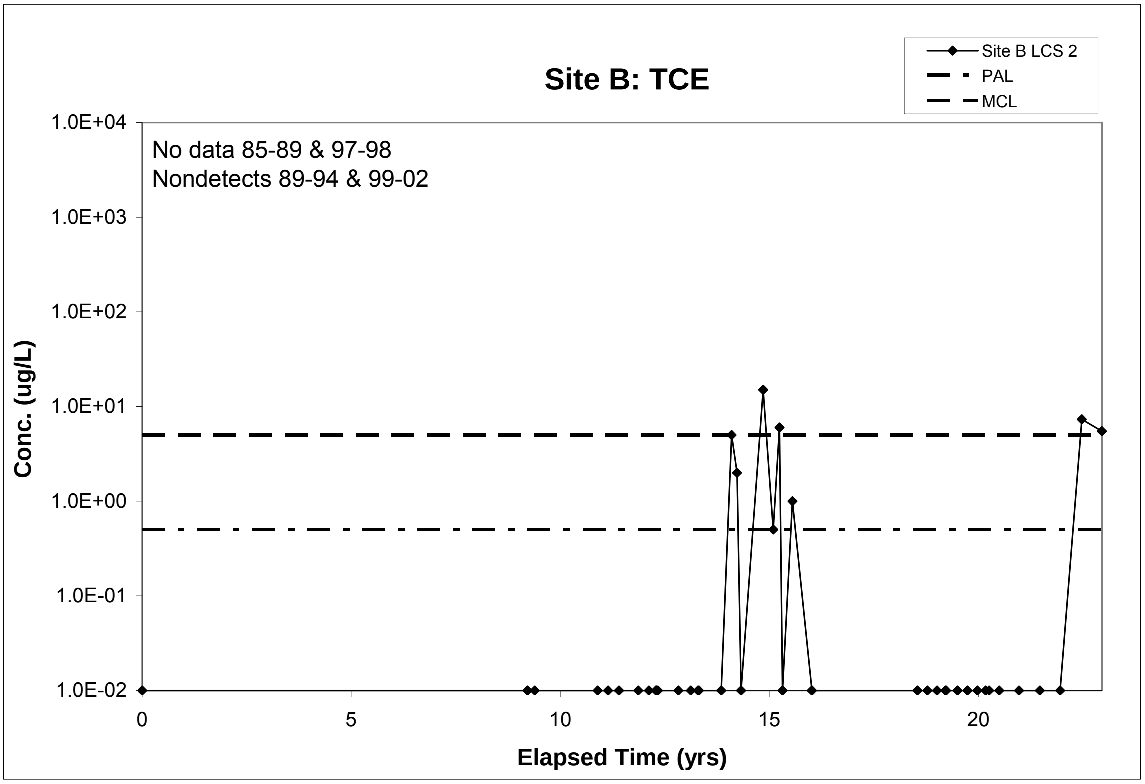

Site AA: p-dichlorobenzene
Site AA LCS 1
PAL
MCL
No data: 89-92
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

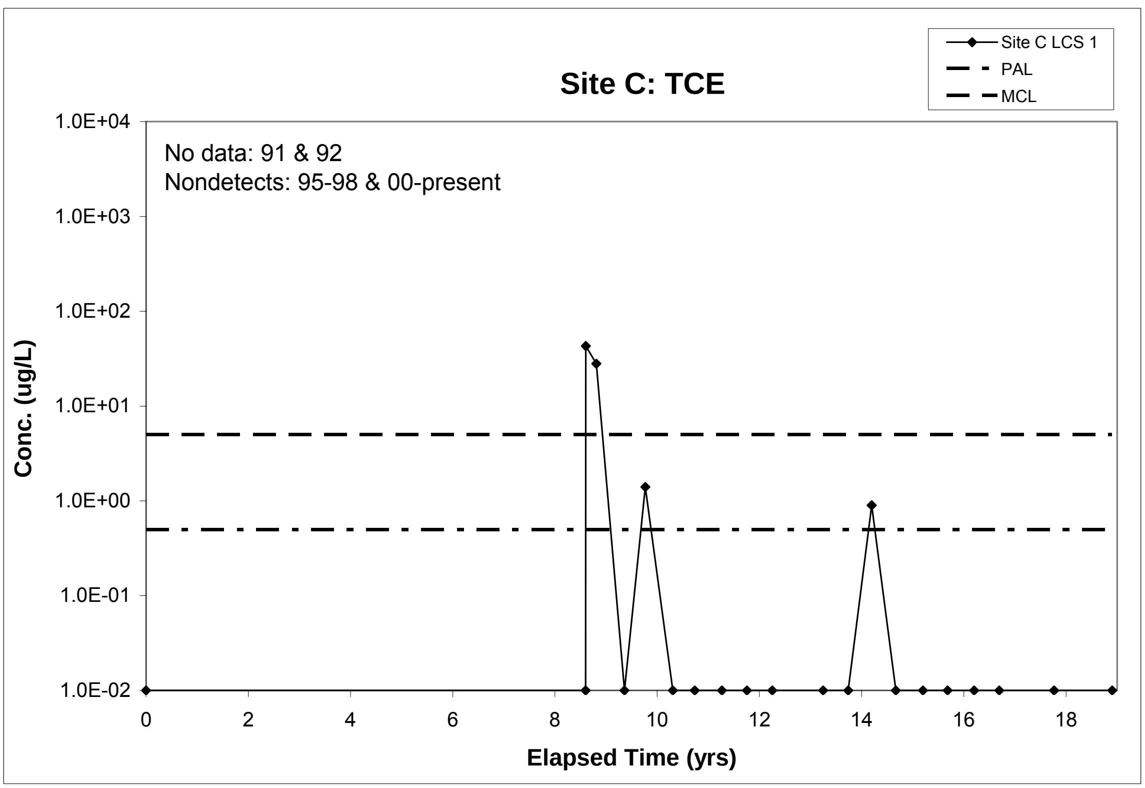

Site DD: p-dichlorobenzene
Site DD LCS 1
PAL
MCL
Nondetects: 01-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

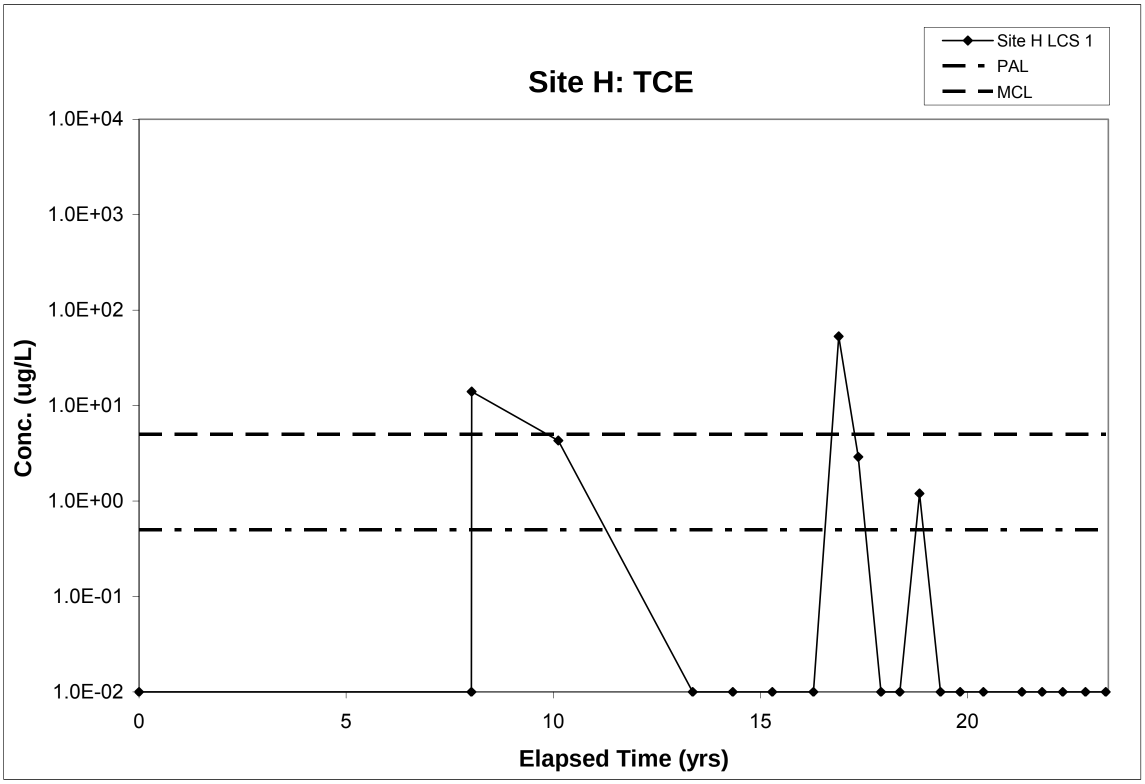

Site DD: p-dichlorobenzene
Site DD LCS 3
PAL
DNR Enf. Std.
Nondetects: 98-01
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

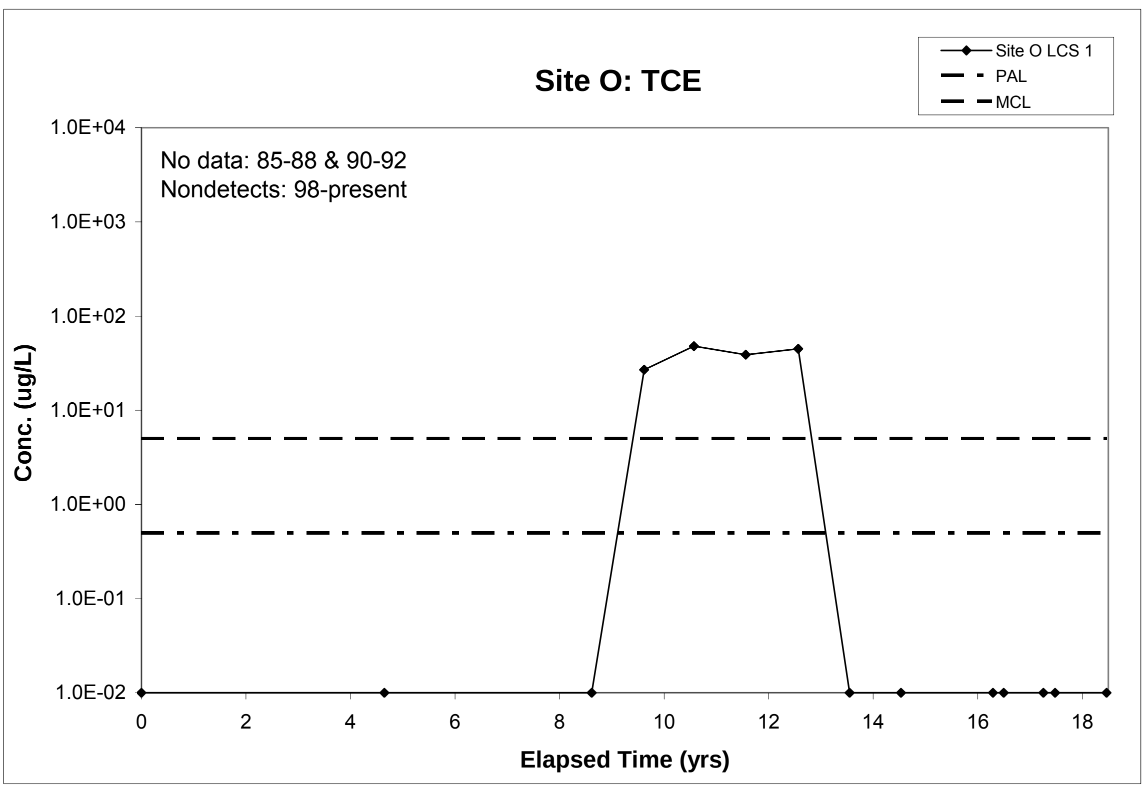

Site GG: p-dichlorobenzene
Site GG LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

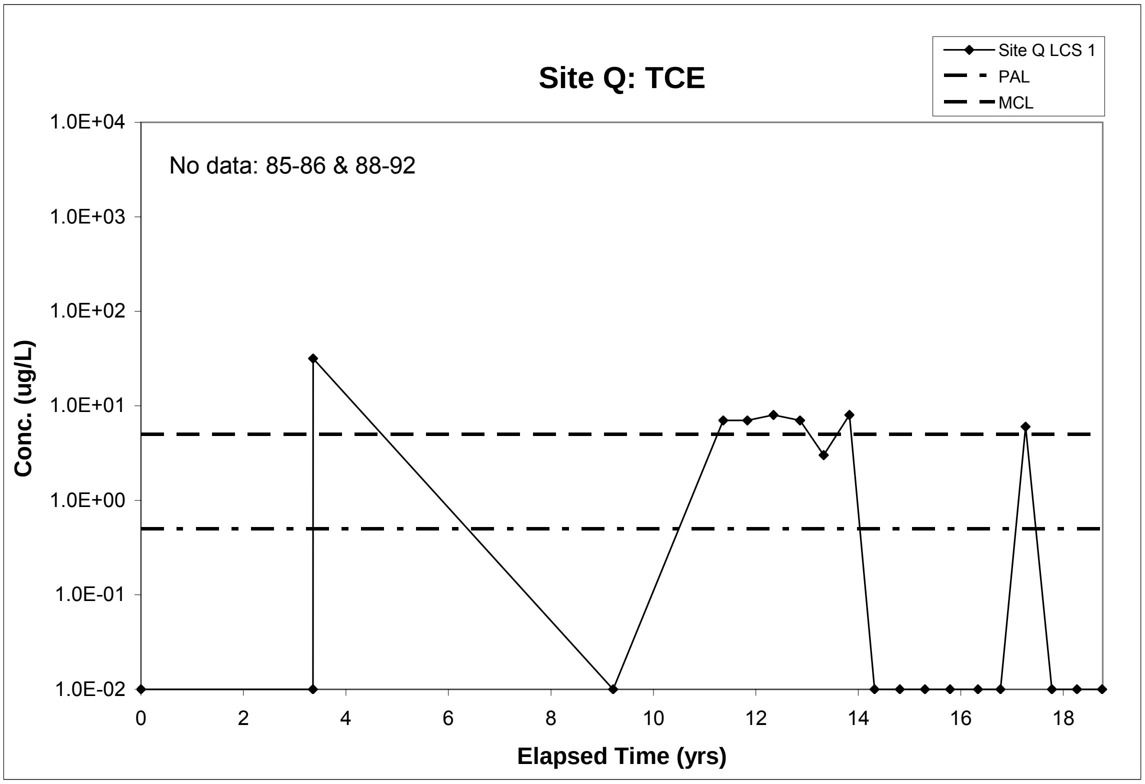

Site B: TCE
Site B LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

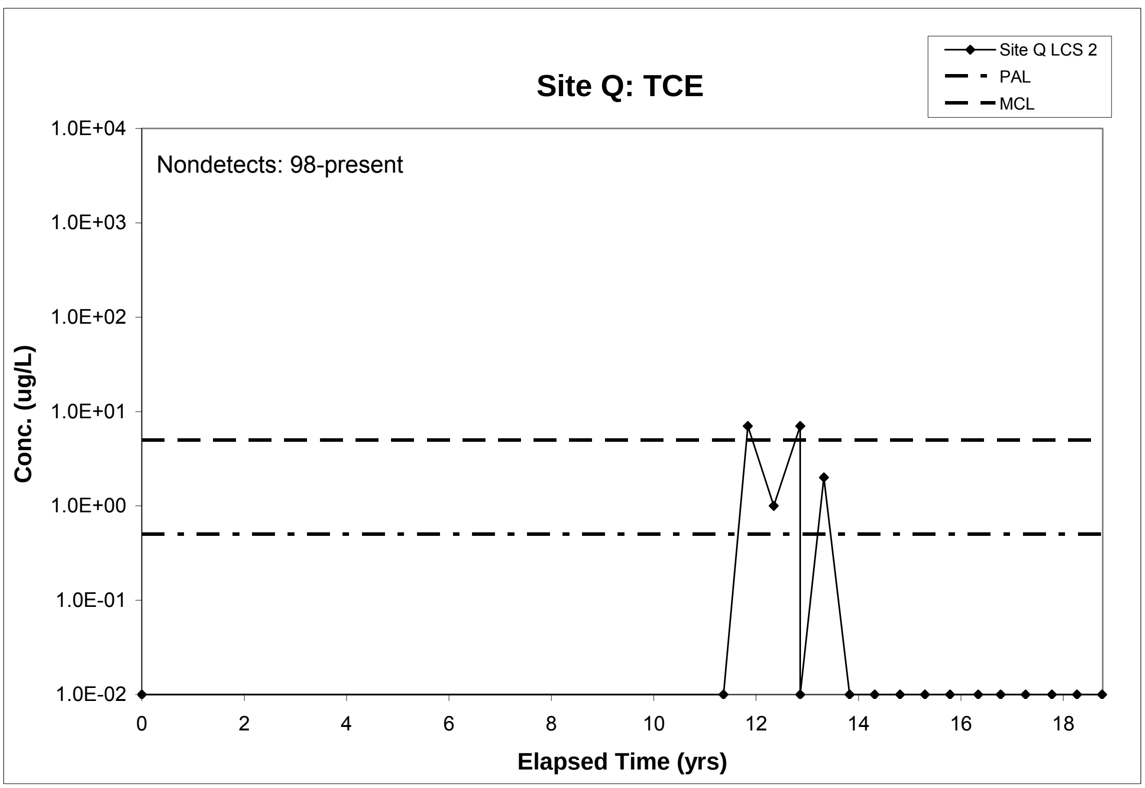

Site B: TCE
Site B LCS 2
PAL
MCL
No data 85-89 & 97-98
Nondetects 89-94 & 99-02
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

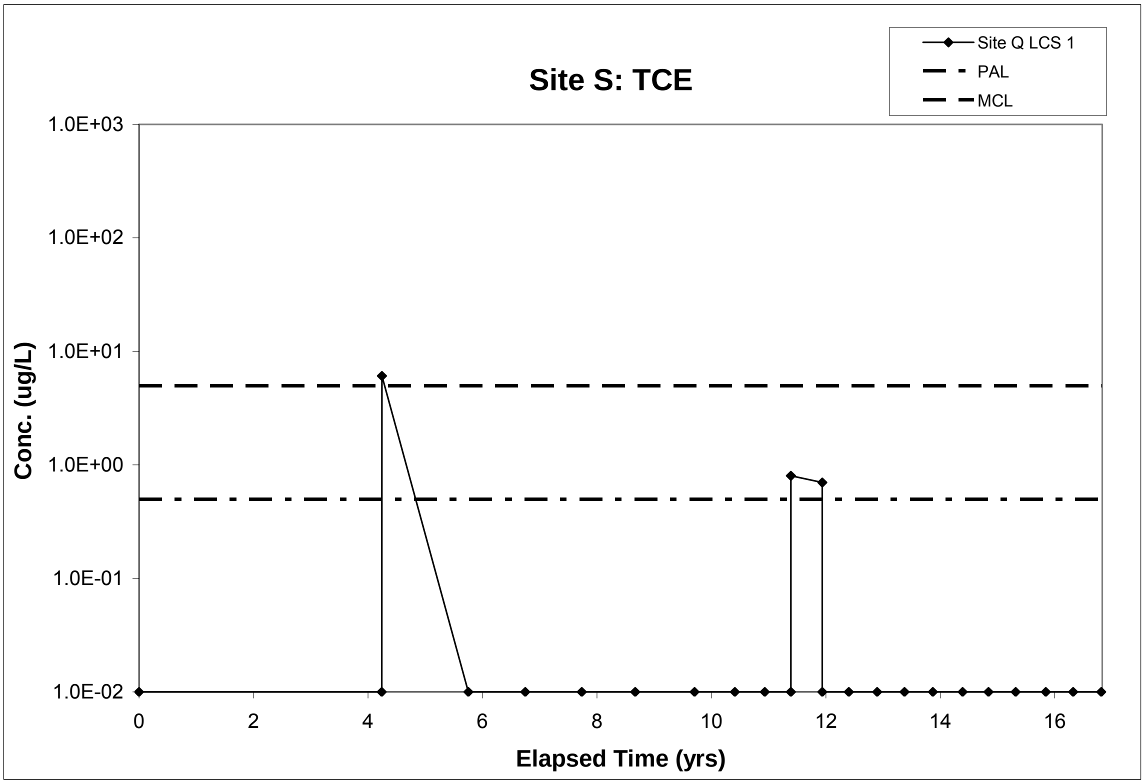

Site C: TCE
Site C LCS 1
PAL
MCL
No data: 91 & 92
Nondetects: 95-98 & 00-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

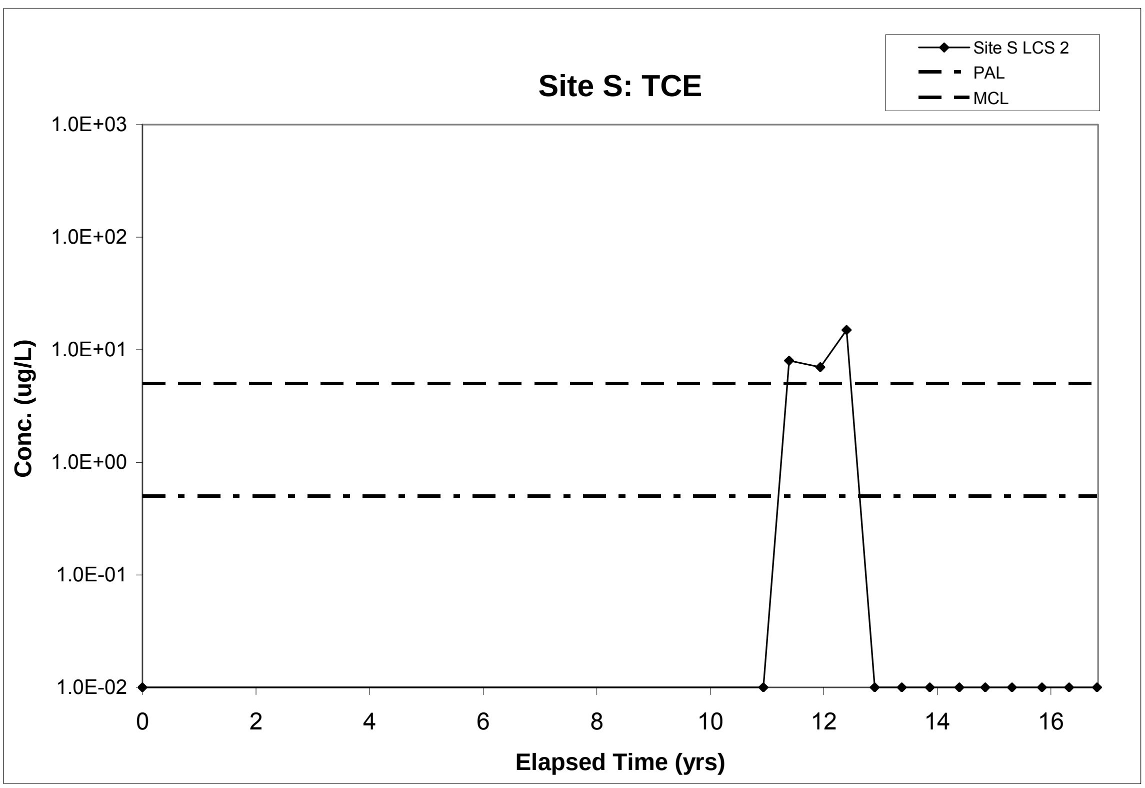

Site H: TCE
Site H LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

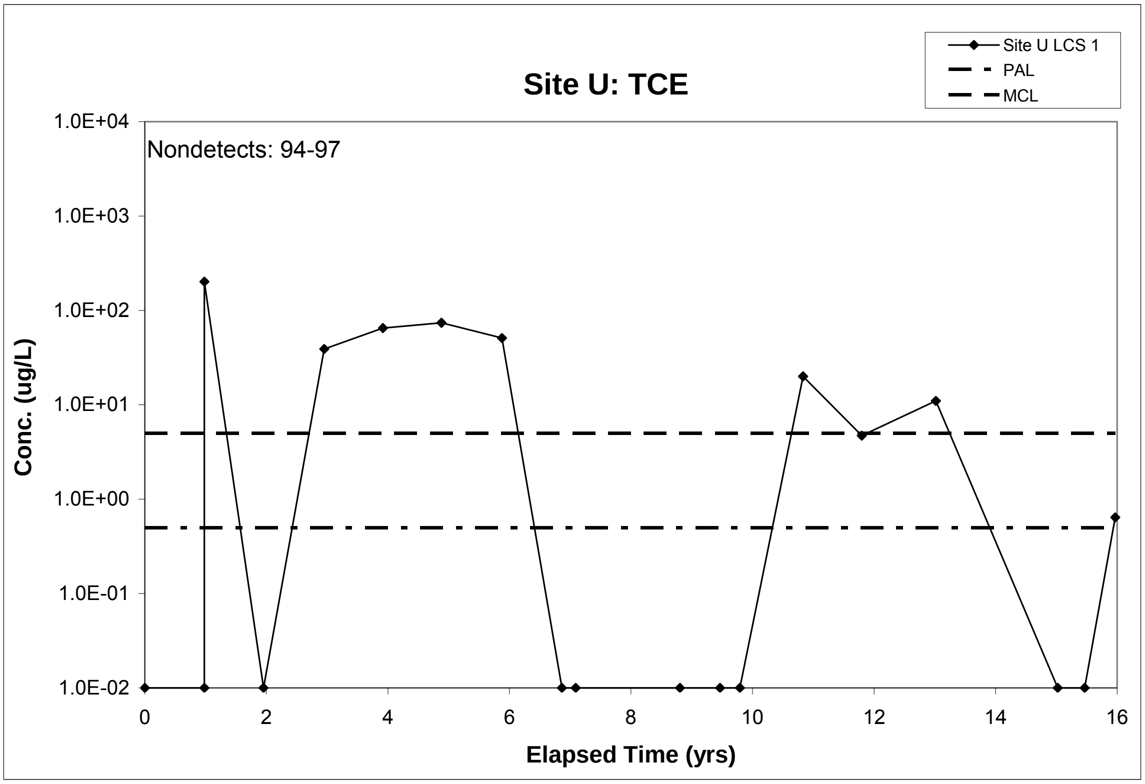

Site O: TCE
Site O LCS 1
PAL
MCL
No data: 85-88 & 90-92
Nondetects: 98-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

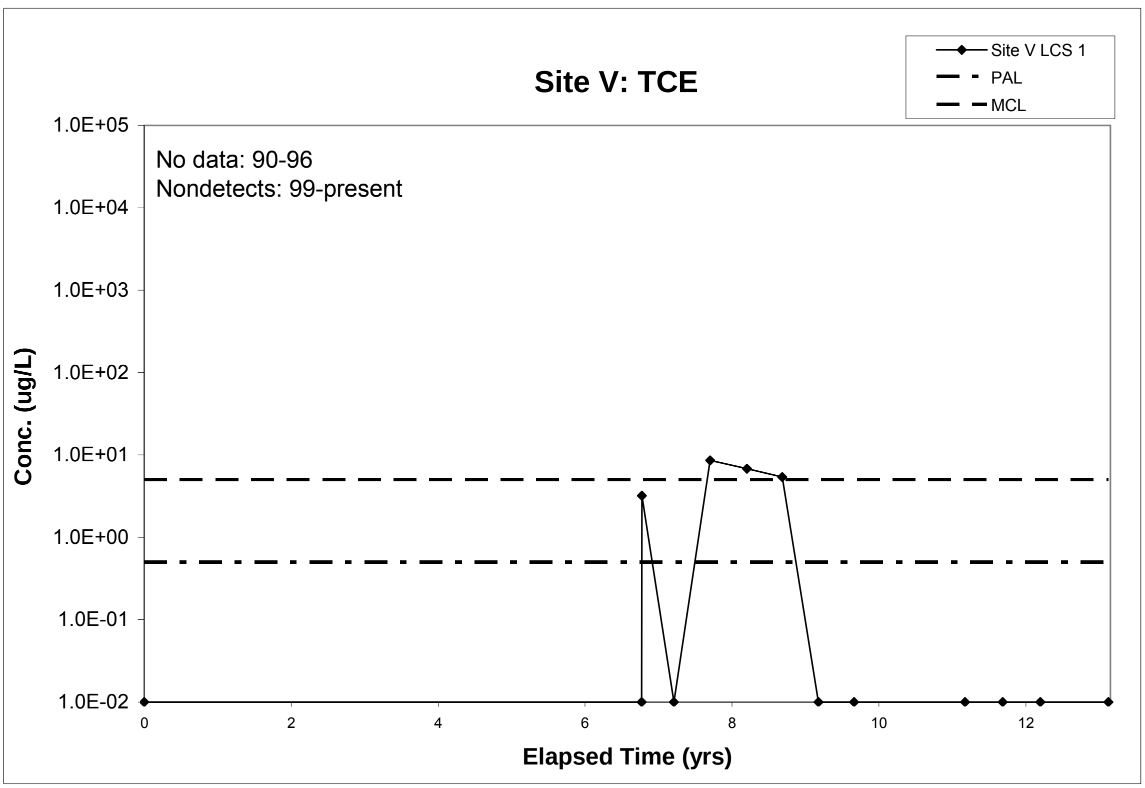

Site Q: TCE
Site Q LCS 1
PAL
MCL
No data: 85-86 & 88-92
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

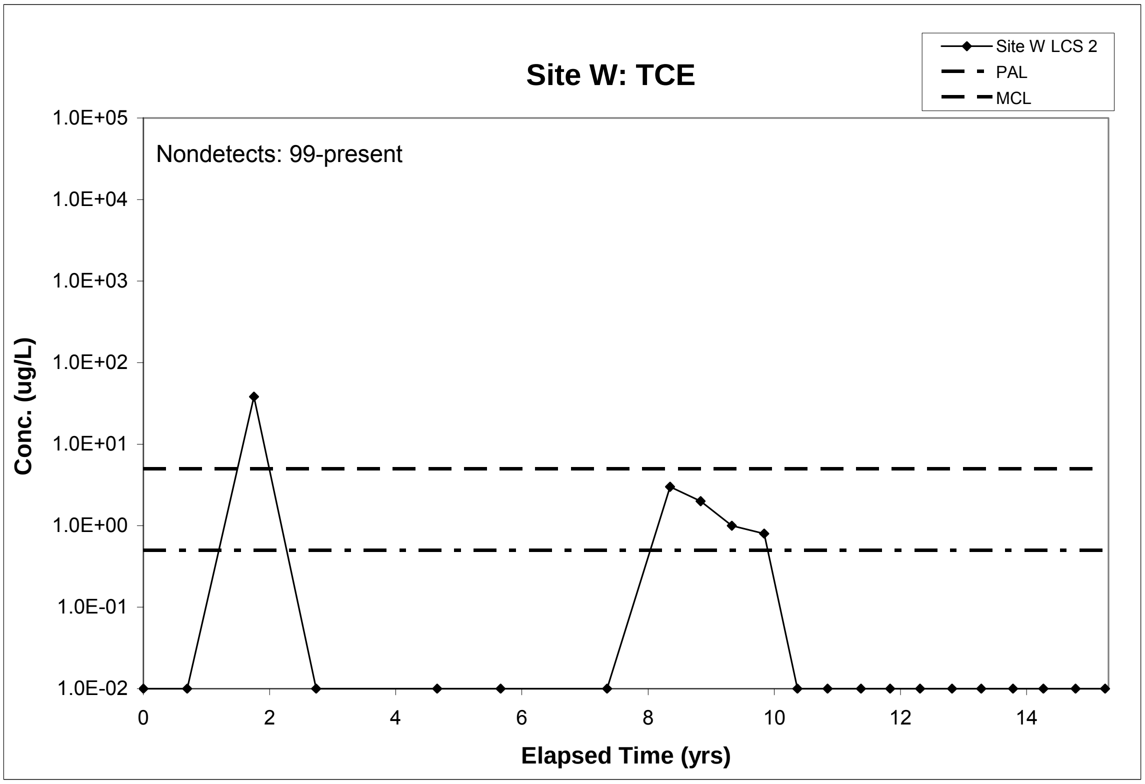

Site Q: TCE
Site Q LCS 2
PAL
MCL
Nondetects: 98-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

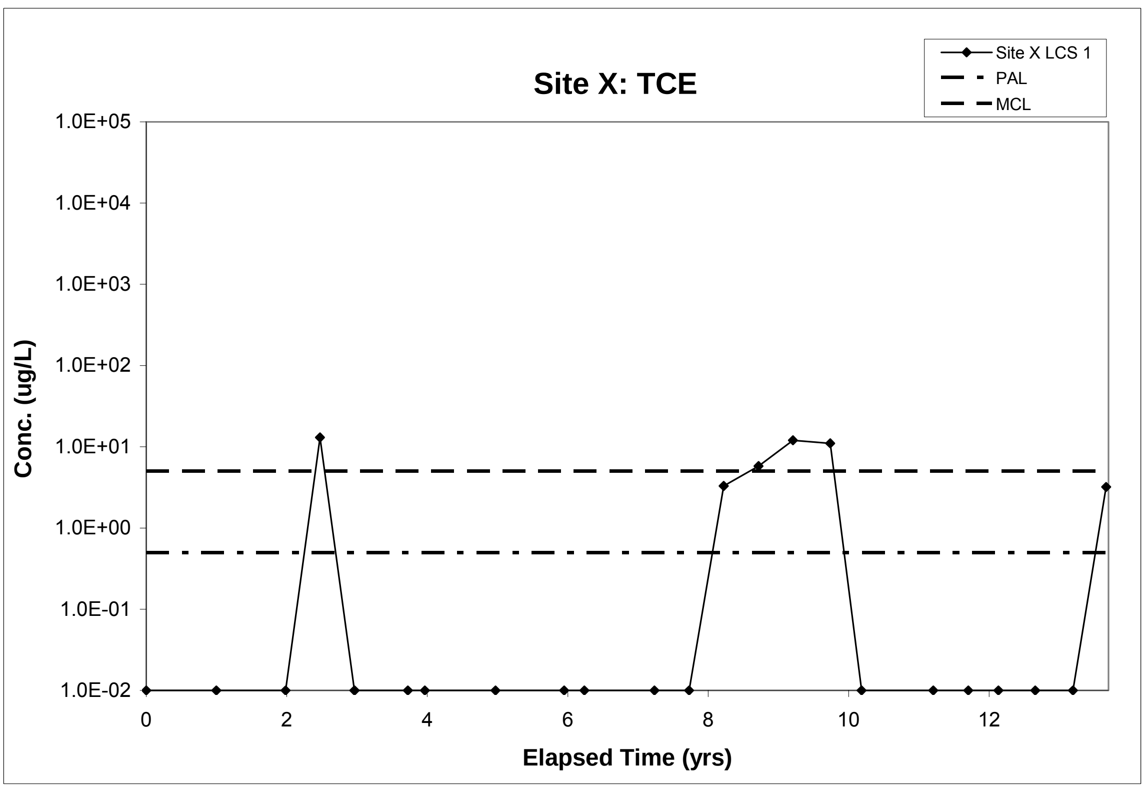

Site S: TCE
Site Q LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

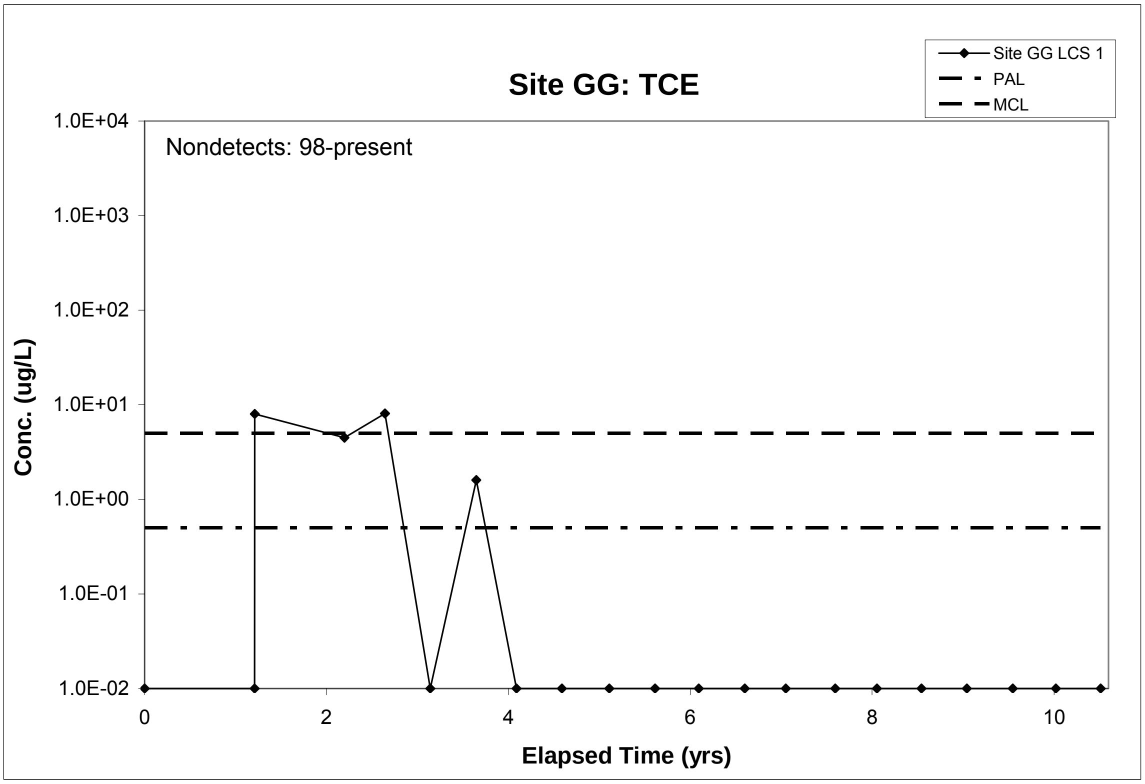

Site S: TCE
Site S LCS 2
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

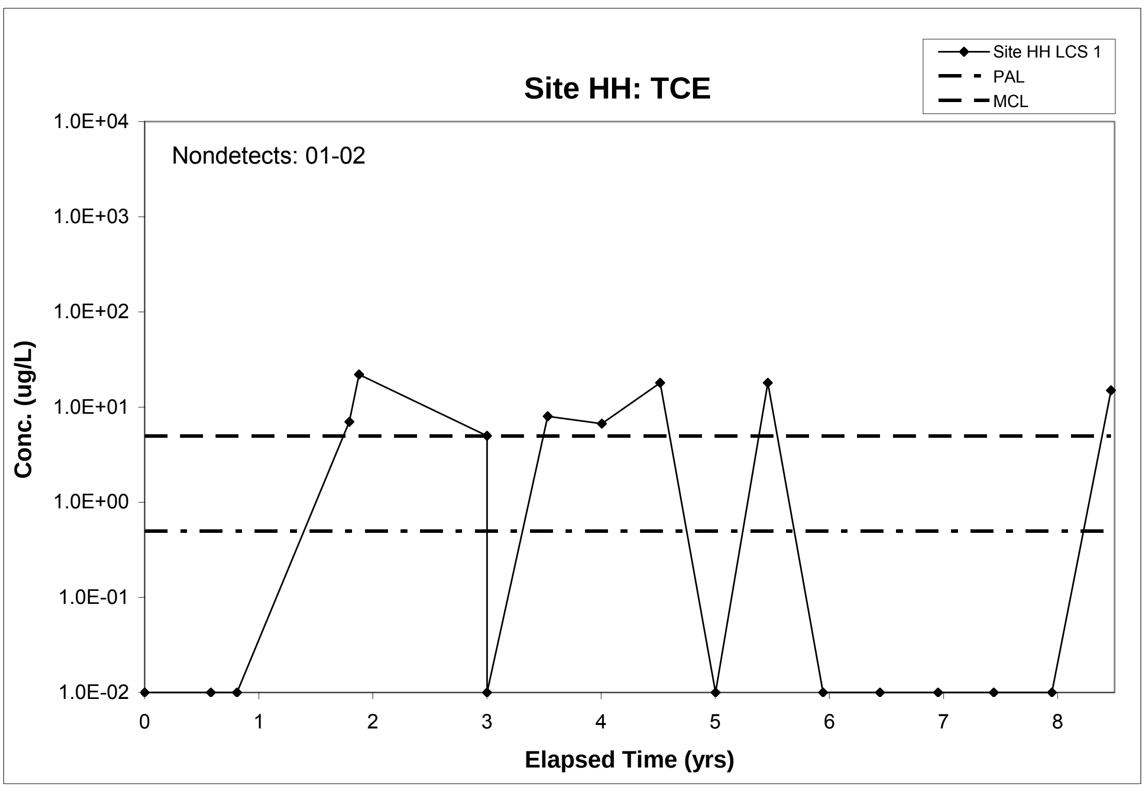

Site U: TCE
Site U LCS 1
PAL
MCL
Nondetects: 94-97
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

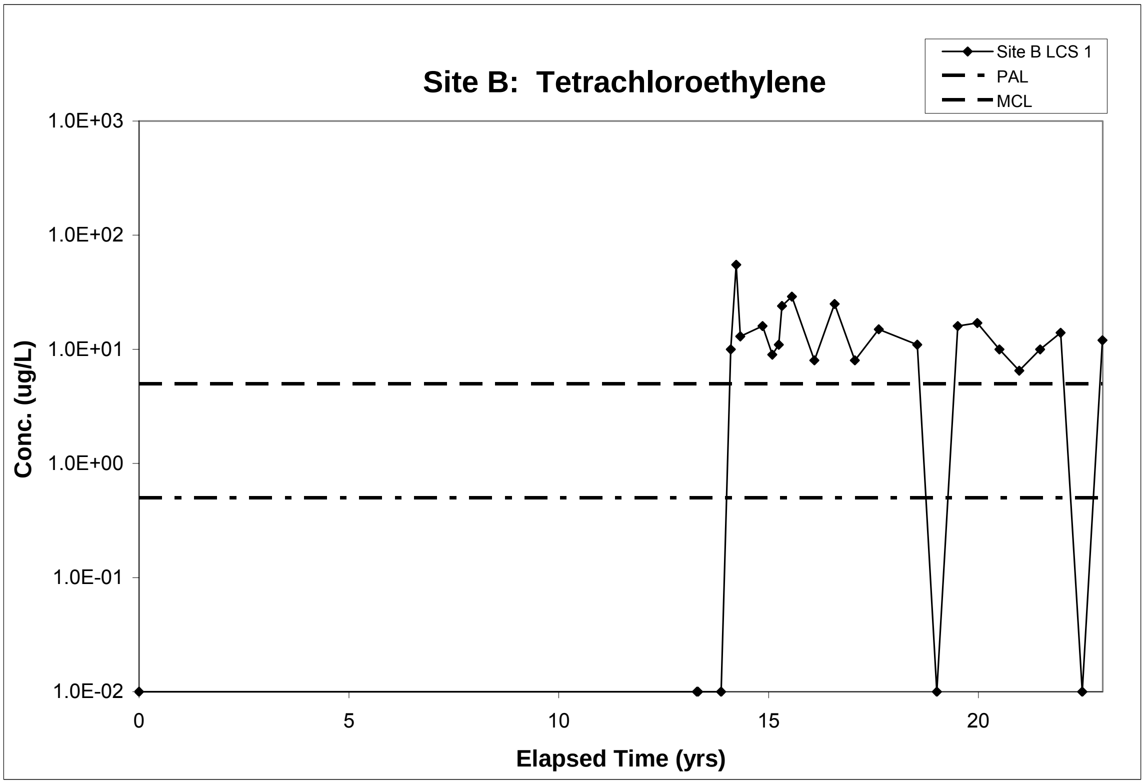

Site V: TCE
Site V LCS 1
PAL
MCL
No data: 90-96
Nondetects: 99-present
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

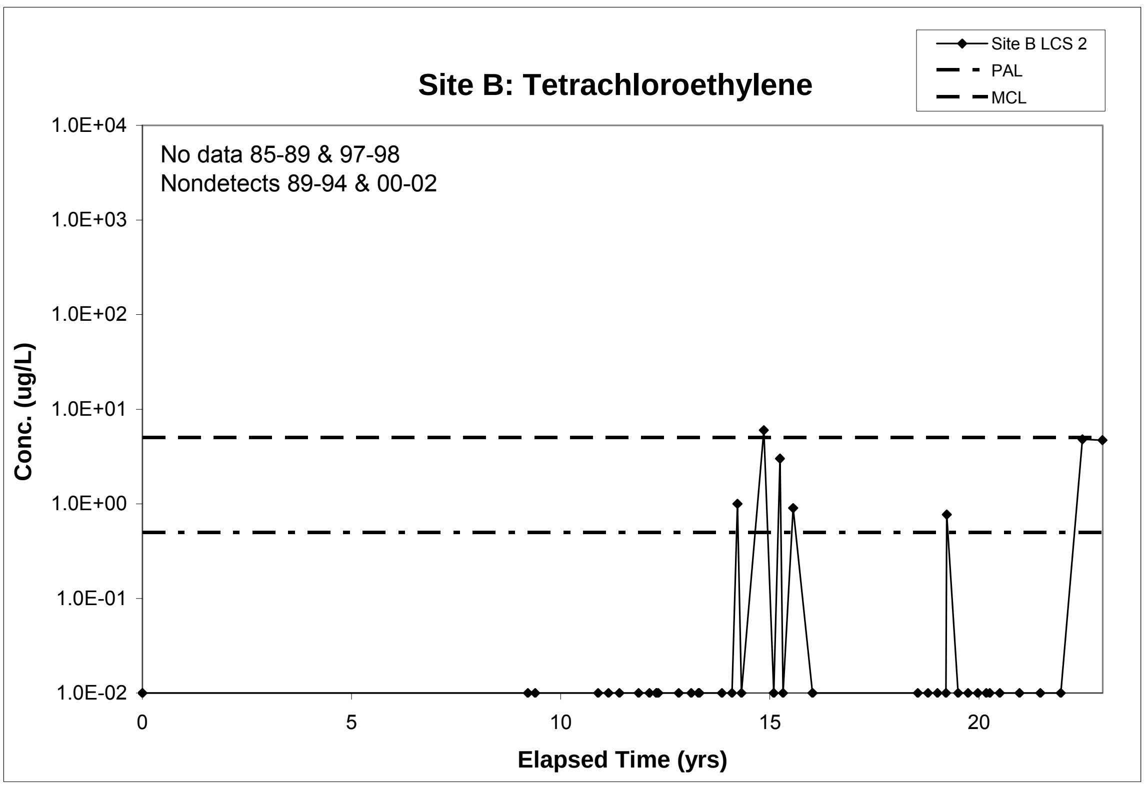

Site W: TCE
Site W LCS 2
PAL
MCL
Nondetects: 99-present
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

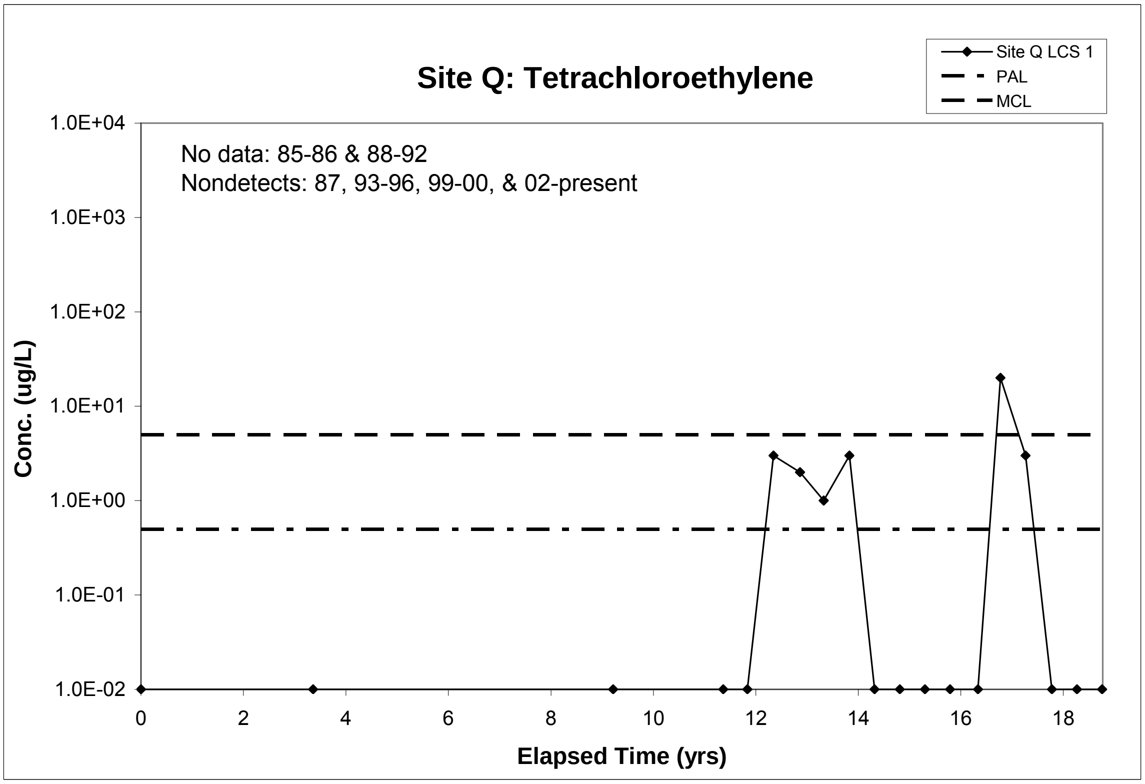

Site X: TCE
Site X LCS 1
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

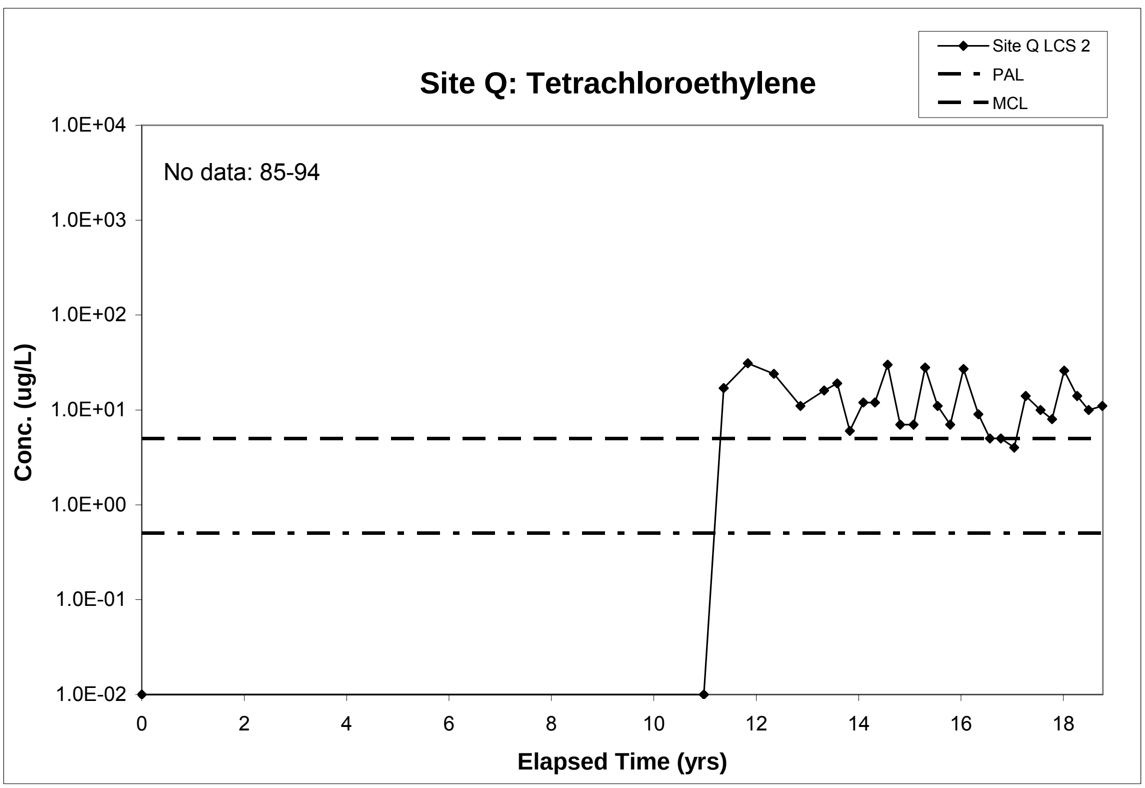

Site GG: TCE
Site GG LCS 1
PAL
MCL
Nondetects: 98-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

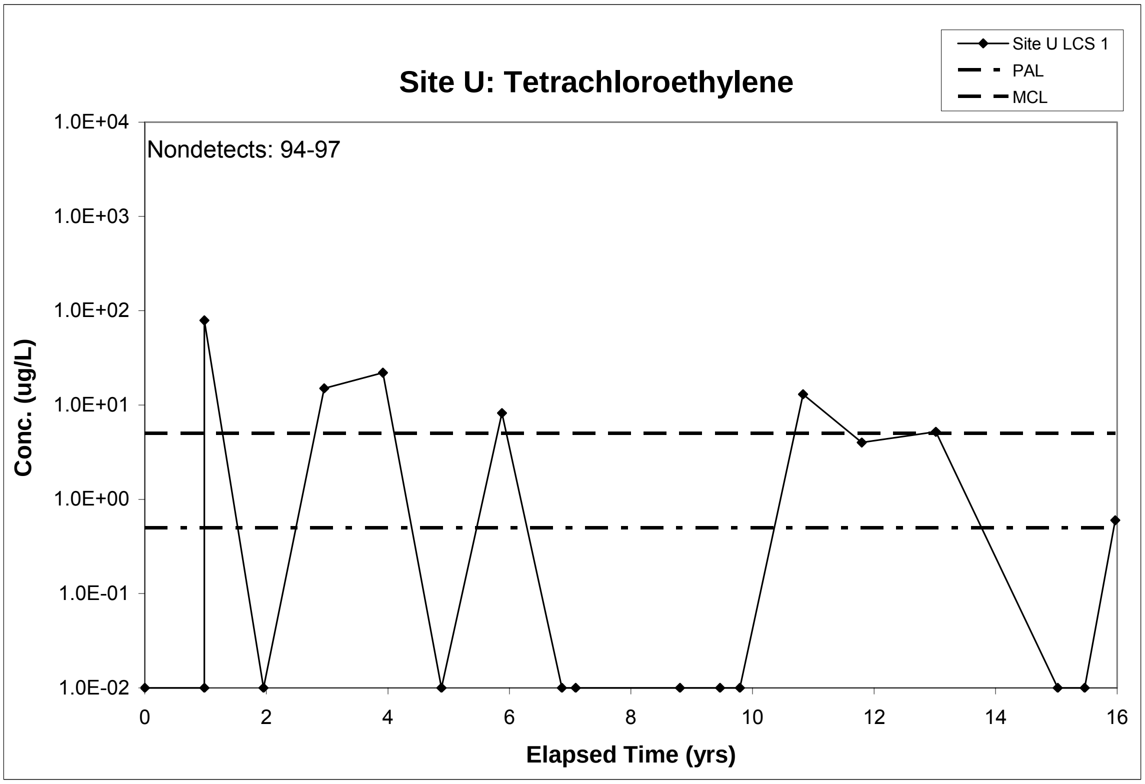

Site HH: TCE
Site HH LCS 1
PAL
MCL
Nondetects: 01-02
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

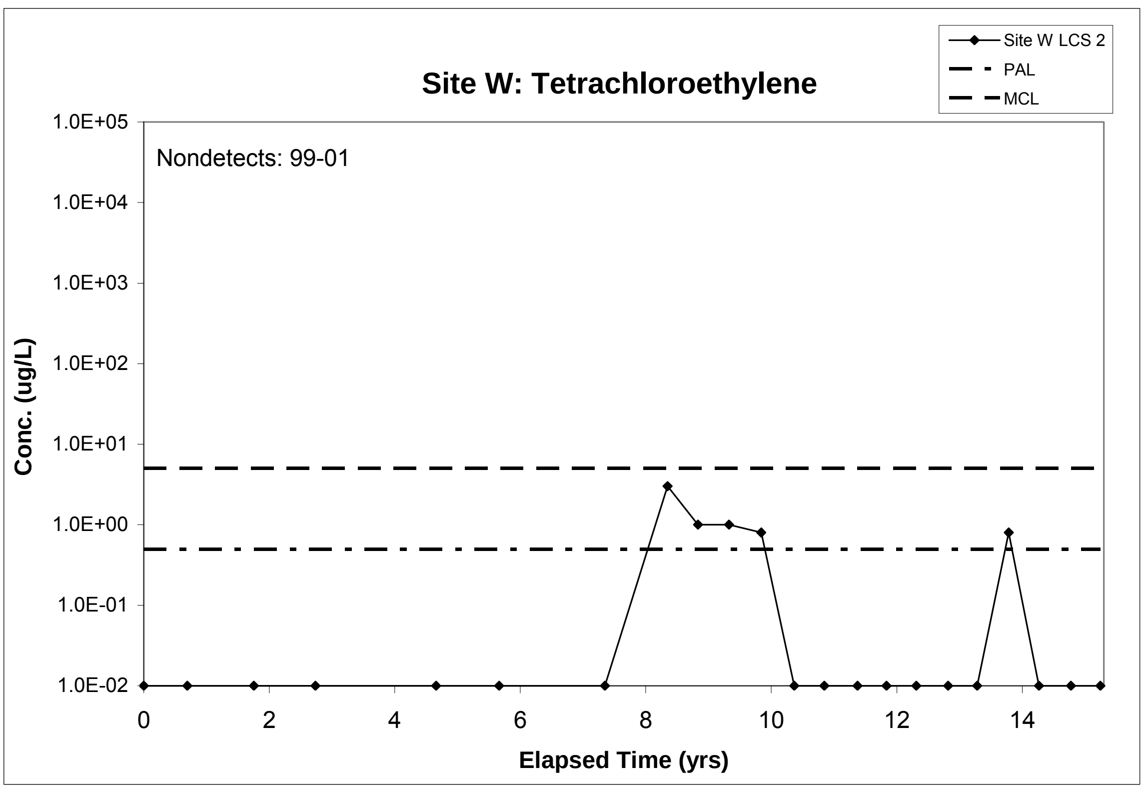

Site B: Tetrachloroethylene
Site B LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

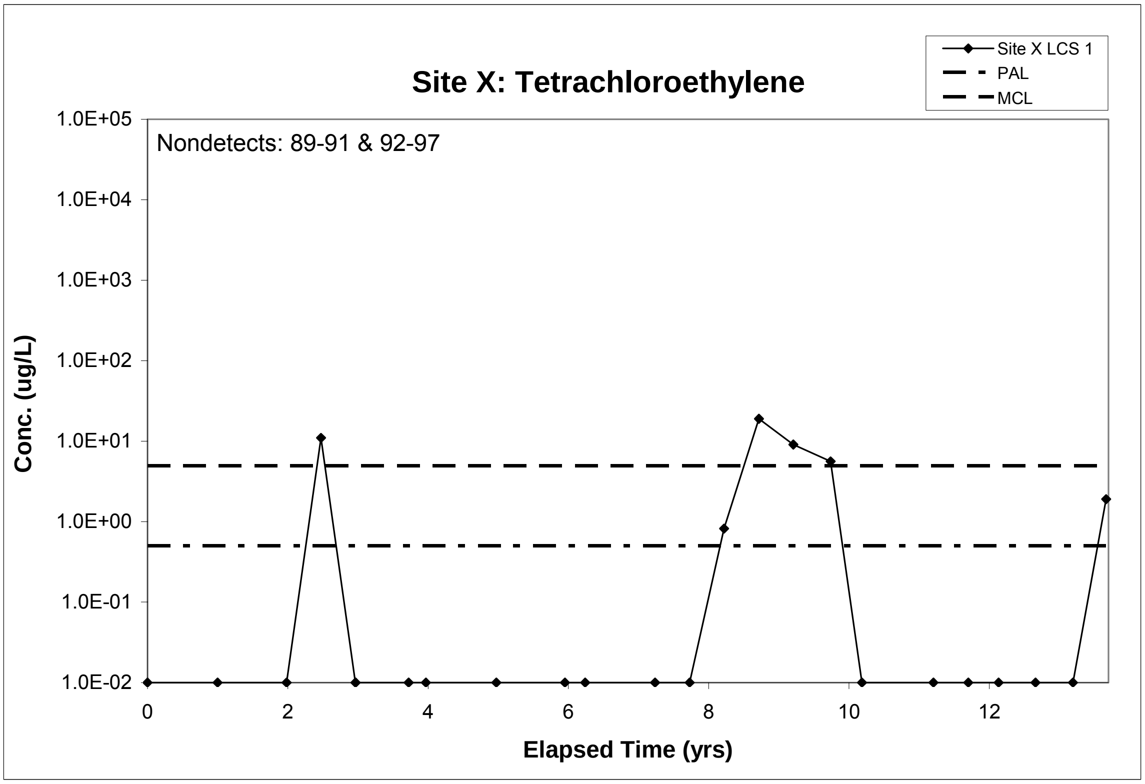

Site B: Tetrachloroethylene
Site B LCS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
No data 85-89 & 97-98
Nondetects 89-94 & 00-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

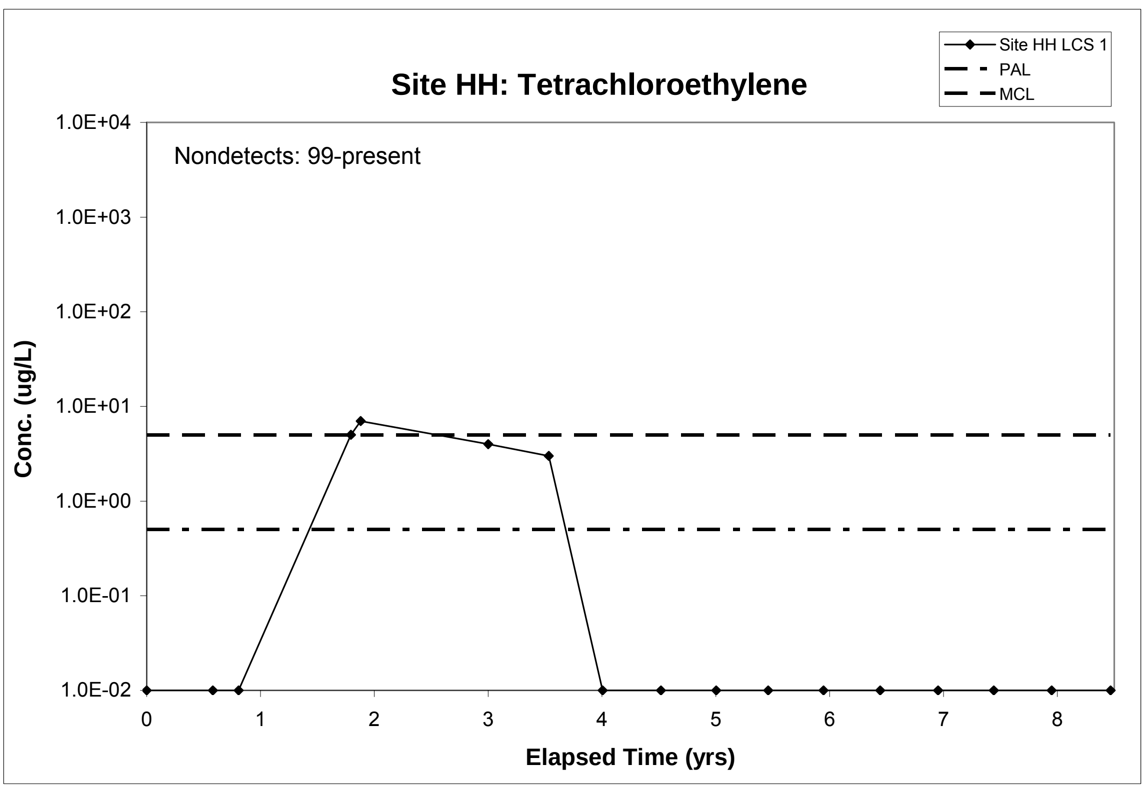

Site Q: Tetrachloroethylene
Site Q LCS 1
PAL
MCL
No data: 85-86 & 88-92
Nondetects: 87, 93-96, 99-00, & 02-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

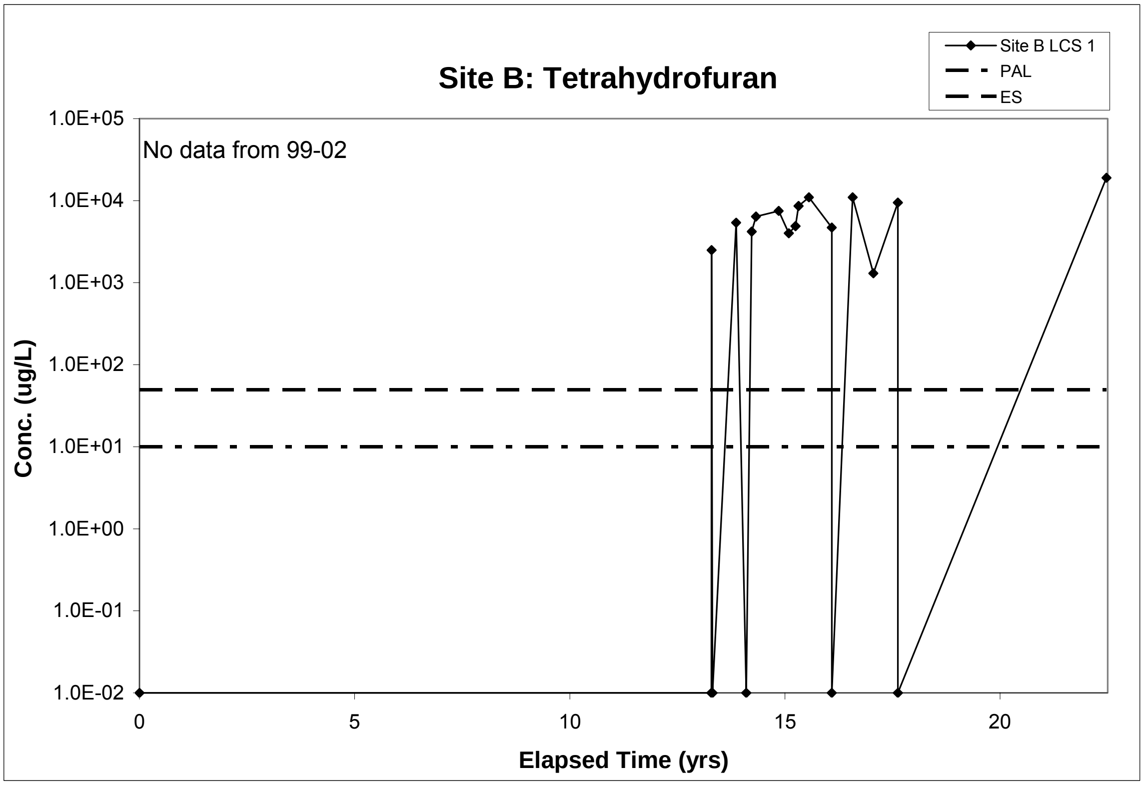

Site Q: Tetrachloroethylene
Site Q LCS 2
PAL
MCL
No data: 85-94
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

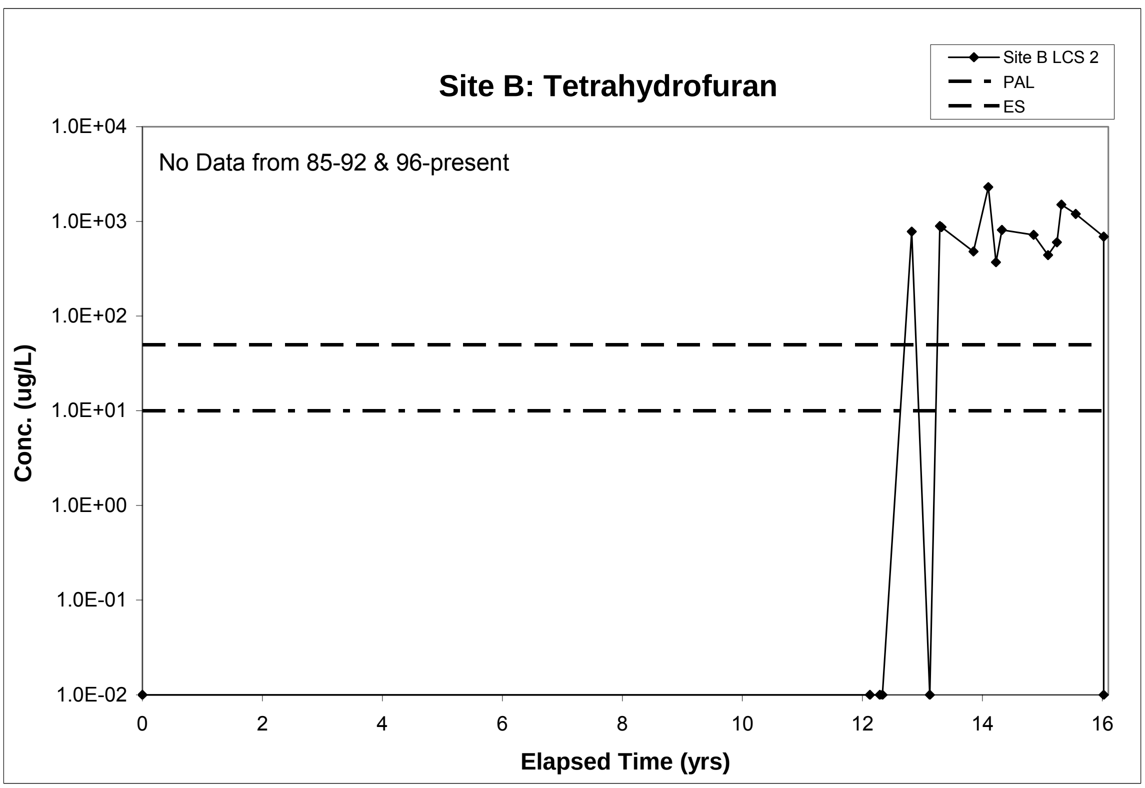

Site U: Tetrachloroethylene
Site U LCS 1
PAL
MCL
Nondetects: 94-97
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

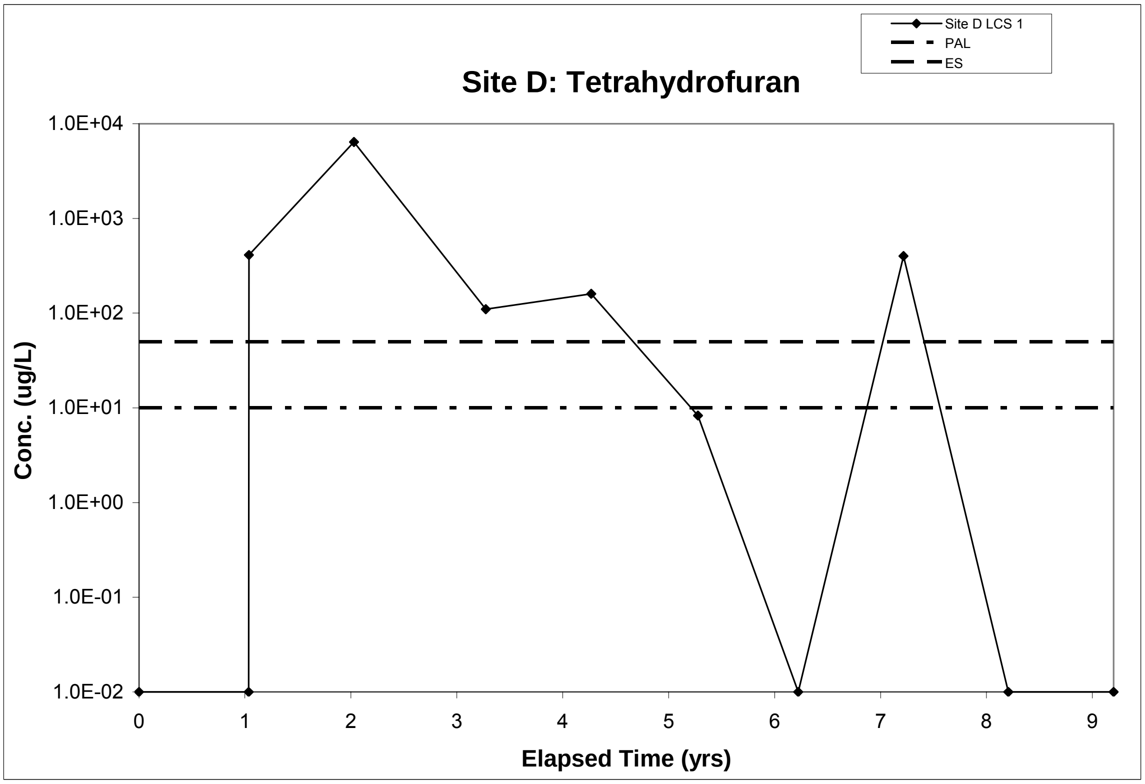

Site W: Tetrachloroethylene
Site W LCS 2
PAL
MCL
Nondetects: 99-01
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

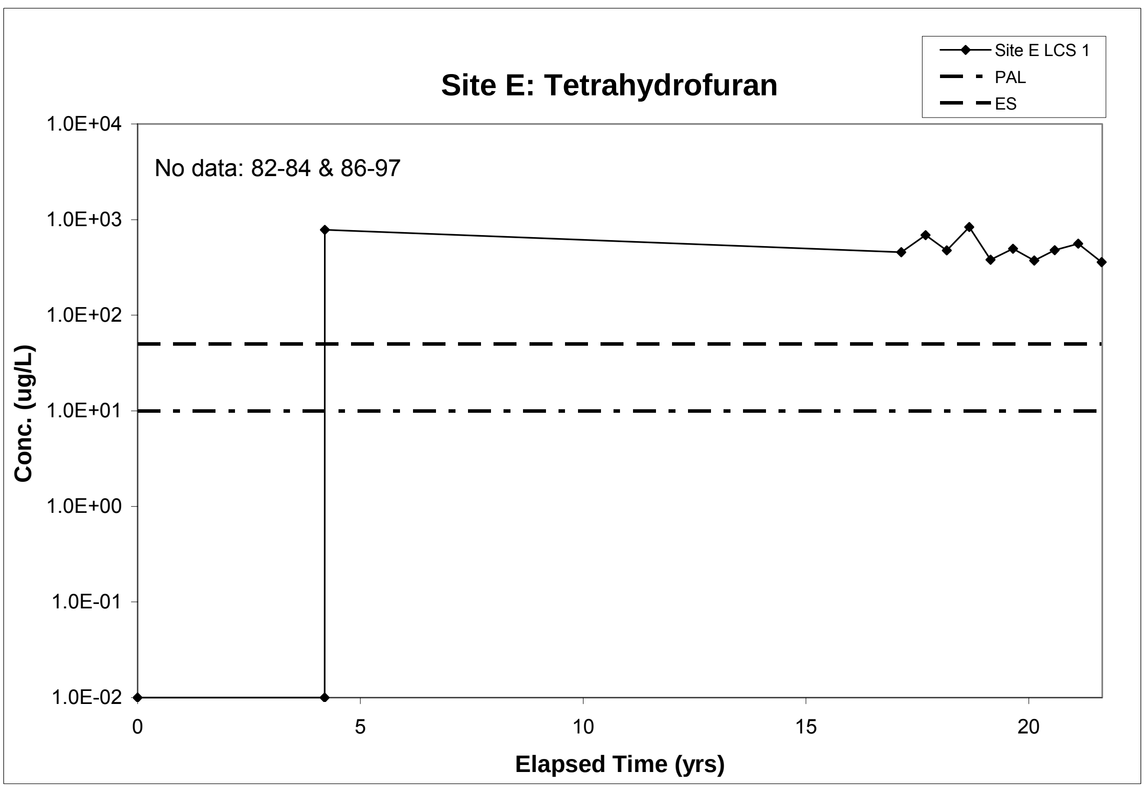

Site X: Tetrachloroethylene
Site X LCS 1
PAL
MCL
Nondetects: 89-91 & 92-97
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

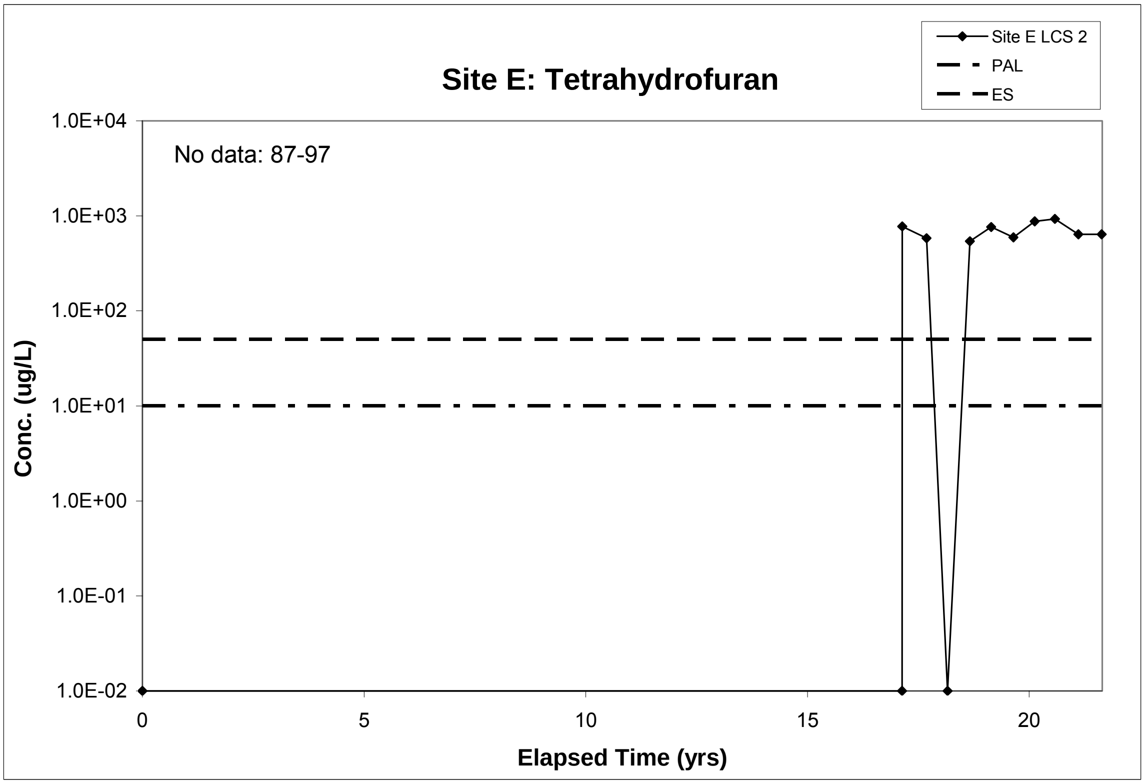

Site HH: Tetrachloroethylene
Site HH LCS 1
PAL
MCL
Nondetects: 99-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

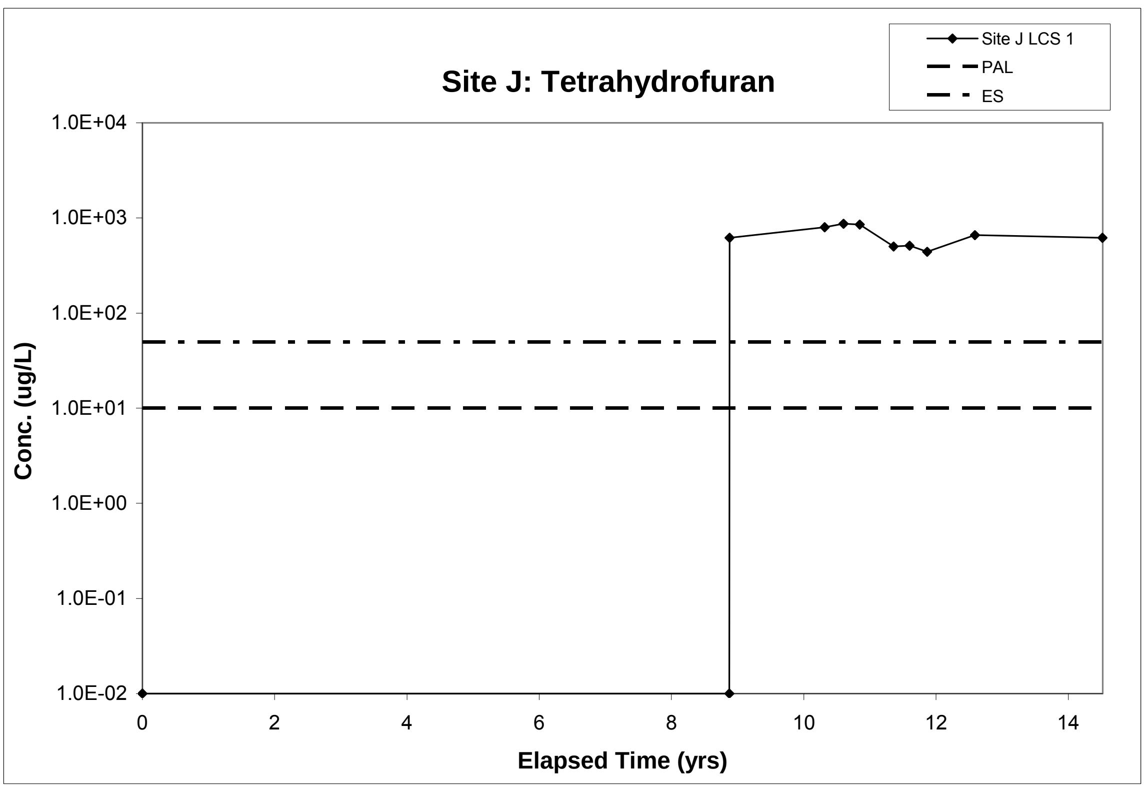

Site B: Tetrahydrofuran
Site B LCS 1
PAL
ES
No data from 99-02
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

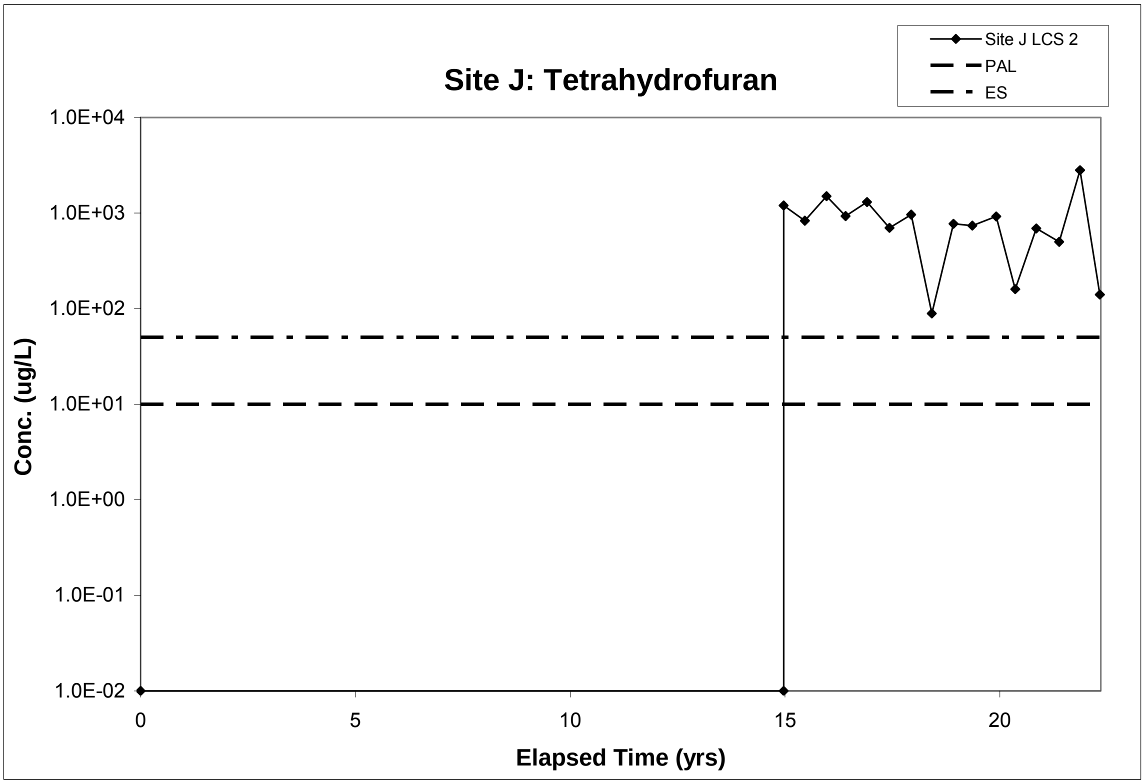

Site B: Tetrahydrofuran
Site B LCS 2
PAL
ES
No Data from 85-92 & 96-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

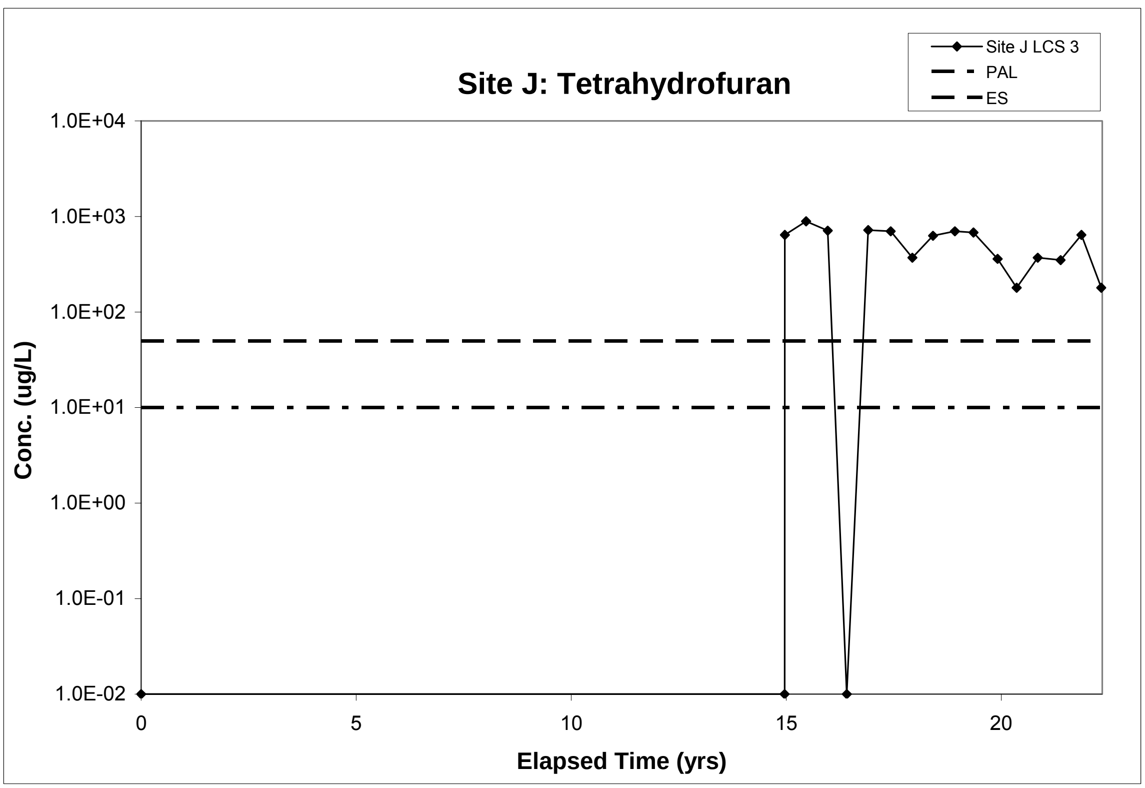

Site D: Tetrahydrofuran
Site D LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
9
Elapsed Time (yrs)

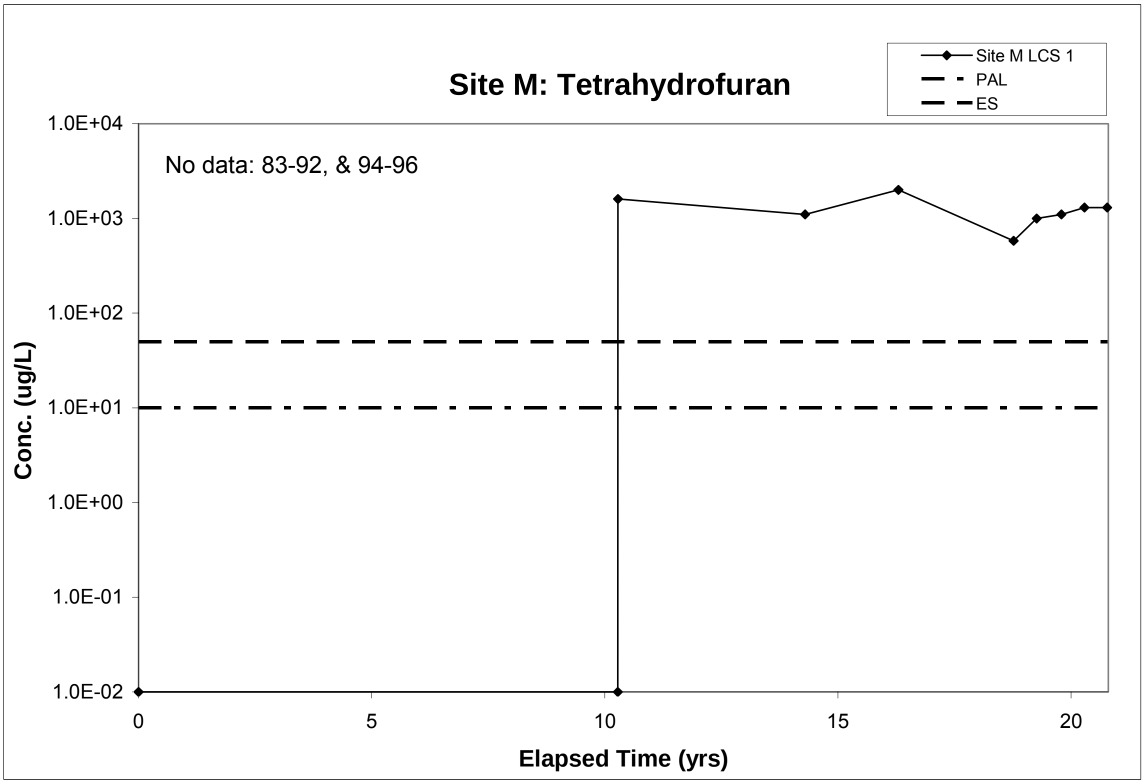

Site E: Tetrahydrofuran
Site E LCS 1
PAL
ES
No data: 82-84 & 86-97
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

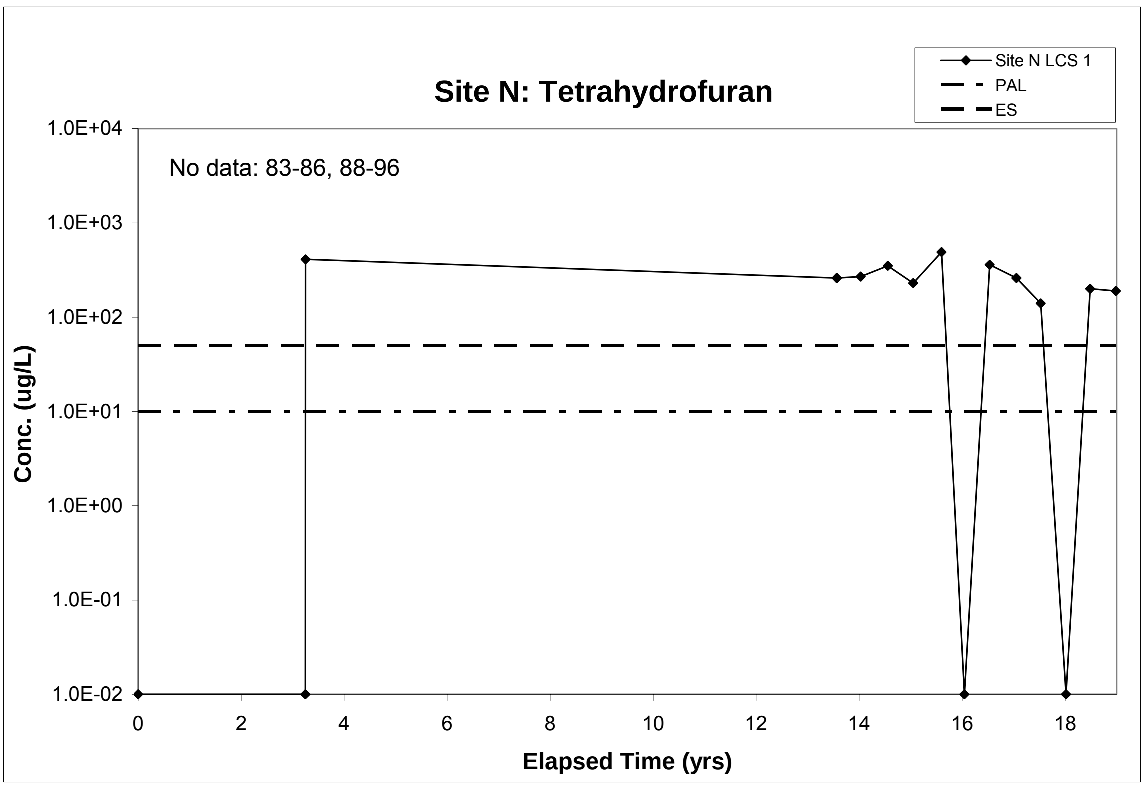

Site E: Tetrahydrofuran
Site E LCS 2
PAL
ES
No data: 87-97
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

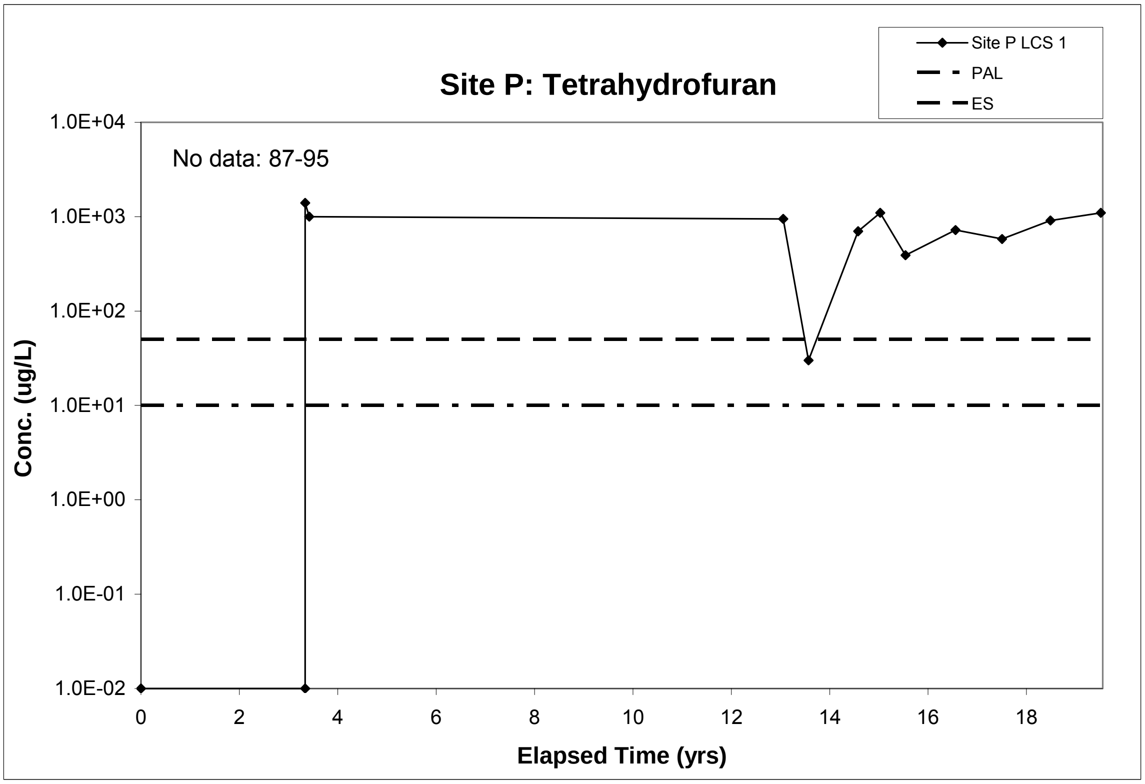

Site J: Tetrahydrofuran
Site J LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)


Site J: Tetrahydrofuran
Site J LCS 2
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

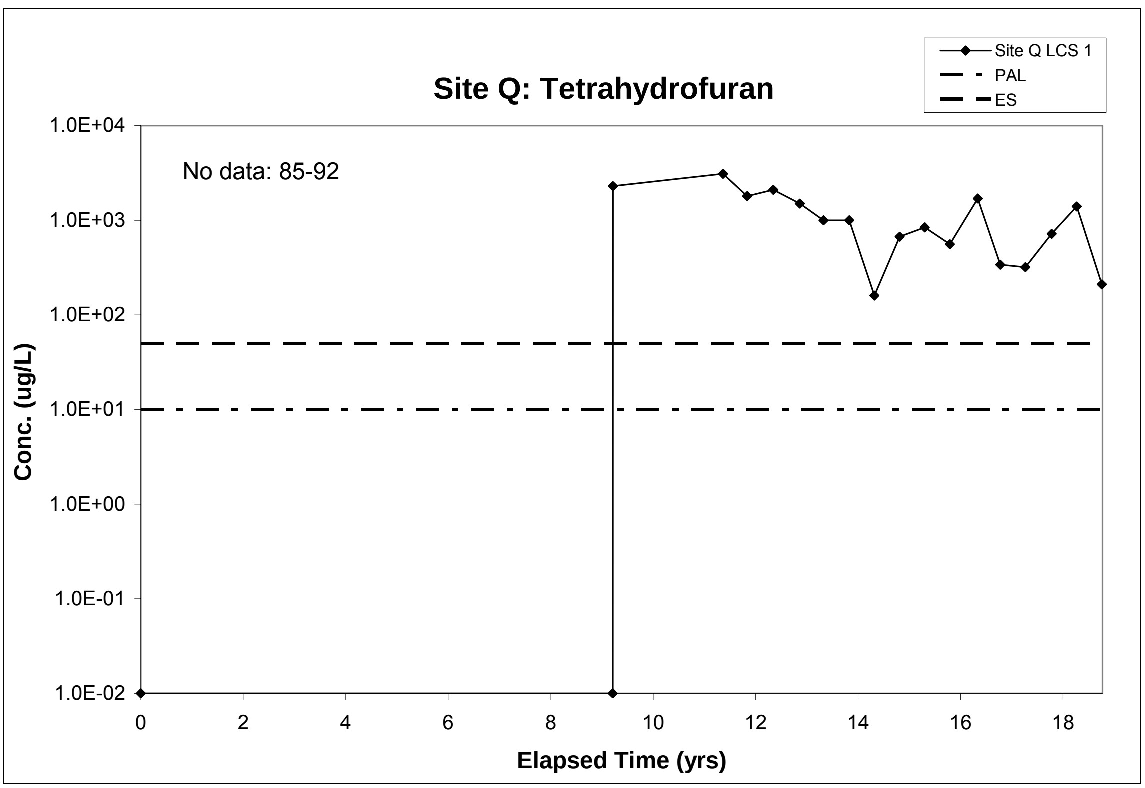

Site J: Tetrahydrofuran
Site J LCS 3
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)


Site M: Tetrahydrofuran
Site M LCS 1
PAL
ES
No data: 83-92, & 94-96
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

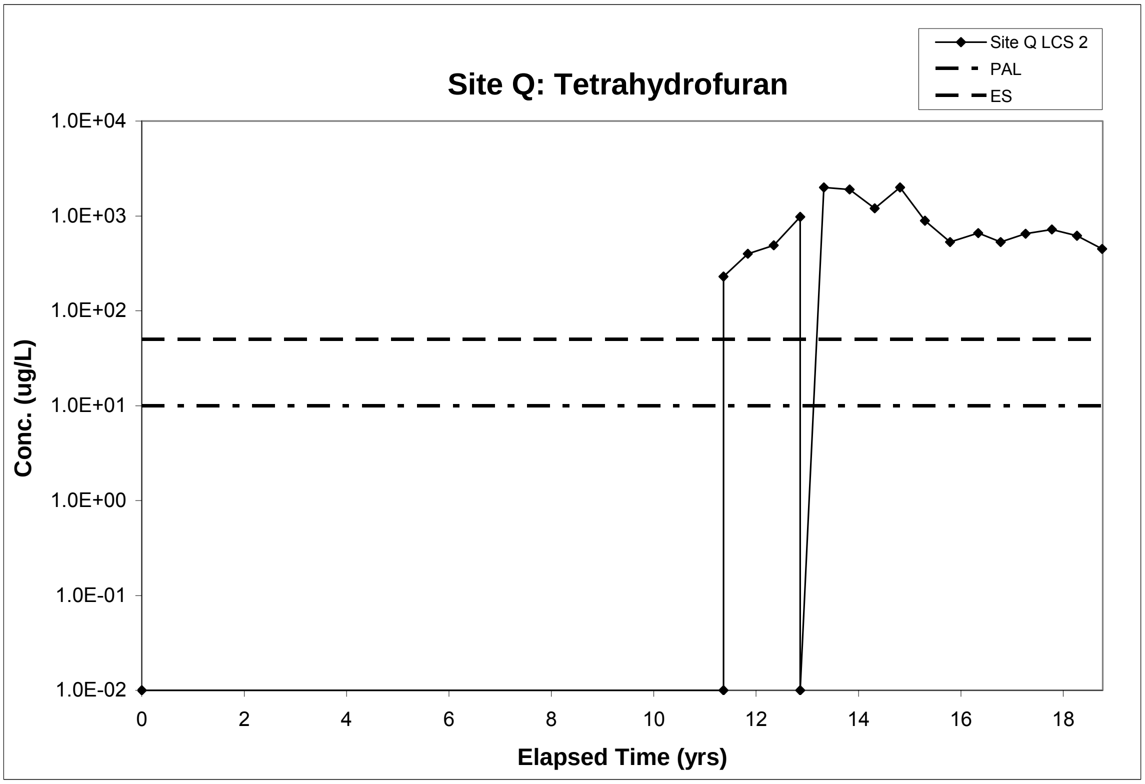

Site N: Tetrahydrofuran
Site N LCS 1
PAL
ES
No data: 83-86, 88-96
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

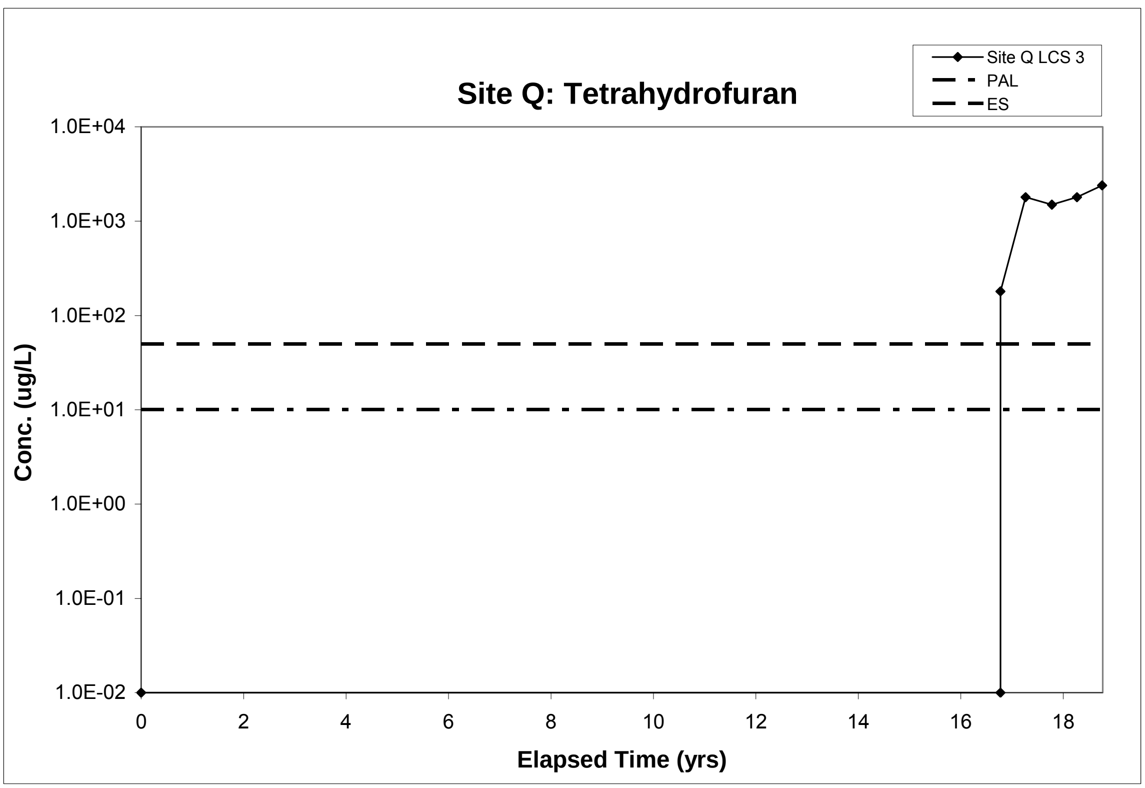


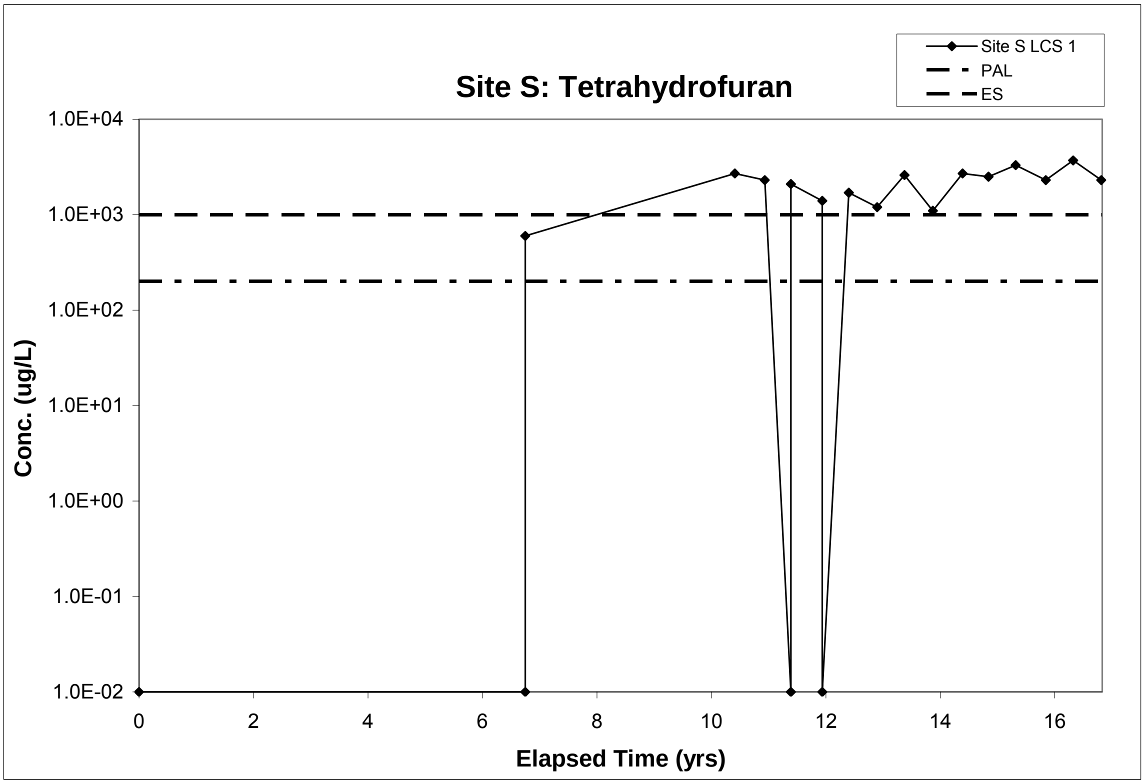
Site P: Tetrahydrofuran
Site P LCS 1
PAL
ES
No data: 87-95
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

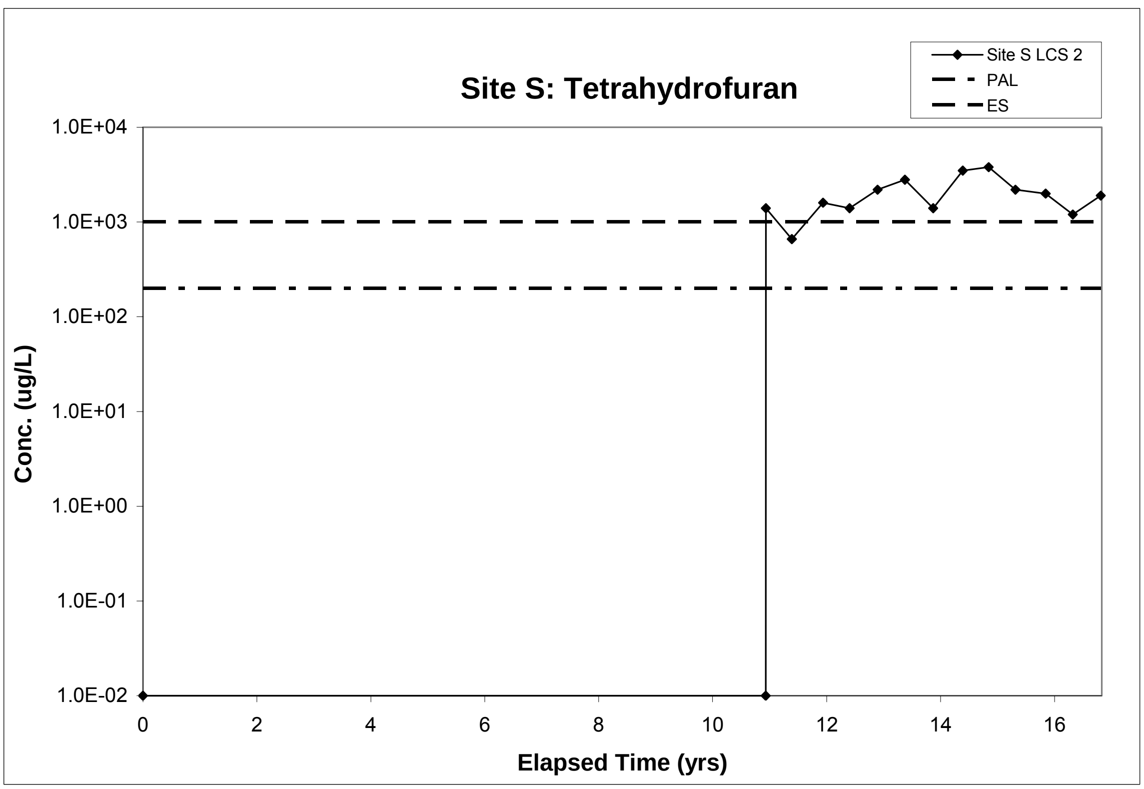


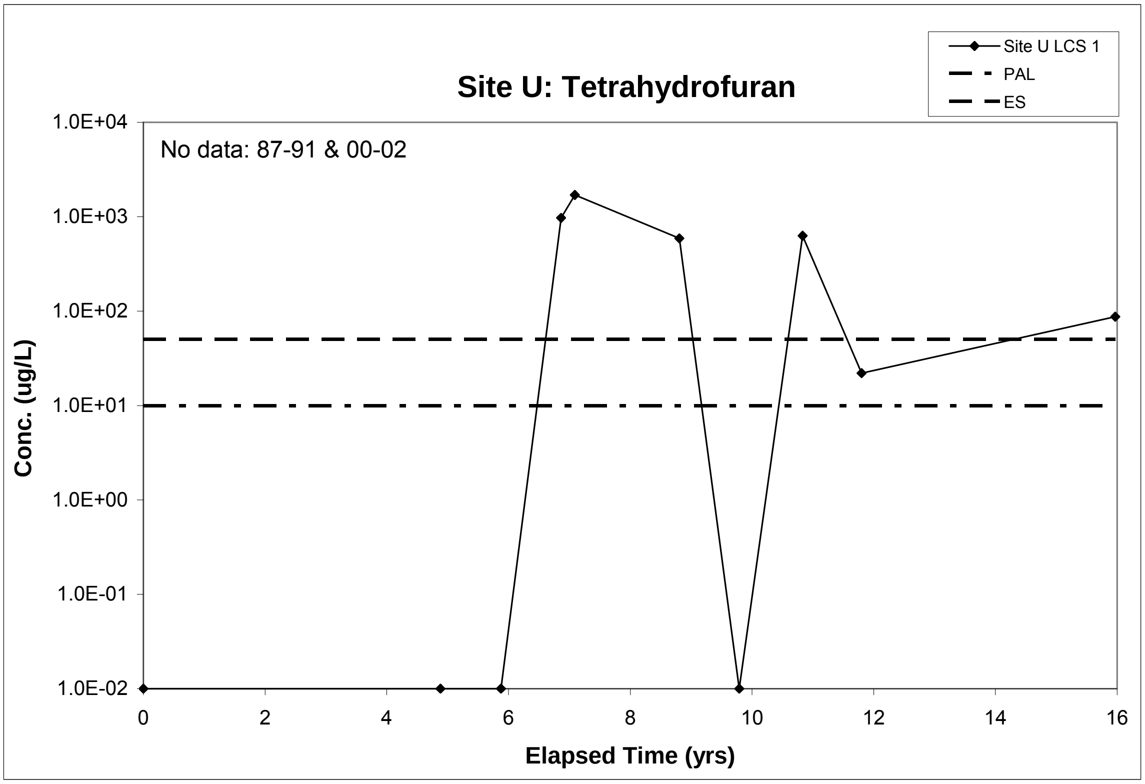
Site Q: Tetrahydrofuran
Site Q LCS 1
PAL
ES
No data: 85-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

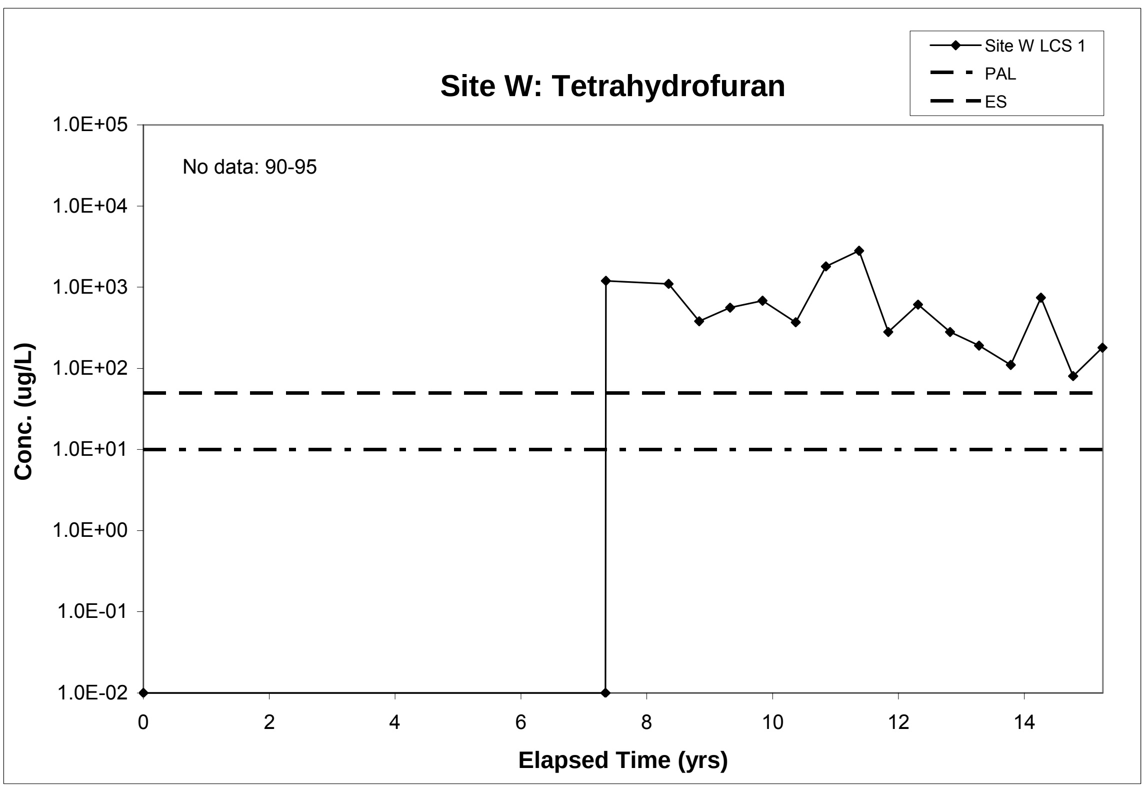

Site Q: Tetrahydrofuran
Site Q LCS 2
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

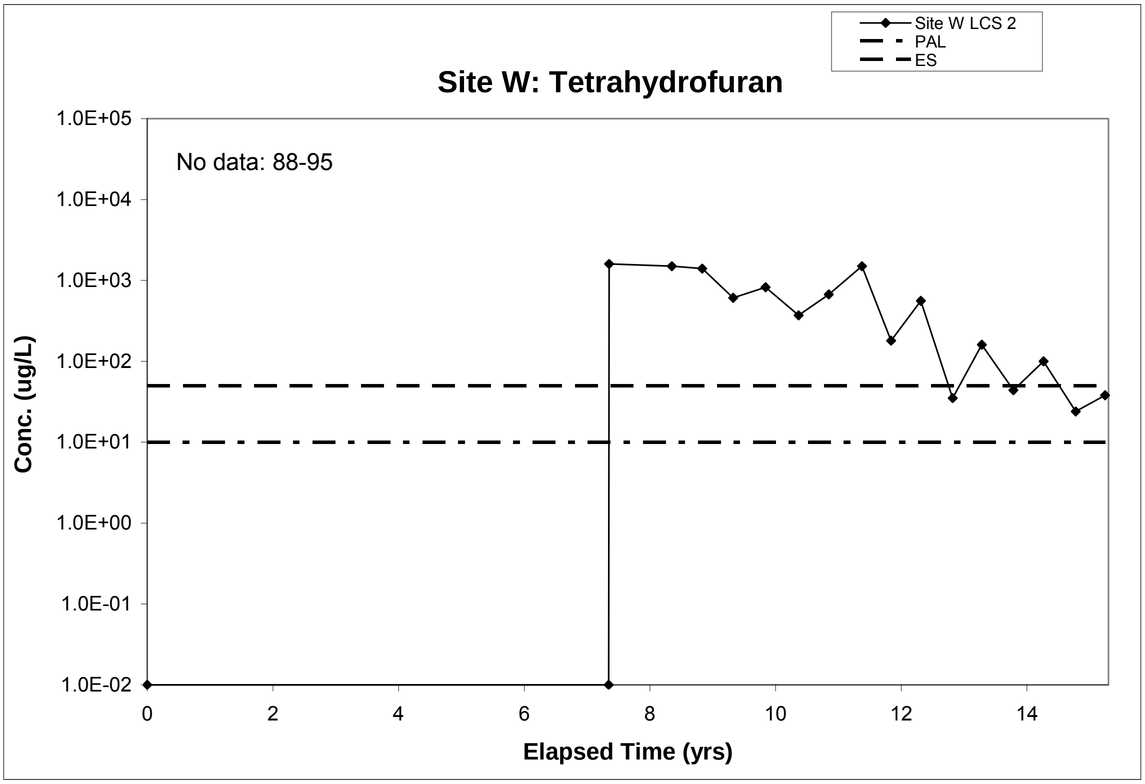

Site Q: Tetrahydrofuran
Site Q LCS 3
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

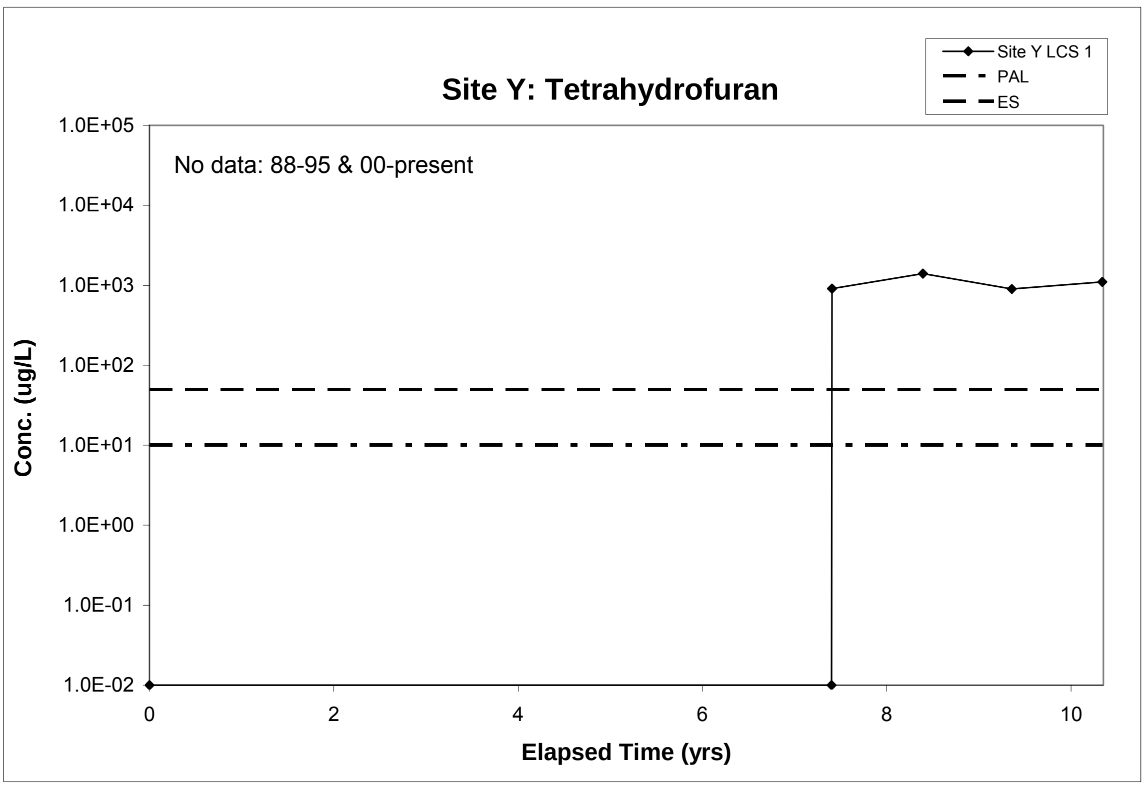

Site S: Tetrahydrofuran
Site S LCS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

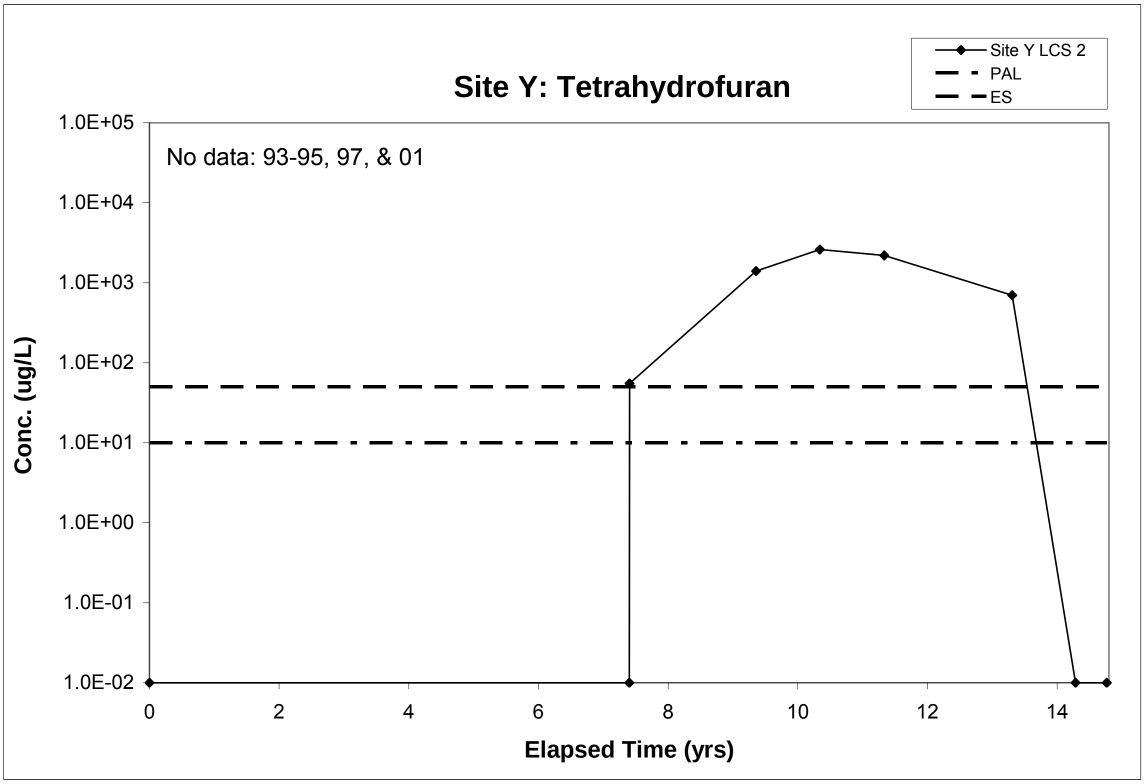

Site S: Tetrahydrofuran
Site S LCS 2
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

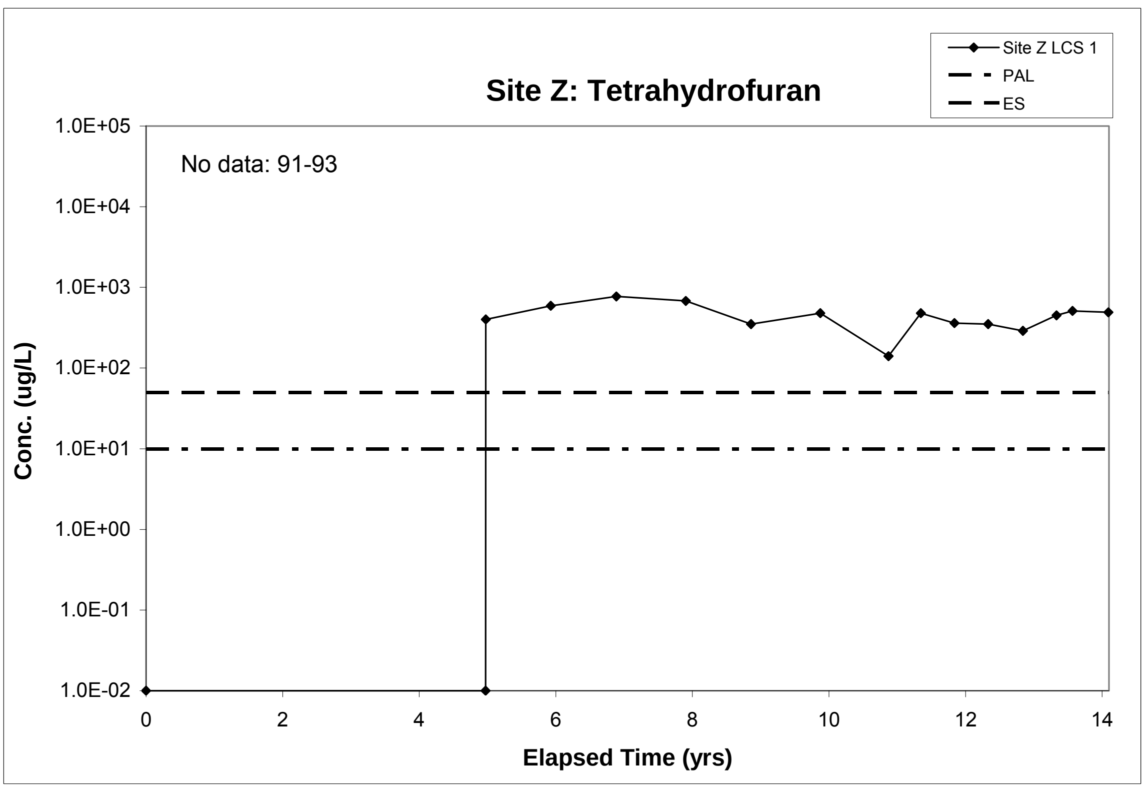

Site U: Tetrahydrofuran
Site U LCS 1
PAL
ES
No data: 87-91 & 00-02
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

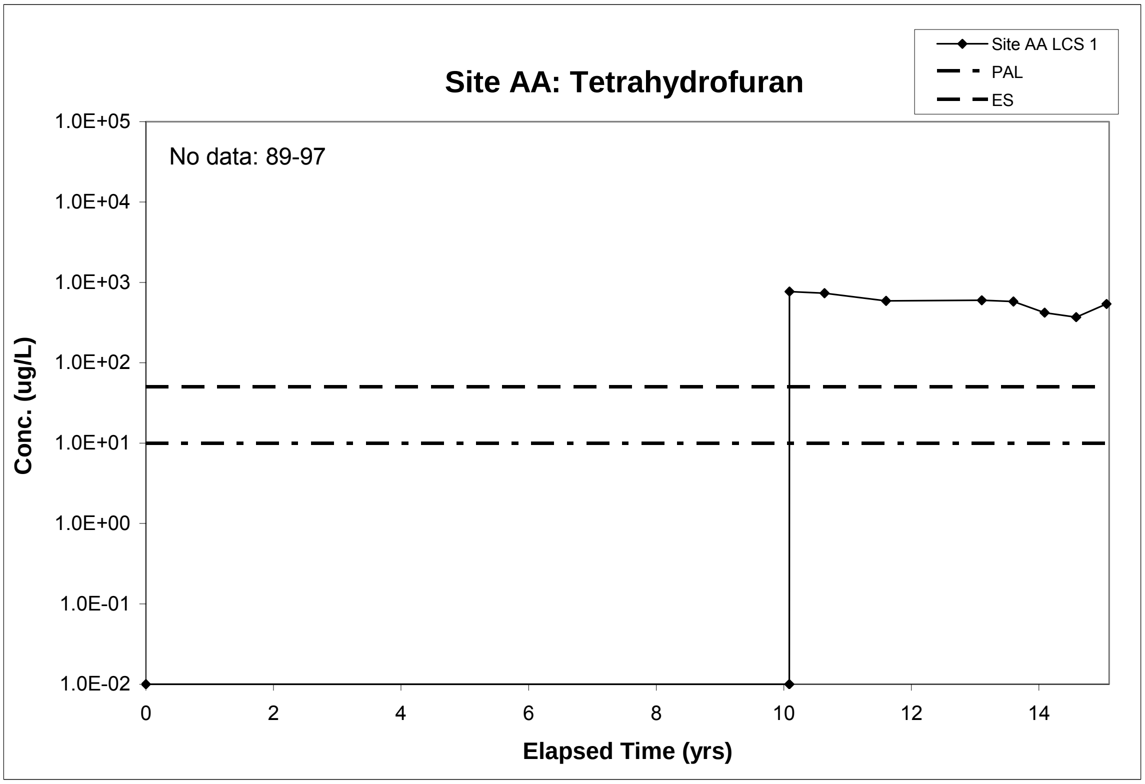

Site W: Tetrahydrofuran
Site W LCS 1
PAL
ES
No data: 90-95
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

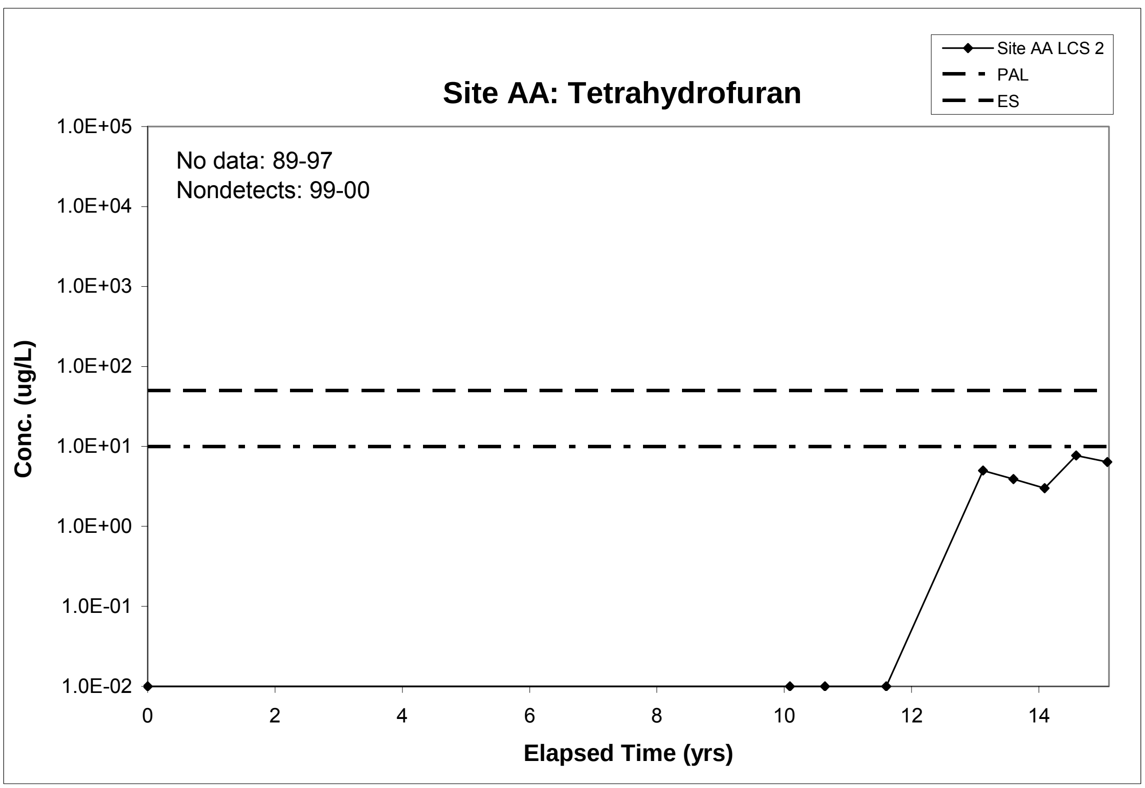

Site W LCS 2
PAL
ES
Site W: Tetrahydrofuran
No data: 88-95
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

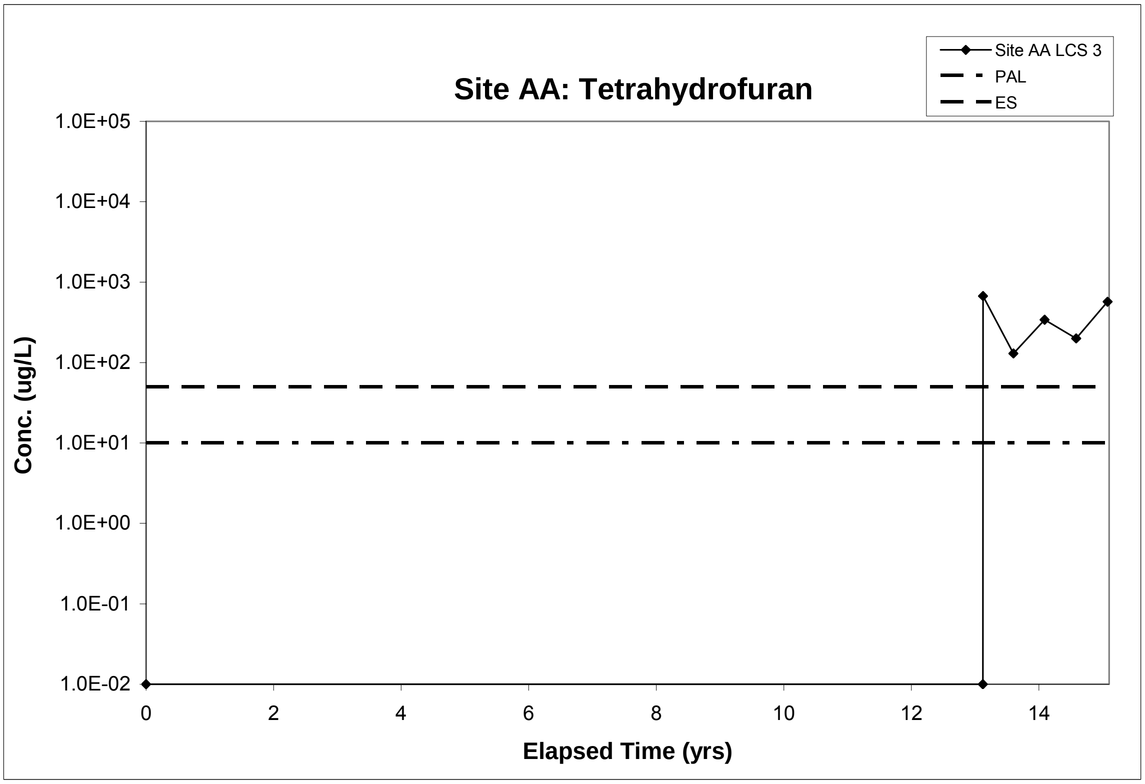

Site Y LCS 1
PAL
ES
Site Y: Tetrahydrofuran
No data: 88-95 & 00-present
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

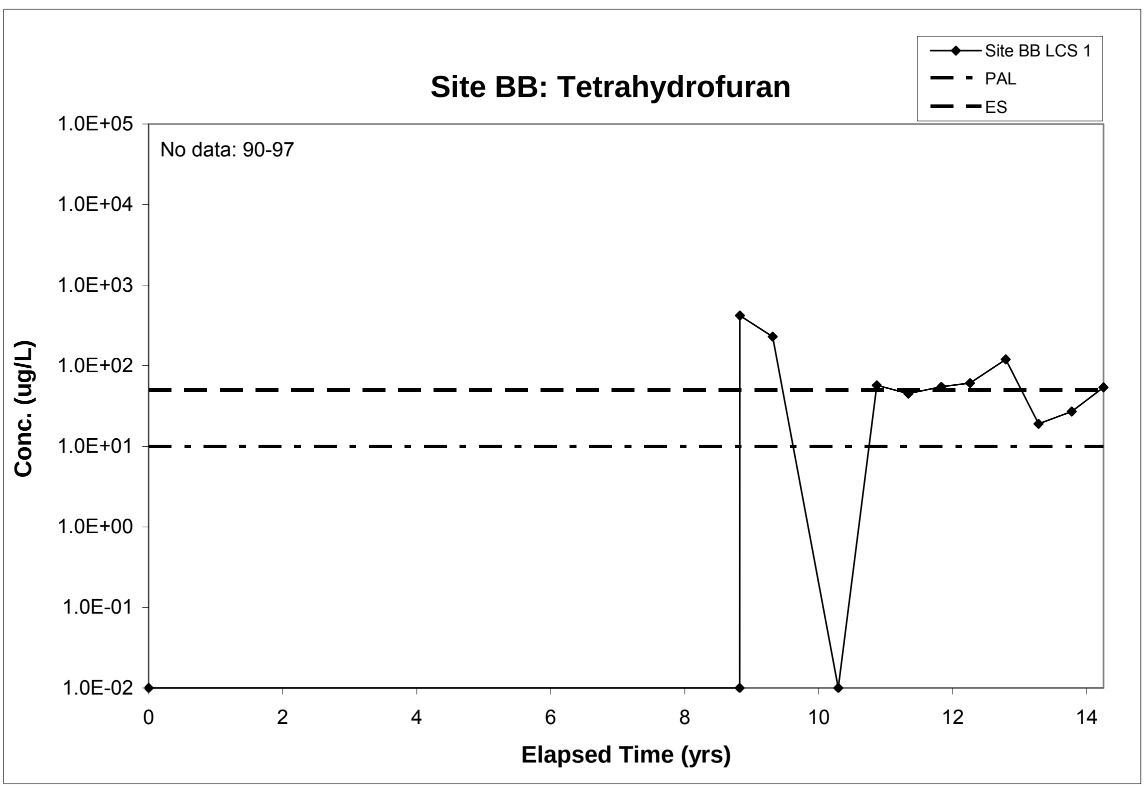

Site Y: Tetrahydrofuran
Site Y LCS 2
PAL
ES
No data: 93-95, 97, & 01
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

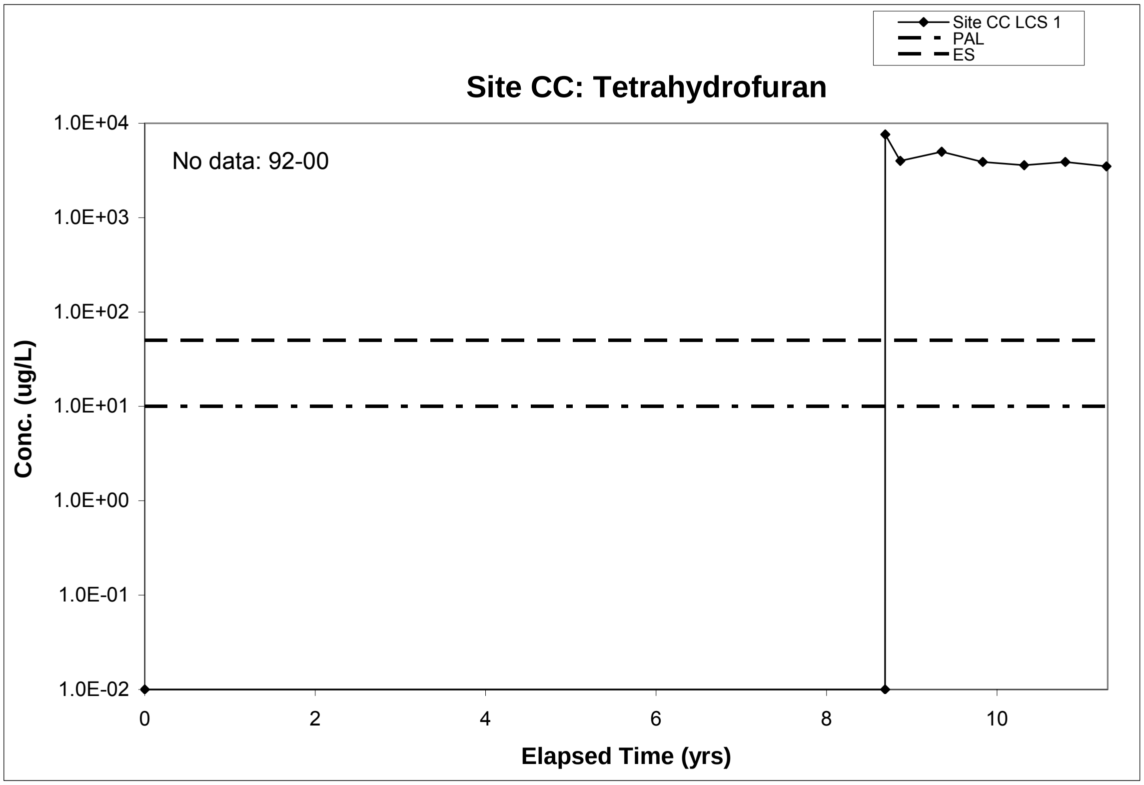

Site Z: Tetrahydrofuran
Site Z LCS 1
PAL
ES
No data: 91-93
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

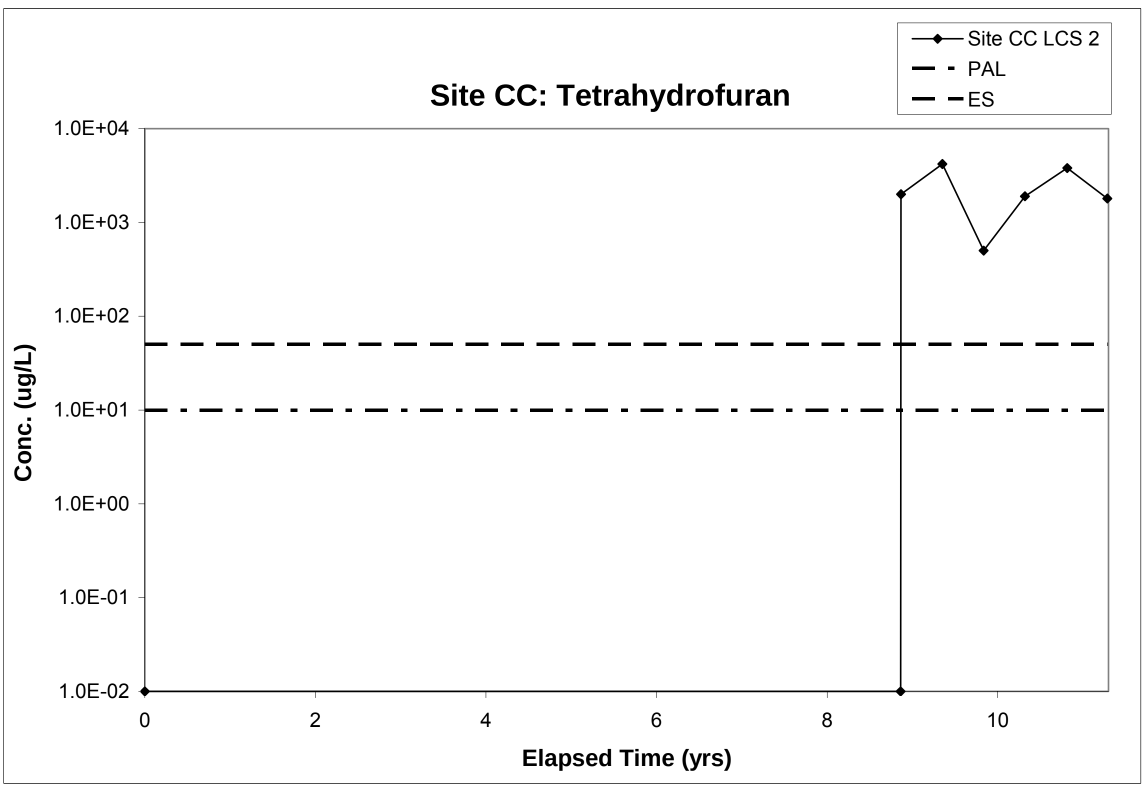

Site AA: Tetrahydrofuran
Site AA LCS 1
PAL
ES
No data: 89-97
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

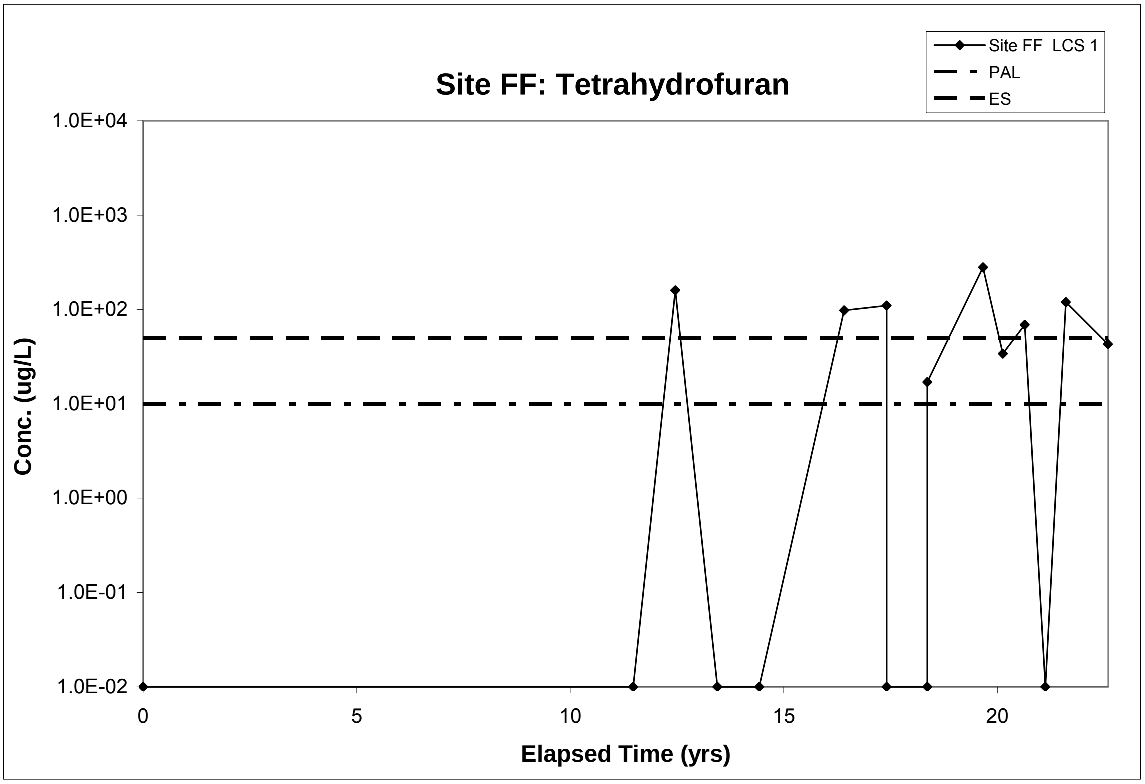

Site AA: Tetrahydrofuran
Site AA LCS 2
PAL
ES
No data: 89-97
Nondetects: 99-00
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

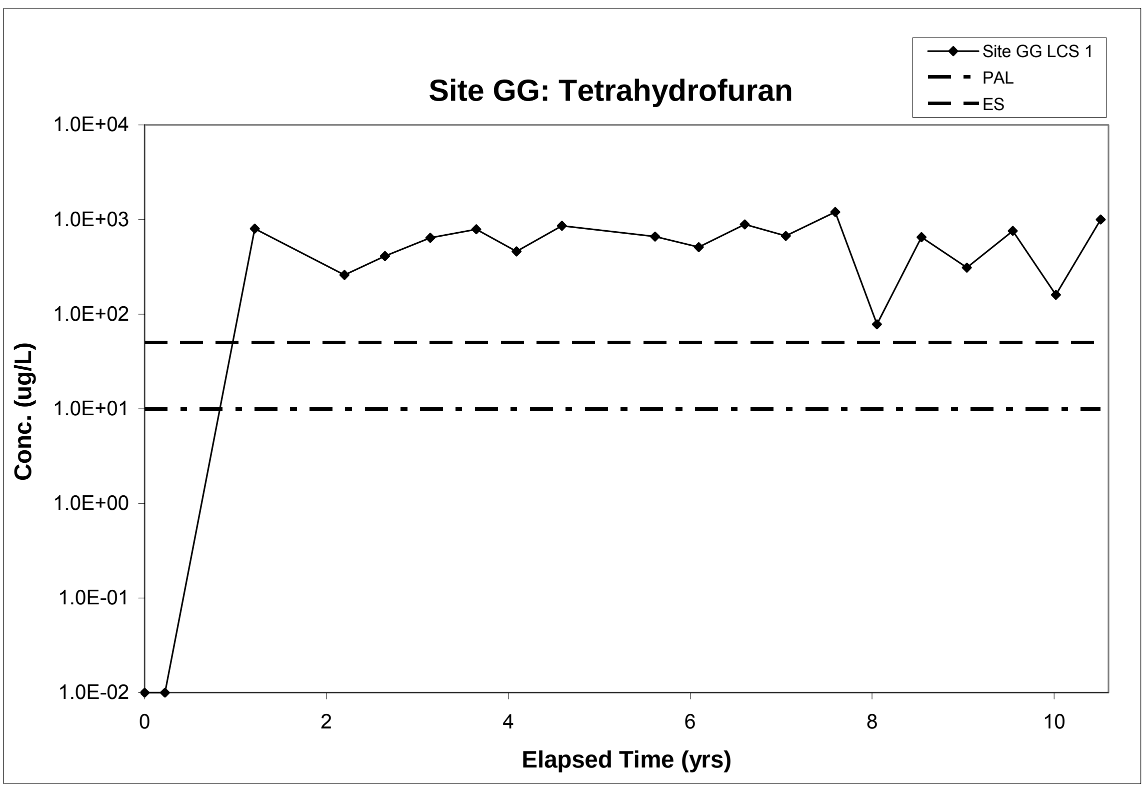

Site AA: Tetrahydrofuran
Site AA LCS 3
PAL
ES
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

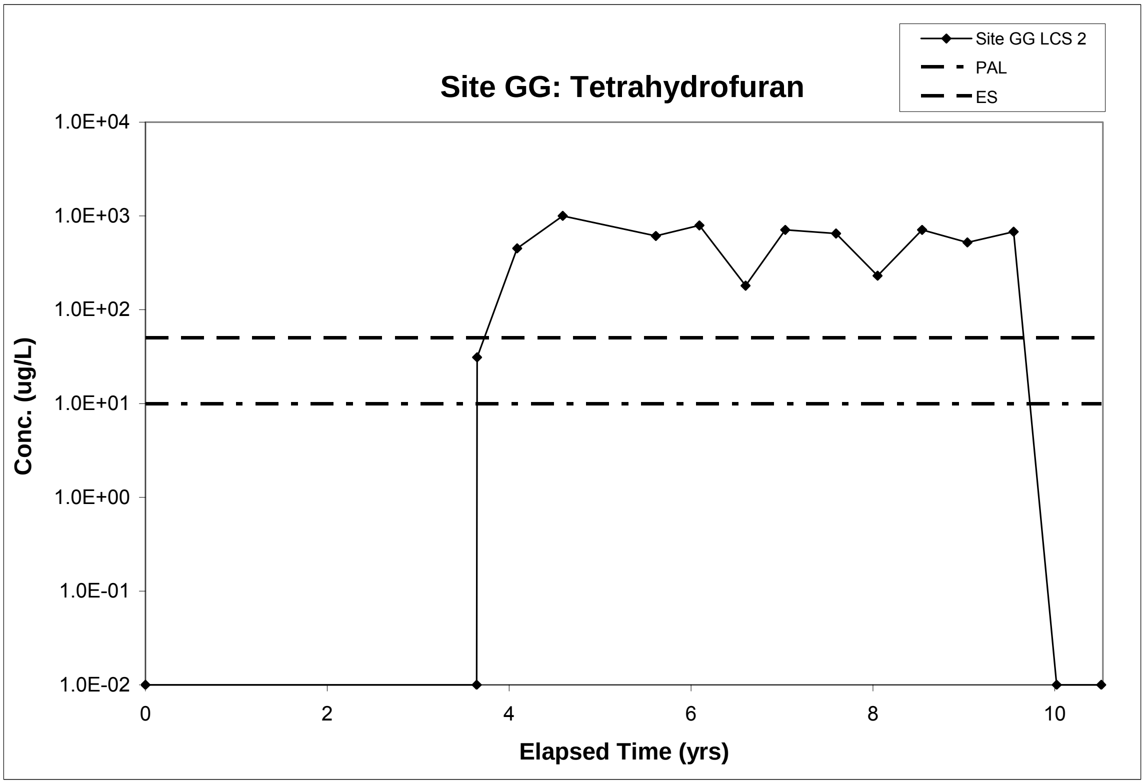

Site BB: Tetrahydrofuran
Site BB LCS 1
PAL
ES
No data: 90-97
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

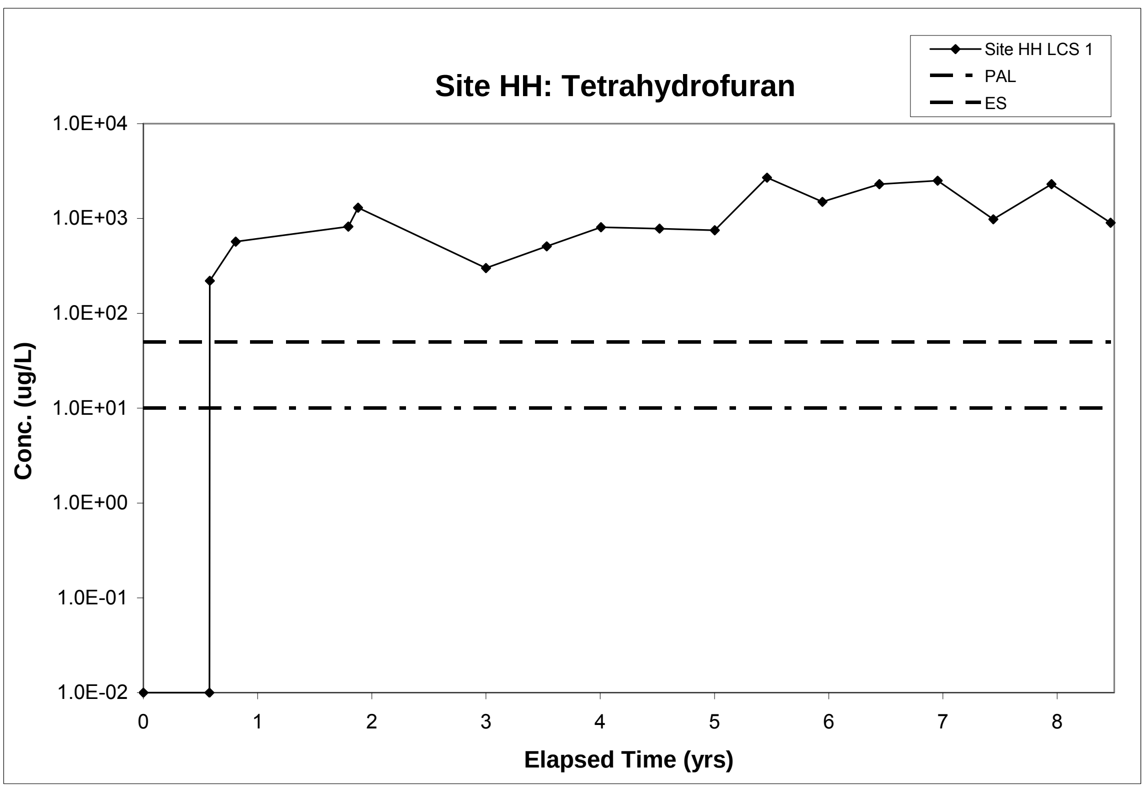

Site CC LCS 1
PAL
ES
Site CC: Tetrahydrofuran
No data: 92-00
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

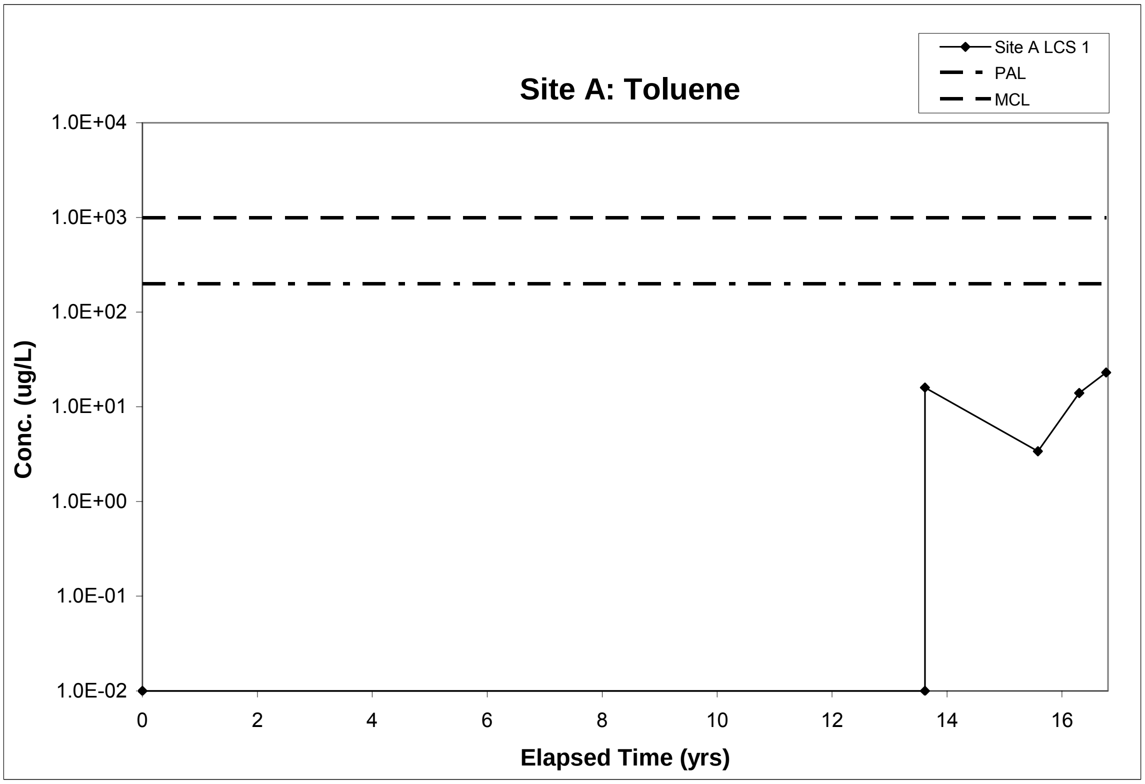

Site CC LCS 2
PAL
ES
Site CC: Tetrahydrofuran
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

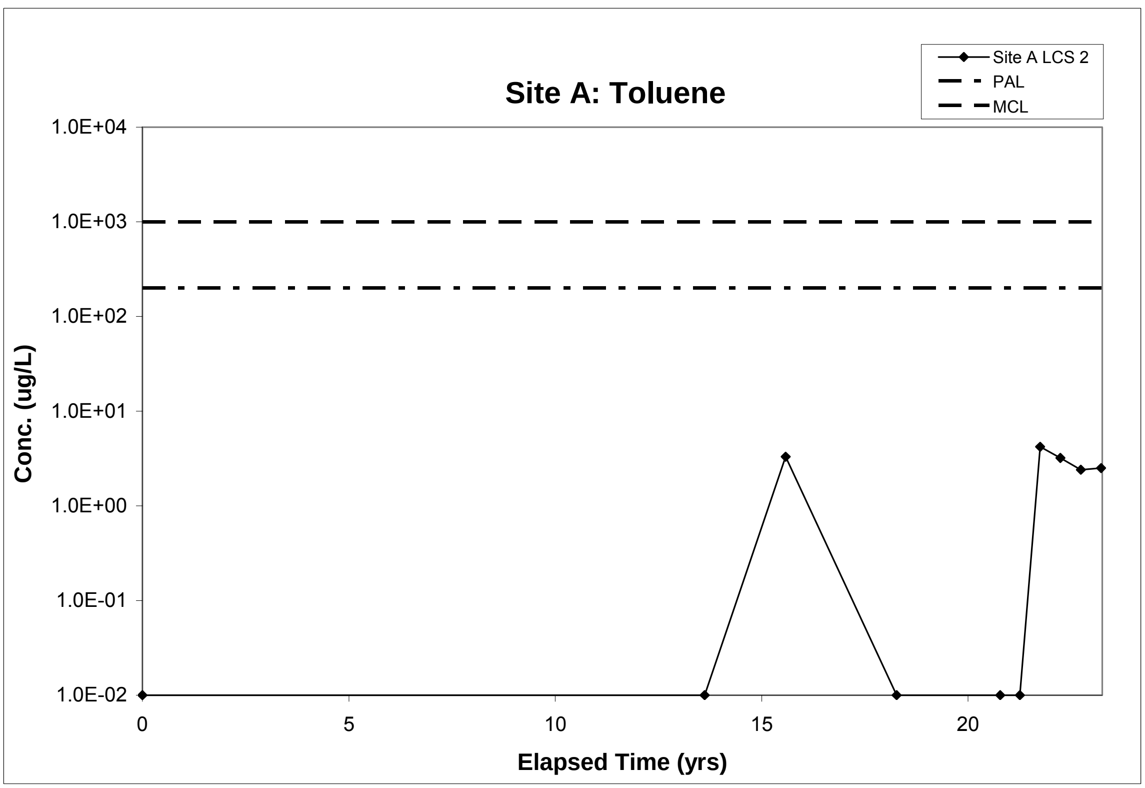

Site FF: Tetrahydrofuran
Site FF LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

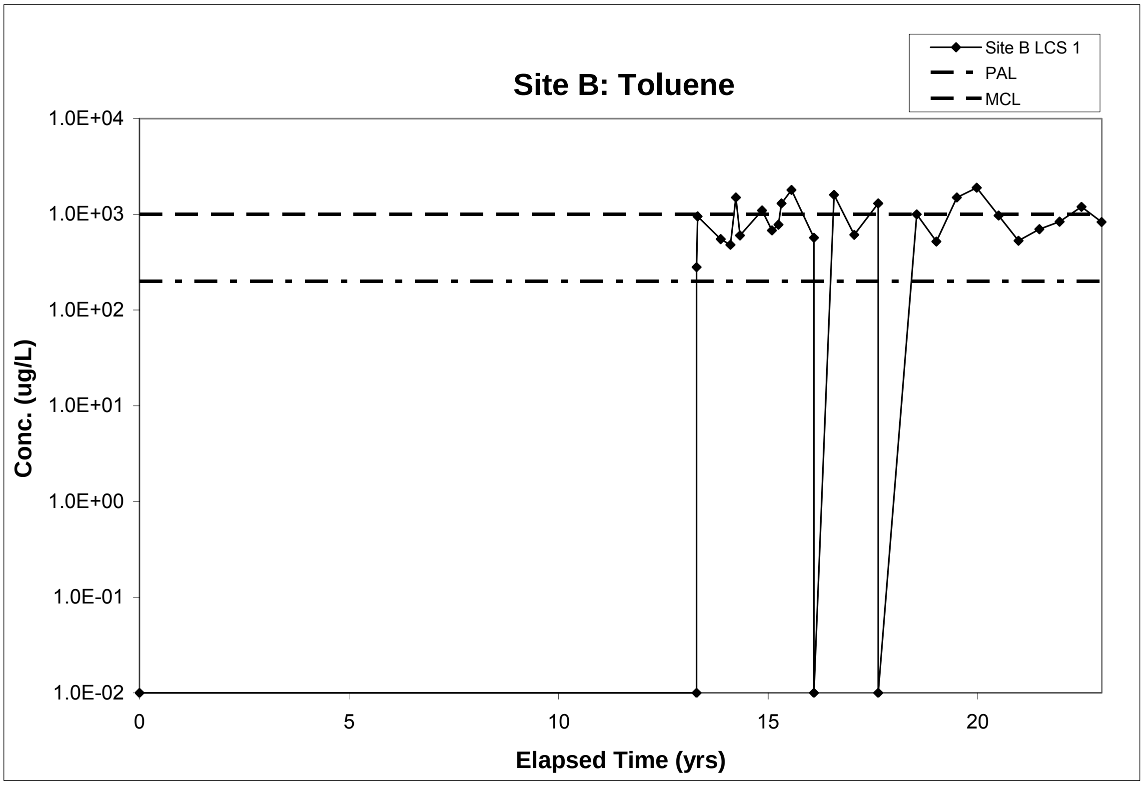

Site GG: Tetrahydrofuran
Site GG LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

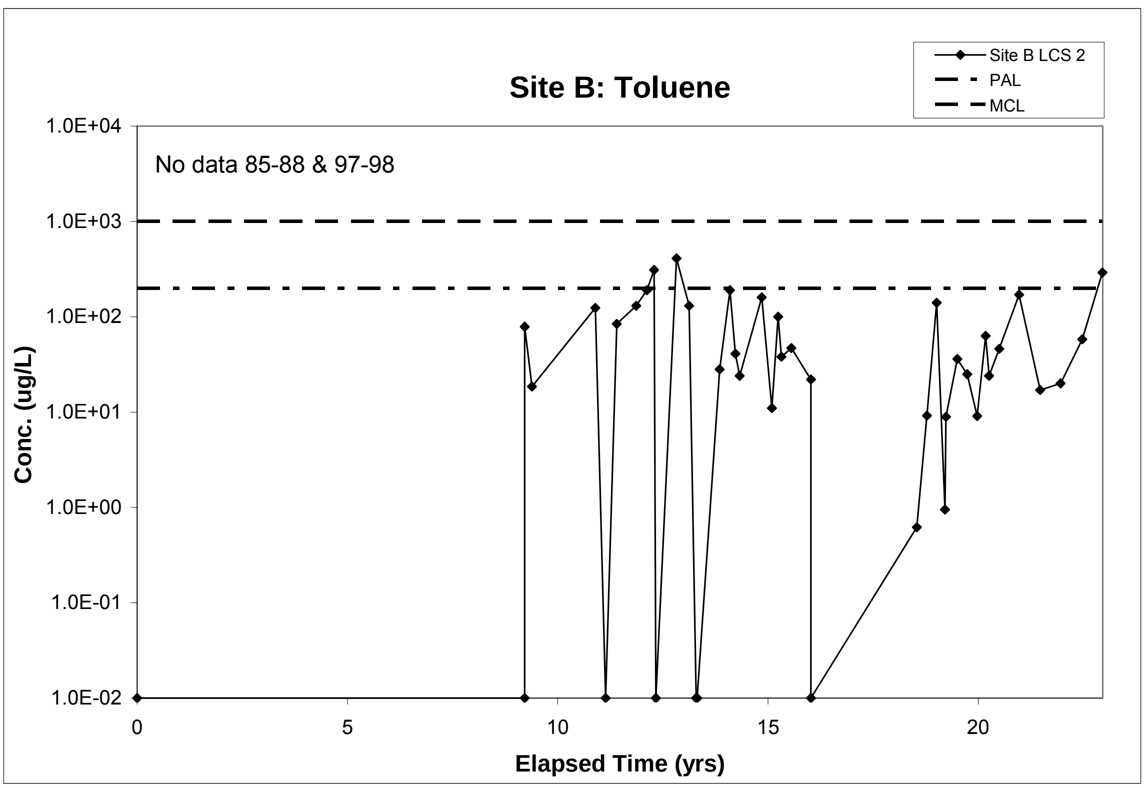

Site GG: Tetrahydrofuran
Site GG LCS 2
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

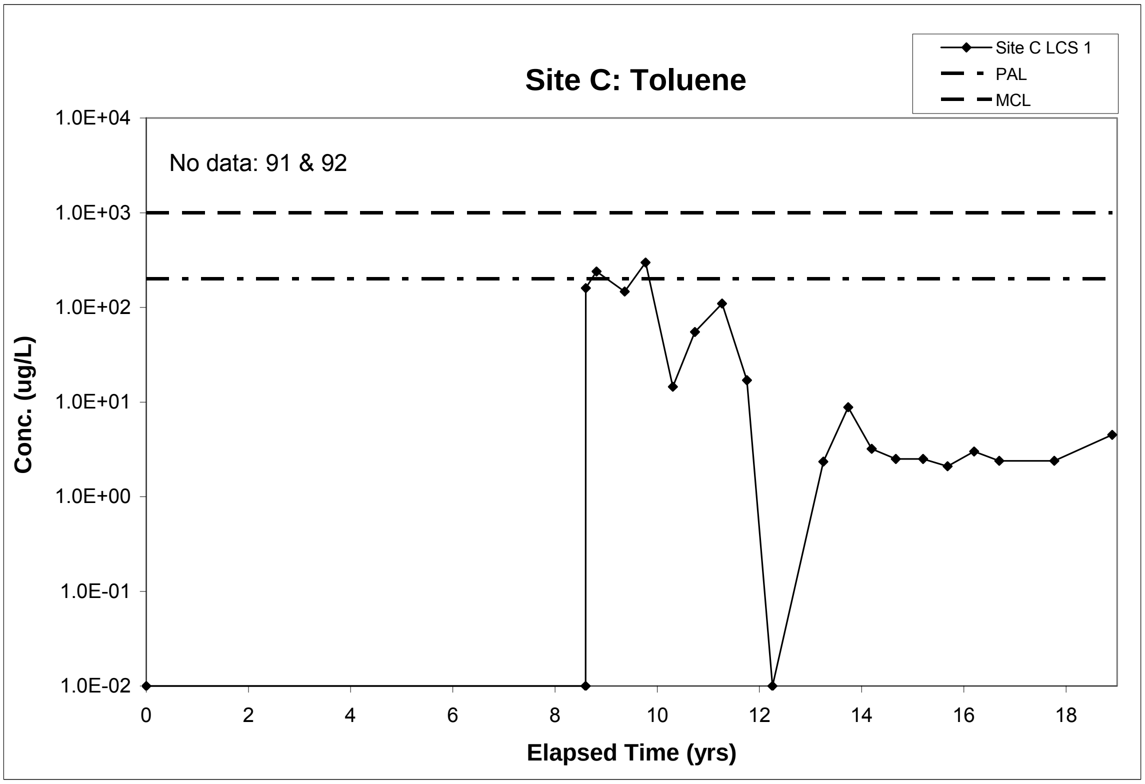

Site HH: Tetrahydrofuran
Site HH LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

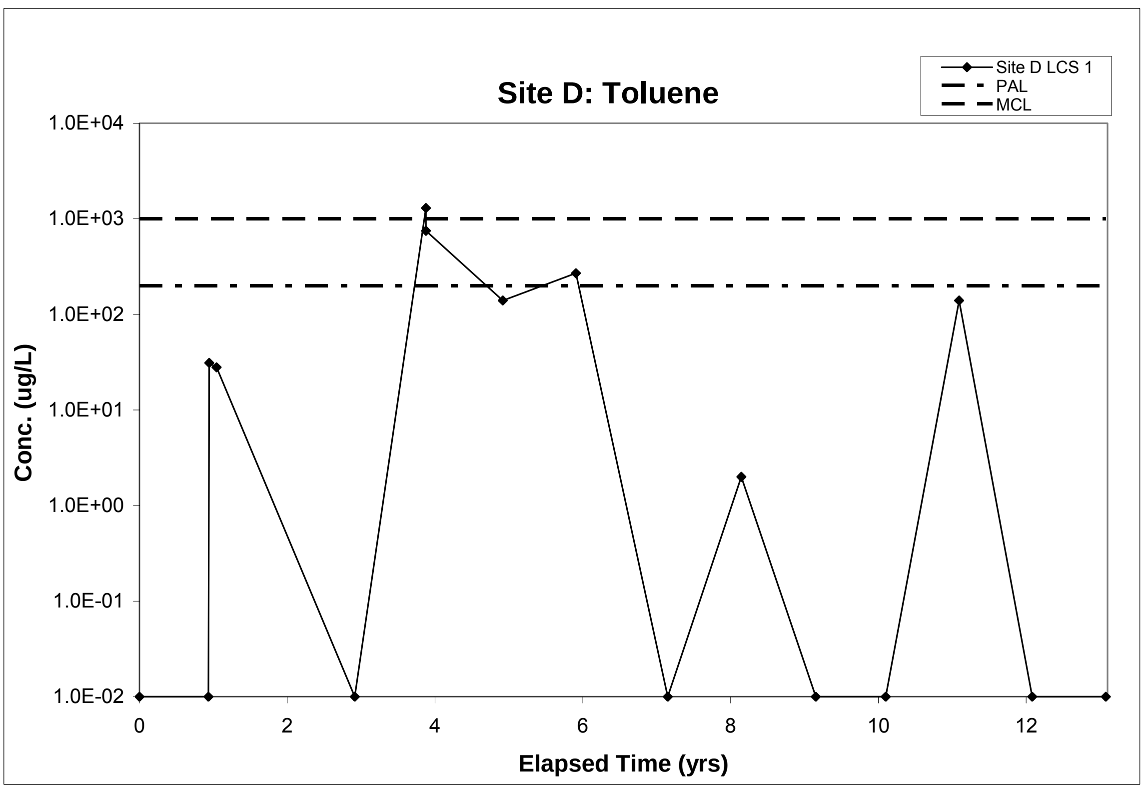

Site A: Toluene
Site A LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

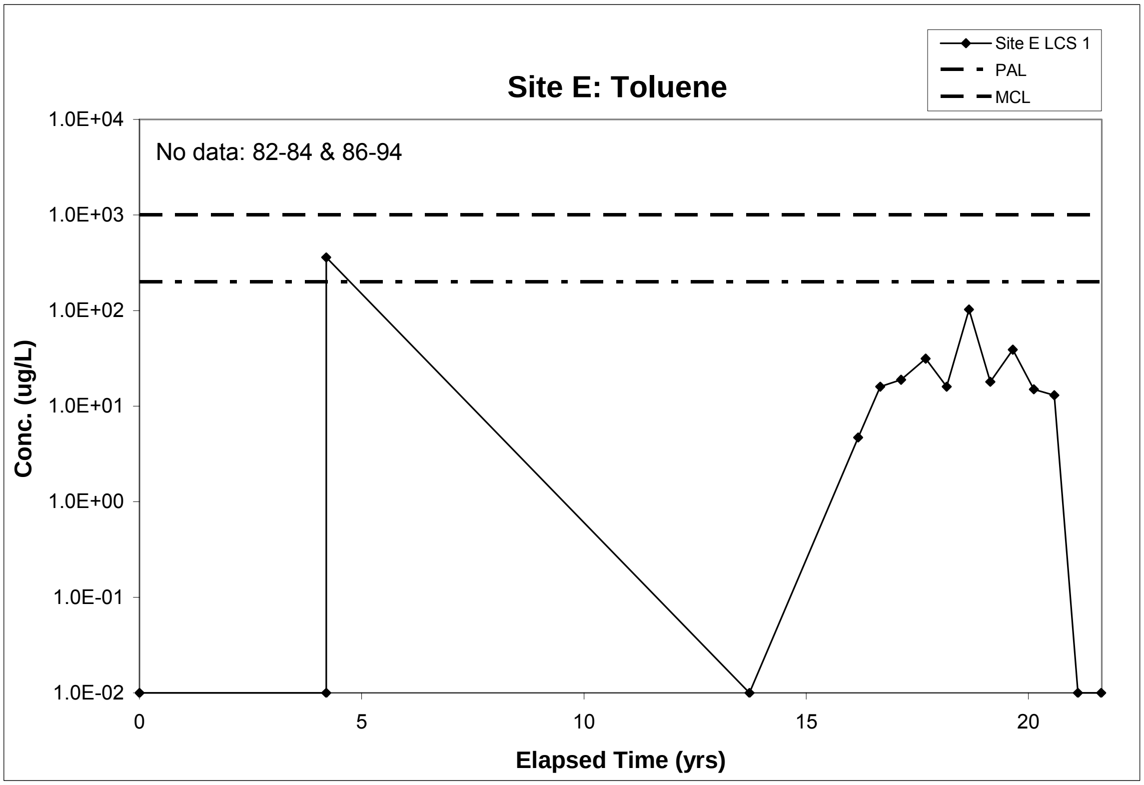

Site A: Toluene
Site A LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

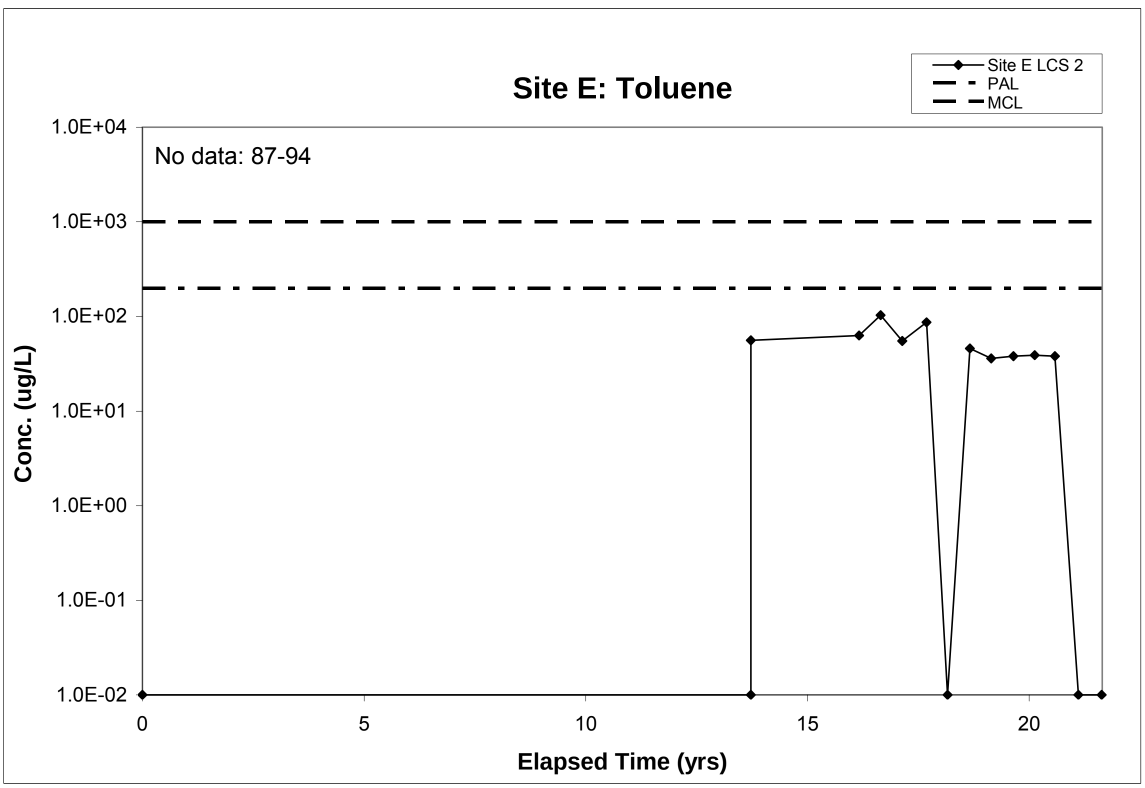

Site B: Toluene
Site B LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

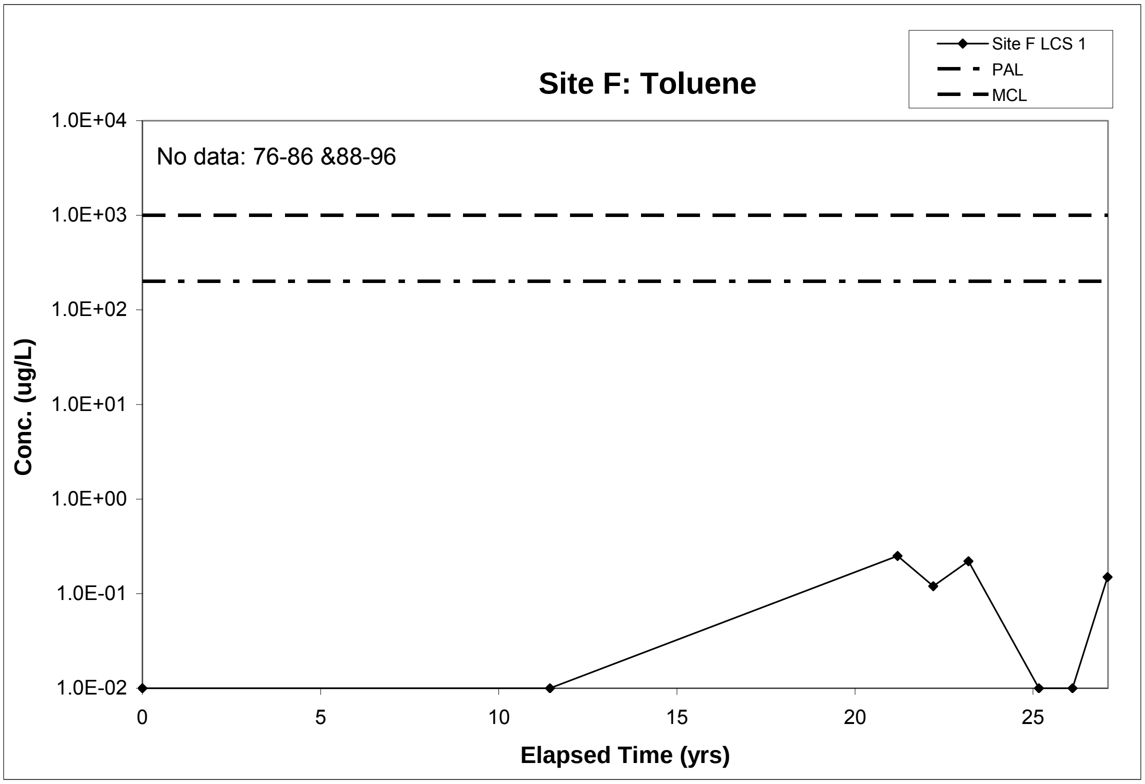

Site B: Toluene
Site B LCS 2
PAL
MCL
No data 85-88 & 97-98
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

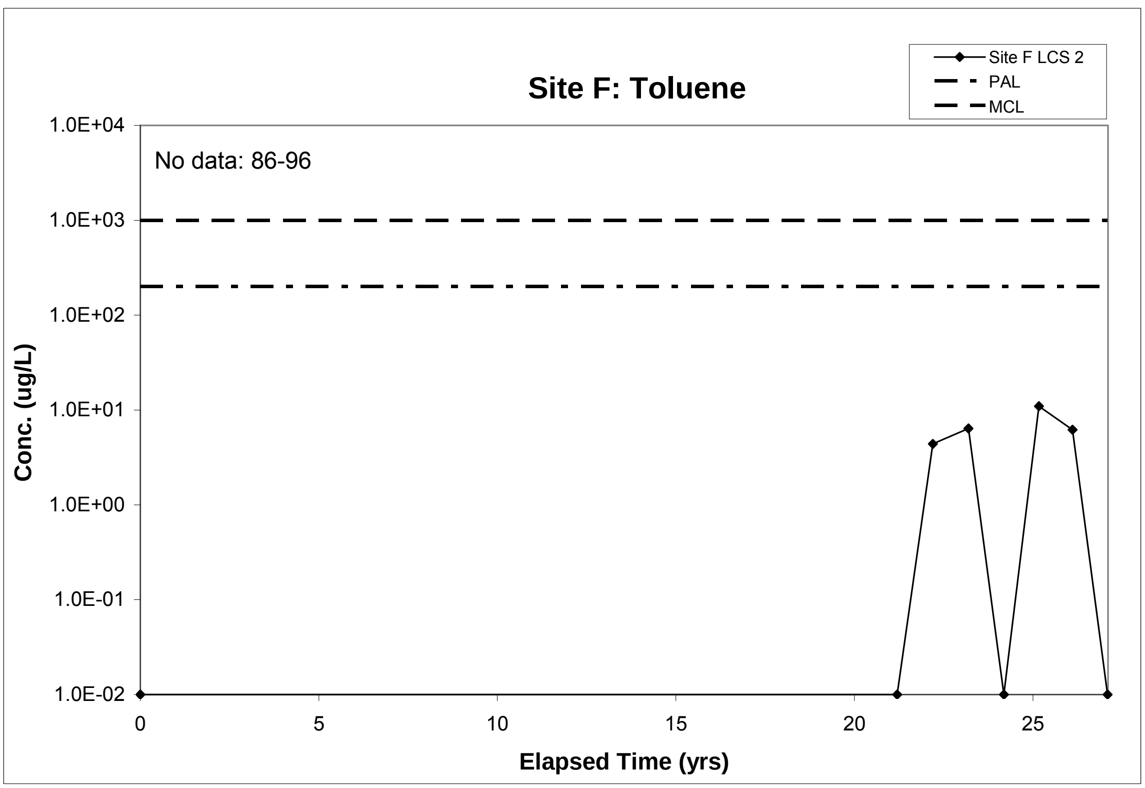

Site C: Toluene
Site C LCS 1
PAL
MCL
No data: 91 & 92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)


Site D: Toluene
Site D LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)


Site E: Toluene
Site E LCS 1
PAL
MCL
No data: 82-84 & 86-94
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)


Site E: Toluene
Site E LCS 2
PAL
MCL
No data: 87-94
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)


Site F: Toluene
Site F LCS 1
PAL
MCL
No data: 76-86 &88-96
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
25
Elapsed Time (yrs)


Site F: Toluene
Site F LCS 2
PAL
MCL
No data: 86-96
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
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1.0E-01
1.0E-02
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5
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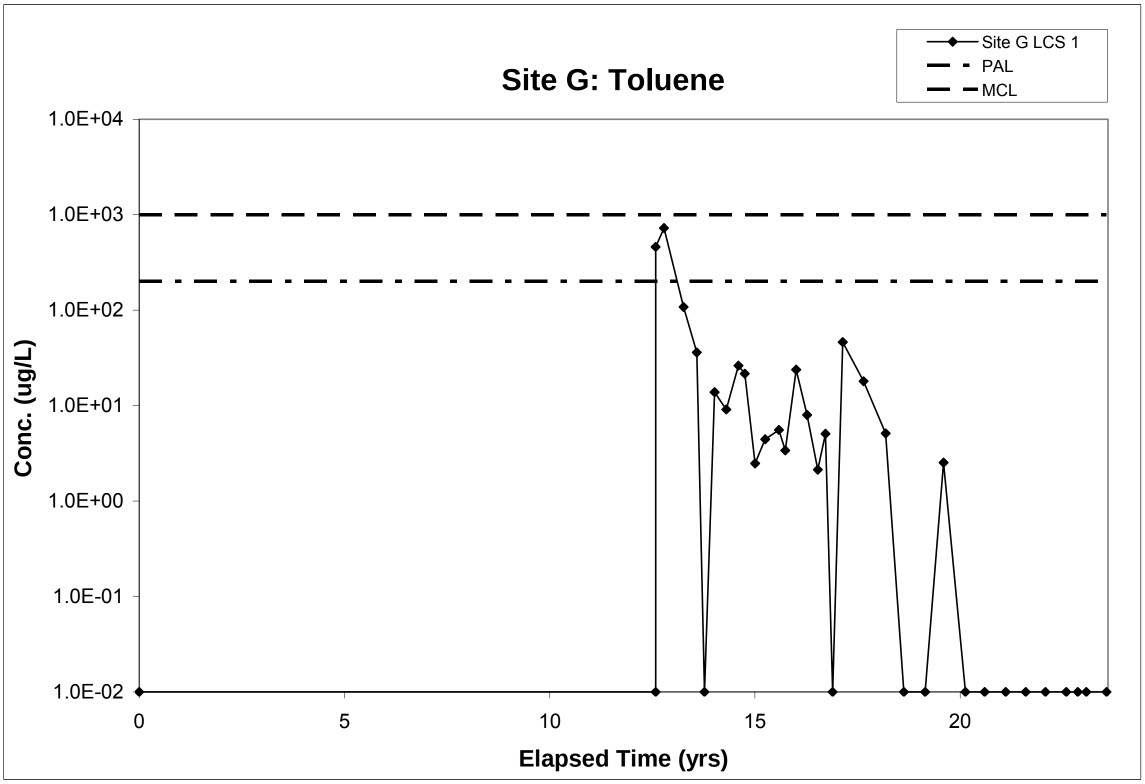
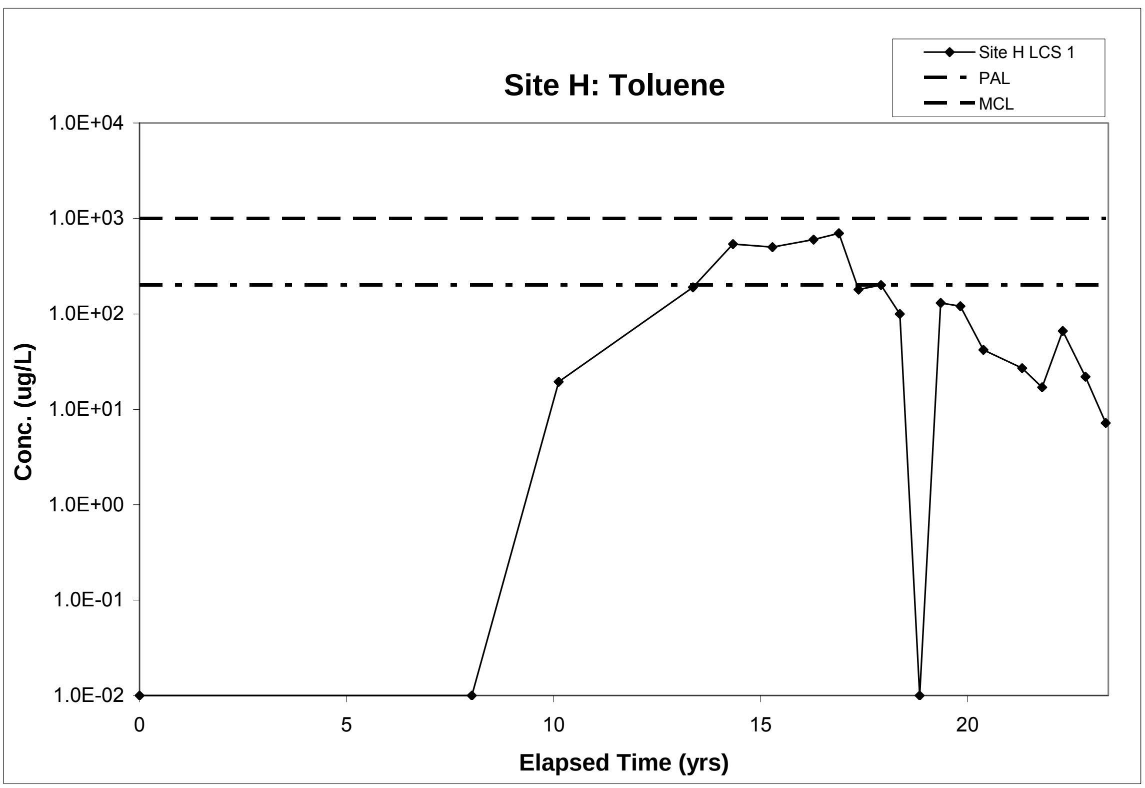
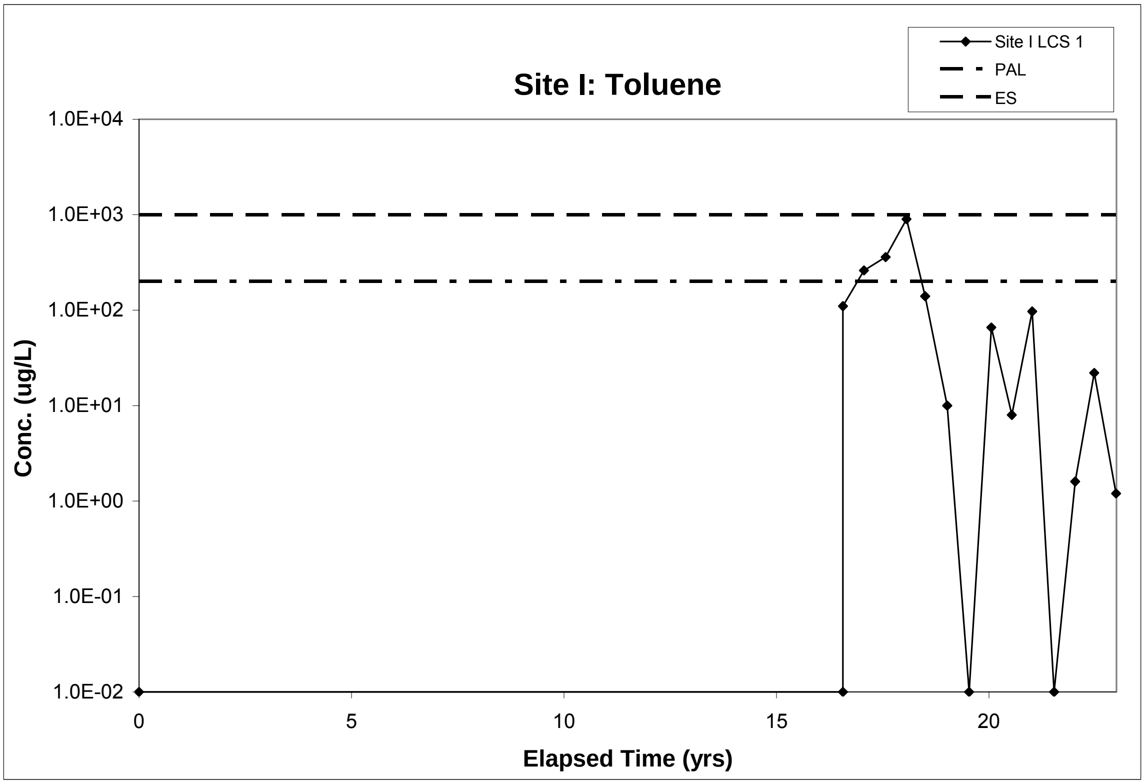
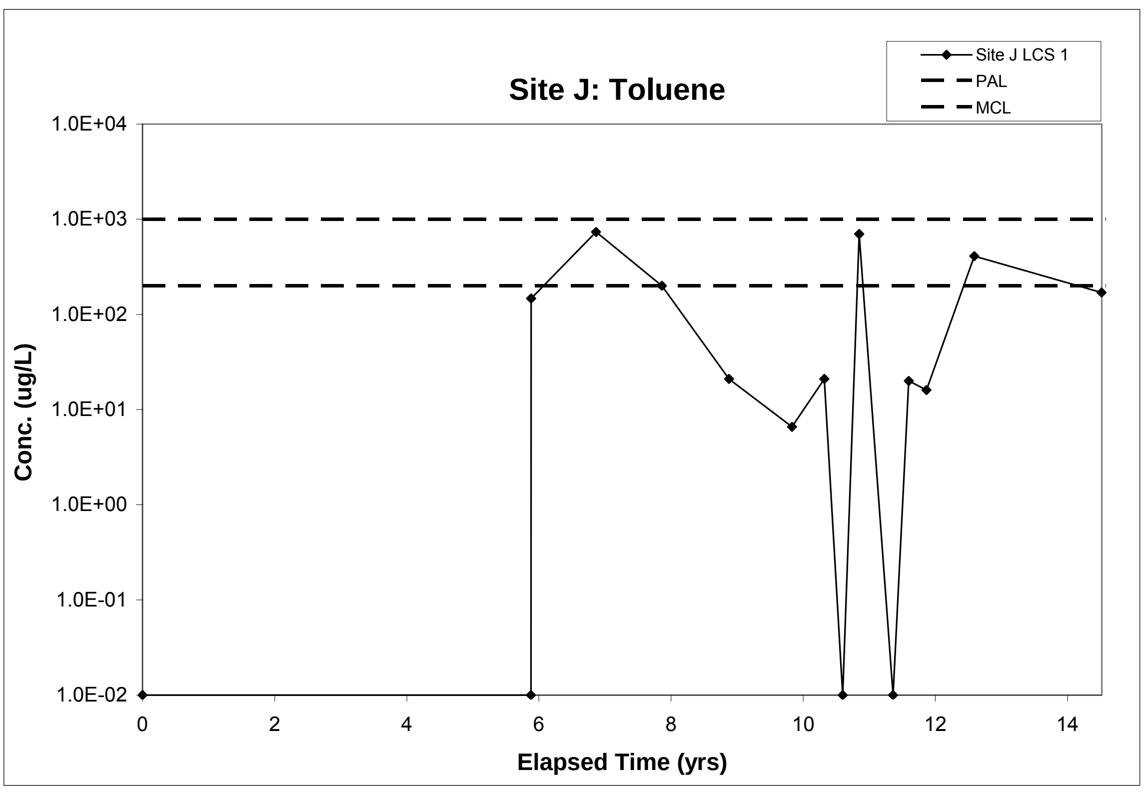
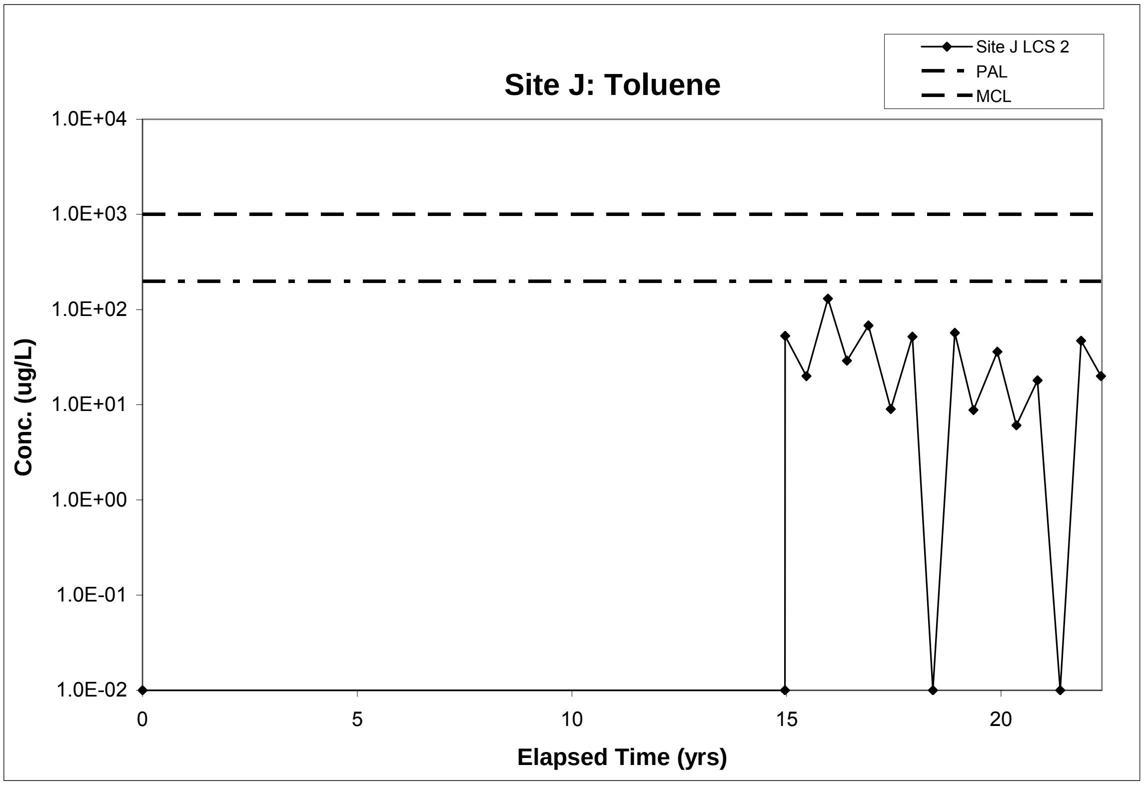
15
20
25
Elapsed Time (yrs)

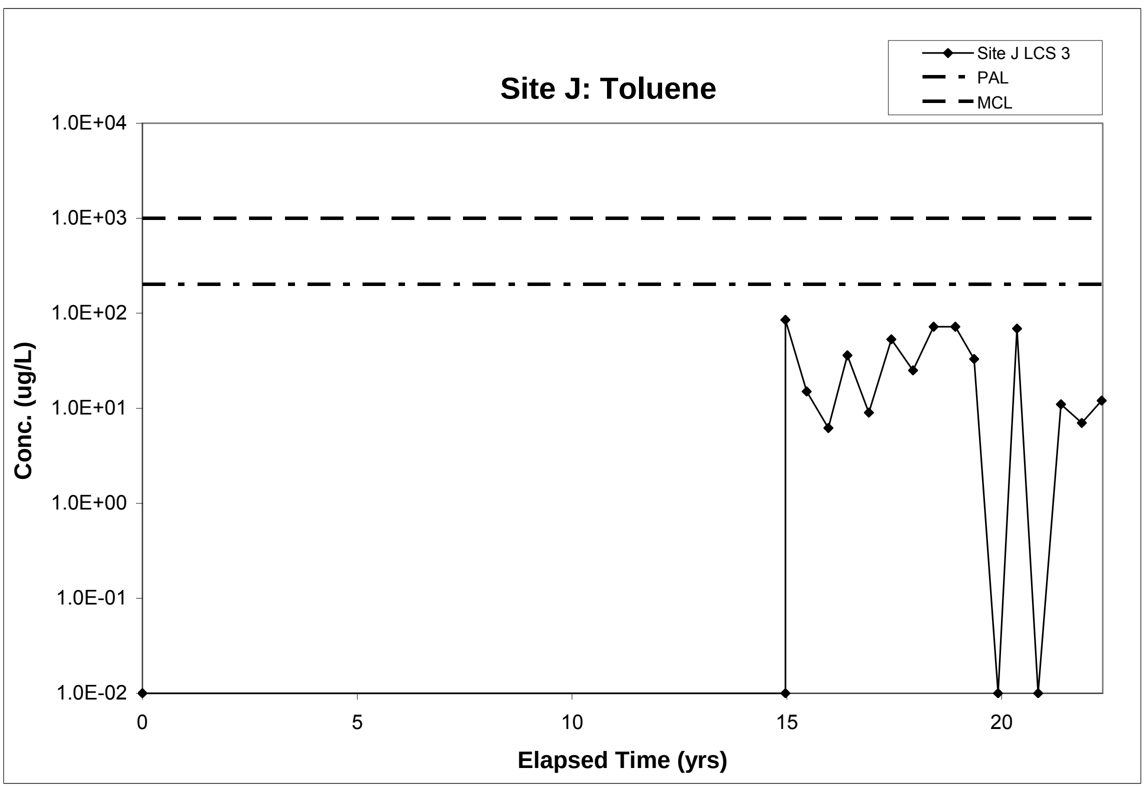

Site G: Toluene
Site G LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

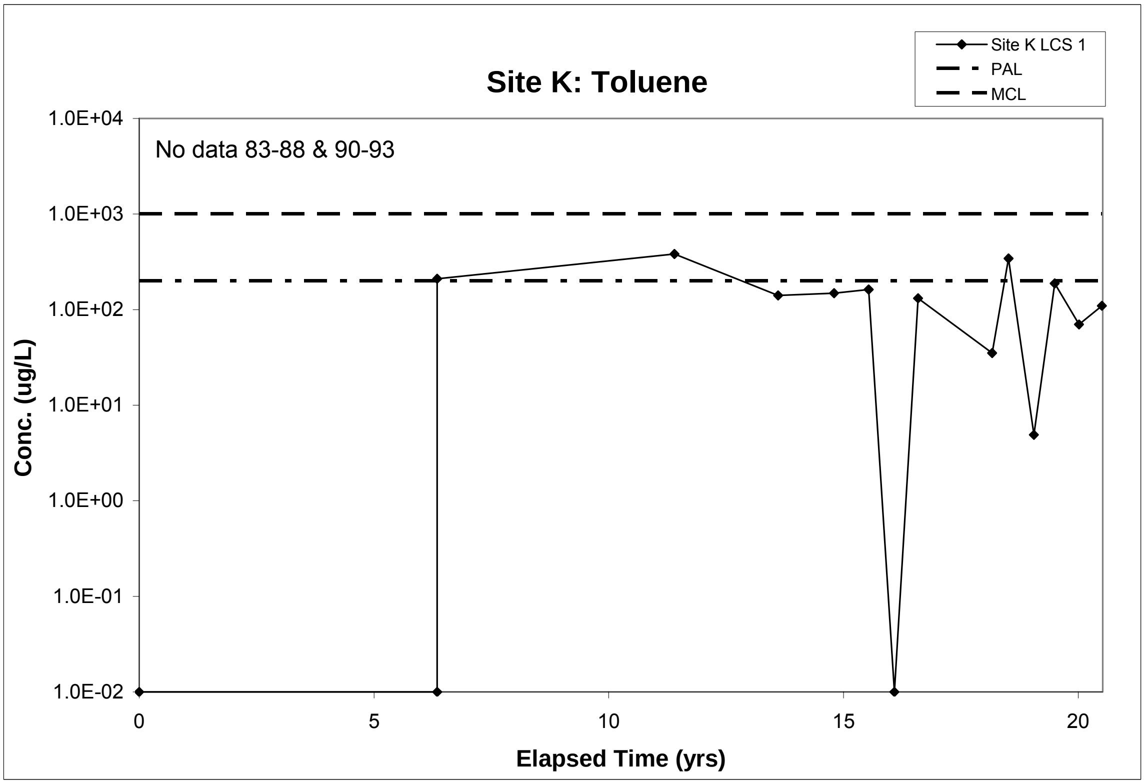

Site H: Toluene
Site H LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

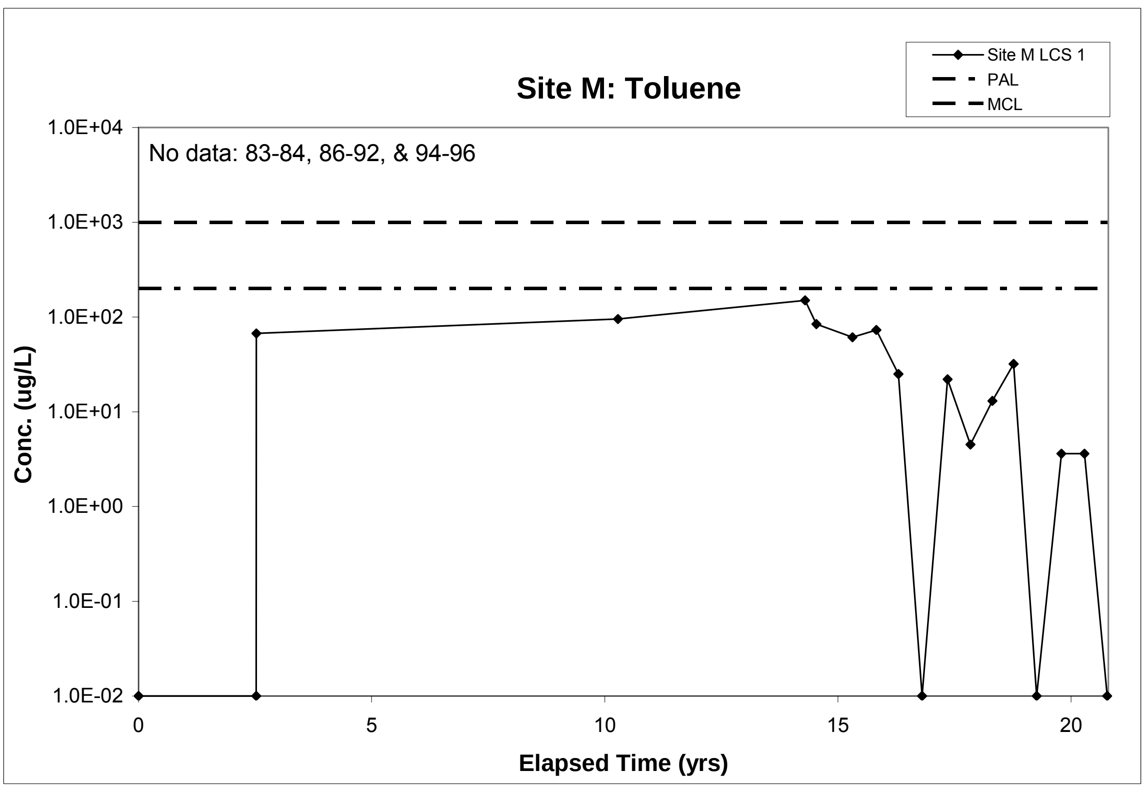

Site I: Toluene
Site I LCS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

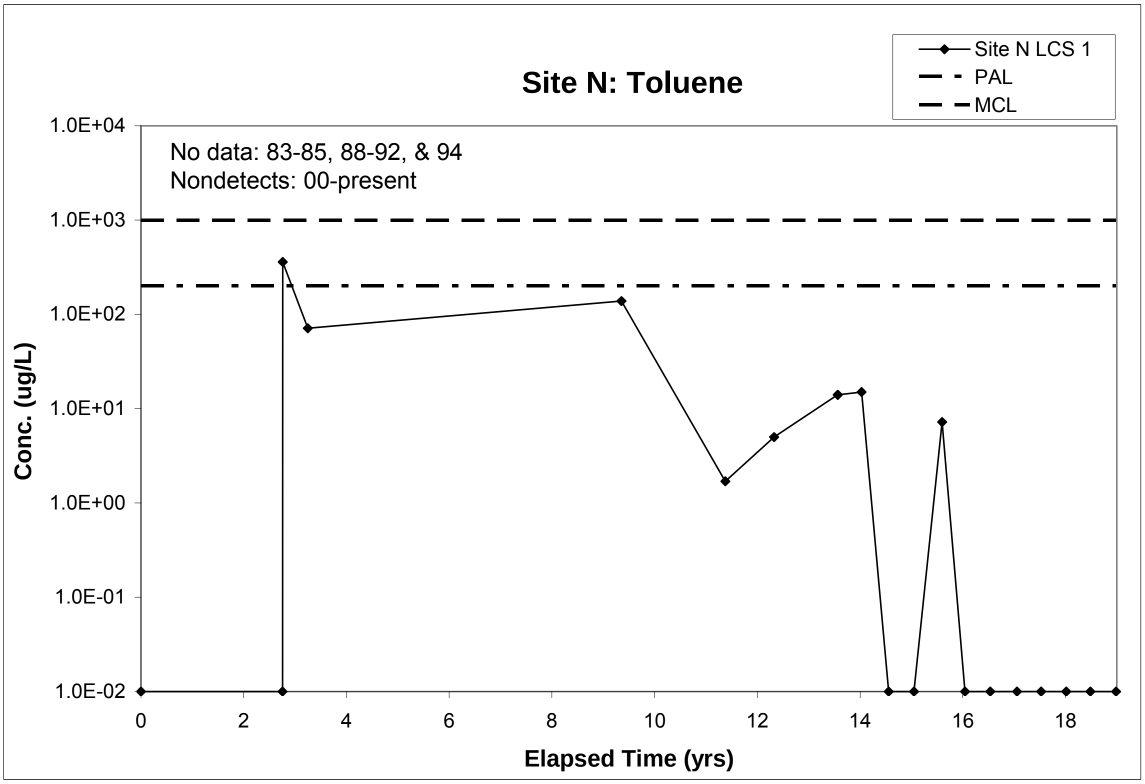

Site J: Toluene
Site J LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

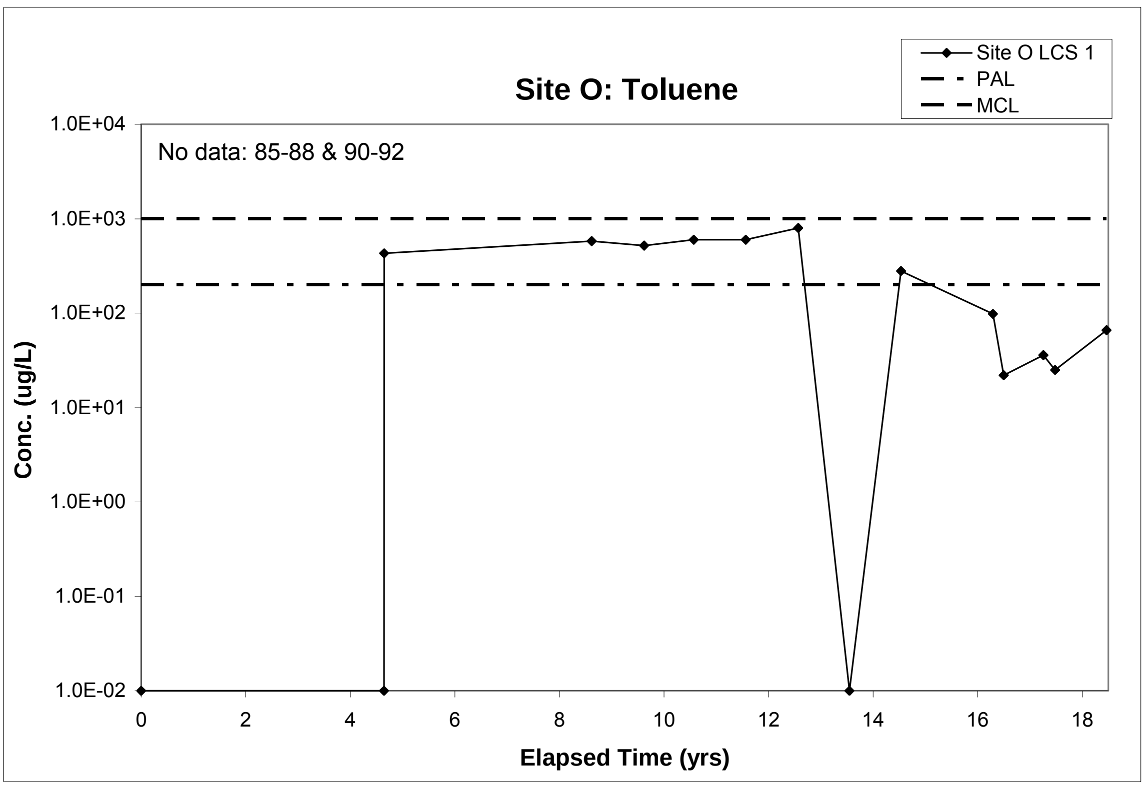

Site J: Toluene
Site J LCS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

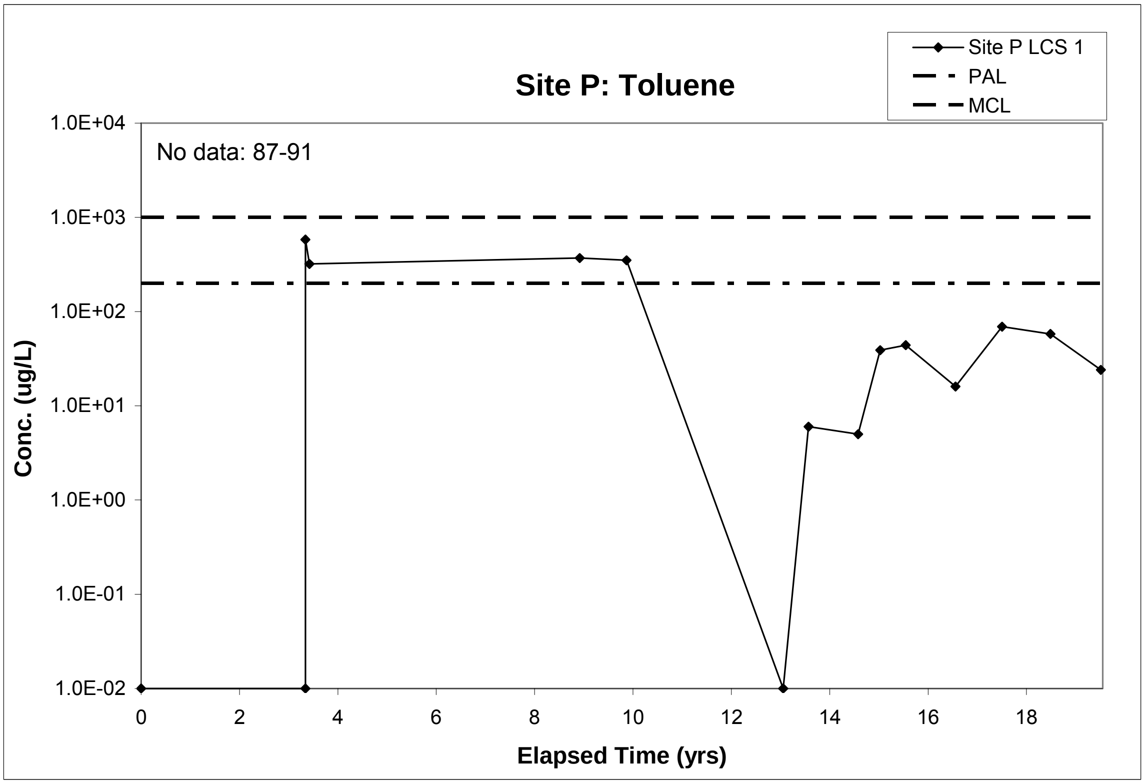

Site J: Toluene
Site J LCS 3
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

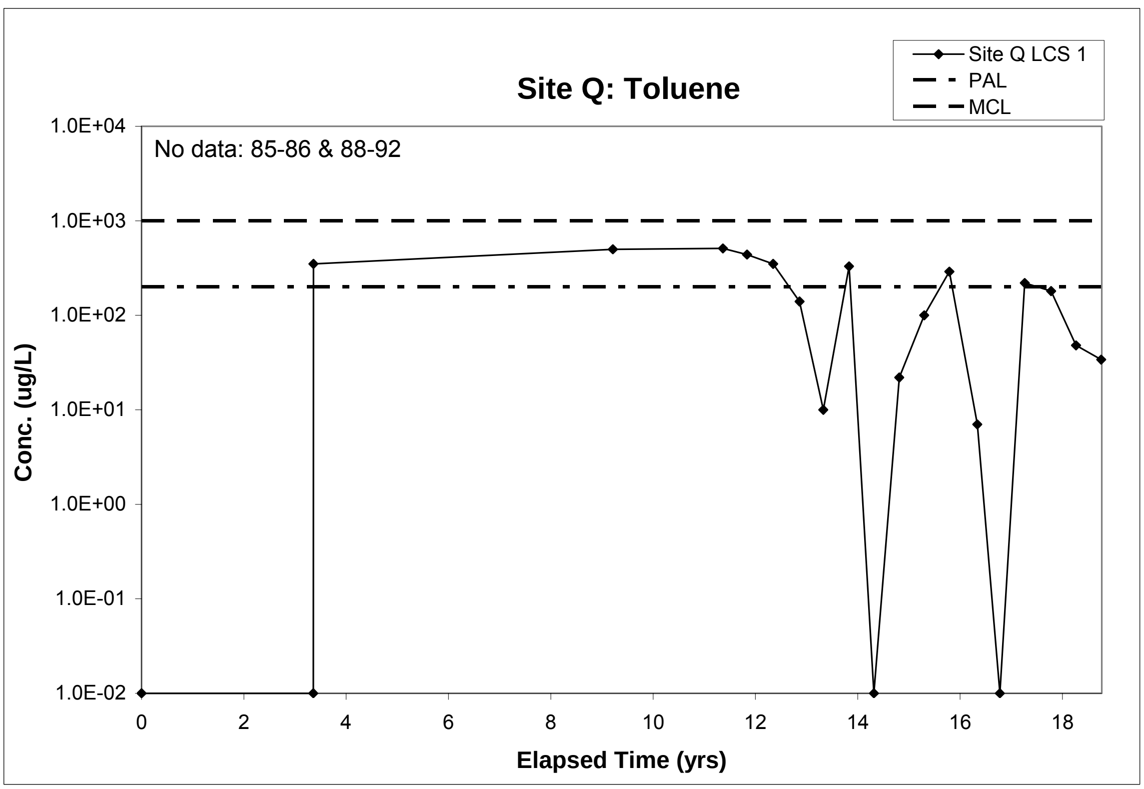

Site K: Toluene
Site K LCS 1
PAL
MCL
No data 83-88 & 90-93
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

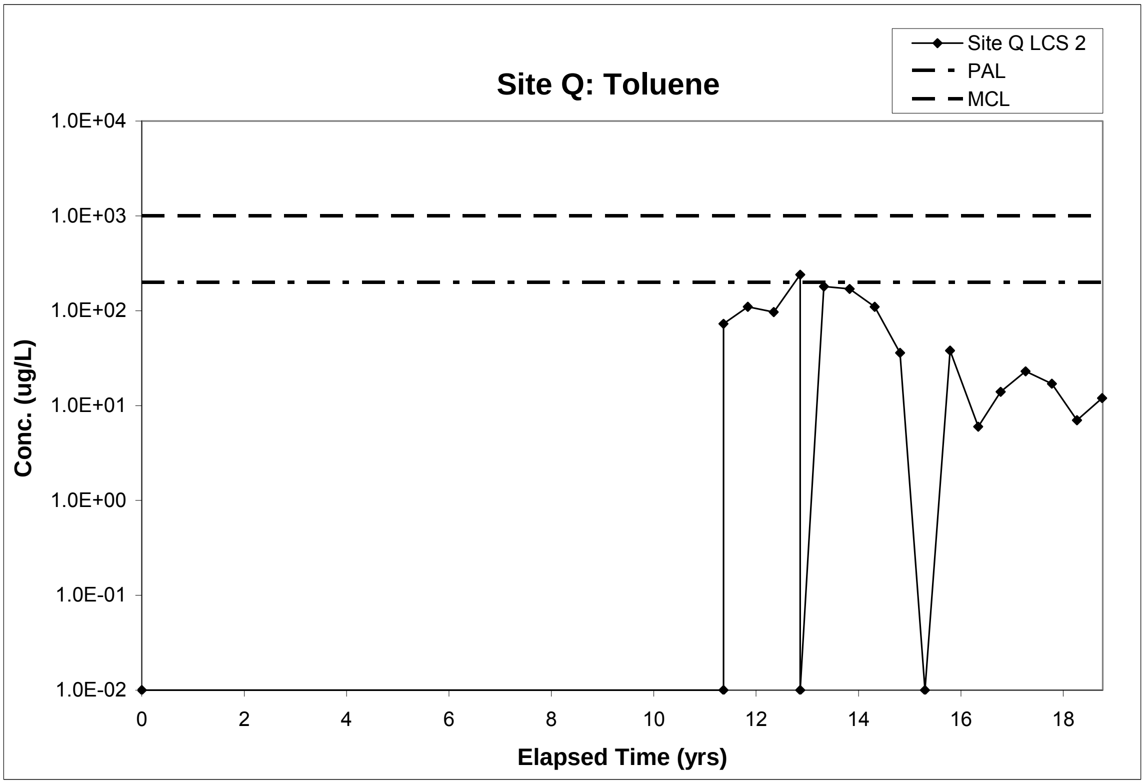

Site M: Toluene
Site M LCS 1
PAL
MCL
No data: 83-84, 86-92, & 94-96
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

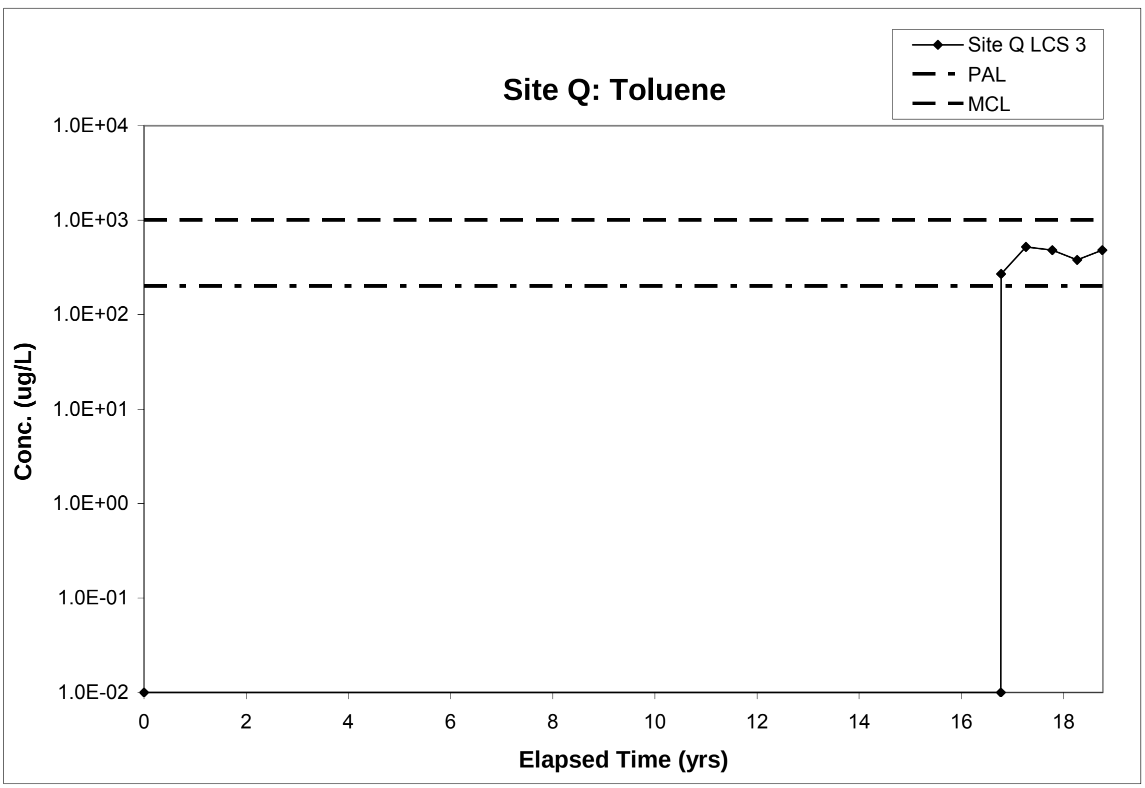

Site N: Toluene
Site N LCS 1
PAL
MCL
No data: 83-85, 88-92, & 94
Nondetects: 00-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

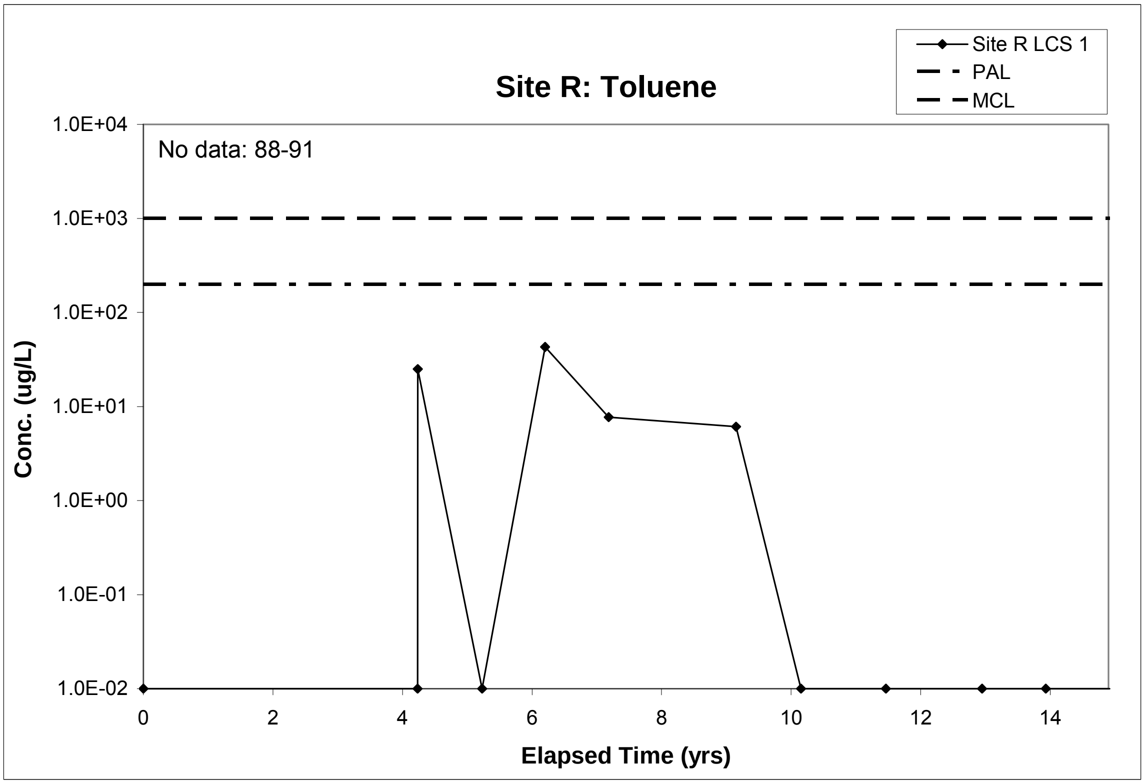

Site O: Toluene
Site O LCS 1
PAL
MCL
No data: 85-88 & 90-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

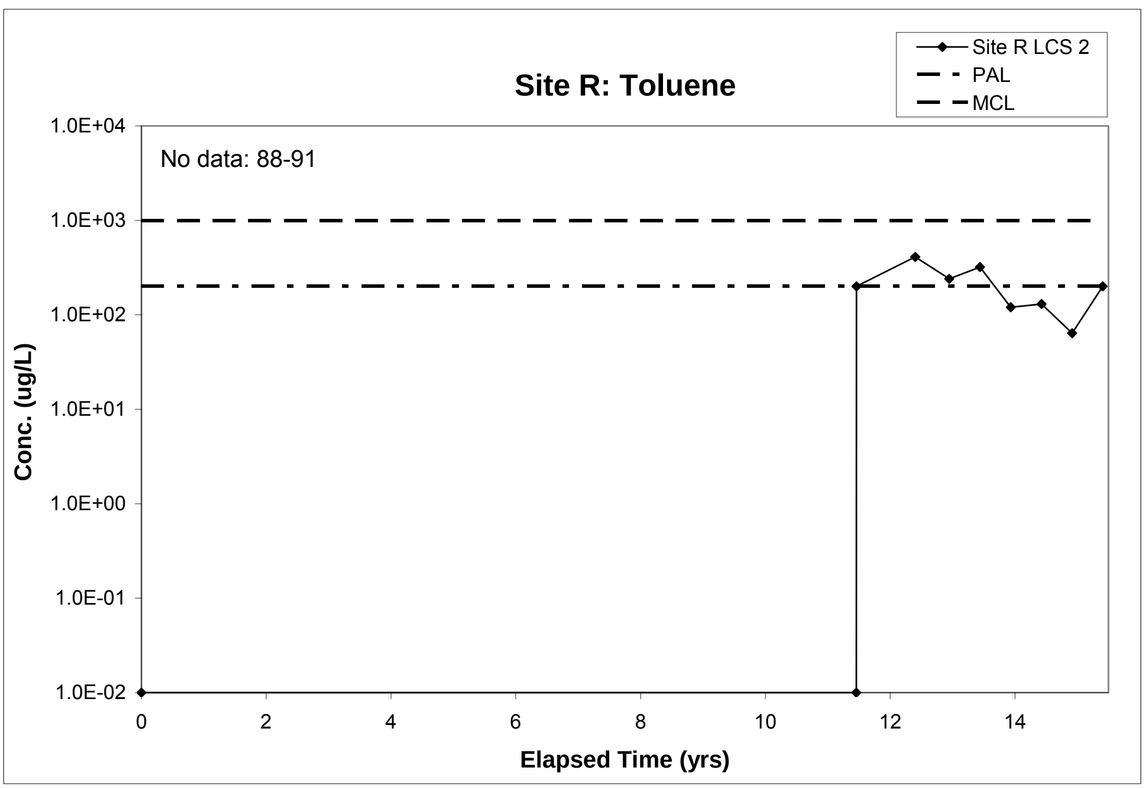

Site P: Toluene
Site P LCS 1
PAL
MCL
No data: 87-91
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

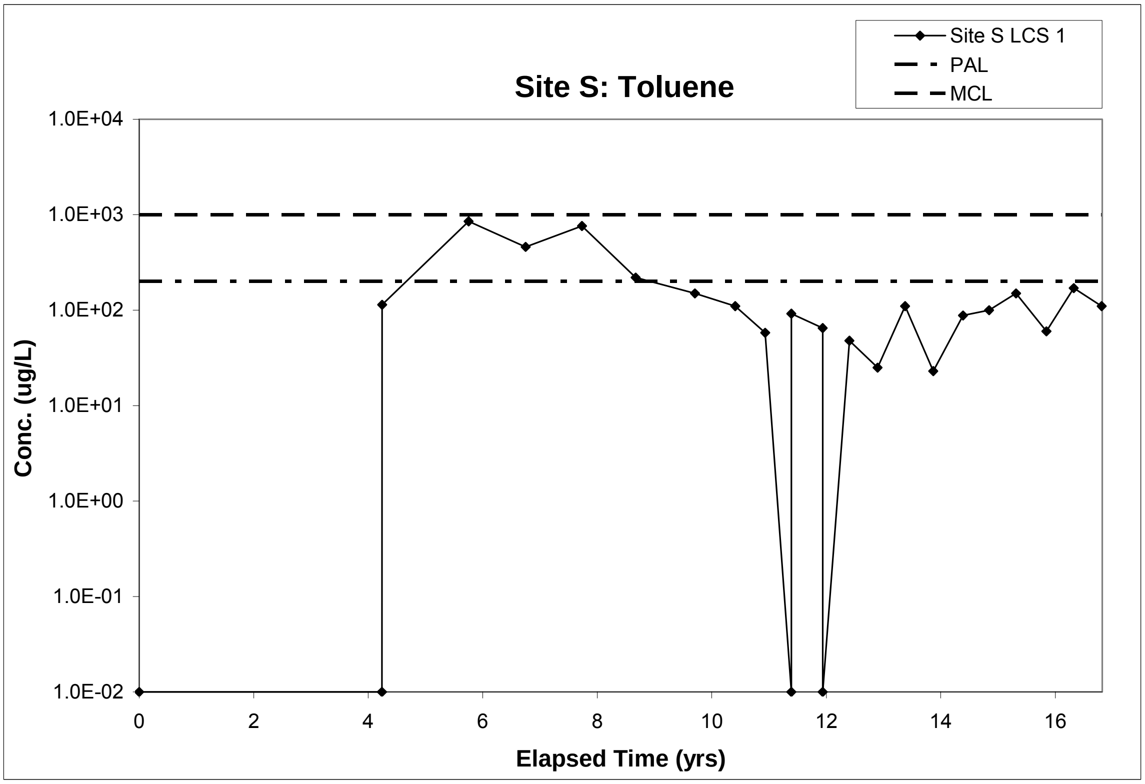

Site Q: Toluene
Site Q LCS 1
PAL
MCL
No data: 85-86 & 88-92
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

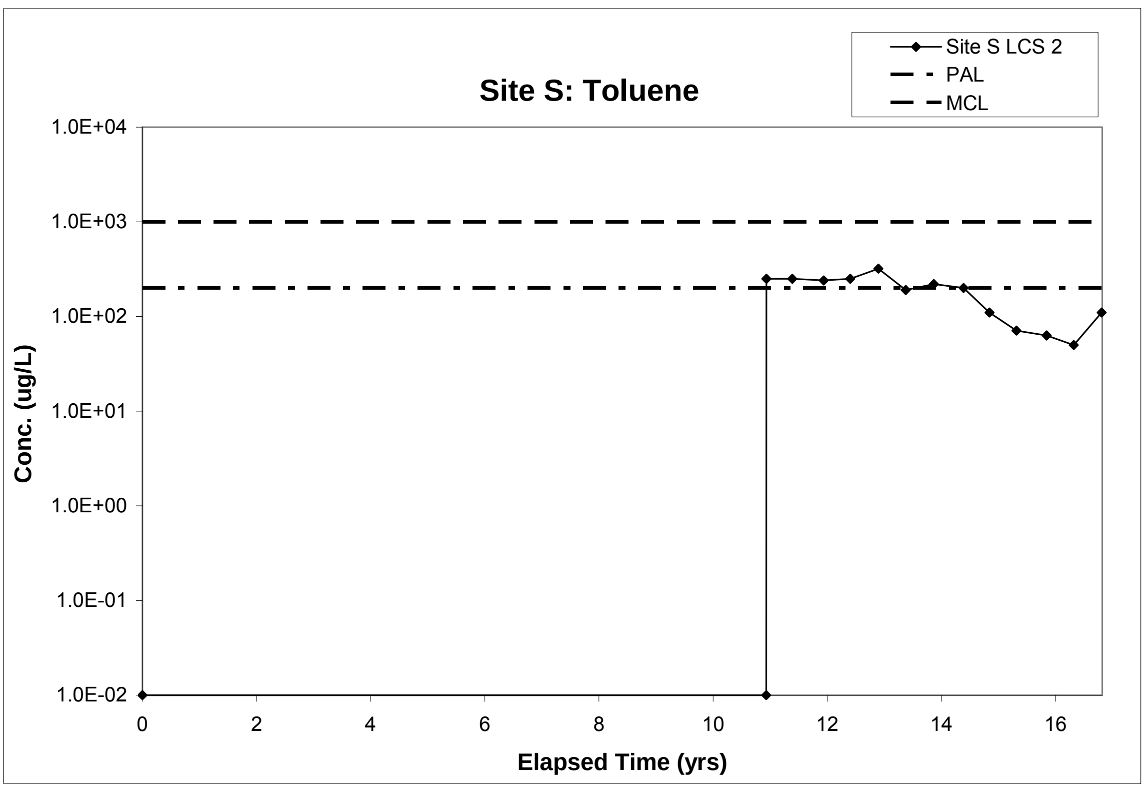

Site Q: Toluene
Site Q LCS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

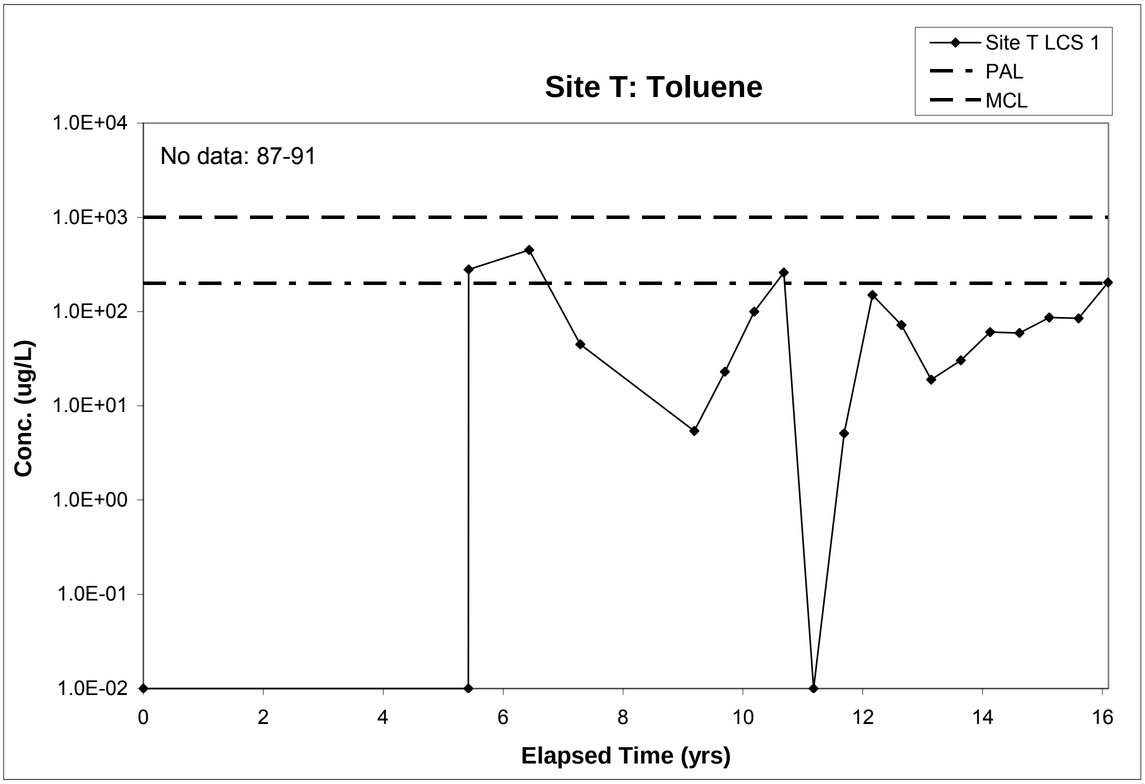

Site Q: Toluene
Site Q LCS 3
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

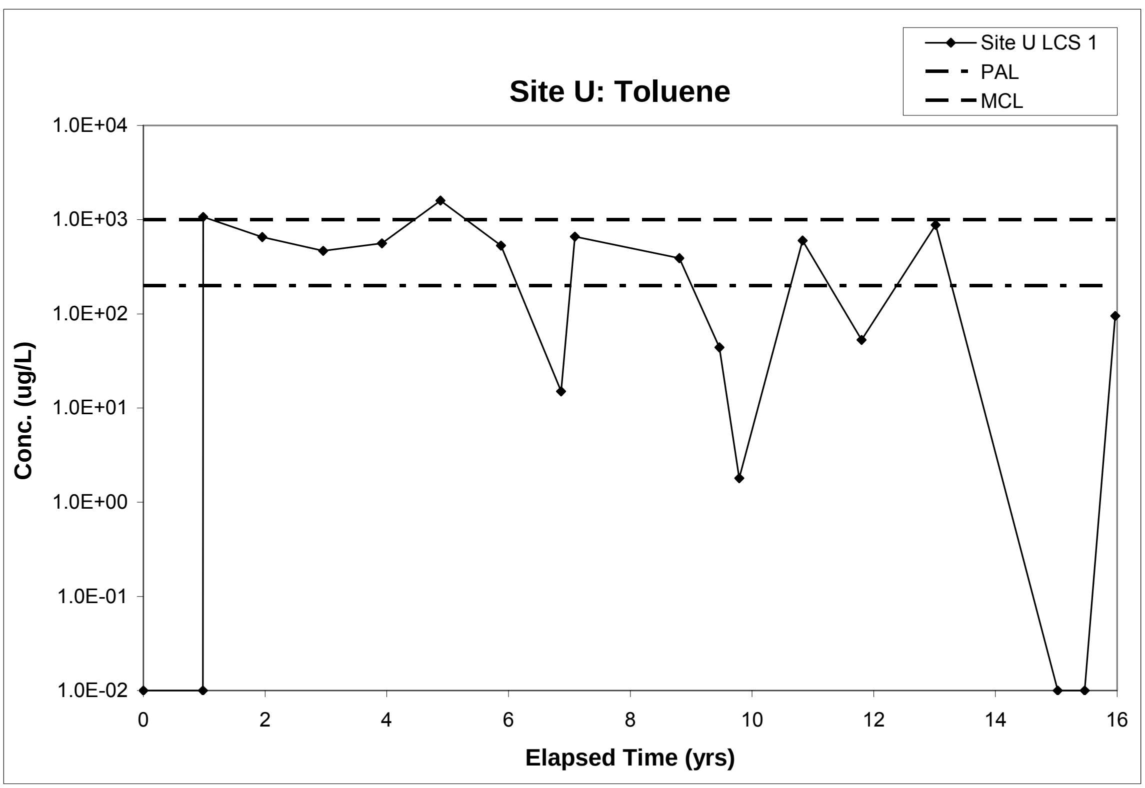

Site R: Toluene
Site R LCS 1
PAL
MCL
No data: 88-91
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

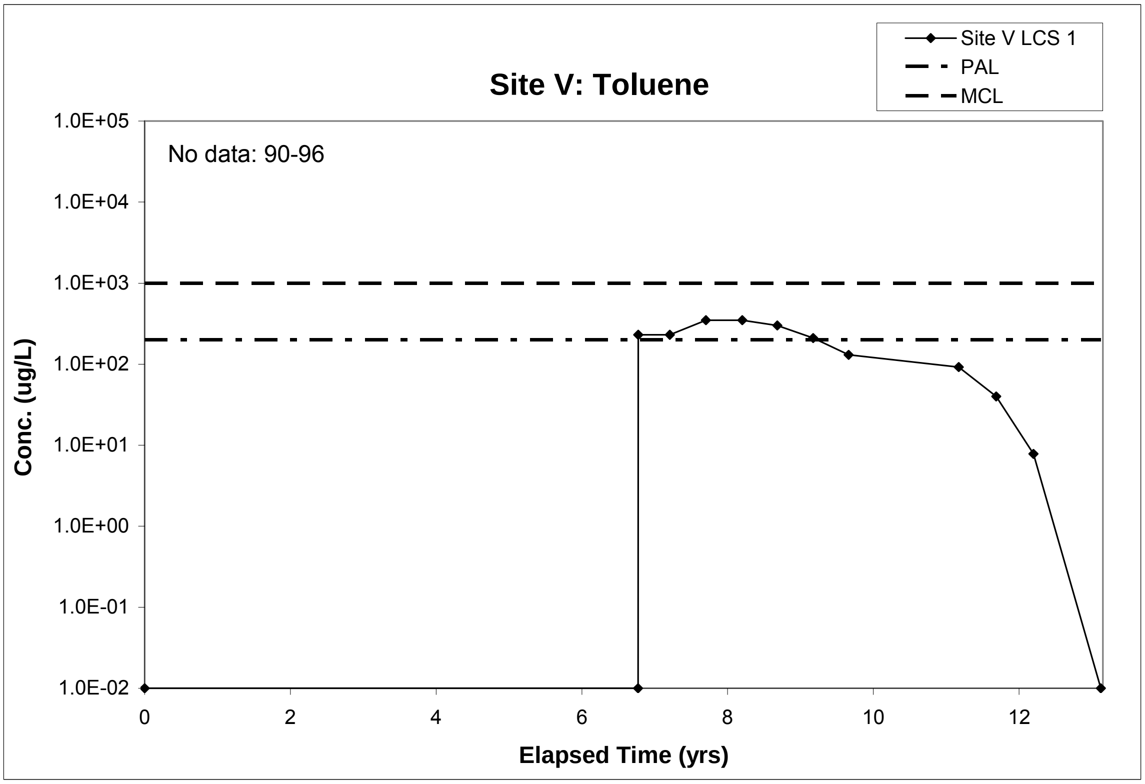

Site R: Toluene
Site R LCS 2
PAL
MCL
No data: 88-91
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

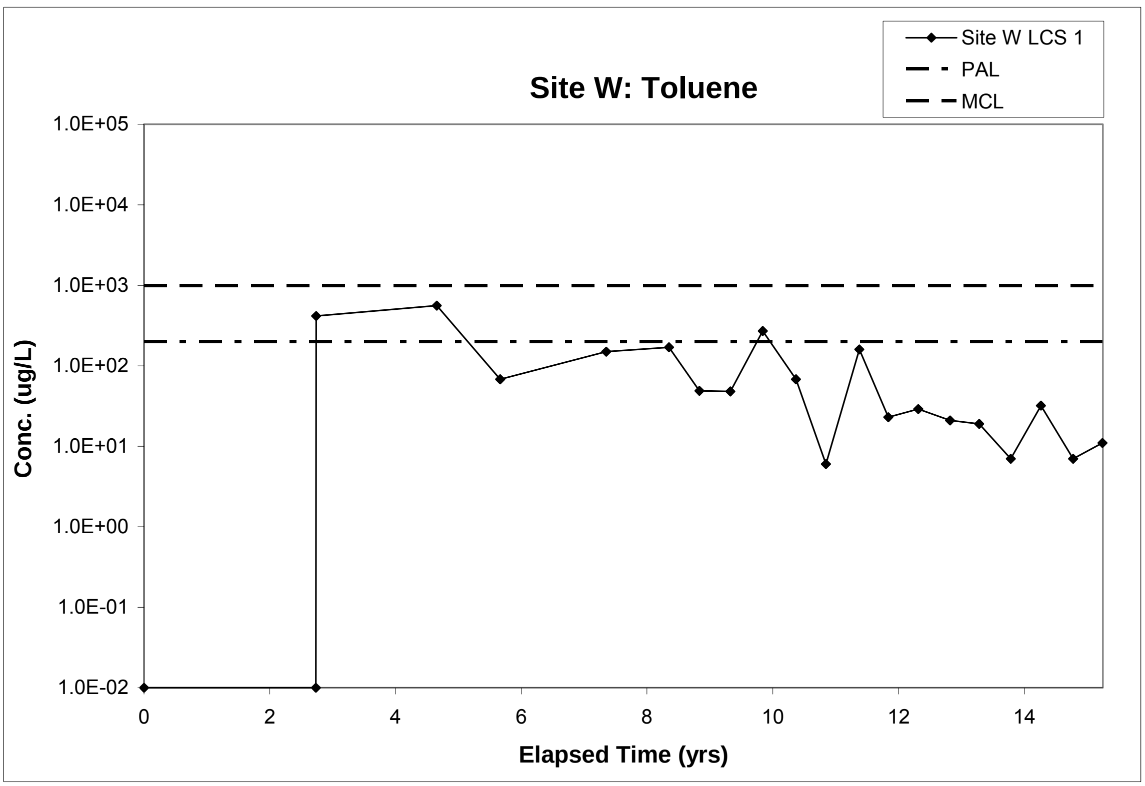

Site S LCS 1
PAL
MCL
Site S: Toluene
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

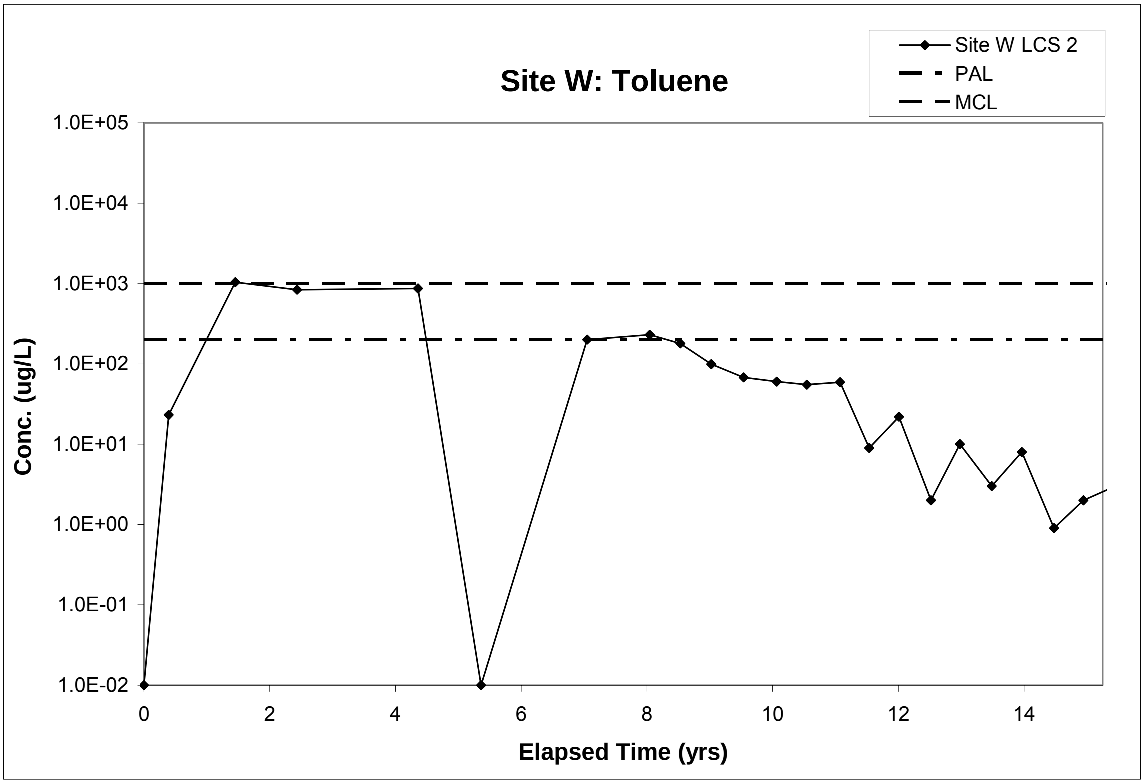

Site S LCS 2
PAL
MCL
Site S: Toluene
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

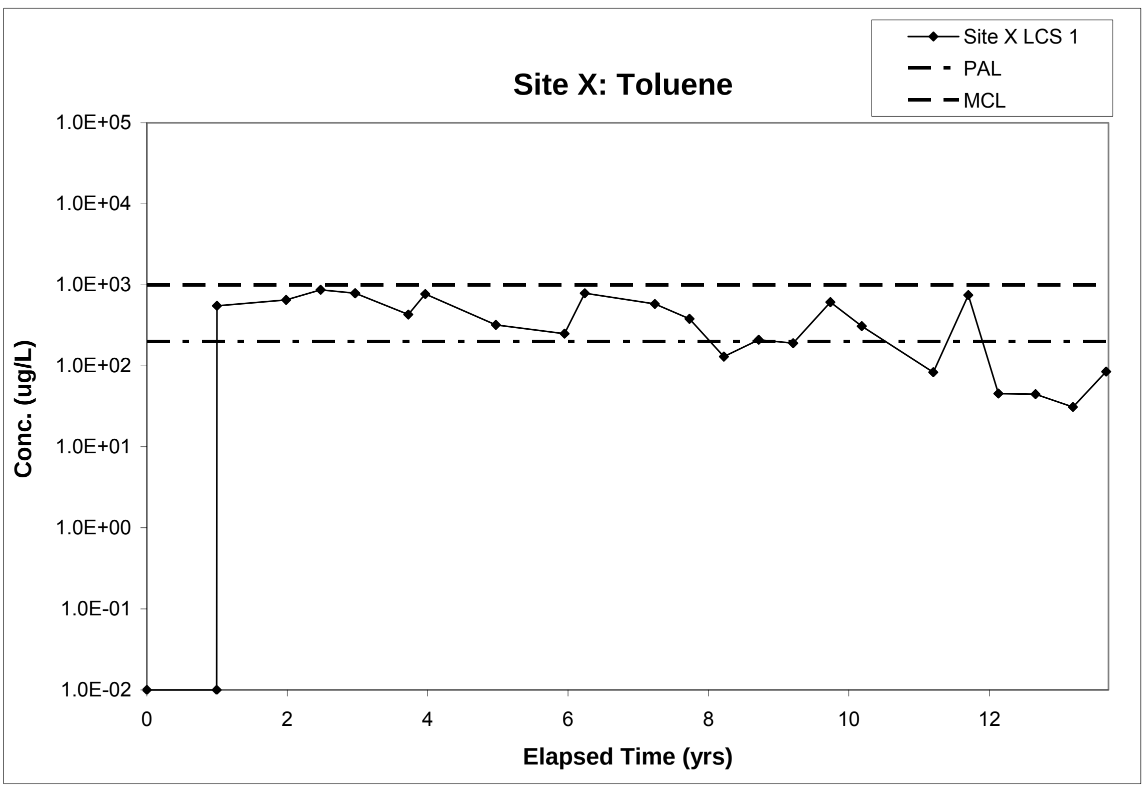

Site T: Toluene
Site T LCS 1
PAL
MCL
No data: 87-91
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

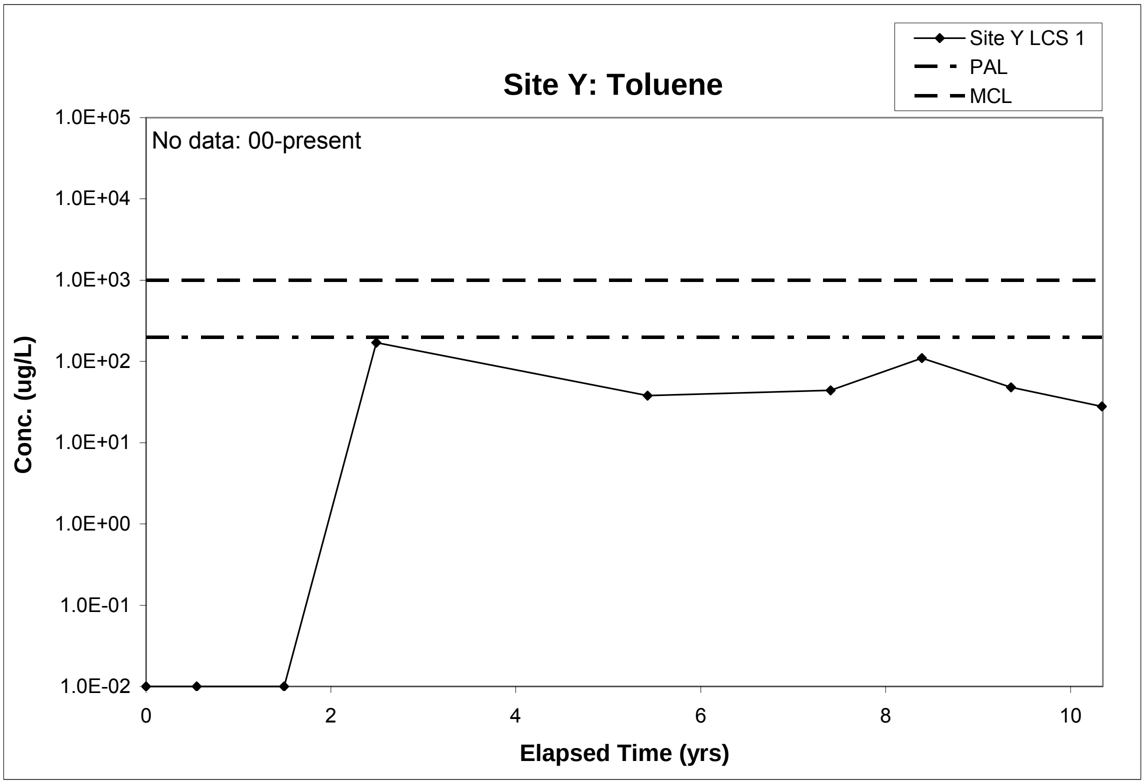

Site U: Toluene
Site U LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

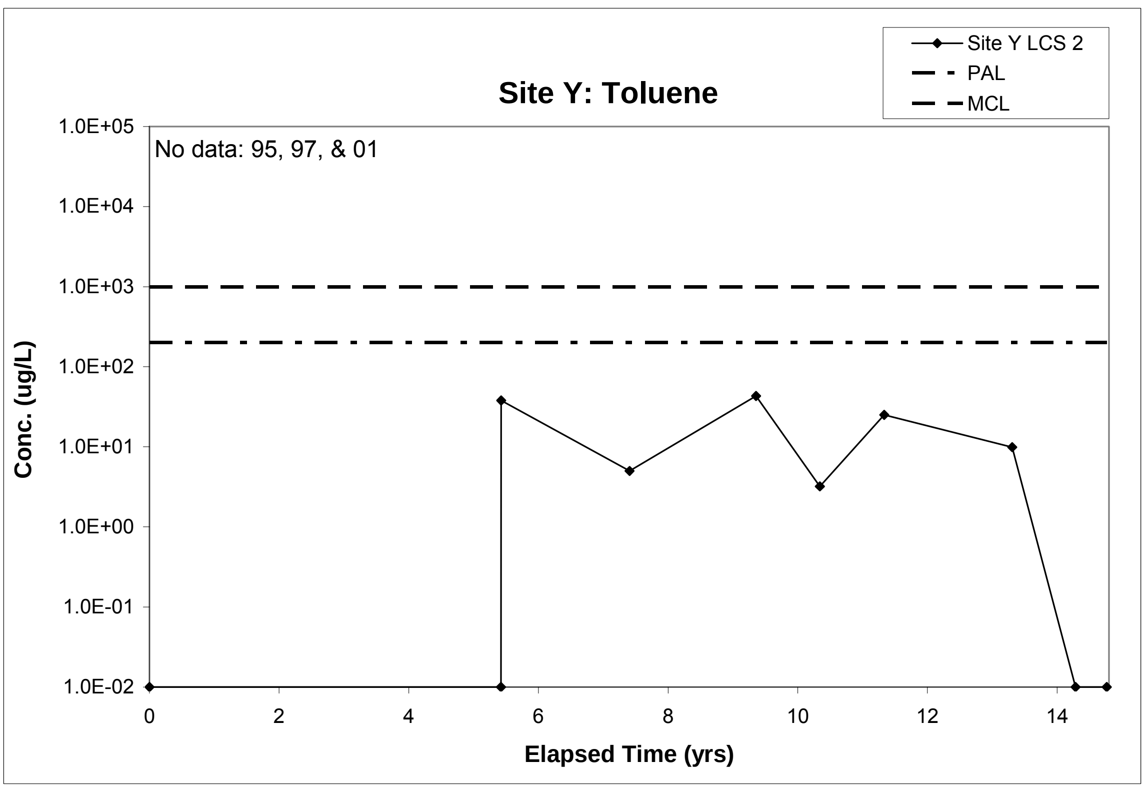

Site V: Toluene
Site V LCS 1
PAL
MCL
No data: 90-96
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

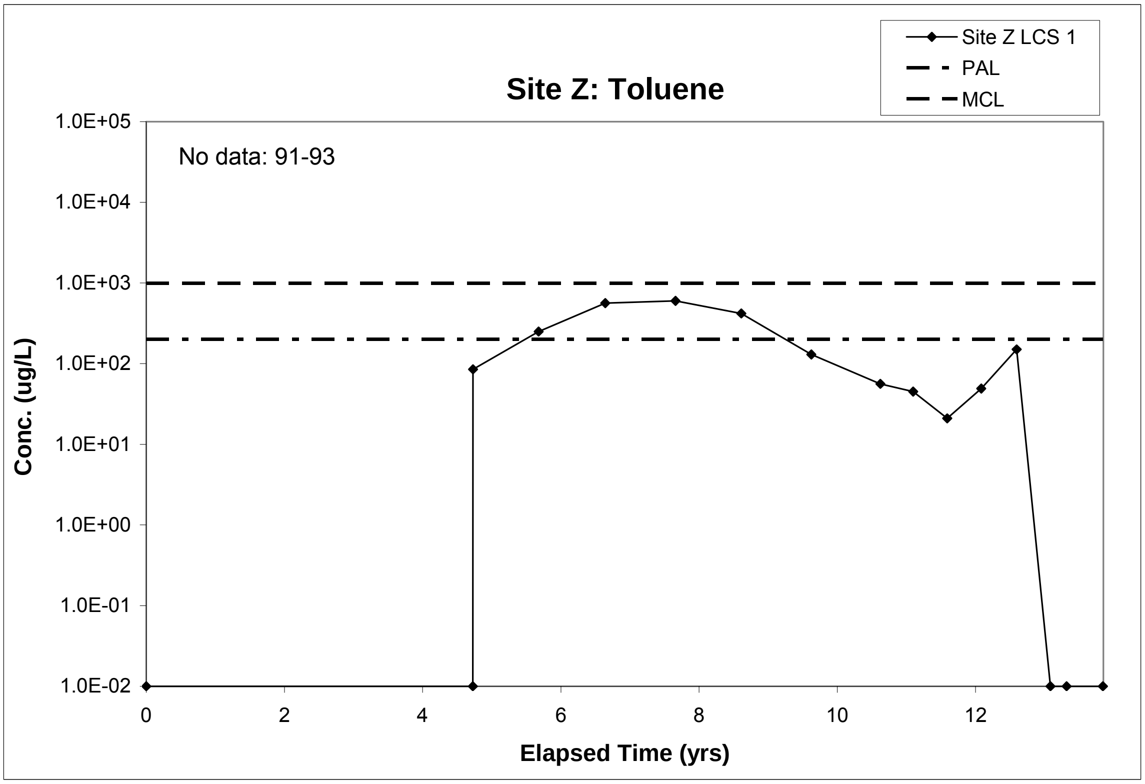

Site W: Toluene
Site W LCS 1
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

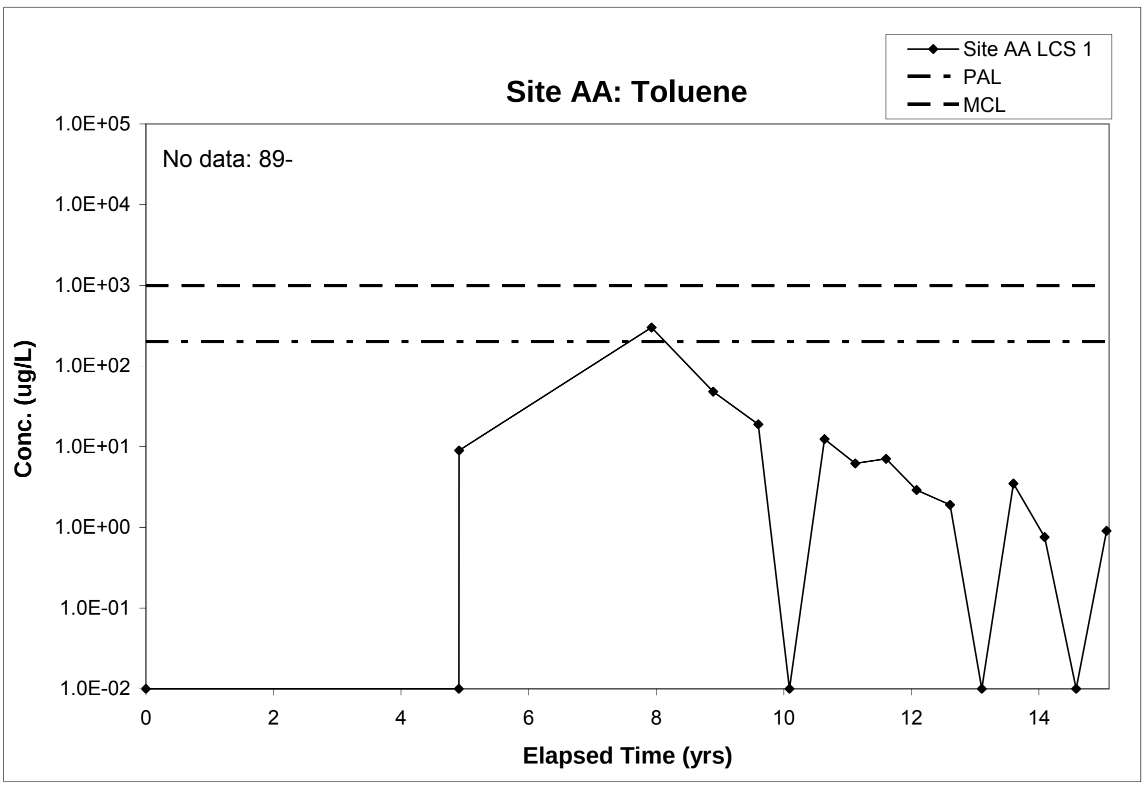

Site W: Toluene
Site W LCS 2
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

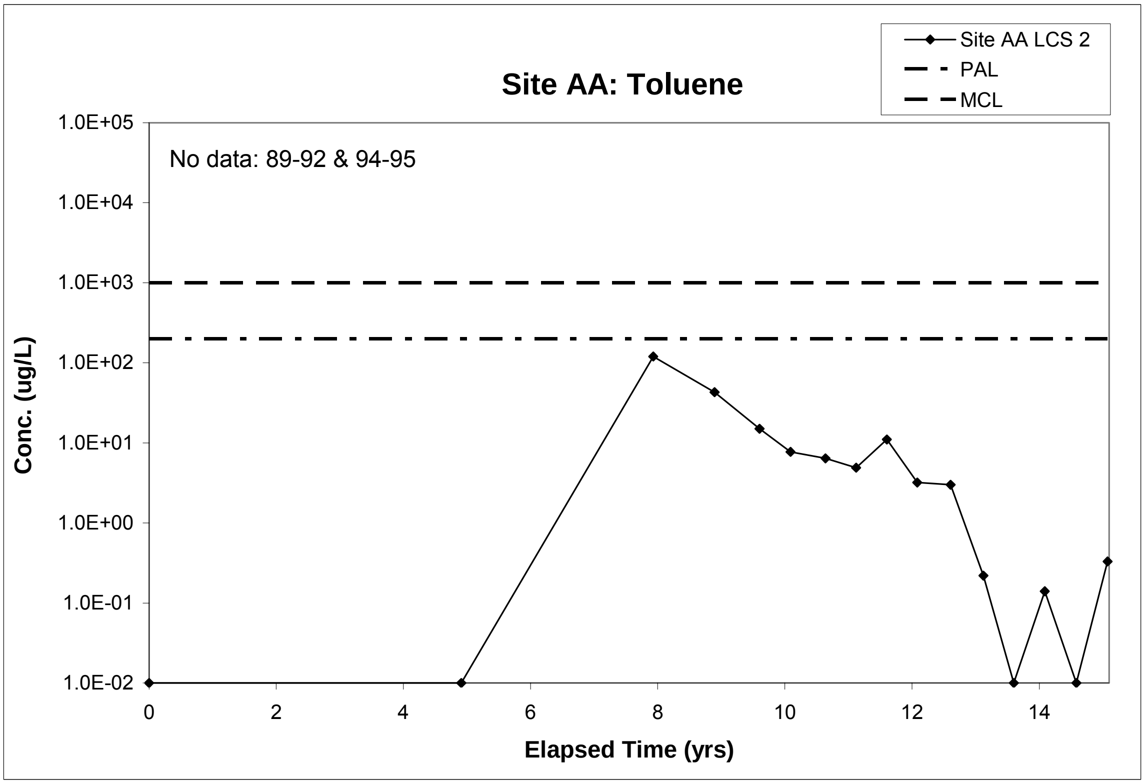

Site X: Toluene
Site X LCS 1
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

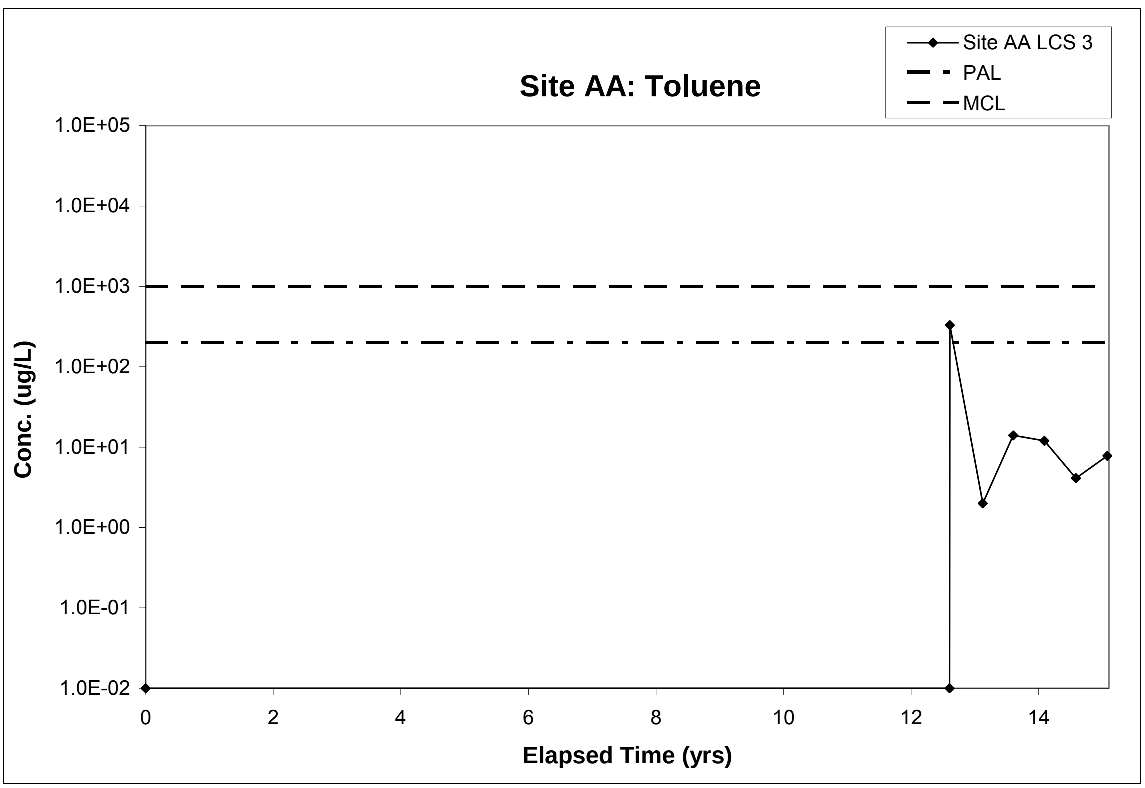

Site Y: Toluene
Site Y LCS 1
PAL
MCL
No data: 00-present
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

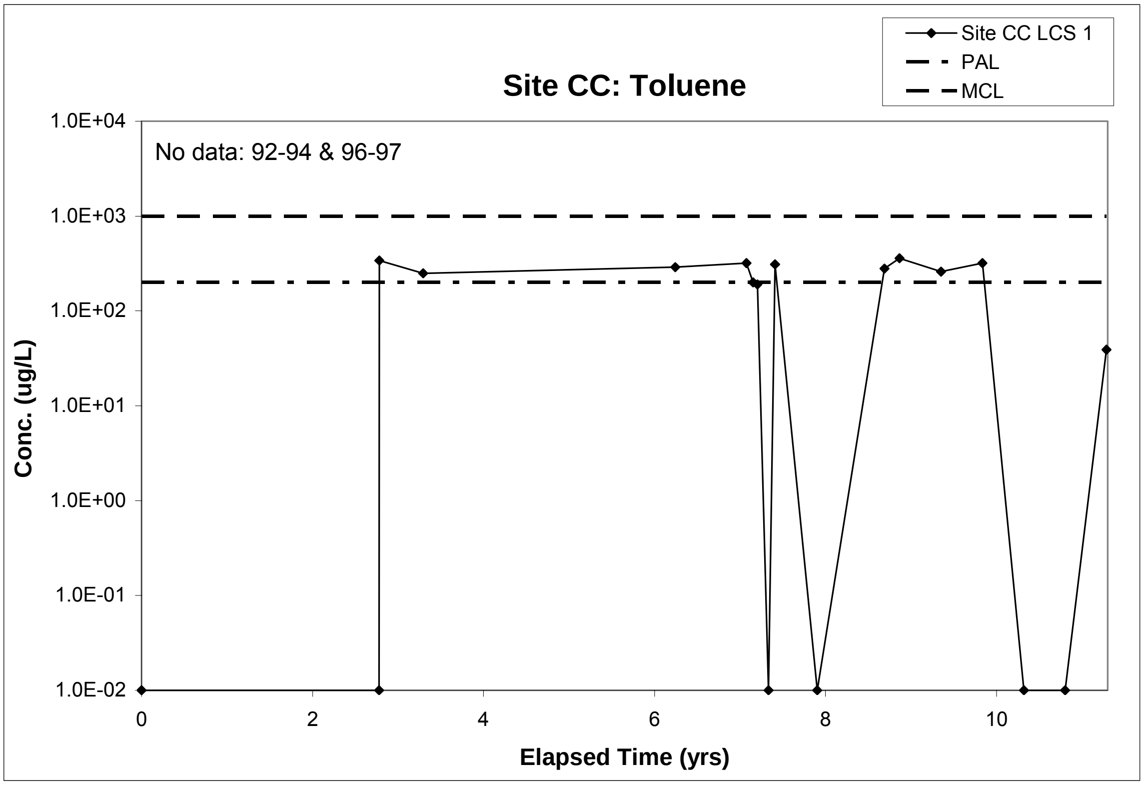

Site Y: Toluene
Site Y LCS 2
PAL
MCL
No data: 95, 97, & 01
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

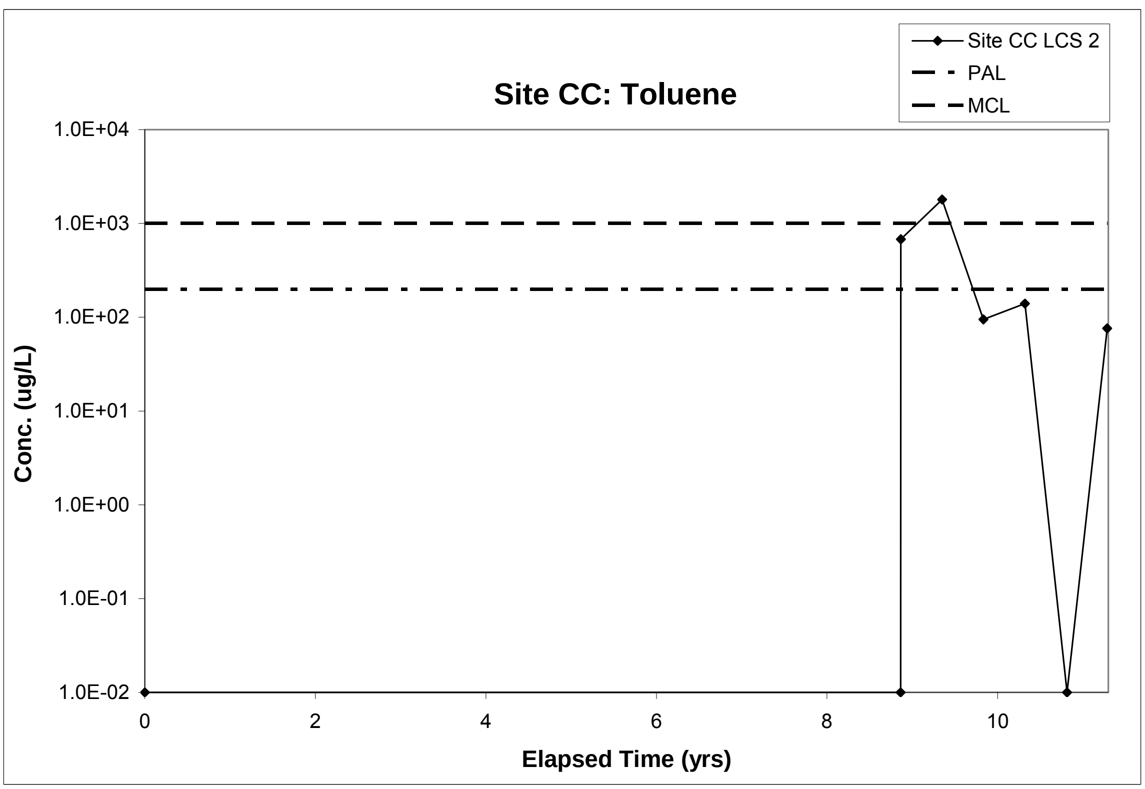

Site Z: Toluene
Site Z LCS 1
PAL
MCL
No data: 91-93
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

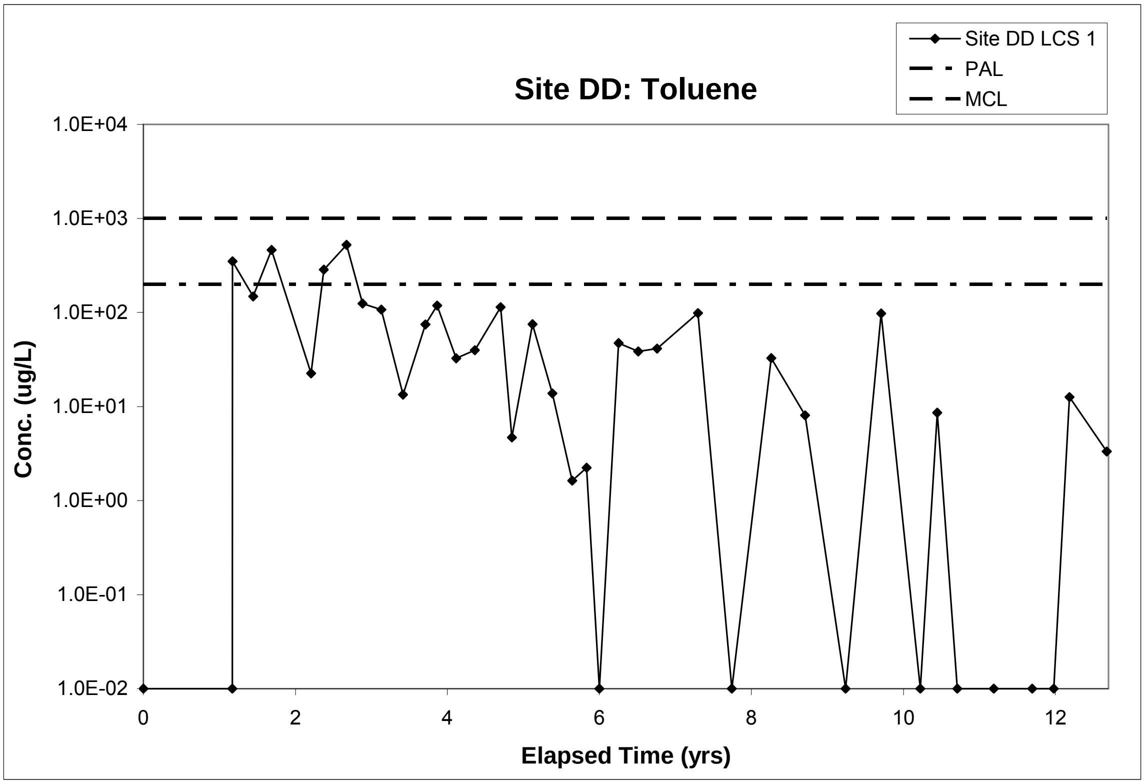

Site AA: Toluene
Site AA LCS 1
PAL
MCL
No data: 89-
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

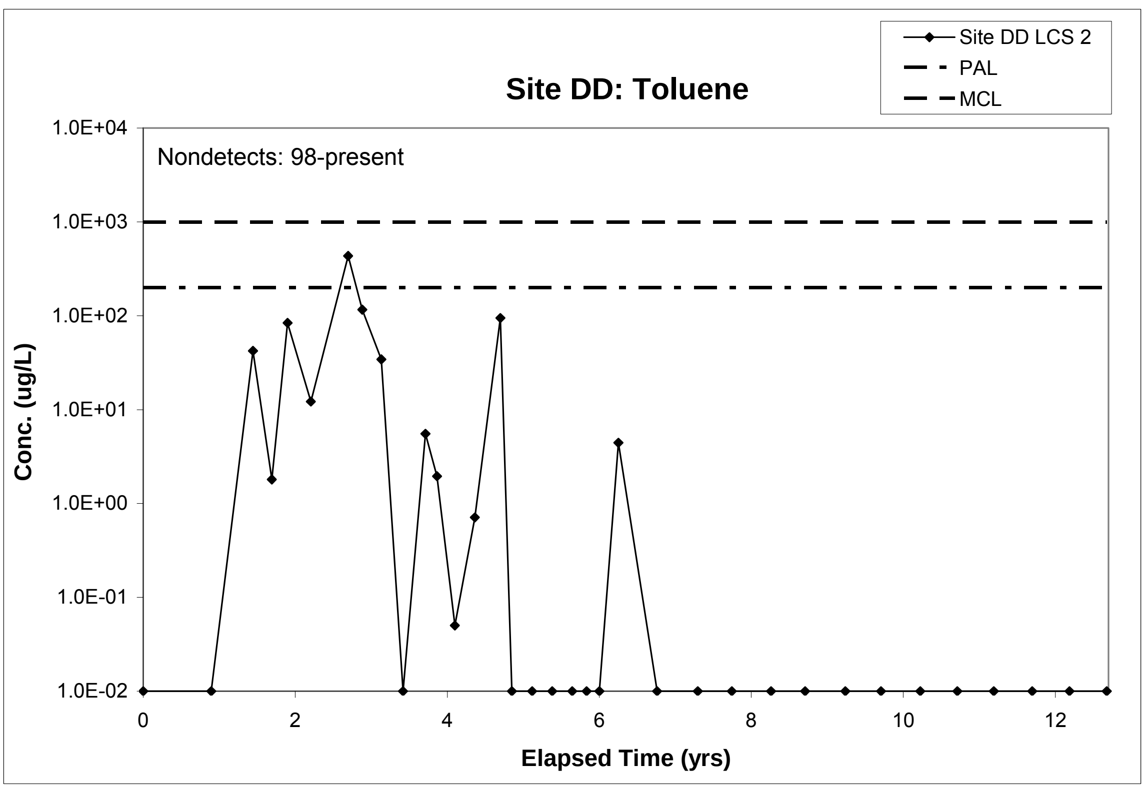

Site AA LCS 2
PAL
MCL
Site AA: Toluene
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
No data: 89-92 & 94-95
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

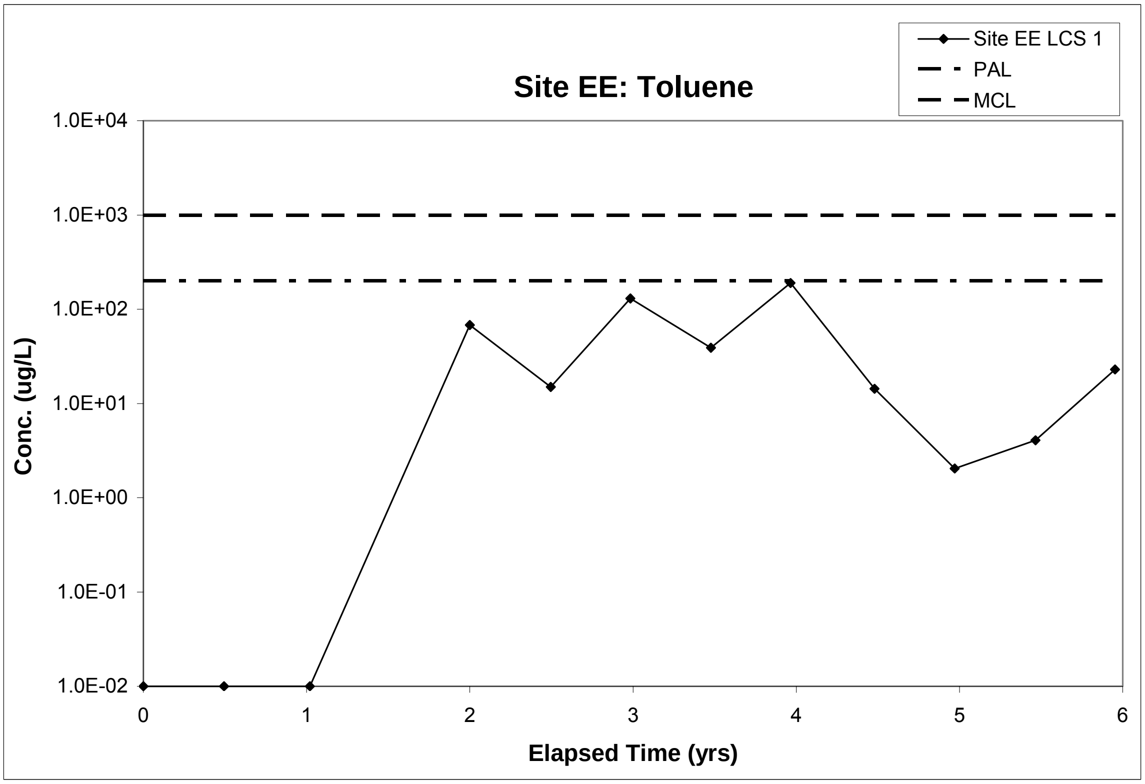

Site AA LCS 3
PAL
MCL
Site AA: Toluene
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

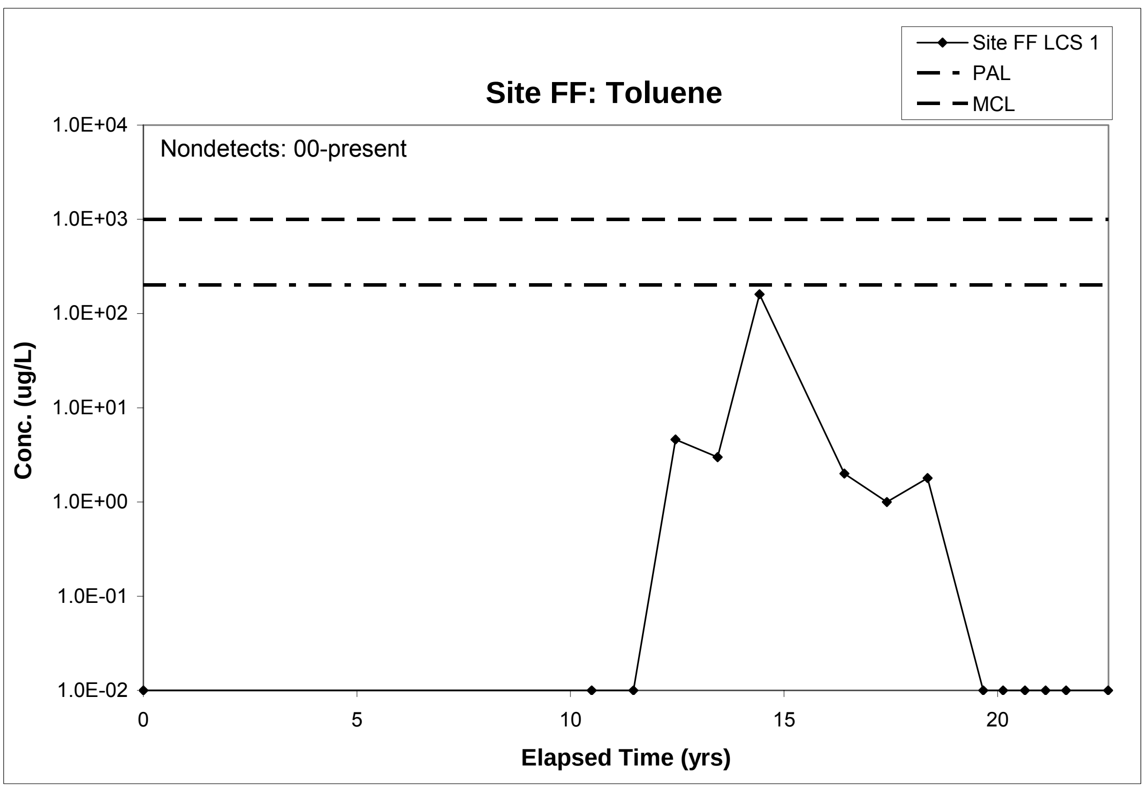

Site CC: Toluene
Site CC LCS 1
PAL
MCL
No data: 92-94 & 96-97
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

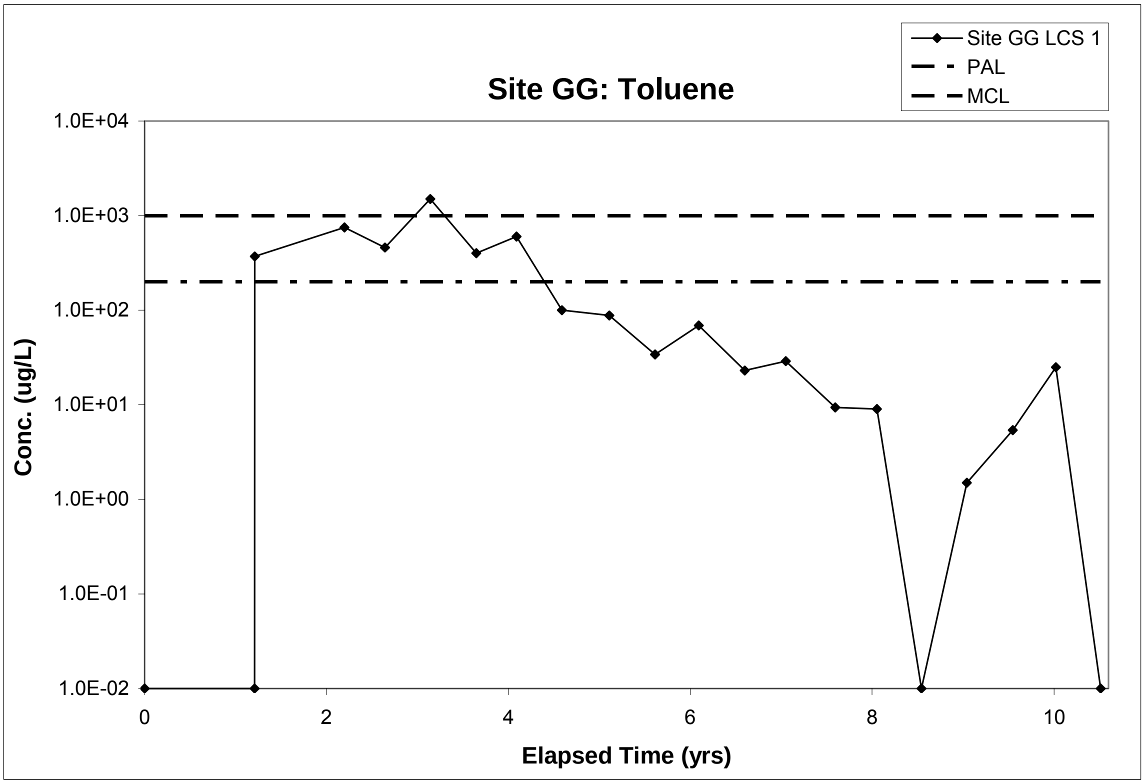

Site CC: Toluene
Site CC LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

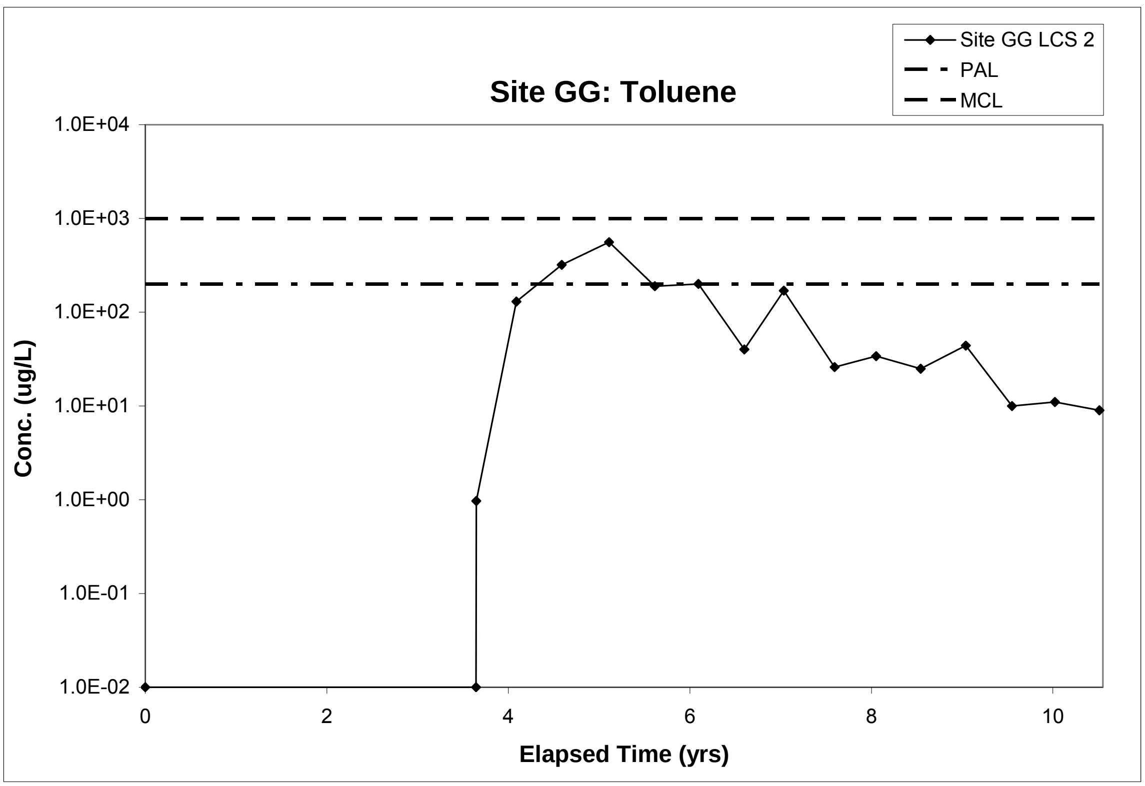

Site DD: Toluene
Site DD LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

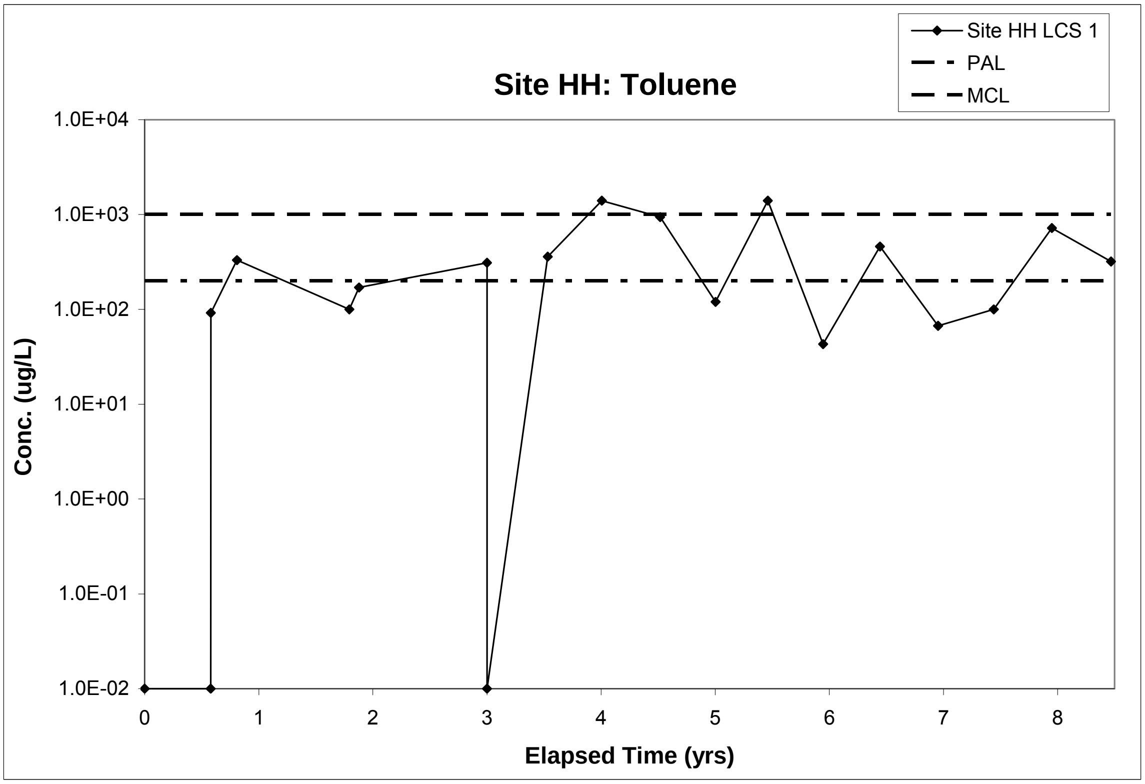

Site DD: Toluene
Site DD LCS 2
PAL
MCL
Nondetects: 98-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)


Site EE: Toluene
Site EE LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
Elapsed Time (yrs)

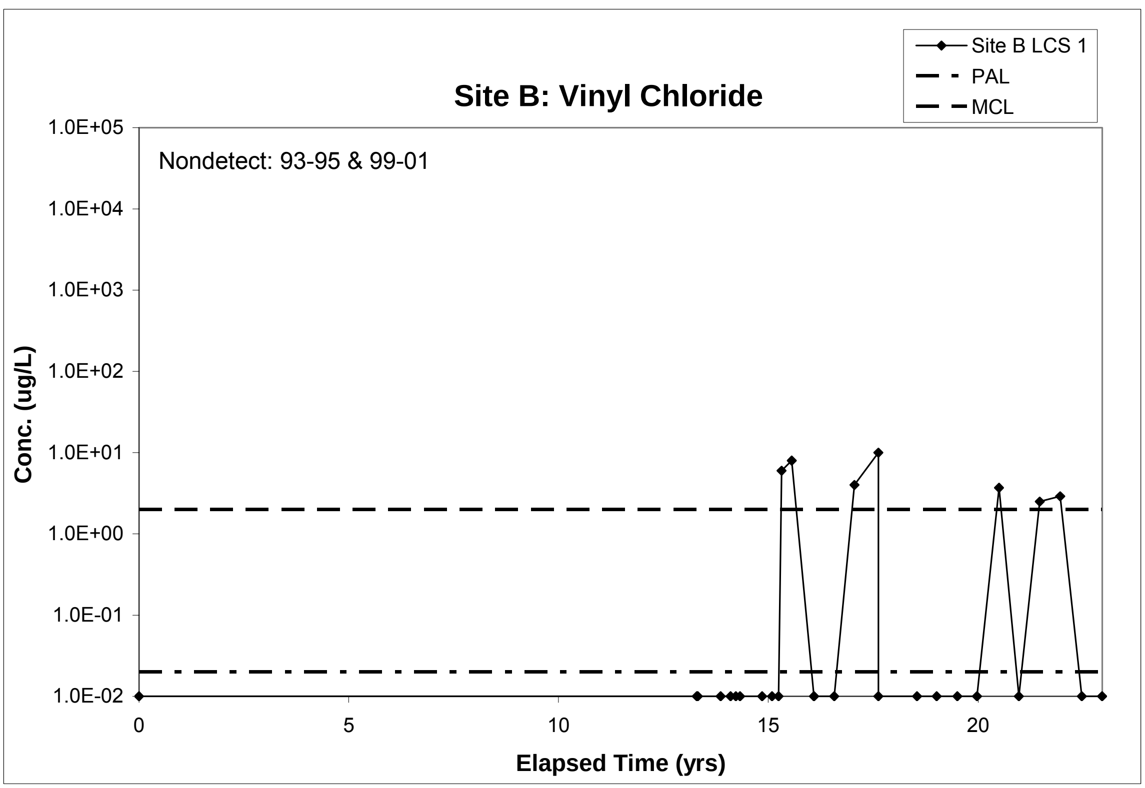

Site FF: Toluene
Site FF LCS 1
PAL
MCL
Nondetects: 00-present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)


Site GG: Toluene
Site GG LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

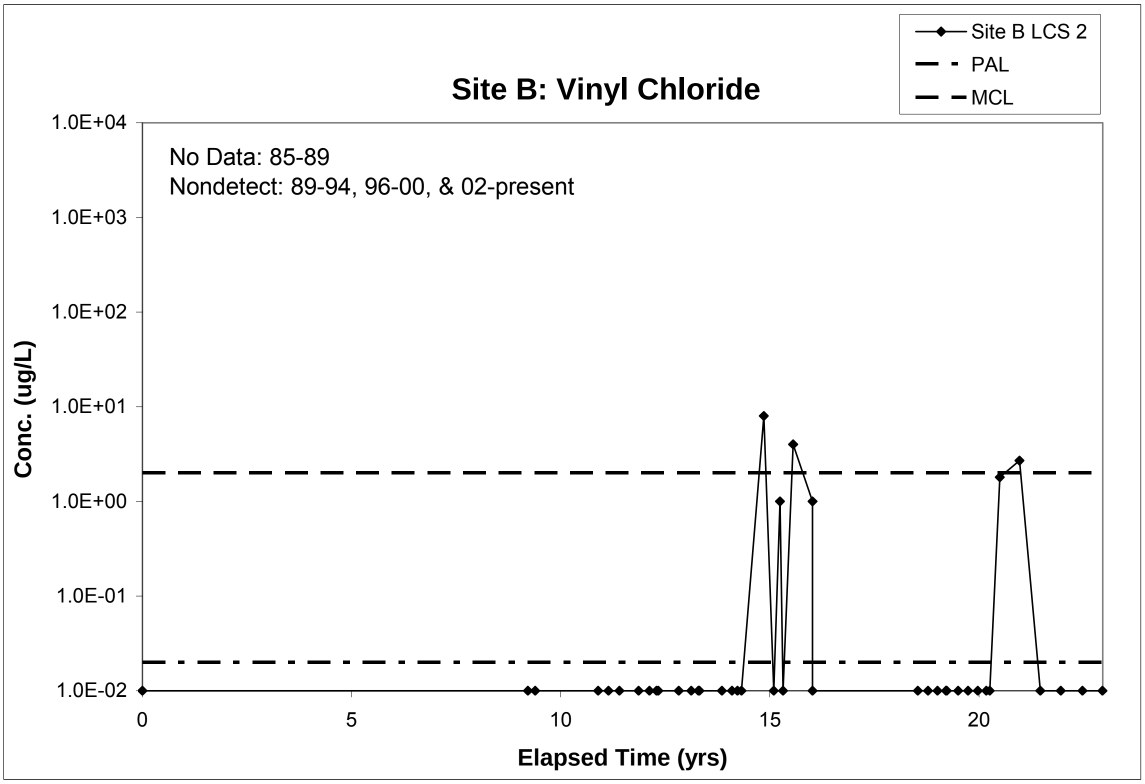

Site GG: Toluene
Site GG LCS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

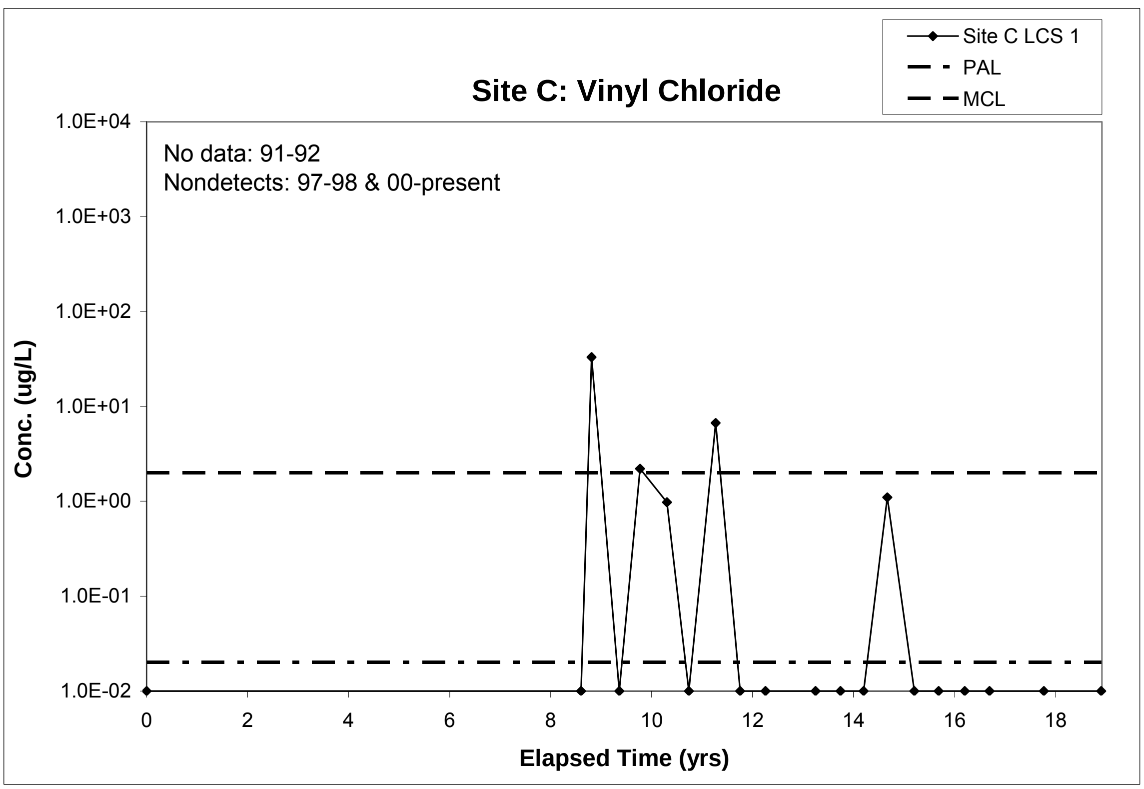


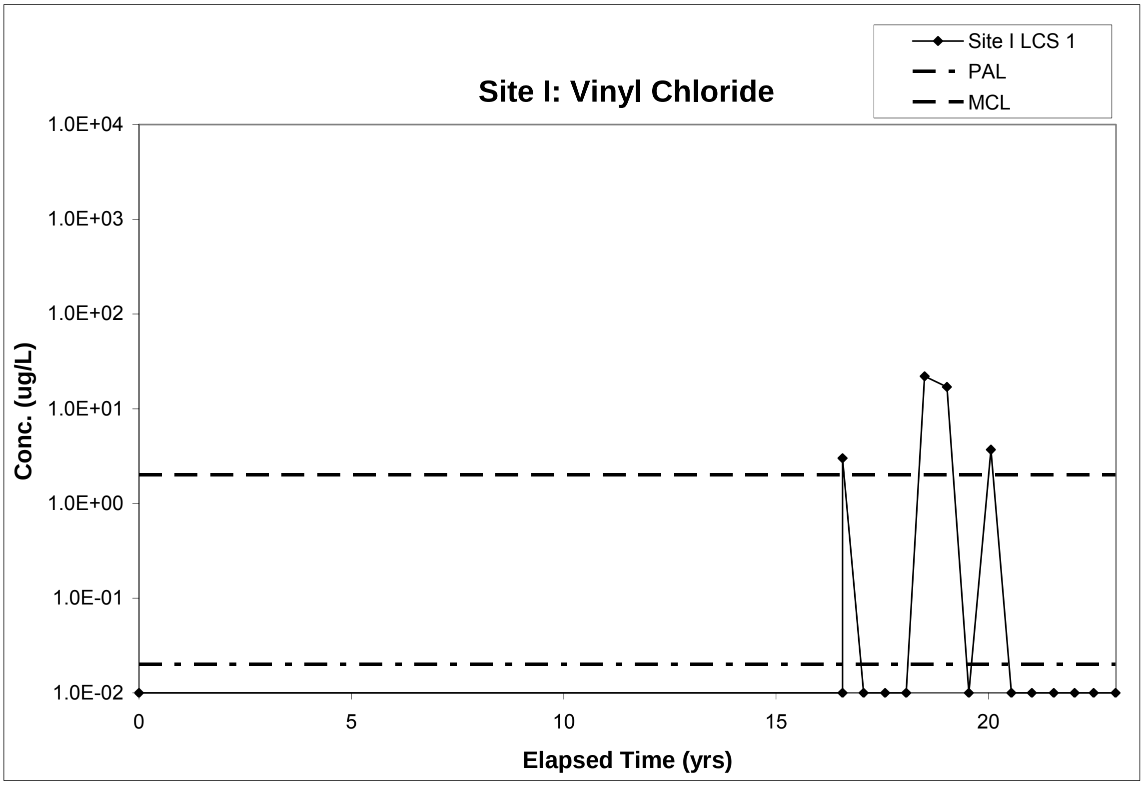
Site HH: Toluene
Site HH LCS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

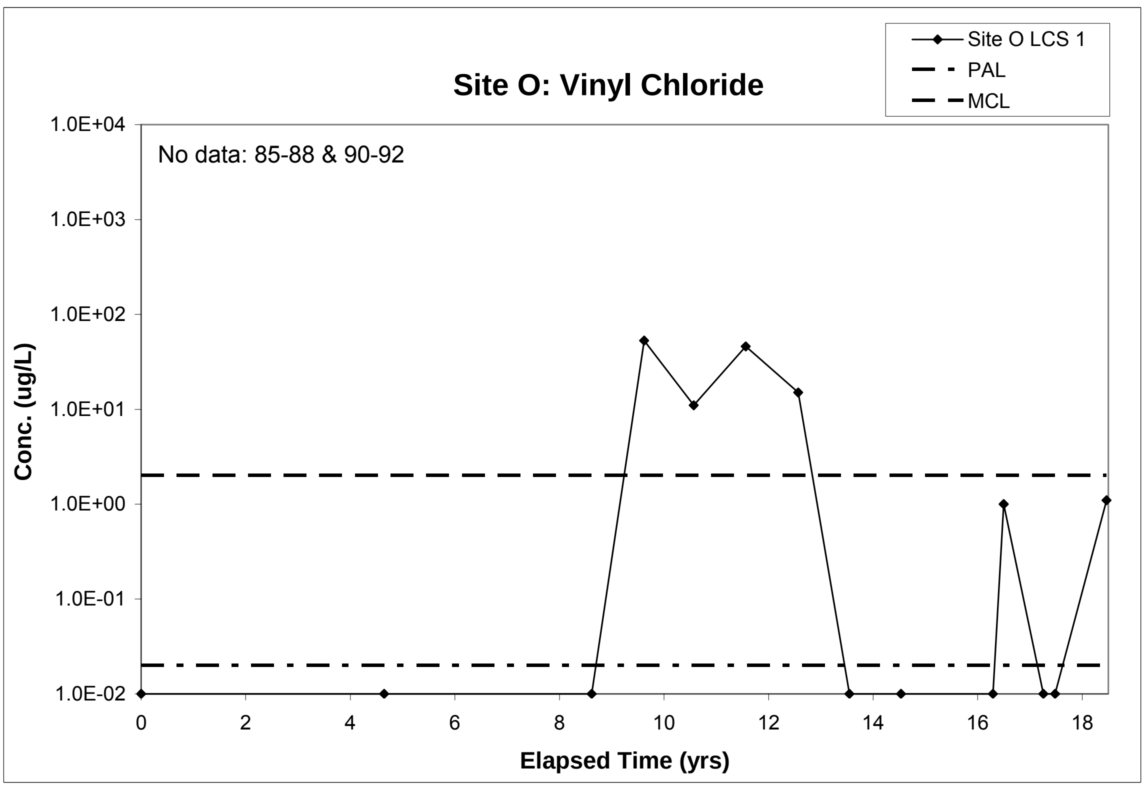


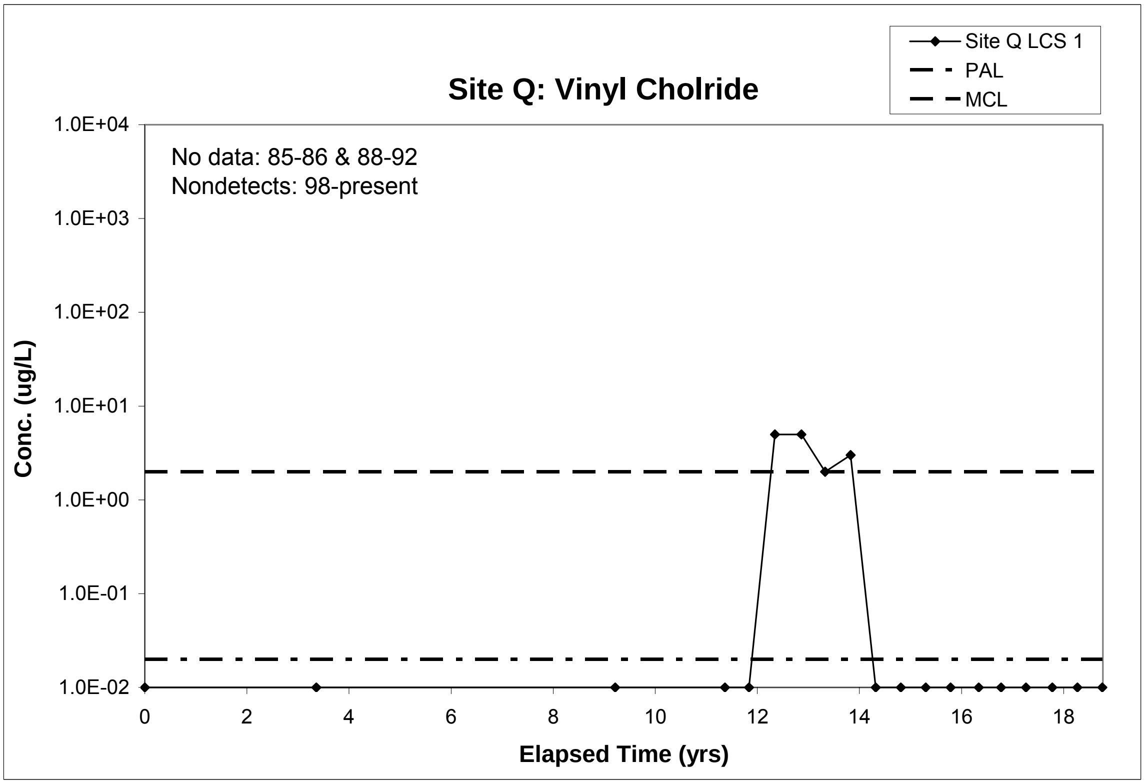
Site B: Vinyl Chloride
Site B LCS 1
PAL
MCL
Nondetect: 93-95 & 99-01
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

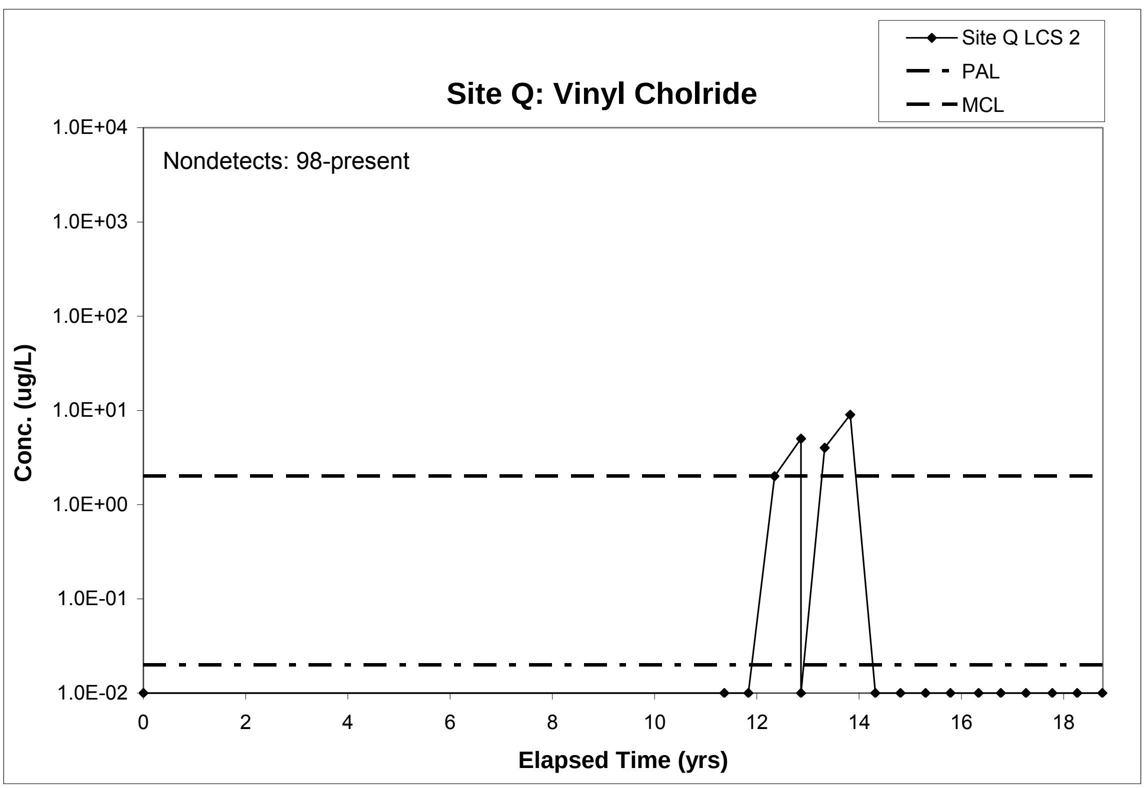

Site B: Vinyl Chloride
Site B LCS 2
PAL
MCL
No Data: 85-89
Nondetect: 89-94, 96-00, & 02-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

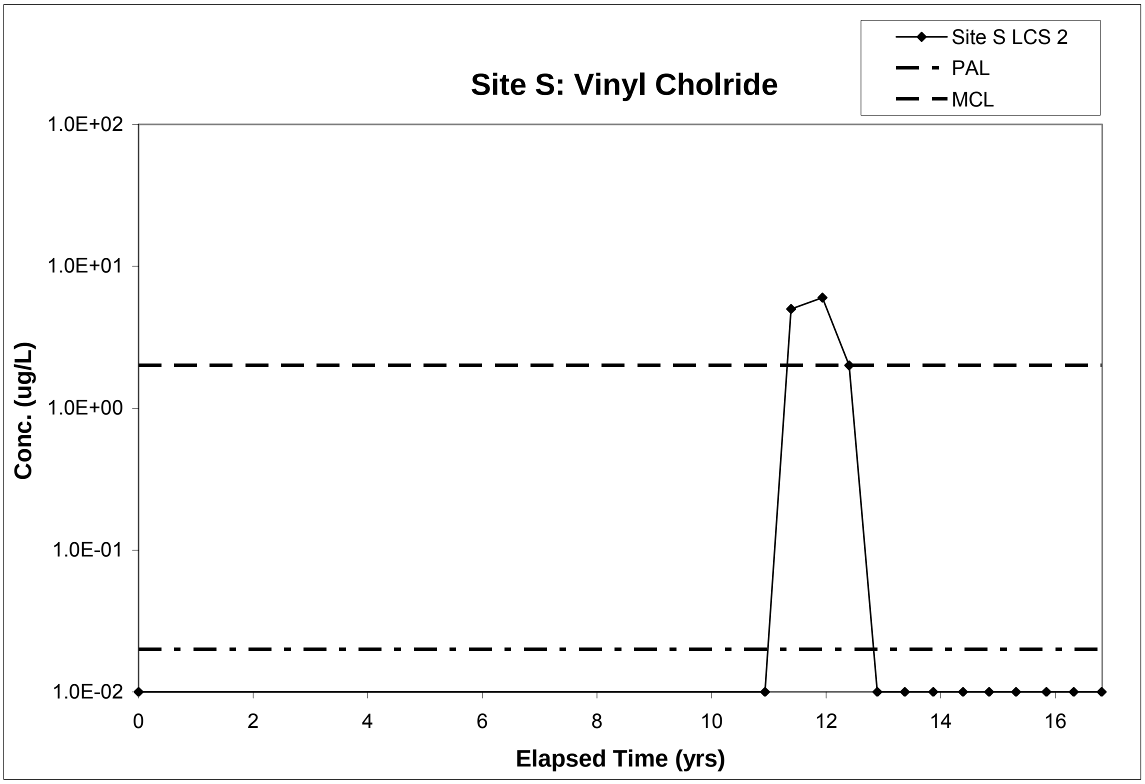

Site C: Vinyl Chloride
Site C LCS 1
PAL
MCL
No data: 91-92
Nondetects: 97-98 & 00-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)


Site I: Vinyl Chloride
Site I LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

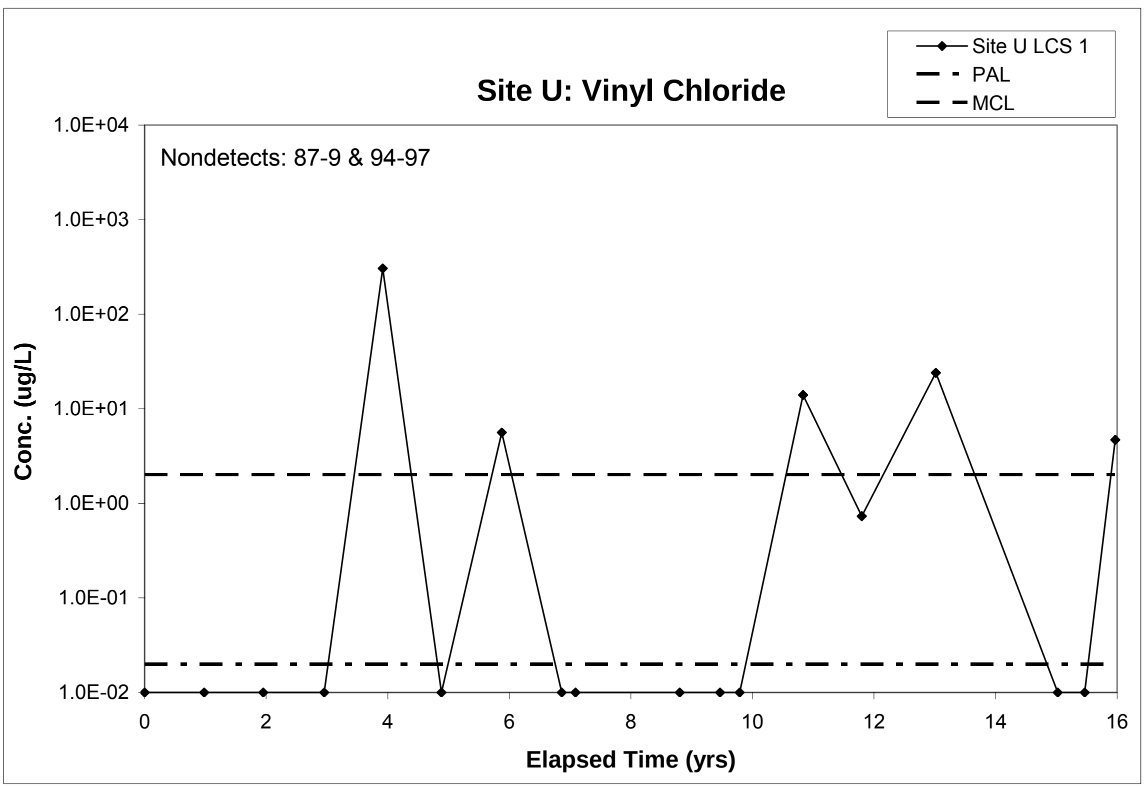

Site O: Vinyl Chloride
Site O LCS 1
PAL
MCL
No data: 85-88 & 90-92
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)


Site Q: Vinyl Cholride
Site Q LCS 1
PAL
MCL
No data: 85-86 & 88-92
Nondetects: 98-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

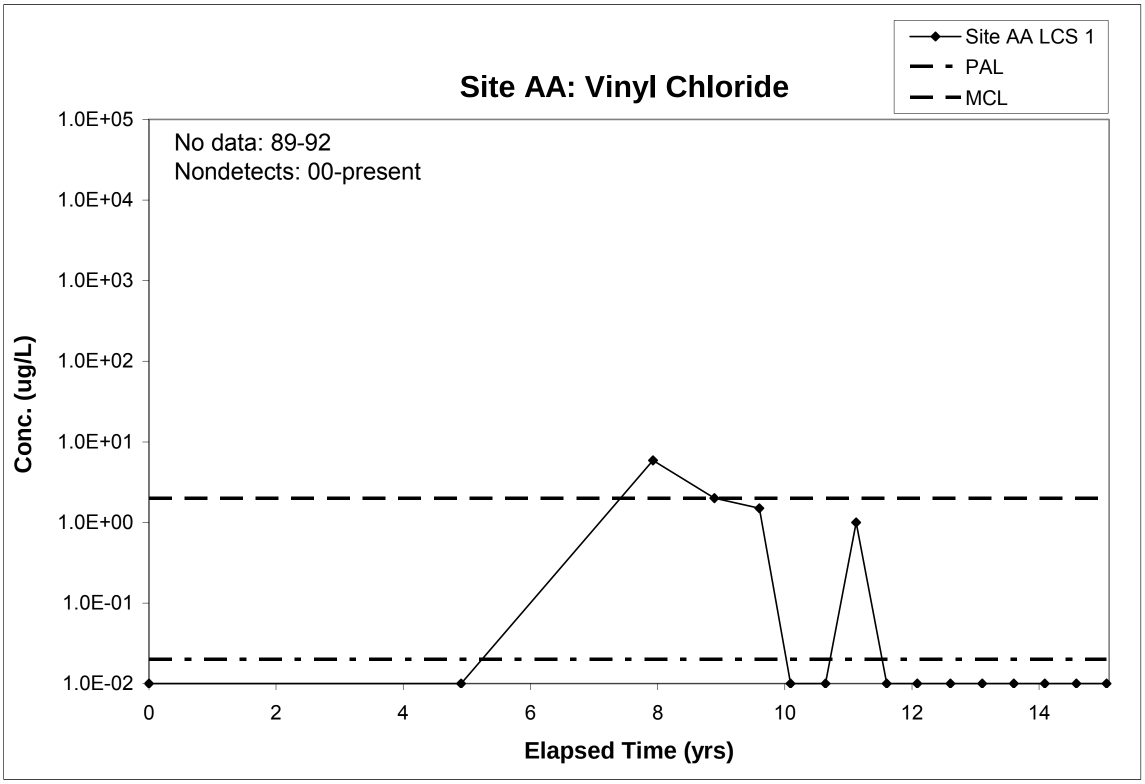

Site Q: Vinyl Cholride
Site Q LCS 2
PAL
MCL
Nondetects: 98-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

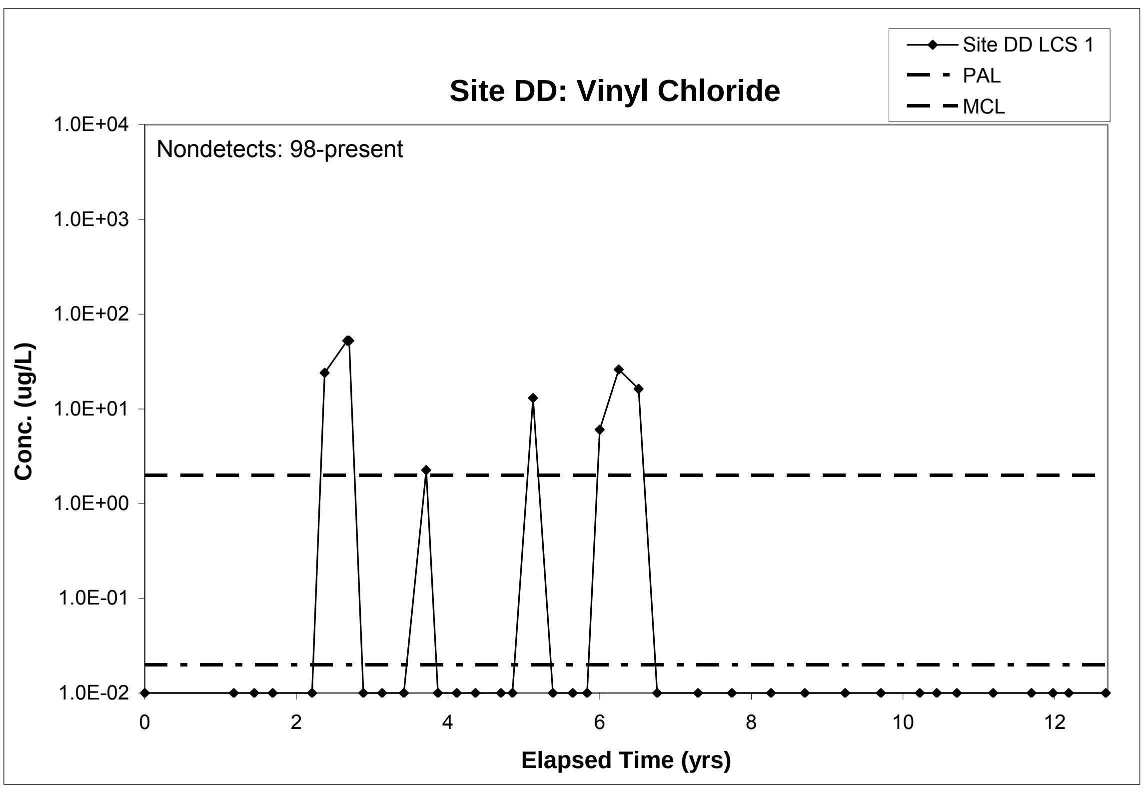


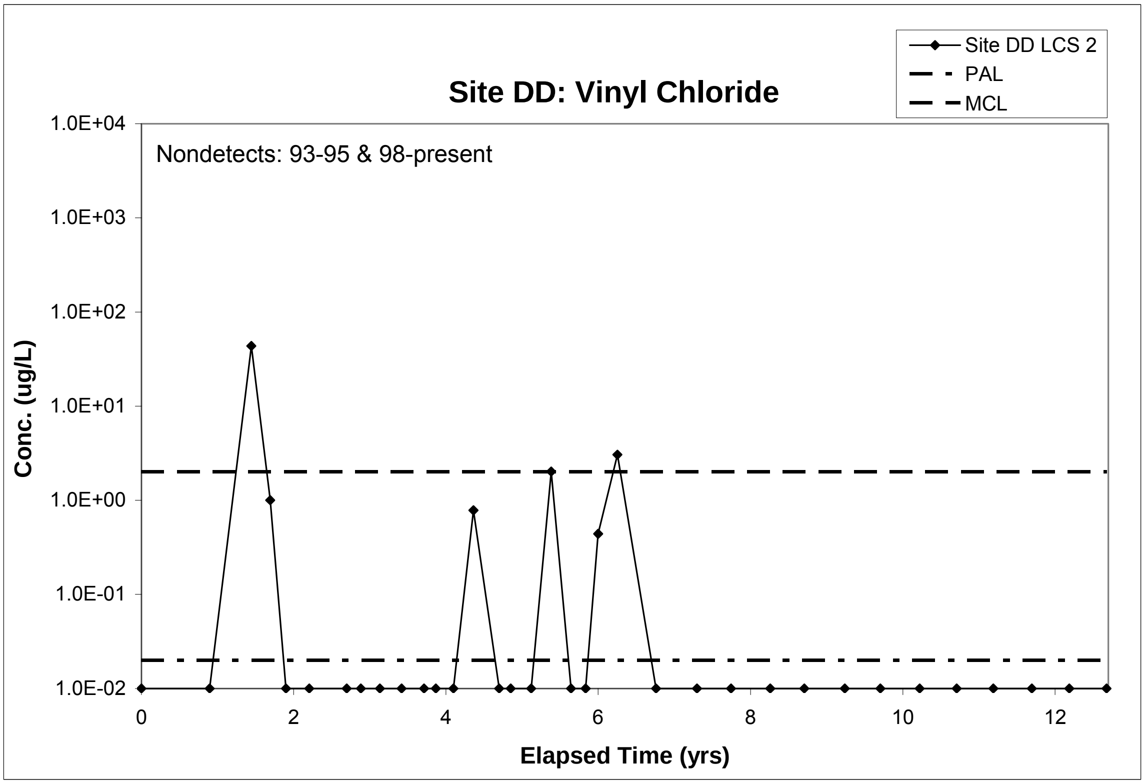
Site S: Vinyl Cholride
Site S LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

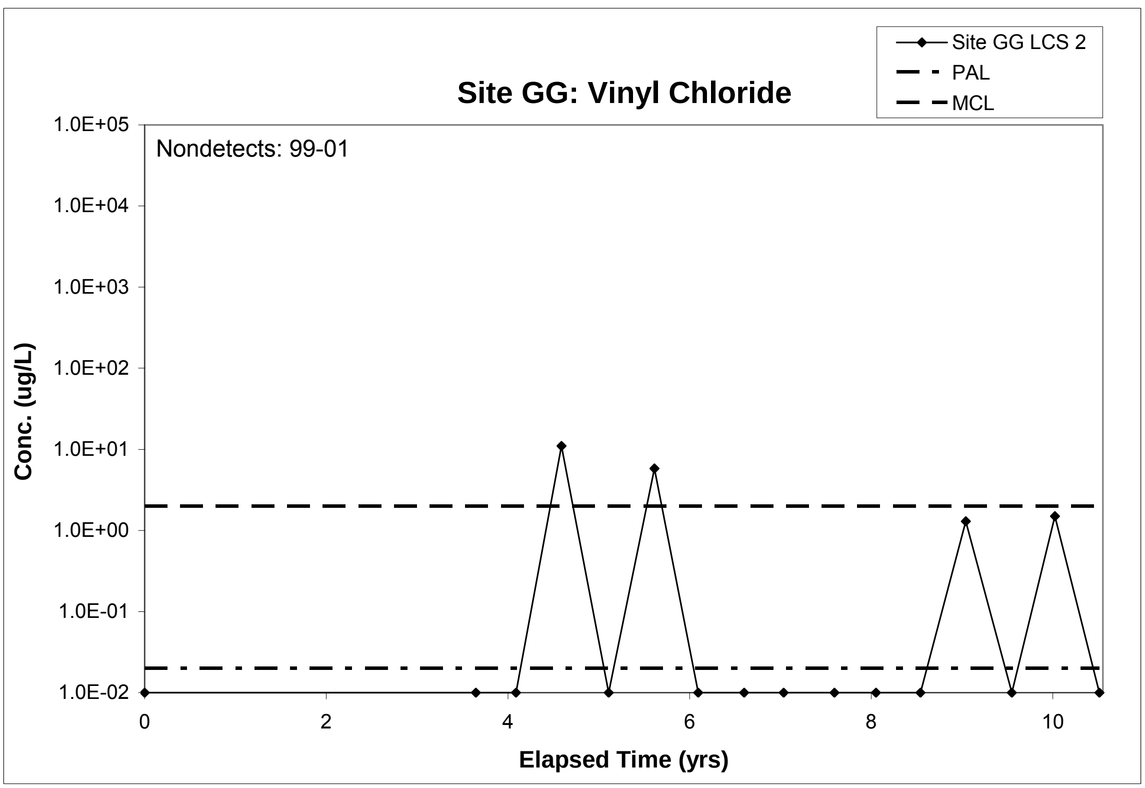


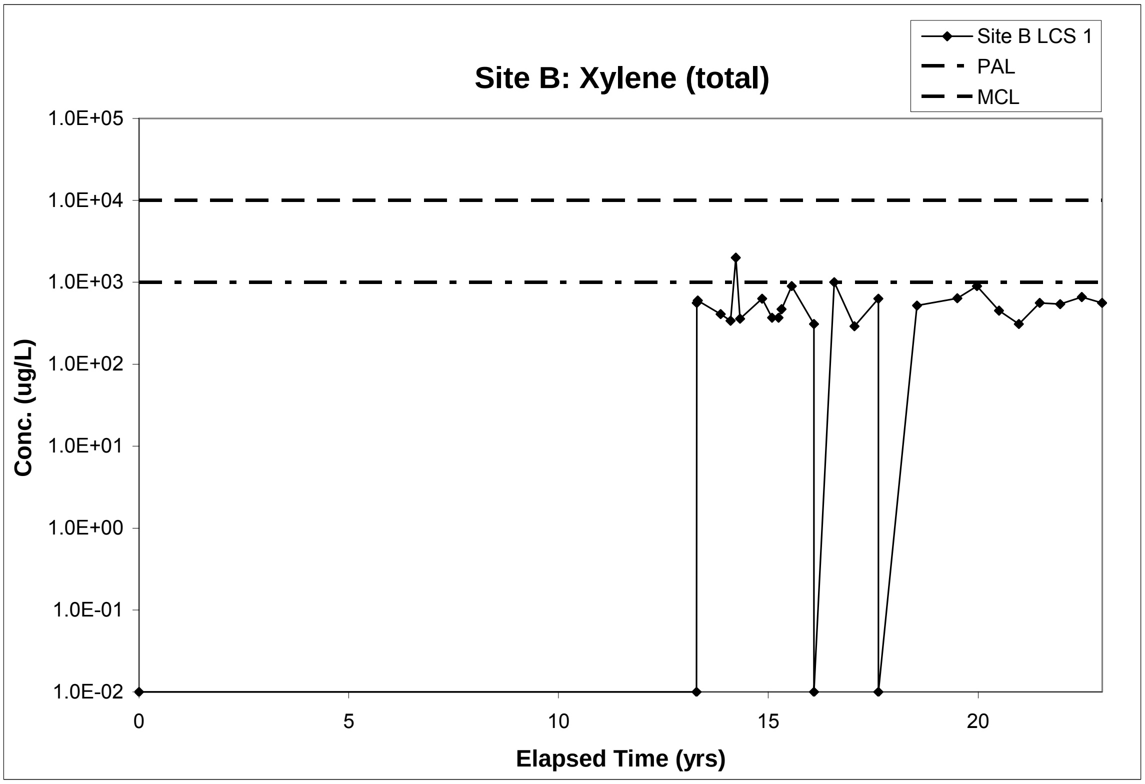
Site U: Vinyl Chloride
Site U LCS 1
PAL
MCL
Nondetects: 87-9 & 94-97
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

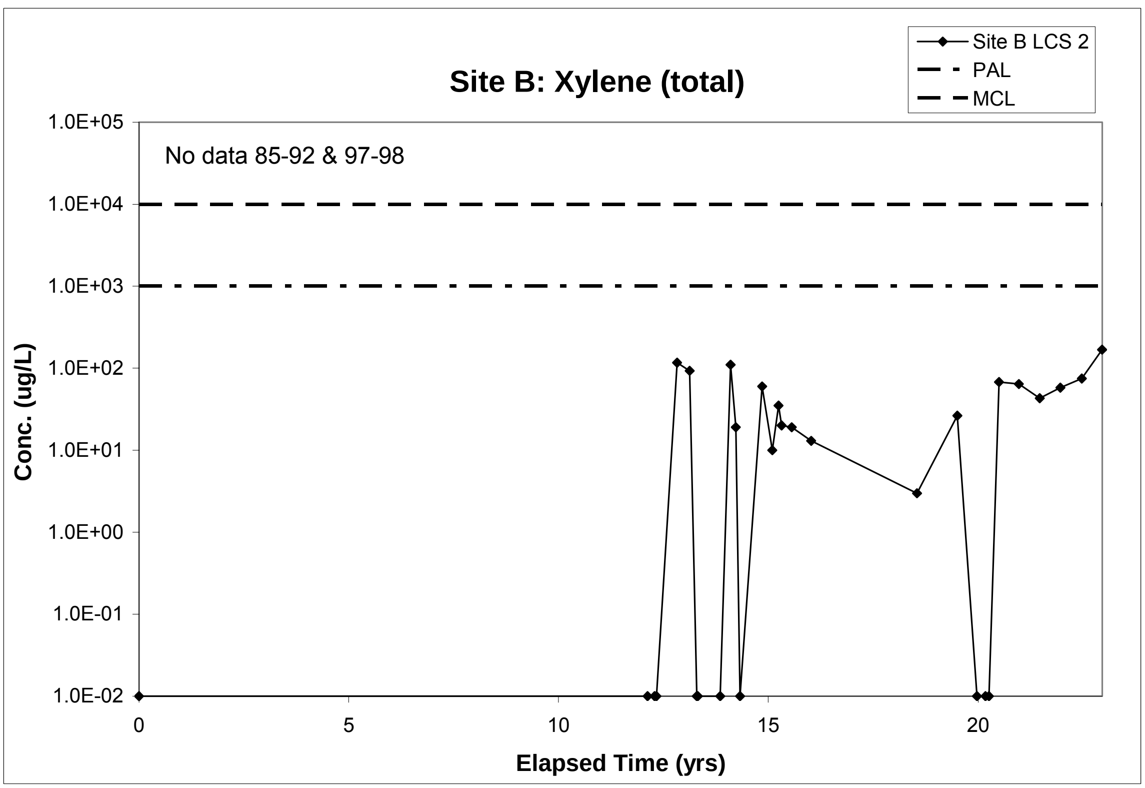

Site AA: Vinyl Chloride
Site AA LCS 1
PAL
MCL
No data: 89-92
Nondetects: 00-present
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

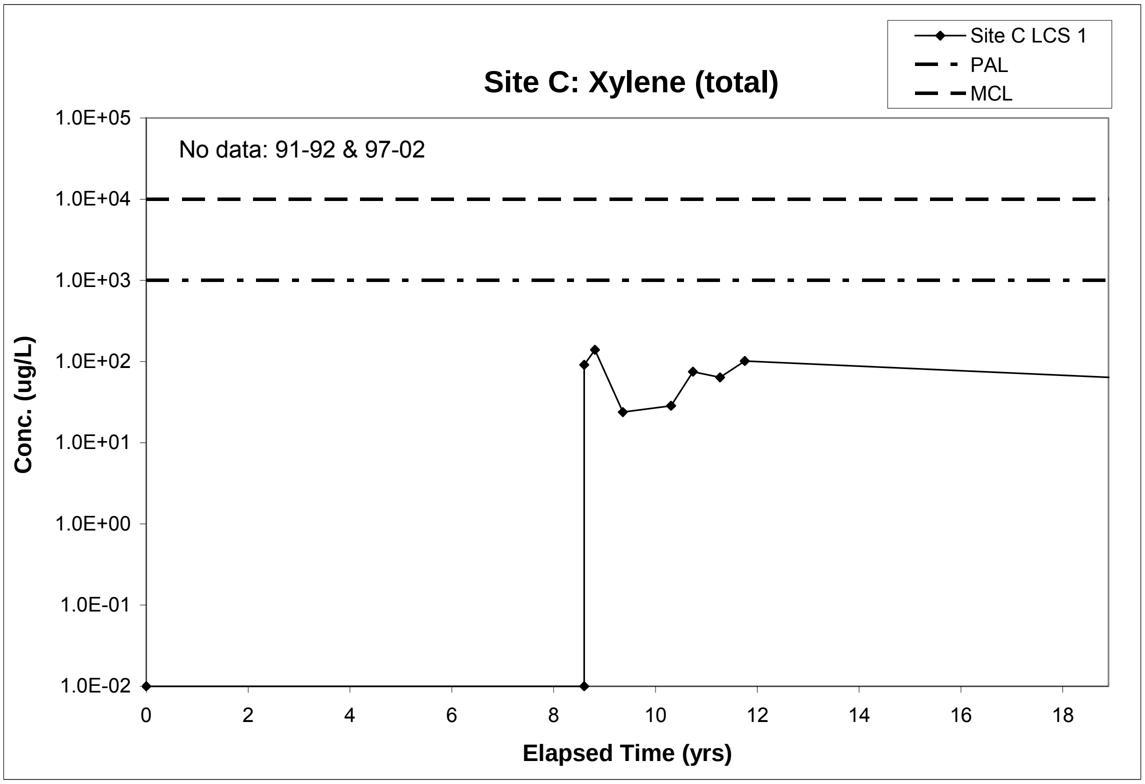

Site DD: Vinyl Chloride
Site DD LCS 1
PAL
MCL
Nondetects: 98-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

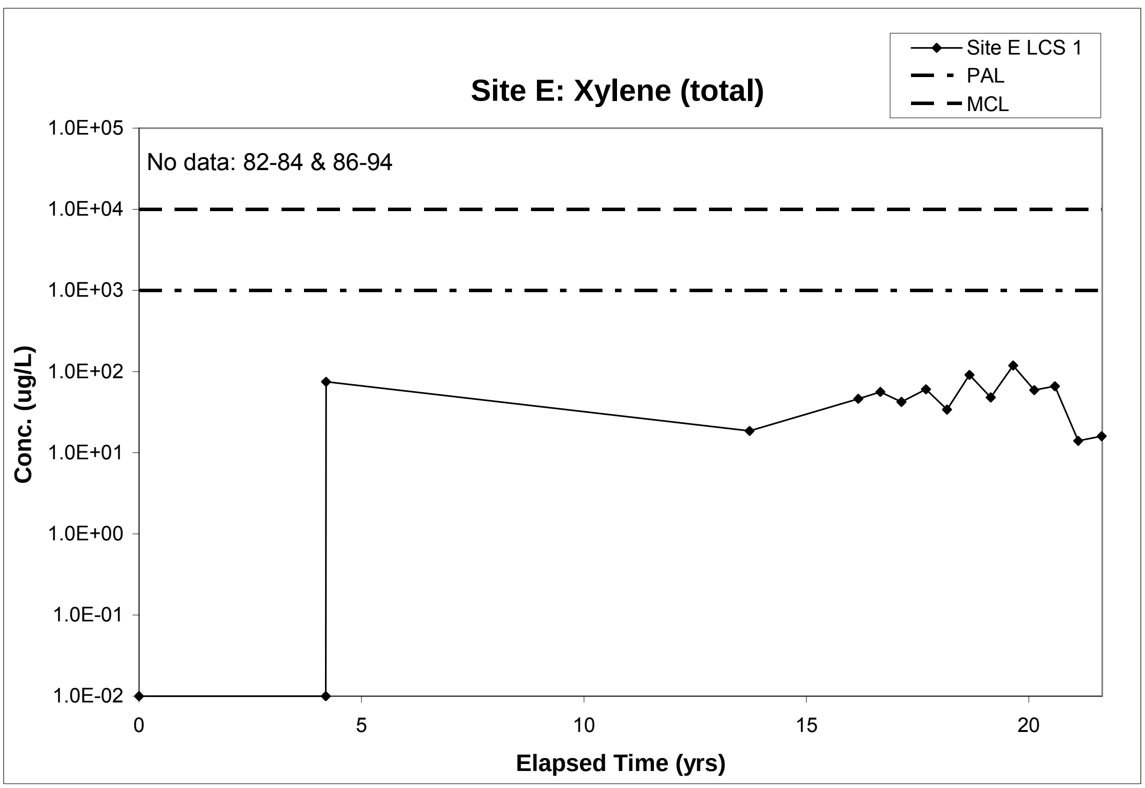

Site DD: Vinyl Chloride
Site DD LCS 2
PAL
MCL
Nondetects: 93-95 & 98-present
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

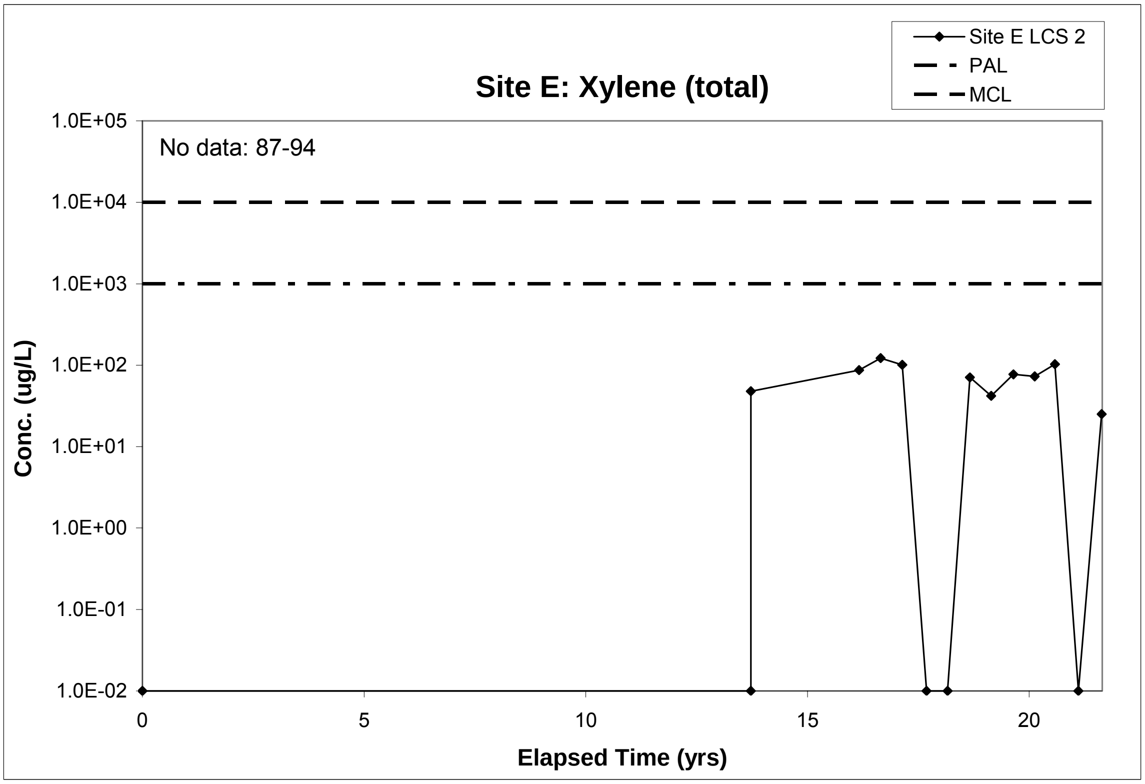

Site GG: Vinyl Chloride
Site GG LCS 2
PAL
MCL
Nondetects: 99-01
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

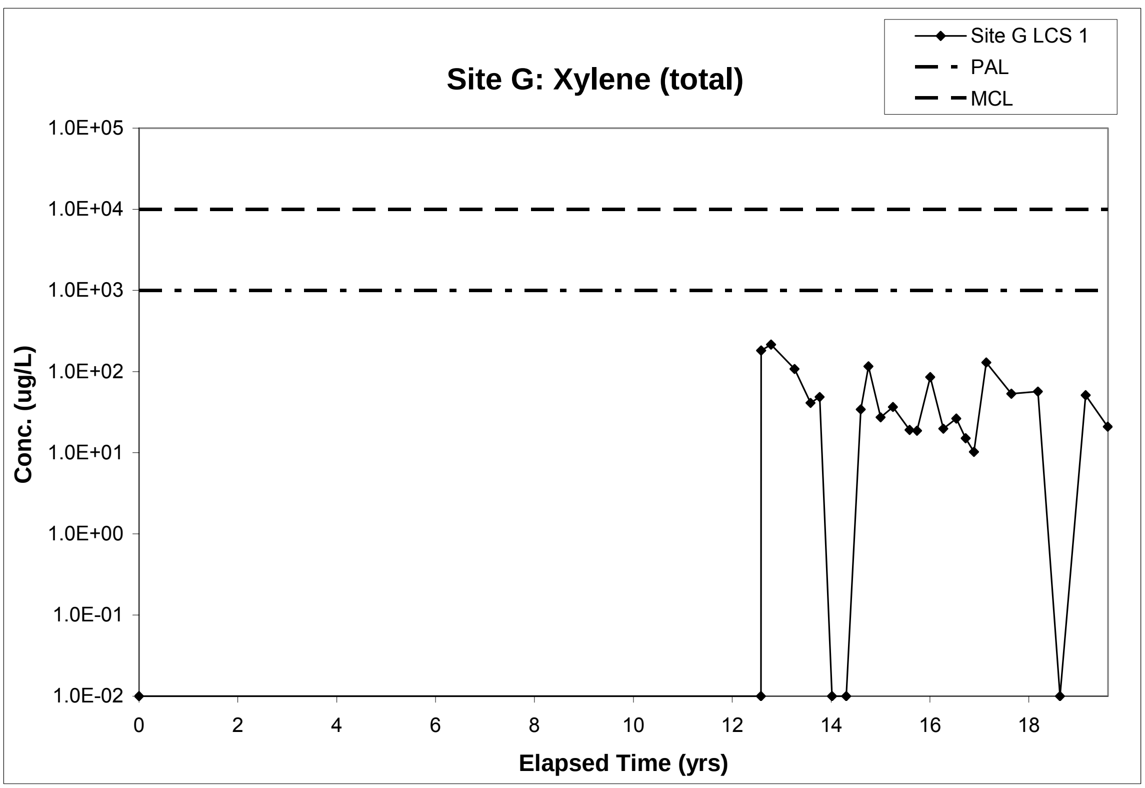

Site B: Xylene (total)
Site B LCS 1
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

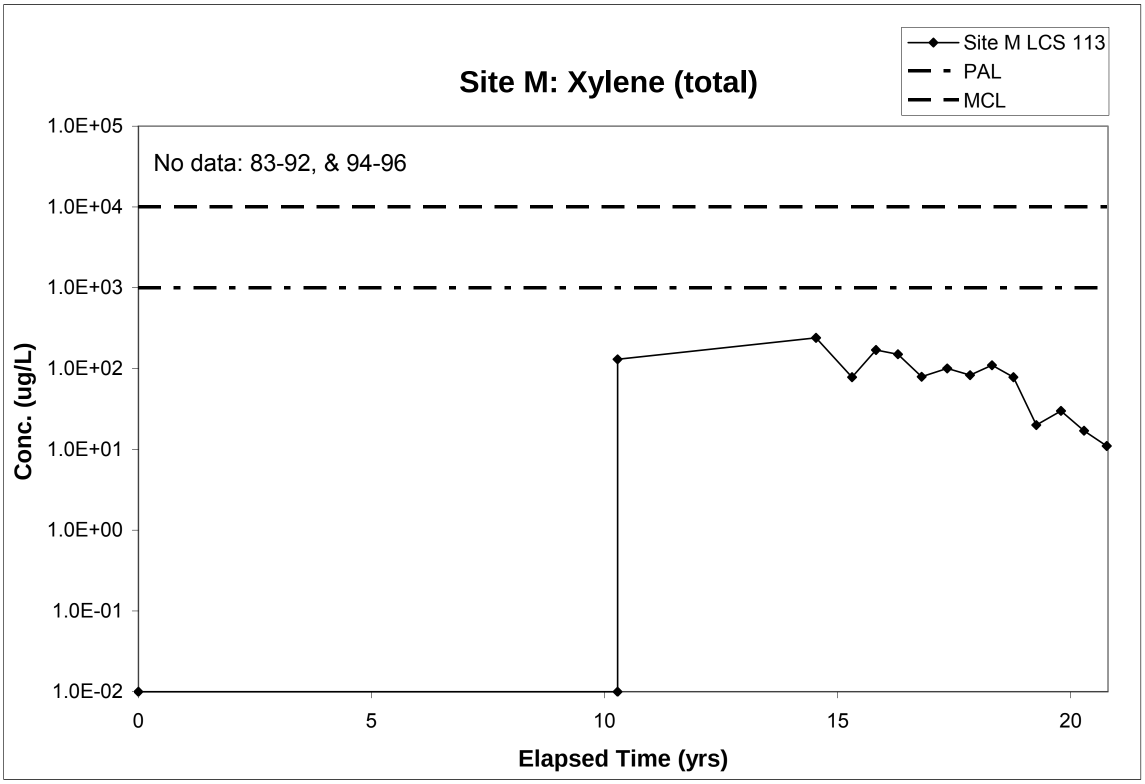

Site B: Xylene (total)
Site B LCS 2
PAL
MCL
No data 85-92 & 97-98
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

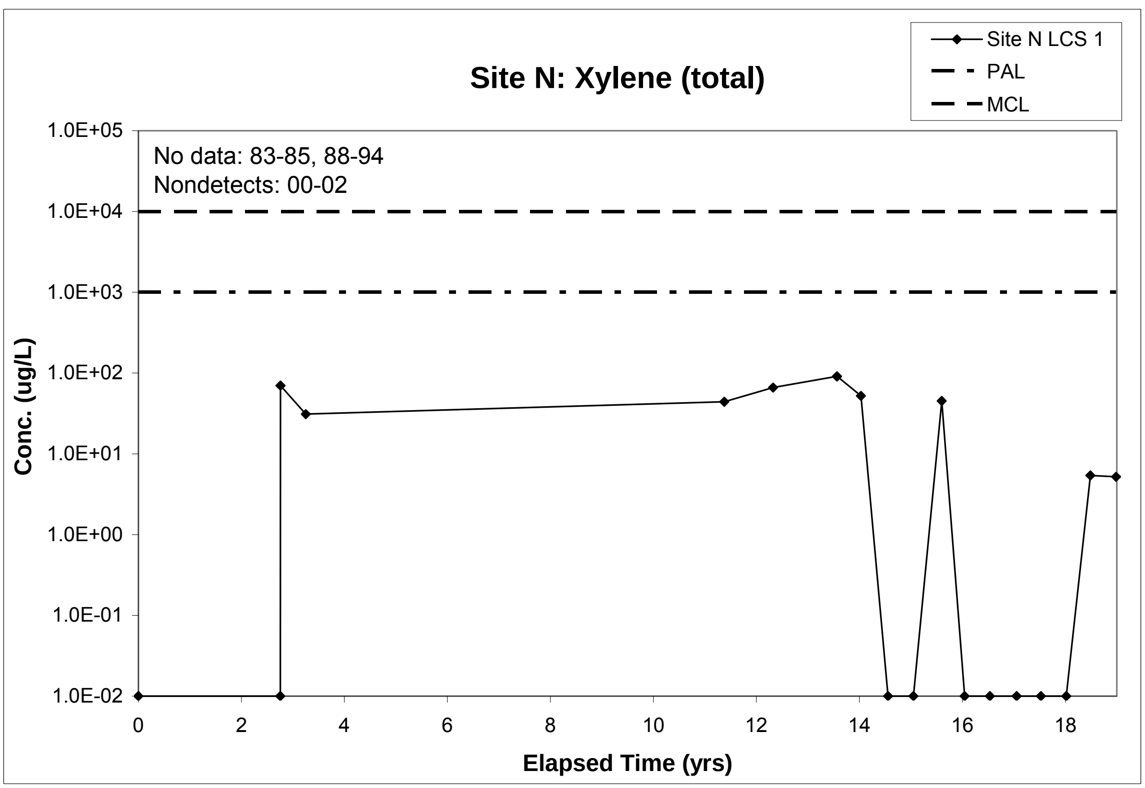

Site C: Xylene (total)
Site C LCS 1
PAL
MCL
No data: 91-92 & 97-02
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

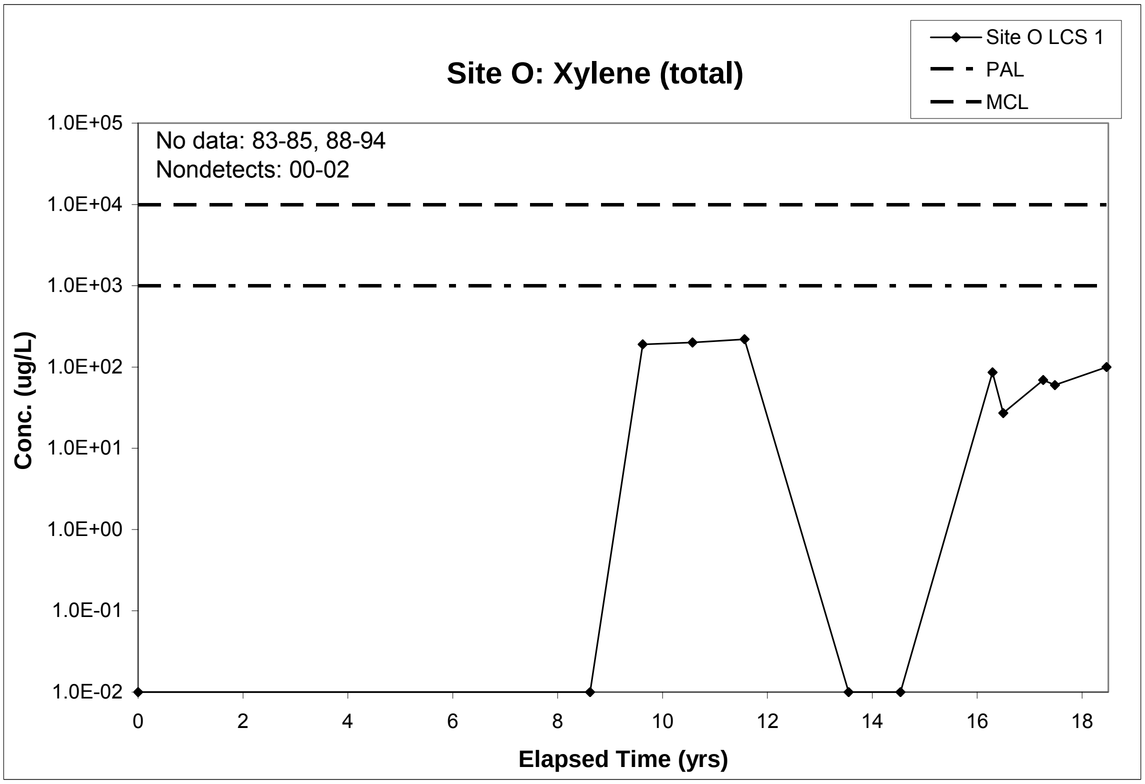

Site E: Xylene (total)
Site E LCS 1
PAL
MCL
No data: 82-84 & 86-94
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

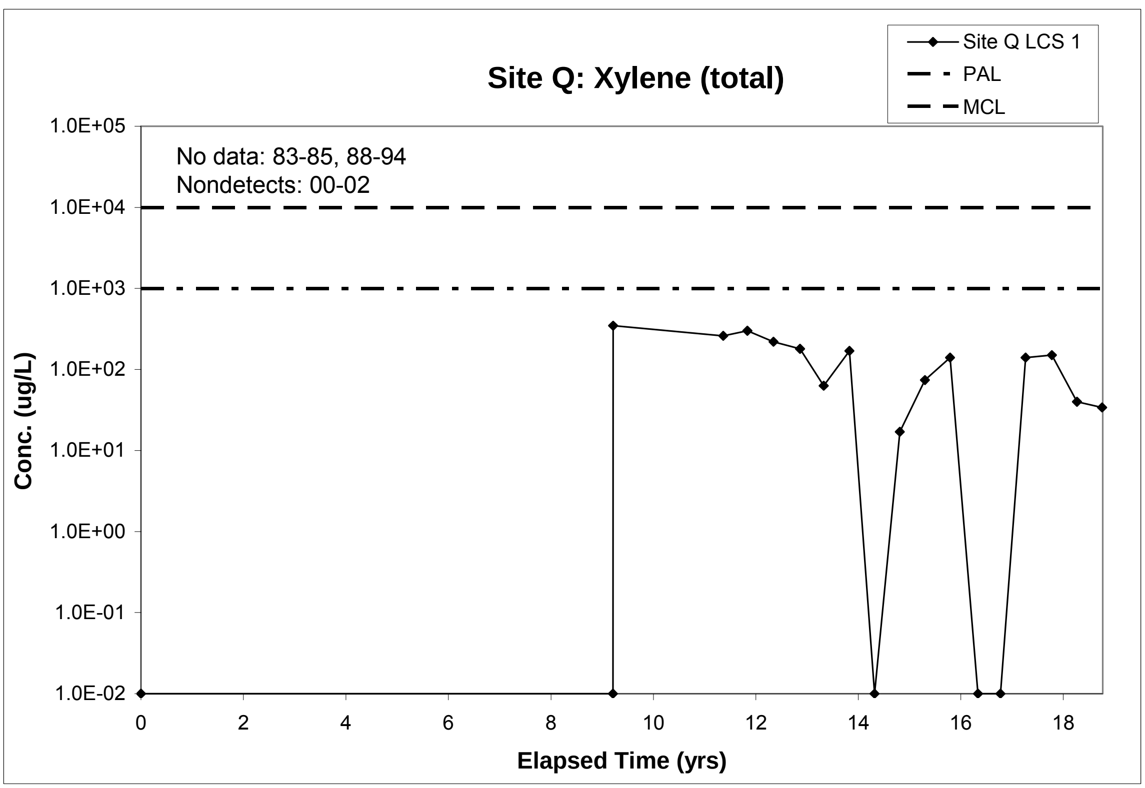

Site E LCS 2
PAL
MCL
Site E: Xylene (total)
No data: 87-94
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

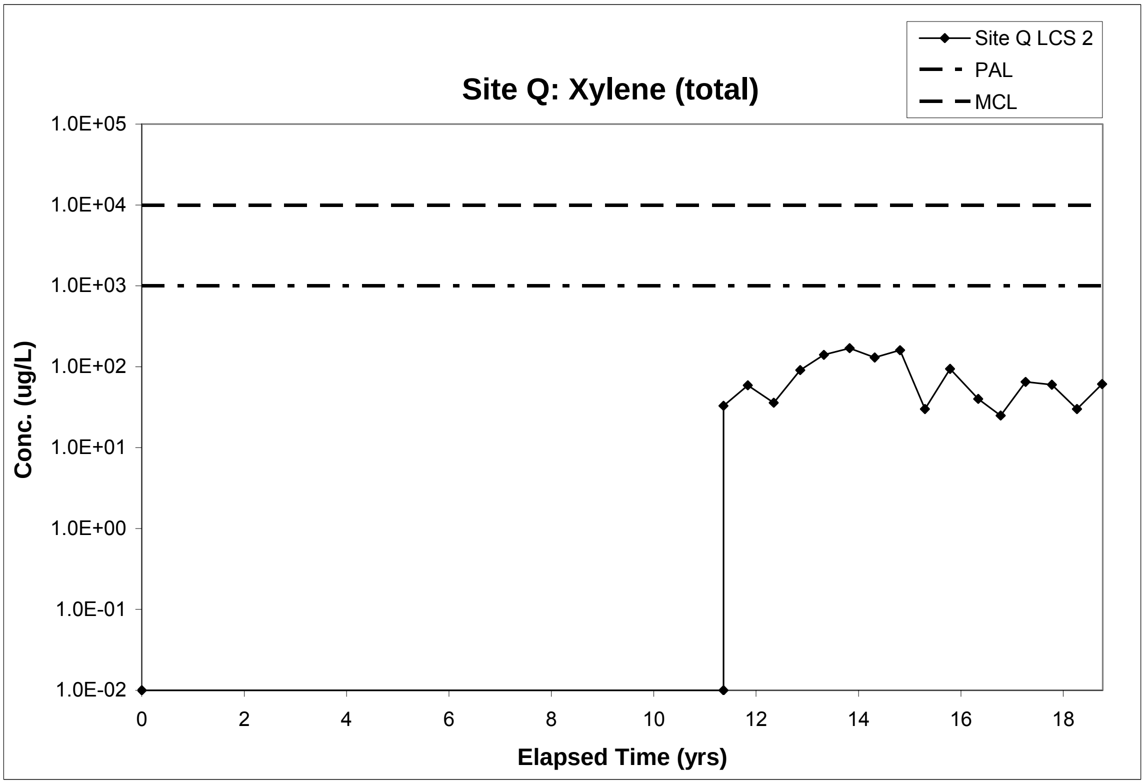

Site G LCS 1
PAL
MCL
Site G: Xylene (total)
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

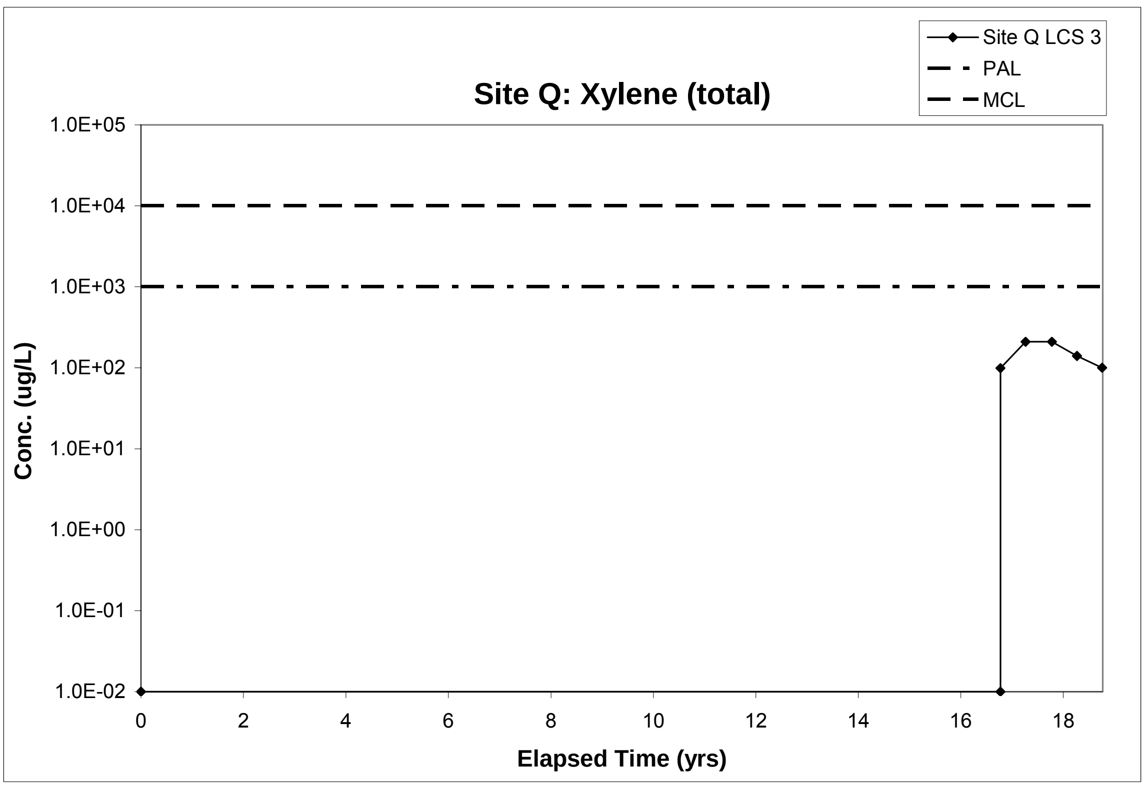

Site M: Xylene (total)
Site M LCS 113
PAL
MCL
No data: 83-92, & 94-96
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

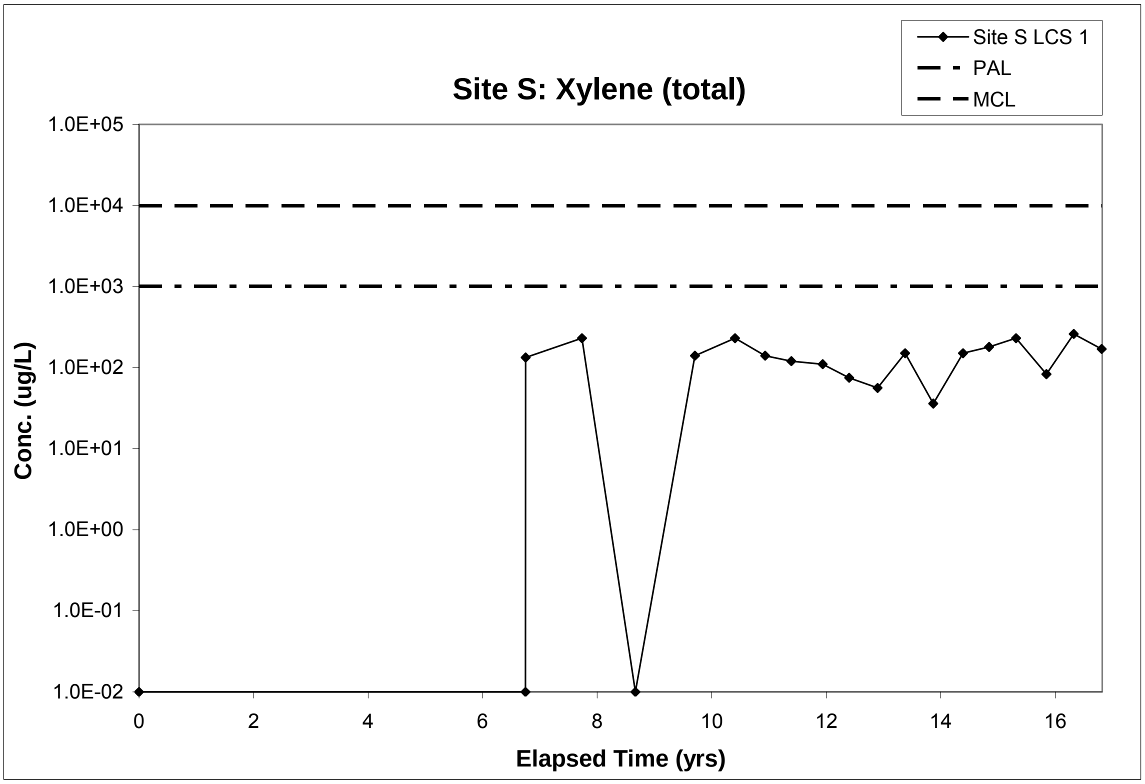

Site N: Xylene (total)
Site N LCS 1
PAL
MCL
No data: 83-85, 88-94
Nondetects: 00-02
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

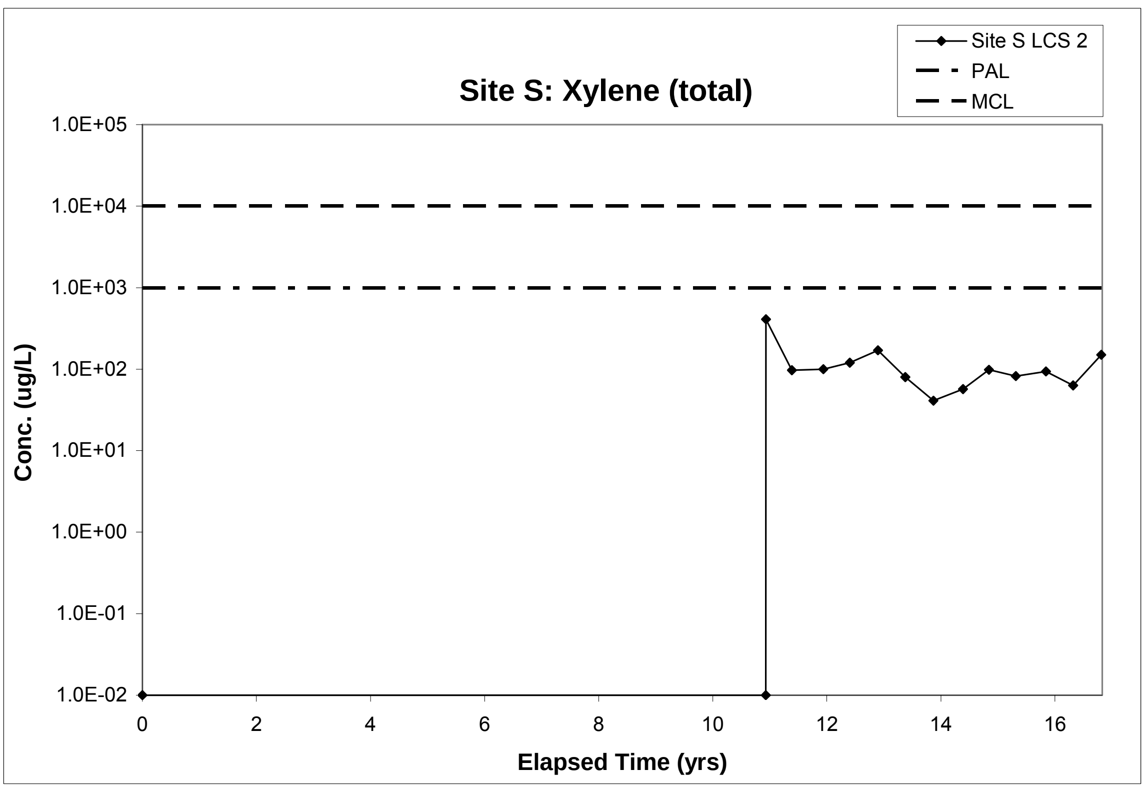

Site O: Xylene (total)
Site O LCS 1
PAL
MCL
No data: 83-85, 88-94
Nondetects: 00-02
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

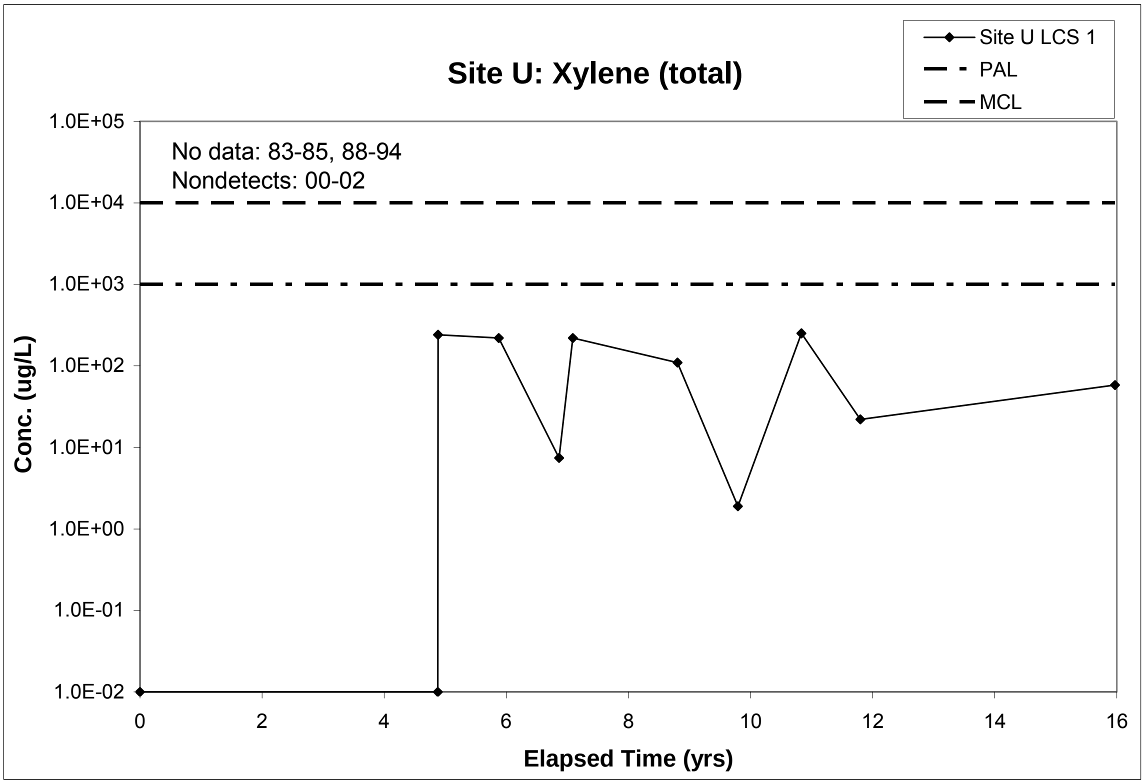

Site Q: Xylene (total)
Site Q LCS 1
PAL
MCL
No data: 83-85, 88-94
Nondetects: 00-02
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

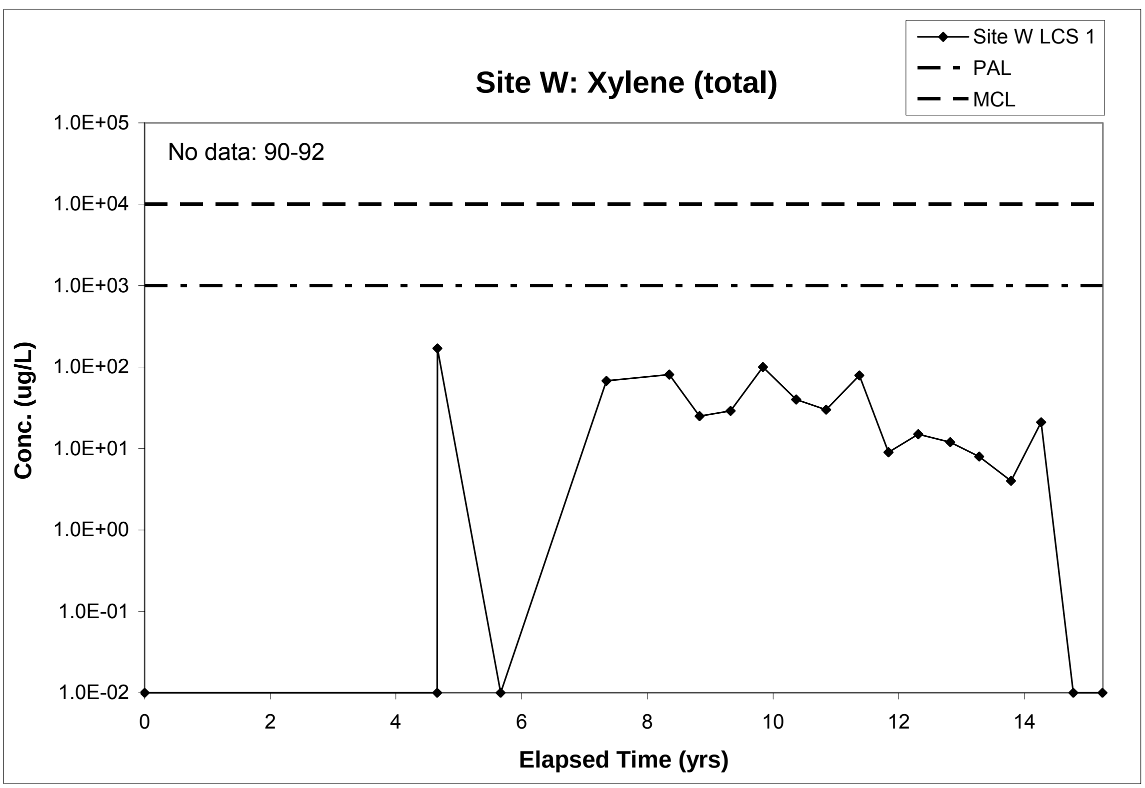

Site Q: Xylene (total)
Site Q LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

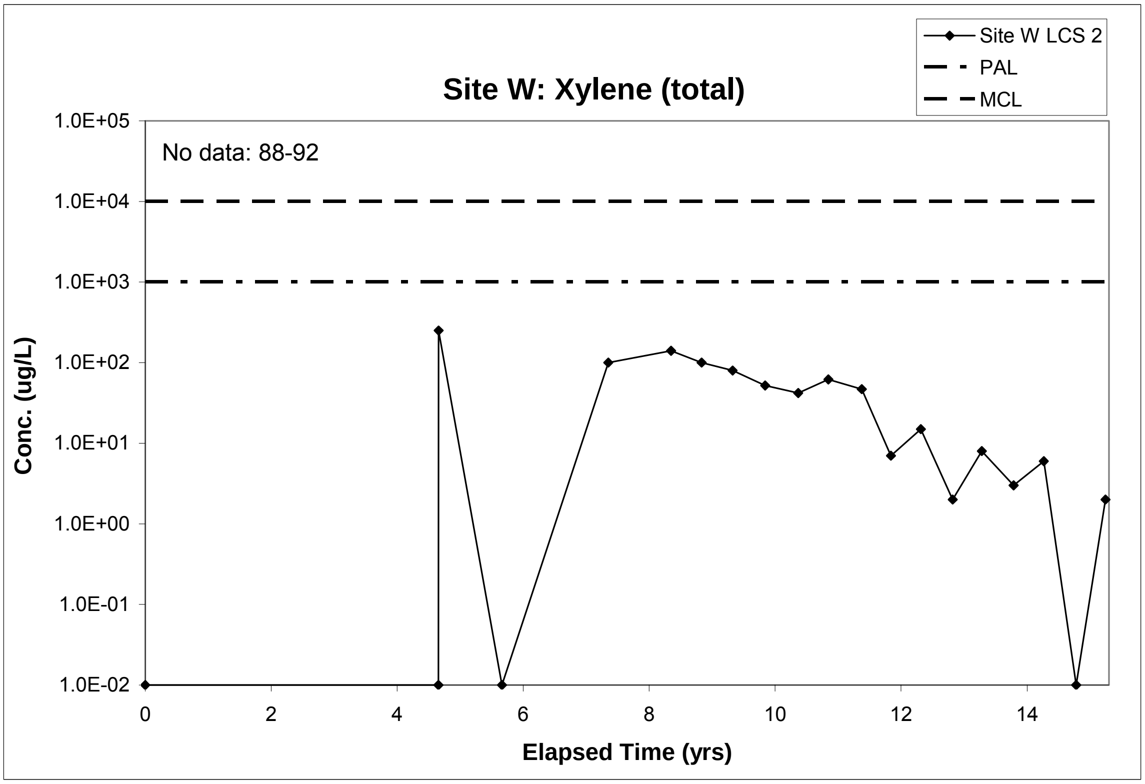

Site Q: Xylene (total)
Site Q LCS 3
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

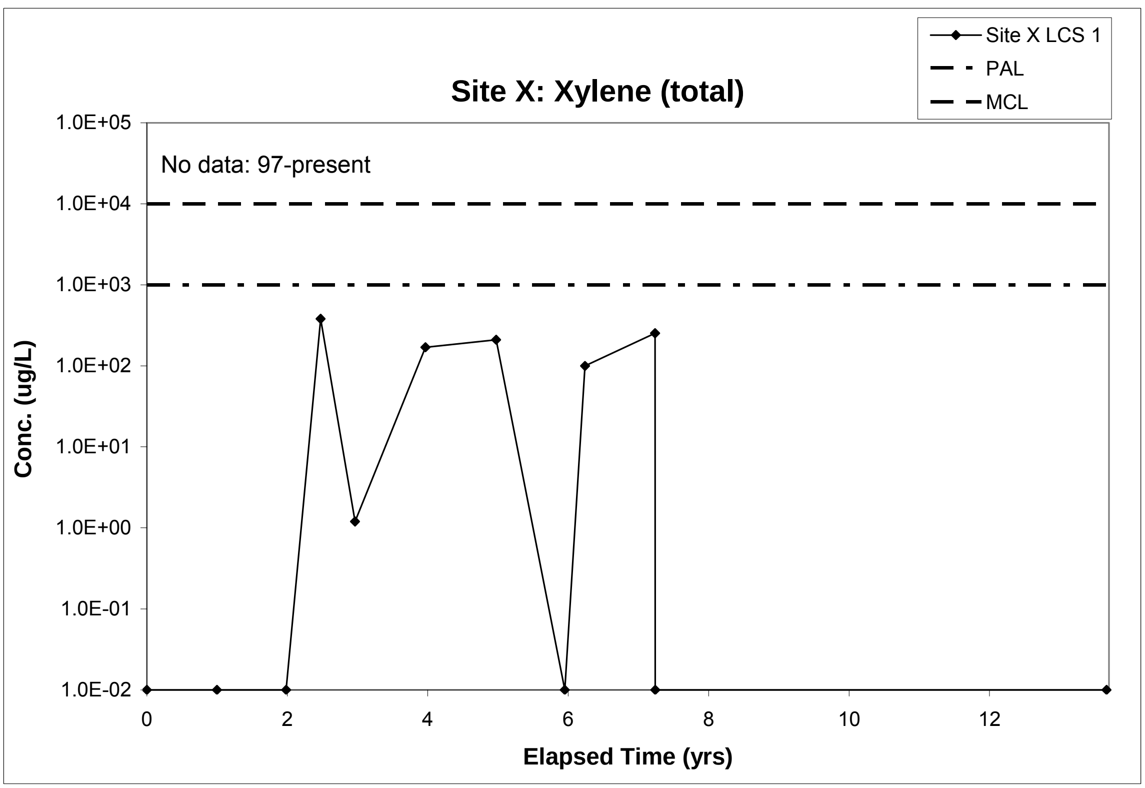

Site S: Xylene (total)
Site S LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

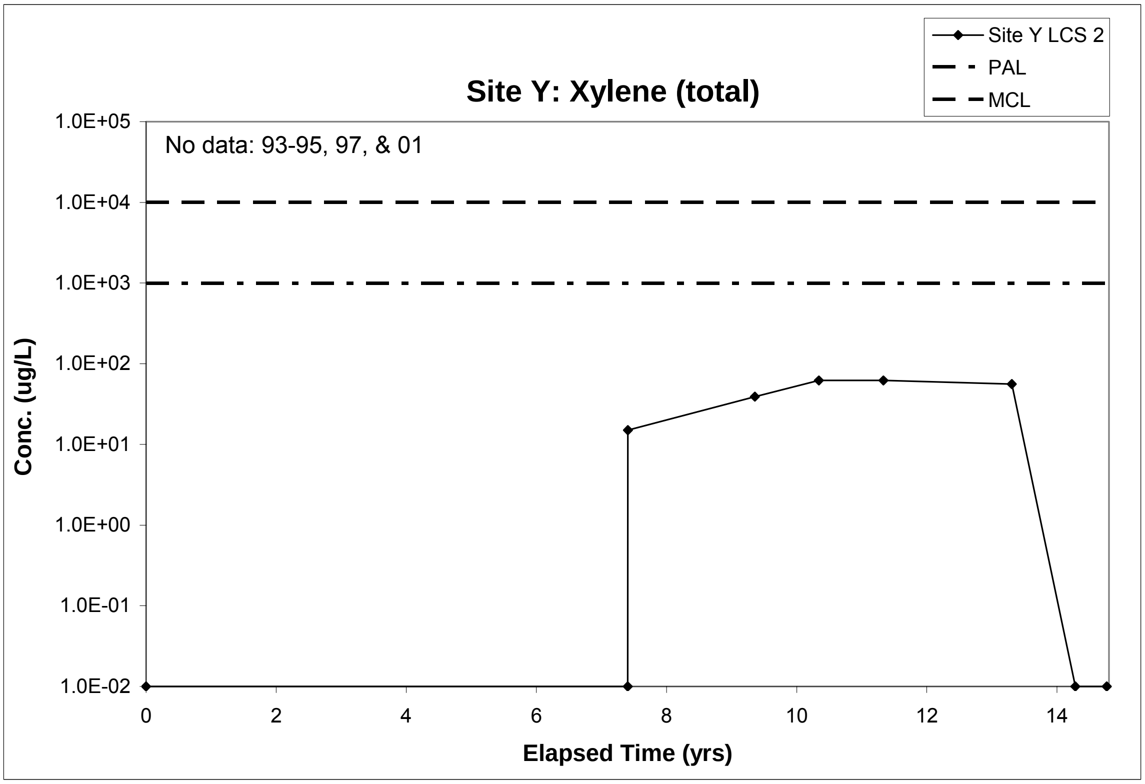

Site S: Xylene (total)
Site S LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

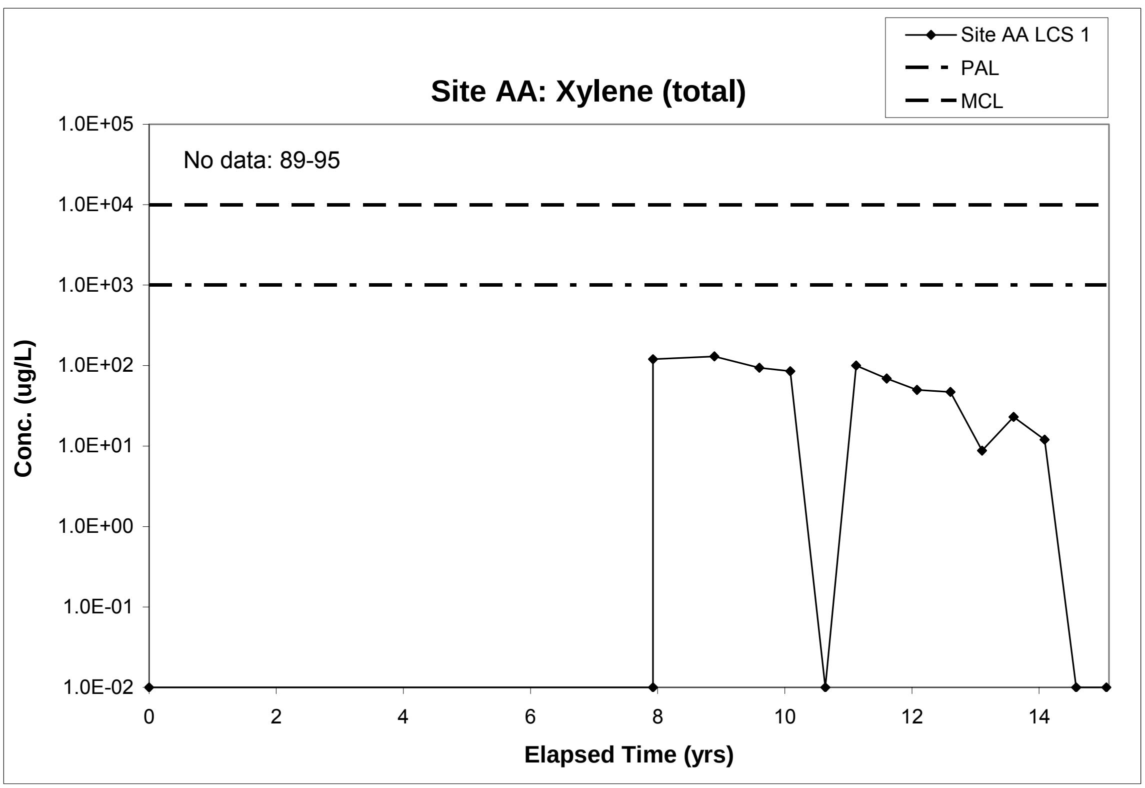

Site U: Xylene (total)
Site U LCS 1
PAL
MCL
No data: 83-85, 88-94
Nondetects: 00-02
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

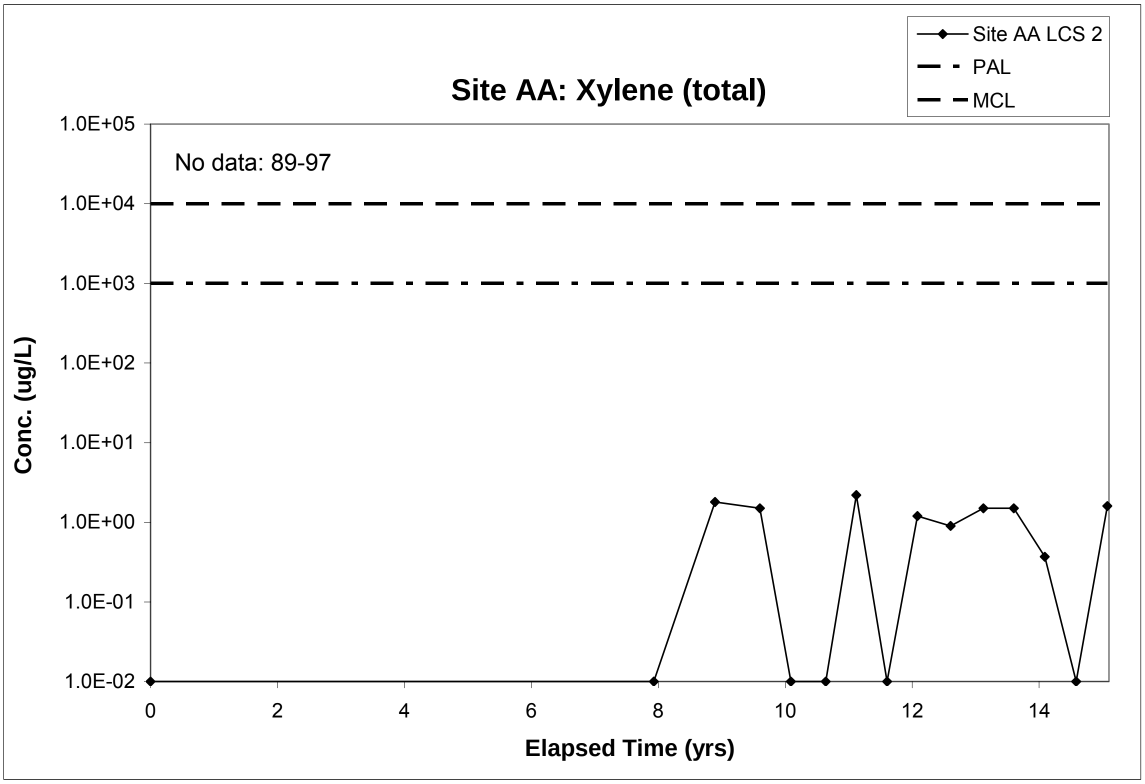

Site W: Xylene (total)
Site W LCS 1
PAL
MCL
No data: 90-92
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

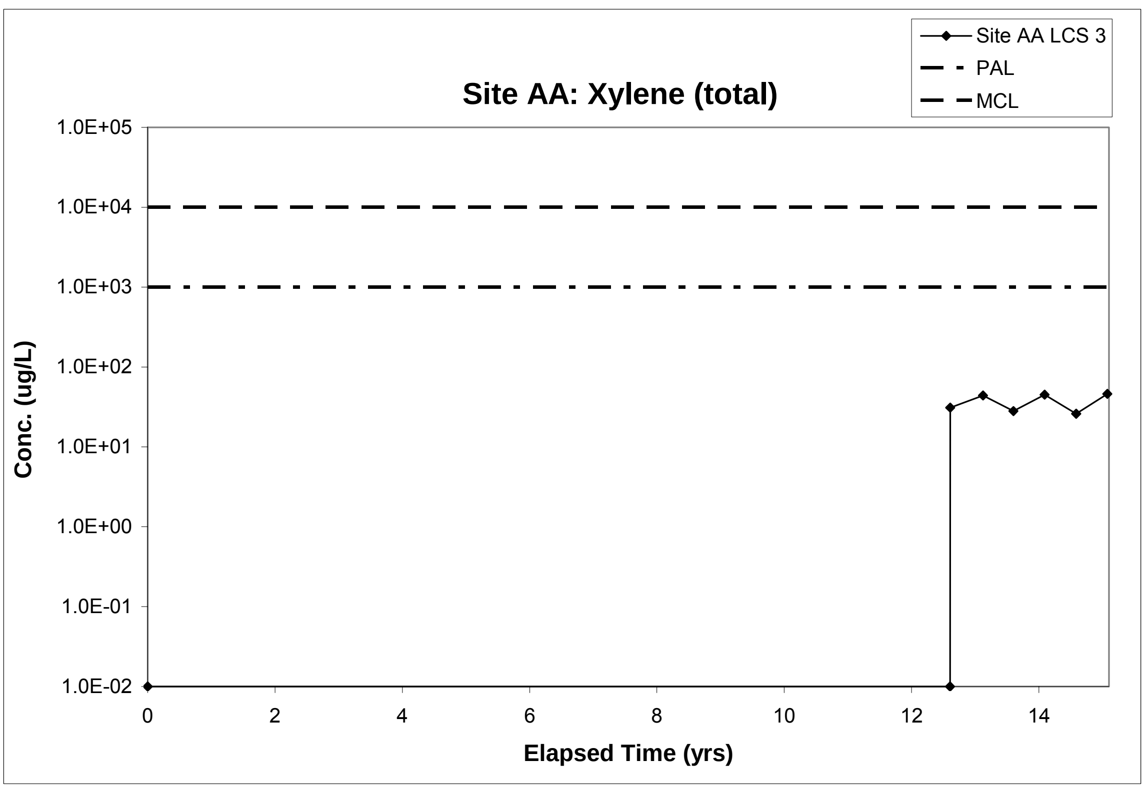

Site W: Xylene (total)
Site W LCS 2
PAL
MCL
No data: 88-92
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

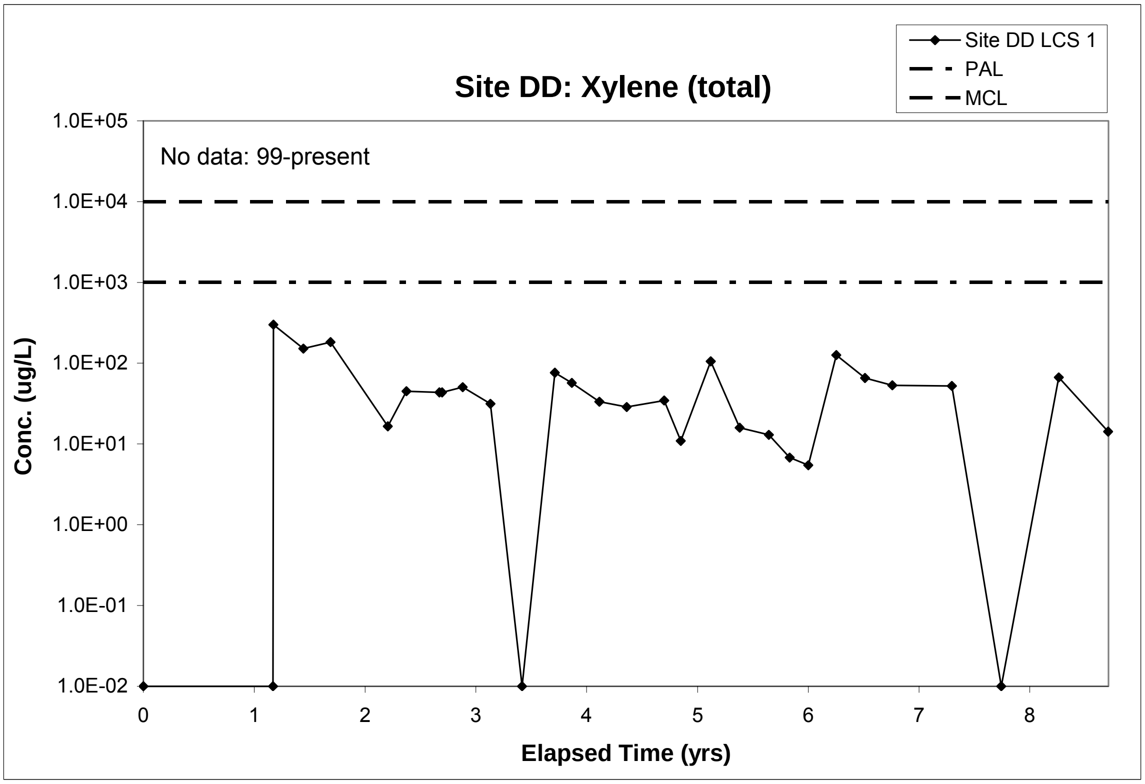

Site X: Xylene (total)
Site X LCS 1
PAL
MCL
No data: 97-present
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

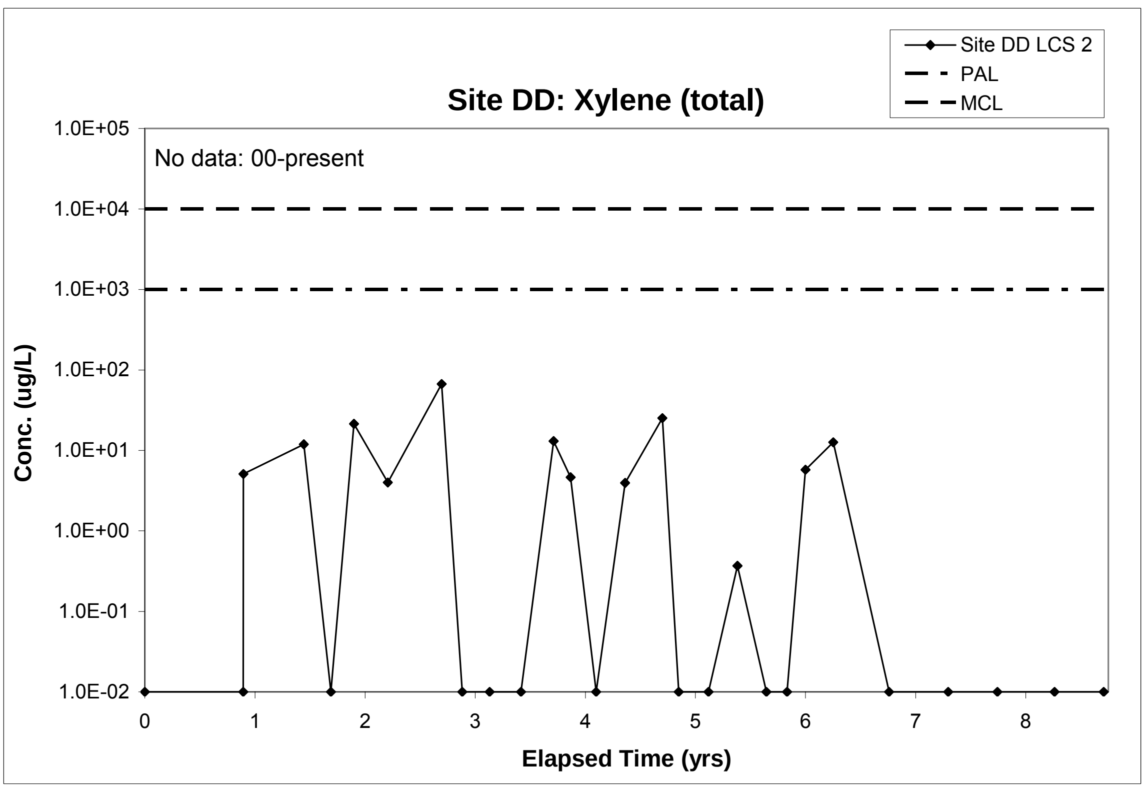

Site Y: Xylene (total)
Site Y LCS 2
PAL
MCL
No data: 93-95, 97, & 01
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

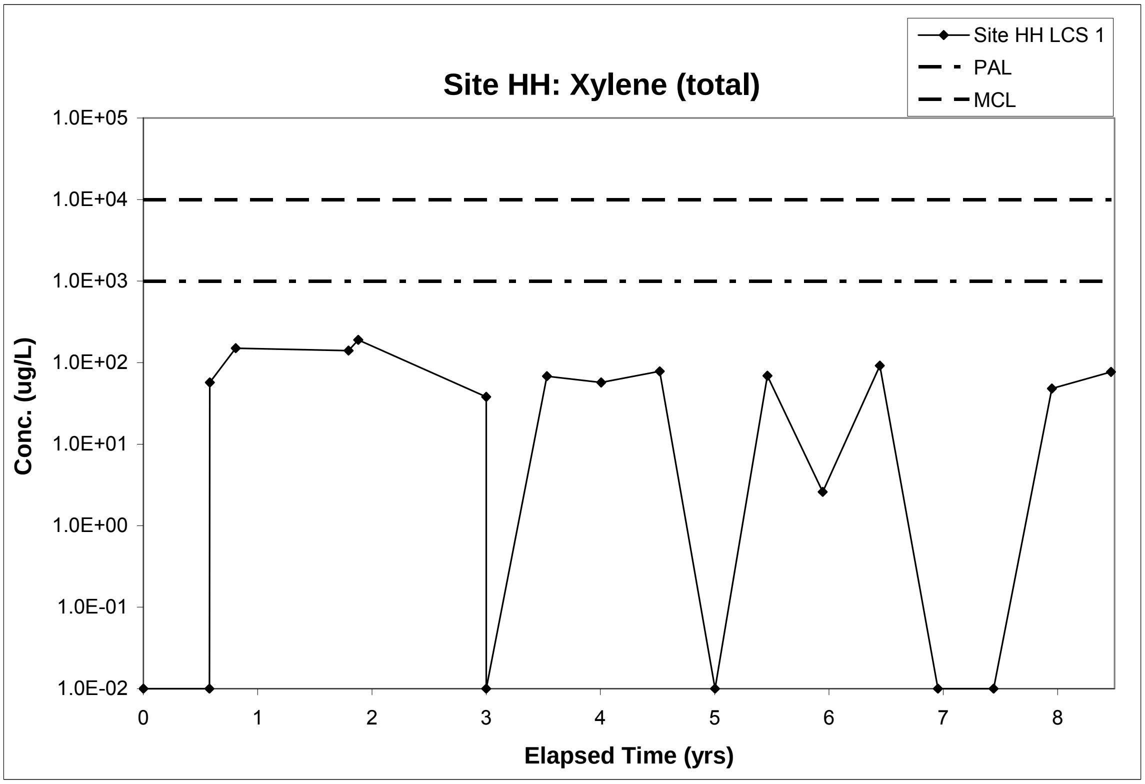

Site AA: Xylene (total)
Site AA LCS 1
PAL
MCL
No data: 89-95
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)


Site AA: Xylene (total)
Site AA LCS 2
PAL
MCL
No data: 89-97
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

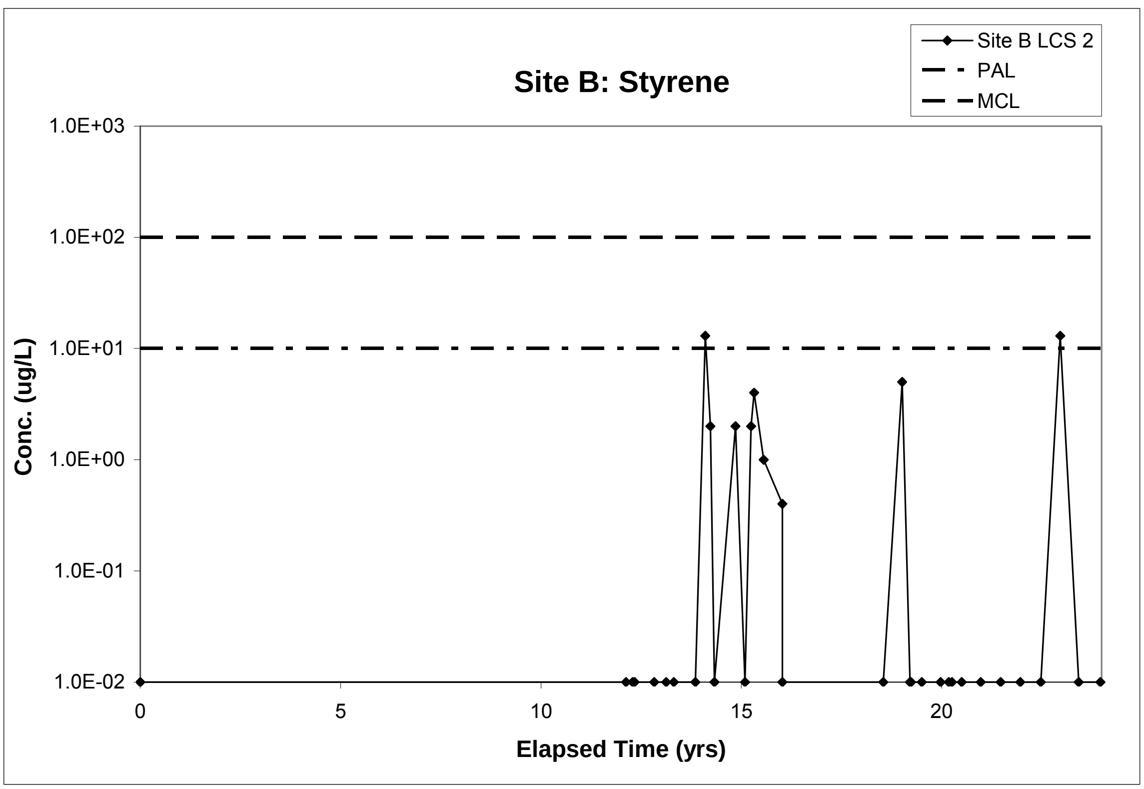

Site AA: Xylene (total)
Site AA LCS 3
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)


Site DD: Xylene (total)
Site DD LCS 1
PAL
MCL
No data: 99-present
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

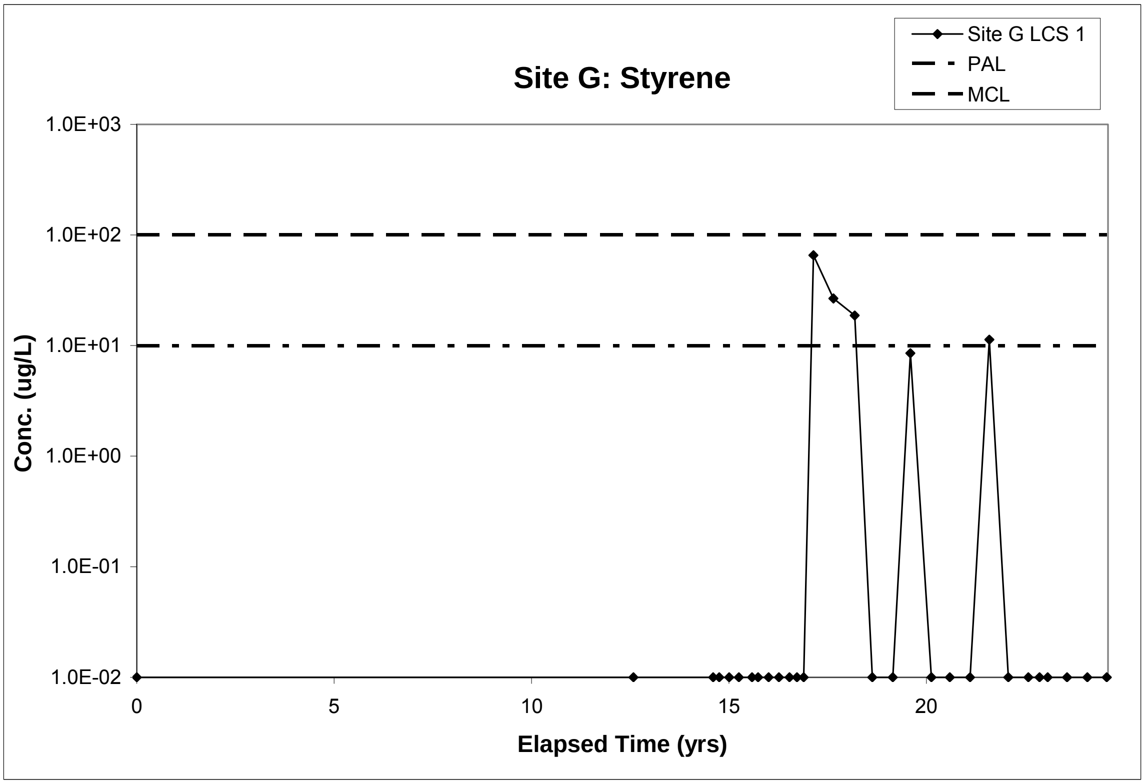

Site DD: Xylene (total)
Site DD LCS 2
PAL
MCL
No data: 00-present
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

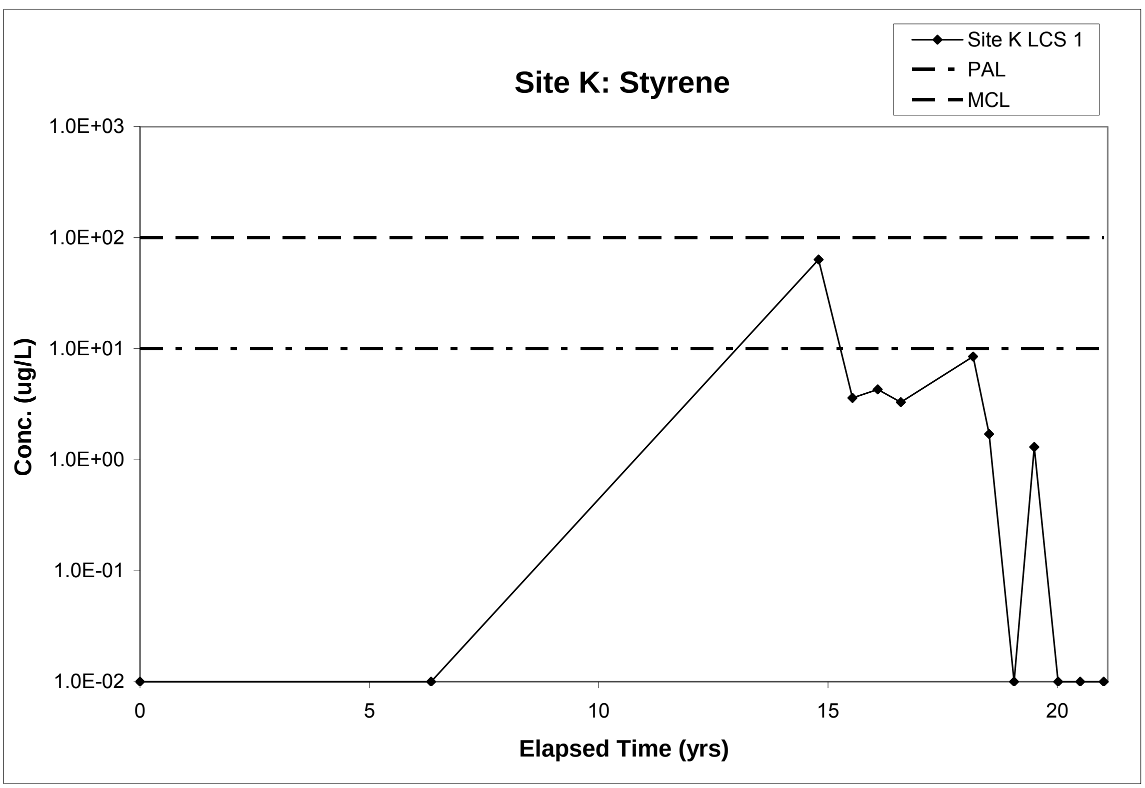


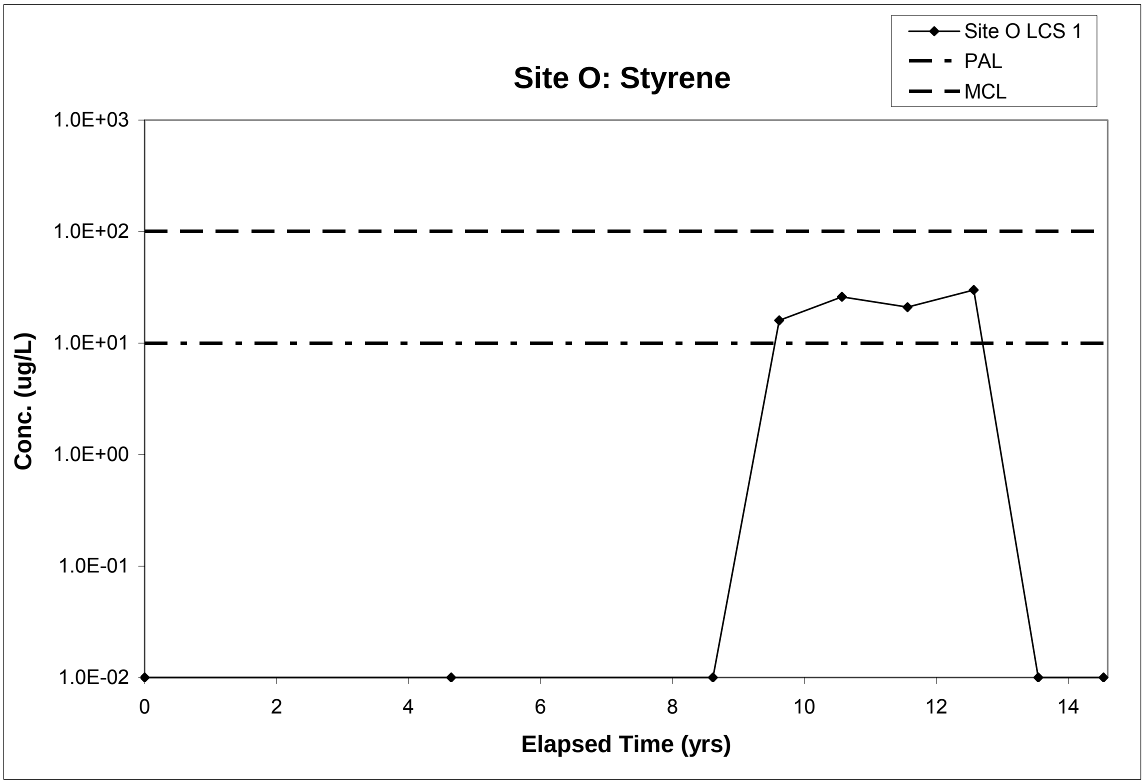
Site HH: Xylene (total)
Site HH LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

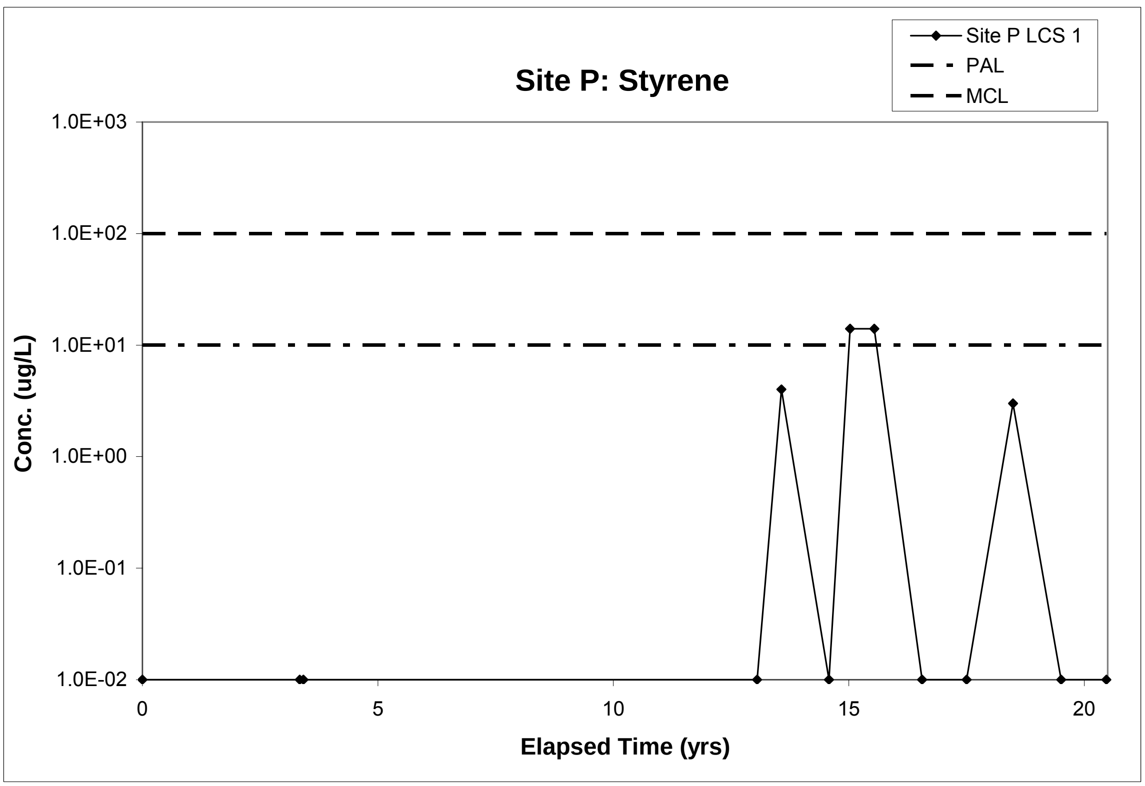


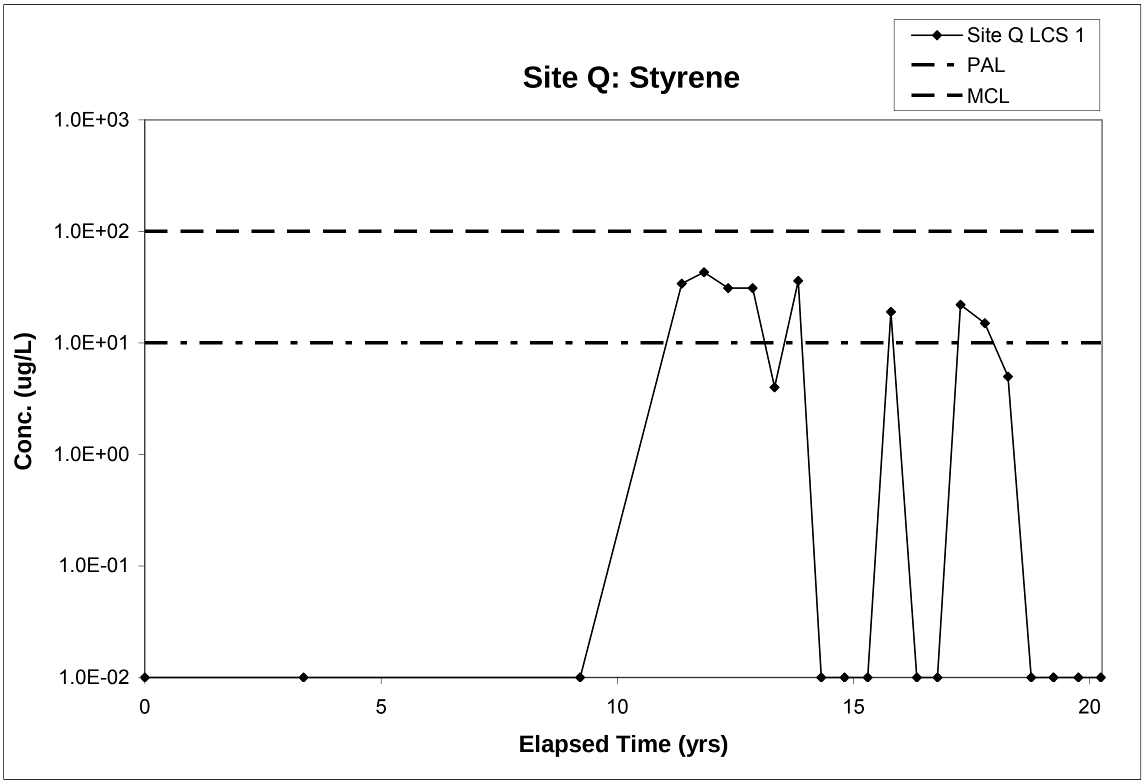
Site B: Styrene
Site B LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

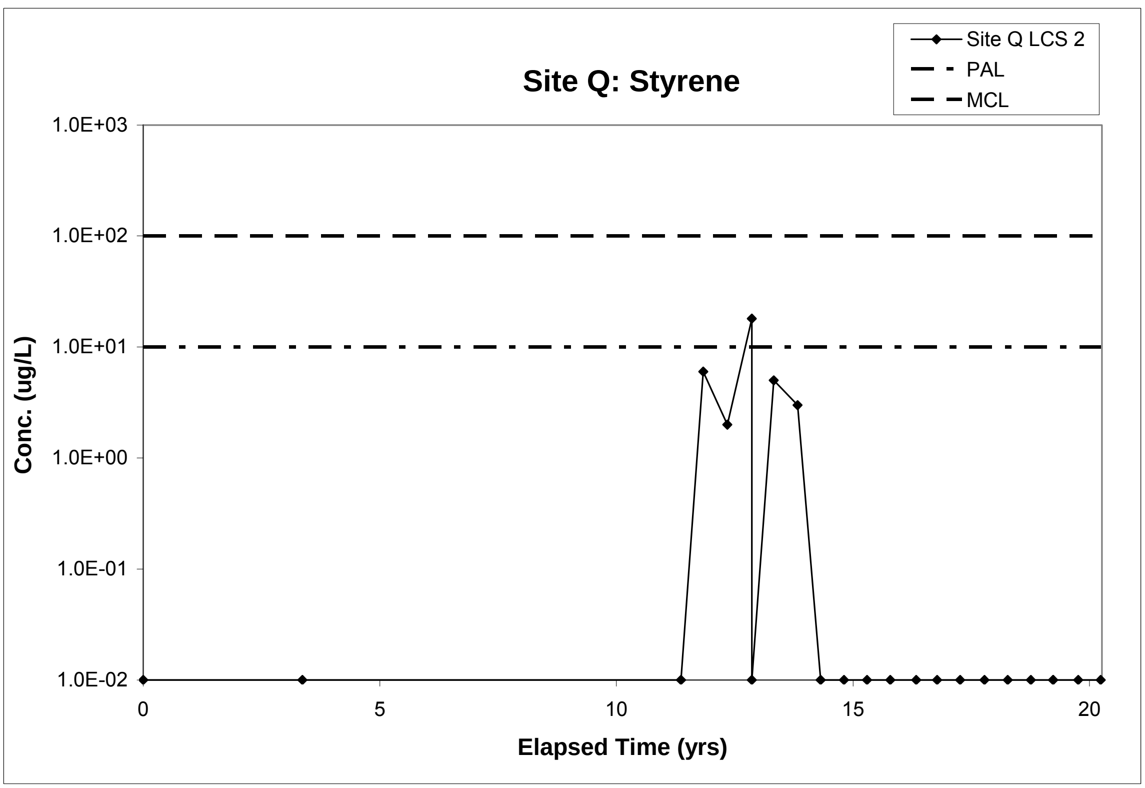

Site G: Styrene
Site G LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

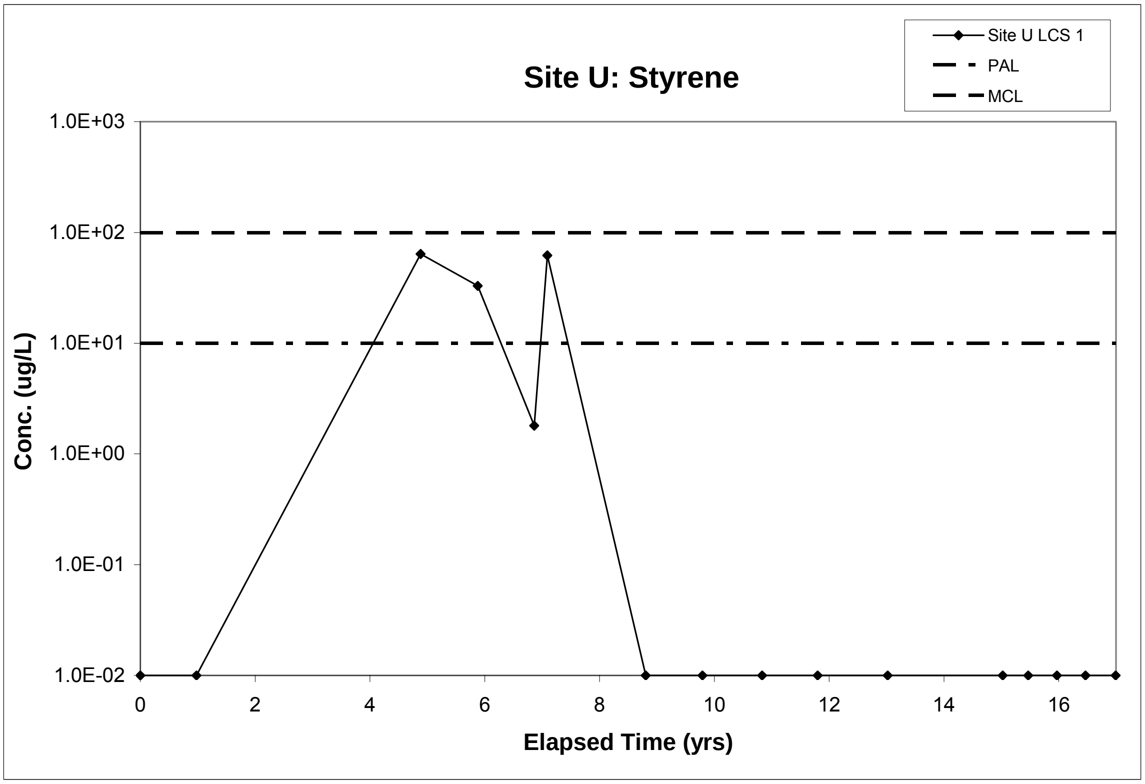

Site K: Styrene
Site K LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

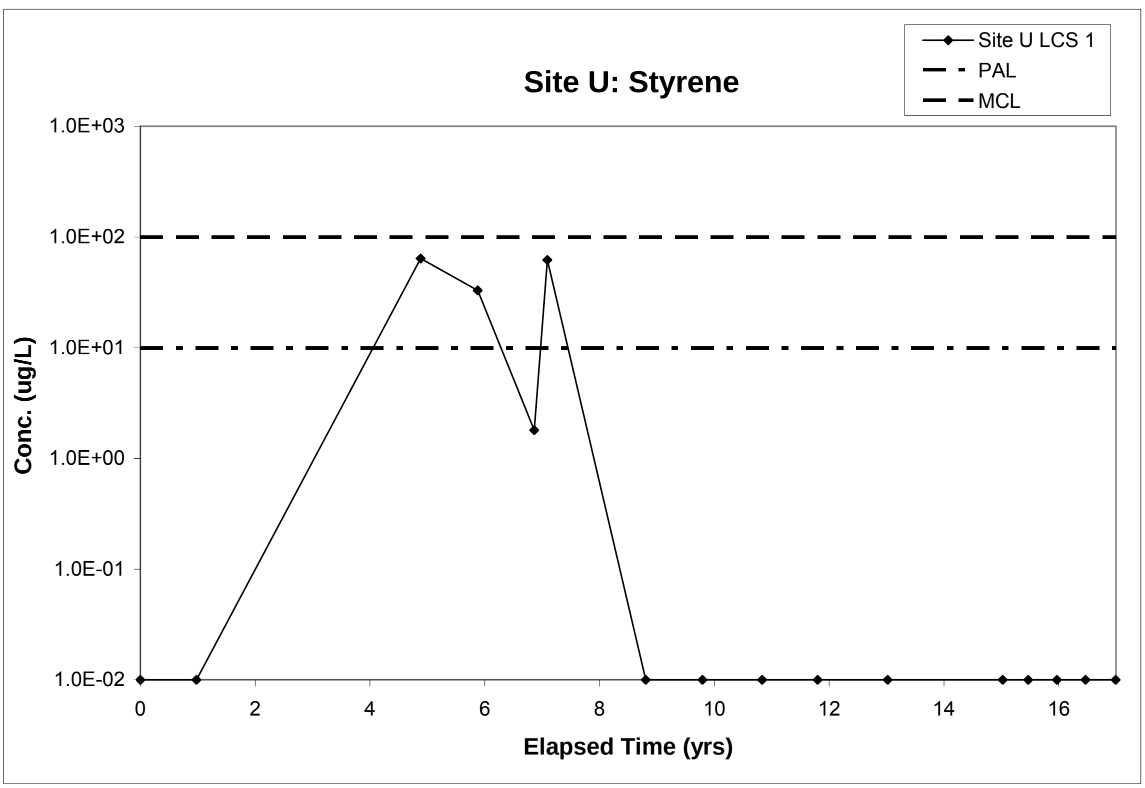

Site O: Styrene
Site O LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

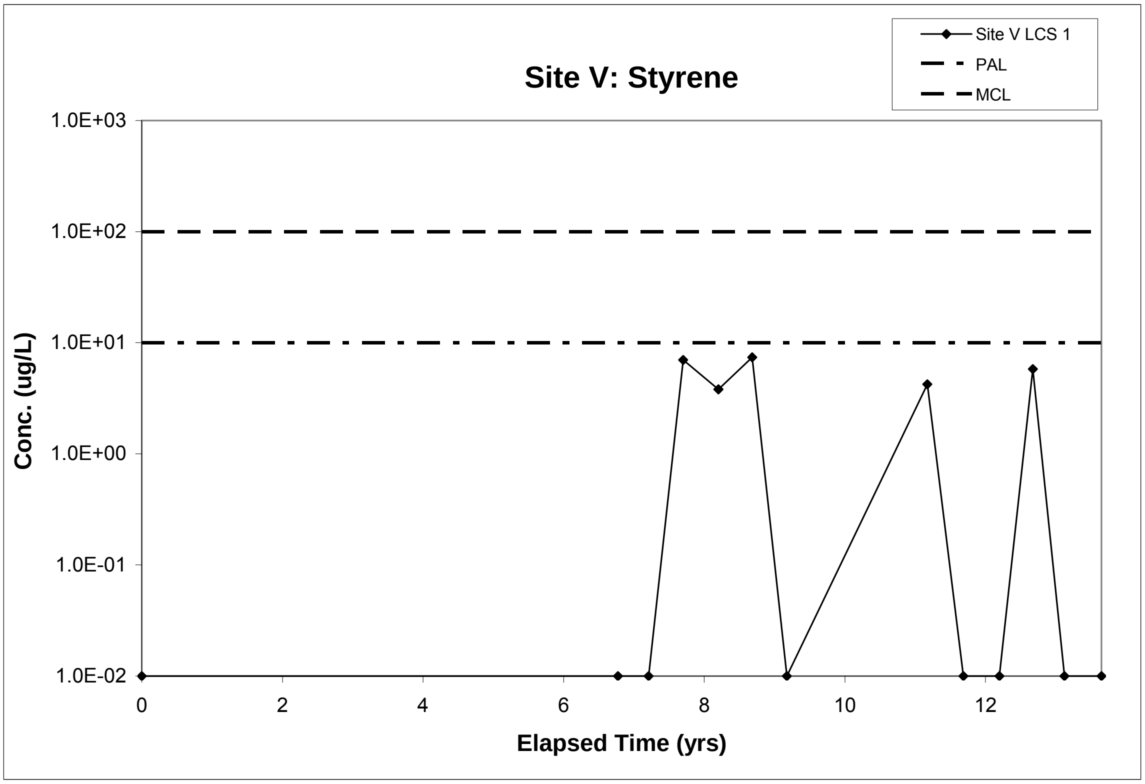

Site P: Styrene
Site P LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

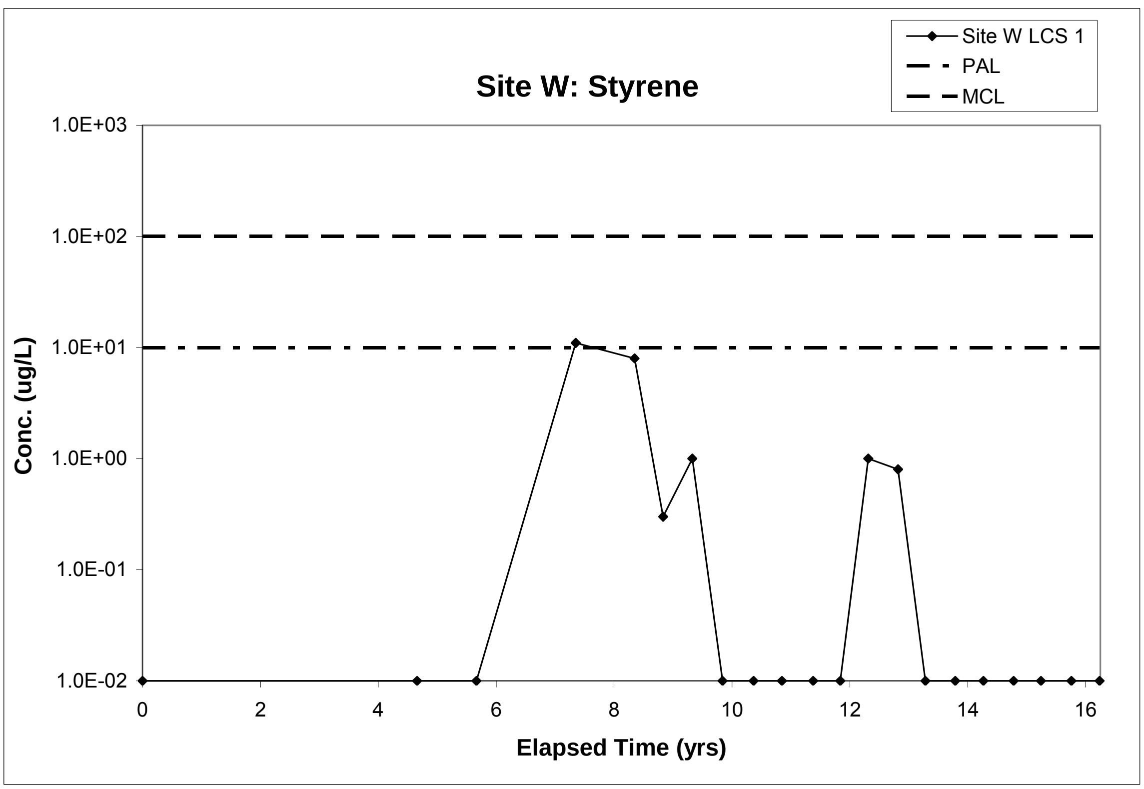

Site Q: Styrene
Site Q LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

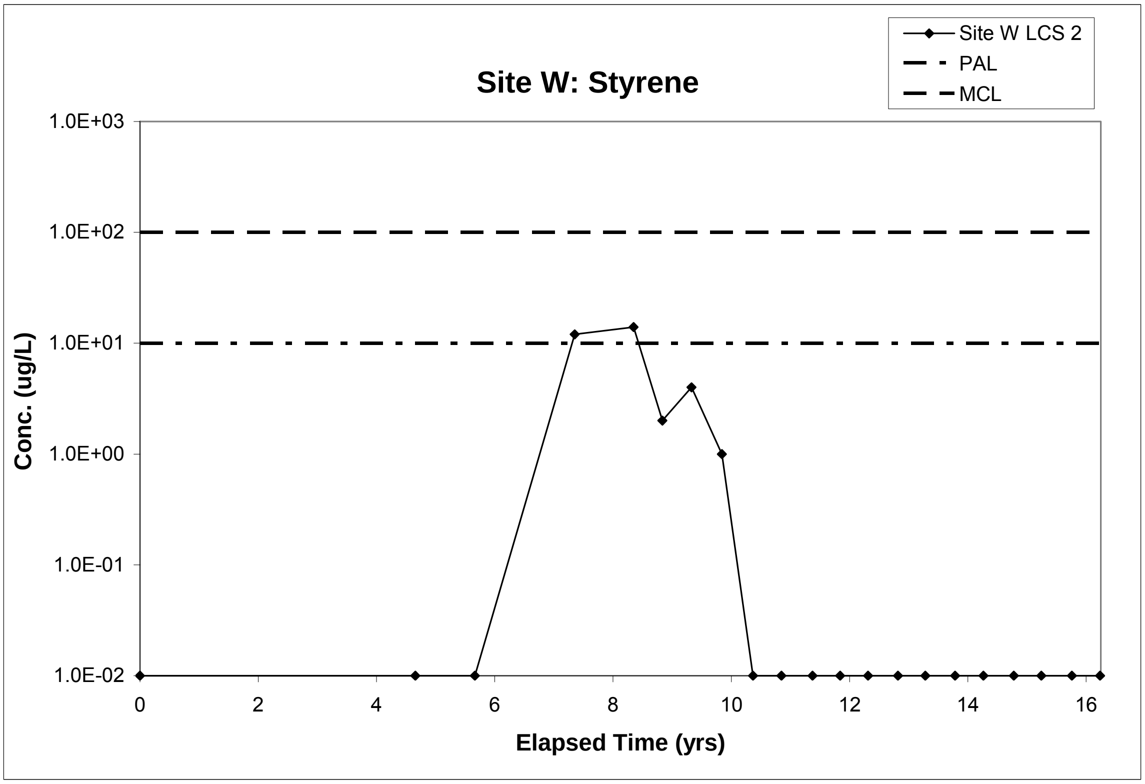

Site Q: Styrene
Site Q LCS 2
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

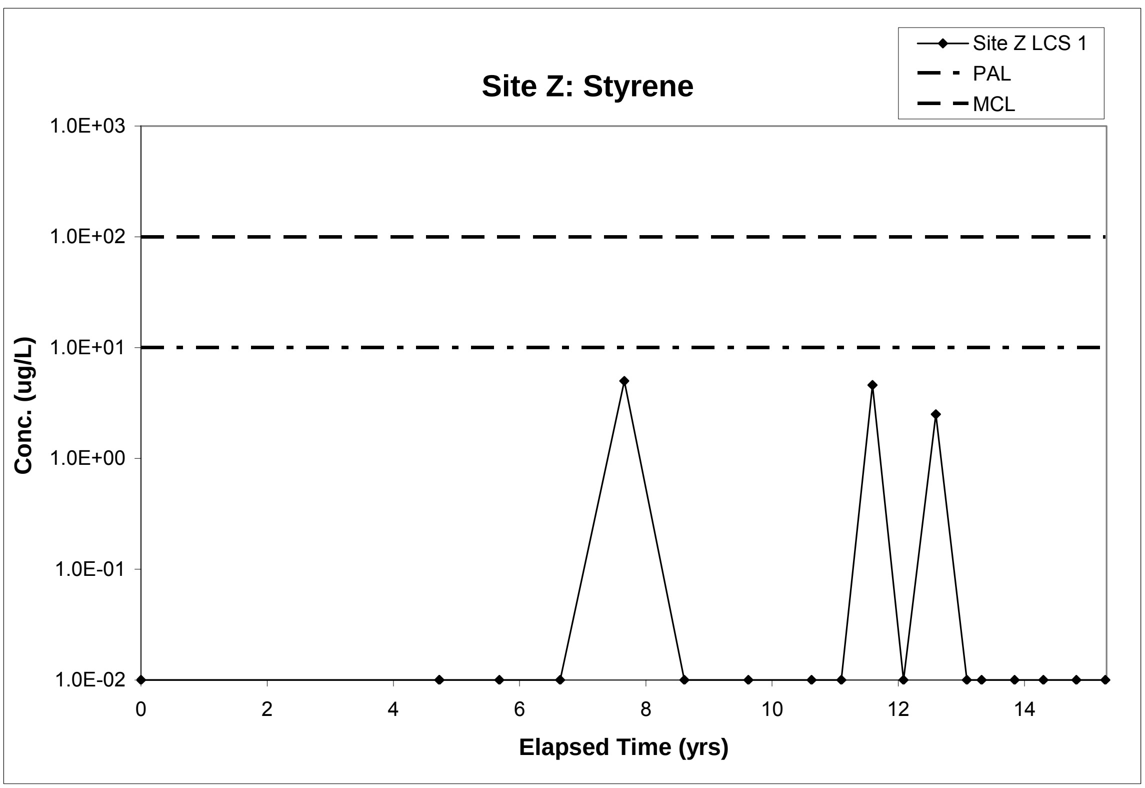

Site U: Styrene
Site U LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

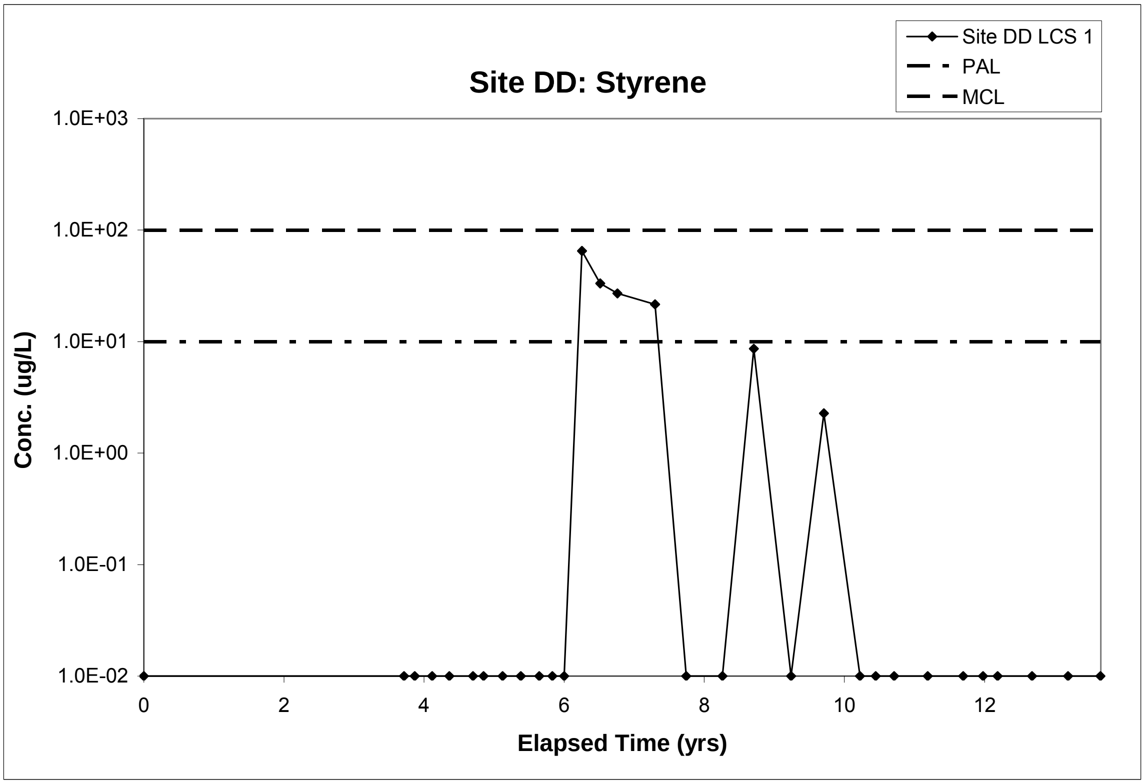

Site U: Styrene
Site U LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

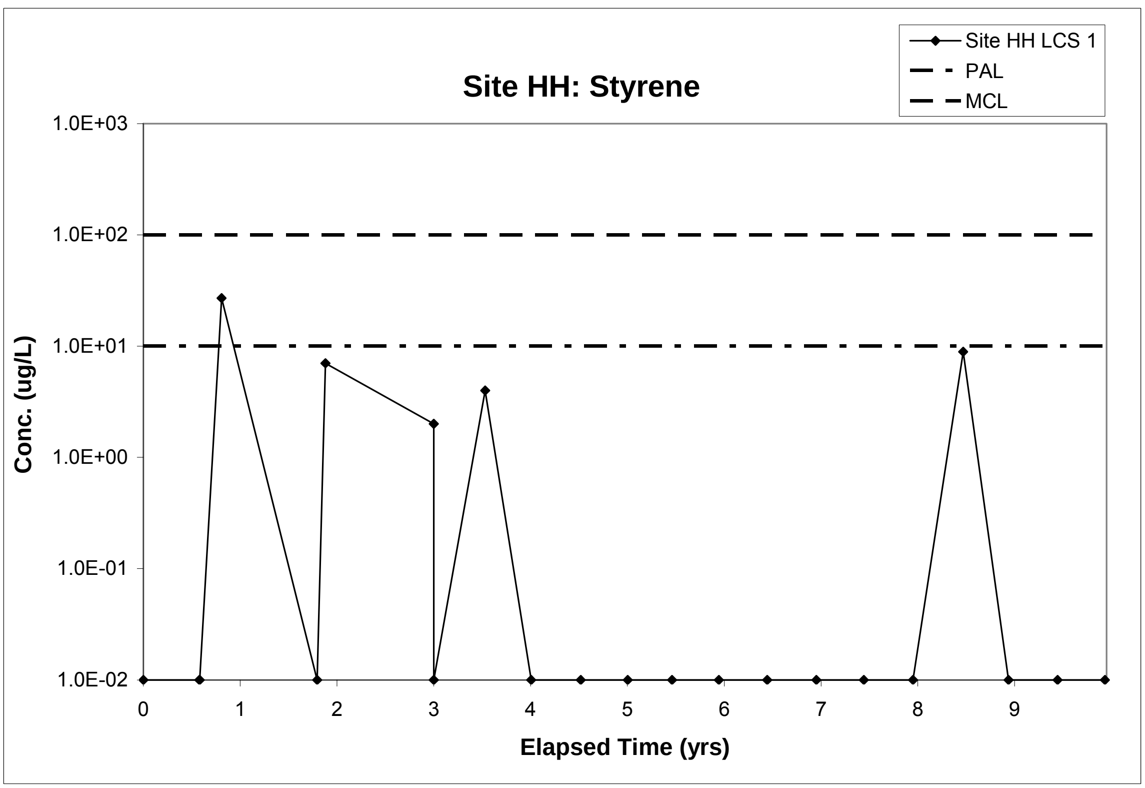

Site V: Styrene
Site V LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

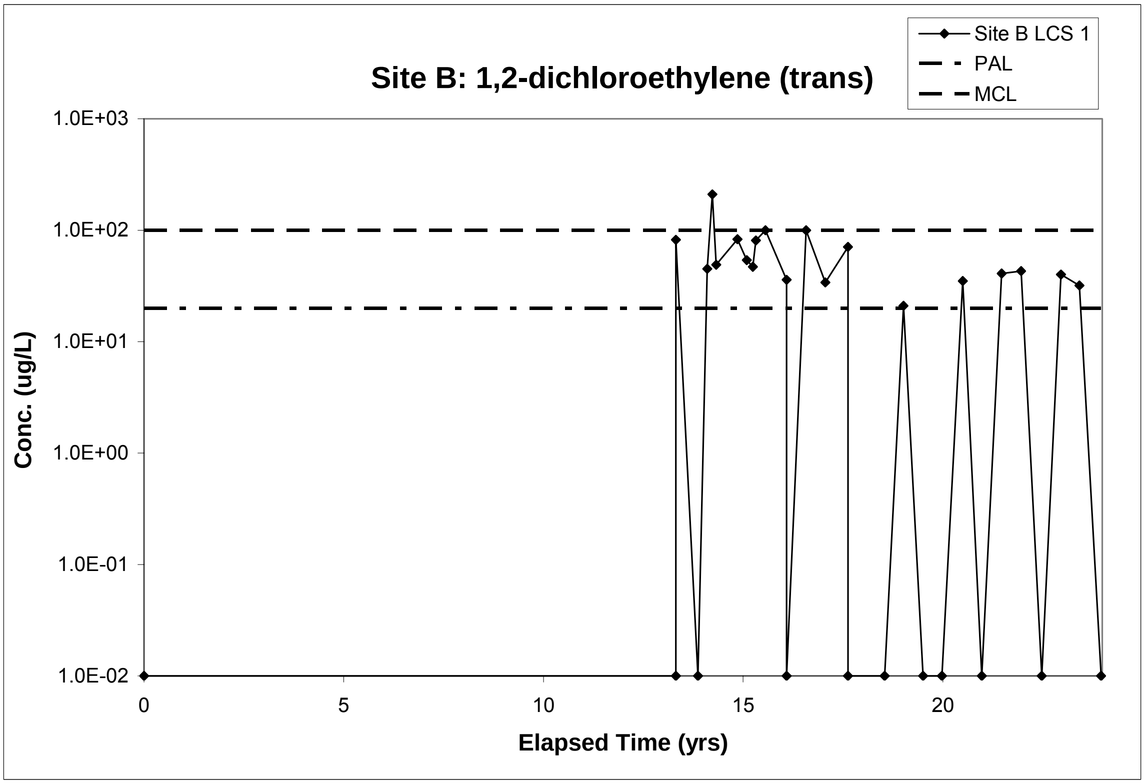

Site W: Styrene
Site W LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)


Site W: Styrene
Site W LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

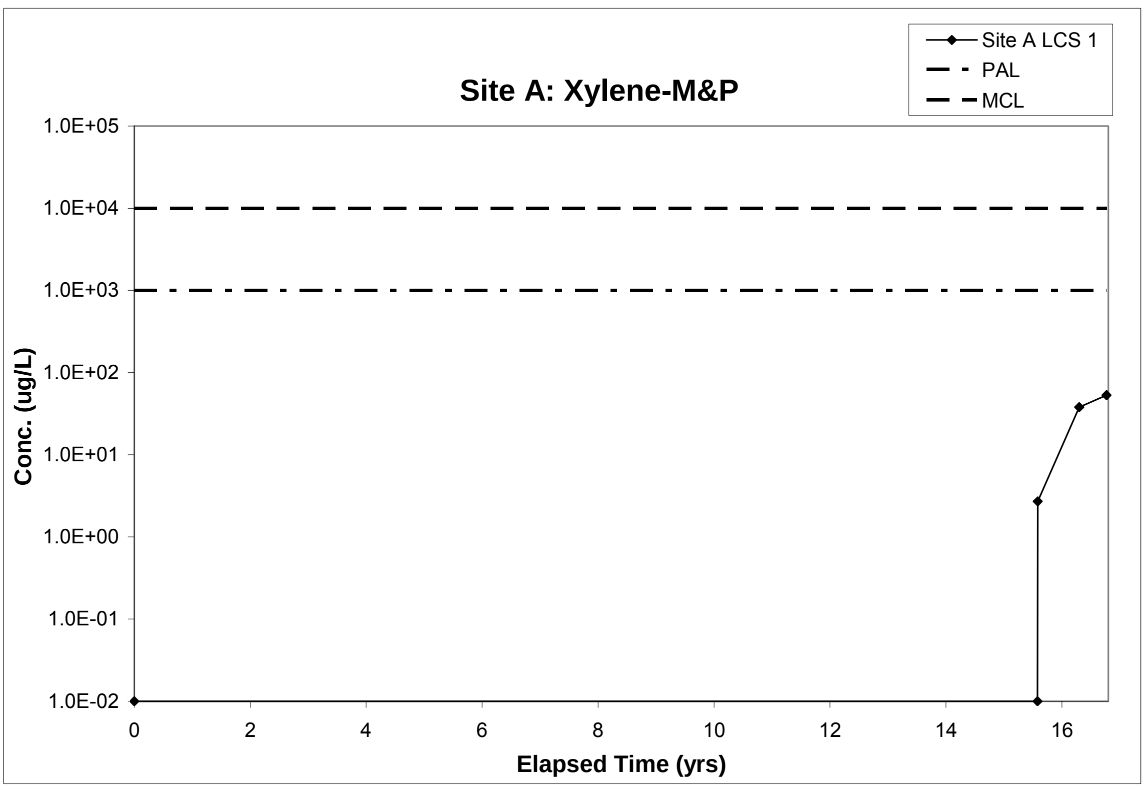

Site Z: Styrene
Site Z LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)


Site DD: Styrene
Site DD LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

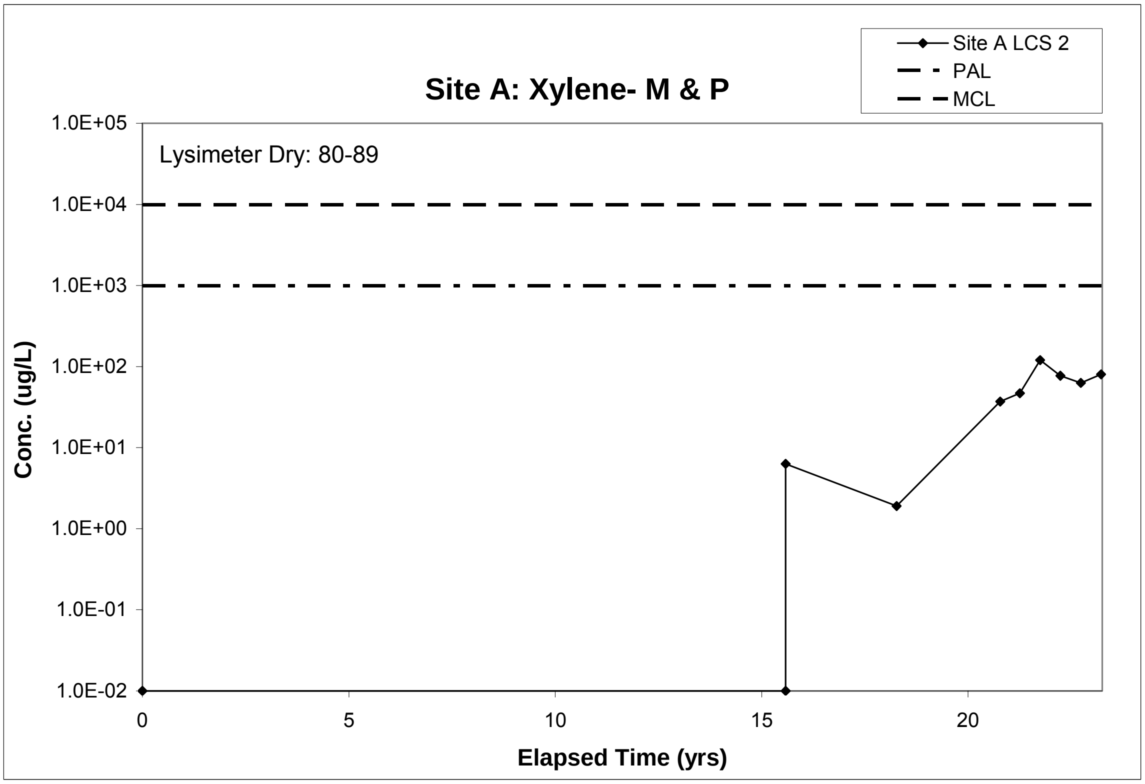

Site HH: Styrene
Site HH LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
9
Elapsed Time (yrs)

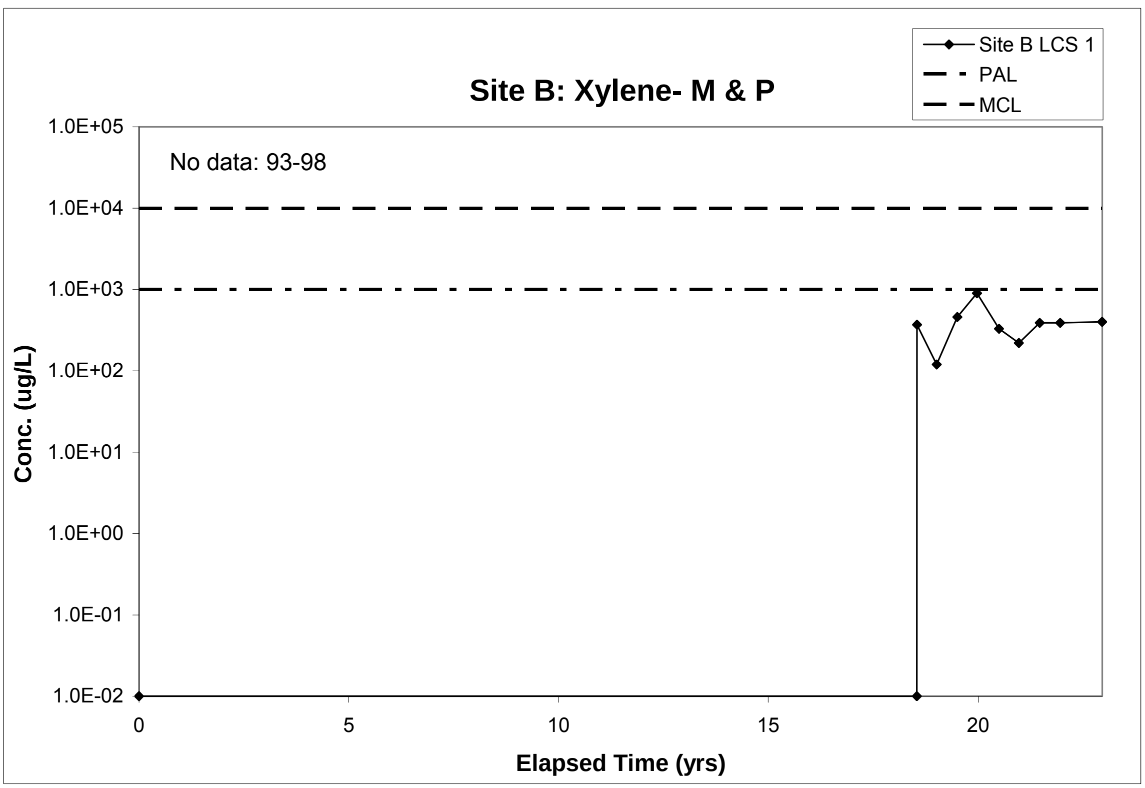


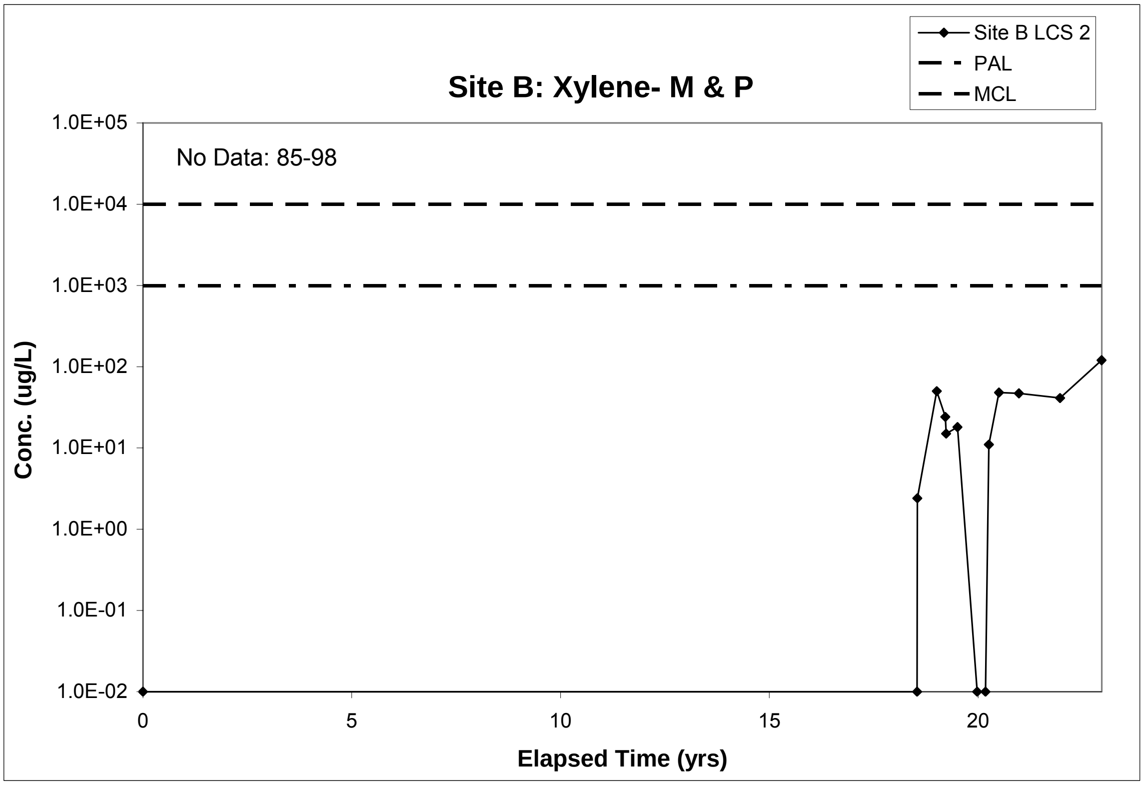
Site B: 1,2-dichloroethylene (trans)
Site B LCS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

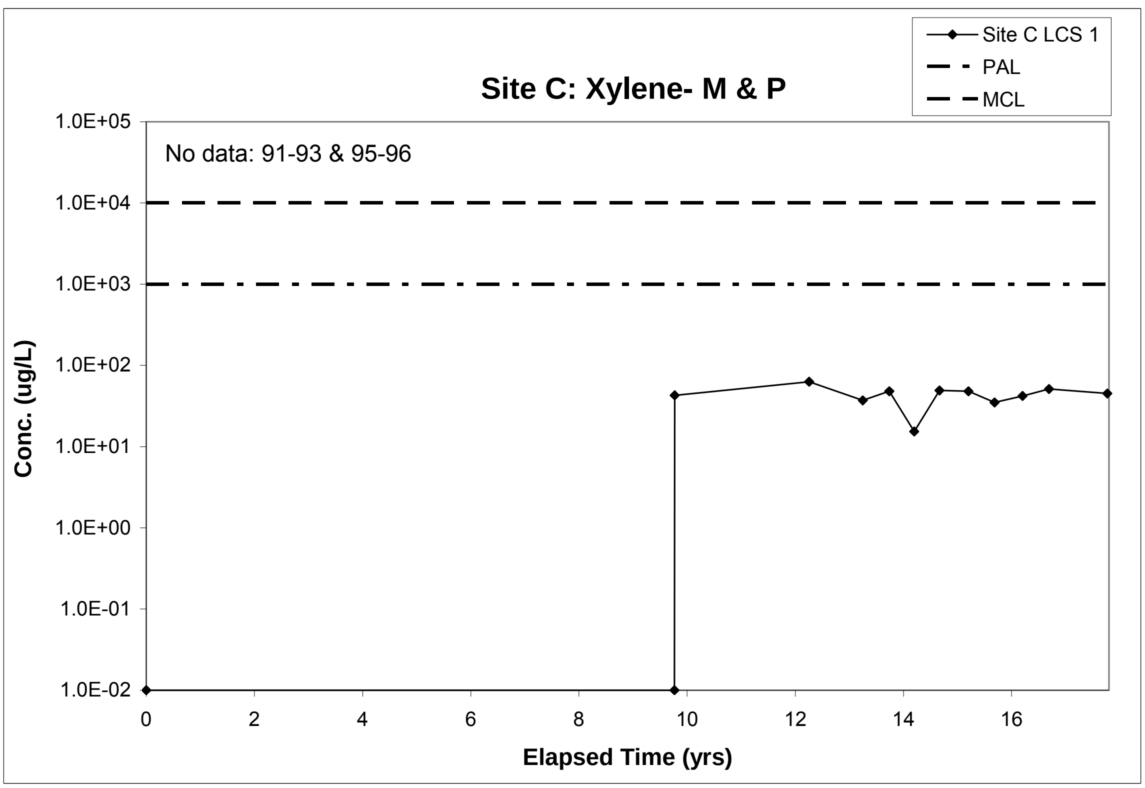


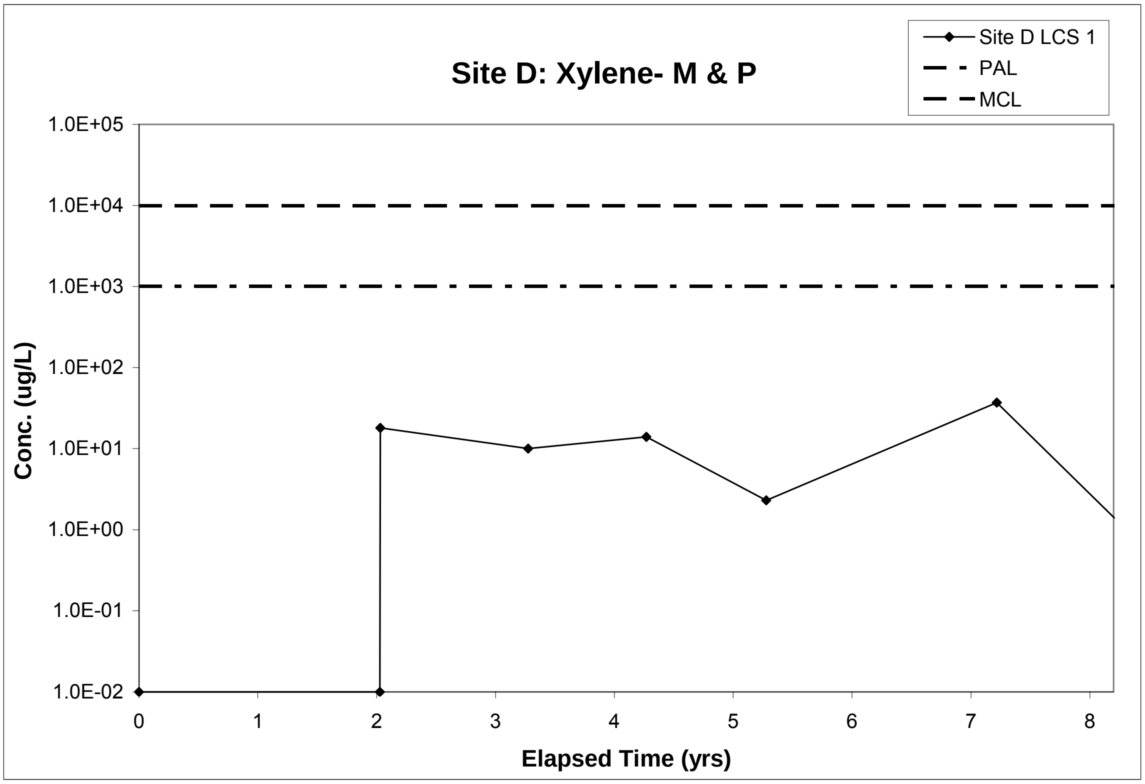
Site A: Xylene-M&P
Site A LCS 1
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

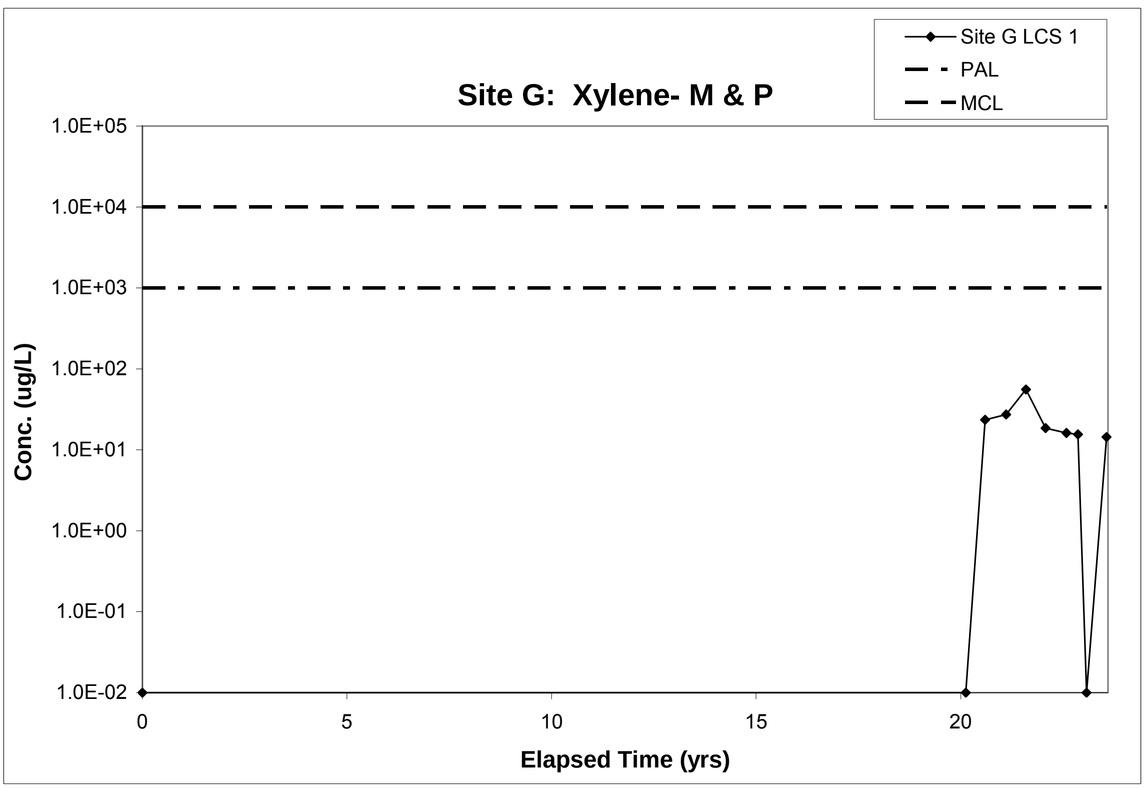

Site A: Xylene- M & P
Site A LCS 2
PAL
MCL
Lysimeter Dry: 80-89
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

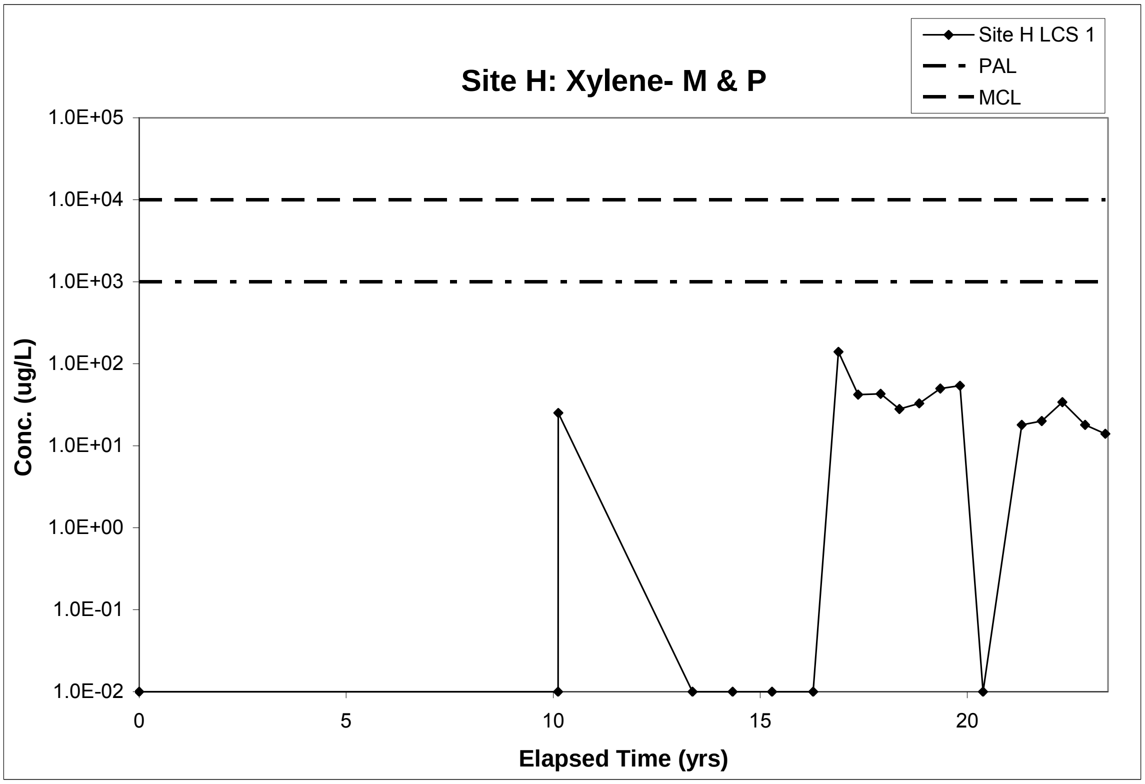

Site B: Xylene- M & P
Site B LCS 1
PAL
MCL
No data: 93-98
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

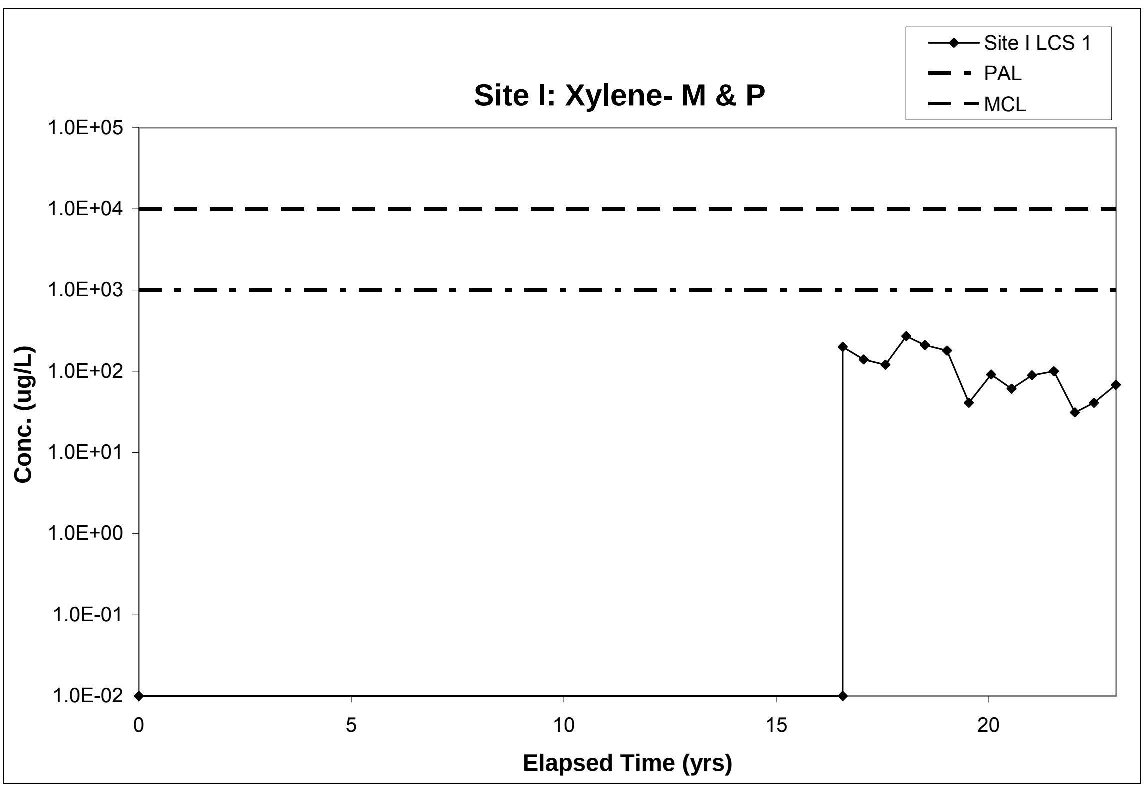

Site B: Xylene- M & P
Site B LCS 2
PAL
MCL
No Data: 85-98
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

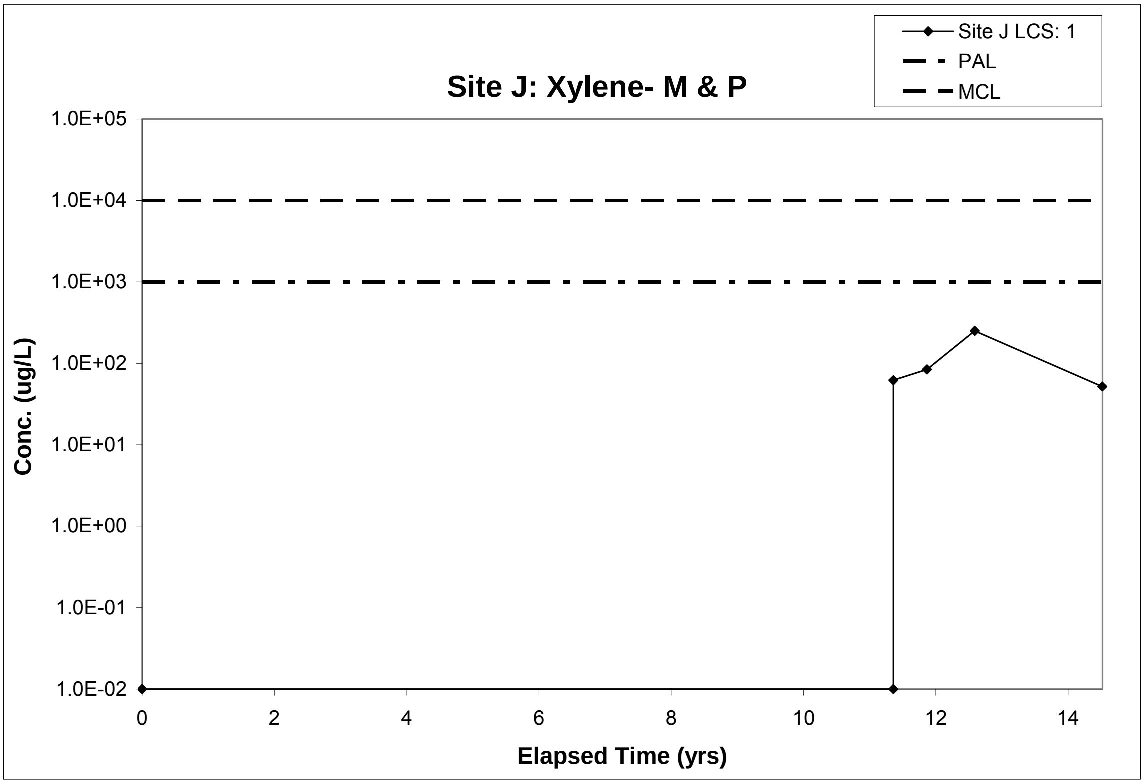

Site C: Xylene- M & P
Site C LCS 1
PAL
MCL
No data: 91-93 & 95-96
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

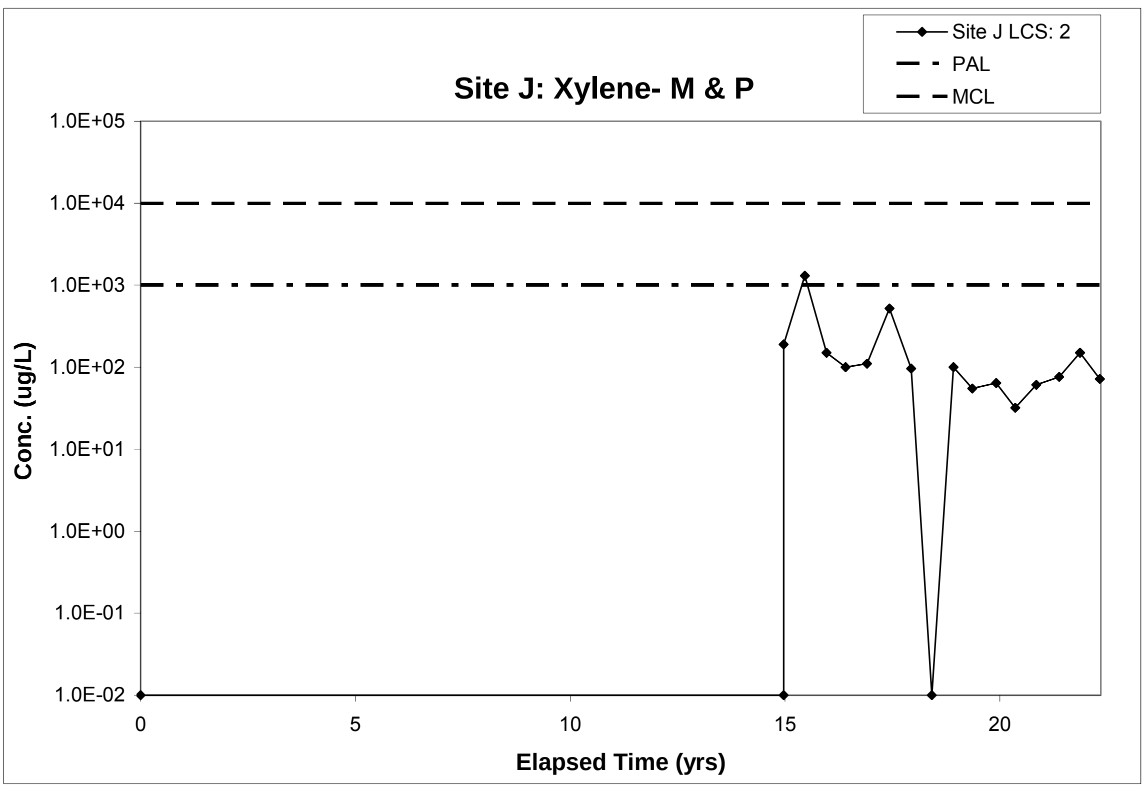

Site D: Xylene- M & P
Site D LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

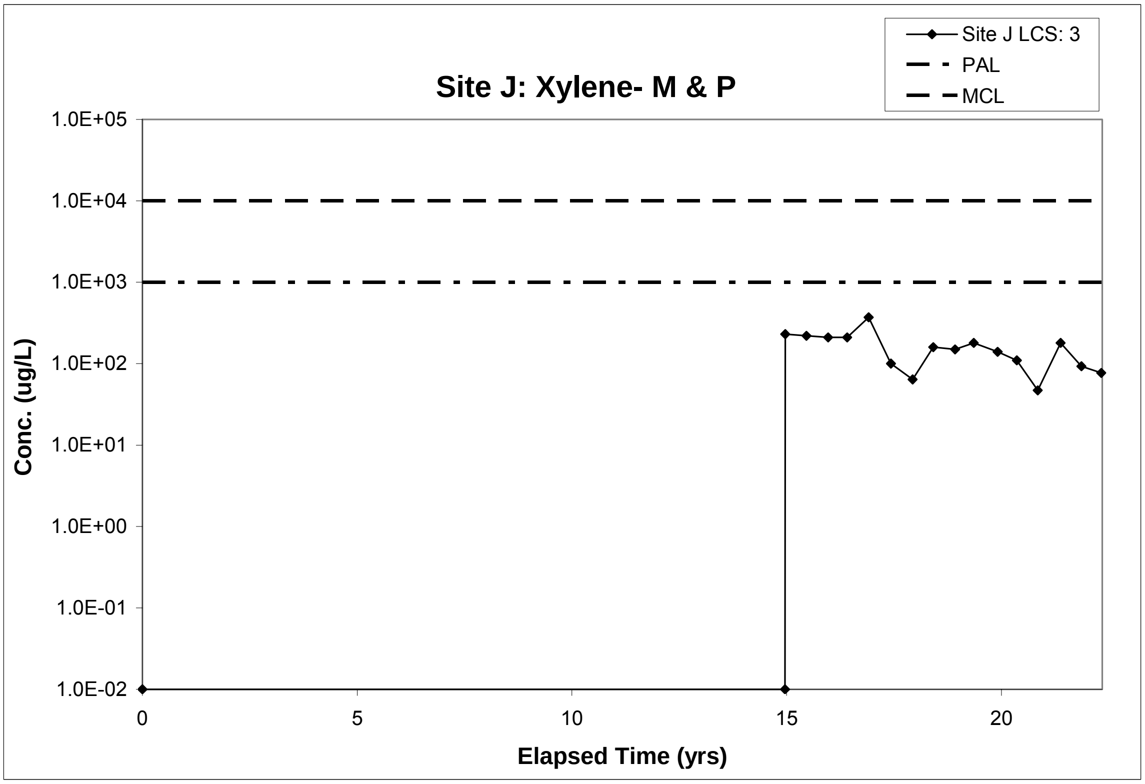

Site G: Xylene- M & P
Site G LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

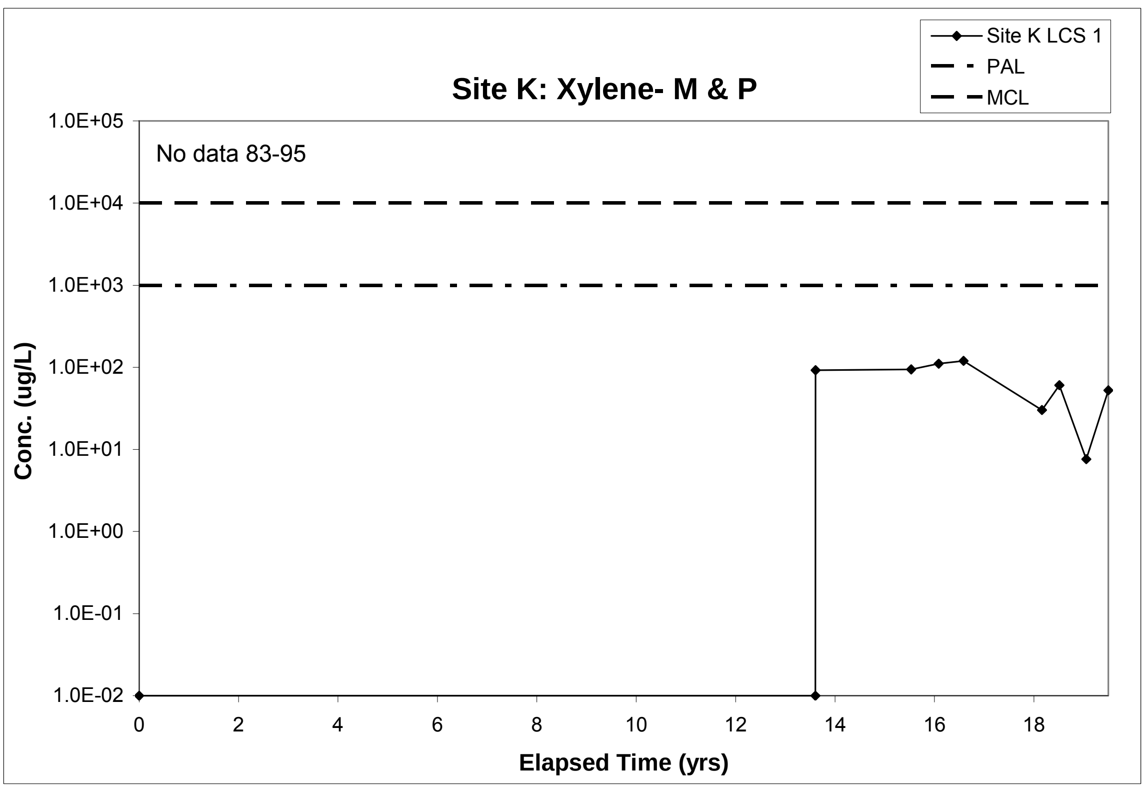

Site H: Xylene- M & P
Site H LCS 1
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

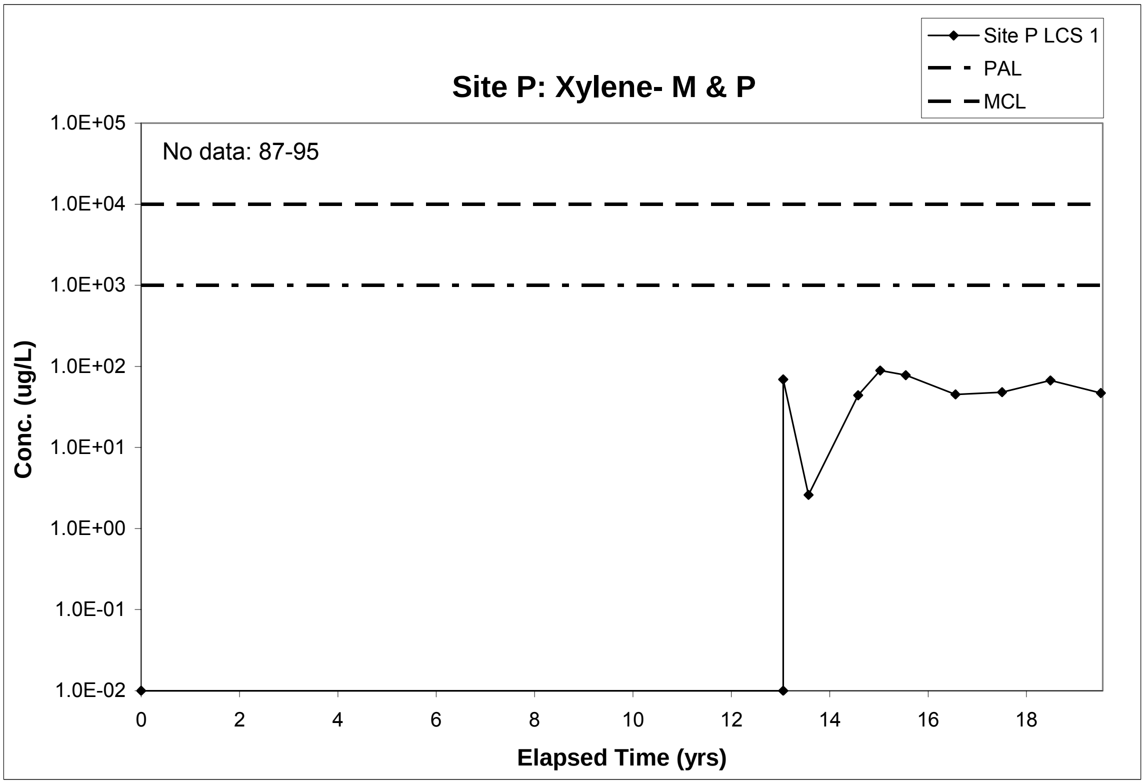

Site I: Xylene- M & P
Site I LCS 1
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

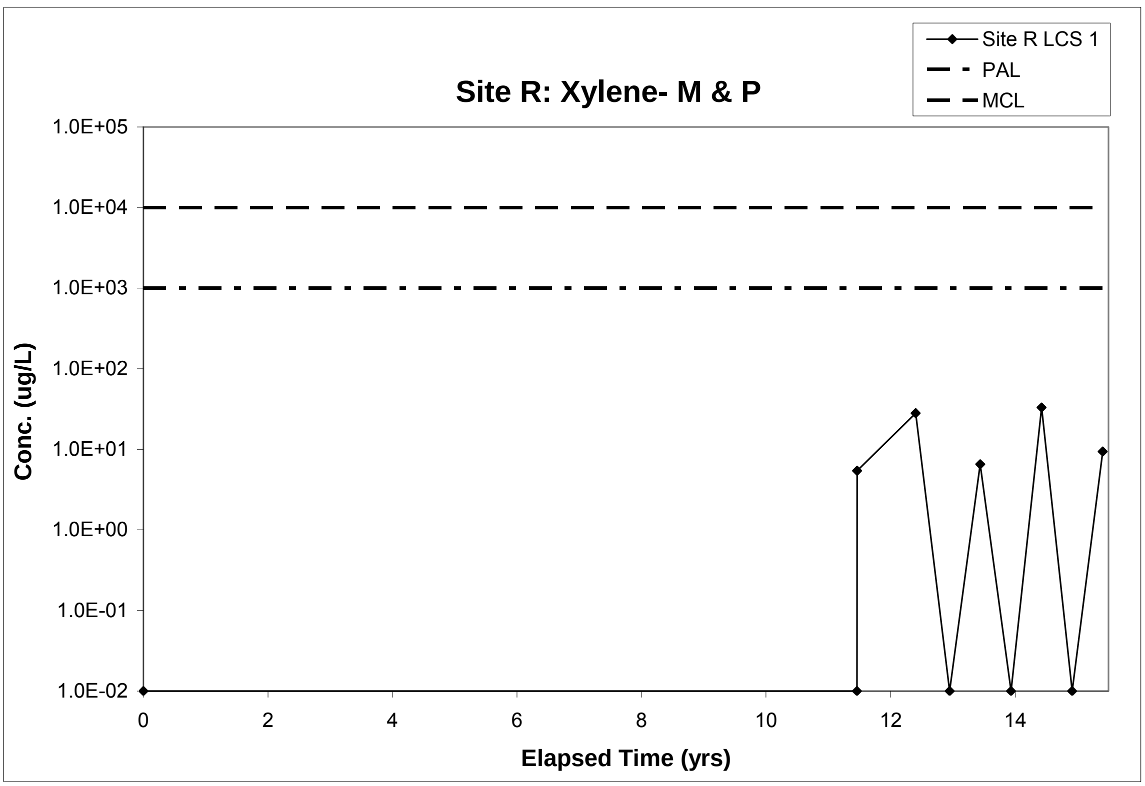

Site J LCS: 1
PAL
MCL
Site J: Xylene- M & P
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

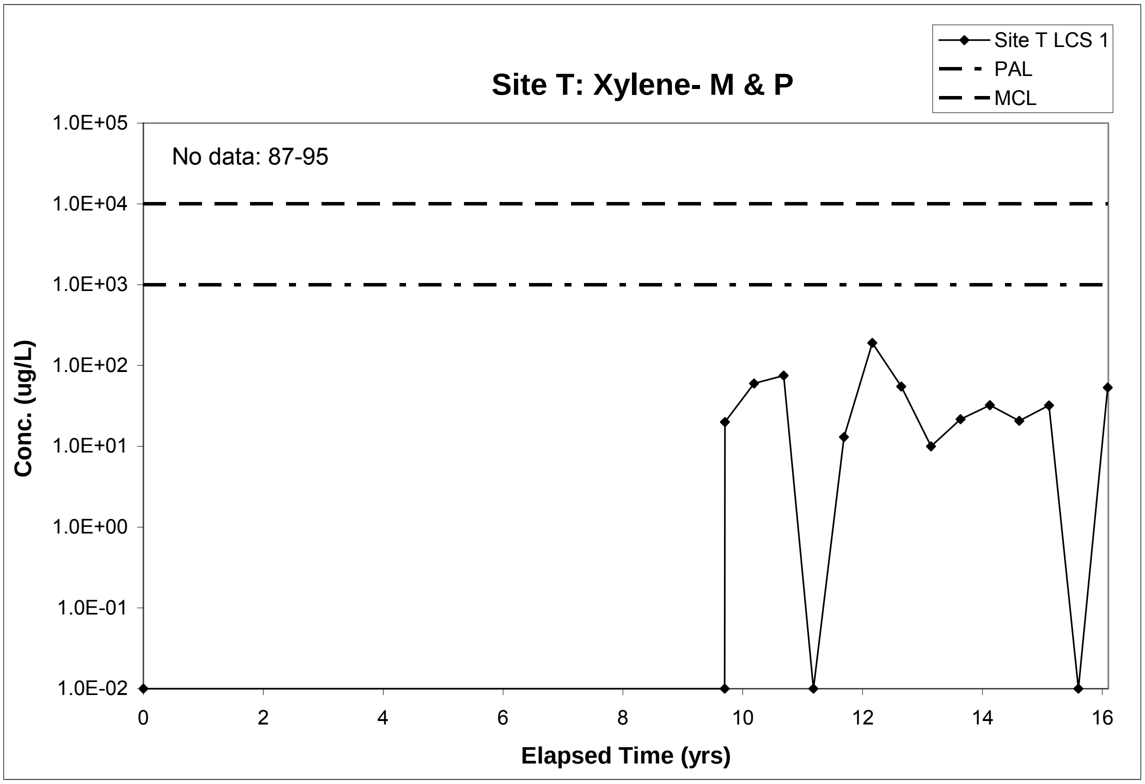

Site J LCS: 2
PAL
MCL
Site J: Xylene- M & P
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

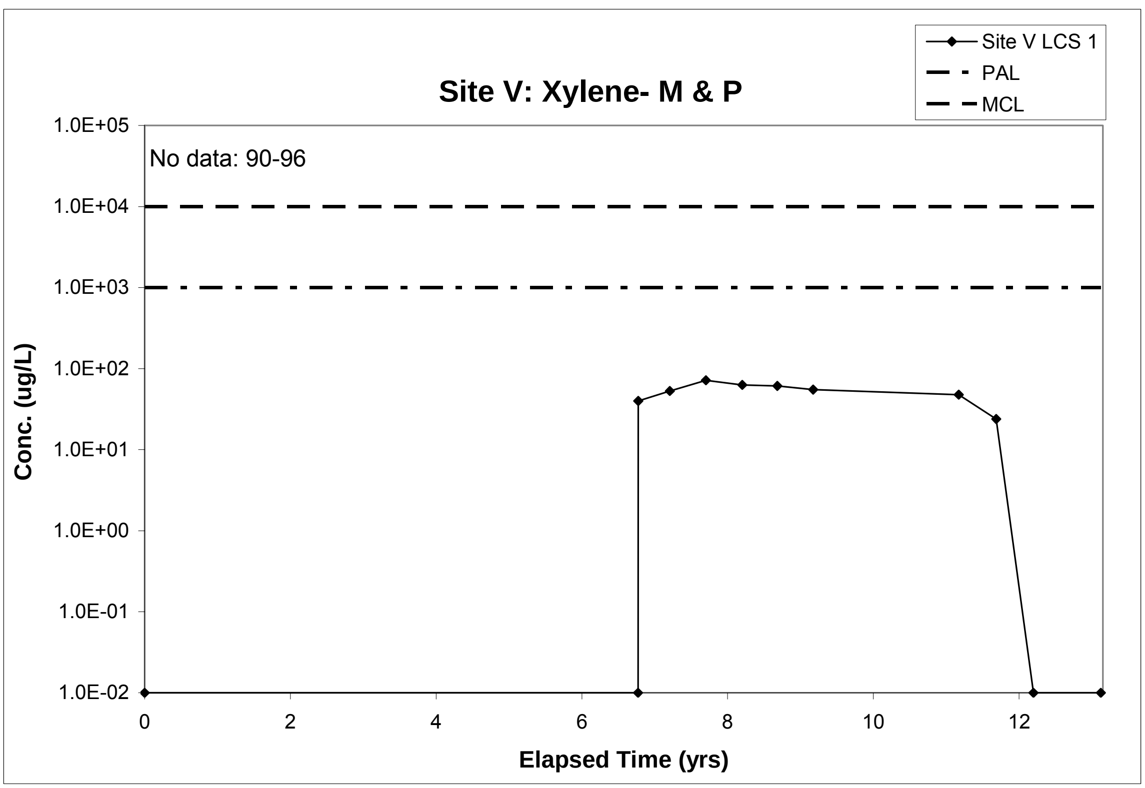

Site J LCS: 3
PAL
MCL
Site J: Xylene- M & P
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

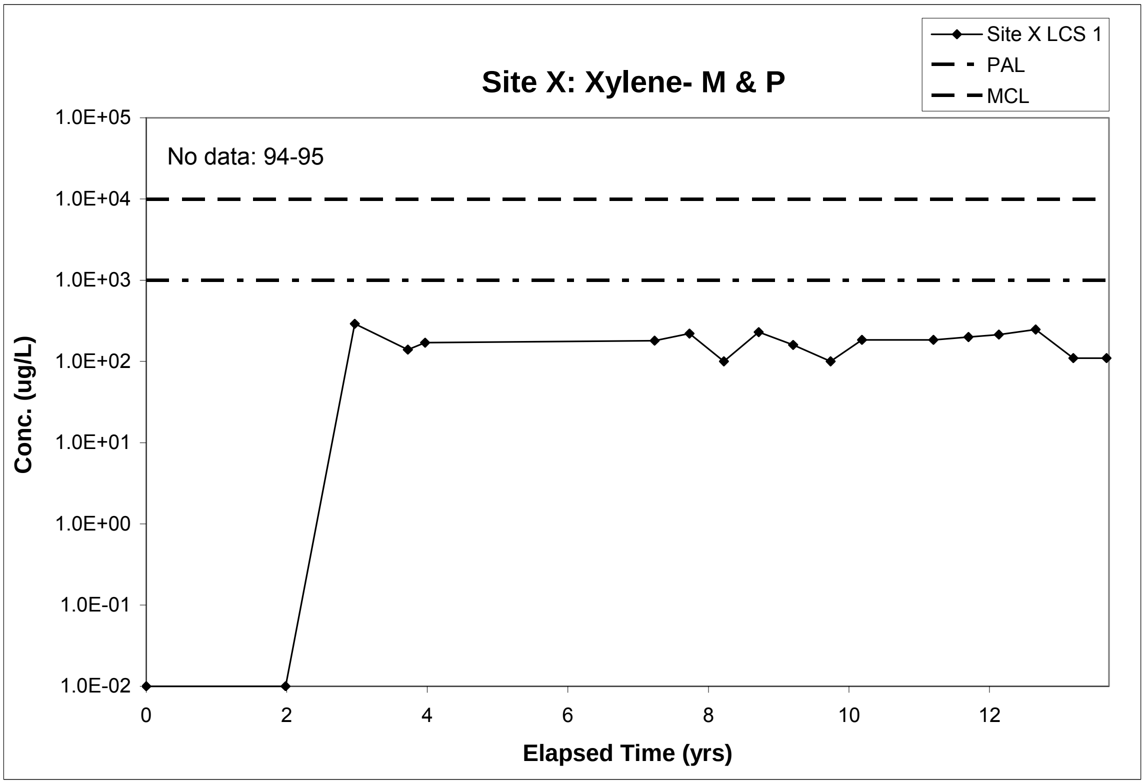

Site K LCS 1
PAL
MCL
Site K: Xylene- M & P
No data 83-95
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

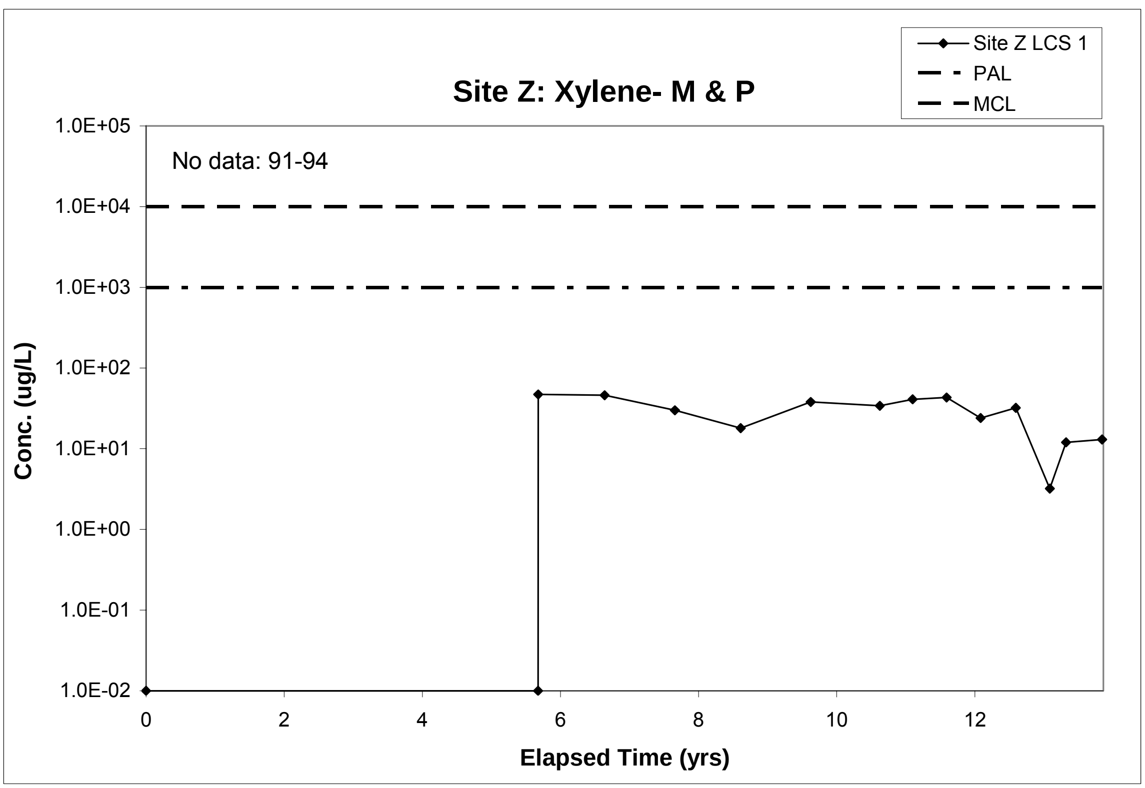

Site P: Xylene- M & P
Site P LCS 1
PAL
MCL
No data: 87-95
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

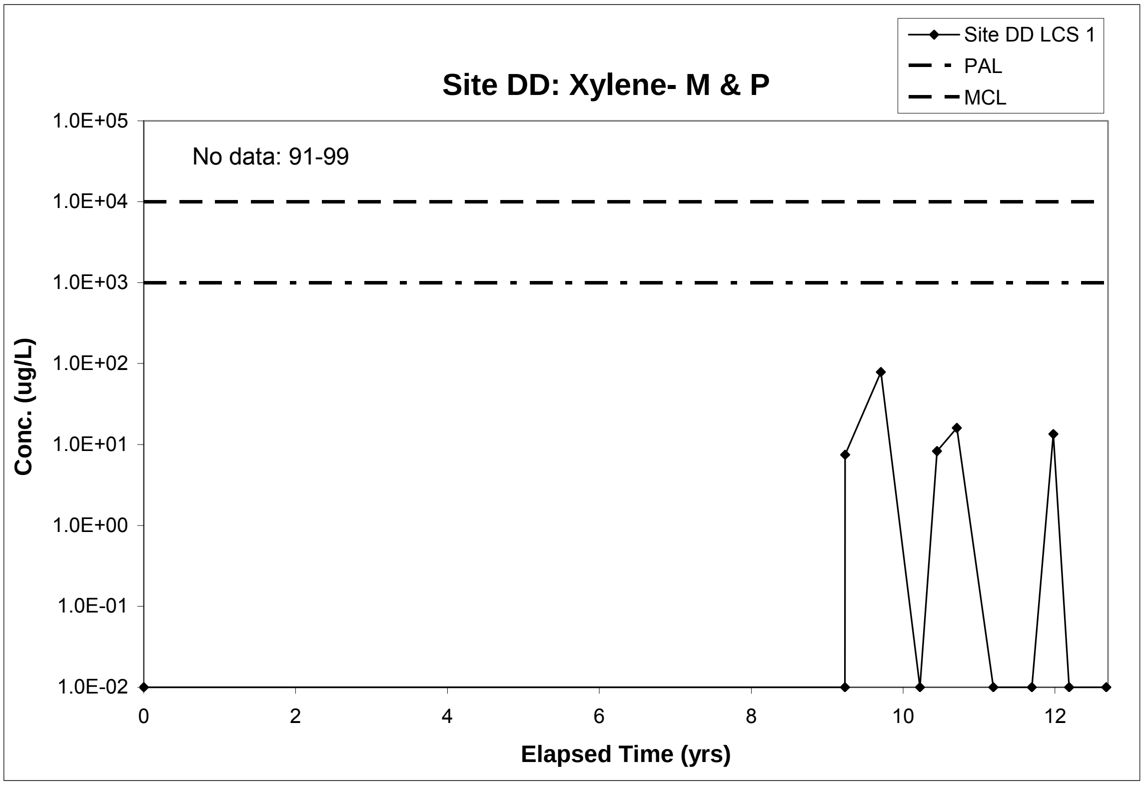

Site R: Xylene- M & P
Site R LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

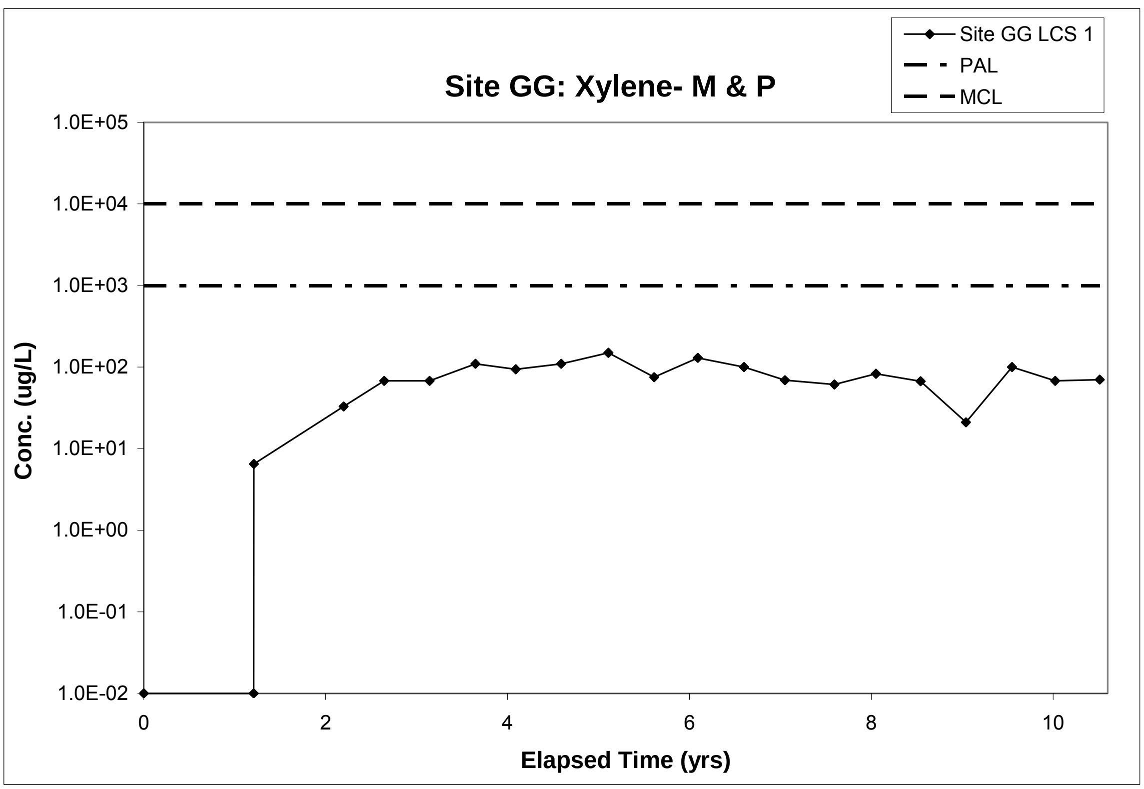

Site T: Xylene- M & P
Site T LCS 1
PAL
MCL
No data: 87-95
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

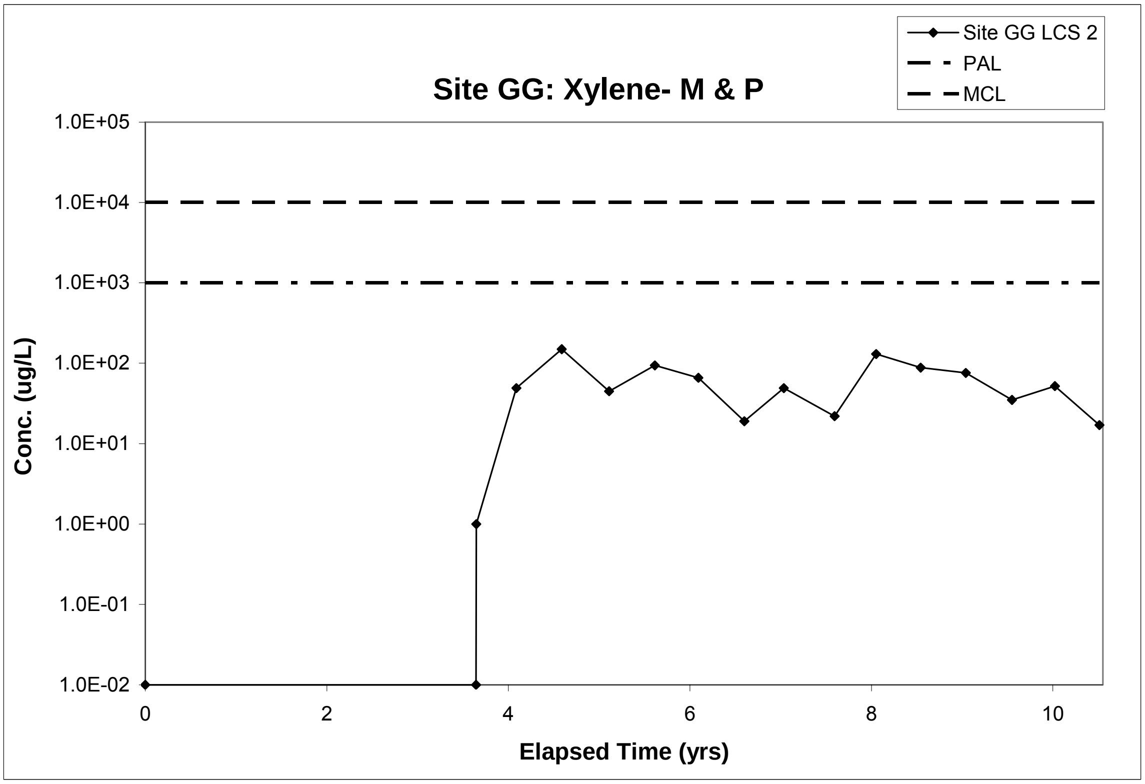

Site V: Xylene- M & P
Site V LCS 1
PAL
MCL
No data: 90-96
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

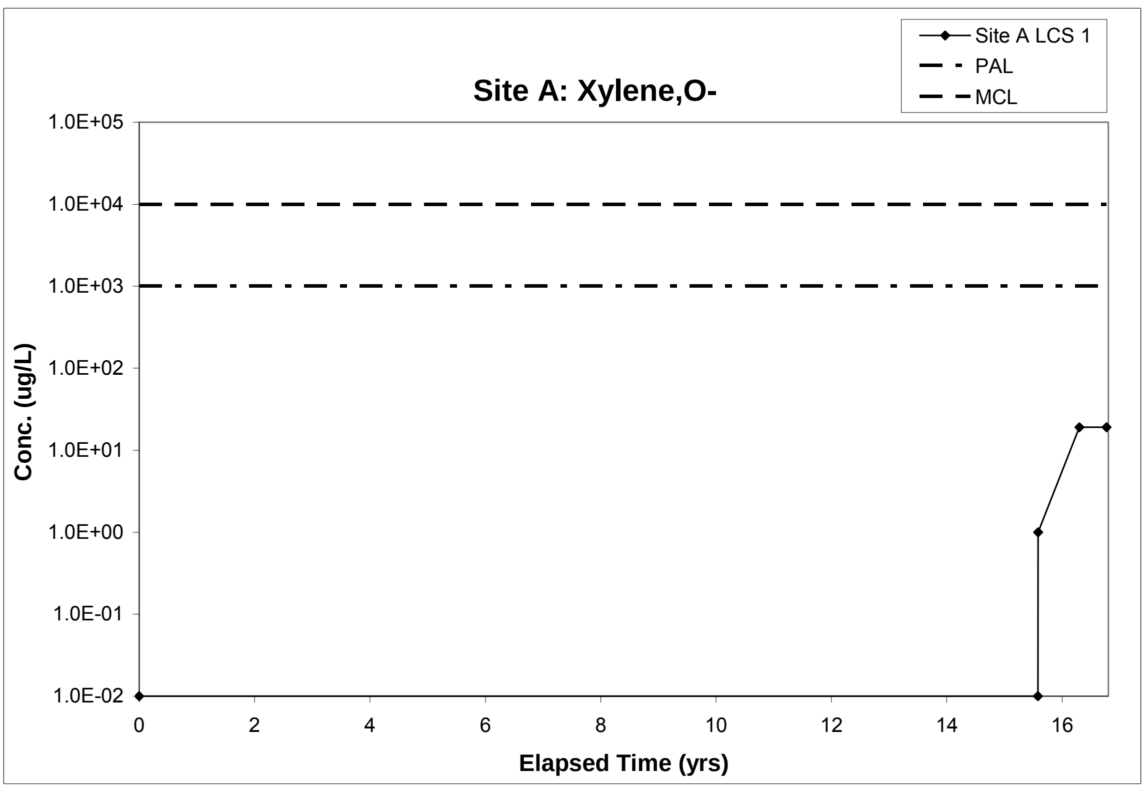

Site X: Xylene- M & P
Site X LCS 1
PAL
MCL
No data: 94-95
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

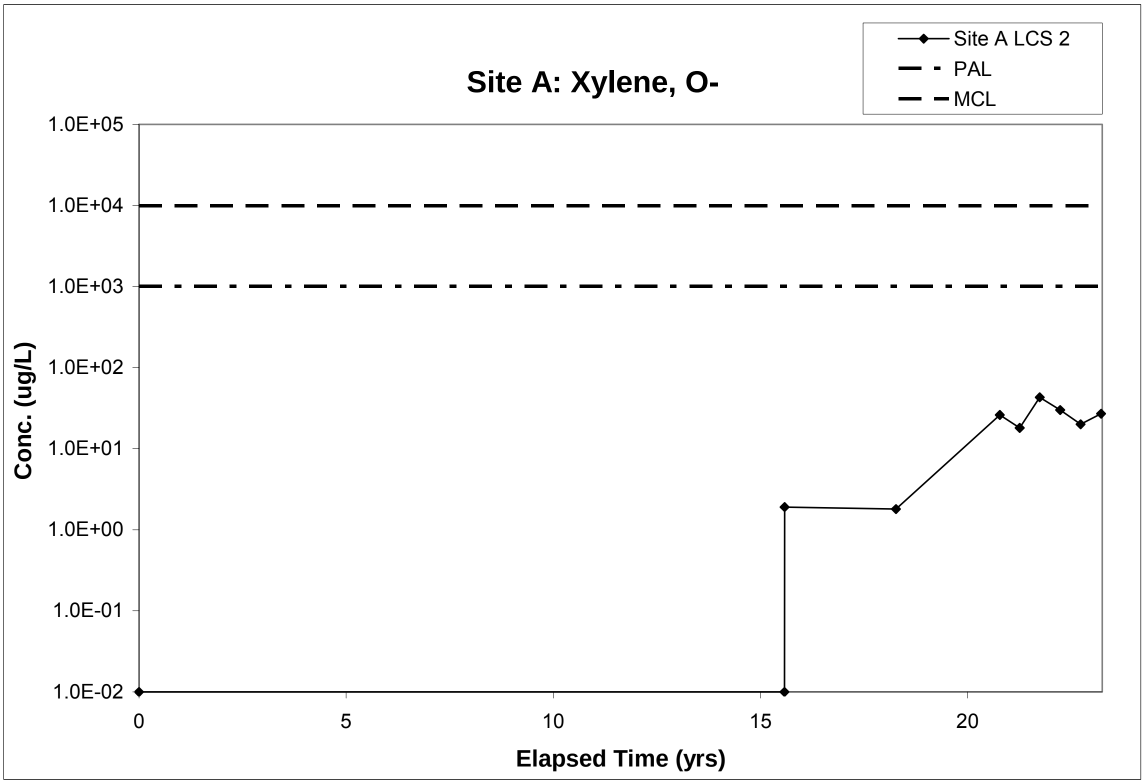

Site Z: Xylene- M & P
Site Z LCS 1
PAL
MCL
No data: 91-94
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

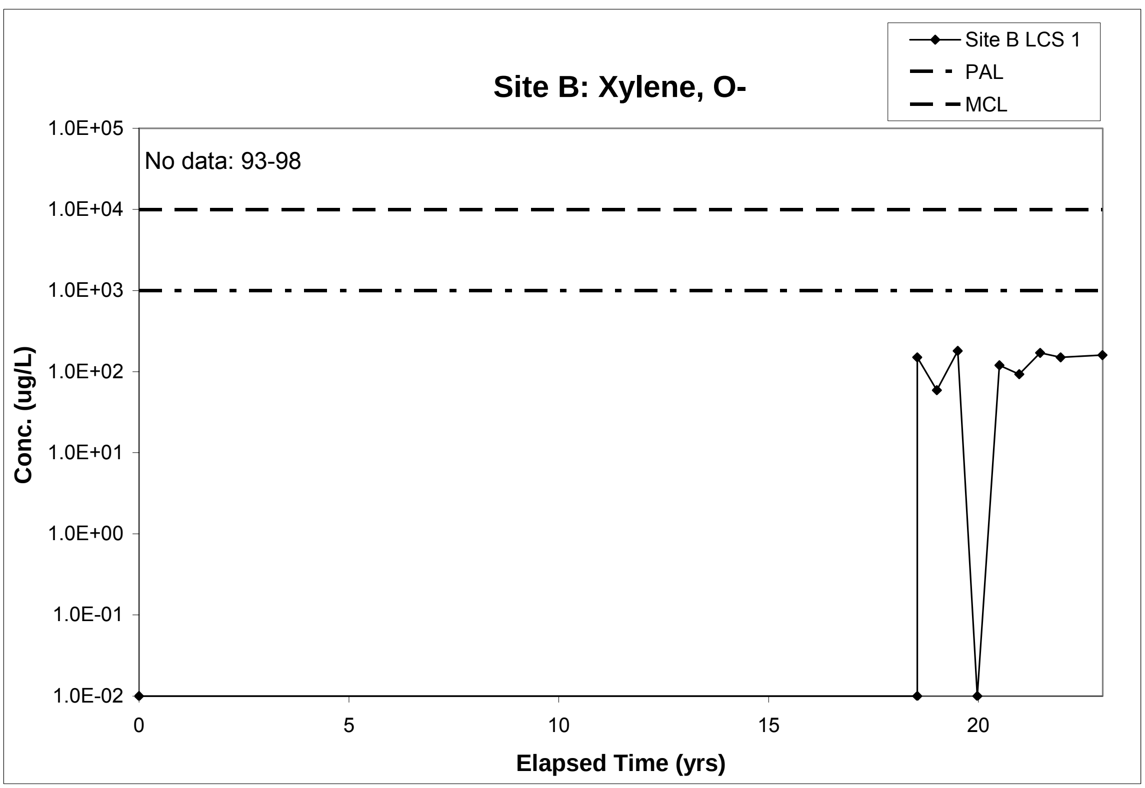

Site DD: Xylene- M & P
Site DD LCS 1
PAL
MCL
No data: 91-99
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

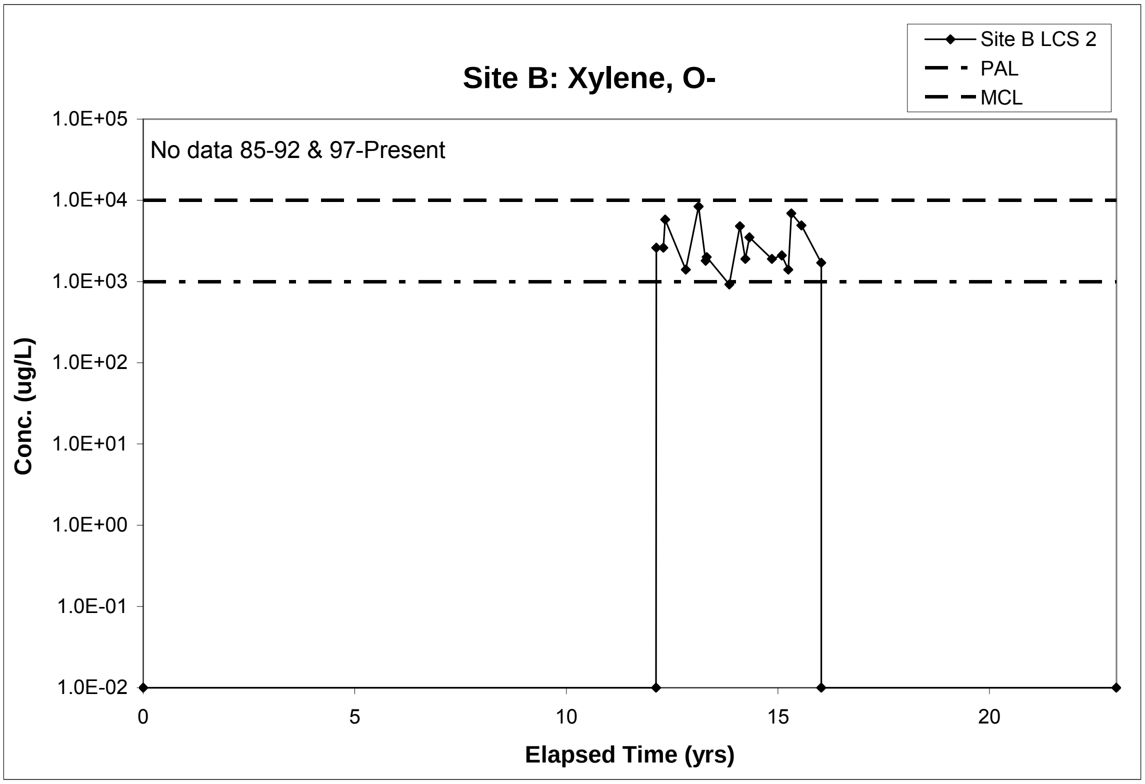

Site GG: Xylene- M & P
Site GG LCS 1
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

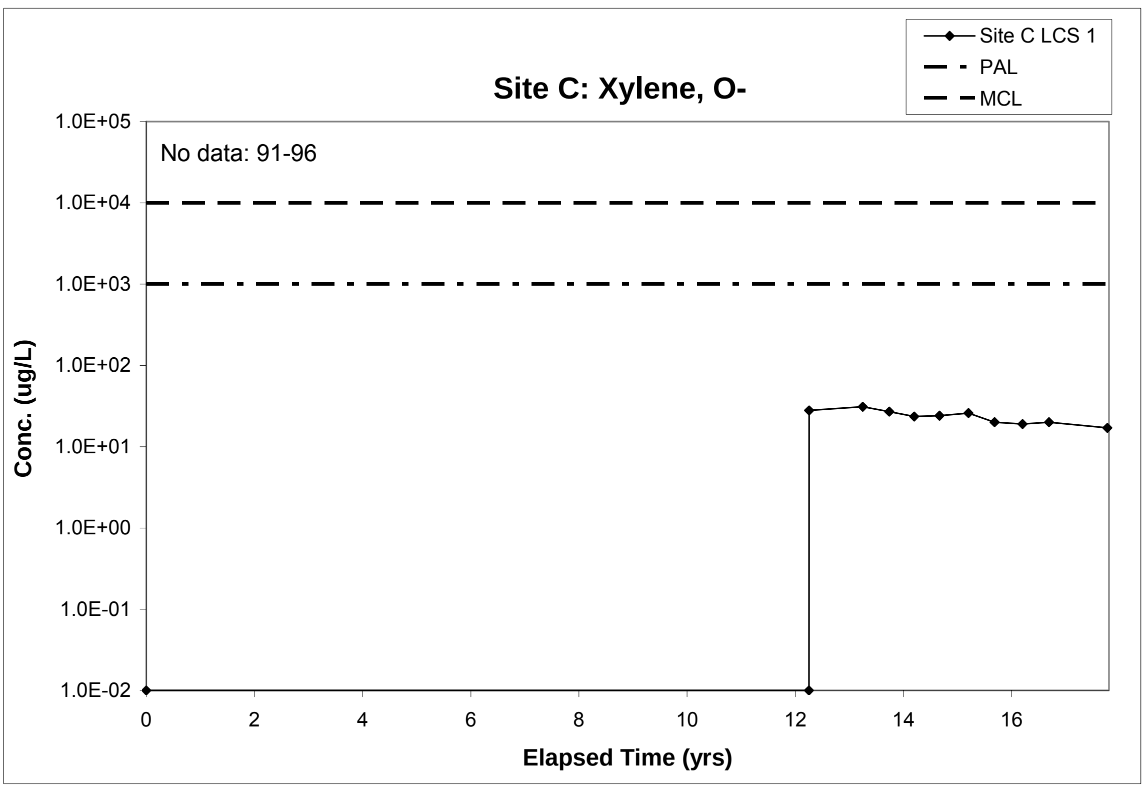

Site GG: Xylene- M & P
Site GG LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

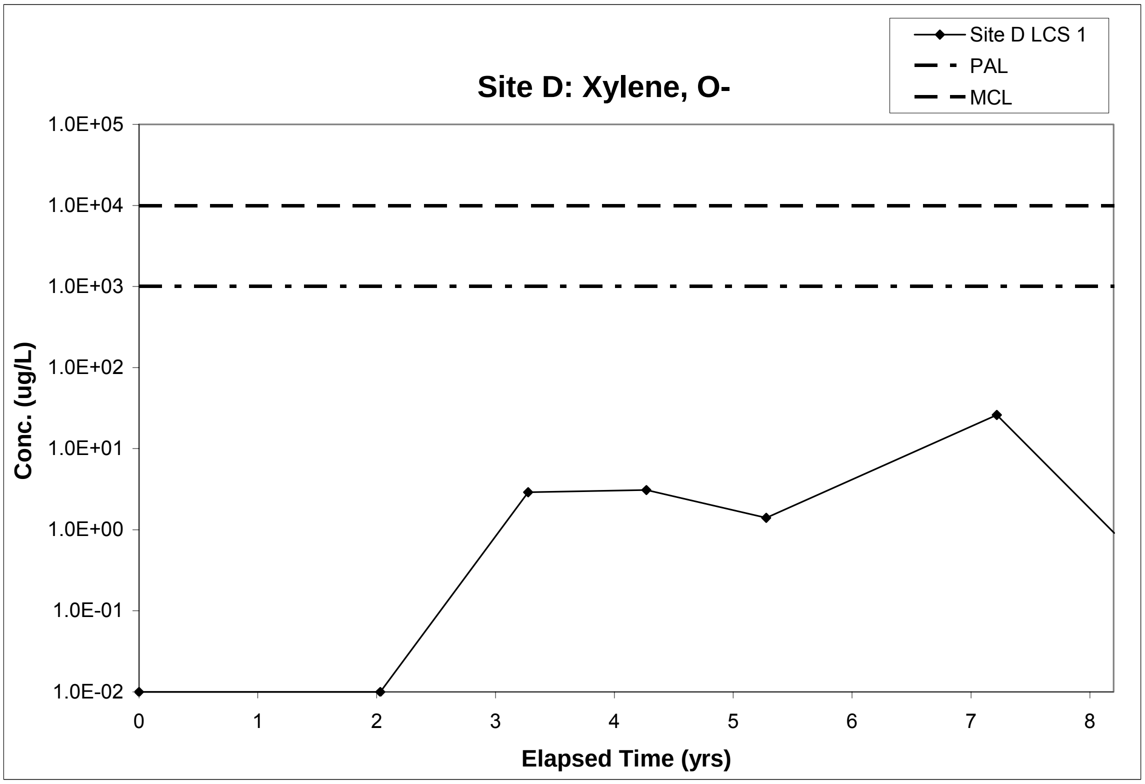

Site A: Xylene,O-
Site A LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

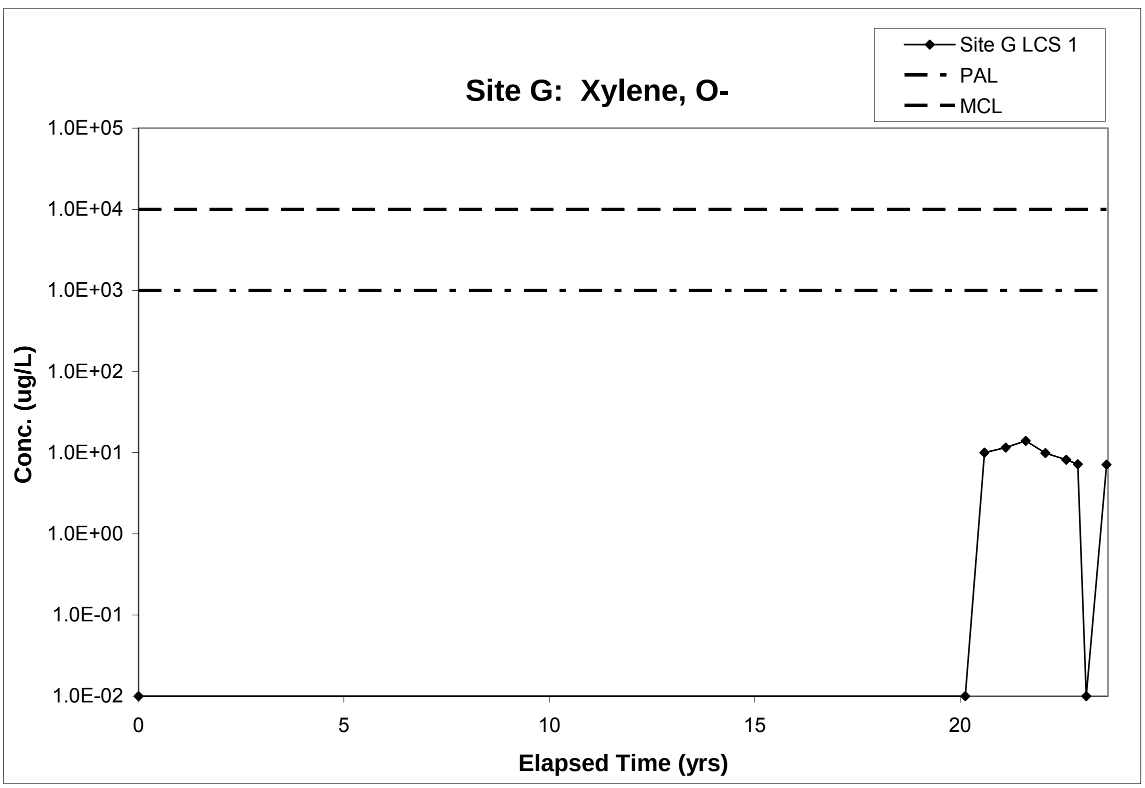

Site A: Xylene, O-
Site A LCS 2
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

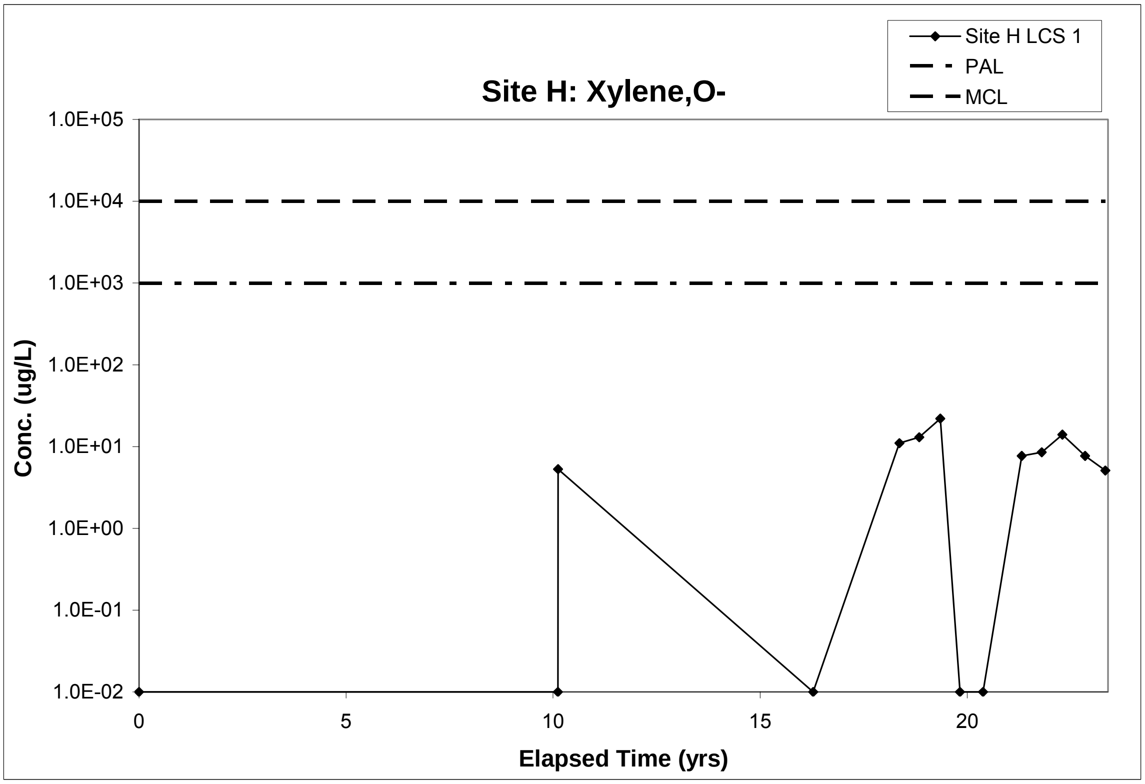

Site B: Xylene, O-
Site B LCS 1
PAL
MCL
No data: 93-98
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

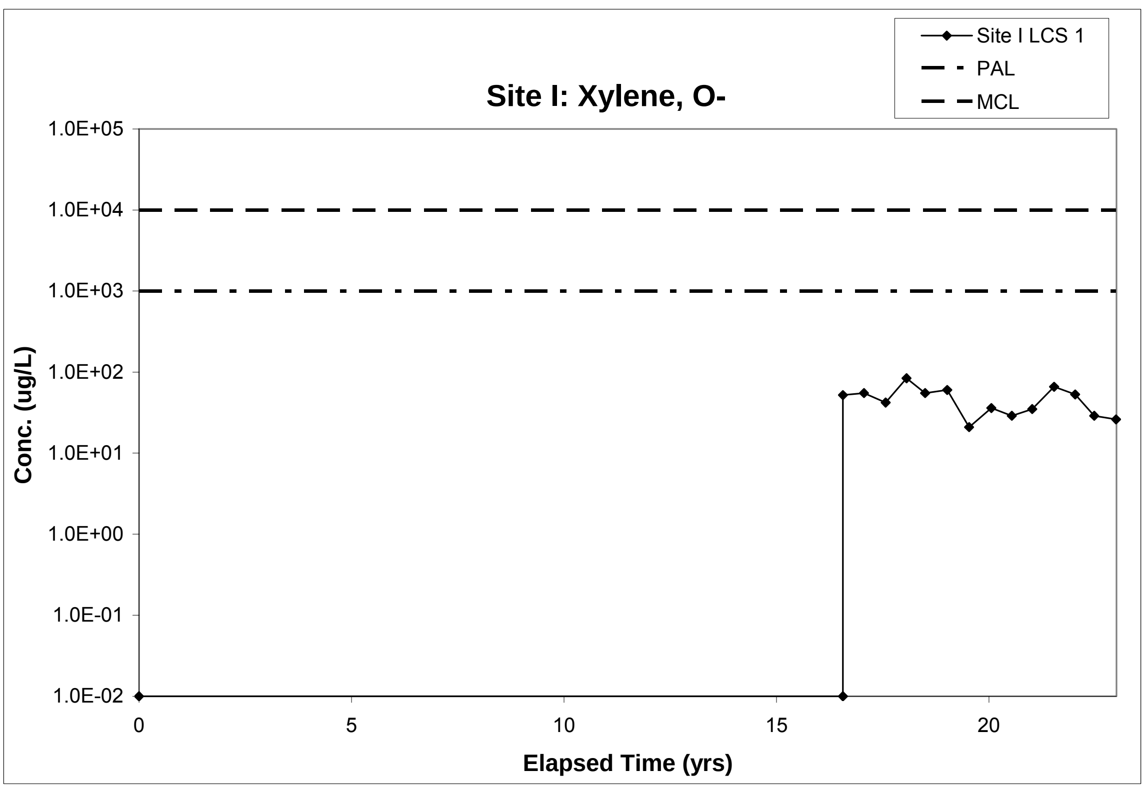

Site B: Xylene, O-
Site B LCS 2
PAL
MCL
No data 85-92 & 97-Present
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

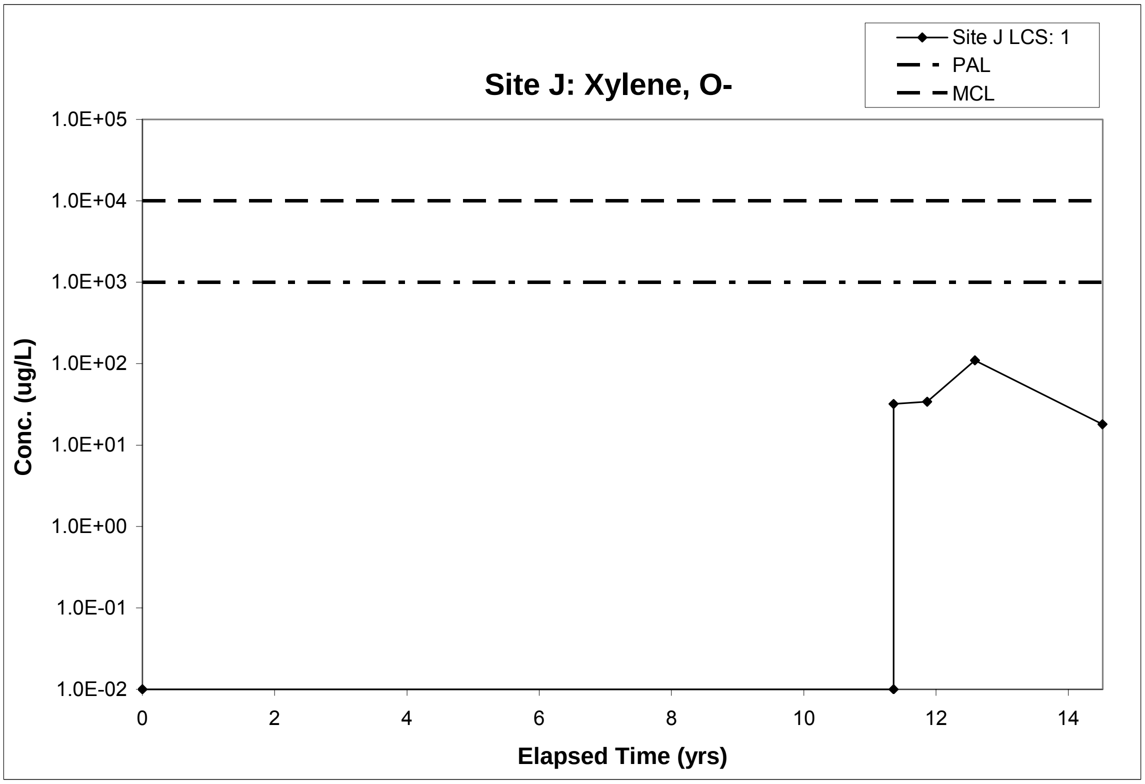

Site C: Xylene, O-
Site C LCS 1
PAL
MCL
No data: 91-96
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

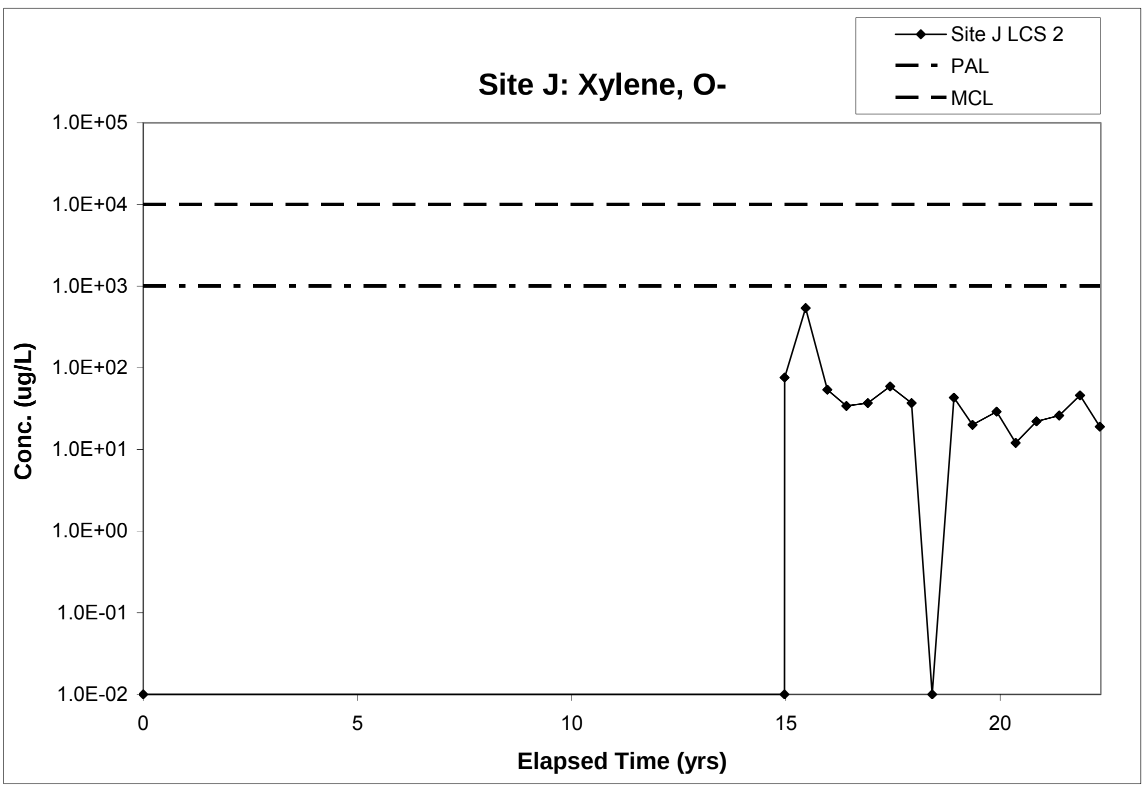

Site D: Xylene, O-
Site D LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

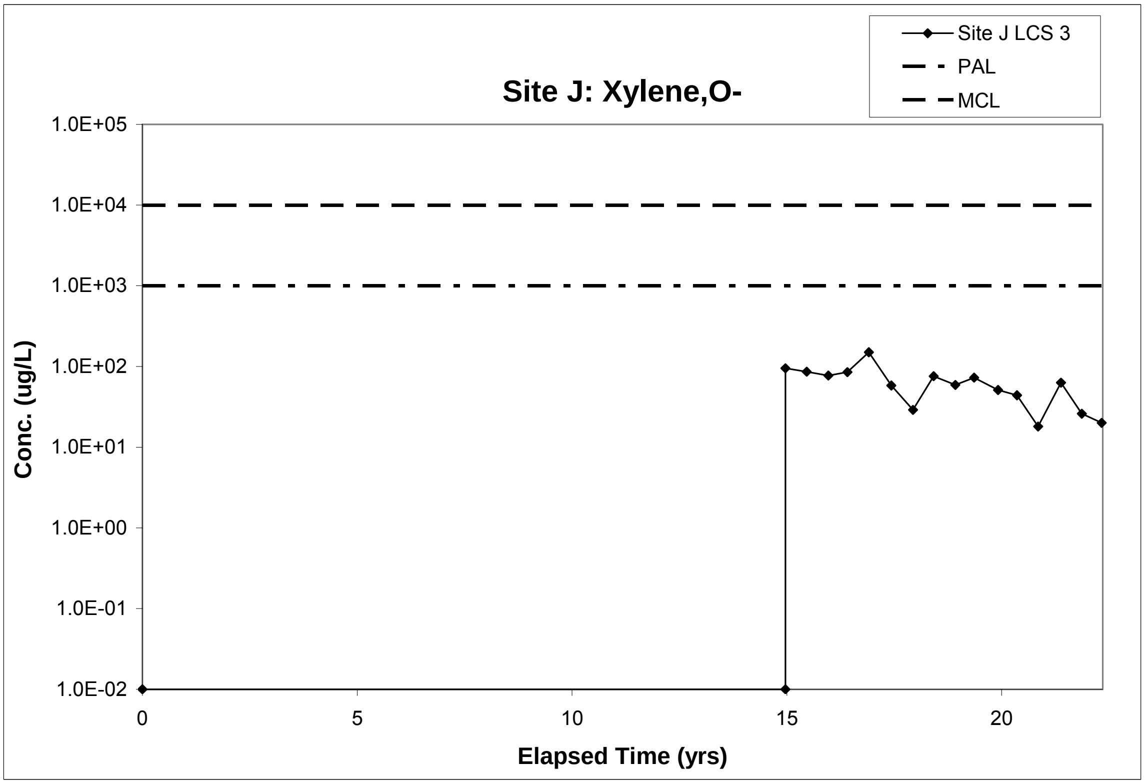

Site G: Xylene, O-
Site G LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

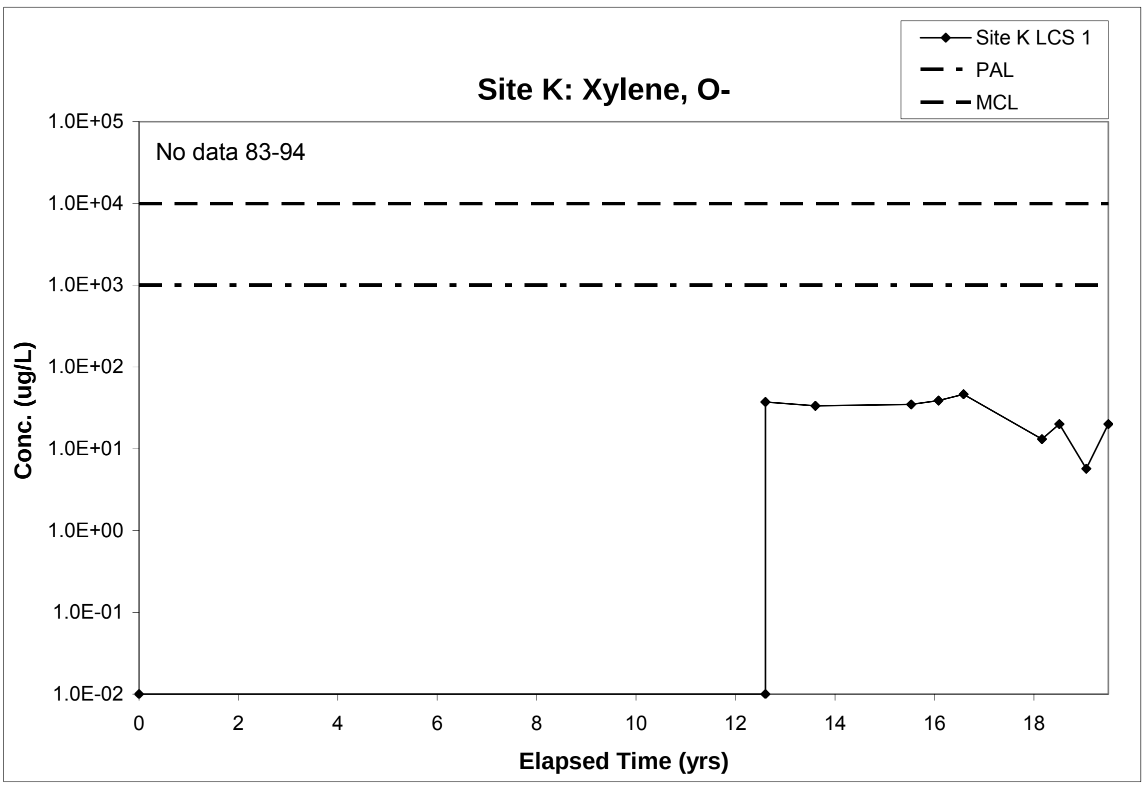

Site H: Xylene,O-
Site H LCS 1
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

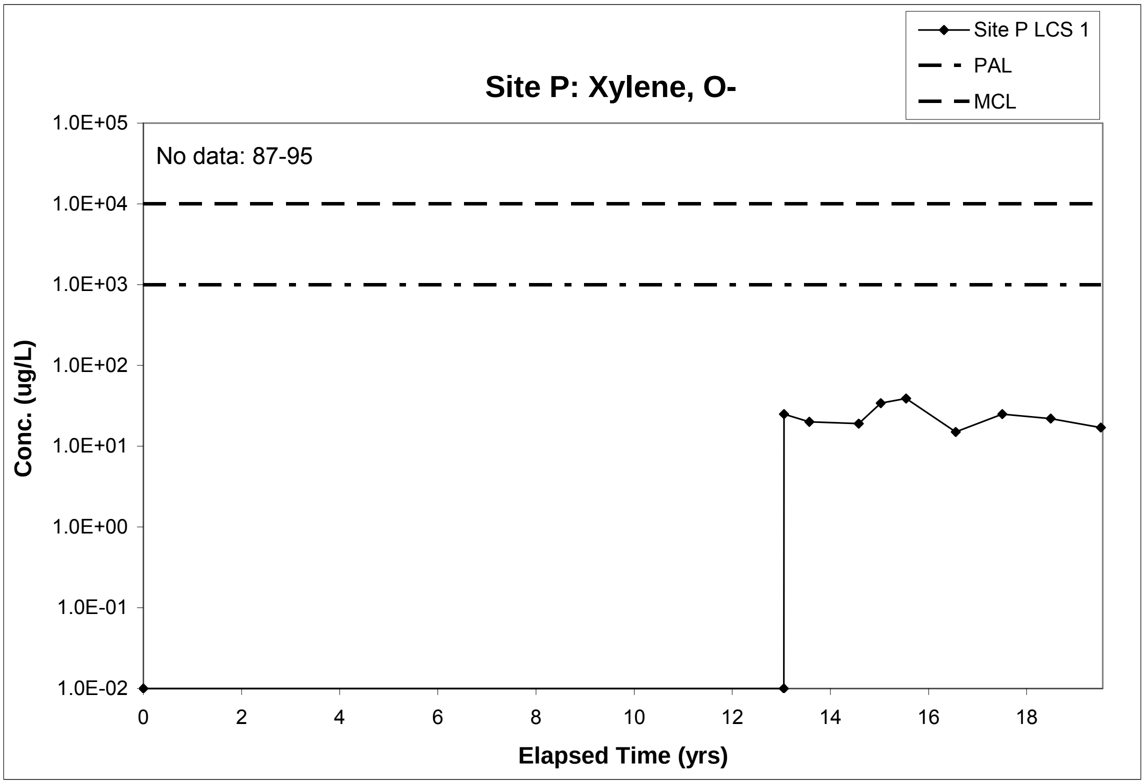

Site I: Xylene, O-
Site I LCS 1
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

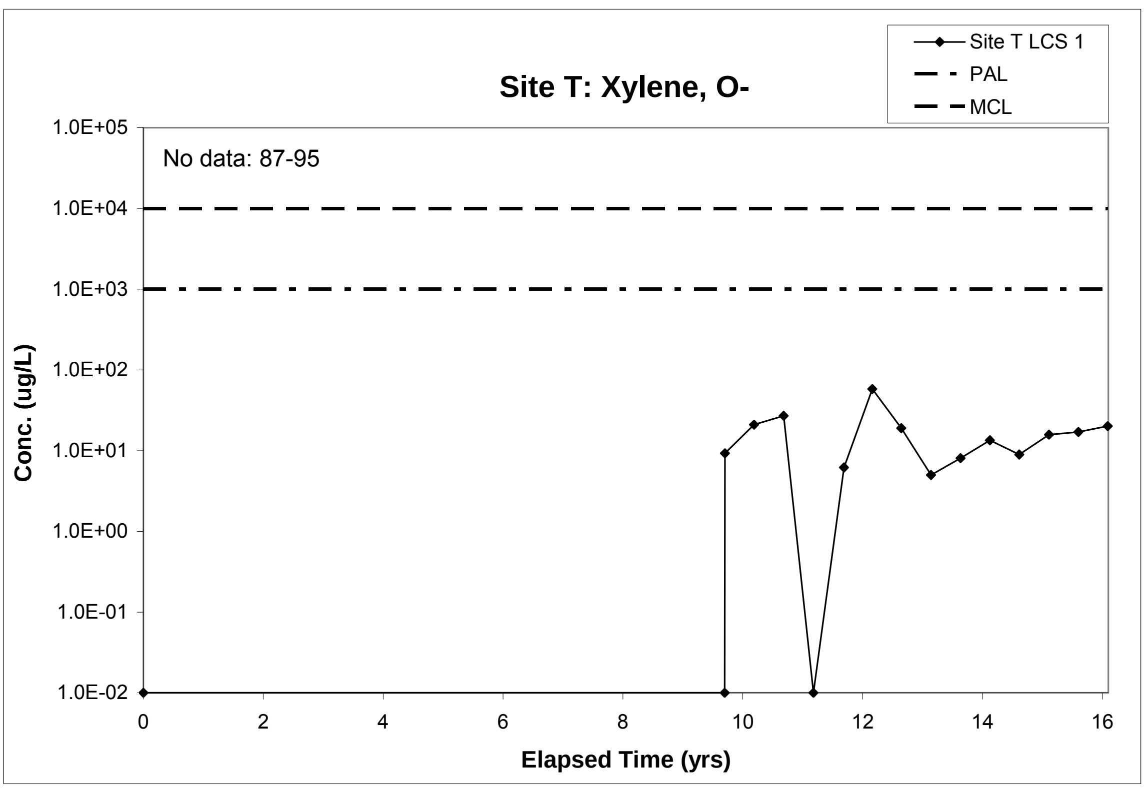

Site J: Xylene, O-
Site J LCS: 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

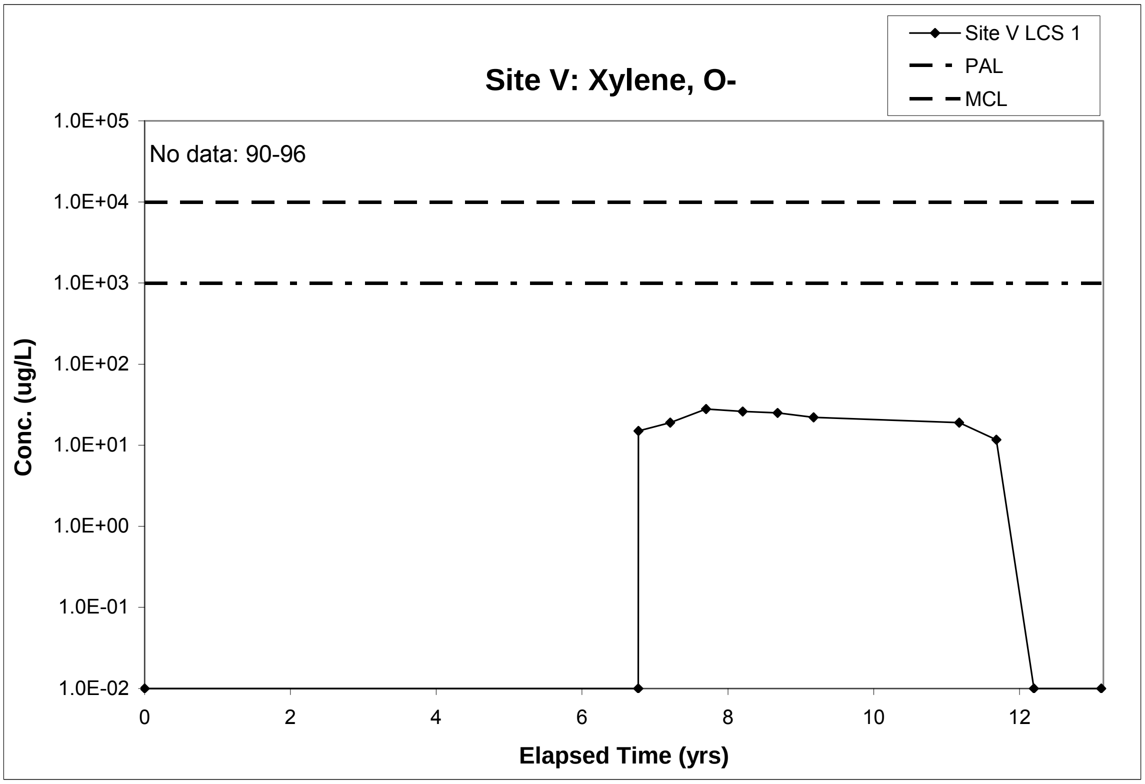

Site J: Xylene, O-
Site J LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)


Site J: Xylene,O-
Site J LCS 3
PAL
MCL
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

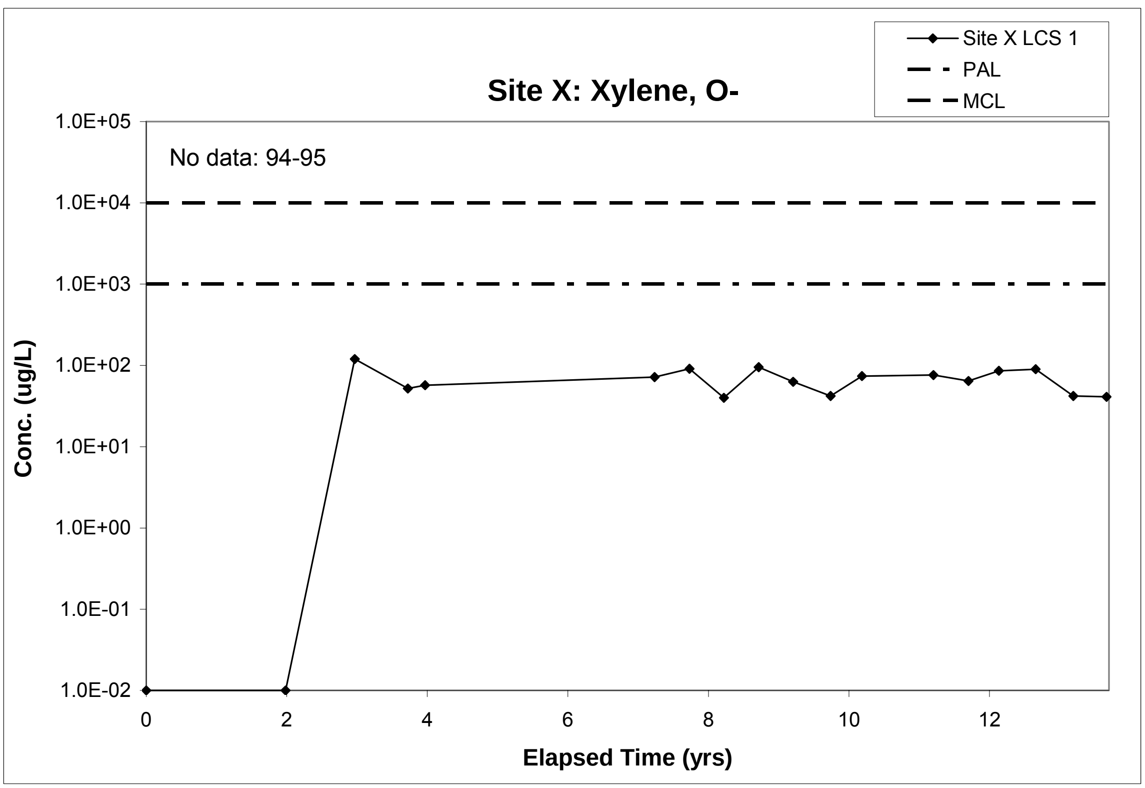

Site K: Xylene, O-
Site K LCS 1
PAL
MCL
No data 83-94
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)


Site P: Xylene, O-
Site P LCS 1
PAL
MCL
No data: 87-95
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

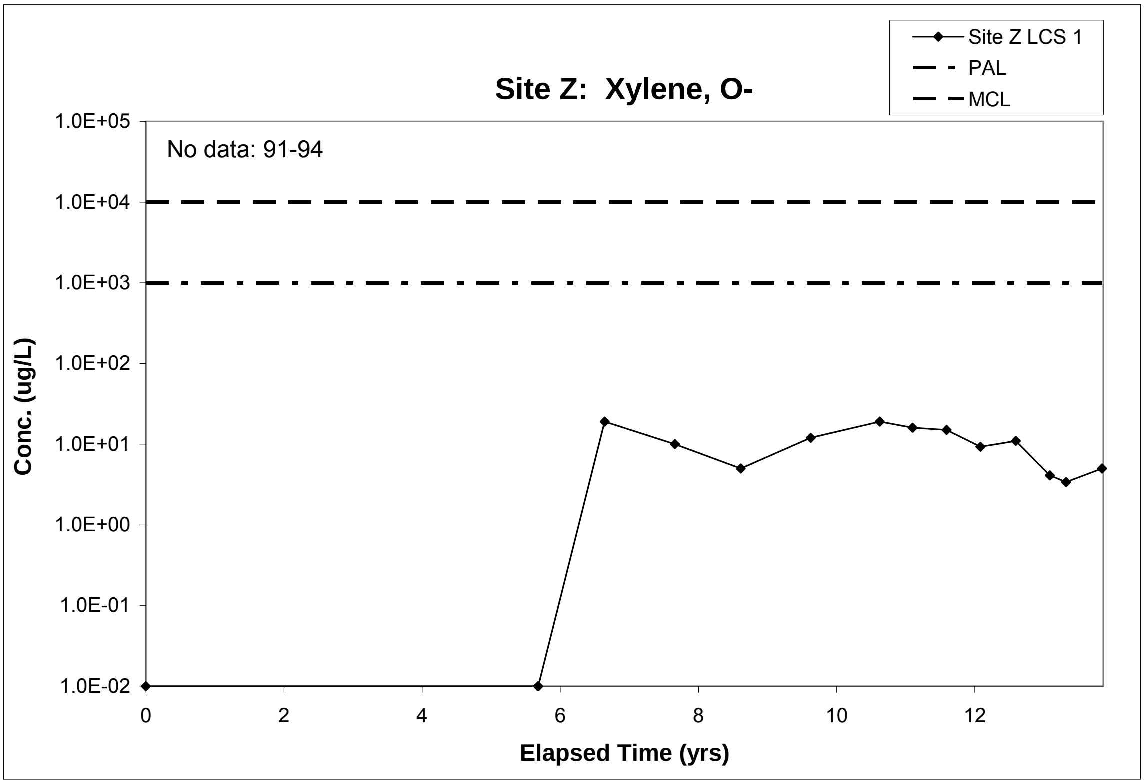

Site T: Xylene, O-
Site T LCS 1
PAL
MCL
No data: 87-95
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

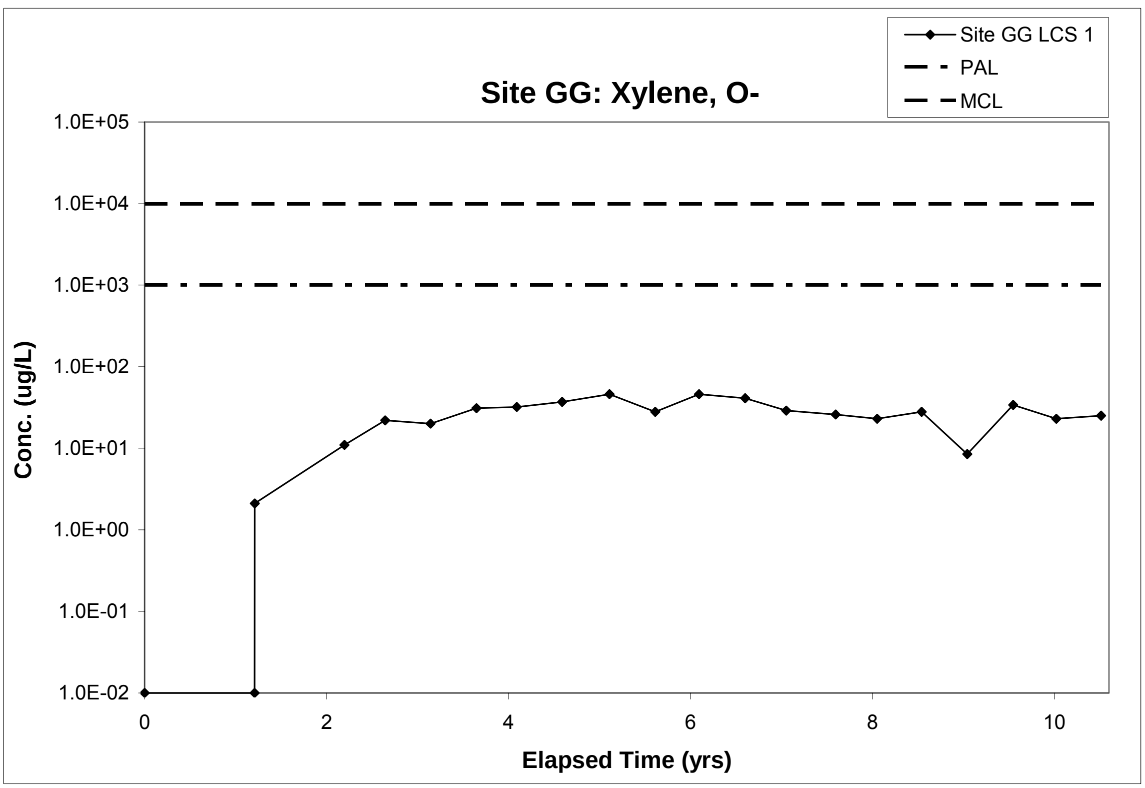


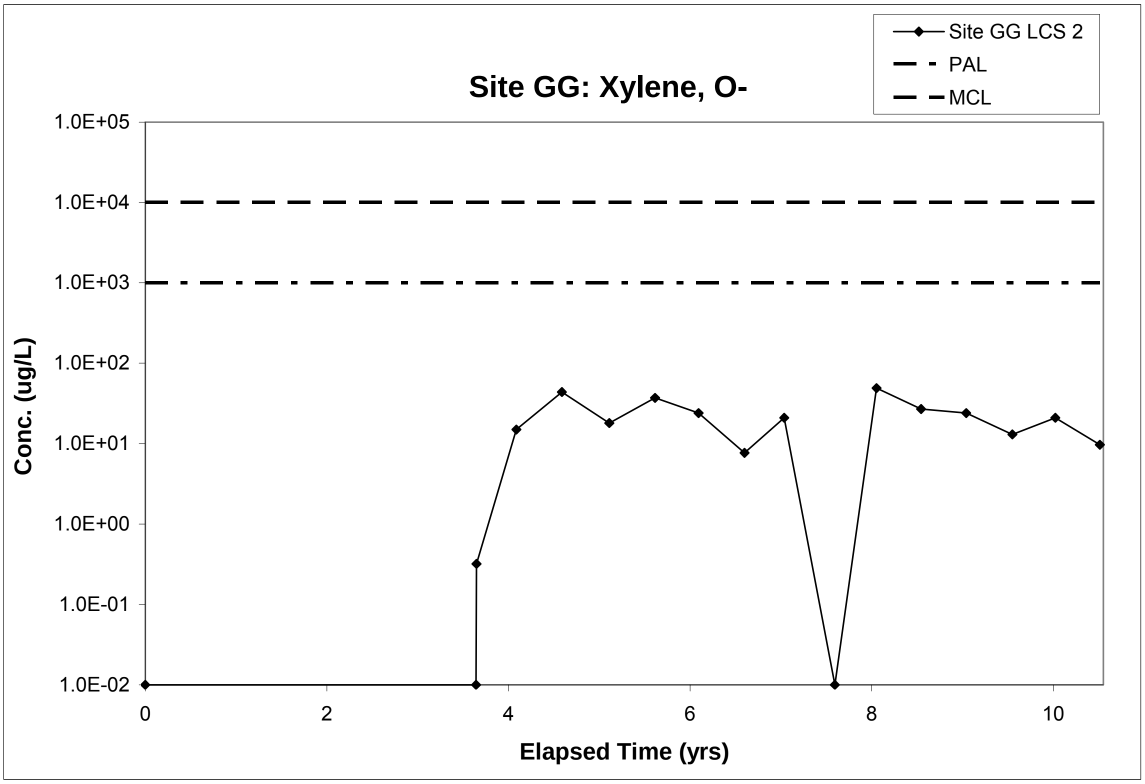
Site V LCS 1
PAL
MCL
Site V: Xylene, O-
No data: 90-96
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)



Site X LCS 1
PAL
MCL
Site X: Xylene, O-
No data: 94-95
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)


Site Z: Xylene, O-
Site Z LCS 1
PAL
MCL
No data: 91-94
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)


Site GG: Xylene, O-
Site GG LCS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)


Site GG: Xylene, O-
Site GG LCS 2
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
Elapsed Time (yrs)

Appendix D: Summary Data used to create each of the VOC concentration records

Landfill Sites	Leachate Collection Points	1,1,1-Trichloroethane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	3	6	4.33	0	0	6	27	NS	NS
	LCS PT 2	0.9	144	43.53	4	0	9	40	NS	NS
Site C	LCS PT 1	-	-	-	-	-	-	-	-	-
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	-	-	-	-	-	-	-	-	-
Site H	LCS PT 1	-	-	-	-	-	-	-	-	-
Site I	LCS PT 1	-	-	-	-	-	-	-	-	-
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	4	130	62.6	3	0	5	13	NS	NS
Site Q	LCS PT 1	1	201	42.6	1	1	5	18	Decreasing	Decreasing
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	0.71	430	159.3	7	3	9	17	Decreasing	Decreasing
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site X	LCS PT 1	3.1	217	61.22	2	1	5	23	NS	NS
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	7.5	160	43.58	2	0	6	15	NS	NS
Site AA	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	0.78	2.3	1.64	0	0	5	14	NS	NS
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	2.5	72	20.7	1	0	5	15	NS	Decreasing
Site GG	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	7	140	48.4	3	0	8	16	NS	NS

Landfill Sites	Leachate Collection Points	1,1-Dichloroethane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	10	120	55.2	4	0	23	26	Decreasing	Decreasing
	LCS PT 2	0.66	149	32.8	3	0	21	42	Decreasing	Decreasing
Site C	LCS PT 1	0.3	30	0.35	0	0	6	19	NS	NS
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	1	76	14.4	0	0	4	14	Decreasing	Decreasing
	LCS PT 2	0.87	11	5.6	0	0	6	13	NS	NS
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	0.81	122	27.8	1	0	4	33	Decreasing*	Decreasing*
Site H	LCS PT 1	3.1	90	49.6	1	0	6	19	NS	NS
Site I	LCS PT 1	2	17	8.7	0	0	4	14	NS	NS
Site J	LCS PT 1	3.1	29	13.1	0	0	3	12	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	1.4	2.4	2	0	0	4	16	Decreasing	Decreasing
Site K	LCS PT 1	1	8.5	3.5	0	0	5	12	NS	NS
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	1.2	100	36.5	1	0	4	18	NS	Decreasing
Site O	LCS PT 1	1.8	290	132.5	5	0	8	13	Decreasing	Decreasing
Site P	LCS PT 1	3.1	170	67.4	2	0	5	13	NS	NS
Site Q	LCS PT 1	8	218	48.4	1	0	11	18	Decreasing	Decreasing
	LCS PT 2	2	23	10.8	0	0	6	17	NS	NS
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	2	98.6	31.5	1	0	5	21	Decreasing	Decreasing
	LCS PT 2	2	29	15.5	0	0	6	13	NS	NS
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	1.7	590	184	8	0	15	17	Decreasing	Decreasing
Site V	LCS PT 1	9.5	31	18	0	0	5	11	NS	NS
Site W	LCS PT 1	0.6	170	26.5	2	0	15	19	Decreasing	Decreasing
	LCS PT 2	2	309	64.1	2	0	7	20	Decreasing	Decreasing
Site X	LCS PT 1	1.5	125	20.9	1	0	12	24	Decreasing	Decreasing
Site Y	LCS PT 1	2.1	48	13.9	0	0	4	8	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	1.5	68	21.2	0	0	13	15	Decreasing	Decreasing
Site AA	LCS PT 1	0.53	6	2.2	0	0	6	15	Decreasing	Decreasing
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	4.2	39	12.2	0	0	10	14	NS	NS
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	3.2	122	25.8	1	0	9	39	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	0.12	41.2	8.1	0	0	8	34	NS	NS
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	1.4	20	10.2	0	0	6	16	Decreasing	Decreasing
Site GG	LCS PT 1	2.3	71	18.6	0	0	10	19	Decreasing	Decreasing
	LCS PT 2	1.9	46	19.7	0	0	5	15	NS	Decreasing
Site HH	LCS PT 1	9.2	63	37.8	0	0	9	16	NS	NS

Landfill Sites	Leachate Collection Points	1,2-Dichloroethane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	3	11	6.7	9	7	9	27	NS	NS
	LCS PT 2	0.4	1	0.79	4	0	5	40	NS	NS
Site C	LCS PT 1	-	-	-	-	-	-	-	-	-
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	-	-	-	-	-	-	-	-	-
Site H	LCS PT 1	-	-	-	-	-	-	-	-	-
Site I	LCS PT 1	-	-	-	-	-	-	-	-	-
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 1	1	37	8.4	7	4	7	18	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	-	-	-	-	-	-	-	-	-
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	0.5	2	1.3	4	0	4	21	NS	NS
Site X	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	-	-	-	-	-	-	-	-	-
Site AA	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Leachate Collection Points	1,2-Dichloropropane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	5	12	9.3	4	4	4	27	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site C	LCS PT 1	-	-	-	-	-	-	-	-	-
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	-	-	-	-	-	-	-	-	-
Site H	LCS PT 1	-	-	-	-	-	-	-	-	-
Site I	LCS PT 1	-	-	-	-	-	-	-	-	-
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	-	-	-	-	-	-	-	-	-
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	1	6	2.6	6	1	6	19	NS	NS
	LCS PT 2	1	21	6	5	1	5	21	Decreasing	Decreasing
Site X	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	-	-	-	-	-	-	-	-	-
Site AA	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Leachate Collection Points	Acetone								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	5900	37000	18925	16	16	16	16	NS	NS
	LCS PT 2	920	8400	3213	17	16	17	19	NS	NS
Site C	LCS PT 1	-	-	-	-	-	-	-	-	-
Site D	LCS PT 1	15	15000	4553	3	3	4	9	NS	NS
Site E	LCS PT 1	38	3230	758	3	2	8	10	NS	NS
	LCS PT 2	22	5040	1182	5	3	8	10	Decreasing	Decreasing
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	-	-	-	-	-	-	-	-	-
Site H	LCS PT 1	200	7700	2116	16	9	16	16	Decreasing	Decreasing
Site I	LCS PT 1	-	-	-	-	-	-	-	-	-
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	57	870	364.8	8	0	12	15	NS	NS
	LCS PT 3	27	230	74.7	1	0	6	15	Increasing	Increasing
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	23	100	56.8	0	0	11	13	NS	NS
	LCS PT 2	5.6	94	28.4	0	0	6	13	NS	NS
Site M	LCS PT 1	72	3100	716	1	1	5	8	NS	NS
Site N	LCS PT 1	20	760	383	3	0	5	13	NS	NS
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	120	1200	533	8	1	8	8	NS	NS
Site Q	LCS PT 1	280	7200	2041	15	7	15	17	NS	NS
	LCS PT 2	48	7800	2816	8	6	12	17	NS	Decreasing
	LCS PT 3	640	24000	10168	5	4	5	5	NS	NS
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	690	18000	7870	17	16	17	19	NS	NS
	LCS PT 2	62	17000	4734	12	9	13	13	NS	NS
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	25	14800	5919	7	6	10	11	Decreasing	Decreasing
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	53	4800	1169	13	6	16	18	NS	NS
	LCS PT 2	110	8900	2068	15	9	17	18	Decreasing	Decreasing
Site X	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	410	3400	1353	4	1	4	7	NS	NS
Site Z	LCS PT 1	54	8580	1395	8	6	13	15	NS	NS
Site AA	LCS PT 1	16	360	173	2	0	5	8	NS	NS
	LCS PT 2	3.1	1100	260.2	2	1	6	8	NS	NS
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	6200	59000	22107	14	14	14	14	NS	NS
	LCS PT 2	360	8200	3463	6	4	6	6	Decreasing	NS
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	15	2000	464	2	1	5	15	NS	NS
Site GG	LCS PT 1	38	2000	644	7	3	11	18	NS	NS
	LCS PT 2	98	11000	1736	9	4	11	14	NS	NS
Site HH	LCS PT 1	210	24000	5080	15	14	15	16	NS	NS

Landfill Sites	Leachate Collection Points	Benzene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	1.4	5.6	3.8	3	1	3	4	NS	NS
	LCS PT 2	0.3	6.1	3.7	7	2	8	9	NS	NS
Site B	LCS PT 1	15	61	31.1	22	22	22	27	NS	NS
	LCS PT 2	0.7	13	4.3	17	4	17	40	NS	NS
Site C	LCS PT 1	0.8	9.2	4	18	5	18	18	NS	NS
Site D	LCS PT 1	1.5	11.3	5.8	6	3	6	14	NS	NS
Site E	LCS PT 1	2.4	9.5	4.7	6	3	6	13	NS	NS
	LCS PT 2	3	7.9	4.5	6	2	6	13	NS	NS
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	0.47	10.5	3.4	12	2	13	19	NS	NS
Site H	LCS PT 1	3.1	41	11.9	5	3	5	19	NS	NS
Site I	LCS PT 1	1.2	9.1	5.6	12	9	12	14	NS	NS
Site J	LCS PT 1	2.2	14	6.1	5	2	5	13	NS	NS
	LCS PT 2	0.83	4	2.1	5	0	5	16	NS	NS
	LCS PT 3	2.8	5	4	9	2	3	4	NS	NS
Site K	LCS PT 1	2.1	4.9	3.4	7	0	7	13	NS	NS
Site L	LCS PT 1	0.16	1.3	0.42	1	0	6	14	NS	NS
	LCS PT 2	0.1	2	0.77	3	0	3	13	NS	NS
Site M	LCS PT 1	1.2	12	4.8	8	3	8	16	Decreasing	Decreasing
Site N	LCS PT 1	0.26	8.9	3	7	2	9	17	Decreasing	Decreasing
Site O	LCS PT 1	1.4	25	11.2	9	4	9	13	Decreasing	Decreasing
Site P	LCS PT 1	2	17	8.8	7	5	7	13	NS	NS
Site Q	LCS PT 1	0.8	26	14.8	9	8	9	18	NS	NS
	LCS PT 2	3	9	5.7	7	4	7	13	NS	NS
	LCS PT 3	7	16	12.3	3	3	3	5	NS	NS
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	3	8	5.2	7	4	7	21	NS	NS
	LCS PT 2	4.1	11	6.9	8	6	8	13	NS	NS
Site T	LCS PT 1	0.33	4	2.4	4		5	18	NS	NS
Site U	LCS PT 1	2.4	85	26.5	9	7	9	17	Decreasing	Decreasing
Site V	LCS PT 1	4.1	9.8	5.5	7	4	7	11	NS	NS
Site W	LCS PT 1	0.9	16	5.3	7	3	7	19	NS	NS
	LCS PT 2	2	23	7.2	6	4	6	20	Decreasing	Decreasing
Site X	LCS PT 1	4	13	8.2	13	12	13	23	Decreasing	NS
Site Y	LCS PT 1	1.1	1.6	1.4	3	0	3	6	NS	NS
	LCS PT 2	1.7	7.8	3.5	4	1	4	8	Decreasing	Decreasing
Site Z	LCS PT 1	2	7.8	4.9	8	3	8	15	NS	NS
Site AA	LCS PT 1	0.58	11	4.2	9	2	9	15	Decreasing	Decreasing
	LCS PT 2	0.25	1.3	0.65	5	0	9	15	Decreasing	Decreasing
	LCS PT 3	1.7	4.7	3.2	4	0	4	6	NS	NS
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	0.42	5.9	3.3	11	4	12	38	NS	NS
	LCS PT 2	0.1	1.3	0.7	4	0	8	34	NS	NS
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	1.4	6	3.9	14	3	14	19	NS	NS
	LCS PT 2	2.5	4.9	3.6	4	0	4	15	NS	NS
Site HH	LCS PT 1	3	21	8.3	4	2	4	16	NS	NS

Landfill Sites	Leachate Collection Points	Chlorobenzene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
Site A	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	2	6	3.1	0	0	7	27	NS	NS
Site B	LCS PT 2	0.4	7	1.9	0	0	8	39	NS	NS
Site C	LCS PT 1	0.9	3.3	1.5	0	0	10	19	NS	NS
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	1.6	4.7	2.9	0	0	4	13	NS	NS
Site E	LCS PT 2	-	-	-	-	-	-	-	-	-
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
Site F	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	-	-	-	-	-	-	-	-	-
Site H	LCS PT 1	-	-	-	-	-	-	-	-	-
Site I	LCS PT 1	3	21	10.2	1	0	6	14	NS	NS
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
Site J	LCS PT 2	-	-	-	-	-	-	-	-	-
Site J	LCS PT 3	-	-	-	-	-	-	-	-	-
Site K	LCS PT 1	1.6	7.2	5	0	0	4	12	NS	NS
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	0.96	11	4.9	0	0	5	16	Decreasing	Decreasing
Site N	LCS PT 1	0.64	7.1	4.1	0	0	5	17	NS	NS
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
Site R	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	-	-	-	-	-	-	-	-	-
Site S	LCS PT 2	-	-	-	-	-	-	-	-	-
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	-	-	-	-	-	-	-	-	-
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 2	-	-	-	-	-	-	-	-	-
Site X	LCS PT 1	1.1	4.9	3.2	0	0	9	22	Increasing	Increasing
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	-	-	-	-	-	-	-	-	-
Site AA	LCS PT 1	-	-	-	-	-	-	-	-	-
Site AA	LCS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Leachate Collection Points	Chloroethane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	1.2	10	6.6	0	0	4	4	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	4	36	13	0	0	8	27	NS	NS
	LCS PT 2	0.8	72	14.3	0	0	10	37	NS	NS
Site C	LCS PT 1	1.7	35.1	10.3	0	0	5	19	NS	NS
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	-	-	-	-	-	-	-	-	-
Site H	LCS PT 1	11	14	12.7	0	0	3	19	NS	NS
Site I	LCS PT 1	1.3	24	10.7	0	0	8	14	NS	NS
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	2.1	30	10.4	0	0	4	17	NS	NS
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 1	2	118	23.5	1	0	6	18	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	6	14	10	0	0	3	13	NS	NS
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	1.6	1300	359	4	3	8	17	Decreasing	Decreasing
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site X	LCS PT 1	2.4	12	5.6	0	0	6	23	NS	NS
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	4.6	21	12.6	0	0	8	15	NS	NS
Site AA	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	1	110	20	1	0	6	14	NS	NS
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	2.9	35	16.5	0	0	6	16	Decreasing	Decreasing
Site GG	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	10	69	23.8	0	0	8	16	NS	NS

Landfill Sites	Leachate Collection Points	Chloromethane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site C	LCS PT 1	-	-	-	-	-	-	-	-	-
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	-	-	-	-	-	-	-	-	-
Site H	LCS PT 1	-	-	-	-	-	-	-	-	-
Site I	LCS PT 1	-	-	-	-	-	-	-	-	-
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	0.41	0.9	0.73	9	0	9	14	NS	NS
	LCS PT 2	0.27	26	7.1	3	1	4	13	NS	NS
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	2	5	3.3	3	2	3	13	NS	NS
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	-	-	-	-	-	-	-	-	-
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site X	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	-	-	-	-	-	-	-	-	-
Site AA	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Leachate Collection Points	cis-1,2-Dichloroethene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	7	71	32.2	17	1	17	27	NS	NS
	LCS PT 2	0.4	11	4.5	2	0	9	31	NS	NS
Site C	LCS PT 1	0.49	8.9	3.2	1	0	7	15	Decreasing	Decreasing
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	0.89	76.1	14.3	1	1	6	13	NS	NS
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	2.48	16	9.6	2	0	4	32	NS	NS
Site H	LCS PT 1	-	-	-	-	-	-	-	-	-
Site I	LCS PT 1	3	28	16	2	0	4	14	NS	NS
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	1.1	2.9	1.7	0	0	3	16	NS	NS
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	1.6	200	65.5	4	2	6	13	NS	Decreasing
Site P	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 1	3	10	6.3	3	0	6	17	Decreasing	Decreasing
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	1	2	1.67	0	0	3	18	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	7.6	160	71.5	5	2	5	11	NS	NS
Site V	LCS PT 1	5.4	15	9.6	2	0	4	10	NS	NS
Site W	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site X	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	-	-	-	-	-	-	-	-	-
Site AA	LCS PT 1	0.64	1	0.88	0	0	5	15	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	1	18	7.4	3	0	6	19	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Leachate Collection Points	Dichlorodifluoromethane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site C	LCS PT 1	-	-	-	-	-	-	-	-	-
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	0.7	43.5	11.7	0	0	8	31	NS	NS
Site H	LCS PT 1	-	-	-	-	-	-	-	-	-
Site I	LCS PT 1	1	140	29.6	0	0	6	14	NS	NS
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	2.8	7.9	5.1	0	0	6	16	NS	NS
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	-	-	-	-	-	-	-	-	-
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site X	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	-	-	-	-	-	-	-	-	-
Site AA	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	0.93	97.4	25.1	0	0	11	34	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	0.23	42	8.4	0	0	6	29	NS	NS
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Leachate Collection Points	Dichloromethane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	47	1300	385	24	24	24	27	Decreasing	Decreasing
	LCS PT 2	2.2	3170	584.7	29	26	29	40	Decreasing	Decreasing
Site C	LCS PT 1	-	-	-	-	-	-	-	-	-
Site D	LCS PT 1	1.4	163	42.2	5	4	5	14	NS	NS
Site E	LCS PT 1	1.4	15	6.4	6	4	6	13	NS	NS
	LCS PT 2	11	148	62.25	4	4	4	13	NS	NS
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	48.7	676	299.3	4	4	4	33	NS	NS
Site H	LCS PT 1	6.8	1025	327.4	10	10	10	19	NS	Decreasing
Site I	LCS PT 1	-	-	-	-	-	-	-	-	-
Site J	LCS PT 1	5.9	500	165.7	4	4	4	13	NS	NS
	LCS PT 2	1.4	7.2	4.2	4	2	4	16	NS	NS
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site K	LCS PT 1	4.9	129	40.5	4	3	4	12	NS	NS
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	1	200	48.9	10	7	10	16	NS	NS
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	2.1	2400	676.9	13	11	13	13	Decreasing	Decreasing
Site P	LCS PT 1	10	640	157	5	5	5	10	NS	NS
Site Q	LCS PT 1	12	5530	417.9	16	16	16	18	Decreasing	Decreasing
	LCS PT 2	3	500	113.9	10	8	10	17	NS	NS
	LCS PT 3	28	1100	339	4	4	4	5	NS	NS
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	0.8	560	267	11	9	11	22	Decreasing	Decreasing
	LCS PT 2	8	470	186.1	9	9	9	13	NS	NS
Site T	LCS PT 1	8.2	44	26.3	4	4	4	18	NS	NS
Site U	LCS PT 1	1.2	8200	1016	13	11	13	15	Decreasing	Decreasing
Site V	LCS PT 1	34.7	540	193.6	6	6	6	11	NS	NS
Site W	LCS PT 1	0.9	724	66.3	15	9	15	19	Decreasing	Decreasing
	LCS PT 2	1	2940	344	13	8	13	21	Decreasing	Decreasing
Site X	LCS PT 1	1.3	2450	547	17	16	17	23	Decreasing	Decreasing
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	11	1200	311.3	7	7	7	15	NS	Decreasing
Site AA	LCS PT 1	0.7	16	5.4	5	2	5	15	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	0.58	18	5.4	8	3	8	14	Decreasing	Decreasing
Site CC	LCS PT 1	36	3700	770	9	9	9	16	Decreasing	Decreasing
	LCS PT 2	33	210	102	4	4	4	6	NS	NS
Site DD	LCS PT 1	6.6	144.7	53.4	9	9	9	35	Decreasing	Decreasing
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	2	190	29.9	8	5	8	16	NS	NS
Site GG	LCS PT 1	1.3	150	49	9	6	9	19	Decreasing	Decreasing
	LCS PT 2	5.2	230	57.9	6	6	6	15	NS	NS
Site HH	LCS PT 1	1.8	1900	390	15	13	15	16	Decreasing	Decreasing

Landfill Sites	Leachate Collection Points	Ethylbenzene								
		Min Conc. (µg/l)	Max Conc. (µg/l)	Avg Conc. (µg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	1.6	37	15.2	0	0	3	4	Increasing	Increasing
	LCS PT 2	1.2	60	31	0	0	8	9	NS	NS
Site B	LCS PT 1	54	450	149.8	13	0	25	25	NS	NS
	LCS PT 2	1	222	23	1	0	25	40	NS	NS
Site C	LCS PT 1	8.9	48	25.4	0	0	19	19	NS	NS
Site D	LCS PT 1	0.47	40	12.2	0	0	10	14	NS	NS
Site E	LCS PT 1	0.69	120	24.8	0	0	10	14	NS	NS
	LCS PT 2	13	57	33.8	0	0	9	13	NS	NS
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	4.5	53	22	0	0	27	33	NS	NS
Site H	LCS PT 1	4.7	62	15.3	0	0	13	19	NS	NS
Site I	LCS PT 1	6.7	79	40.1	0	0	12	14	NS	NS
Site J	LCS PT 1	20	93	40.5	0	0	10	13	NS	NS
	LCS PT 2	12	340	71.3	2	0	15	16	NS*	NS*
	LCS PT 3	27	120	66.2	0	0	16	16	NS	NS
Site K	LCS PT 1	3	68	33.6	0	0	12	13	NS	NS
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	1.1	120	41.3	0	0	15	16	NS	NS
Site N	LCS PT 1	1.4	33.9	20.2	0	0	9	18	NS	NS
Site O	LCS PT 1	8.6	75	36.9	0	0	9	13	Decreasing	Decreasing
Site P	LCS PT 1	0.5	49	24.3	0	0	12	13	NS	NS
Site Q	LCS PT 1	5	140	63.5	1	0	14	18	Decreasing	NS
	LCS PT 2	7	46	26.6	0	0	15	17	NS	NS
	LCS PT 3	23	80	60.3	0	0	4	5	NS	NS
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	10	107	43.7	0	0	15	22	NS	NS
	LCS PT 2	14	77	32.9	0	0	13	13	NS	NS
Site T	LCS PT 1	4	79	21.7	0	0	15	18	NS	NS
Site U	LCS PT 1	0.61	130	61.4	0	0	12	17	NS	NS
Site V	LCS PT 1	12	26	21.3	0	0	8	11	NS	NS
Site W	LCS PT 1	1	68	13.8	0	0	15	19	Decreasing	Decreasing
	LCS PT 2	0.5	100	22	0	0	16	21	Decreasing	Decreasing
Site X	LCS PT 1	31	120	78.5	0	0	19	23	NS	NS
Site Y	LCS PT 1	6.8	14	11.5	0	0	4	8	NS	NS
	LCS PT 2	3	21	15.6	0	0	6	8	NS	NS
Site Z	LCS PT 1	8.3	37	16.9	0	0	10	15	NS	NS
Site AA	LCS PT 1	2.1	56	27.6	0	0	8	15	Decreasing	Decreasing
	LCS PT 2	0.78	1.5	1.1	0	0	6	15	Decreasing	Decreasing
	LCS PT 3	8.3	32	21.2	0	0	6	6	Increasing	Increasing
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	65	240	127	4	0	9	16	Decreasing	Decreasing
	LCS PT 2	32	130	70	0	0	5	6	NS	NS
Site DD	LCS PT 1	1.9	72	18.8	0	0	30	38	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	0.16	31	6.5	0	0	9	30	NS	NS
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	1	42	11.9	0	0	4	16	NS	NS
Site GG	LCS PT 1	2	56	33.6	0	0	17	18	Increasing	Increasing
	LCS PT 2	0.31	68	23.5	0	0	15	15	NS	NS
Site HH	LCS PT 1	9	39	21.2	0	0	6	10	NS	NS

Landfill Sites	Leachate Collection Points	Styrene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1									
	LCS PT 2									
Site B	LCS PT 1									
	LCS PT 2	0.4	13	4.71	2	0	9	33	NS	NS
Site C	LCS PT 1									
Site D	LCS PT 1									
Site E	LCS PT 1									
	LCS PT 2									
Site F	LCS PT 1									
	LCS PT 2									
Site G	LCS PT 1	8.51	65.5	26.2	4	0	5	28	NS	NS
Site H	LCS PT 1									
Site I	LCS PT 1									
Site J	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site K	LCS PT 1	1.3	63.6	12.3	1	0	7	12	NS	NS
Site L	LCS PT 1									
	LCS PT 2									
Site M	LCS PT 1									
Site N	LCS PT 1									
Site O	LCS PT 1	16	30	23.3	4	0	4	8	NS	NS
Site P	LCS PT 1	3	14	8.75	2	0	4	12	NS	NS
Site Q	LCS PT 1									
	LCS PT 2	2	18	6.8	1	0	5	21	NS	NS
	LCS PT 3									
Site R	LCS PT 1									
	LCS PT 2									
Site S	LCS PT 1									
	LCS PT 2									
Site T	LCS PT 1									
Site U	LCS PT 1	1.8	64	40.2	3	0	4	14	NS	NS
Site V	LCS PT 1	3.8	7.4	5.65	0	0	5	12	NS	NS
Site W	LCS PT 1	0.3	11	3.68	1	0	6	20	NS	NS
	LCS PT 2	1	14	6.6	2	0	5	20	NS	NS
Site X	LCS PT 1									
Site Y	LCS PT 1									
	LCS PT 2									
Site Z	LCS PT 1	2.5	5	4.03	0	0	3	17	NS	NS
Site AA	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site BB	LCS PT 1									
Site CC	LCS PT 1									
	LCS PT 2									
Site DD	LCS PT 1	2.28	65.1	26.3	4	0	6	30	Decreasing	Decreasing
	LCS PT 2									
	LCS PT 3									
Site EE	LCS PT 1									
Site FF	LCS PT 1									
Site GG	LCS PT 1									
	LCS PT 2									
Site HH	LCS PT 1	2	27	9.78	1	0	5	20	NS	NS

Landfill Sites	Leachate Collection Points	Styrene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1									
	LCS PT 2									
Site B	LCS PT 1									
	LCS PT 2	0.4	13	4.71	2	0	9	33	NS	NS
Site C	LCS PT 1									
Site D	LCS PT 1									
Site E	LCS PT 1									
	LCS PT 2									
Site F	LCS PT 1									
	LCS PT 2									
Site G	LCS PT 1	8.51	65.5	26.2	4	0	5	28	NS	NS
Site H	LCS PT 1									
Site I	LCS PT 1									
Site J	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site K	LCS PT 1	1.3	63.6	12.3	1	0	7	12	NS	NS
Site L	LCS PT 1									
	LCS PT 2									
Site M	LCS PT 1									
Site N	LCS PT 1									
Site O	LCS PT 1	16	30	23.3	4	0	4	8	NS	NS
Site P	LCS PT 1	3	14	8.75	2	0	4	12	NS	NS
Site Q	LCS PT 1									
	LCS PT 2	2	18	6.8	1	0	5	21	NS	NS
	LCS PT 3									
Site R	LCS PT 1									
	LCS PT 2									
Site S	LCS PT 1									
	LCS PT 2									
Site T	LCS PT 1									
Site U	LCS PT 1	1.8	64	40.2	3	0	4	14	NS	NS
Site V	LCS PT 1	3.8	7.4	5.65	0	0	5	12	NS	NS
Site W	LCS PT 1	0.3	11	3.68	1	0	6	20	NS	NS
	LCS PT 2	1	14	6.6	2	0	5	20	NS	NS
Site X	LCS PT 1									
Site Y	LCS PT 1									
	LCS PT 2									
Site Z	LCS PT 1	2.5	5	4.03	0	0	3	17	NS	NS
Site AA	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site BB	LCS PT 1									
Site CC	LCS PT 1									
	LCS PT 2									
Site DD	LCS PT 1	2.28	65.1	26.3	4	0	6	30	Decreasing	Decreasing
	LCS PT 2									
	LCS PT 3									
Site EE	LCS PT 1									
Site FF	LCS PT 1									
Site GG	LCS PT 1									
	LCS PT 2									
Site HH	LCS PT 1	2	27	9.78	1	0	5	20	NS	NS

Landfill Sites	Leachate Collection Points	Carbon Disulfide								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1									
	LCS PT 2									
Site B	LCS PT 1									
	LCS PT 2									
Site C	LCS PT 1									
Site D	LCS PT 1									
Site E	LCS PT 1									
	LCS PT 2									
Site F	LCS PT 1									
	LCS PT 2									
Site G	LCS PT 1									
Site H	LCS PT 1									
Site I	LCS PT 1									
Site J	LCS PT 1									
	LCS PT 2	2	15	7.45	0	0	6	18	NS	NS
	LCS PT 3	2.3	150	23.4	0	0	9	18	NS	NS
Site K	LCS PT 1	1.58	6	3.41	0	0	5	6	NS	NS
Site L	LCS PT 1									
	LCS PT 2	0.94	250	33.2	1	0	10	15	NS	NS
Site M	LCS PT 1									
Site N	LCS PT 1									
Site O	LCS PT 1									
Site P	LCS PT 1									
Site Q	LCS PT 1									
	LCS PT 2	9	22	14.8	0	0	6	21	NS	NS
	LCS PT 3									
Site R	LCS PT 1									
	LCS PT 2									
Site S	LCS PT 1									
	LCS PT 2									
Site T	LCS PT 1									
Site U	LCS PT 1	0.65	1.8	0.97	0	0	5	11	NS	NS
Site V	LCS PT 1									
Site W	LCS PT 1									
	LCS PT 2									
Site X	LCS PT 1									
Site Y	LCS PT 1									
	LCS PT 2									
Site Z	LCS PT 1									
Site AA	LCS PT 1	34	61	44.3	0	0	4	11	NS	NS
	LCS PT 2									
	LCS PT 3	2	5.5	3.5	0	0	4	8	NS	NS
Site BB	LCS PT 1									
Site CC	LCS PT 1									
	LCS PT 2									
Site DD	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site EE	LCS PT 1									
Site FF	LCS PT 1									
Site GG	LCS PT 1	2.1	18	7.57	0	0	6	20	NS	NS
	LCS PT 2	5.1	22	12.7	0	0	3	16	NS	NS
Site HH	LCS PT 1									

Landfill Sites	Leachate Collection Points	Bromomethane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1									
	LCS PT 2									
Site B	LCS PT 1									
	LCS PT 2									
Site C	LCS PT 1									
Site D	LCS PT 1									
Site E	LCS PT 1									
	LCS PT 2									
Site F	LCS PT 1									
	LCS PT 2									
Site G	LCS PT 1									
Site H	LCS PT 1									
Site I	LCS PT 1									
Site J	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site K	LCS PT 1									
Site L	LCS PT 1									
	LCS PT 2									
Site M	LCS PT 1									
Site N	LCS PT 1									
Site O	LCS PT 1									
Site P	LCS PT 1									
Site Q	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site R	LCS PT 1									
	LCS PT 2									
Site S	LCS PT 1									
	LCS PT 2									
Site T	LCS PT 1									
Site U	LCS PT 1									
Site V	LCS PT 1									
Site W	LCS PT 1									
	LCS PT 2									
Site X	LCS PT 1									
Site Y	LCS PT 1									
	LCS PT 2									
Site Z	LCS PT 1									
Site AA	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site BB	LCS PT 1									
Site CC	LCS PT 1									
	LCS PT 2									
Site DD	LCS PT 1	0.47	160	32.4	14	10	16	40	NS	NS
	LCS PT 2									
	LCS PT 3									
Site EE	LCS PT 1									
Site FF	LCS PT 1									
Site GG	LCS PT 1									
	LCS PT 2									
Site HH	LCS PT 1									

Landfill Sites	Leachate Collection Points	Methyl Ethyl Ketone								
		Min Conc. (µg/l)	Max Conc. (µg/l)	Avg Conc. (µg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	4900	53000	25618	16	16	16	16	NS	NS
	LCS PT 2	2200	13000	6047	17	17	17	18	NS	NS
Site C	LCS PT 1	-	-	-	-	-	-	-	-	-
Site D	LCS PT 1	1.8	4000	2225	3	3	4	9	NS	NS
Site E	LCS PT 1	18	541	168	2	1	6	11	NS	NS
	LCS PT 2	28	789	208	3	1	6	10	Decreasing	NS
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	-	-	-	-	-	-	-	-	-
Site H	LCS PT 1	-	-	-	-	-	-	-	-	-
Site I	LCS PT 1	-	-	-	-	-	-	-	-	-
Site J	LCS PT 1	8.6	1100	369	2	1	4	5	NS	NS
	LCS PT 2	34	1200	402	9	5	12	16	NS	NS
	LCS PT 3	20	210	75.5	1	0	4	16	NS	NS
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	3	6.9	5.2	0	0	7	13	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	130	37000	4909	8	2	8	10	NS	NS
Site Q	LCS PT 1	440	7700	2123	15	14	15	17	NS	NS
	LCS PT 2	64	9500	3528	9	7	11	17	NS	Decreasing
	LCS PT 3	1600	26000	16320	5	5	5	5	NS	NS
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	750	25000	8673	17	17	17	17	NS	NS
	LCS PT 2	150	28000	7709	13	12	13	13	NS	NS
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	29	25000	6987	6	6	8	12	Decreasing	Decreasing
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	68	5000	1352	16	10	17	20	NS	NS
	LCS PT 2	98	8000	2140	17	11	17	18	Decreasing	Decreasing
Site X	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	340	3000	1628	5	4	5	7	NS	NS
Site Z	LCS PT 1	32	11900	2086	9	7	12	14	NS	NS
Site AA	LCS PT 1	3.5	180	79.7	2	0	5	8	NS	NS
	LCS PT 2	3.6	87	23.6	0	0	6	8	NS	NS
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	7800	70000	30057	14	14	14	14	NS	Decreasing
	LCS PT 2	340	20000	8080	6	5	6	6	Decreasing	Decreasing
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	12	2700	865.8	8	6	12	18	NS	NS
	LCS PT 2	35	16000	2132	9	6	13	14	NS	NS
Site HH	LCS PT 1	500	34000	7650	16	16	16	16	NS	Increasing

Landfill Sites	Leachate Collection Points	Methyl Teriary Butyl Ester								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	0.5	6.7	4.1	0	0	3	4	NS	NS
	LCS PT 2	0.31	4.7	3.8	0	0	6	9	NS	NS
Site B	LCS PT 1	4	22	12	4	0	8	18	Increasing	NS
	LCS PT 2	1	13	6	1	0	8	14	NS	NS
Site C	LCS PT 1	1	1	1.25	0	0	4	8	NS	NS
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	1.3	24	7.3	1	0	4	13	NS	NS
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	-	-	-	-	-	-	-	-	-
Site H	LCS PT 1	4.3	35	15.3	2	0	6	17	NS	NS
Site I	LCS PT 1	17	35	27.8	7	0	7	10	NS	NS
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site K	LCS PT 1	0.6	2.4	1.5	0	0	4	10	NS	NS
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 1	4	18	11	4	0	9	17	Decreasing	Decreasing
	LCS PT 2	6	45	19.8	11	0	13	17	NS	NS
	LCS PT 3	47	620	279	4	4	4	5	NS	NS
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	6	17	9.4	1	0	5	13	NS	NS
Site T	LCS PT 1	1.9	55	14.3	1	0	6	14	NS	NS
Site U	LCS PT 1	-	-	-	-	-	-	-	-	-
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site X	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	3.4	6.6	5.1	0	0	9	14	NS	NS
Site AA	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	1.2	7.1	3.2	0	0	7	11	NS	NS
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	2	5.1	3.8	0	0	7	14	NS	NS
Site GG	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Leachate Collection Points	Naphthalene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	0.58	11	4.52	1	0	4	4	NS	NS
	LCS PT 2	1.7	18	10.5	9	0	11	13	Increasing	Increasing
Site B	LCS PT 1	37	1600	216	24	23	24	28	NS	NS
	LCS PT 2	1.1	33	8.33	5	0	20	35	NS	NS
Site C	LCS PT 1	3.76	19	8.19	6	0	11	11	NS	NS
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	4.8	17	10.7	14	0	16	23	NS	NS
	LCS PT 2	3.8	25	9.64	8	0	15	23	NS	NS
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	4.34	72	25	19	5	24	28	NS	NS
Site H	LCS PT 1	3.4	62	14.5	1	0	6	17	NS	NS
Site I	LCS PT 1	1.4	8.8	5.47	3	0	10	27	NS	NS
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	5	17	10.9	9	0	12	20	NS	NS
	LCS PT 3	10	27	16.9	17	0	17	20	NS	NS
Site K	LCS PT 1	4.7	183	23.1	7	1	12	18	NS	NS
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	1.3	100	29.9	11	3	14	25	Decreasing	Decreasing
Site N	LCS PT 1	0.85	28	9.16	3	0	10	20	NS	NS
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	2.3	110	26.6	10	2	14	19	NS	NS
Site Q	LCS PT 1	2	12	6.78	3	0	9	23	Decreasing	Decreasing
	LCS PT 2	2	9	5.78	1	0	9	22	NS	NS
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	1	100	27.7	20	3	22	37	Increasing	Increasing
	LCS PT 2	4.8	24	10.9	4	0	7	27	NS	NS
Site T	LCS PT 1	0.82	20	6.8	2	0	9	25	NS	NS
Site U	LCS PT 1	1.3	8.3	3.87	0	0	3	16	NS	NS
Site V	LCS PT 1	8.42	13	11.5	4	0	4	16	NS	NS
Site W	LCS PT 1	1	77.4	11	3	1	10	24	NS*	NS*
	LCS PT 2	0.4	26	9.18	5	0	11	24	Decreasing	Decreasing
Site X	LCS PT 1	2	65	10.9	1	1	9	24	NS	NS
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	4.4	44	18.5	7	1	8	12	NS	NS
Site Z	LCS PT 1	2.6	28	10.1	8	0	14	31	Decreasing	Decreasing
Site AA	LCS PT 1	5.2	83.3	49.8	13	10	14	20	NS	NS
	LCS PT 2	0.4	3.8	2.28	0	0	10	20	Decreasing	NS
	LCS PT 3	1.6	3.9	2.9	0	0	4	9	NS	NS
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	3.17	57.1	18.6	11	2	15	37	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	1.28	7.15	4.18	0	0	7	31	NS	NS
Site EE	LCS PT 1	1.5	4.4	2.81	0	0	5	11	NS	NS
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	1.2	25	6.5	1	0	8	19	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	8	160	79.5	6	4	6	26	NS	NS

Landfill Sites	Leachate Collection Points	p-Dichlorobenzene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	32	350	83	20	4	20	27	NS	NS
	LCS PT 2	2.7	30	8.8	3	0	17	38	NS	NS
Site C	LCS PT 1	1.5	13	8	0	0	17	19	NS	NS
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	1.7	17	8.6	1	0	8	15	NS	NS
	LCS PT 2	3.4	7.5	6	0	0	7	14	NS	NS
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	2	57	15.7	6	0	20	33	NS	NS
Site H	LCS PT 1	3	6.1	4.2	0	0	4	19	NS	NS
Site I	LCS PT 1	3	12	8	0	0	13	14	NS	NS
Site J	LCS PT 1	6.2	41	18.3	2	0	7	13	NS	NS
	LCS PT 2	5.4	17	9.9	1	0	13	20	NS	NS
	LCS PT 3	6.6	18	10.3	1	0	12	20	NS	NS
Site K	LCS PT 1	3.2	31	13.8	3	0	7	15	NS	NS
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	2.8	22	8.3	1	0	9	15	Decreasing	Decreasing
Site N	LCS PT 1	2.3	8.2	5.2	0	0	9	18	Decreasing	Decreasing
Site O	LCS PT 1	3.6	30	11.8	1	0	7	13	NS	NS
Site P	LCS PT 1	4.3	17	8.4	2	0	10	15	NS	NS
Site Q	LCS PT 1	4	20	10.4	3	0	14	19	NS	NS
	LCS PT 2	3	12	7.2	0	0	13	18	NS	NS
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	2	27	12.5	4	0	13	20	Increasing	Increasing
	LCS PT 2	4	14	8.5	0	0	11	14	Increasing	Increasing
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	0.6	32	11.4	3	0	6	14	NS	NS
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	0.9	10	4	0	0	11	19	NS	Decreasing
	LCS PT 2	0.6	14	5.6	0	0	11	21	Decreasing	Decreasing
Site X	LCS PT 1	4.4	8.5	6.8	0	0	9	25	NS	NS
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	3.5	17	6.4	1	0	13	15	NS	NS
Site AA	LCS PT 1	3.8	13	8.6	0	0	13	17	Decreasing	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	1.5	55	13.6	6	0	23	44	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	0.5	8.4	2.3	0	0	10	38	NS	NS
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	0.92	8	4.9	0	0	12	20	Increasing	Increasing
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Leachate Collection Points	Trichloroethylene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	5.5	30	13.8	19	19	19	27	NS	NS
	LCS PT 2	0.5	15	5,3	8	5	8	42	NS	NS
Site C	LCS PT 1	0.9	43	18.3	4	2	4	19	NS	NS
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	-	-	-	-	-	-	-	-	-
Site H	LCS PT 1	1.2	53	15	5	2	5	19	NS	NS
Site I	LCS PT 1	-	-	-	-	-	-	-	-	-
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	27	48	39.8	4	4	4	13	NS	NS
Site P	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 1	3	31.6	9.7	8	7	8	18	NS	NS
	LCS PT 2	1	7	4.3	4	2	4	17	NS	NS
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	0.7	6	2.5	3	1	3	22	Decreasing	Decreasing
	LCS PT 2	7	15	10	3	3	3	13	NS	NS
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	0.6	202	51.9	9	7	9	17	Decreasing	Decreasing
Site V	LCS PT 1	3.2	8.6	6	4	3	4	11	NS	NS
Site W	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	0.8	38.2	9	5	1	5	21	Decreasing	Decreasing
Site X	LCS PT 1	3.2	13	8	6	4	6	23	NS	NS
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	-	-	-	-	-	-	-	-	-
Site AA	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	1.6	8.1	5.6	4	2	4	19	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	5	22	12.5	8	8	8	17	NS	NS

Landfill Sites	Leachate Collection Points	Tetrachloroethylene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	6.5	55	16	20	20	20	25	NS	NS
	LCS PT 2	0.77	6	3	7	1	7	42	NS	NS
Site C	LCS PT 1	-	-	-	-	-	-	-	-	-
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	-	-	-	-	-	-	-	-	-
Site H	LCS PT 1	-	-	-	-	-	-	-	-	-
Site I	LCS PT 1	-	-	-	-	-	-	-	-	-
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 1	1	20	5.3	6	1	6	18	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	0.6	79	18.4	8	6	8	17	Decreasing	Decreasing
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	0.8	3	1.3	5	0	5	21	NS	NS
Site X	LCS PT 1	0.82	19	7.9	6	4	6	23	NS	NS
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	-	-	-	-	-	-	-	-	-
Site AA	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	3	7	4.8	4	2	4	16	NS	NS

Landfill Sites	Leachate Collection Points	Tetrahydrofuran								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	1300	19000	7142	14	14	14	18	Increasing	NS
	LCS PT 2	370	2300	896	13	13	13	18	NS	NS
Site C	LCS PT 1	-	-	-	-	-	-	-	-	-
Site D	LCS PT 1	8.3	6400	1248	5	5	5	8	NS	NS
Site E	LCS PT 1	360	837	535	11	11	11	11	NS	NS
	LCS PT 2	540	930	704	9	9	9	10	NS	NS
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	-	-	-	-	-	-	-	-	-
Site H	LCS PT 1	-	-	-	-	-	-	-	-	-
Site I	LCS PT 1	-	-	-	-	-	-	-	-	-
Site J	LCS PT 1	440	870	652	9	9	9	9	NS	NS
	LCS PT 2	89	2800	899	16	16	16	16	NS	NS
	LCS PT 3	180	890	541	15	15	15	16	Decreasing	Decreasing
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	580	2000	1247	8	8	8	8	NS	NS
Site N	LCS PT 1	140	490	285	12	12	12	14	NS	NS
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	30	1400	807	11	10	11	11	NS	NS
Site Q	LCS PT 1	160	3100	1160	17	17	17	17	Decreasing	Decreasing
	LCS PT 2	230	2000	890	15	15	15	16	NS	NS
	LCS PT 3	180	2400	1536	5	5	5	5	NS	NS
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	600	3700	2166	15	15	15	17	Increasing	Increasing
	LCS PT 2	660	3800	2004	13	13	13	13	NS	NS
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	22	1700	666	6	5	6	9	NS	NS
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	80	2800	710	16	16	16	16	NS	Decreasing
	LCS PT 2	24	1600	600	16	12	16	16	Decreasing	Decreasing
Site X	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LCS PT 1	900	1400	1077	4	4	4	4	NS	NS
	LCS PT 2	55	2600	1391	5	5	5	7	NS	NS
Site Z	LCS PT 1	140	771	452	14	14	14	14	NS	NS
Site AA	LCS PT 1	370	771	575	8	8	8	8	Decreasing	Decreasing
	LCS PT 2	3	7.7	5.2	0	0	5	8	NS	NS
	LCS PT 3	130	670	382	5	5	5	5	NS	NS
Site BB	LCS PT 1	6.8	820	290	8	7	9	11	Decreasing	Decreasing
Site CC	LCS PT 1	3500	7600	4500	7	7	7	7	NS	NS
	LCS PT 2	500	4200	2366	6	6	6	6	NS	NS
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	17	280	103	9	6	9	15	NS	NS
Site GG	LCS PT 1	78	1200	617	18	18	18	18	NS	NS
	LCS PT 2	31	1000	546.8	12	11	12	14	NS	NS
Site HH	LCS PT 1	220	2700	1203	16	16	16	16	Increasing	Increasing

Landfill Sites	Leachate Collection Points	Toluene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	3.4	23	14.1	0	0	4	4	NS	NS
	LCS PT 2	2.4	4.2	3.1	0	0	5	5	NS	NS
Site B	LCS PT 1	280	1900	963	25	10	25	27	NS	NS
	LCS PT 2	0.6	410	87.3	3	0	35	40	NS	NS
Site C	LCS PT 1	2.1	298	59.7	2	0	18	19	Decreasing	Decreasing
Site D	LCS PT 1	2	1300	332.6	3	1	8	15	NS	NS
Site E	LCS PT 1	4.7	360	57.7	1	0	11	14	NS*	NS*
	LCS PT 2	36	103	56	0	0	10	13	NS	NS
Site F	LCS PT 1	0.12	0.25	0.19	0	0	4	7	NS	NS
	LCS PT 2	4.4	11	7	0	0	4	7	NS	NS
Site G	LCS PT 1	2.1	724	76.3	2	0	20	33	NS*	NS*
Site H	LCS PT 1	7.2	700	197.8	5	0	17	19	NS	Decreasing
Site I	LCS PT 1	1.2	900	164.7	3	0	12	14	Decreasing*	Decreasing*
Site J	LCS PT 1	6.6	734	222.3	4	0	11	13	NS	NS
	LCS PT 2	6.1	130	39.6	0	0	14	16	NS	NS
	LCS PT 3	6.2	85	36	0	0	14	16	NS	NS
Site K	LCS PT 1	4.9	382	160.4	2	0	12	13	NS	NS
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	3.6	150	48.7	0	0	13	16	NS	Decreasing
Site N	LCS PT 1	1.7	360	69.5	1	0	9	18	Decreasing	Decreasing
Site O	LCS PT 1	22	800	338	7	0	12	13	Decreasing	Decreasing
Site P	LCS PT 1	5	580	156	4	0	12	13	Decreasing	Decreasing
Site Q	LCS PT 1	7	510	220	8	0	16	18	Decreasing	NS
	LCS PT 2	6	240	75.5	1	0	15	17	Decreasing	Decreasing
	LCS PT 3	270	520	426	5	0	5	5	NS	NS
Site R	LCS PT 1	6.1	43	20.5	0	0	4	10	NS	NS
	LCS PT 2	64	410	210	5	0	8	8	NS	NS
Site S	LCS PT 1	23	854	188	4	0	20	22	Decreasing	Decreasing
	LCS PT 2	50	320	178.8	7	0	13	13	Decreasing	Decreasing
Site T	LCS PT 1	5.1	450	113.8	4	0	16	17	NS	NS
Site U	LCS PT 1	1.8	1600	508	10	2	15	17	NS	NS
Site V	LCS PT 1	7.8	350	194	6	0	10	11	Decreasing	Decreasing
Site W	LCS PT 1	6	560	111.2	3	0	19	19	Decreasing	Decreasing
	LCS PT 2	0.9	1040	180.2	5	1	20	21	Decreasing	Decreasing
Site X	LCS PT 1	31	870	420	16	0	23	23	Decreasing	Decreasing
Site Y	LCS PT 1	28	170	73	0	0	6	8	NS	NS
	LCS PT 2	3.2	43	20.7	0	0	6	8	NS	NS
Site Z	LCS PT 1	21	600	215.5	4	0	11	14	NS	NS
Site AA	LCS PT 1	0.76	300	34.3	1	0	12	15	Decreasing	Decreasing
	LCS PT 2	0.14	120	17.9	0	0	12	15	Decreasing	Decreasing
	LCS PT 3	2	330	61.6	1	0	6	6	NS	NS
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	39	360	263	10	0	12	16	NS	NS
	LCS PT 2	76	1800	558	2	1	5	6	NS	NS
Site DD	LCS PT 1	1.6	523.5	100	4	0	29	37	Decreasing	Decreasing
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	0.71	433	63.9	1	0	13	34	NS	NS
Site EE	LCS PT 1	2	190	53.9	0	0	9	11	NS	NS
Site FF	LCS PT 1	1	160	28.7	0	0	6	14	NS	NS
Site GG	LCS PT 1	1.5	1500	263.1	6	1	17	19	Decreasing	Decreasing
	LCS PT 2	0.97	560	118	15	15	15	15	Decreasing	NS
Site HH	LCS PT 1	43	1400	433.3	8	2	16	17	NS	NS

Landfill Sites	Leachate Collection Points	Vinyl Chloride								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	2.5	10	5.3	7	7	7	27	NS	Decreasing
	LCS PT 2	1	8	3.1	6	6	6	40	NS	NS
Site C	LCS PT 1	0.98	33	8.8	5	5	5	19	NS	NS
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	-	-	-	-	-	-	-	-	-
Site H	LCS PT 1	-	-	-	-	-	-	-	-	-
Site I	LCS PT 1	3	22	11.4	4	4	4	14	NS	NS
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	1	53	21.8	6	6	6	13	NS	Decreasing
Site P	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 1	2	5	3.7	4	4	4	18	NS	NS
	LCS PT 2	2	9	5	4	4	4	17	NS	NS
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	2	6	4.3	3	3	3	13	NS	NS
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	0.73	304	58.8	6	6	6	17	NS	NS
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site X	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	-	-	-	-	-	-	-	-	-
Site AA	LCS PT 1	1	5.9	2.6	4	4	4	15	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	2.3	52.5	24	8	8	8	38	NS	NS
	LCS PT 3	0.4	43.5	8.5	6	6	6	34	NS	NS
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	1.3	11	4.9	4	4	4	15	NS	Decreasing
Site HH	LCS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Leachate Collection Points	Xylene O, M, and P-								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site B	LCS PT 1	290	2000	599.2	2	0	24	26	NS	NS
	LCS PT 2	3	168	55.6	0	0	18	28	NS	NS
Site C	LCS PT 1	24	140	73.6	0	0	8	8	NS	NS
Site D	LCS PT 1	-	-	-	-	-	-	-	-	-
Site E	LCS PT 1	14	119	53.3	0	0	14	14	NS	NS
	LCS PT 2	25	122	75	0	0	10	13	NS	NS
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	10.3	215	62.6	0	0	21	24	Decreasing	Decreasing
Site H	LCS PT 1	-	-	-	-	-	-	-	-	-
Site I	LCS PT 1	-	-	-	-	-	-	-	-	-
Site J	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site K	LCS PT 1	-	-	-	-	-	-	-	-	-
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	11	240	92.6	0	0	14	14	Decreasing	Decreasing
Site N	LCS PT 1	5.2	91	50	0	0	10	17	NS	NS
Site O	LCS PT 1	27	220	119	0	0	8	11	Decreasing	Decreasing
Site P	LCS PT 1	-	-	-	-	-	-	-	-	-
Site Q	LCS PT 1	17	346	152.4	0	0	14	17	Decreasing	Decreasing
	LCS PT 2	25	170	76.5	0	0	16	16	NS	NS
	LCS PT 3	99	210	151.8	0	0	5	5	NS	NS
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	36	260	146.6	0	0	17	18	NS	NS
	LCS PT 2	41	410	120.2	0	0	13	13	NS	NS
Site T	LCS PT 1	-	-	-	-	-	-	-	-	-
Site U	LCS PT 1	1.9	250	125.5	0	0	9	9	NS	NS
Site V	LCS PT 1	-	-	-	-	-	-	-	-	-
Site W	LCS PT 1	4	170	46.1	0	0	15	18	NS	NS
	LCS PT 2	2	250	57.3	0	0	16	18	Decreasing	Decreasing
Site X	LCS PT 1	1.2	380	185.5	0	0	6	11	NS	NS
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	15	62	46.8	0	0	5	7	NS	NS
Site Z	LCS PT 1	-	-	-	-	-	-	-	-	-
Site AA	LCS PT 1	8.8	130	67.2	0	0	11	14	Decreasing	Decreasing
	LCS PT 2	0.37	2.2	1.4	0	0	9	14	NS	NS
	LCS PT 3	26	46	36.7	0	0	6	6	NS	NS
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	5.5	300	62.7	0	0	26	28	NS*	NS*
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	0.37	67	14.6	0	0	12	26	NS	NS
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site HH	LCS PT 1	2.6	190	82	0	0	13	17	NS	NS

Landfill Sites	Leachate Collection Points	Xylene, M&P								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	2.7	53	31.2	0	0	3	3	NS	NS
	LCS PT 2	1.9	120	54	0	0	8	8	Increasing	Increasing
Site B	LCS PT 1	120	900	397.8	0	0	9	9	NS	NS
	LCS PT 2	2.4	120	37.6	0	0	10	12	NS*	NS*
Site C	LCS PT 1	15.4	63	43.3	0	0	11	11	NS	NS
Site D	LCS PT 1	1.4	37	13.8	0	0	6	6	NS	NS
Site E	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	14.4	55.8	24.5	0	0	7	9	NS	NS
Site H	LCS PT 1	14	140	39.9	0	0	13	18	NS	NS
Site I	LCS PT 1	31	270	117.3	0	0	14	14	Decreasing	Decreasing
Site J	LCS PT 1	52	250	112	0	0	4	4	NS	NS
	LCS PT 2	32	1300	205.1	1	0	15	16	NS	Decreasing
	LCS PT 3	47	370	158.8	0	0	16	16	NS	NS
Site K	LCS PT 1	7.6	120	71	0	0	8	8	Decreasing	NS
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	2.6	89	54.4	0	0	9	9	NS	NS
Site Q	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	5.4	33	16.5	0	0	5	8	NS	NS
Site S	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site T	LCS PT 1	10	190	48.6	0	0	12	14	NS	NS
Site U	LCS PT 1	-	-	-	-	-	-	-	-	-
Site V	LCS PT 1	24	72	52	0	0	8	10	NS	NS
Site W	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site X	LCS PT 1	100	290	177.4	0	0	16	17	NS	NS
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	3.2	47	29.3	0	0	13	13	Decreasing	Decreasing
Site AA	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	7.5	78.6	24.8	0	0	5	10	NS	NS
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	6.5	150	78.1	0	0	19	19	NS	NS
	LCS PT 2	1	150	59.5	0	0	15	15	NS	NS
Site HH	LCS PT 1	-	-	-	-	-	-	-	-	-

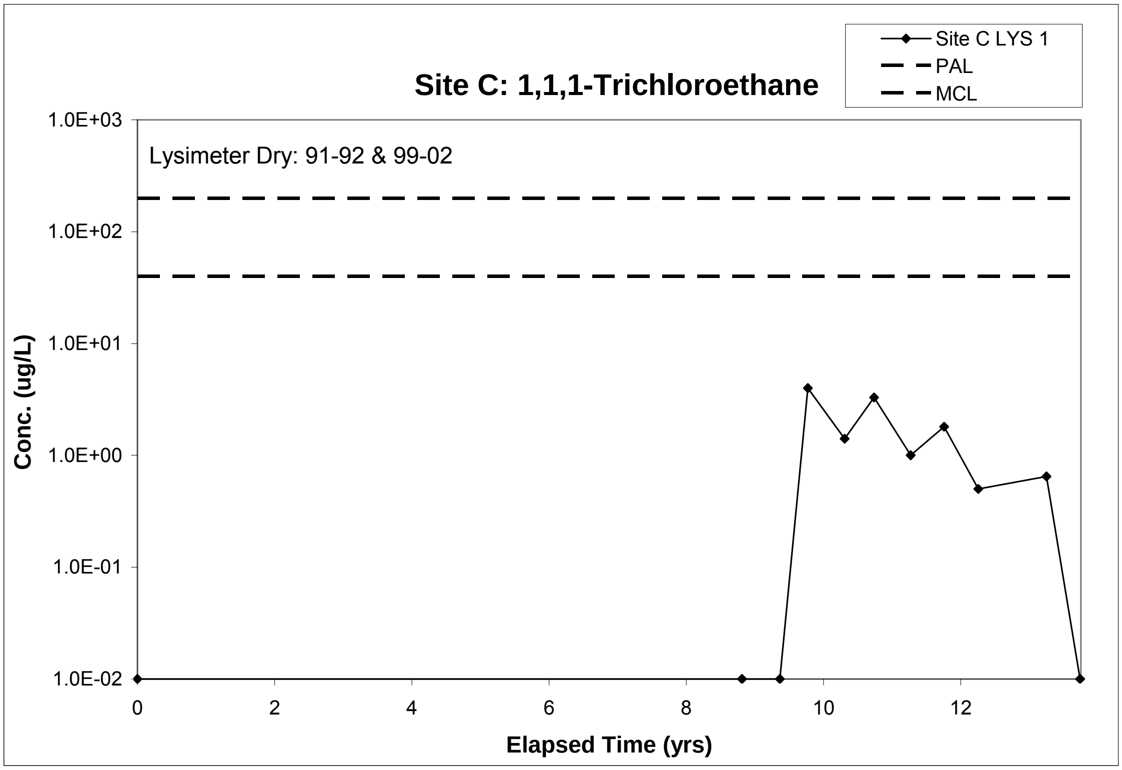
Landfill Sites	Leachate Collection Points	Xylene, O-								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1	1	19	13	0	0	3	3	NS	NS
	LCS PT 2	1.8	43	21	0	0	8	8	Increasing	Increasing
Site B	LCS PT 1	59	180	135.3	0	0	8	9	NS	NS
	LCS PT 2	920	8400	3212	17	0	17	19	NS	NS
Site C	LCS PT 1	17	31	23.6	0	0	10	10	Decreasing	Decreasing
Site D	LCS PT 1	0.9	26	6.9	0	0	5	6	NS	NS
Site E	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site F	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site G	LCS PT 1	7.1	14	9.7	0	0	7	7	NS	Decreasing
Site H	LCS PT 1	5.1	22	8.2	0	0	9	9	NS	NS
Site I	LCS PT 1	21	84	45.9	0	0	14	14	NS	NS
Site J	LCS PT 1	18	110	48.5	0	0	4	4	NS	NS
	LCS PT 2	12	540	70.3	0	0	15	15	Decreasing*	Decreasing
	LCS PT 3	18	150	63.1	0	0	16	16	Decreasing	Decreasing
Site K	LCS PT 1	5.7	46.3	27.7	0	0	9	9	Decreasing	Decreasing
Site L	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site M	LCS PT 1	-	-	-	-	-	-	-	-	-
Site N	LCS PT 1	-	-	-	-	-	-	-	-	-
Site O	LCS PT 1	-	-	-	-	-	-	-	-	-
Site P	LCS PT 1	15	39	24	0	0	9	9	NS	NS
Site Q	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site R	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site S	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site T	LCS PT 1	5	58	17.6	0	0	13	13	NS	NS
Site U	LCS PT 1	-	-	-	-	-	-	-	-	-
Site V	LCS PT 1	11.7	28	20.7	0	0	8	8	NS	NS
Site W	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site X	LCS PT 1	40	120	69.1	0	0	16	16	NS	NS
Site Y	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site Z	LCS PT 1	3.4	19	10.7	0	0	12	12	NS	NS
Site AA	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site BB	LCS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
Site DD	LCS PT 1	-	-	-	-	-	-	-	-	-
	LCS PT 2	-	-	-	-	-	-	-	-	-
	LCS PT 3	-	-	-	-	-	-	-	-	-
Site EE	LCS PT 1	-	-	-	-	-	-	-	-	-
Site FF	LCS PT 1	-	-	-	-	-	-	-	-	-
Site GG	LCS PT 1	2.1	46	27	0	0	19	19	NS	NS
	LCS PT 2	0.32	49	22.2	0	0	14	14	NS	NS
Site HH	LCS PT 1	-	-	-	-	-	-	-	-	-

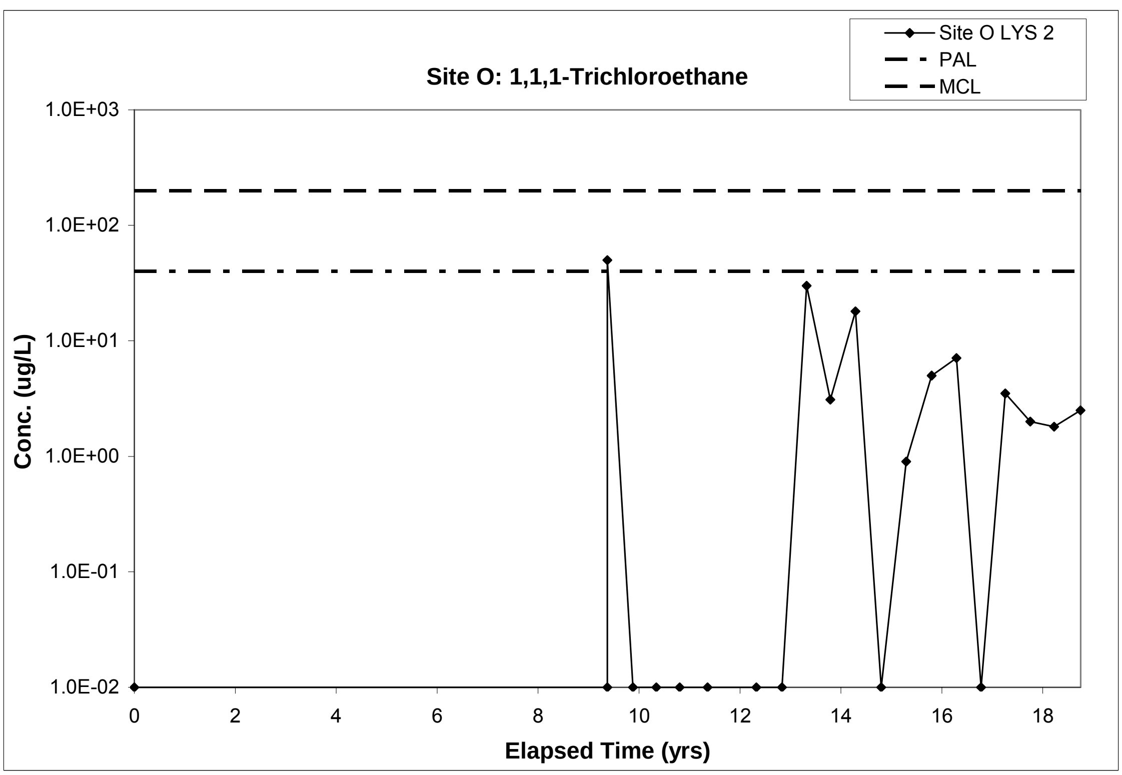
Landfill Sites	Leachate Collection Points	trans-1,2-dichloroethene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1									
	LCS PT 2									
Site B	LCS PT 1	21	210	63.4	19	3	19	28	Decreasing	Decreasing
	LCS PT 2									
Site C	LCS PT 1									
Site D	LCS PT 1									
Site E	LCS PT 1									
	LCS PT 2									
Site F	LCS PT 1									
	LCS PT 2									
Site G	LCS PT 1									
Site H	LCS PT 1									
Site I	LCS PT 1									
Site J	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site K	LCS PT 1									
Site L	LCS PT 1									
	LCS PT 2									
Site M	LCS PT 1									
Site N	LCS PT 1									
Site O	LCS PT 1									
Site P	LCS PT 1									
Site Q	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site R	LCS PT 1									
	LCS PT 2									
Site S	LCS PT 1									
	LCS PT 2									
Site T	LCS PT 1									
Site U	LCS PT 1									
Site V	LCS PT 1									
Site W	LCS PT 1									
	LCS PT 2									
Site X	LCS PT 1									
Site Y	LCS PT 1									
	LCS PT 2									
Site Z	LCS PT 1									
Site AA	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site BB	LCS PT 1									
Site CC	LCS PT 1									
	LCS PT 2									
Site DD	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site EE	LCS PT 1									
Site FF	LCS PT 1									
Site GG	LCS PT 1									
	LCS PT 2									
Site HH	LCS PT 1									

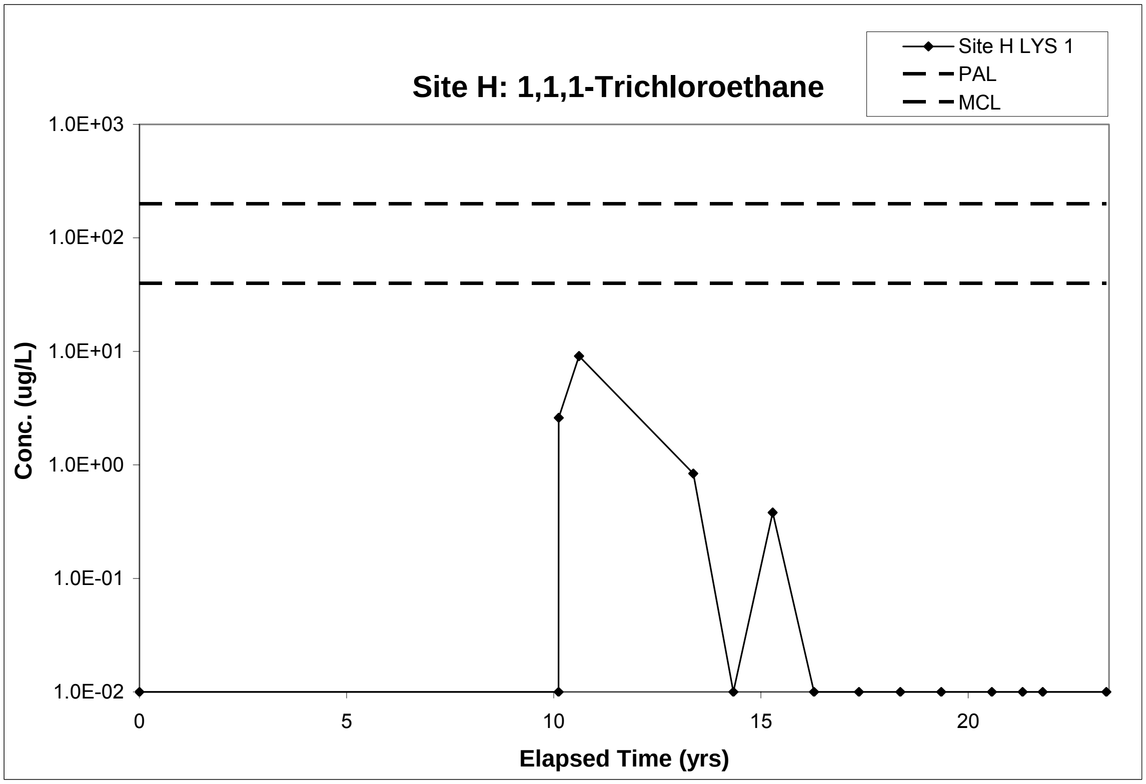
Landfill Sites	Leachate Collection Points	o-dichlorobenzene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1									
	LCS PT 2									
Site B	LCS PT 1									
	LCS PT 2									
Site C	LCS PT 1									
Site D	LCS PT 1									
Site E	LCS PT 1									
	LCS PT 2									
Site F	LCS PT 1									
	LCS PT 2									
Site G	LCS PT 1									
Site H	LCS PT 1									
Site I	LCS PT 1									
Site J	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site K	LCS PT 1	0.9	3.8	2.59	0	0	7	19	Increasing	NS
Site L	LCS PT 1									
	LCS PT 2									
Site M	LCS PT 1									
Site N	LCS PT 1									
Site O	LCS PT 1									
Site P	LCS PT 1									
Site Q	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site R	LCS PT 1									
	LCS PT 2									
Site S	LCS PT 1									
	LCS PT 2									
Site T	LCS PT 1									
Site U	LCS PT 1									
Site V	LCS PT 1									
Site W	LCS PT 1									
	LCS PT 2									
Site X	LCS PT 1									
Site Y	LCS PT 1									
	LCS PT 2									
Site Z	LCS PT 1									
Site AA	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site BB	LCS PT 1									
Site CC	LCS PT 1									
	LCS PT 2									
Site DD	LCS PT 1	1	44.3	18.8	0	0	4	47	NS	NS
	LCS PT 2									
	LCS PT 3									
Site EE	LCS PT 1									
Site FF	LCS PT 1									
Site GG	LCS PT 1									
	LCS PT 2									
Site HH	LCS PT 1									

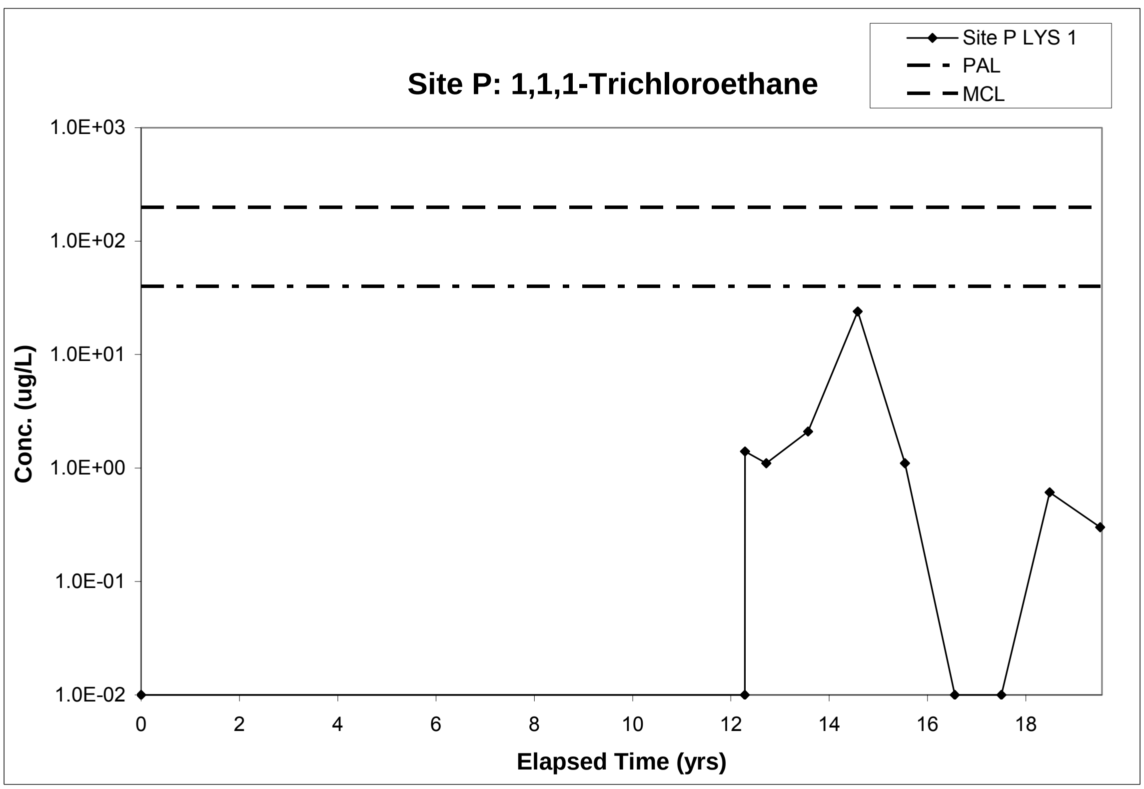
Landfill Sites	Leachate Collection Points	Chloroform								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LCS PT 1									
	LCS PT 2									
Site B	LCS PT 1									
	LCS PT 2									
Site C	LCS PT 1									
Site D	LCS PT 1									
Site E	LCS PT 1									
	LCS PT 2									
Site F	LCS PT 1									
	LCS PT 2									
Site G	LCS PT 1									
Site H	LCS PT 1									
Site I	LCS PT 1									
Site J	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site K	LCS PT 1									
Site L	LCS PT 1									
	LCS PT 2									
Site M	LCS PT 1									
Site N	LCS PT 1									
Site O	LCS PT 1									
Site P	LCS PT 1	4	620	159	4	3	4	15	NS	NS
Site Q	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site R	LCS PT 1									
	LCS PT 2									
Site S	LCS PT 1									
	LCS PT 2									
Site T	LCS PT 1									
Site U	LCS PT 1	0.67	160	47	6	3	6	18	NS	Decreasing
Site V	LCS PT 1									
Site W	LCS PT 1									
	LCS PT 2									
Site X	LCS PT 1									
Site Y	LCS PT 1									
	LCS PT 2									
Site Z	LCS PT 1									
Site AA	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site BB	LCS PT 1									
Site CC	LCS PT 1									
	LCS PT 2									
Site DD	LCS PT 1									
	LCS PT 2									
	LCS PT 3									
Site EE	LCS PT 1									
Site FF	LCS PT 1									
Site GG	LCS PT 1									
	LCS PT 2									
Site HH	LCS PT 1									

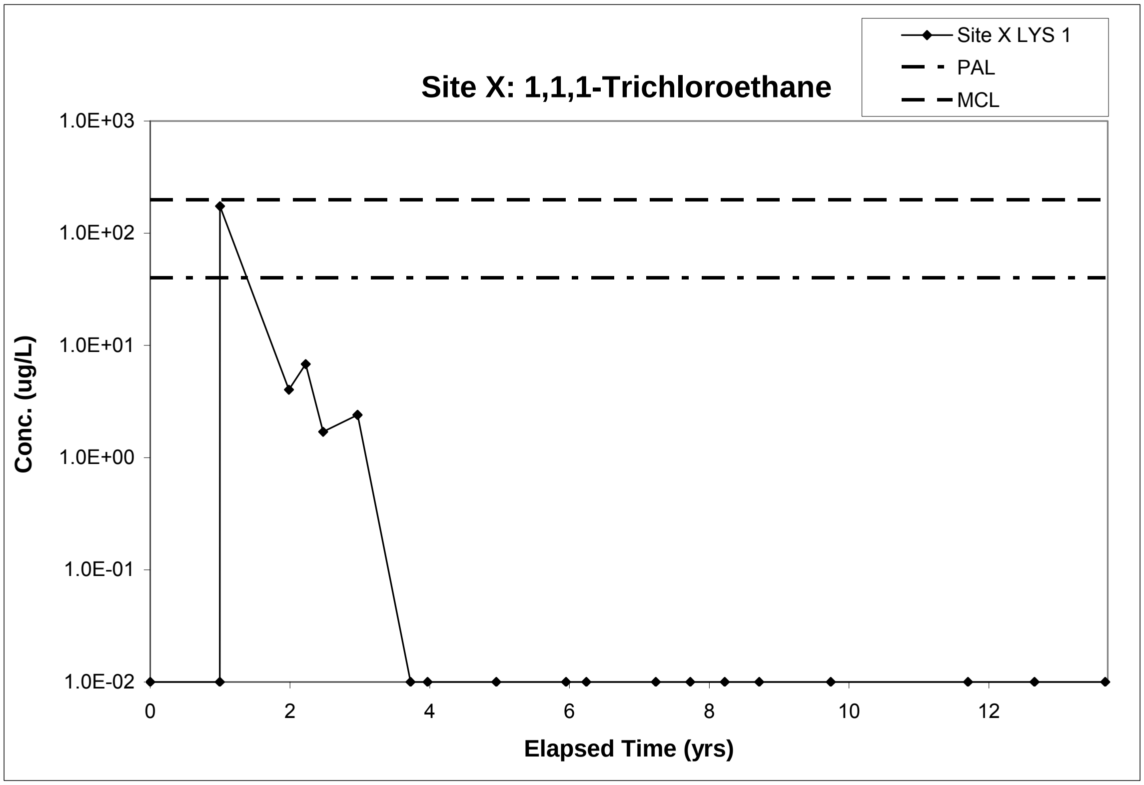
Appendix E: Temporal Concentration Variation: Representative Lysimeter Figures

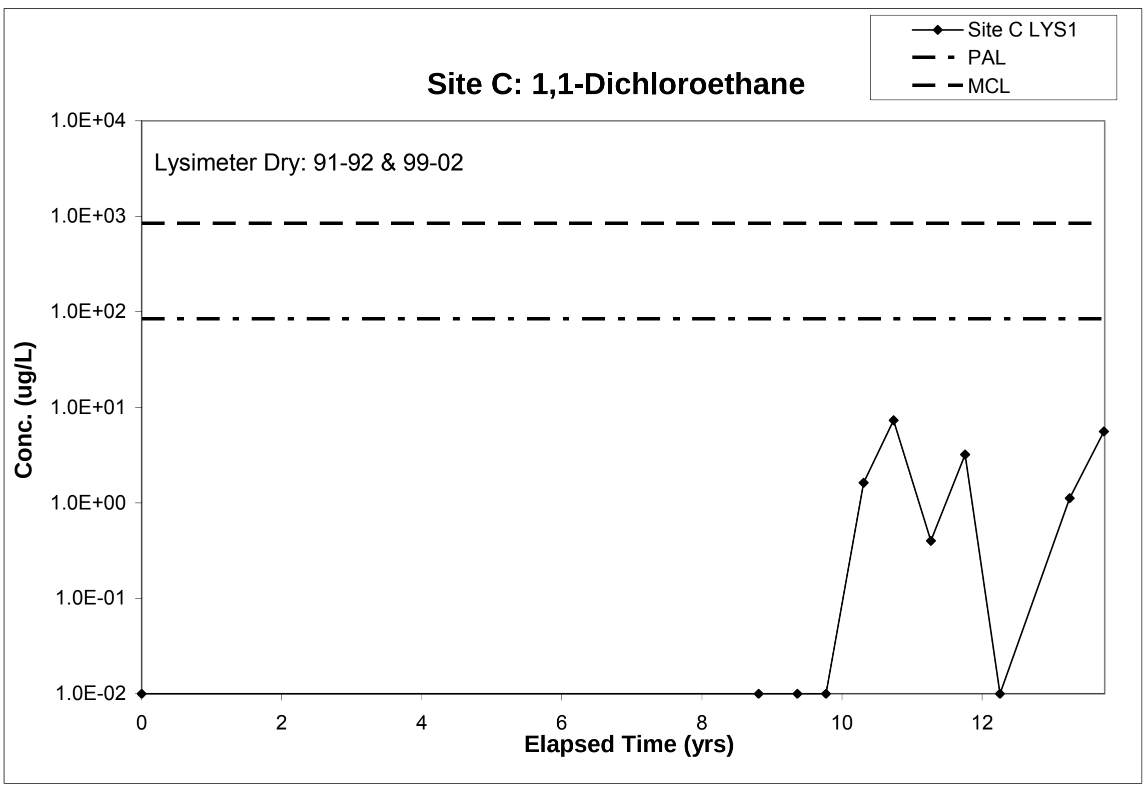


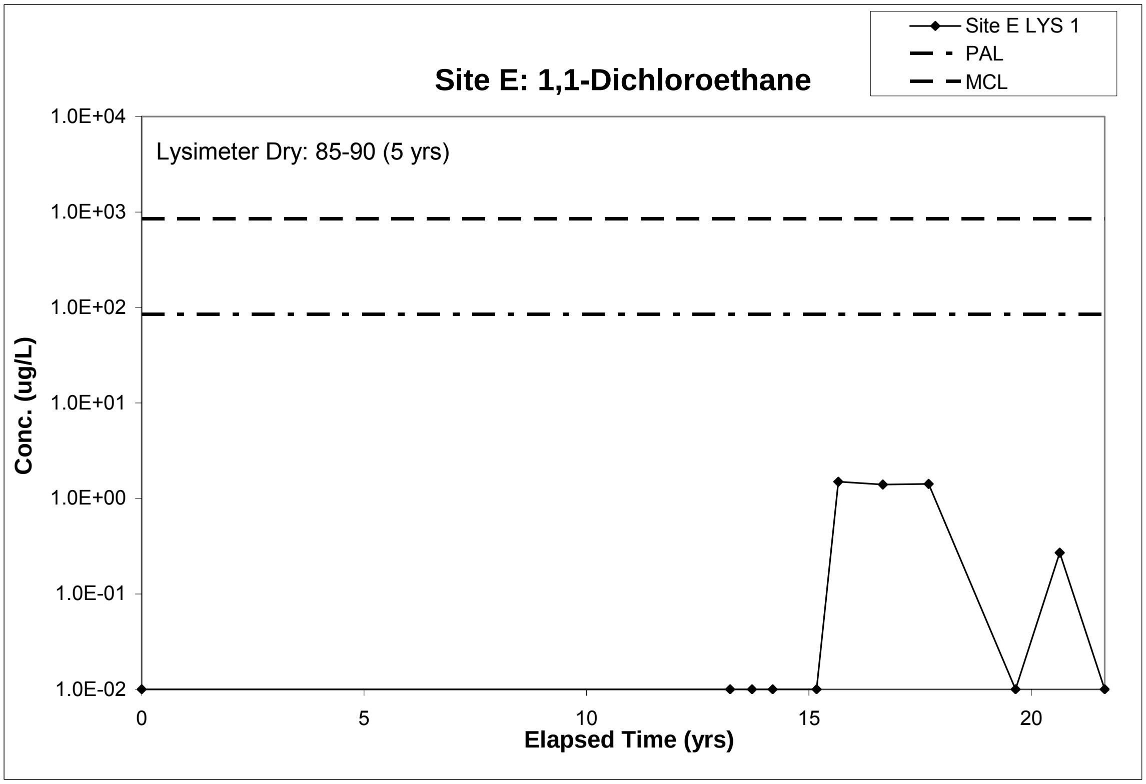


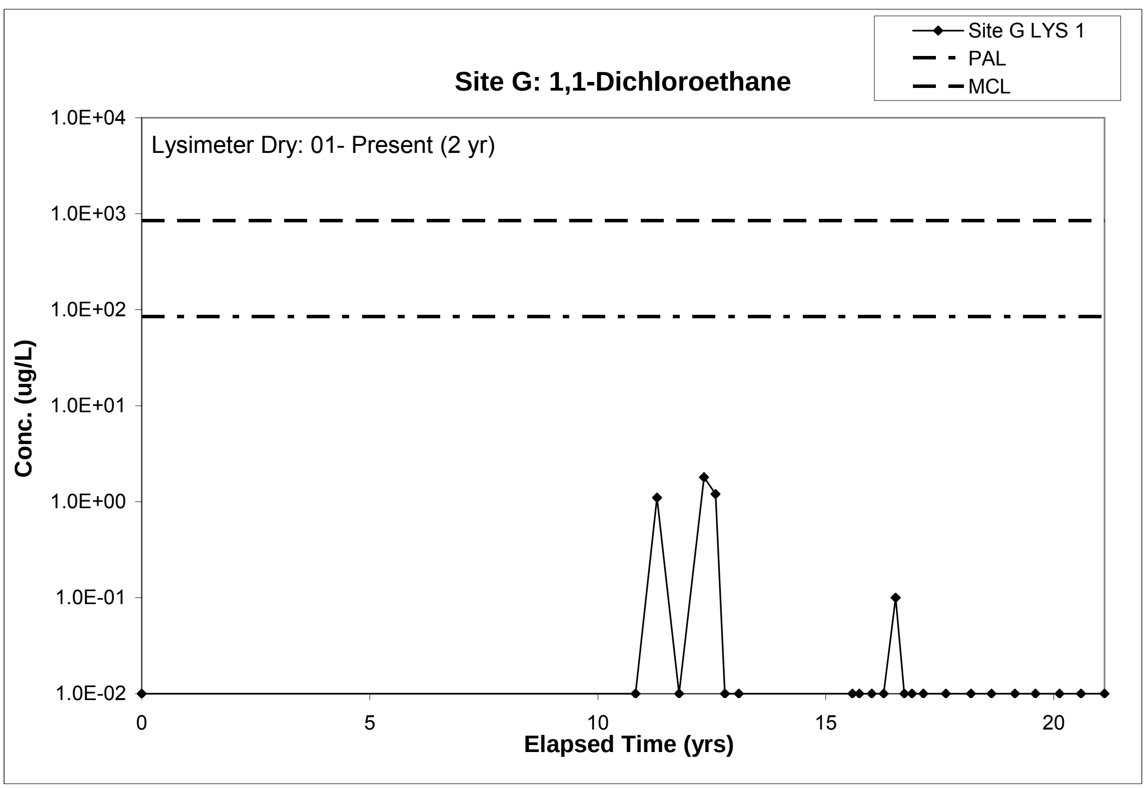

Site H: 1,1,1-Trichloroethane
Site H LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

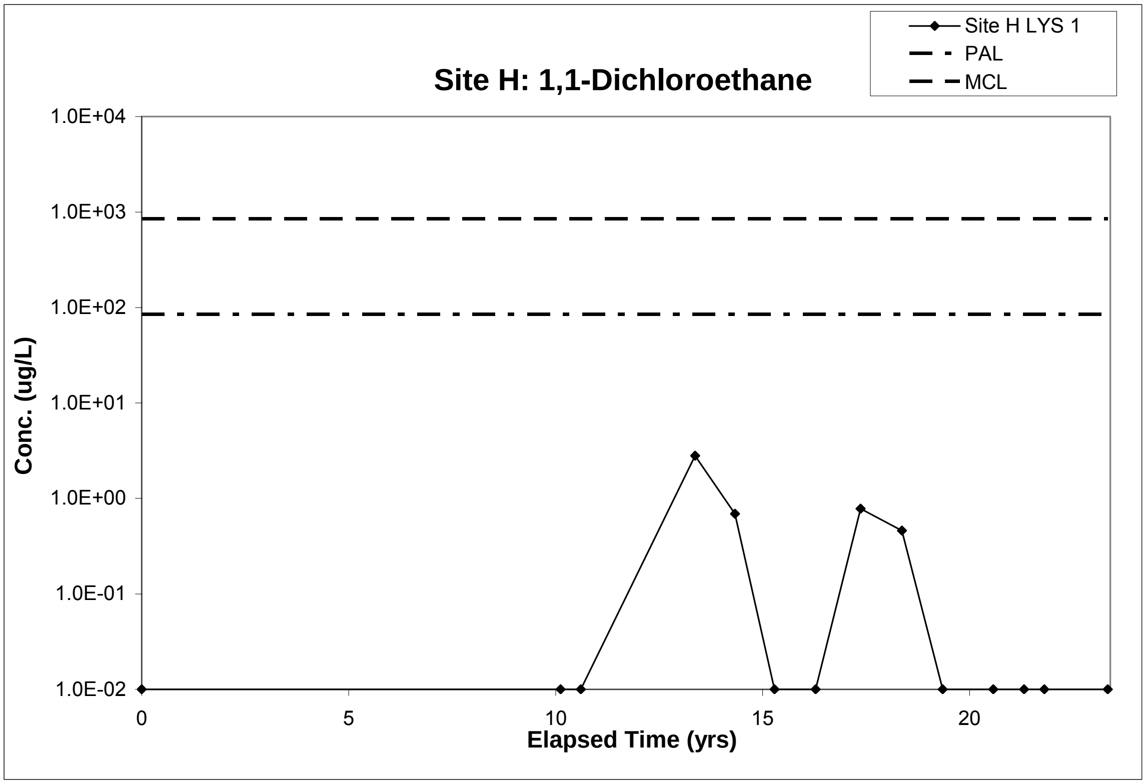

Site P: 1,1,1-Trichloroethane
Site P LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

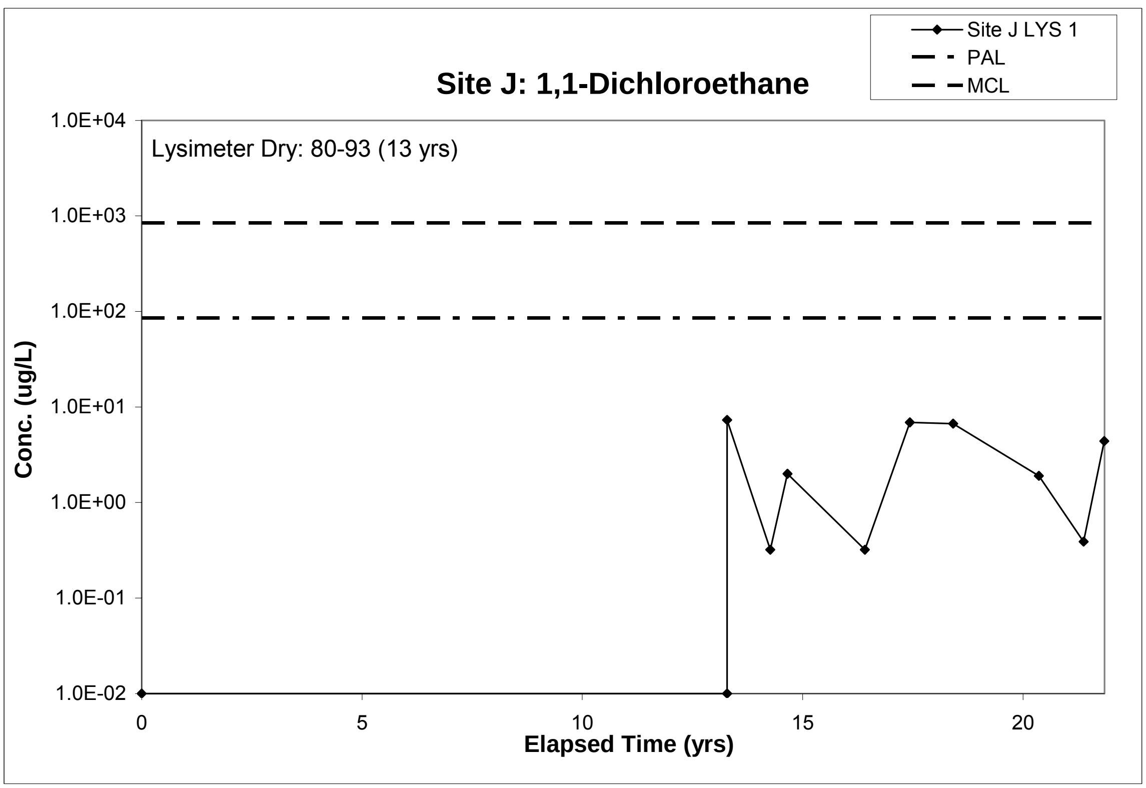

Site X: 1,1,1-Trichloroethane
Site X LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

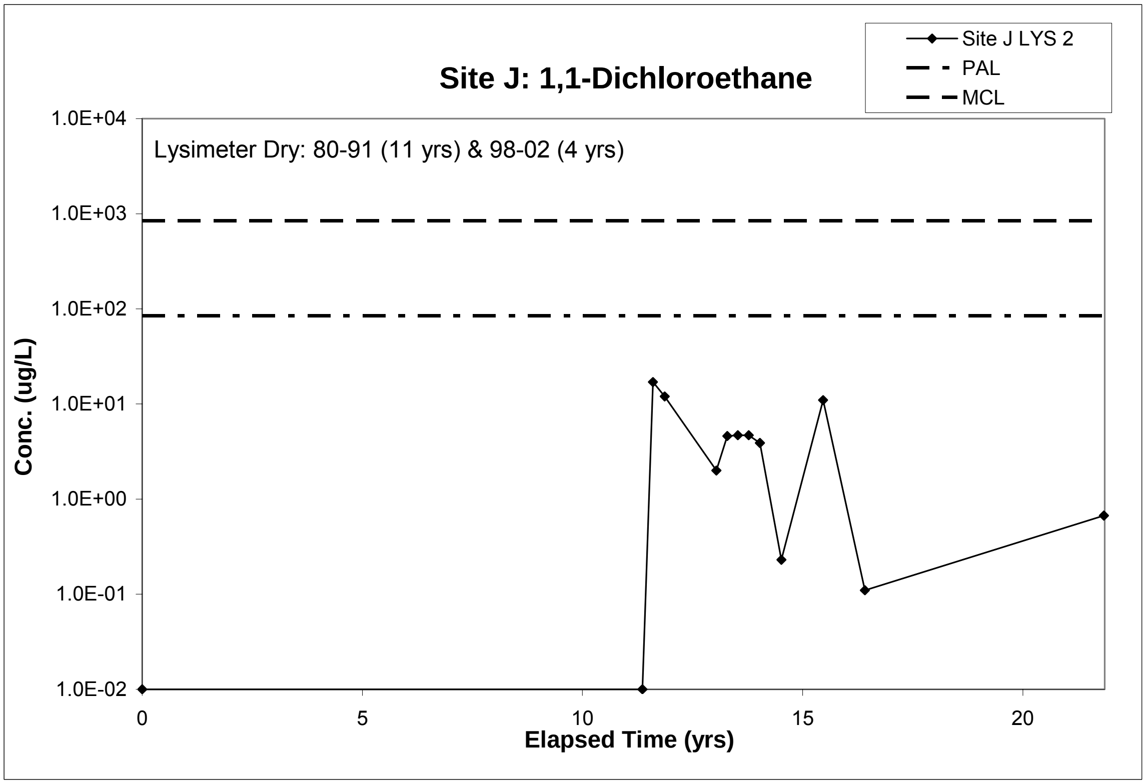

Site C: 1,1-Dichloroethane
Site C LYS1
PAL
MCL
Lysimeter Dry: 91-92 & 99-02
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

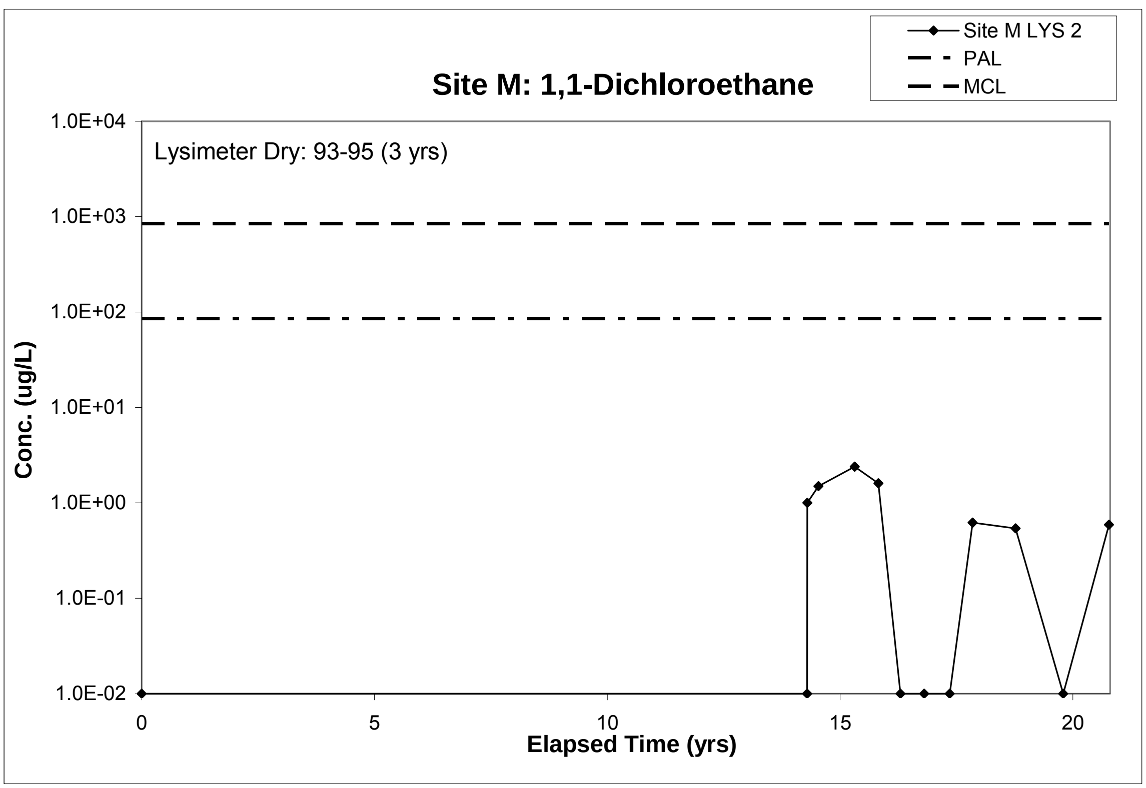

Site E: 1,1-Dichloroethane
Site E LYS 1
PAL
MCL
Lysimeter Dry: 85-90 (5 yrs)
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

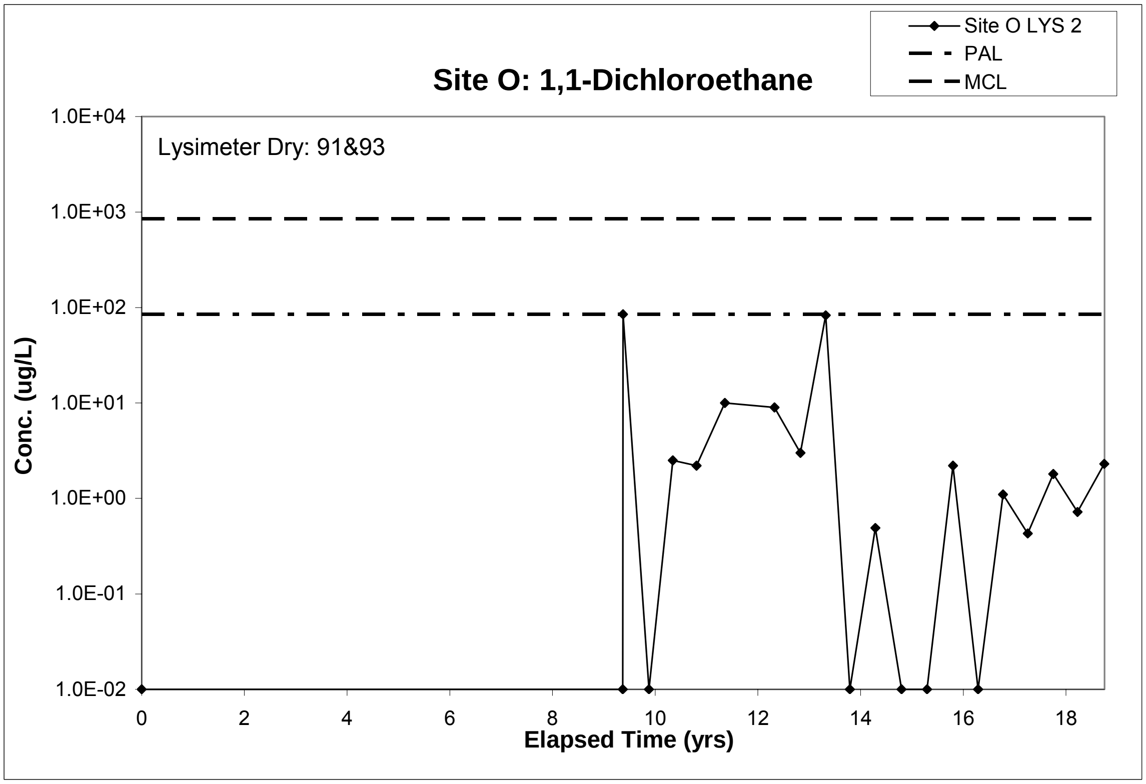

Site G: 1,1-Dichloroethane
Site G LYS 1
PAL
MCL
Lysimeter Dry: 01- Present (2 yr)
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

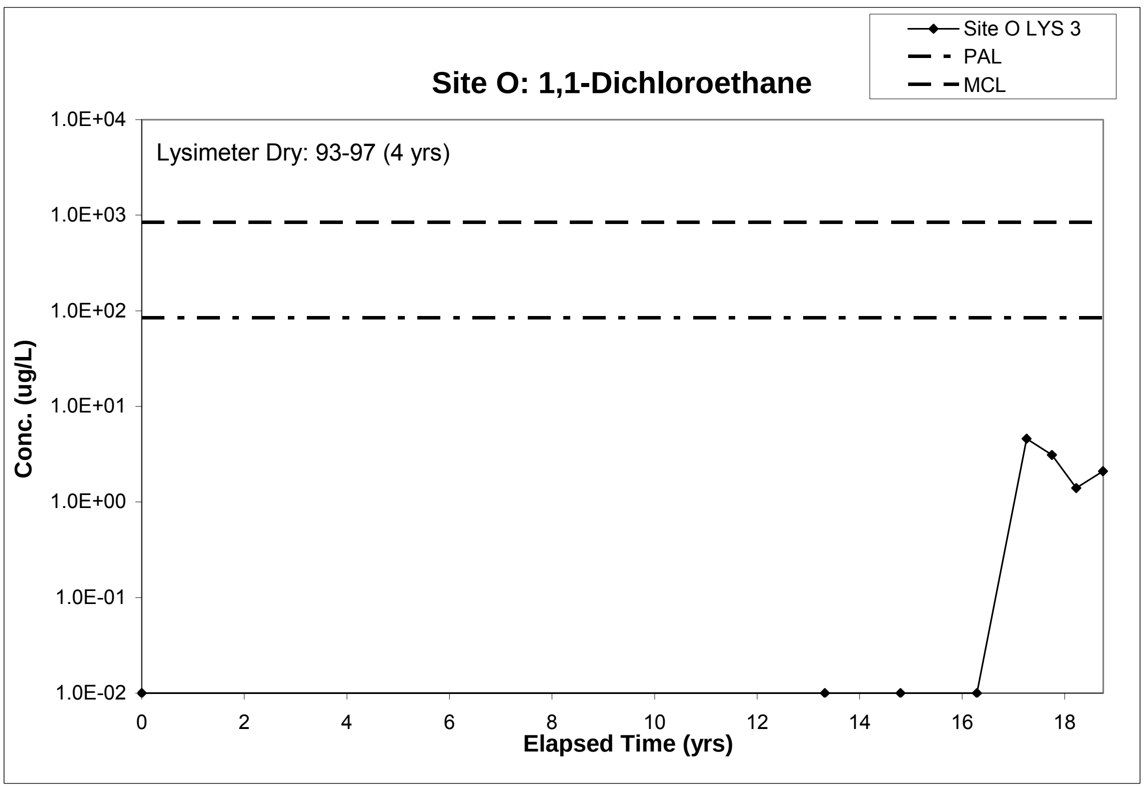

Site H: 1,1-Dichloroethane
Site H LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

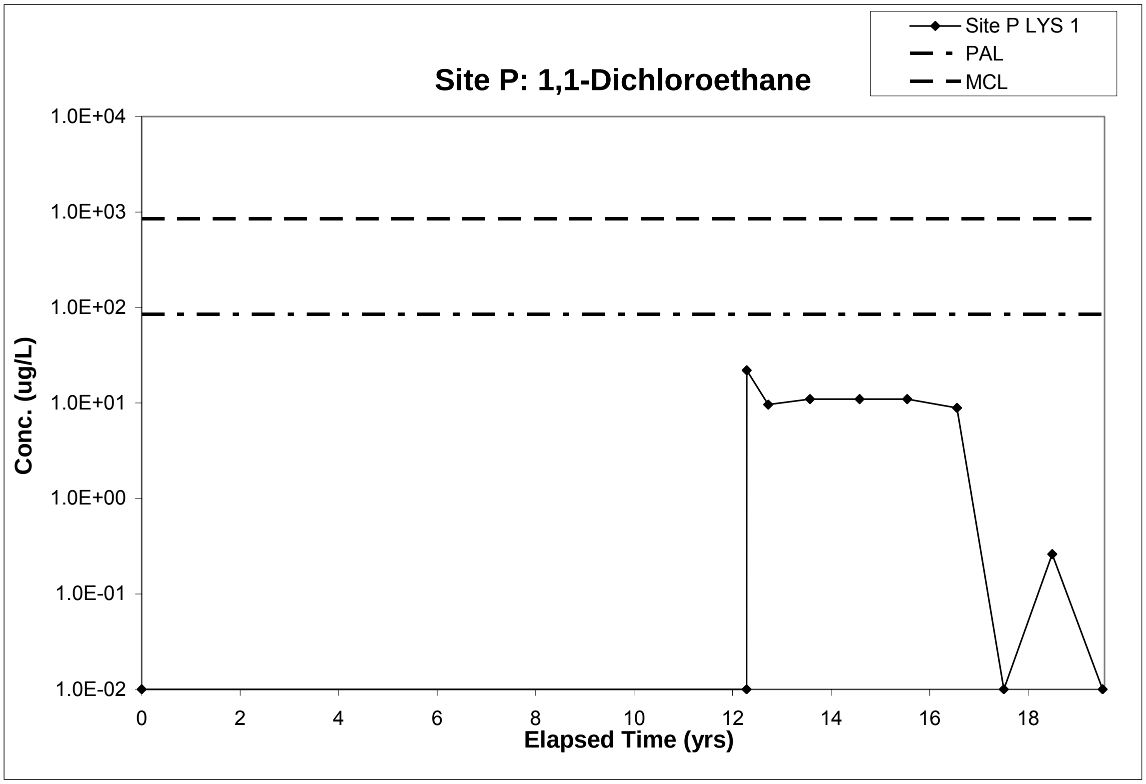

Site J: 1,1-Dichloroethane
Site J LYS 1
PAL
MCL
Lysimeter Dry: 80-93 (13 yrs)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

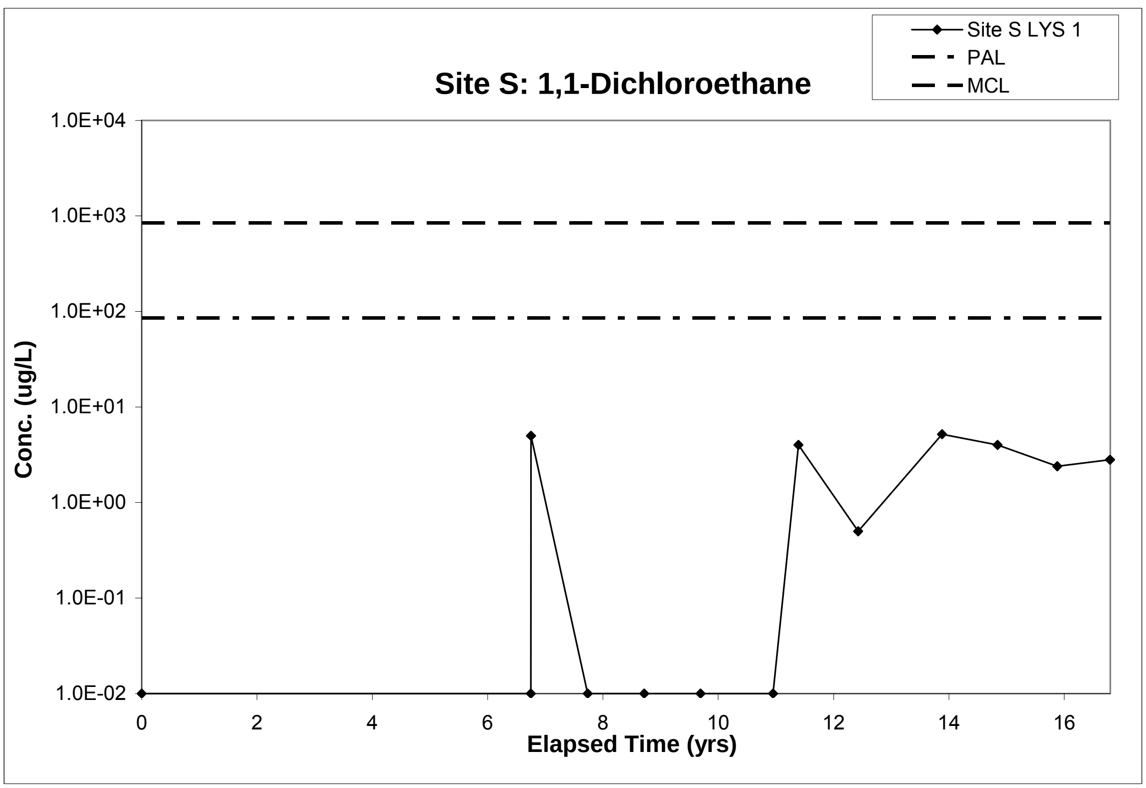

Site J: 1,1-Dichloroethane
Site J LYS 2
PAL
MCL
Lysimeter Dry: 80-91 (11 yrs) & 98-02 (4 yrs)
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

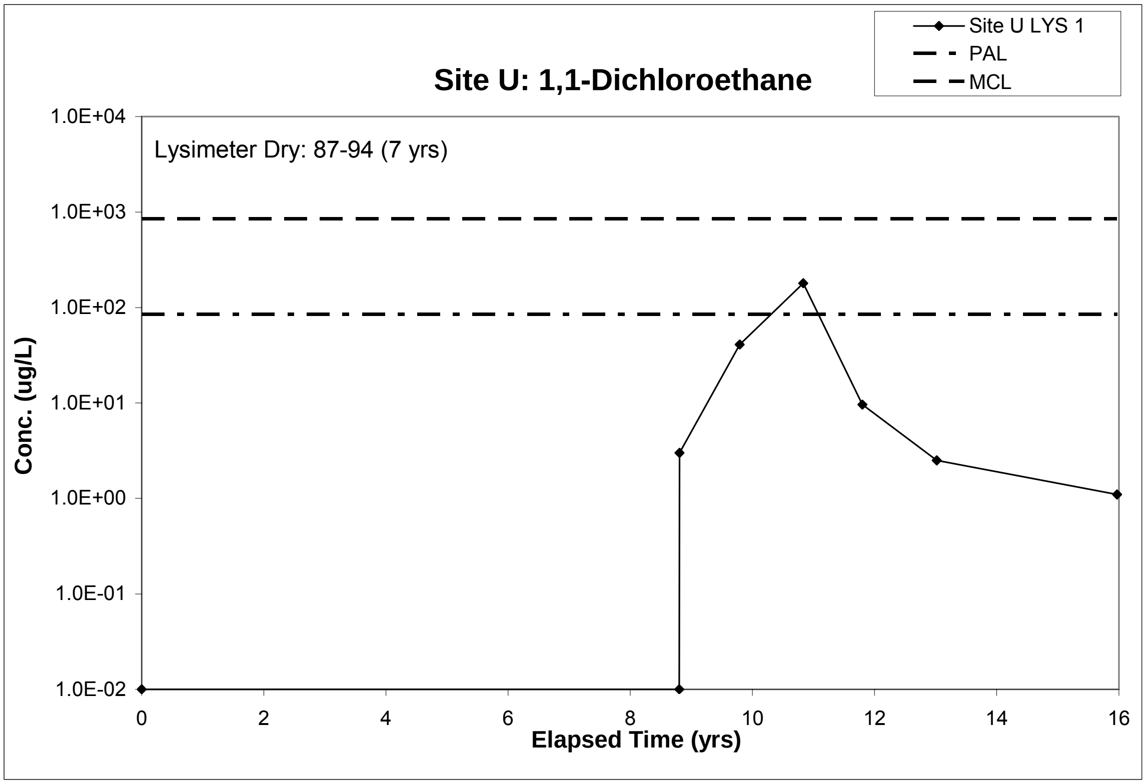

Site M: 1,1-Dichloroethane
Site M LYS 2
PAL
MCL
Lysimeter Dry: 93-95 (3 yrs)
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

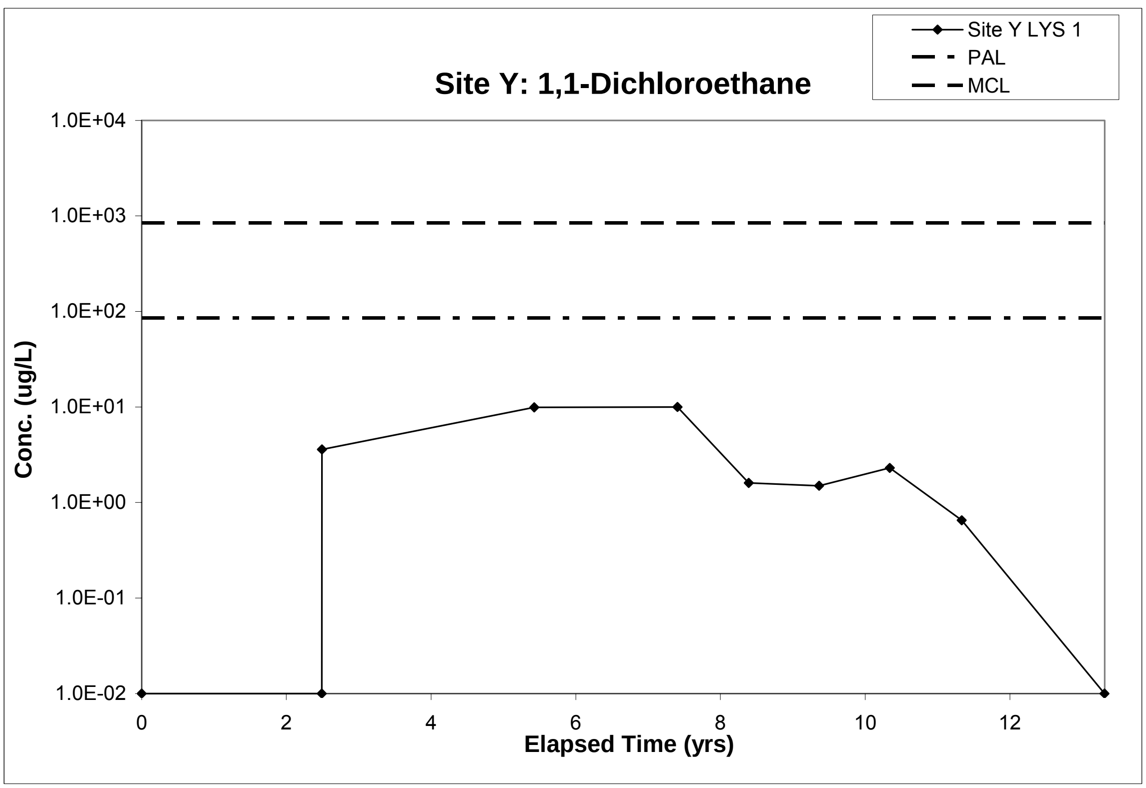

Site O: 1,1-Dichloroethane
Site O LYS 2
PAL
MCL
Lysimeter Dry: 91&93
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

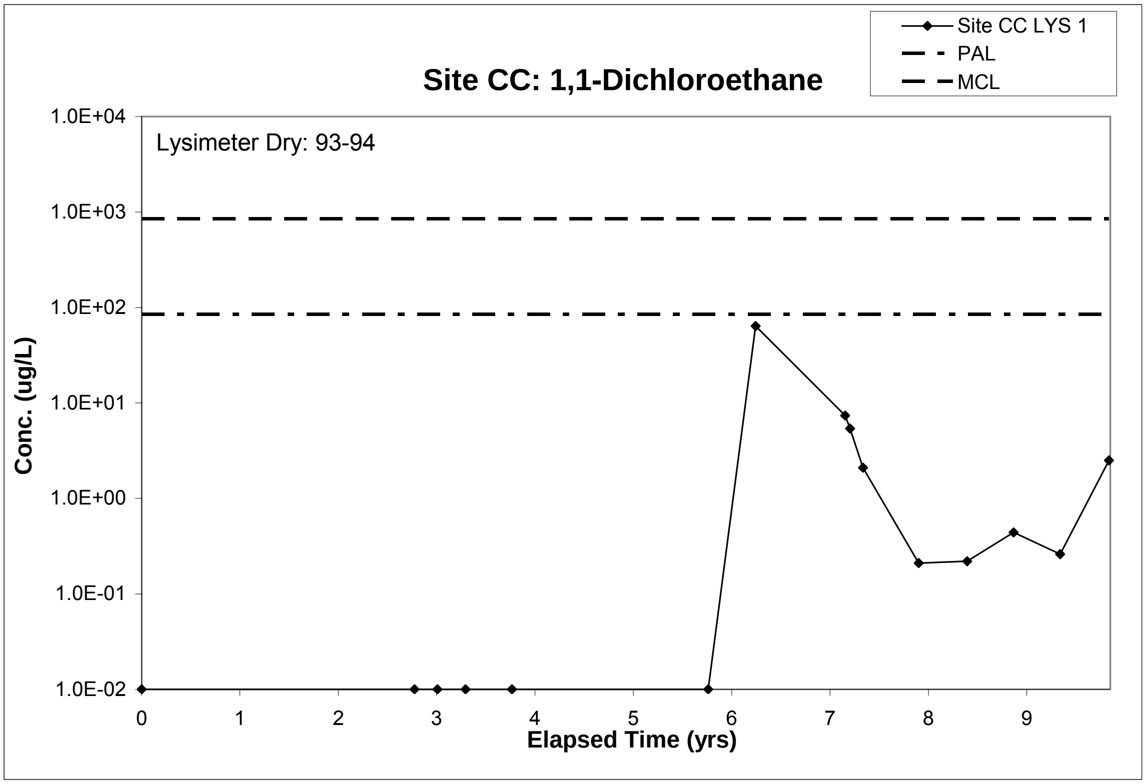

Site O: 1,1-Dichloroethane
Site O LYS 3
PAL
MCL
Lysimeter Dry: 93-97 (4 yrs)
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

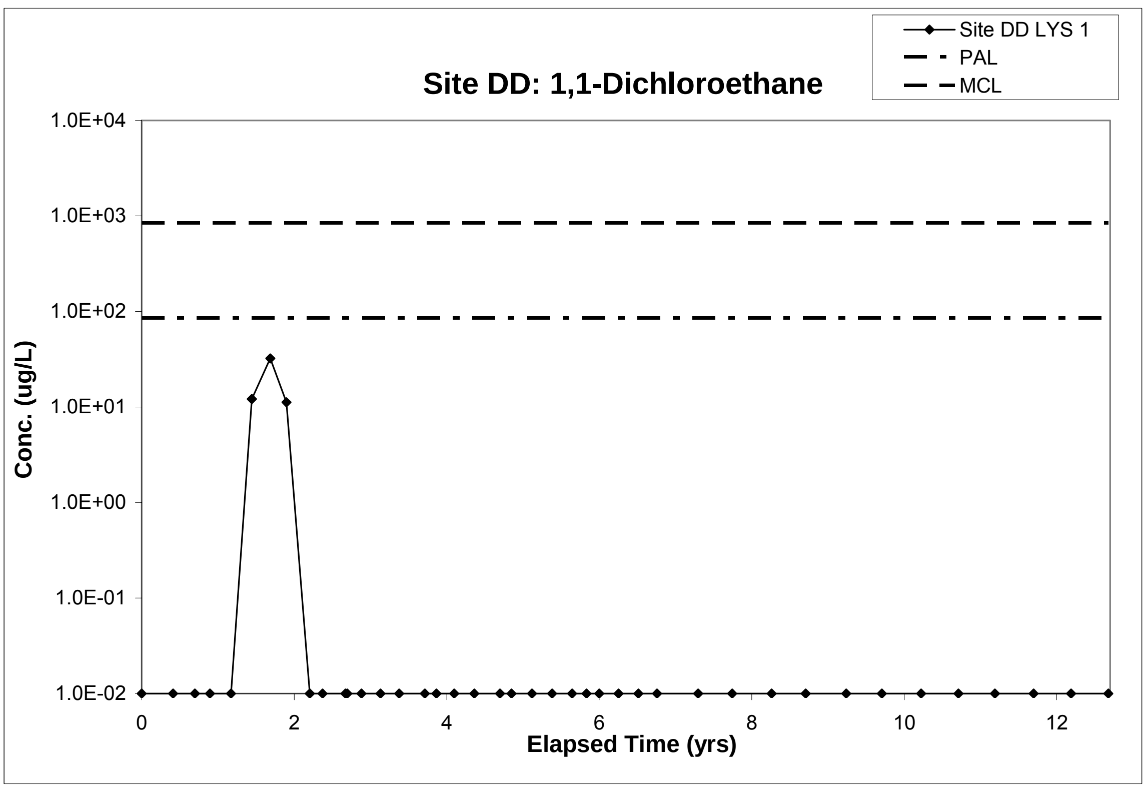

Site P: 1,1-Dichloroethane
Site P LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

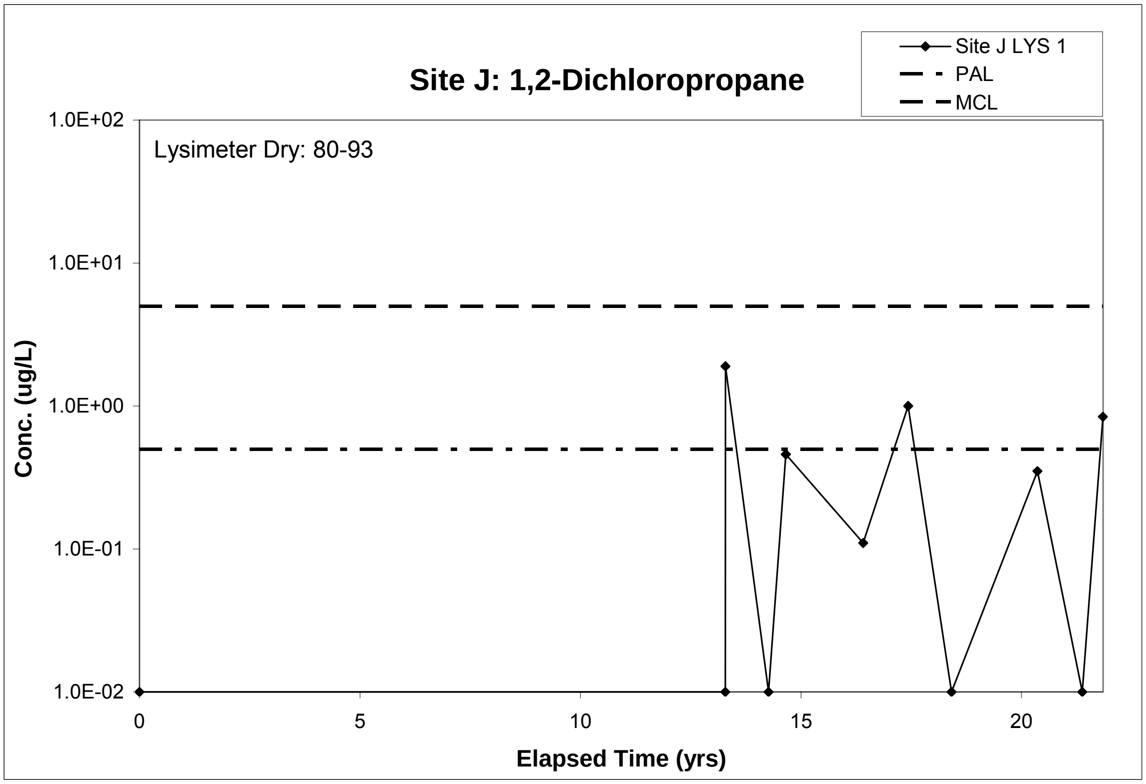

Site S: 1,1-Dichloroethane
Site S LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

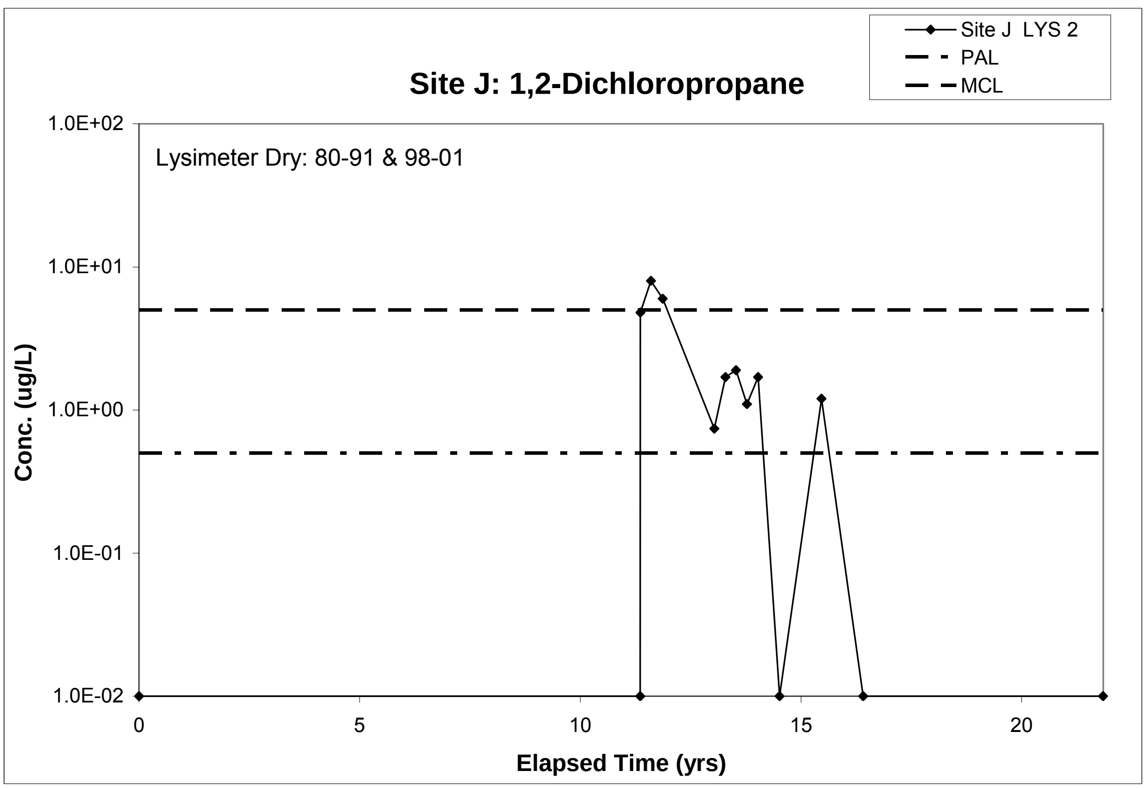

Site U LYS 1
PAL
MCL
Site U: 1,1-Dichloroethane
Lysimeter Dry: 87-94 (7 yrs)
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

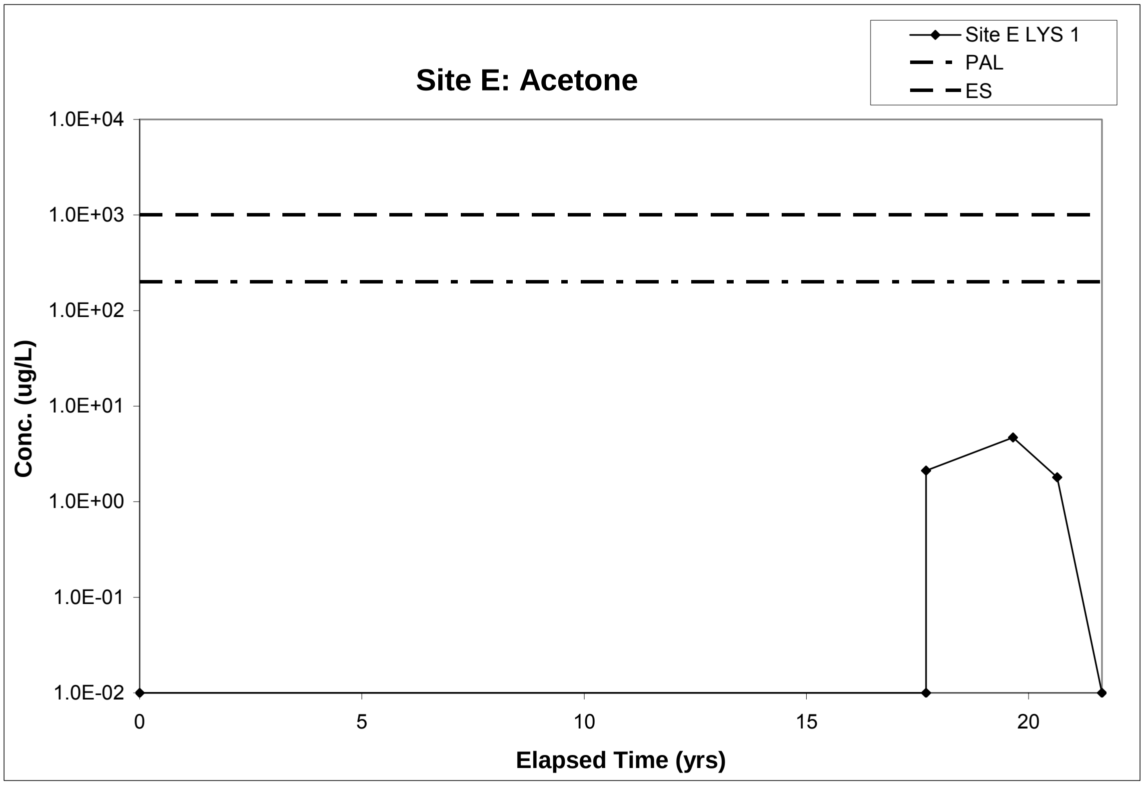

Site Y LYS 1
PAL
MCL
Site Y: 1,1-Dichloroethane
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

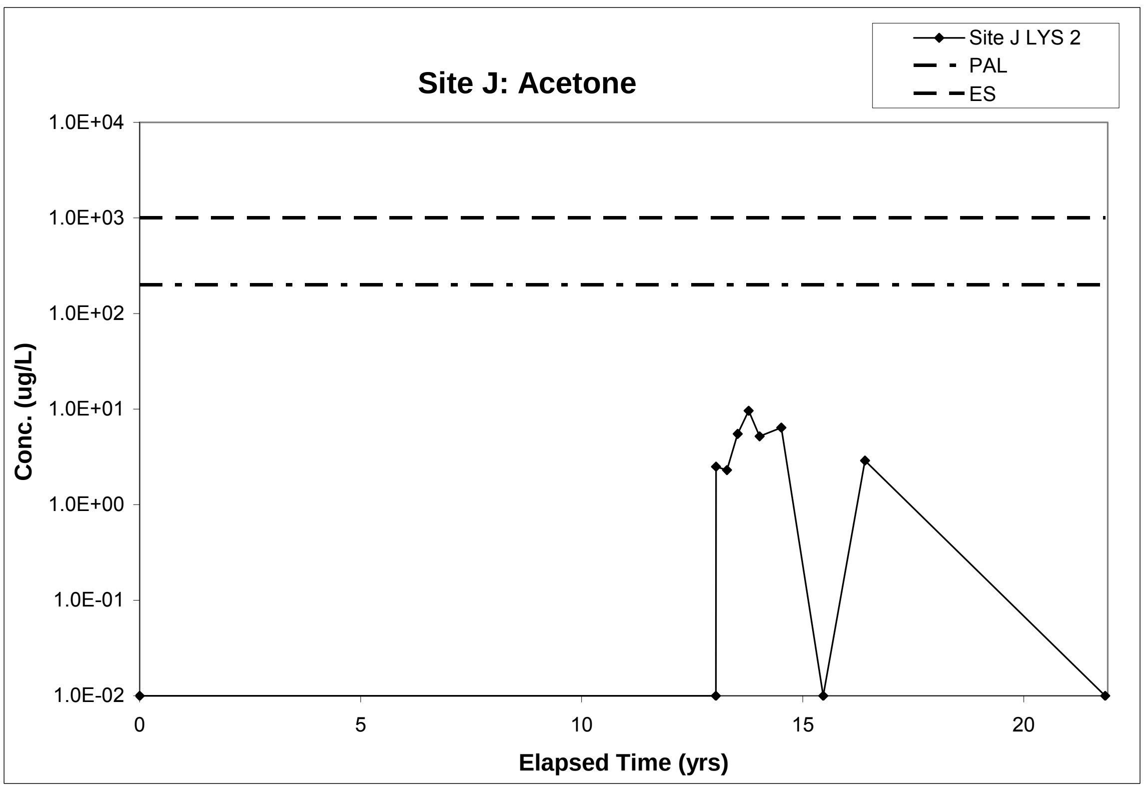

Site CC: 1,1-Dichloroethane
Site CC LYS 1
PAL
MCL
Lysimeter Dry: 93-94
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0 1 2 3 4 5 6 7 8 9
Elapsed Time (yrs)

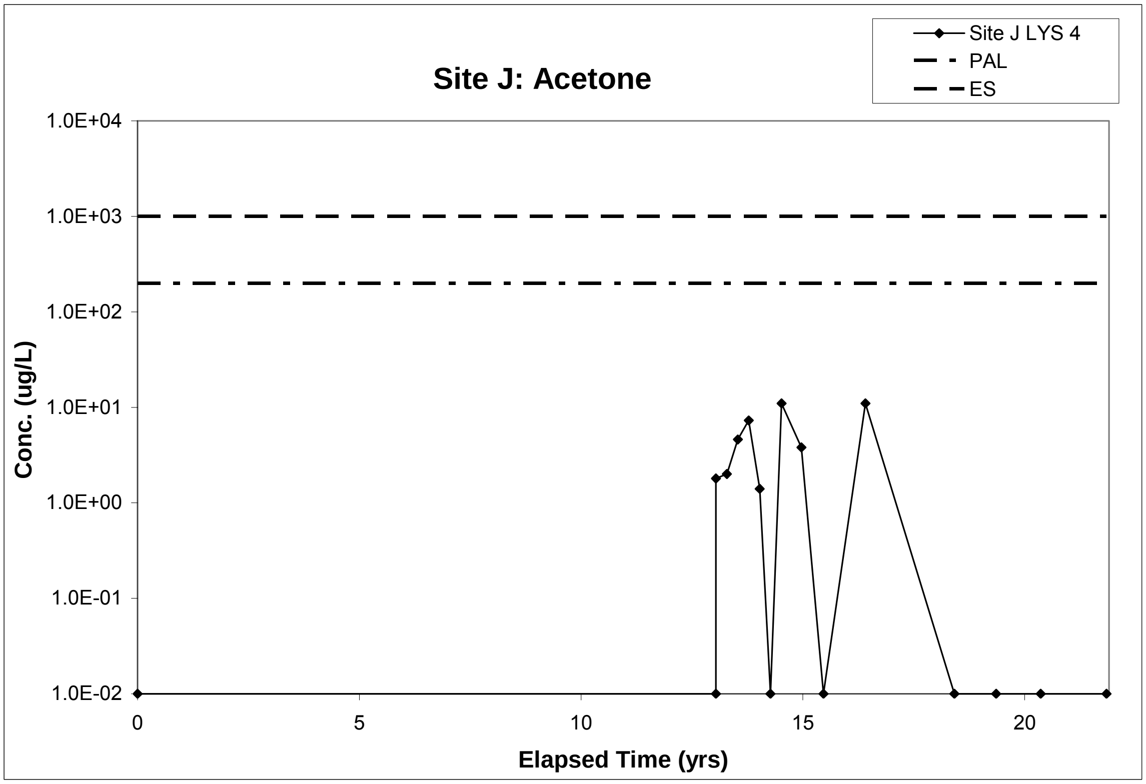

Site DD: 1,1-Dichloroethane
Site DD LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0 2 4 6 8 10 12
Elapsed Time (yrs)

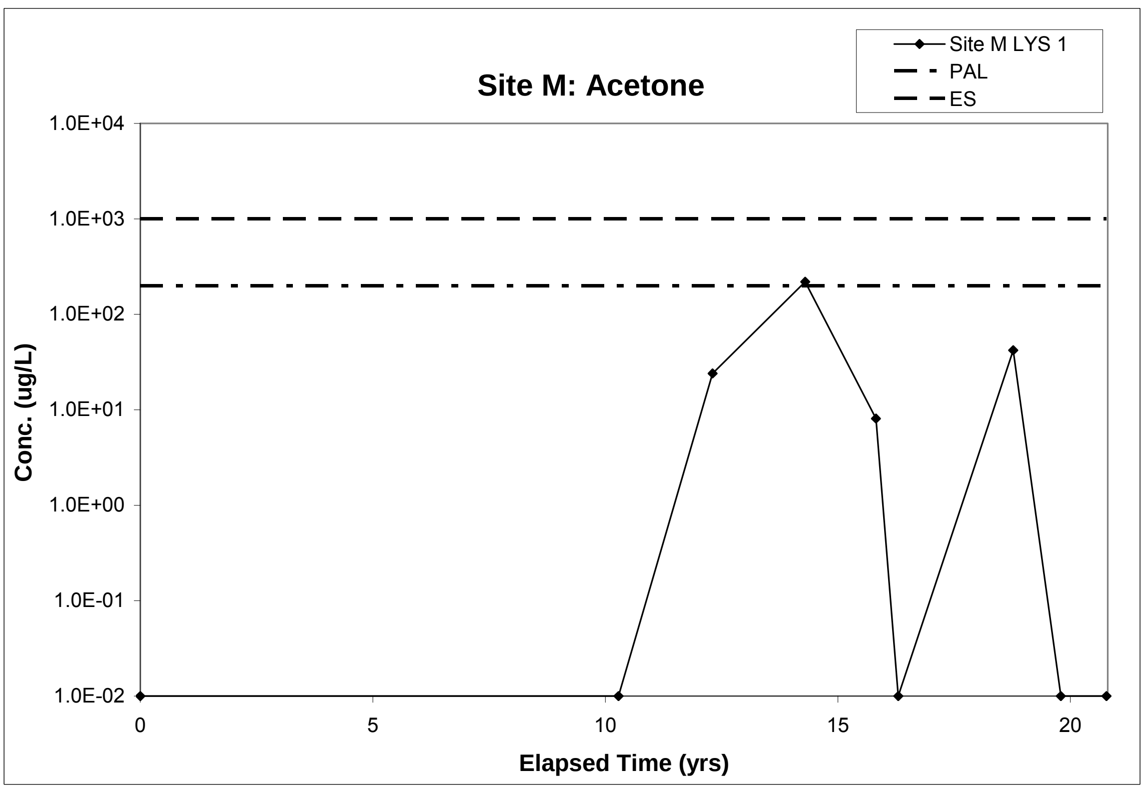

Site J: 1,2-Dichloropropane
Site J LYS 1
PAL
MCL
Lysimeter Dry: 80-93
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

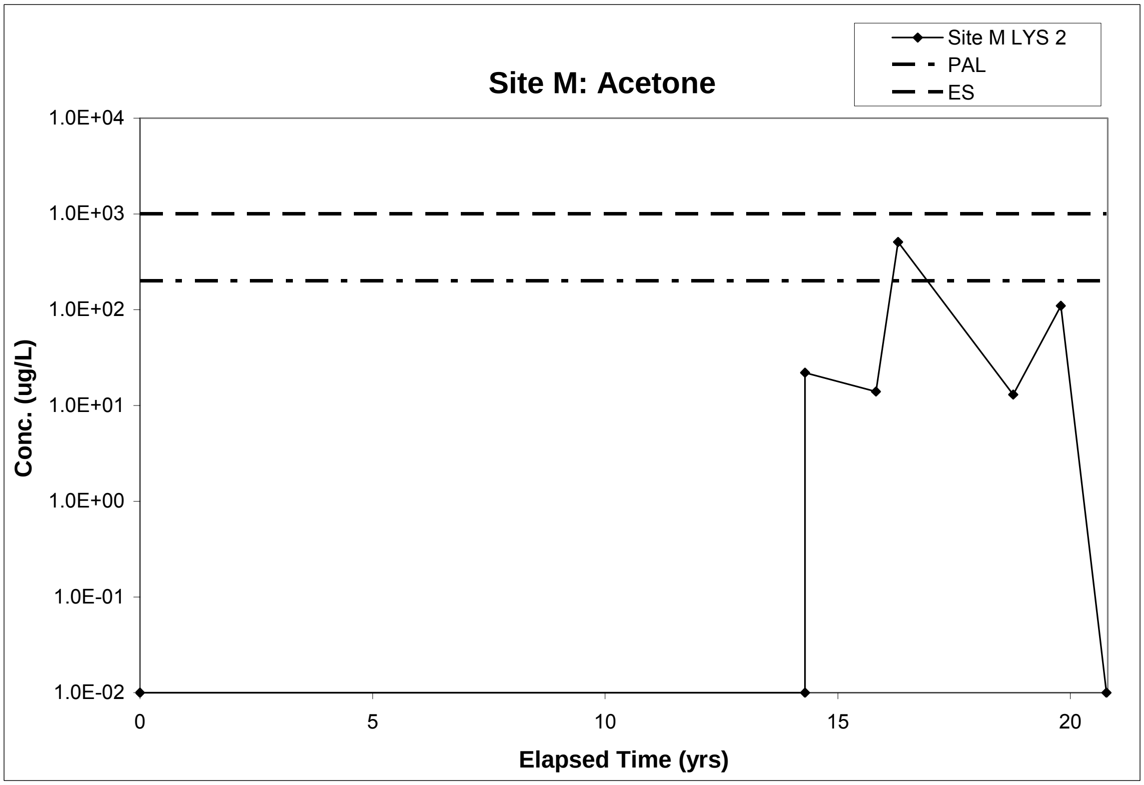

Site J: 1,2-Dichloropropane
Site J LYS 2
PAL
MCL
Lysimeter Dry: 80-91 & 98-01
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

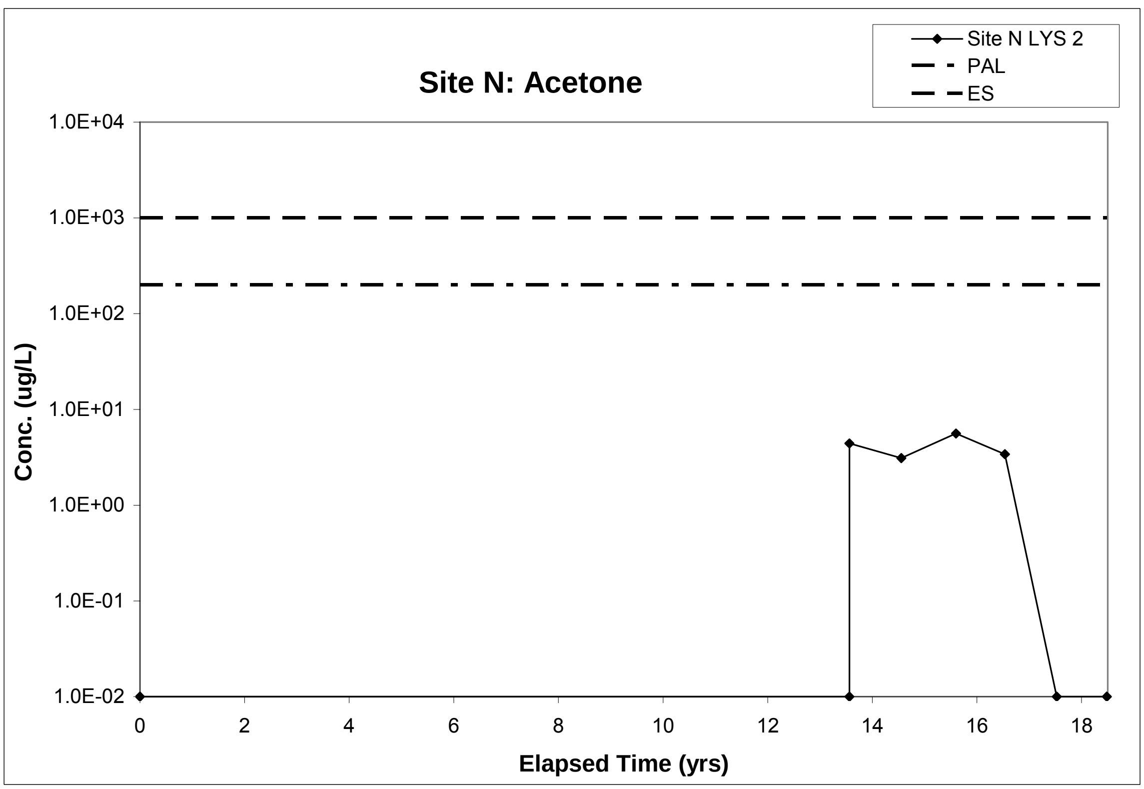

Site E: Acetone
Site E LYS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

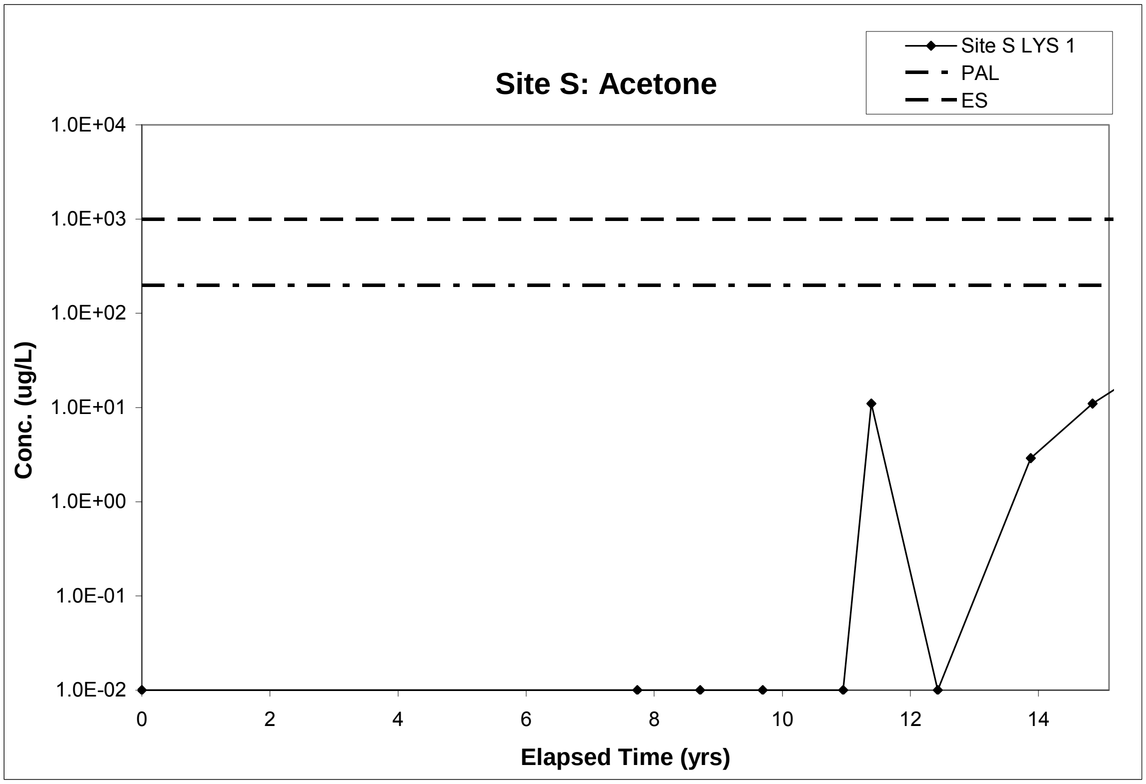

Site J: Acetone
Site J LYS 2
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

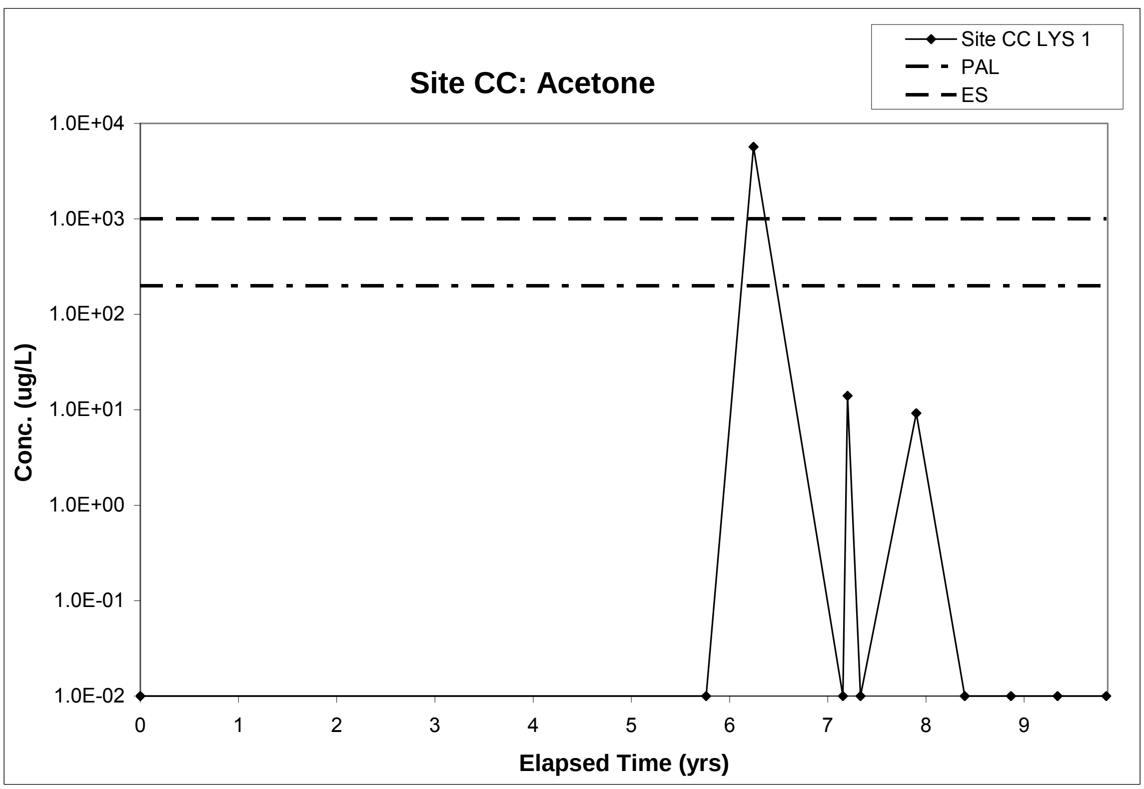

Site J: Acetone
Site J LYS 4
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

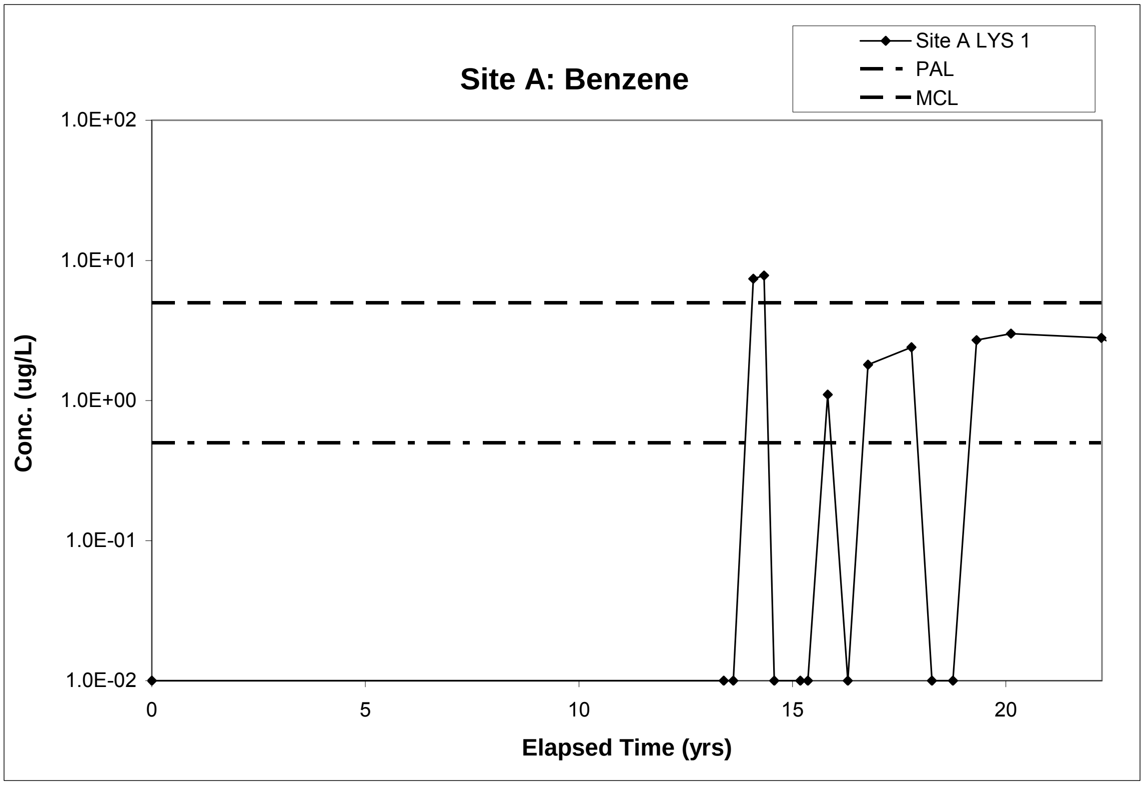

Site M: Acetone
Site M LYS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

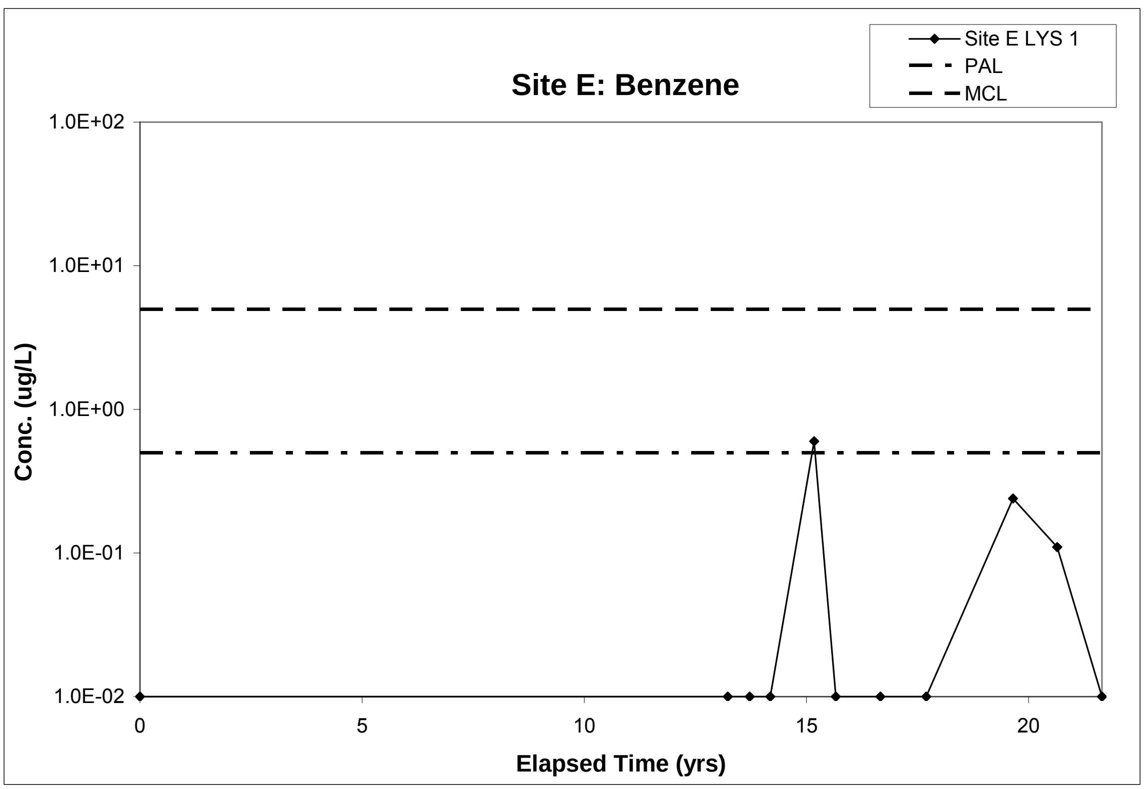

Site M: Acetone
Site M LYS 2
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)


Site N: Acetone
Site N LYS 2
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

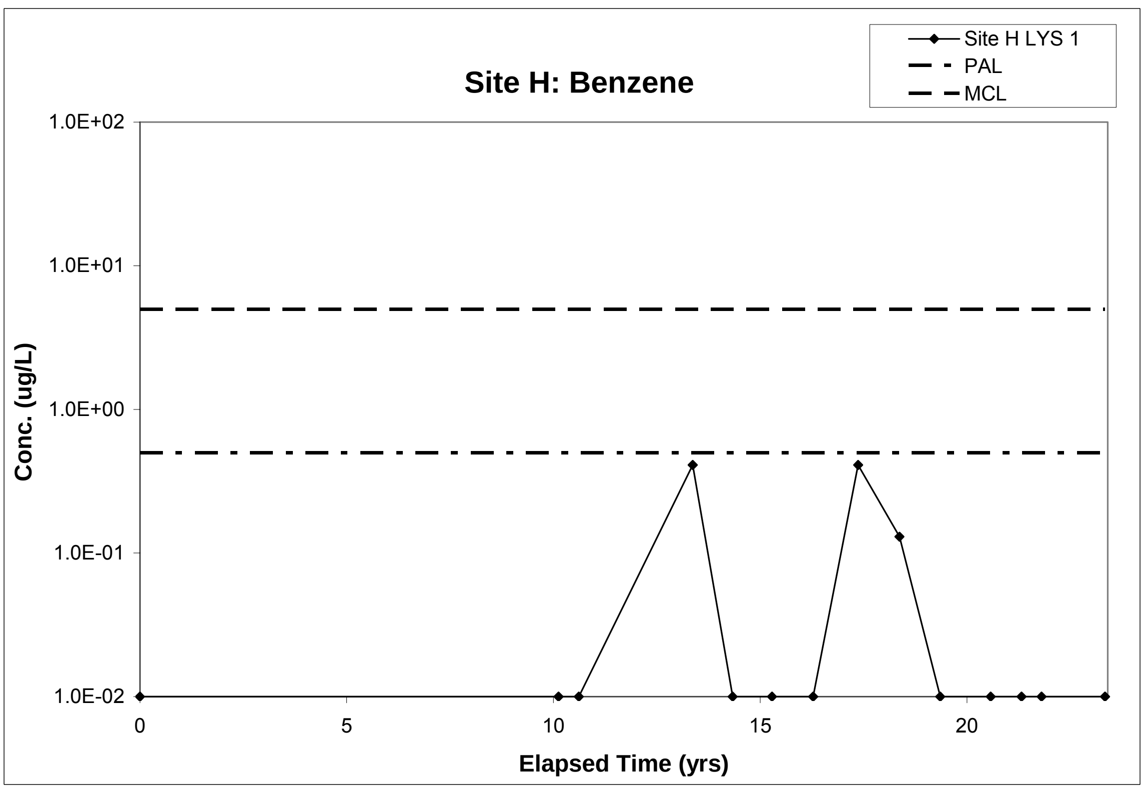

Site S: Acetone
Site S LYS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

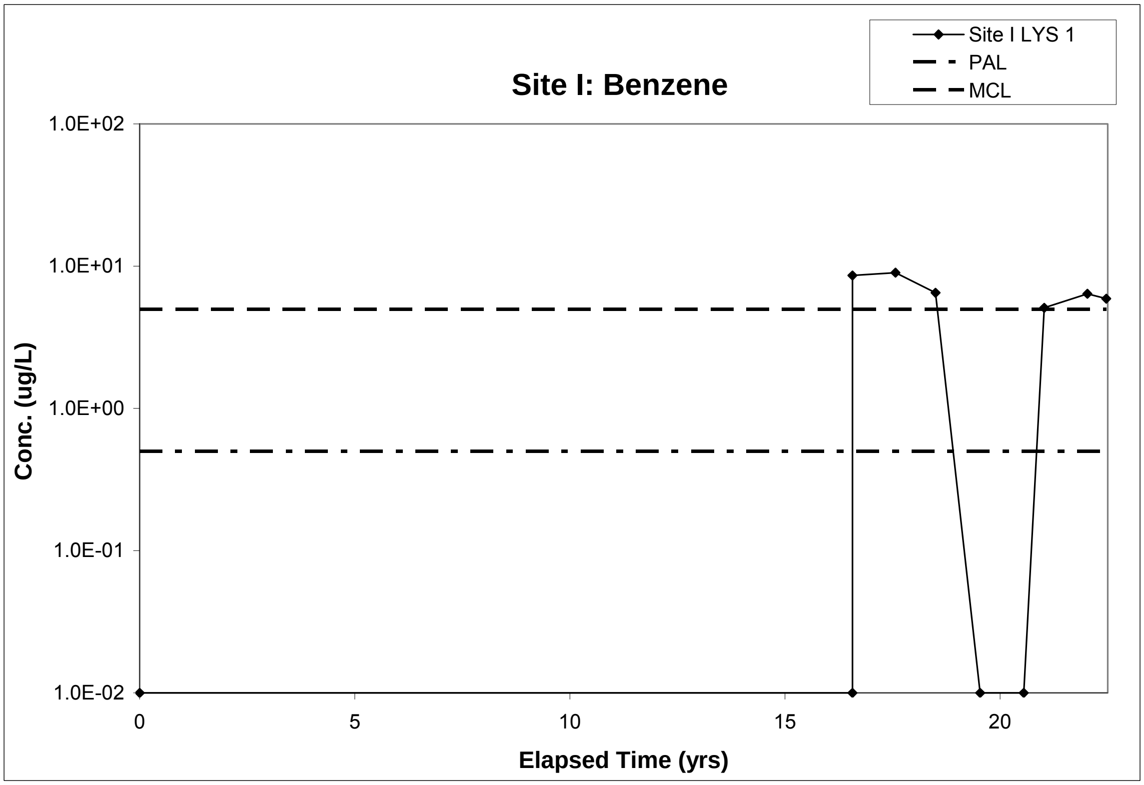

Site CC: Acetone
Site CC LYS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
9
Elapsed Time (yrs)

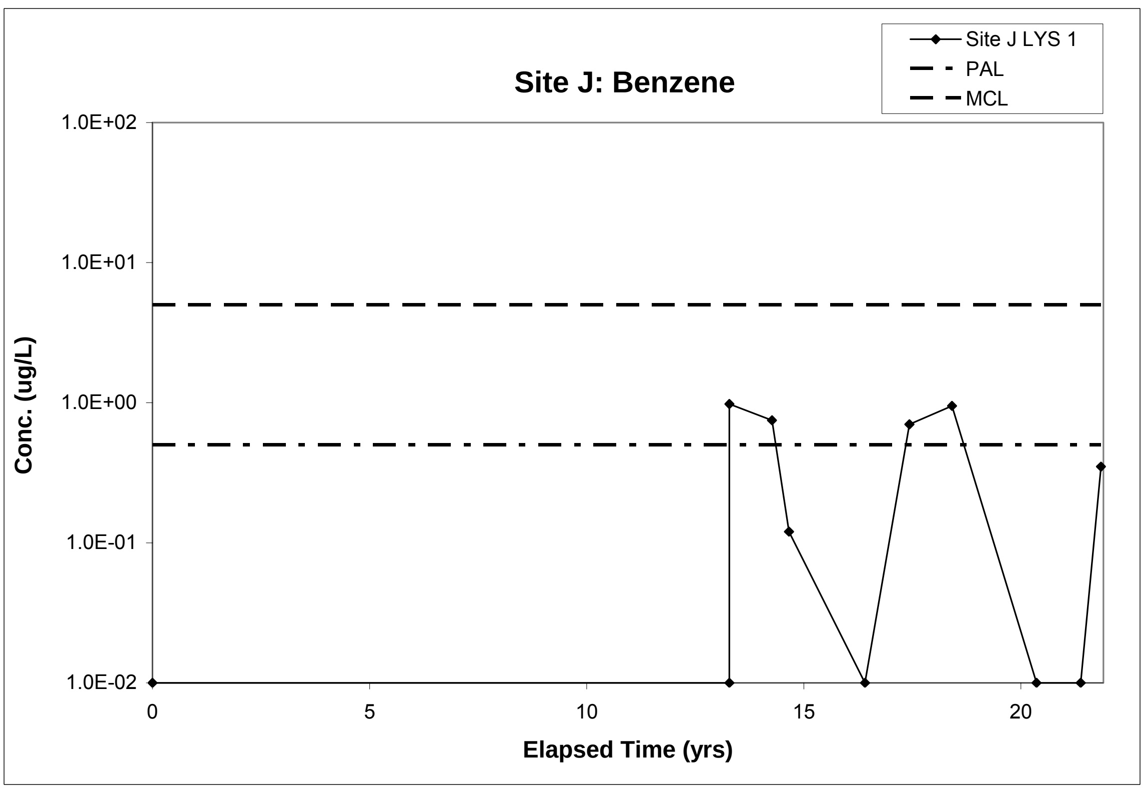

Site A: Benzene
Site A LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

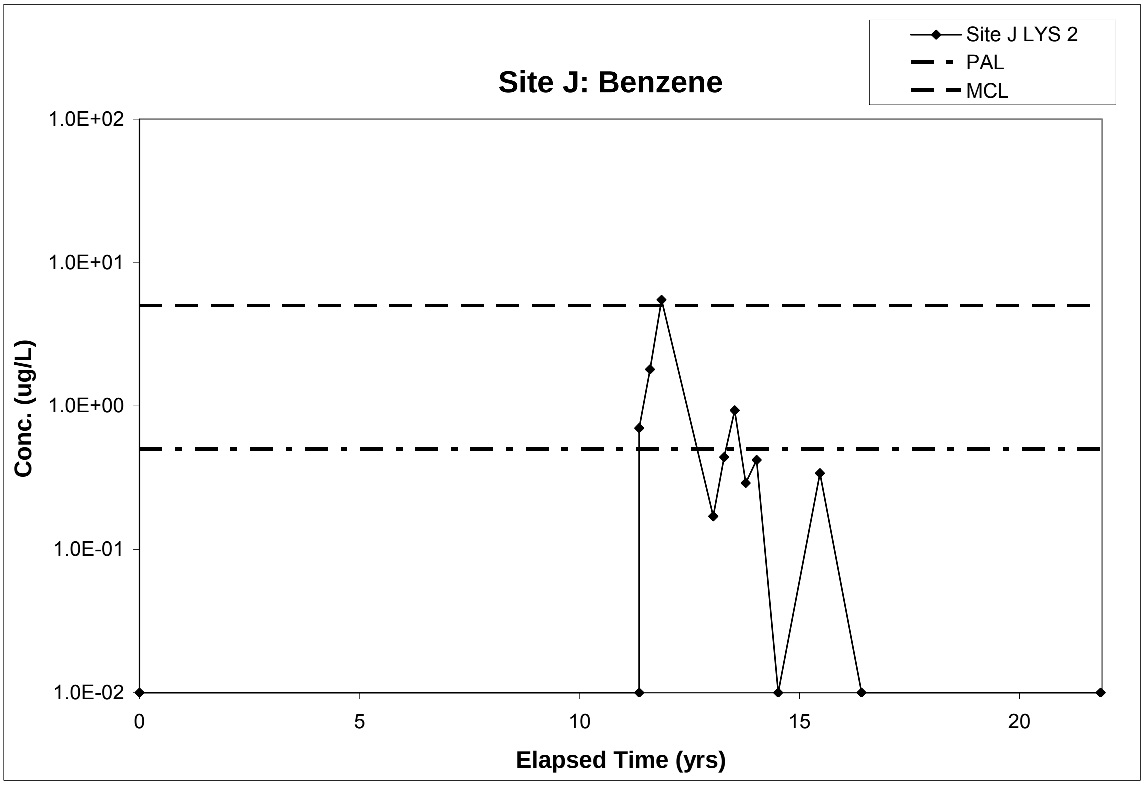

Site E: Benzene
Site E LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

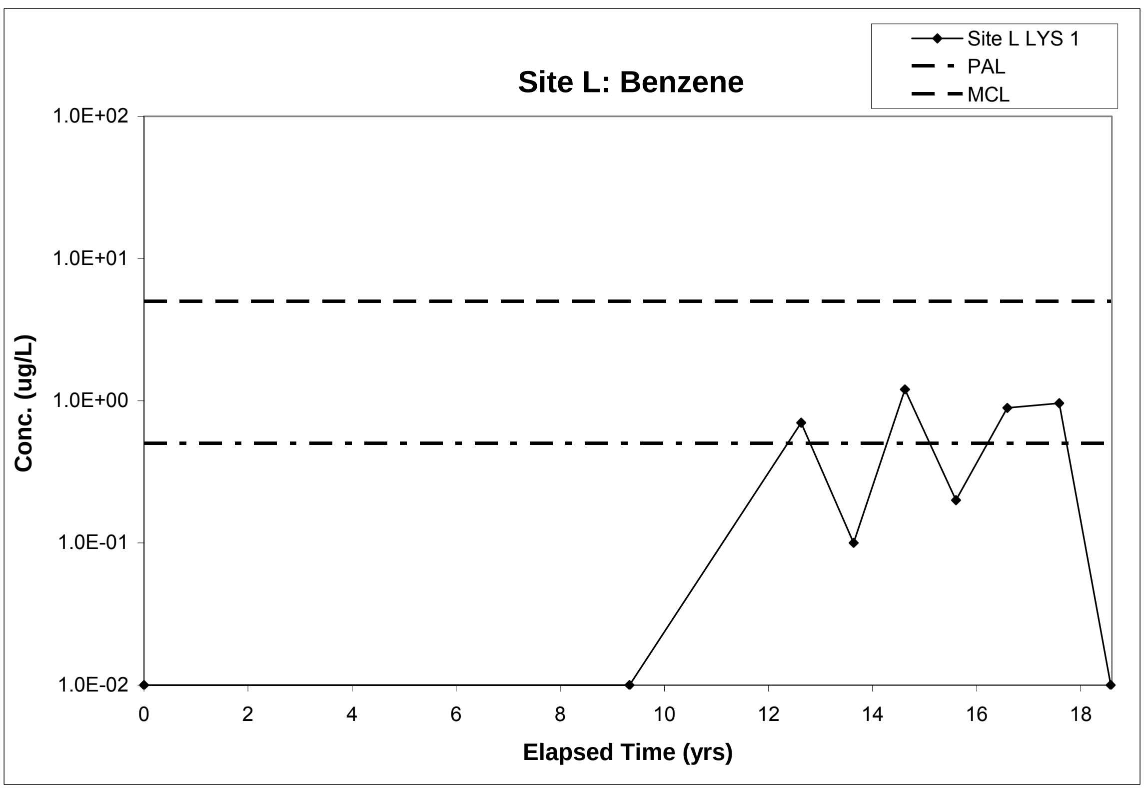

Site G: Benzene
Site G LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)


Site H: Benzene
Site H LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

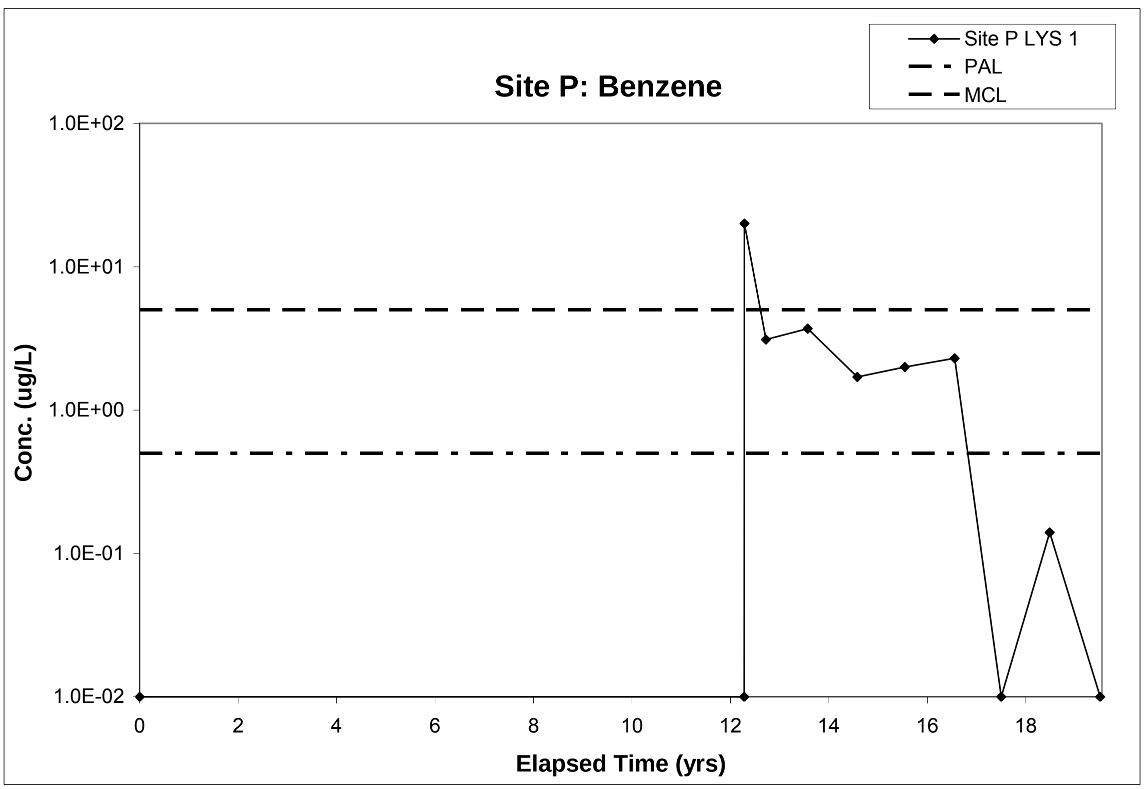

Site I: Benzene
Site I LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)


Site J: Benzene
Site J LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

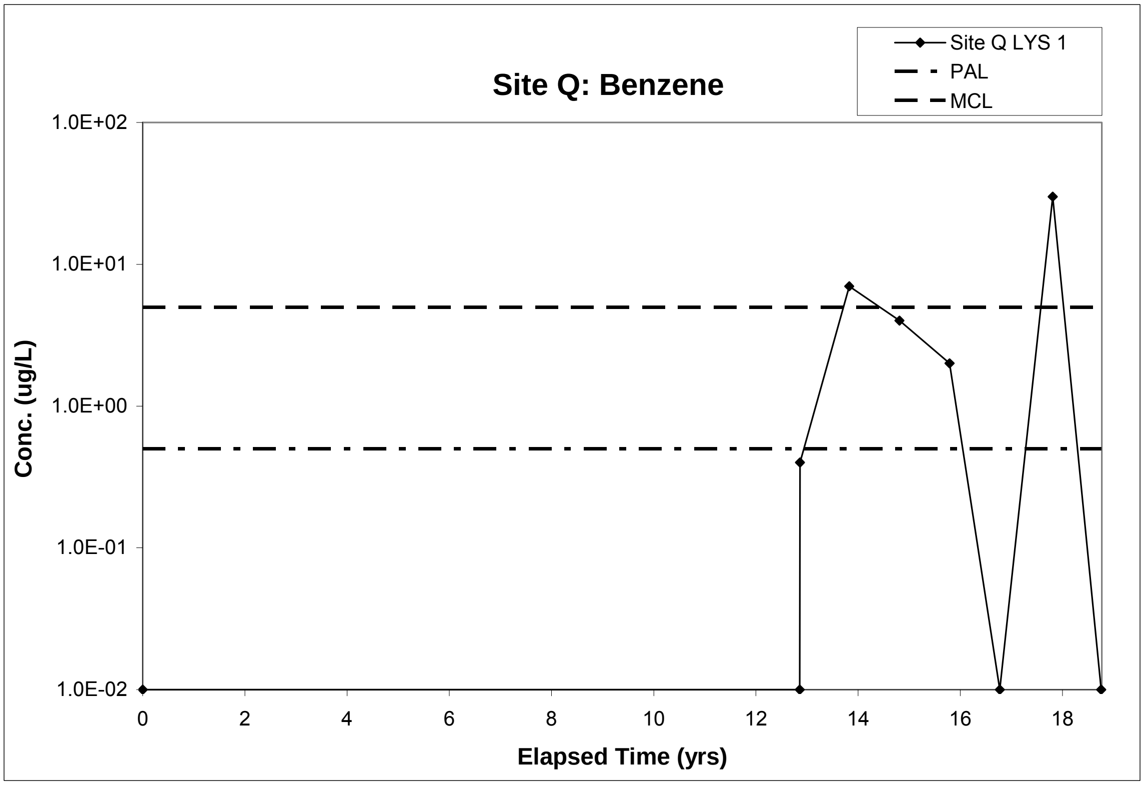

Site J: Benzene
Site J LYS 2
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

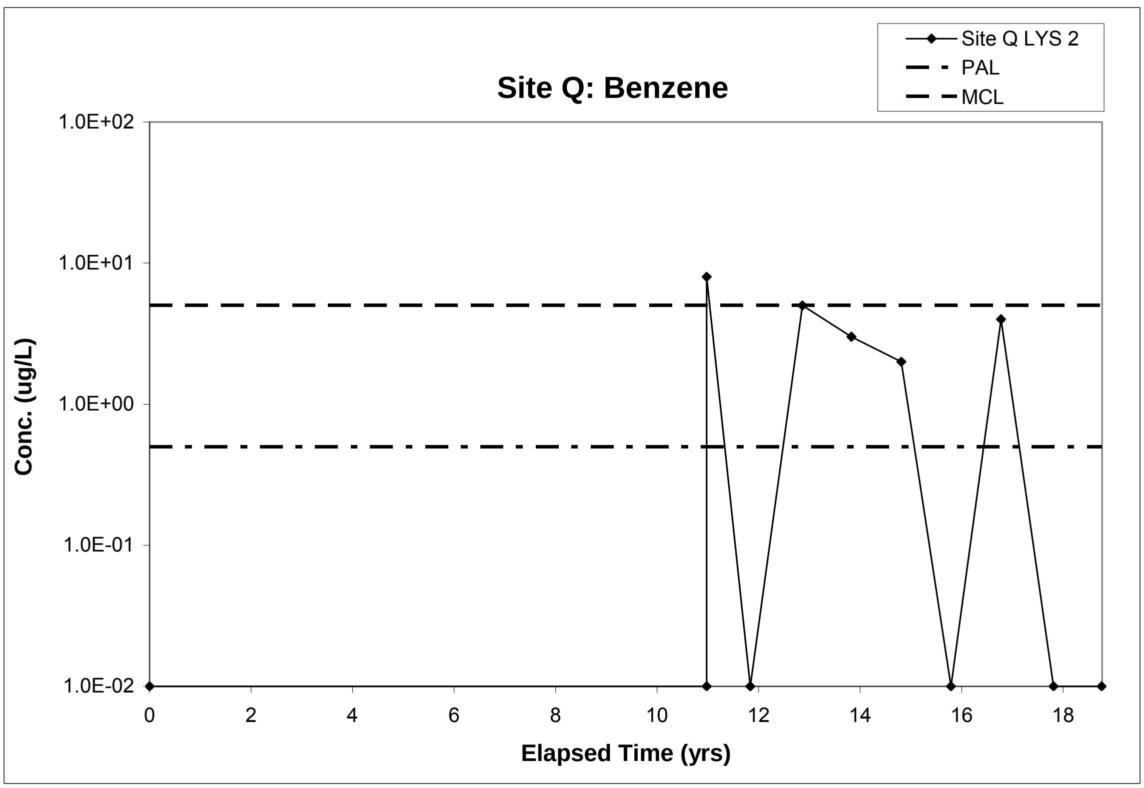

Site L: Benzene
Site L LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

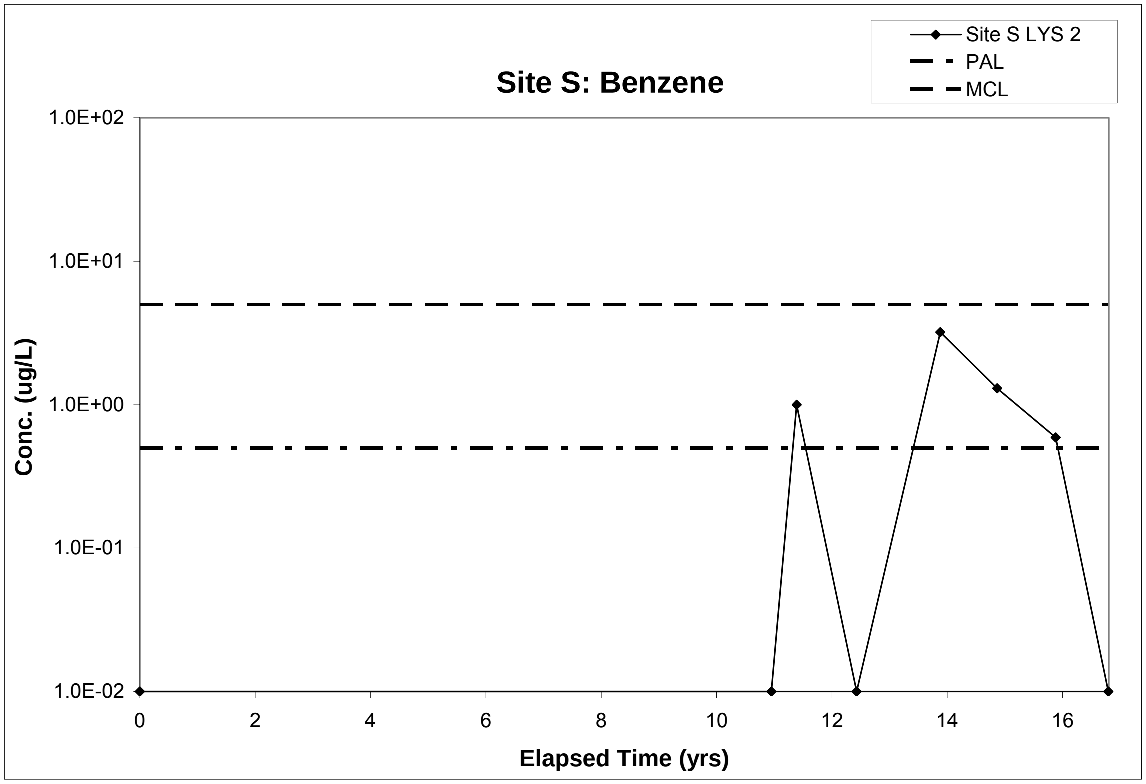
Site M: Benzene
Site M LYS 2
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)



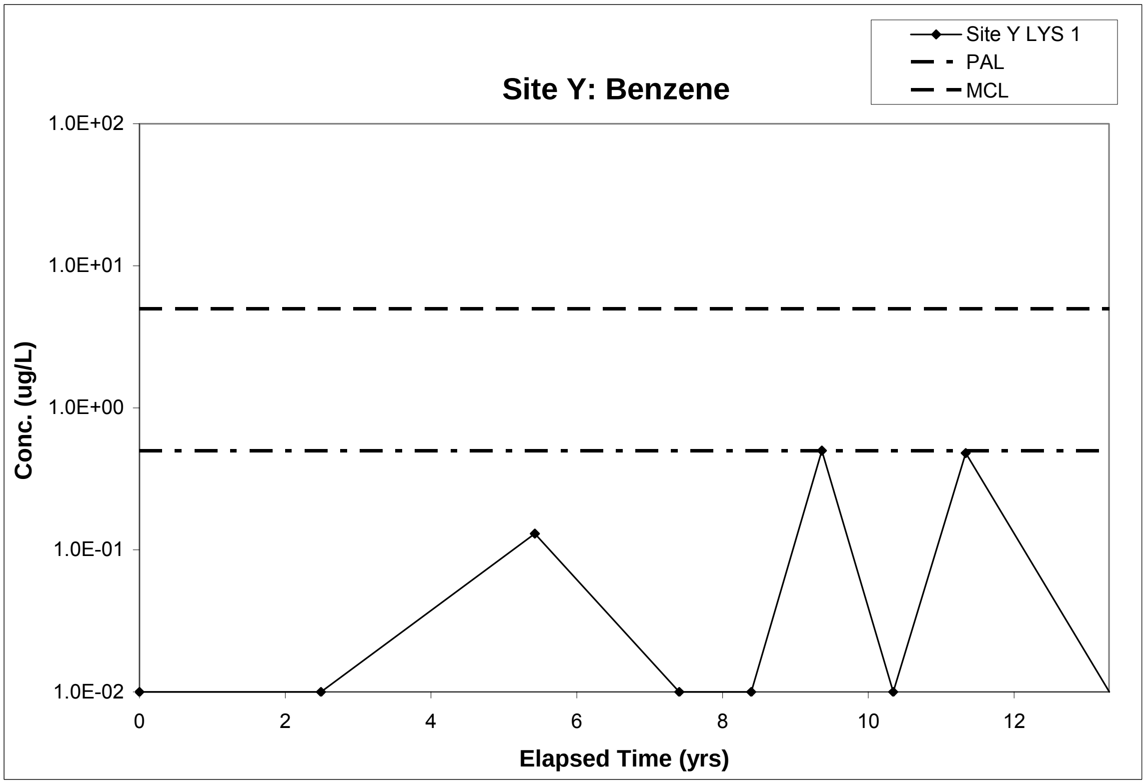
Site P: Benzene
Site P LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

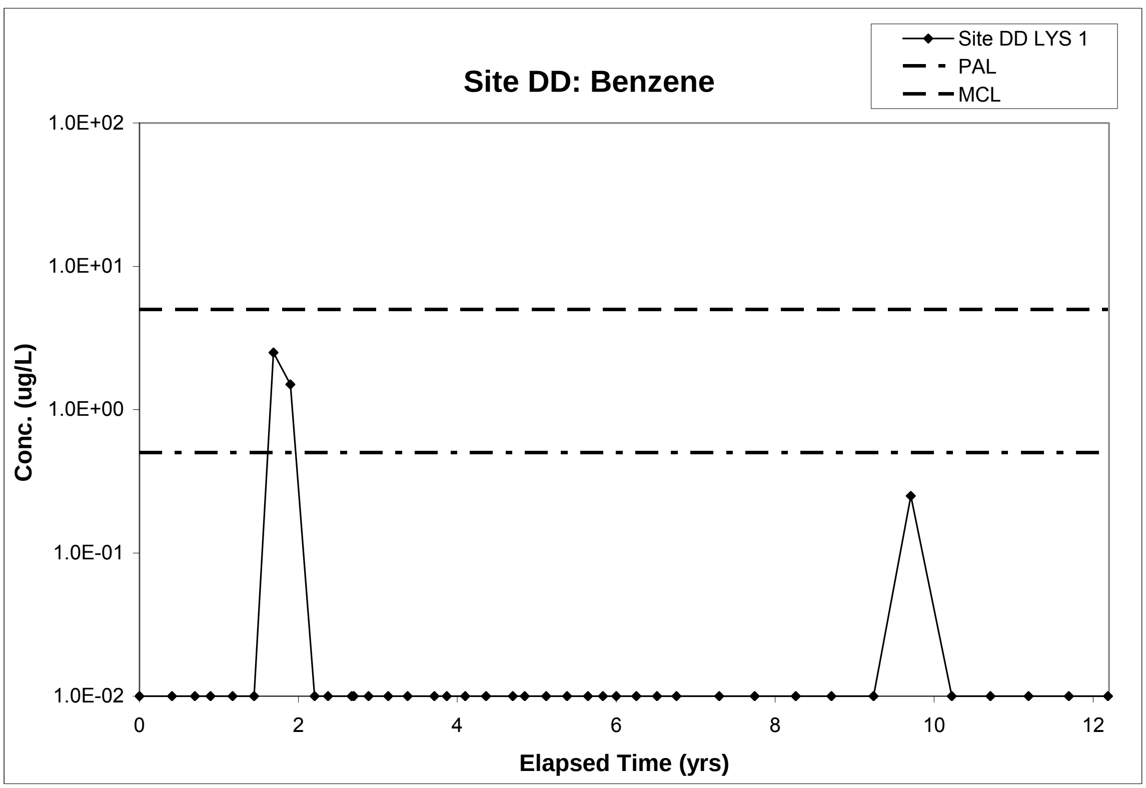

Site Q: Benzene
Site Q LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

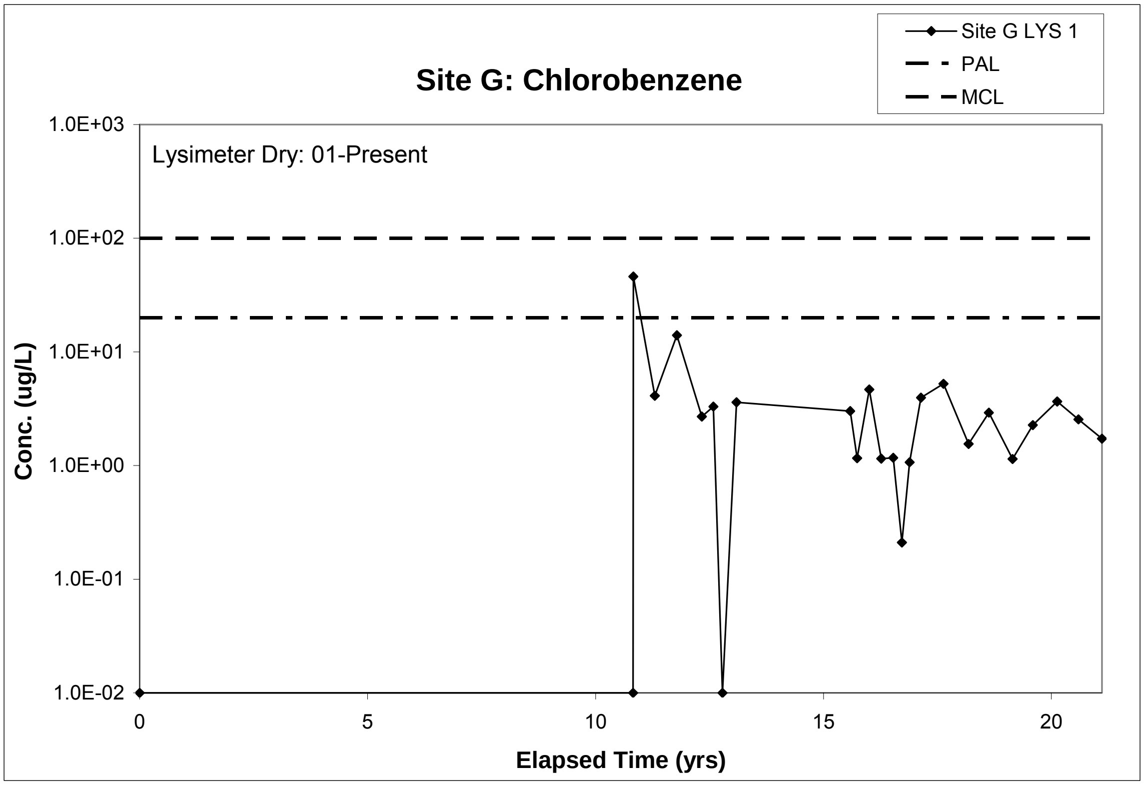

Site Q: Benzene
Site Q LYS 2
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

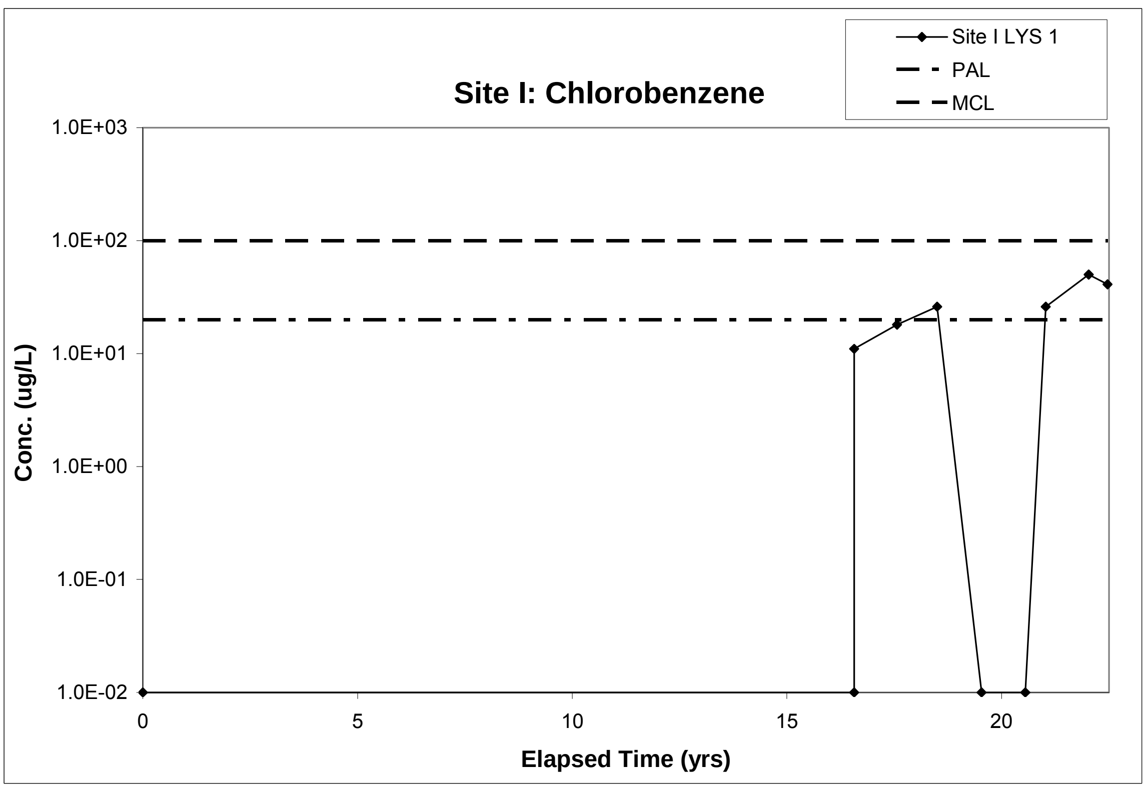

Site S: Benzene
Site S LYS 2
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

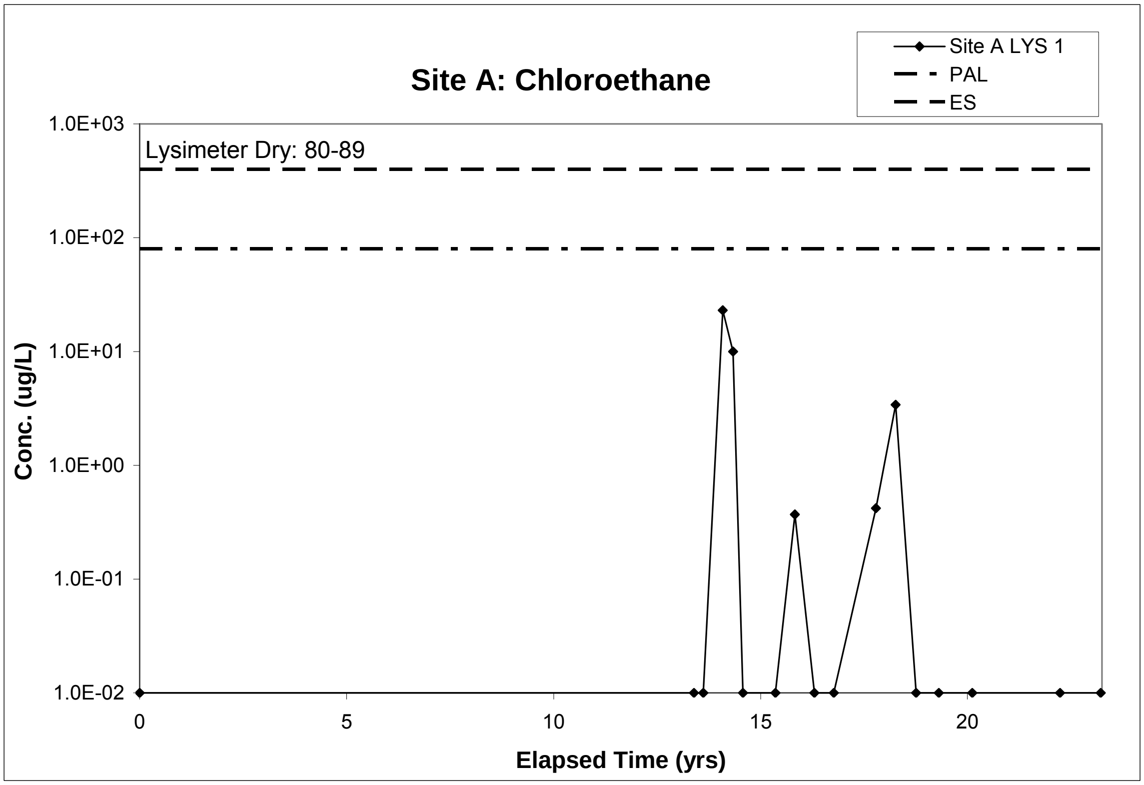

Site U: Benzene
Site U LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

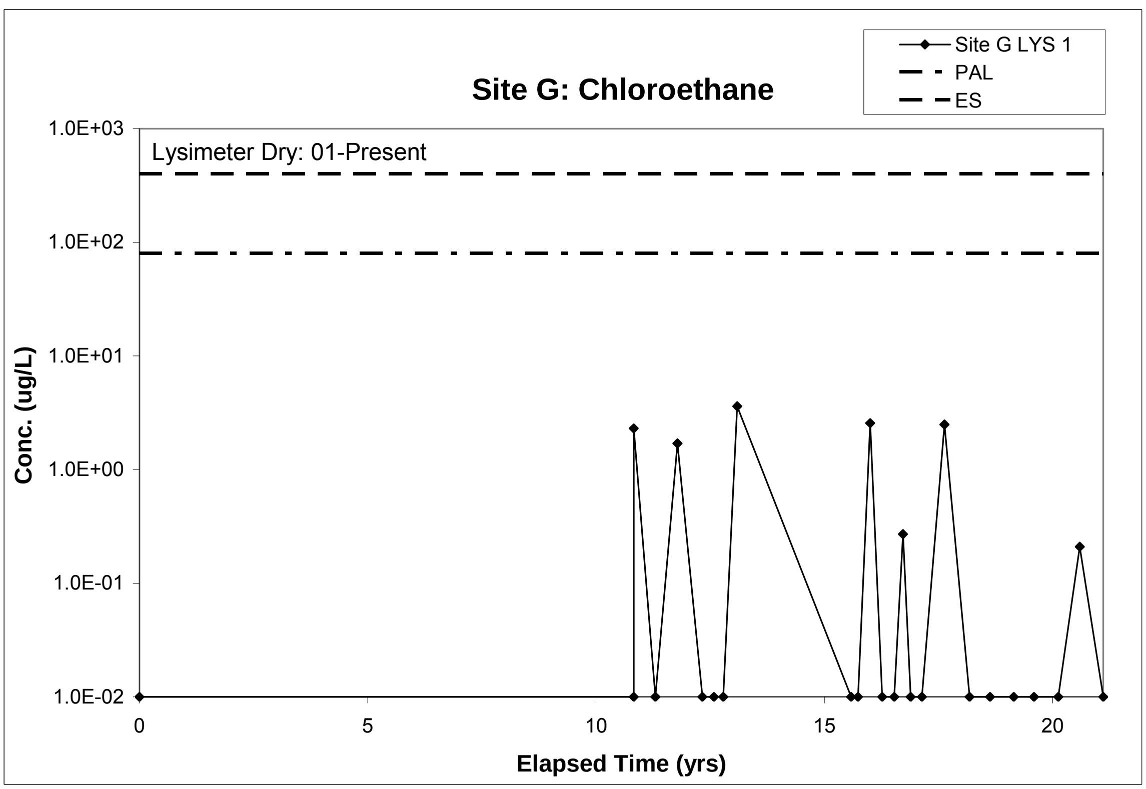

Site Y: Benzene
Site Y LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

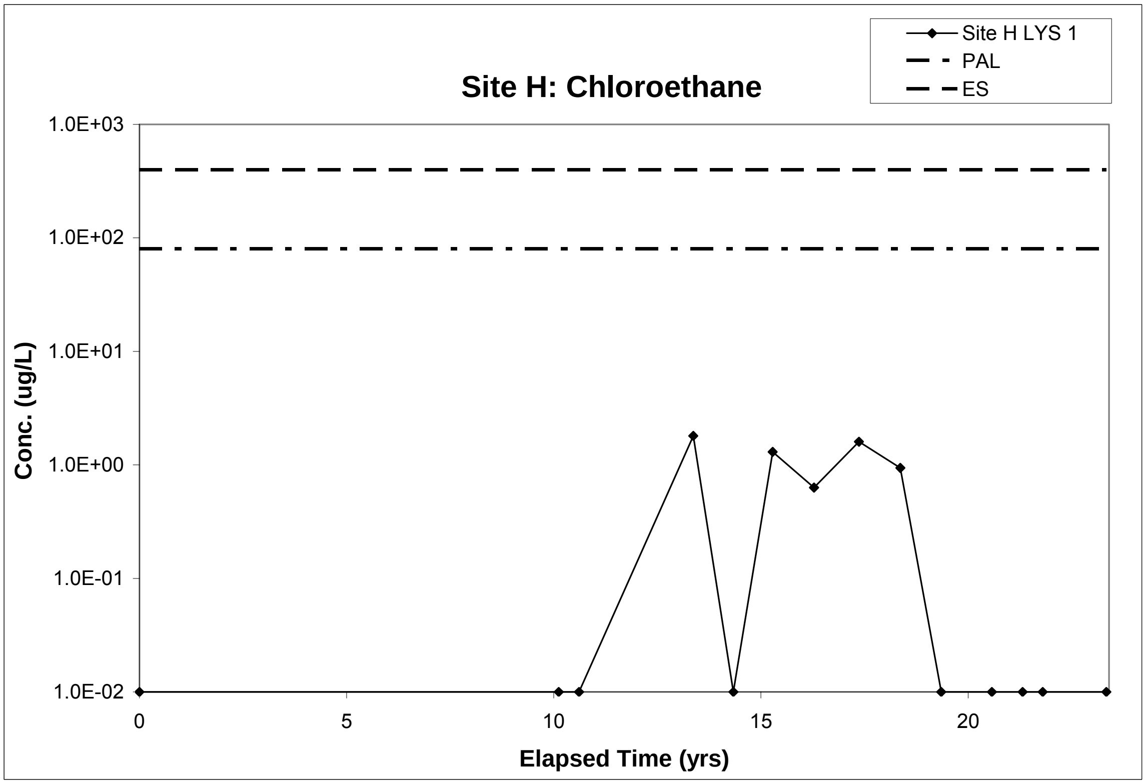

Site DD: Benzene
Site DD LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

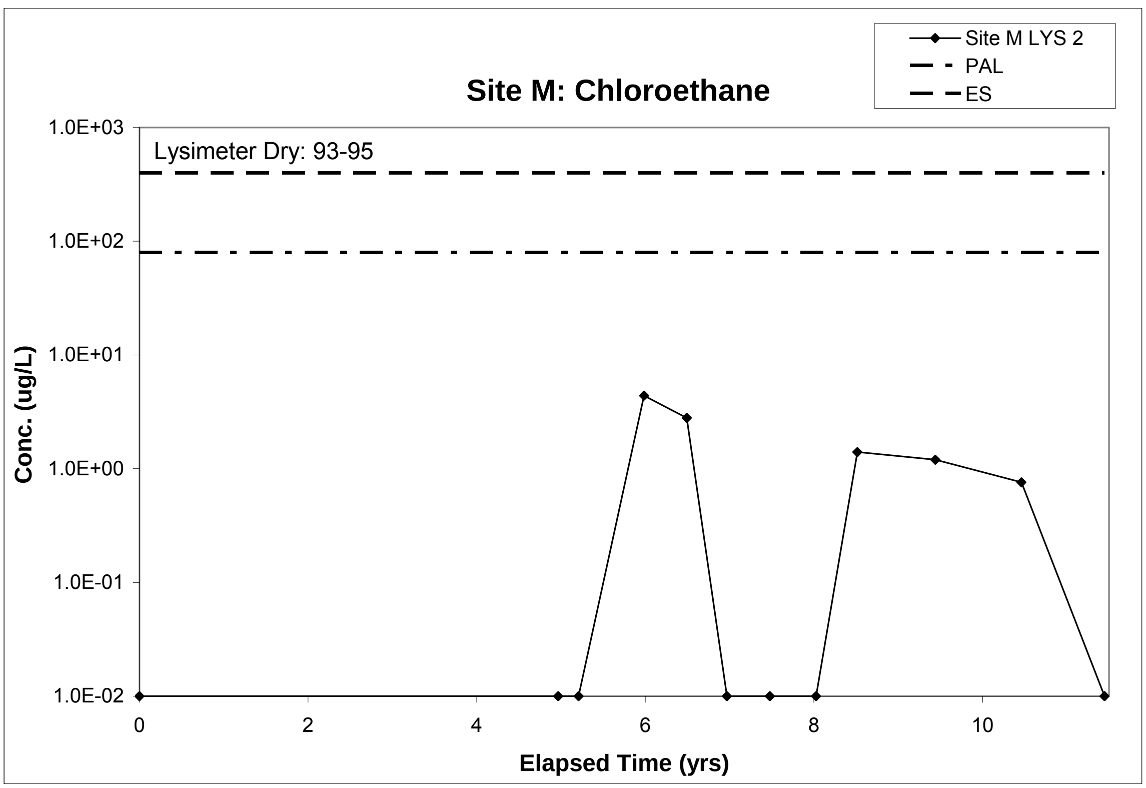

Site G: Chlorobenzene
Site G LYS 1
PAL
MCL
Lysimeter Dry: 01-Present
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

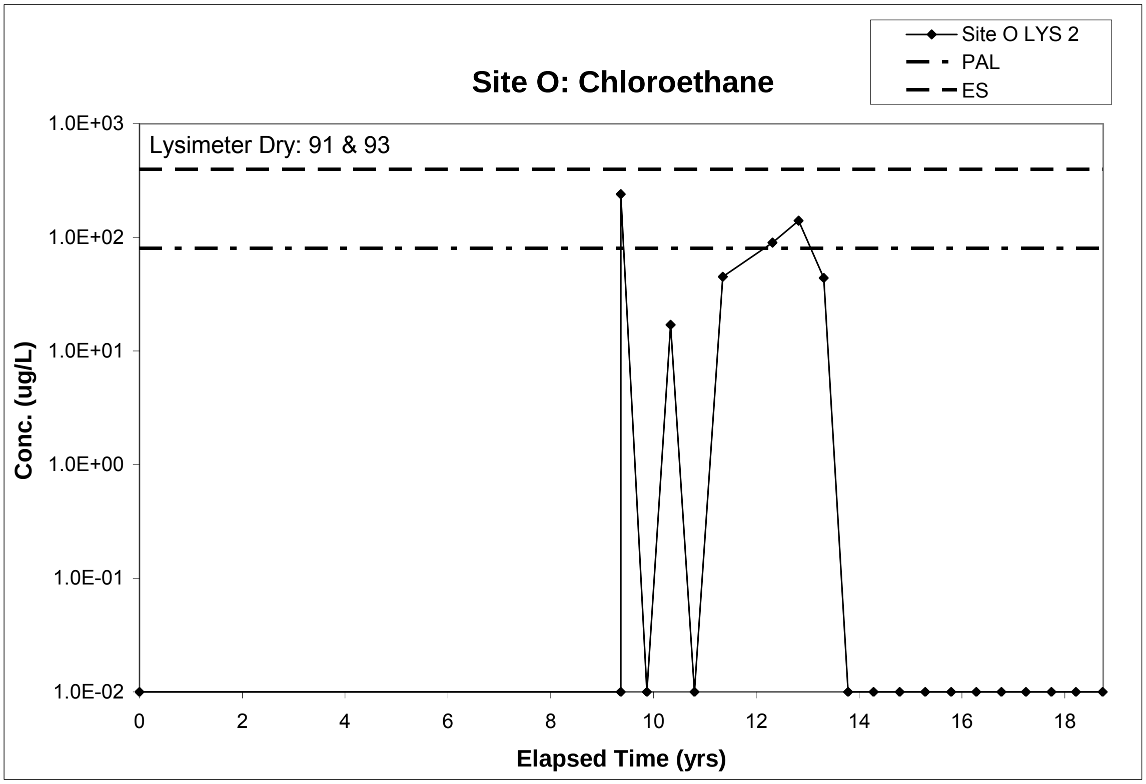

Site I: Chlorobenzene
Site I LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)


Site A: Chloroethane
Site A LYS 1
PAL
ES
Lysimeter Dry: 80-89
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

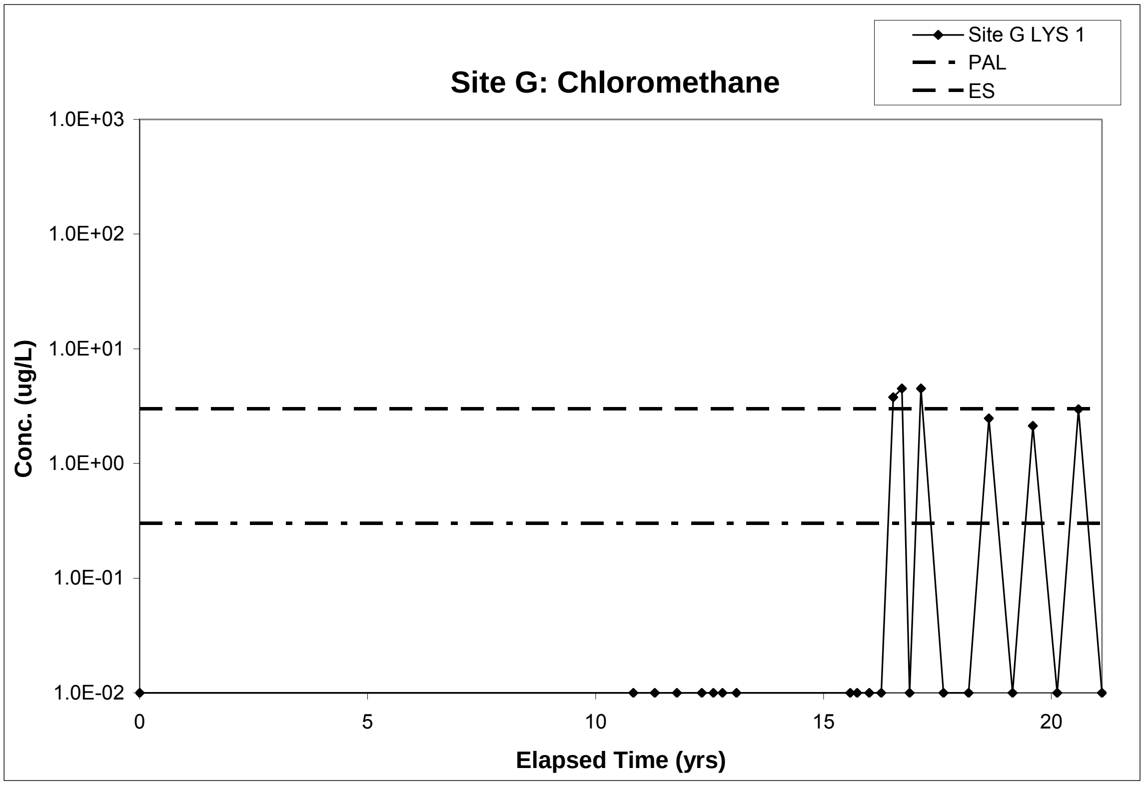

Site G: Chloroethane
Site G LYS 1
PAL
ES
Lysimeter Dry: 01-Present
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

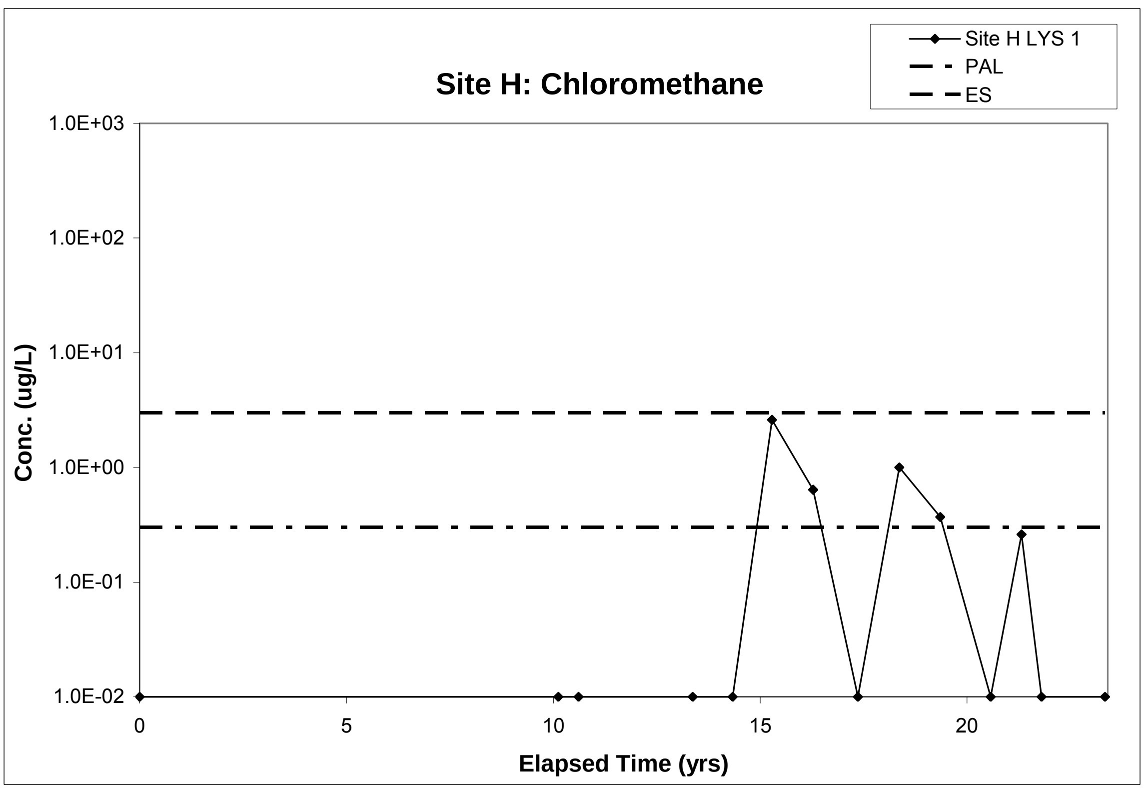

Site H: Chloroethane
Site H LYS 1
PAL
ES
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

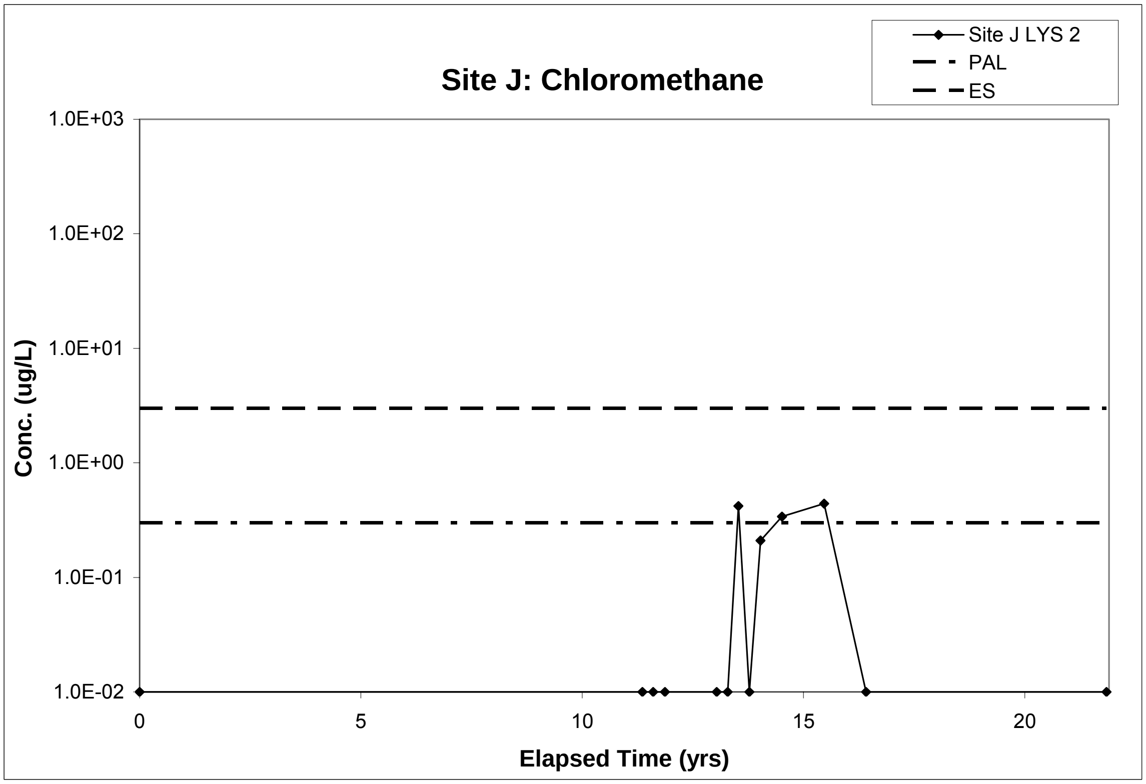

Site M: Chloroethane
Site M LYS 2
PAL
ES
Lysimeter Dry: 93-95
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
Elapsed Time (yrs)

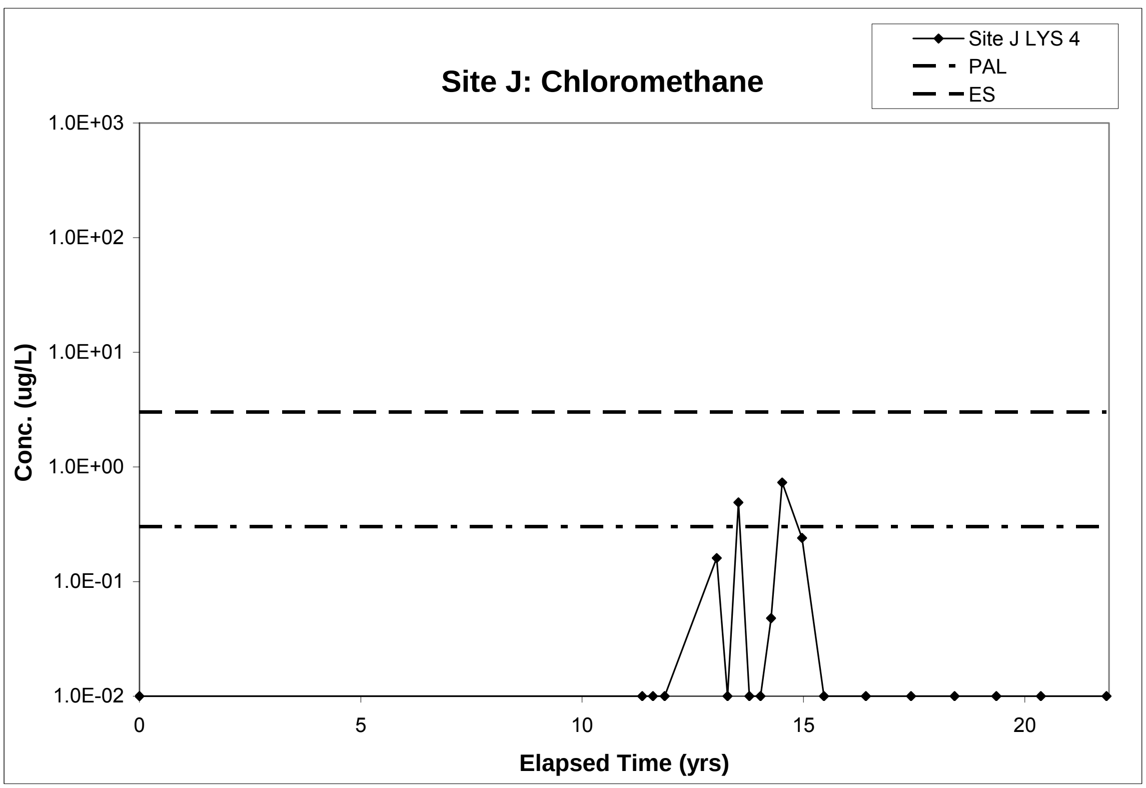

Site O: Chloroethane
Site O LYS 2
PAL
ES
Lysimeter Dry: 91 & 93
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

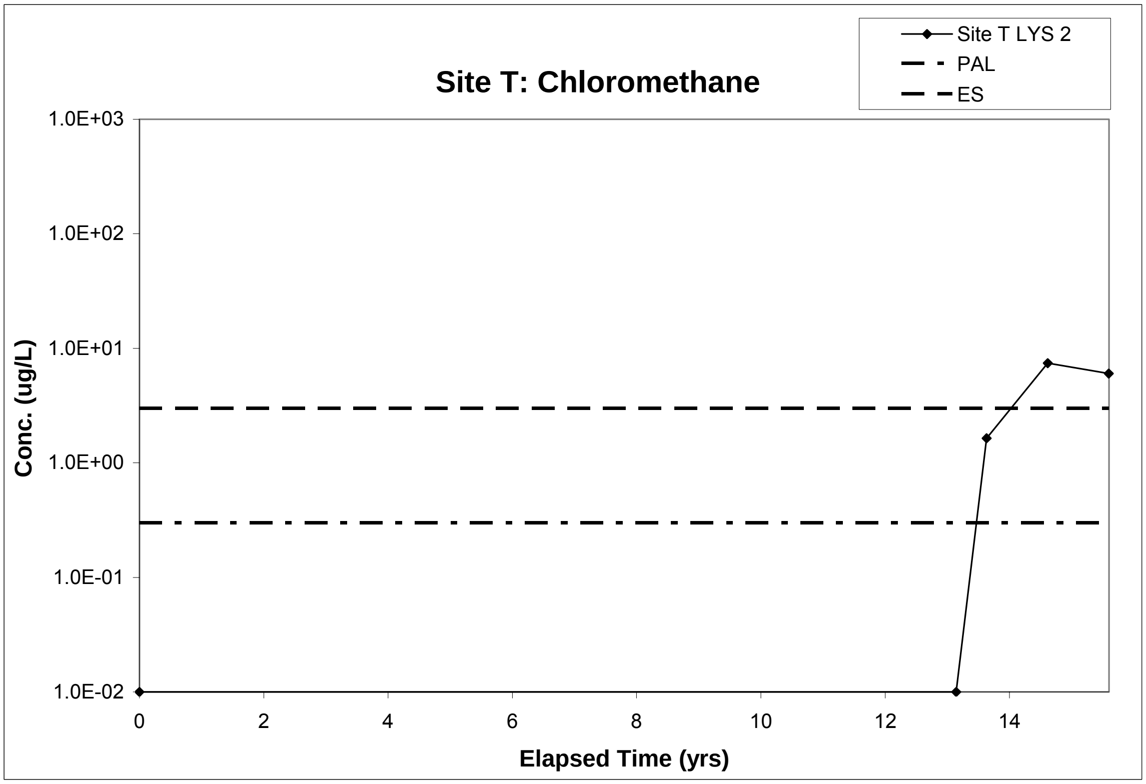

Site H: Chloroform
Site H LYS 1
PAL
ES
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

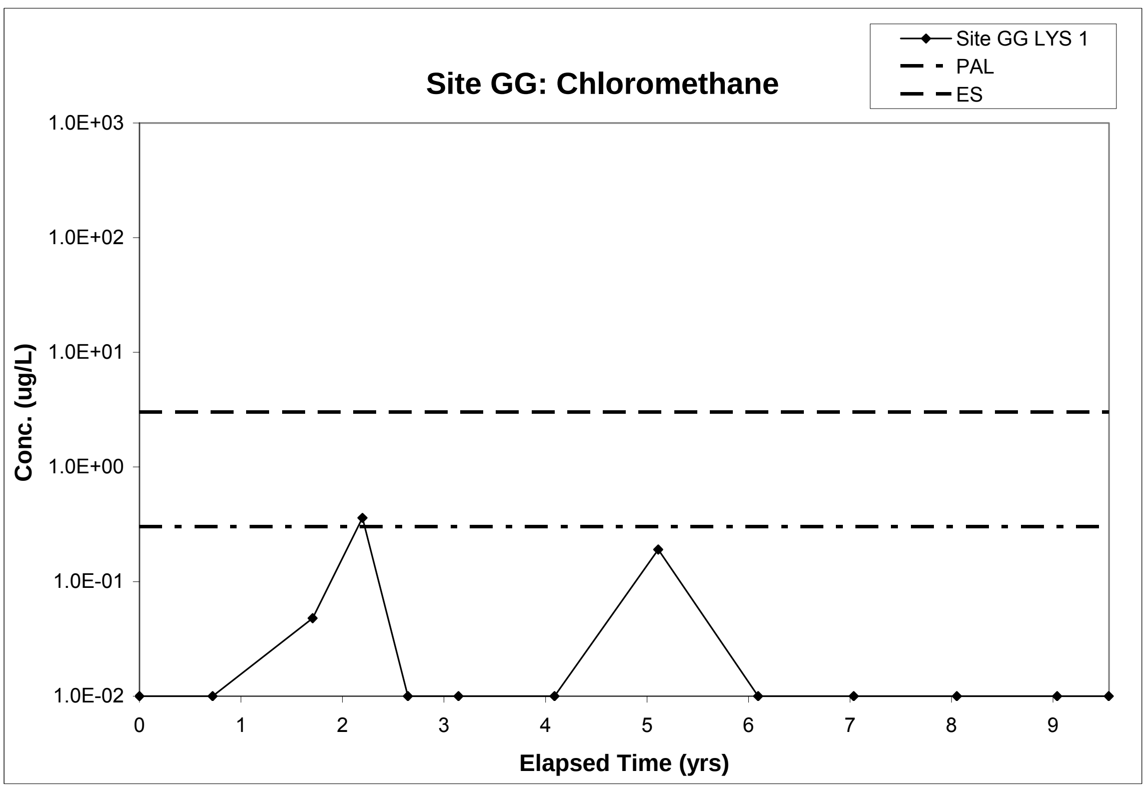

Site G: Chloromethane
Site G LYS 1
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

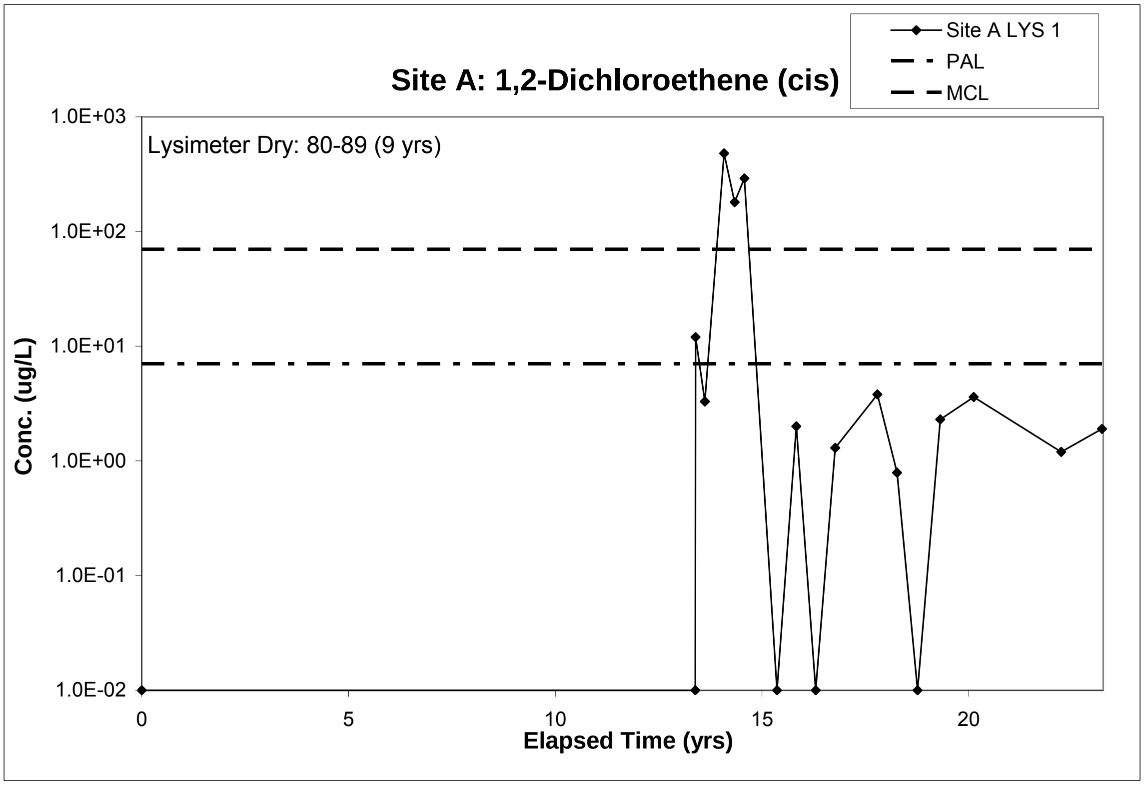

Site H: Chloromethane
Site H LYS 1
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

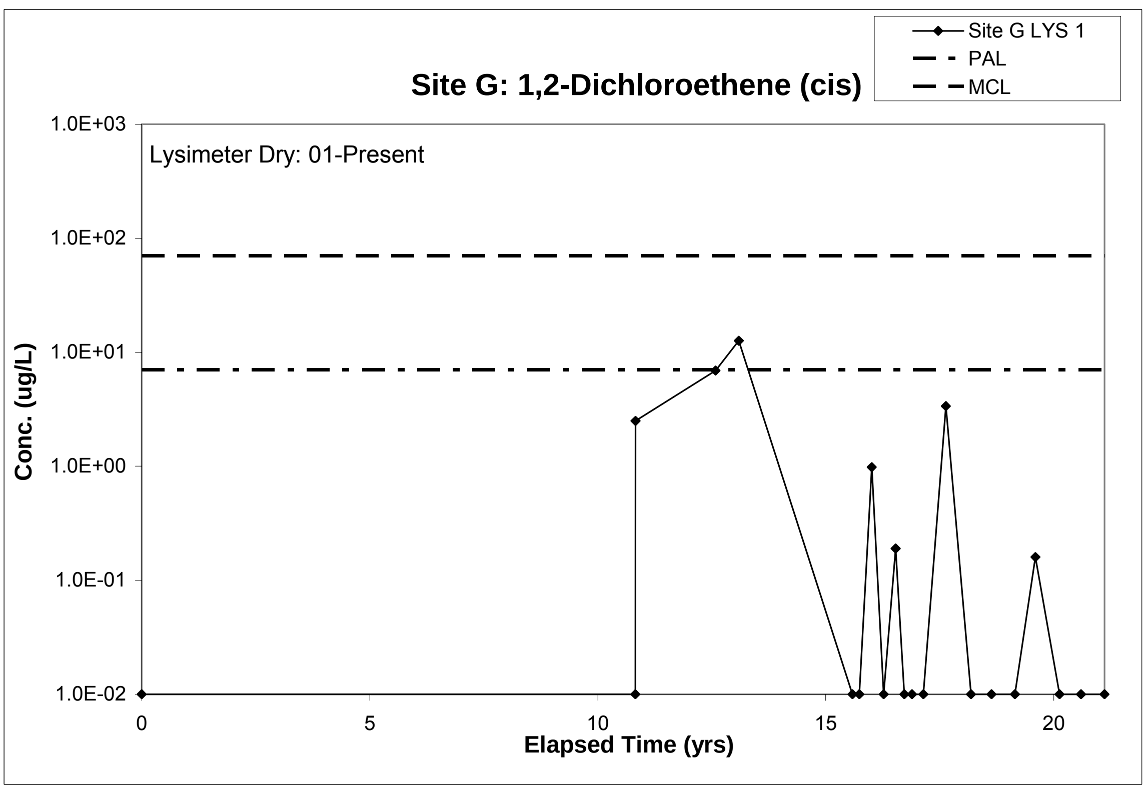

Site J: Chloromethane
Site J LYS 2
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

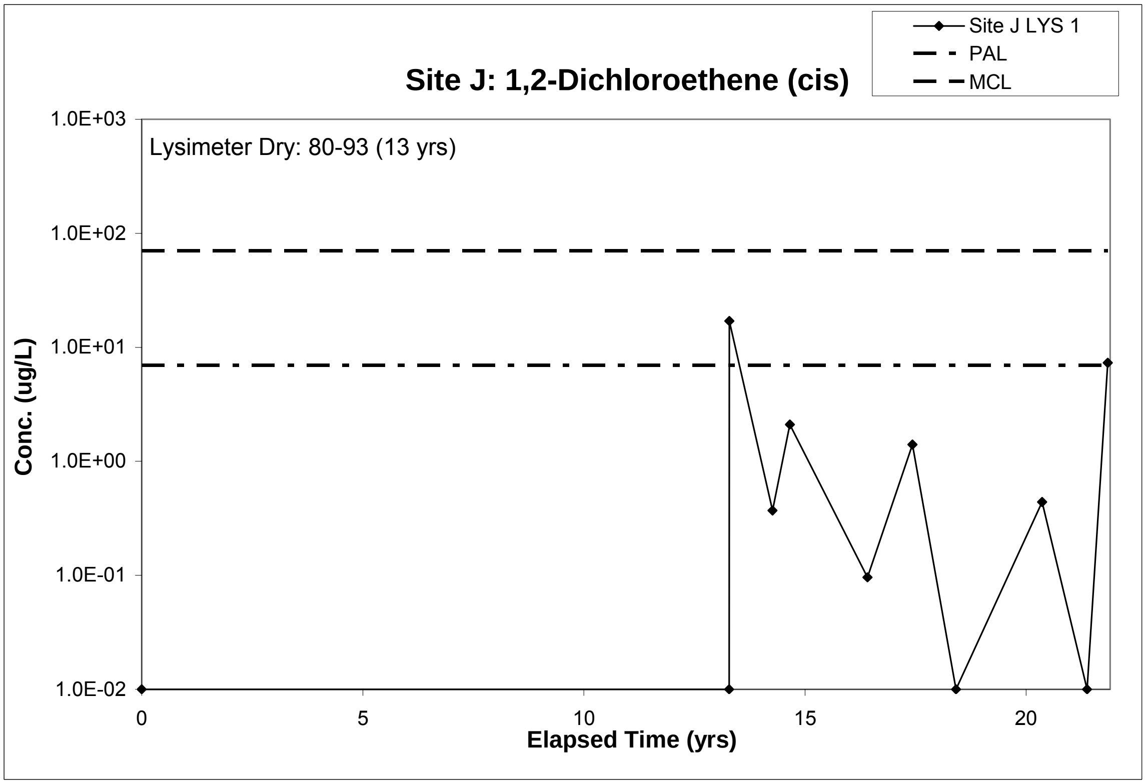

Site J: Chloromethane
Site J LYS 4
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

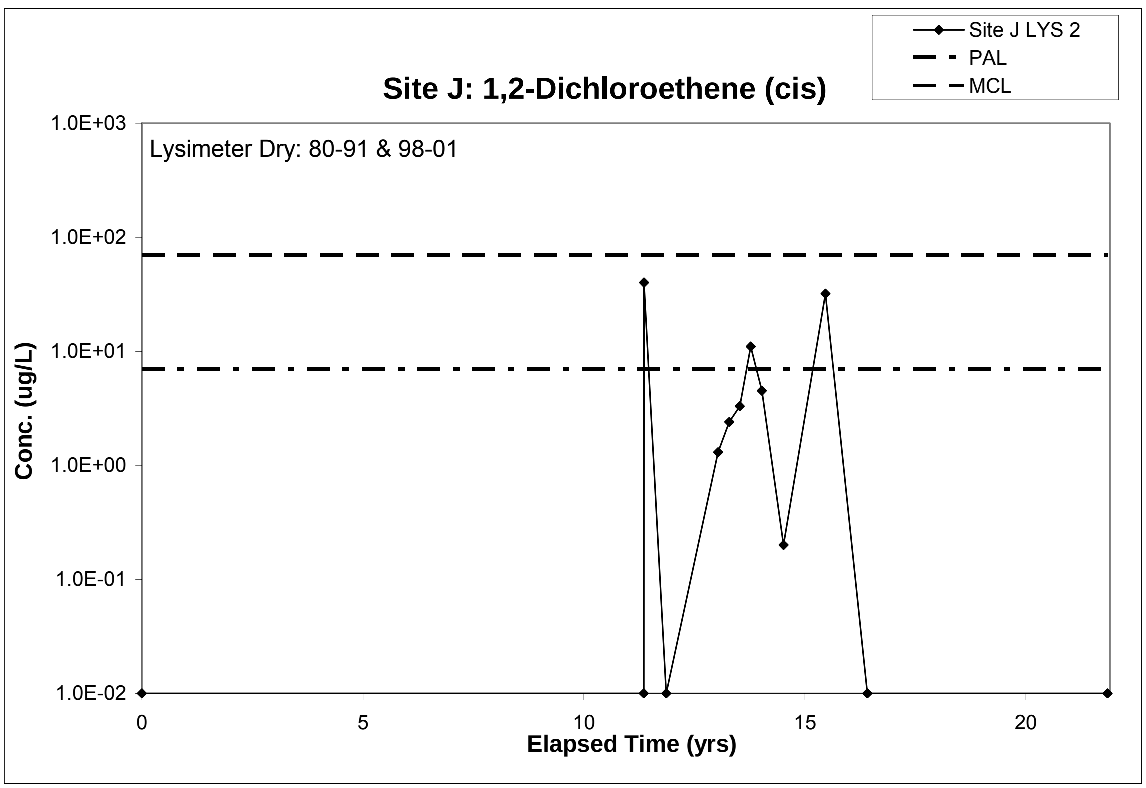

Site T: Chloromethane
Site T LYS 2
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

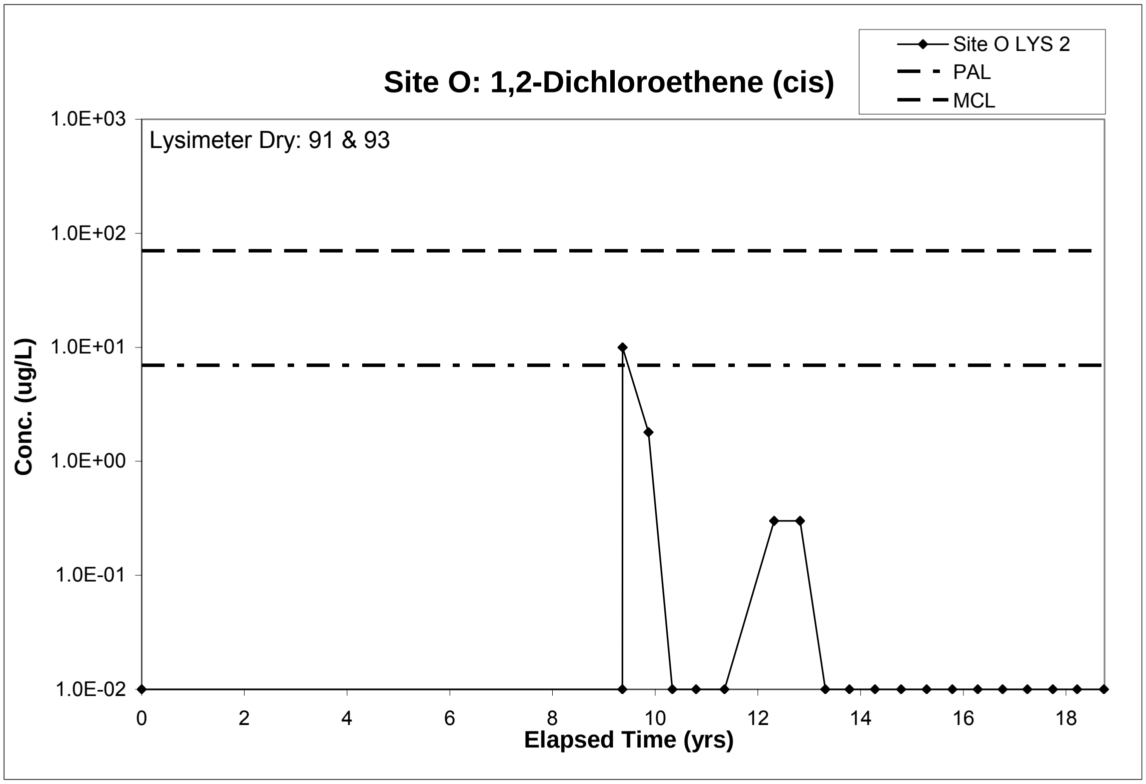

Site GG: Chloromethane
Site GG LYS 1
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
9
Elapsed Time (yrs)

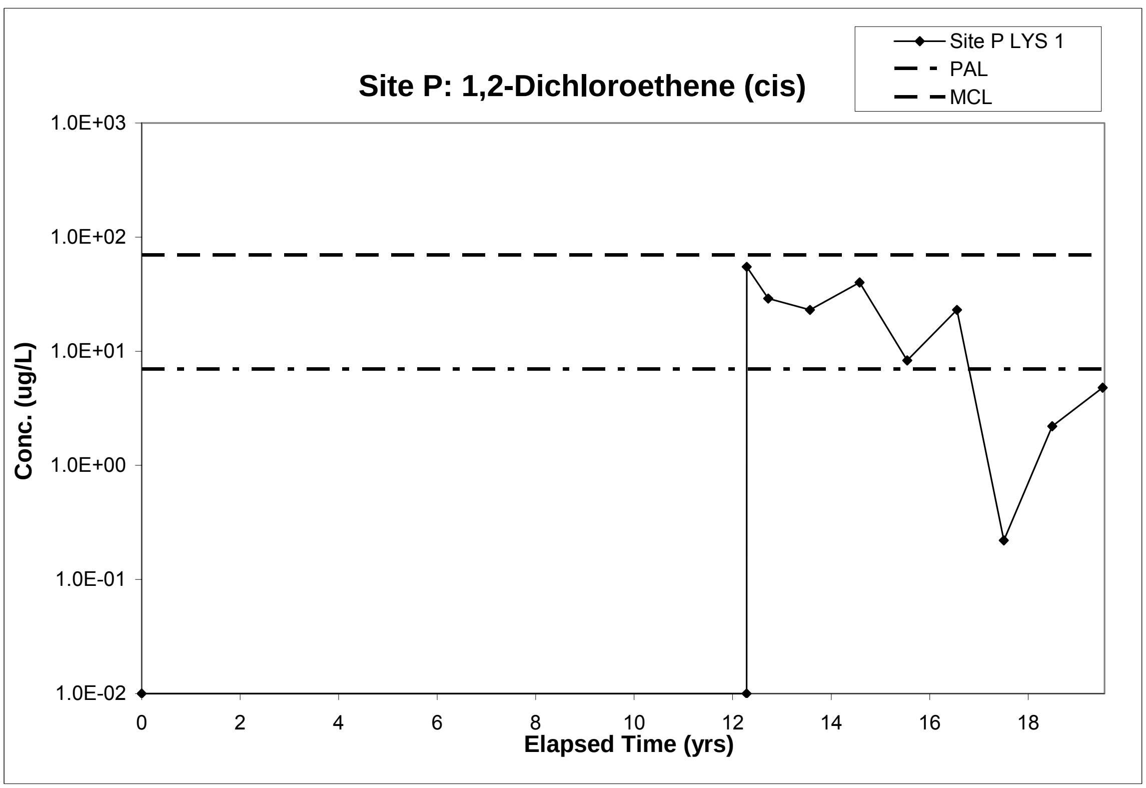

Site A: 1,2-Dichloroethene (cis)
Site A LYS 1
PAL
MCL
Lysimeter Dry: 80-89 (9 yrs)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

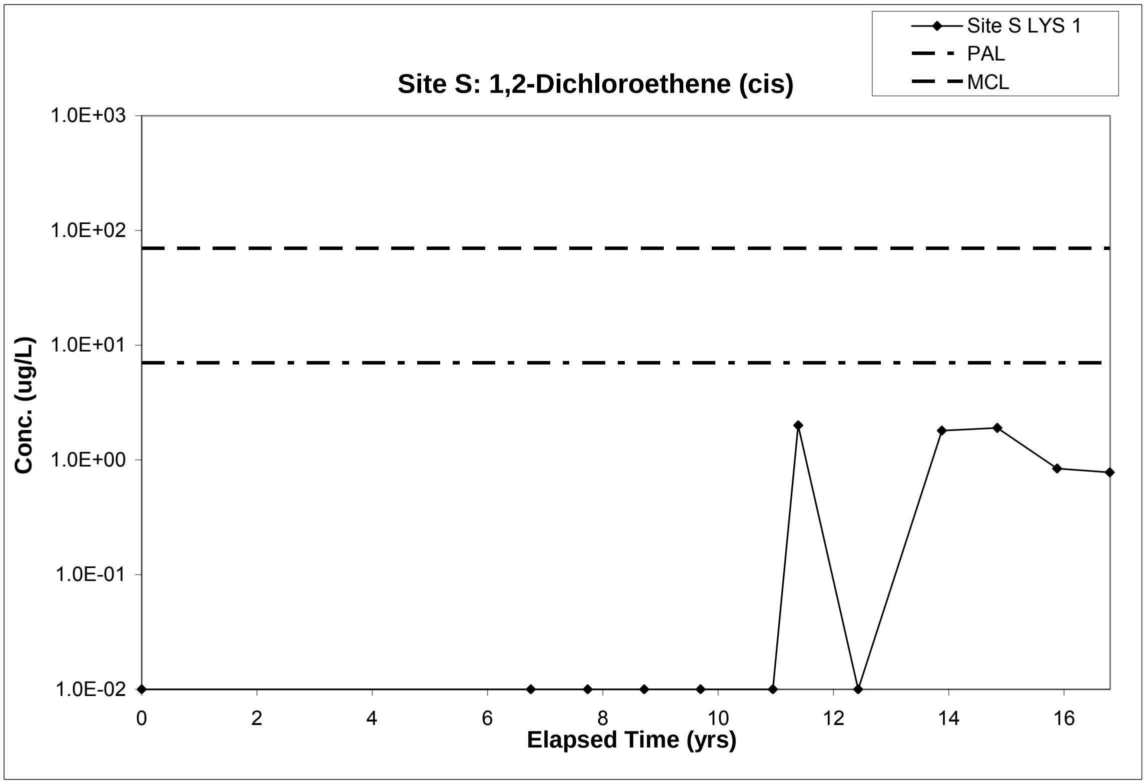

Site G: 1,2-Dichloroethene (cis)
Site G LYS 1
PAL
MCL
Lysimeter Dry: 01-Present
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

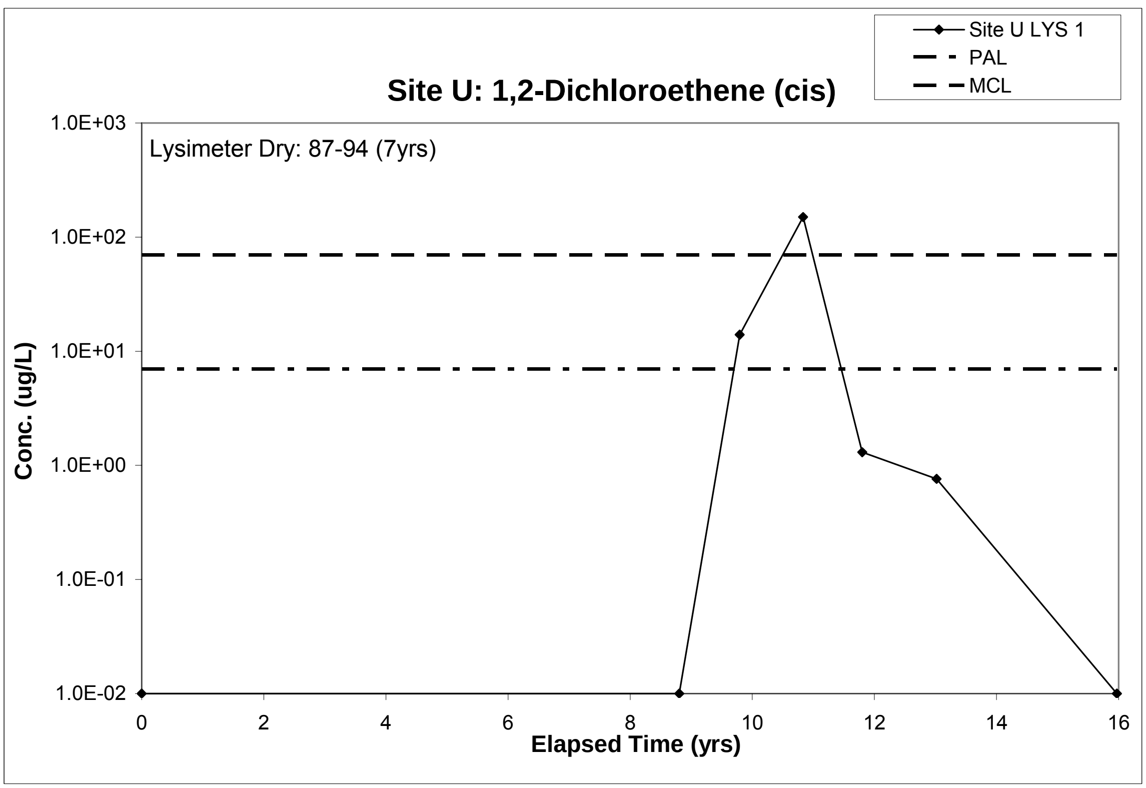

Site J LYS 1
PAL
MCL
Site J: 1,2-Dichloroethene (cis)
Lysimeter Dry: 80-93 (13 yrs)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

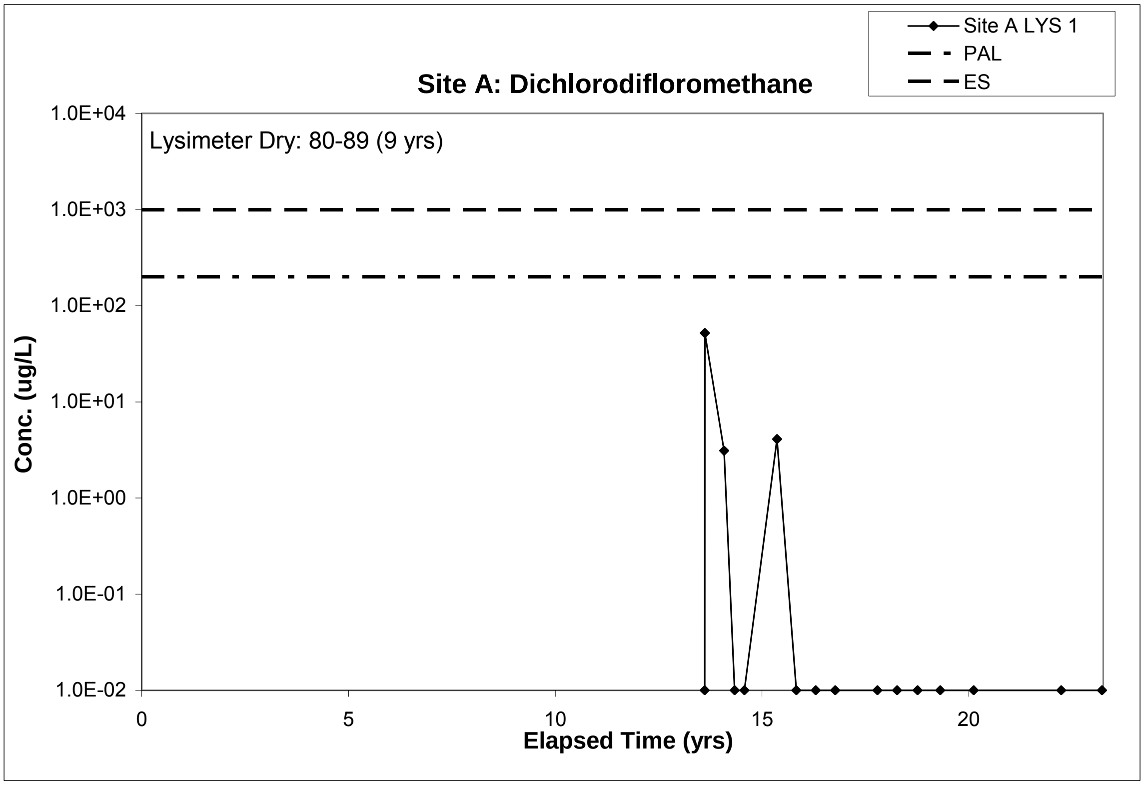

Site J LYS 2
PAL
MCL
Site J: 1,2-Dichloroethene (cis)
Lysimeter Dry: 80-91 & 98-01
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

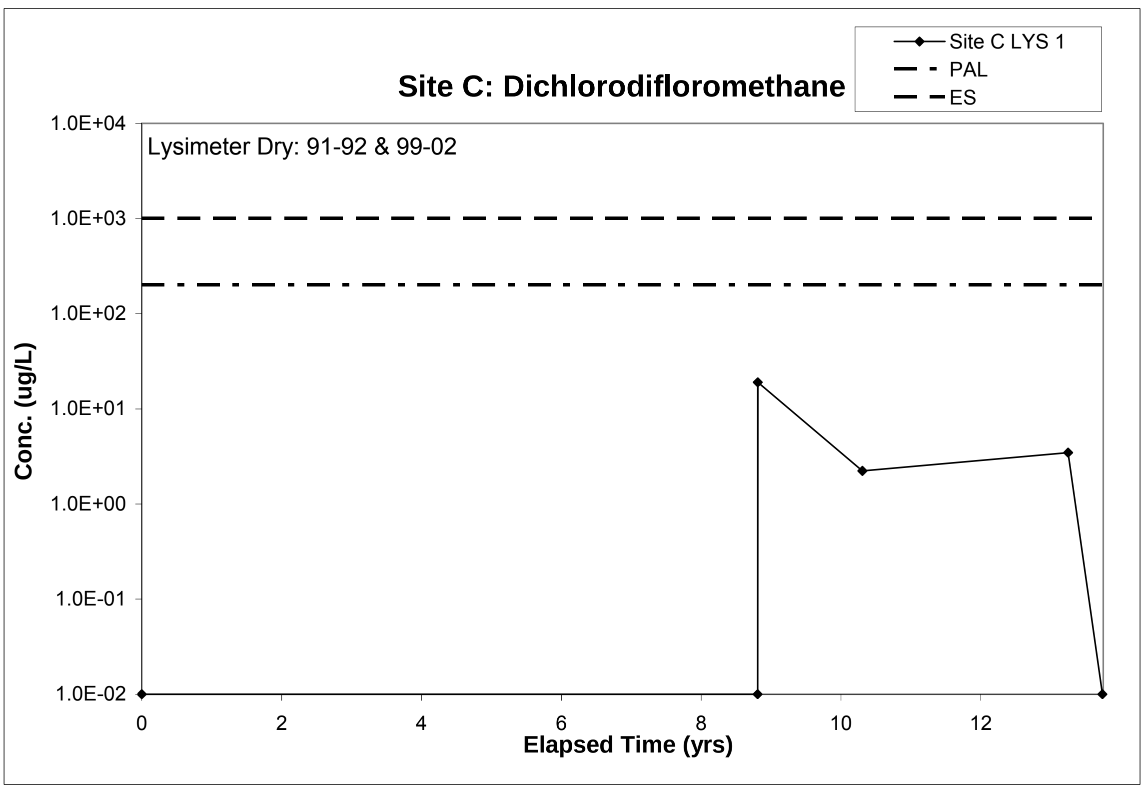

Site O: 1,2-Dichloroethene (cis)
Site O LYS 2
PAL
MCL
Lysimeter Dry: 91 & 93
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0 2 4 6 8 10 12 14 16 18
Elapsed Time (yrs)

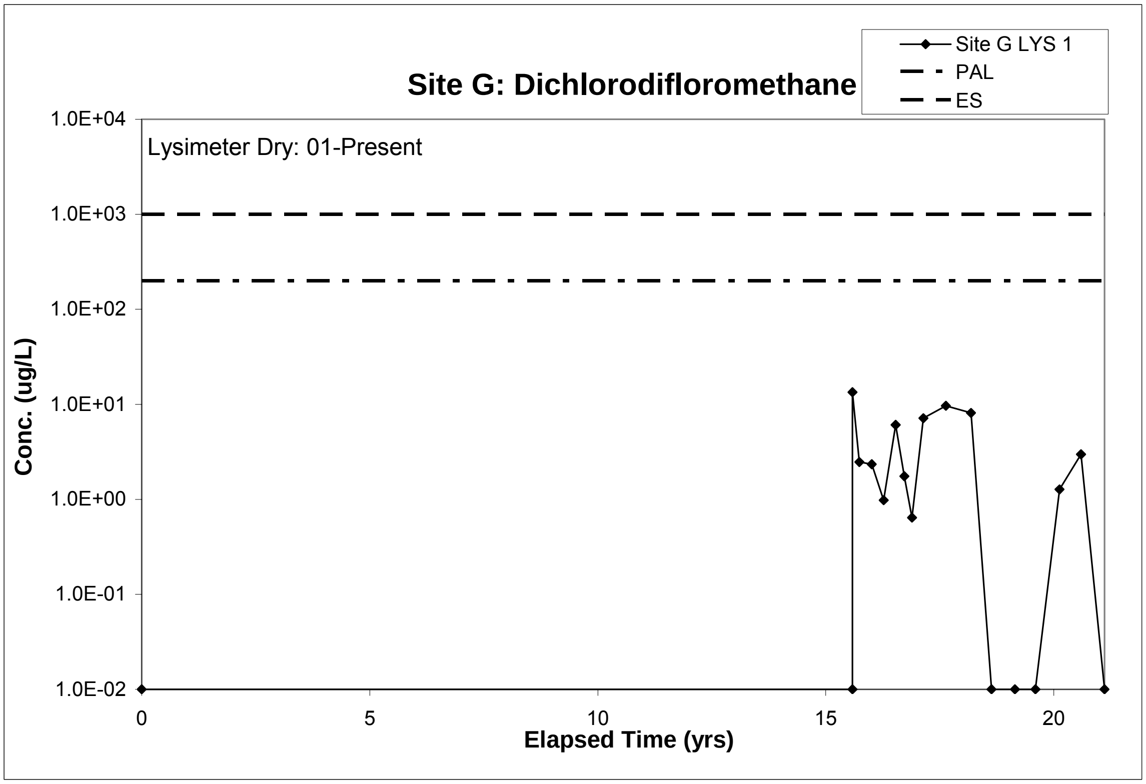

Site P: 1,2-Dichloroethene (cis)
Site P LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0 2 4 6 8 10 12 14 16 18
Elapsed Time (yrs)

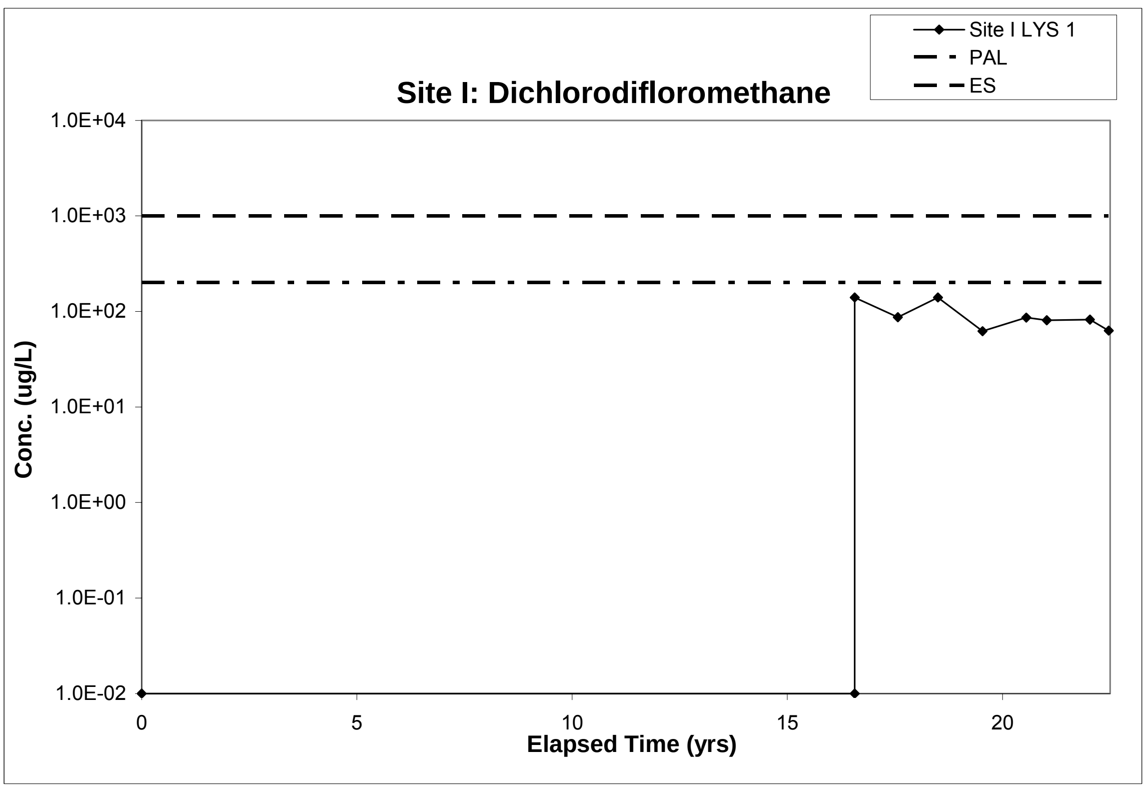

Site S: 1,2-Dichloroethene (cis)
Site S LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

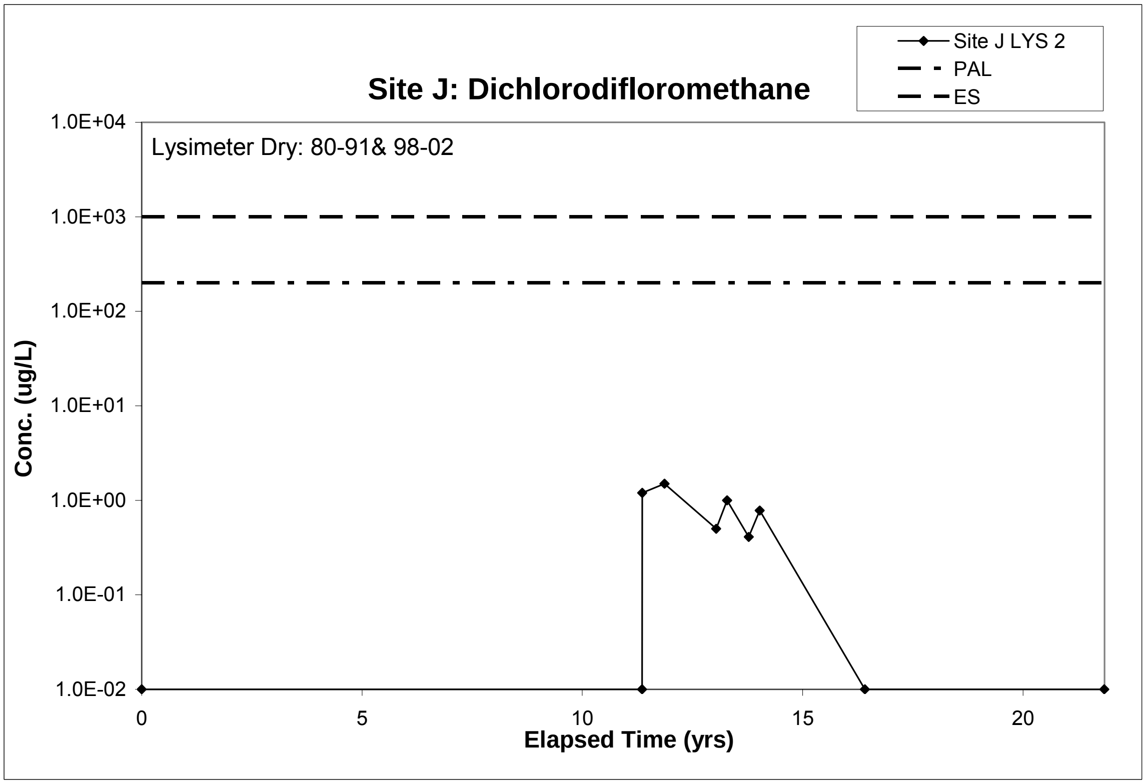

Site U: 1,2-Dichloroethene (cis)
Site U LYS 1
PAL
MCL
Lysimeter Dry: 87-94 (7yrs)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

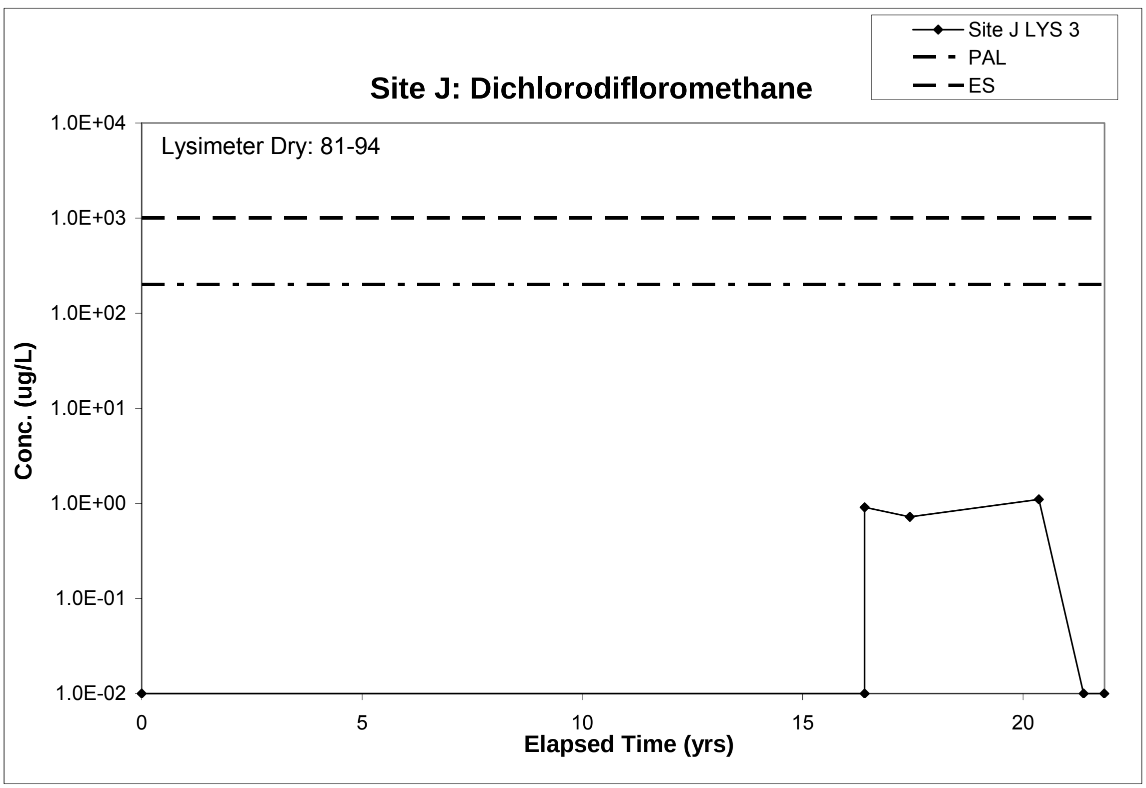

Site A LYS 1
PAL
ES
Site A: Dichlorodifloromethane
Lysimeter Dry: 80-89 (9 yrs)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

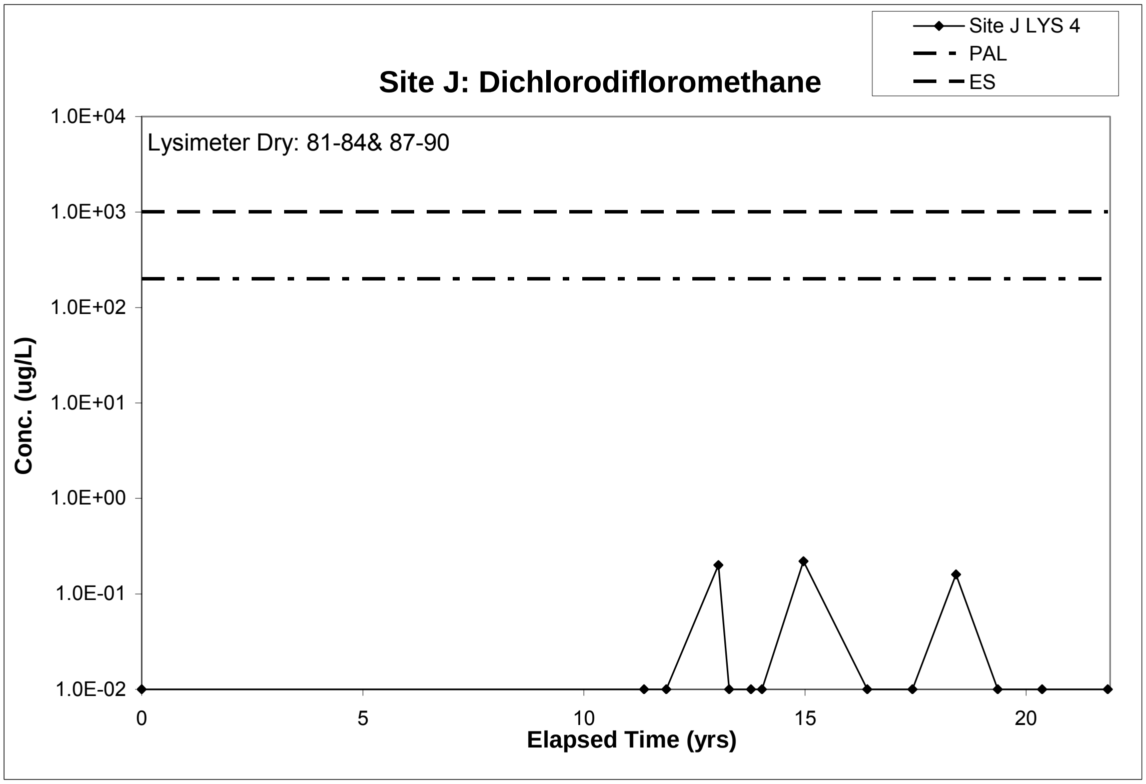

Site C LYS 1
PAL
ES
Site C: Dichlorodifloromethane
Lysimeter Dry: 91-92 & 99-02
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

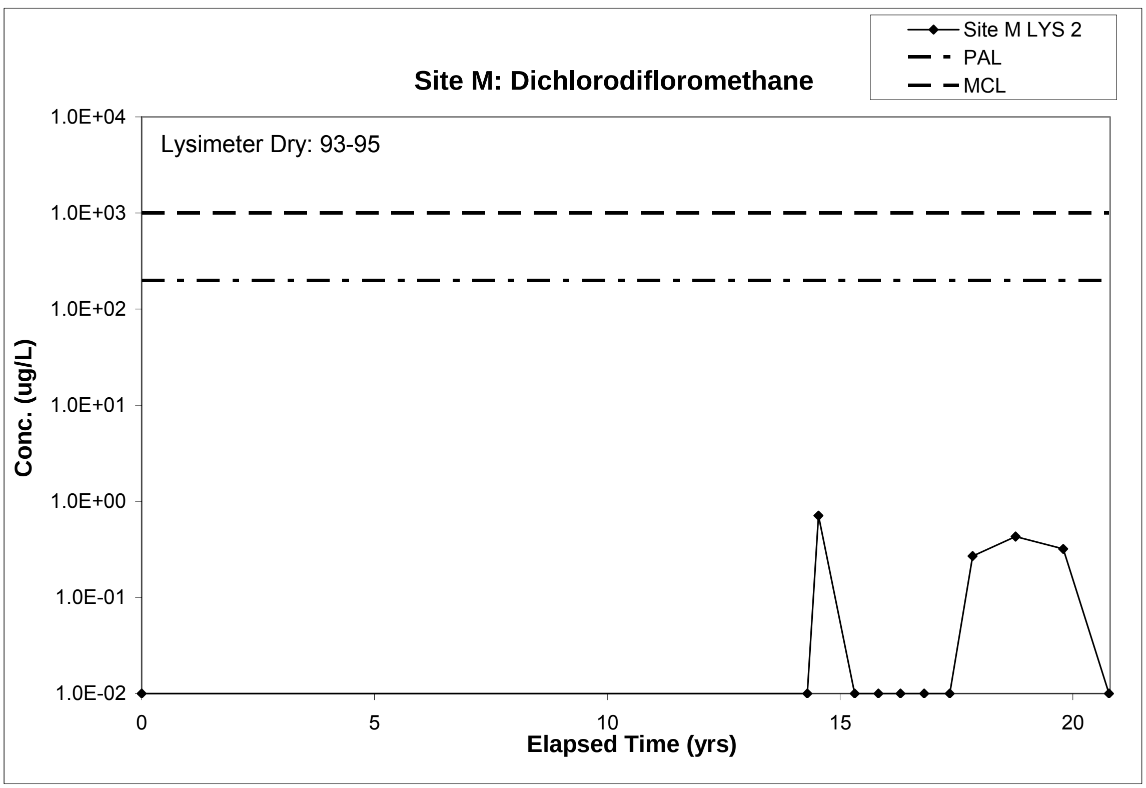

Site G: Dichlorodifloromethane
Site G LYS 1
PAL
ES
Lysimeter Dry: 01-Present
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

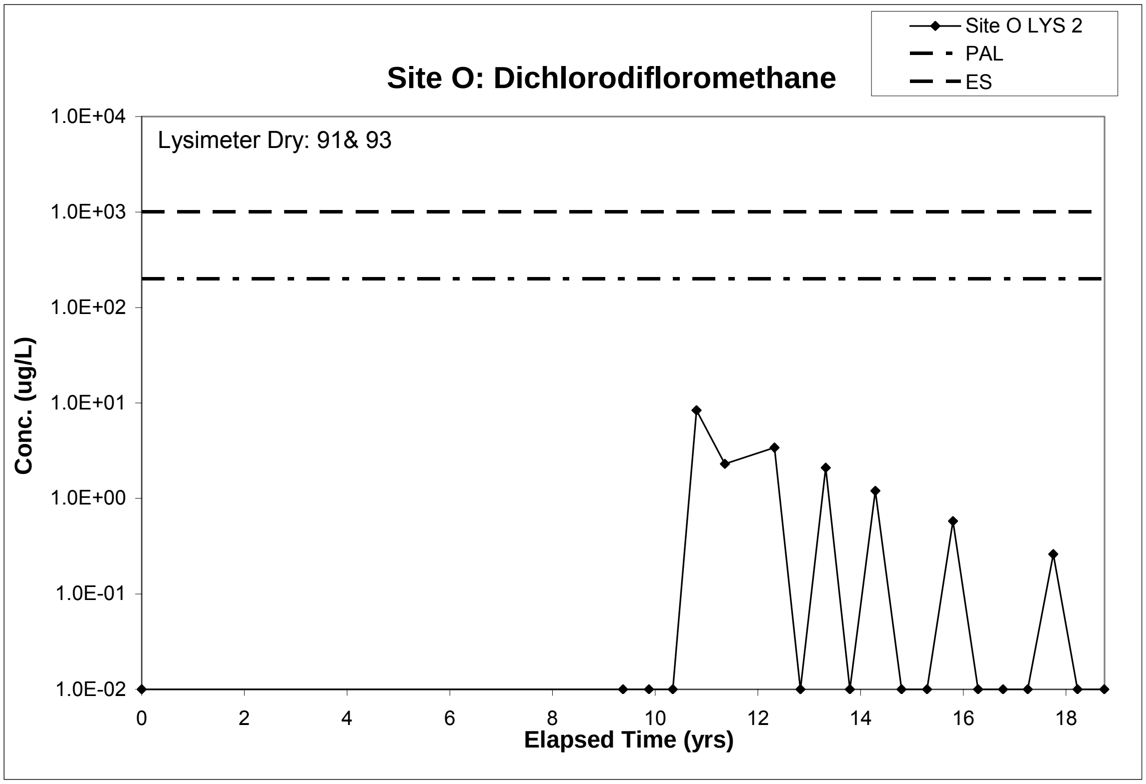

Site I: Dichlorodifloromethane
Site I LYS 1
PAL
ES
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

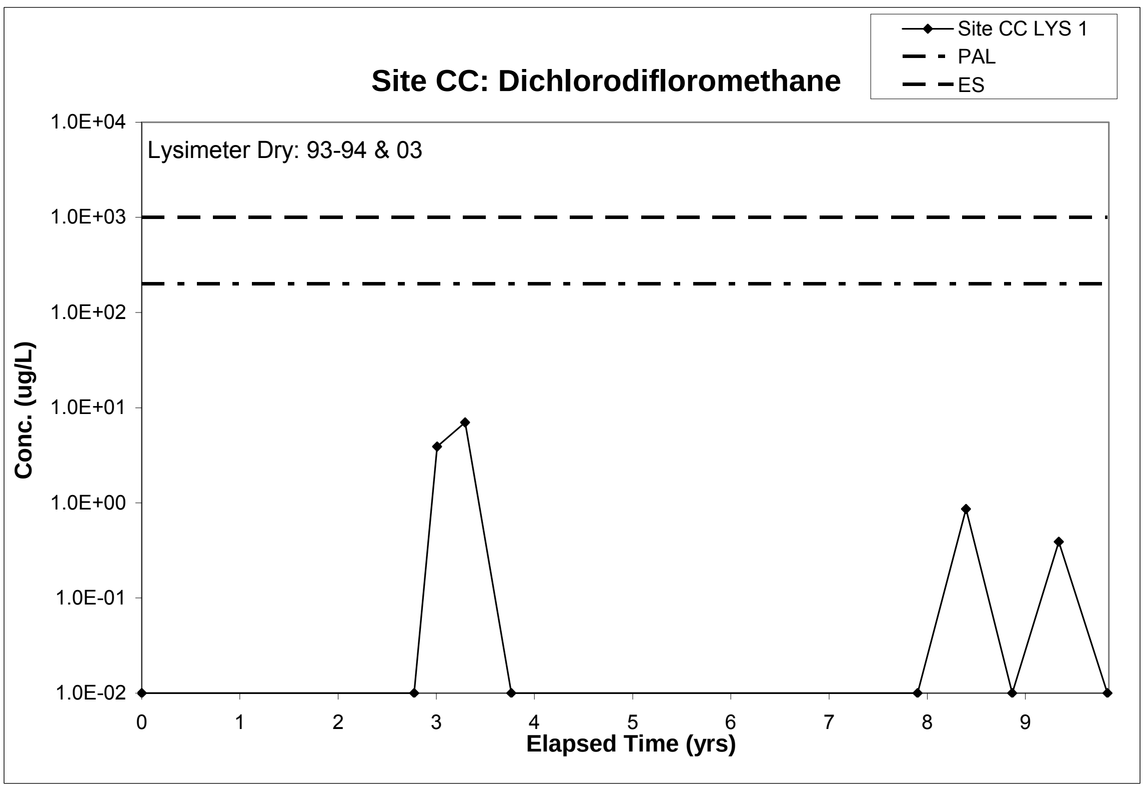

Site J: Dichlorodifloromethane
Site J LYS 2
PAL
ES
Lysimeter Dry: 80-91& 98-02
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

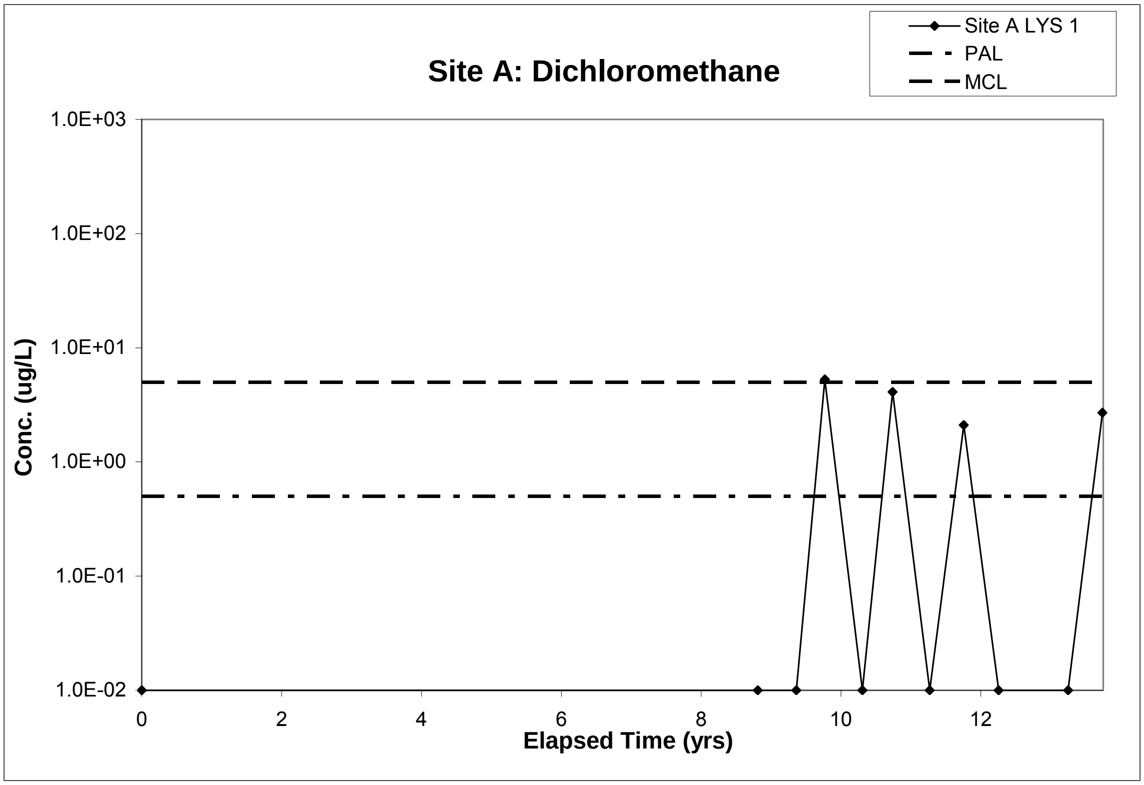

Site J: Dichlorodifloromethane
Site J LYS 3
PAL
ES
Lysimeter Dry: 81-94
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

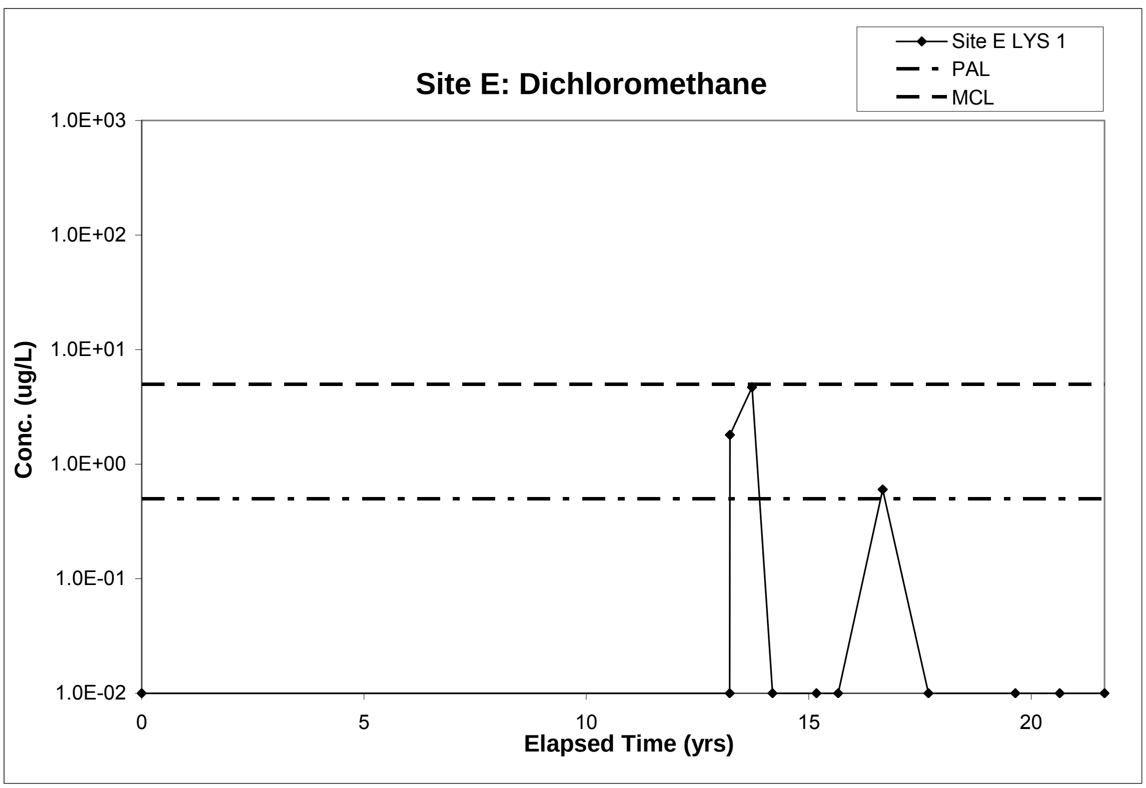

Site J: Dichlorodifloromethane
Site J LYS 4
PAL
ES
Lysimeter Dry: 81-84& 87-90
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

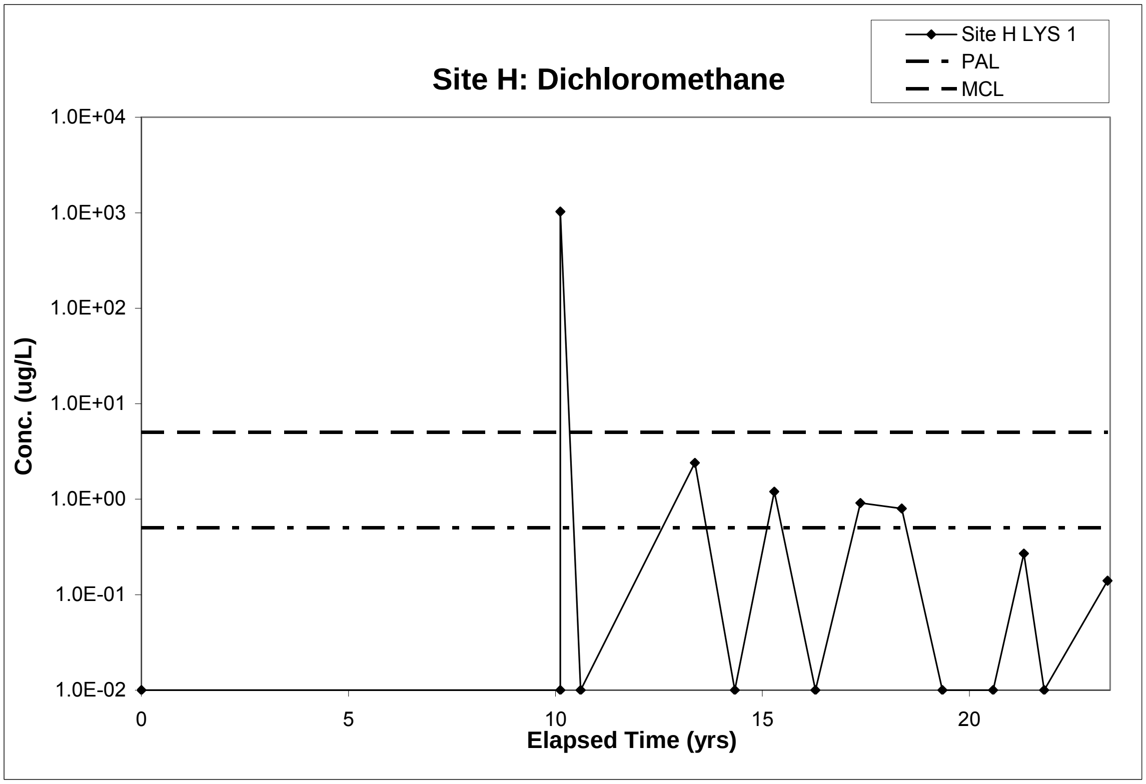

Site M: Dichlorodifloromethane
Site M LYS 2
PAL
MCL
Lysimeter Dry: 93-95
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

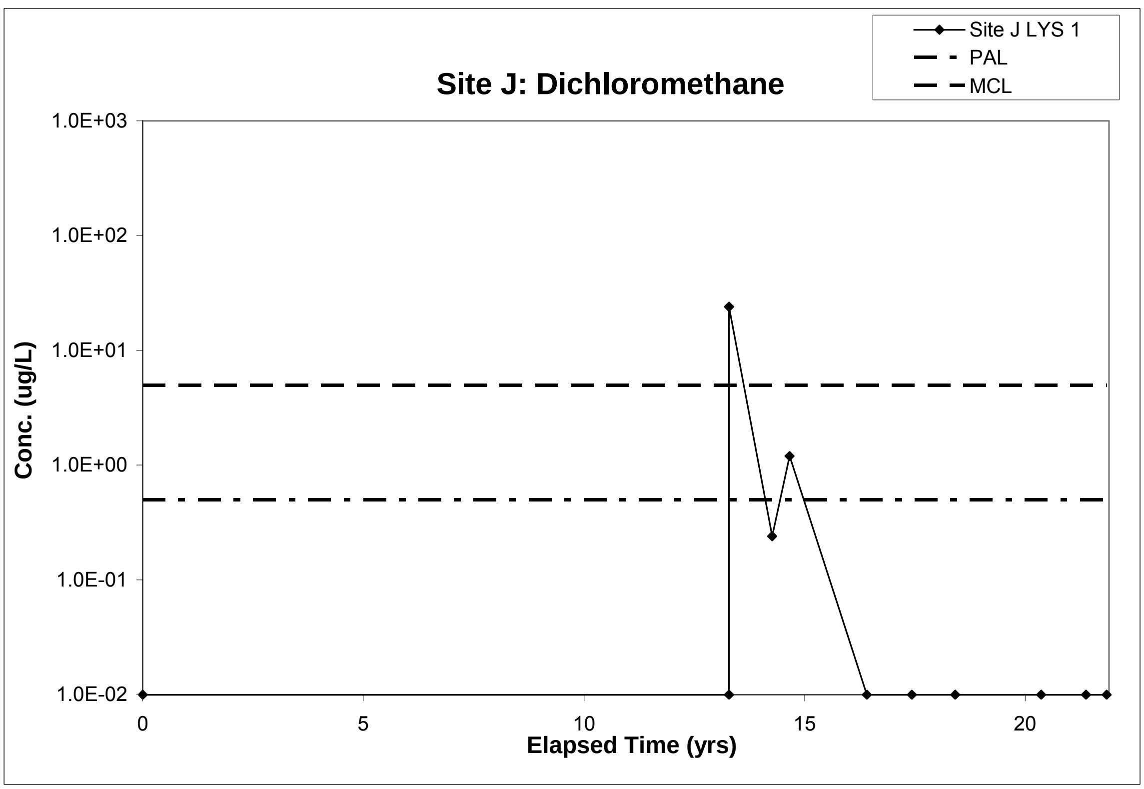

Site O: Dichlorodifloromethane
Site O LYS 2
PAL
ES
Lysimeter Dry: 91& 93
Conc. (ug/L)
Elapsed Time (yrs)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18

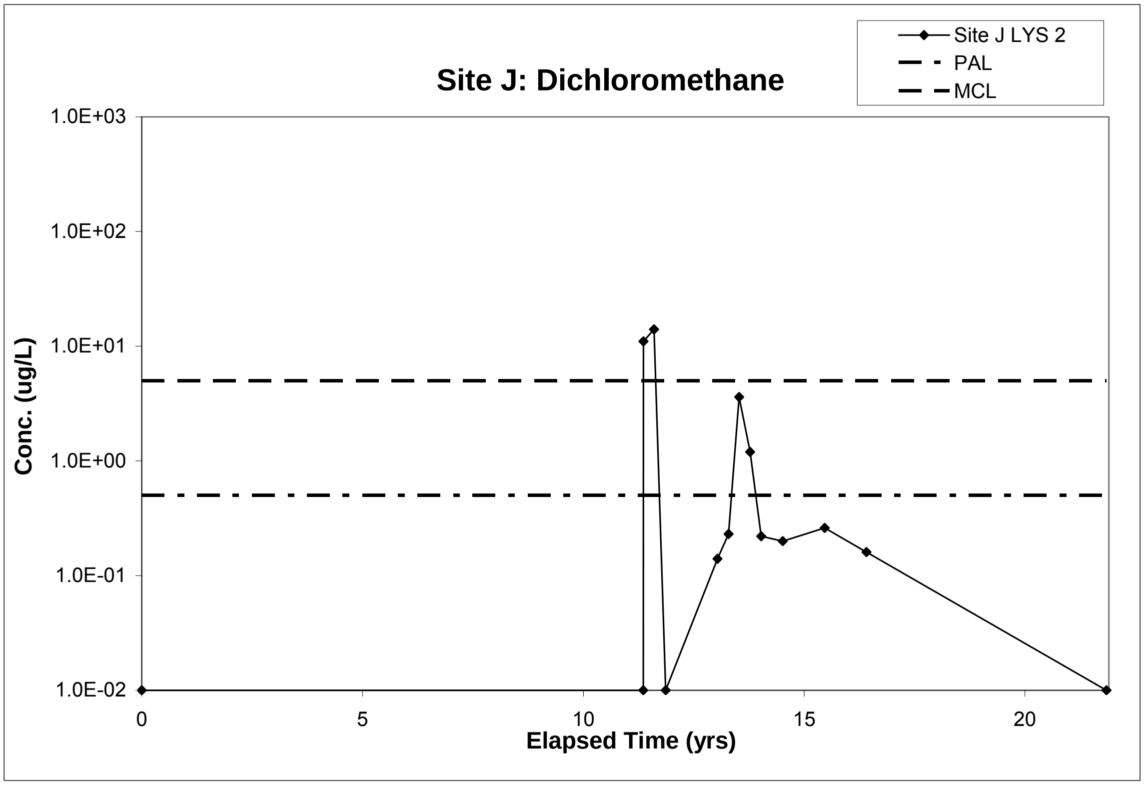

Site CC: Dichlorodifloromethane
Site CC LYS 1
PAL
ES
Lysimeter Dry: 93-94 & 03
Conc. (ug/L)
Elapsed Time (yrs)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
9


Site A: Dichloromethane
Site A LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

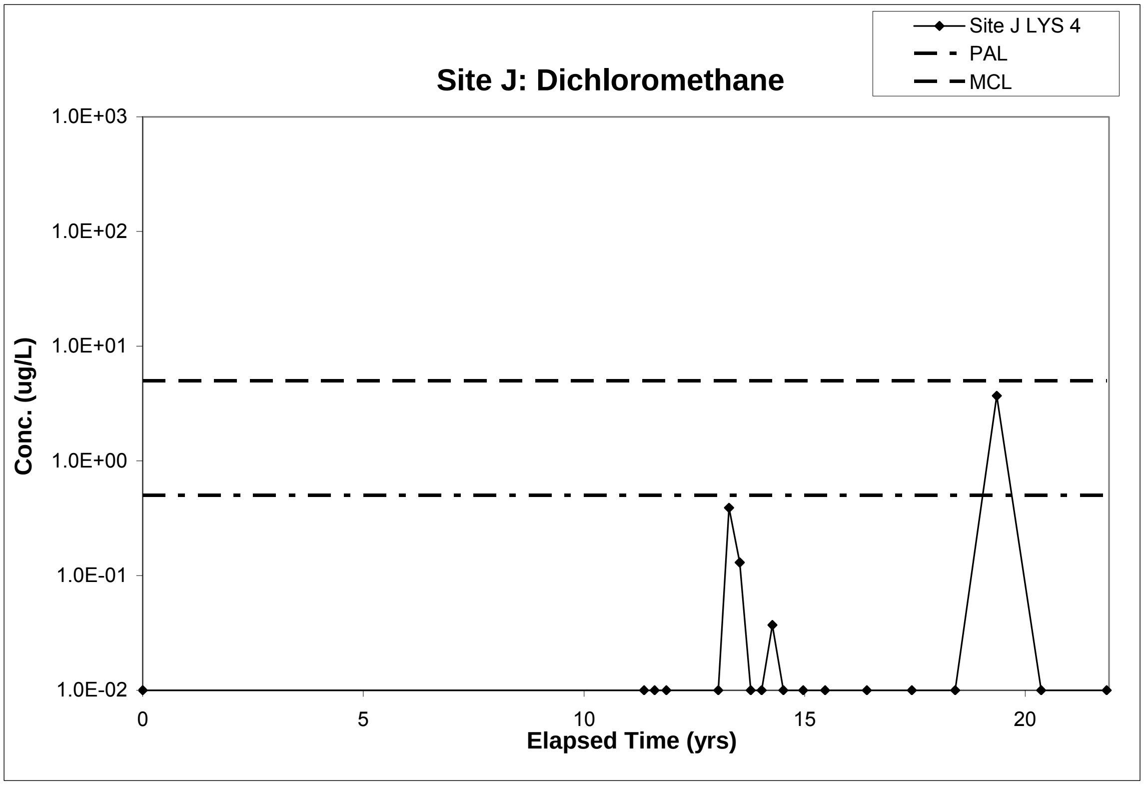

Site E: Dichloromethane
Site E LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

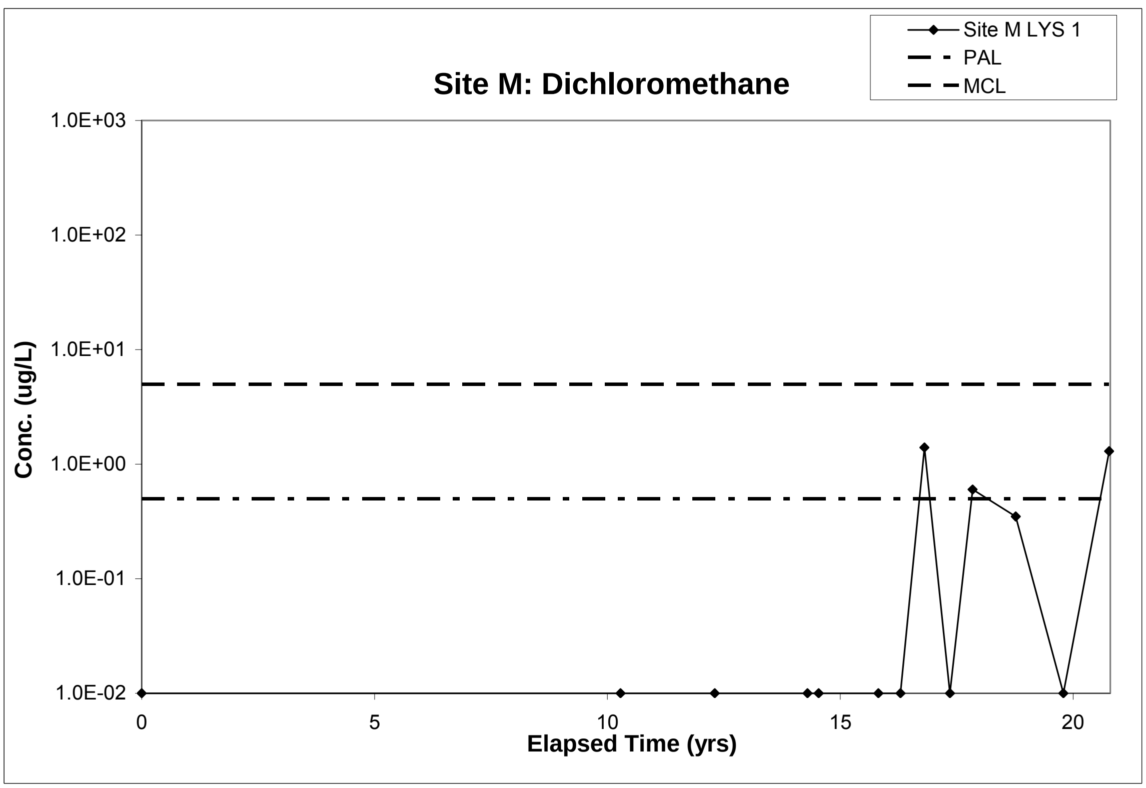

Site H: Dichloromethane
Site H LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

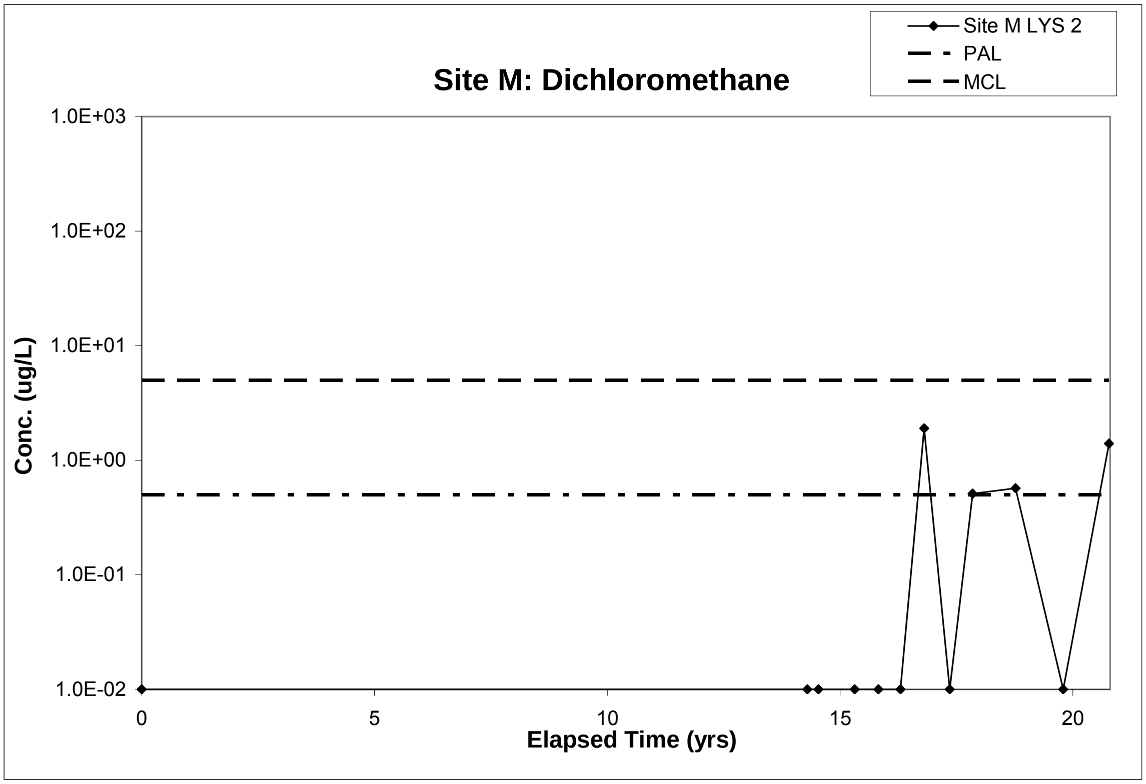

Site J: Dichloromethane
Site J LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

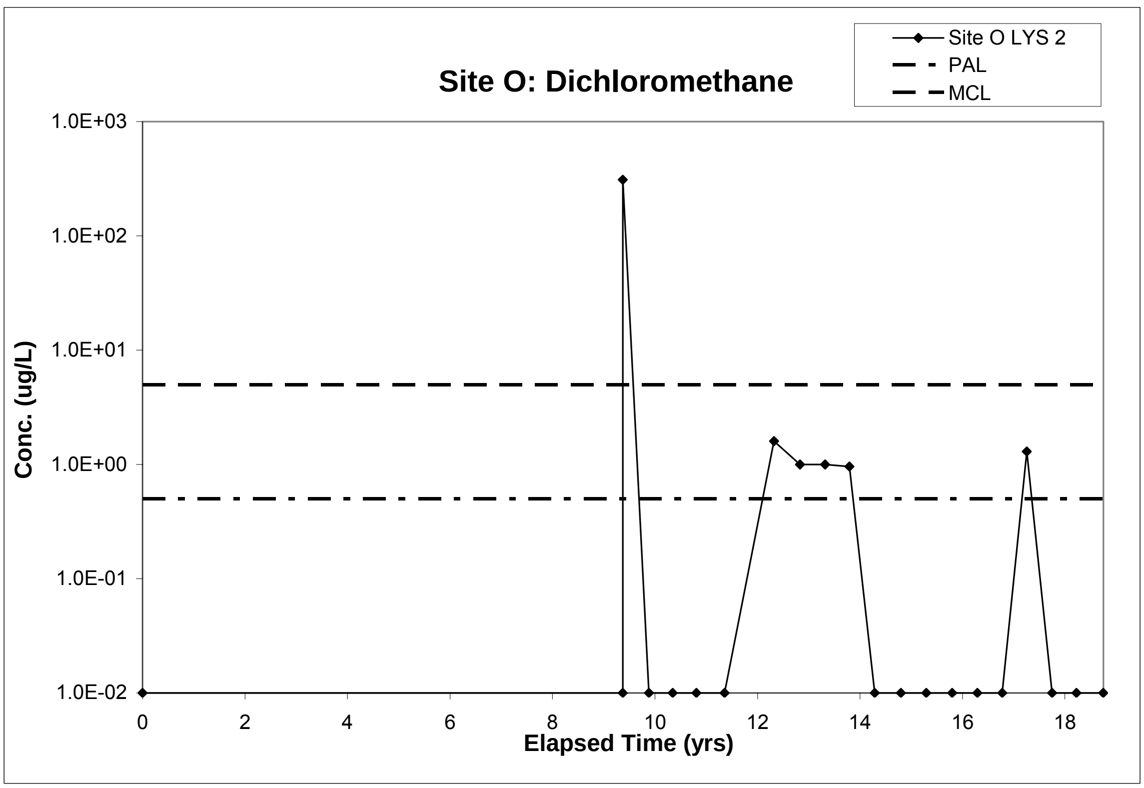

Site J: Dichloromethane
Site J LYS 2
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

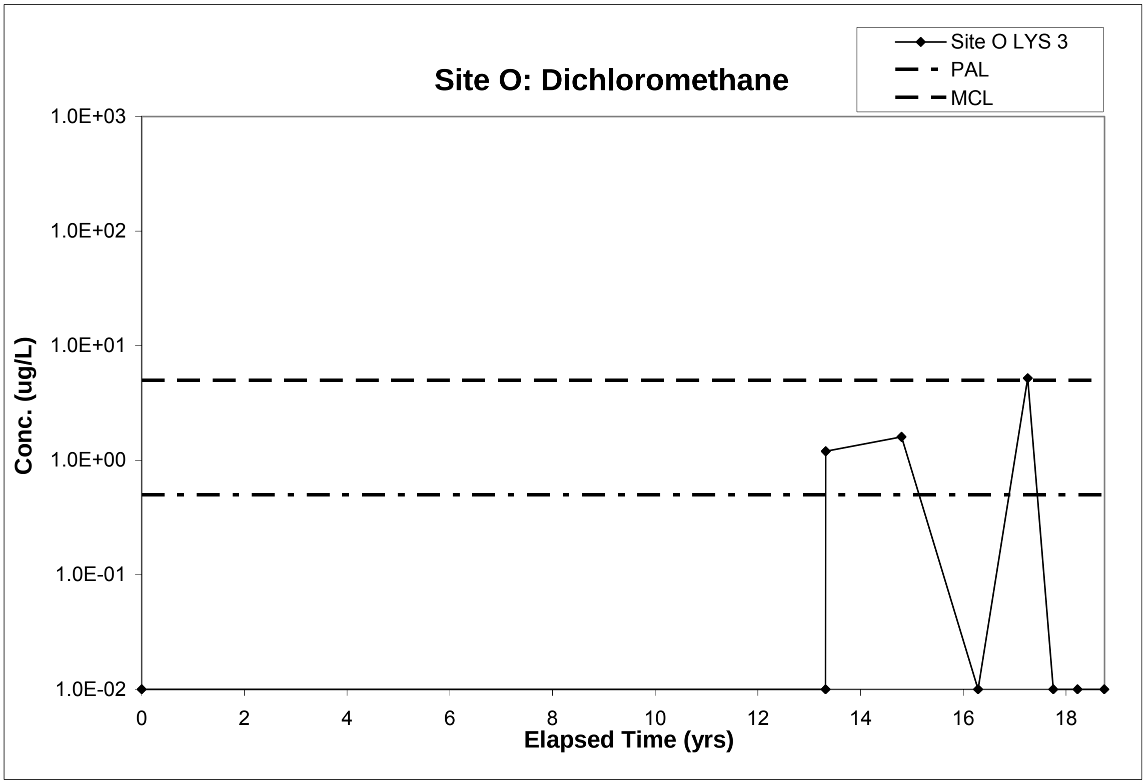

Site J: Dichloromethane
Site J LYS 3
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

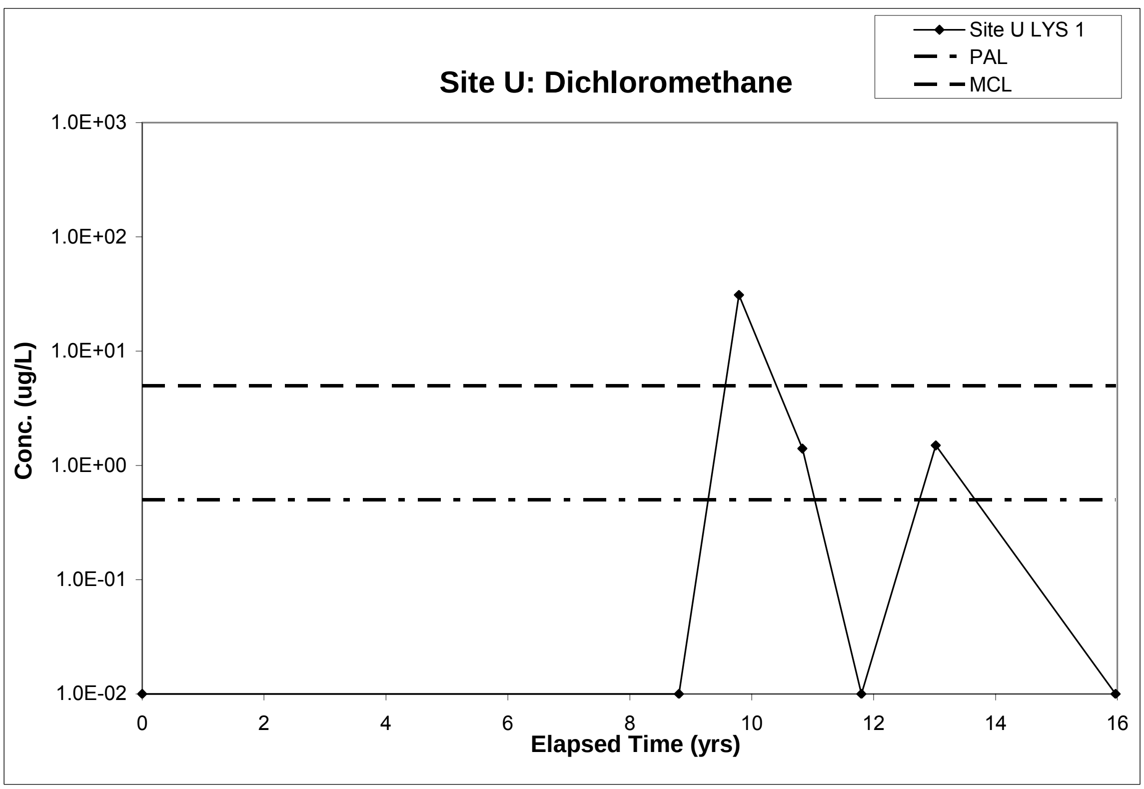

Site J: Dichloromethane
Site J LYS 4
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

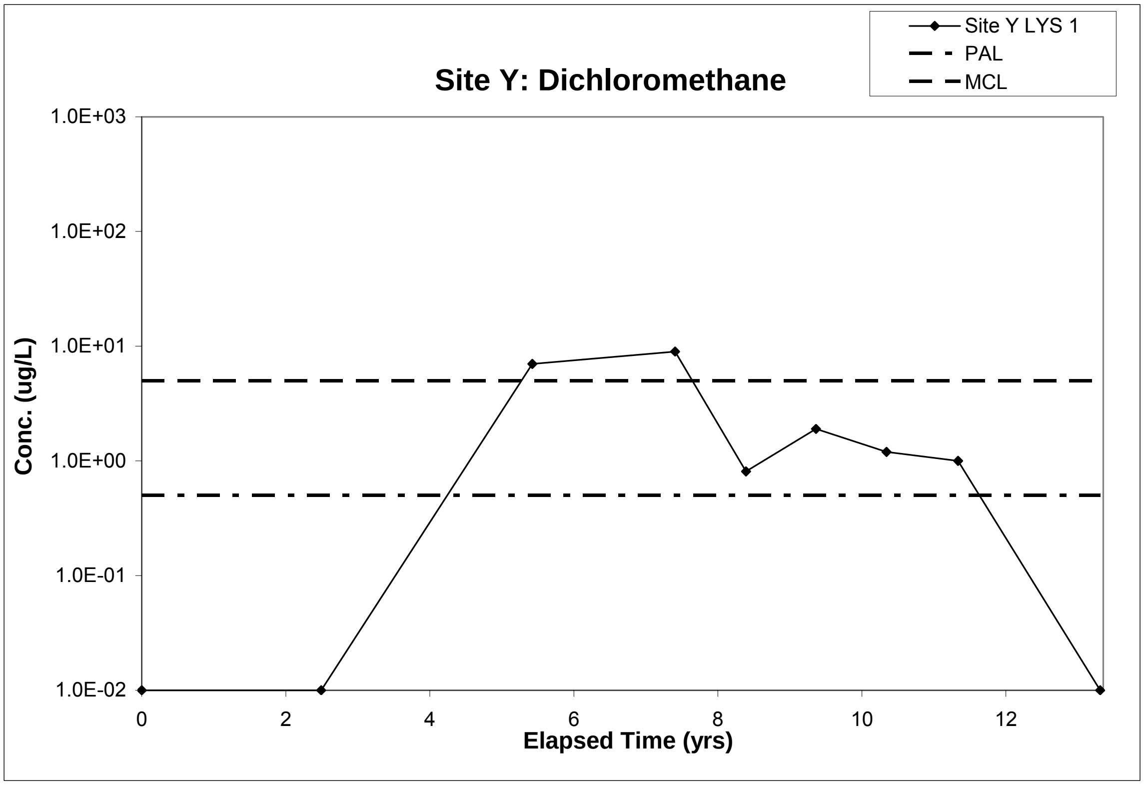

Site M: Dichloromethane
Site M LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

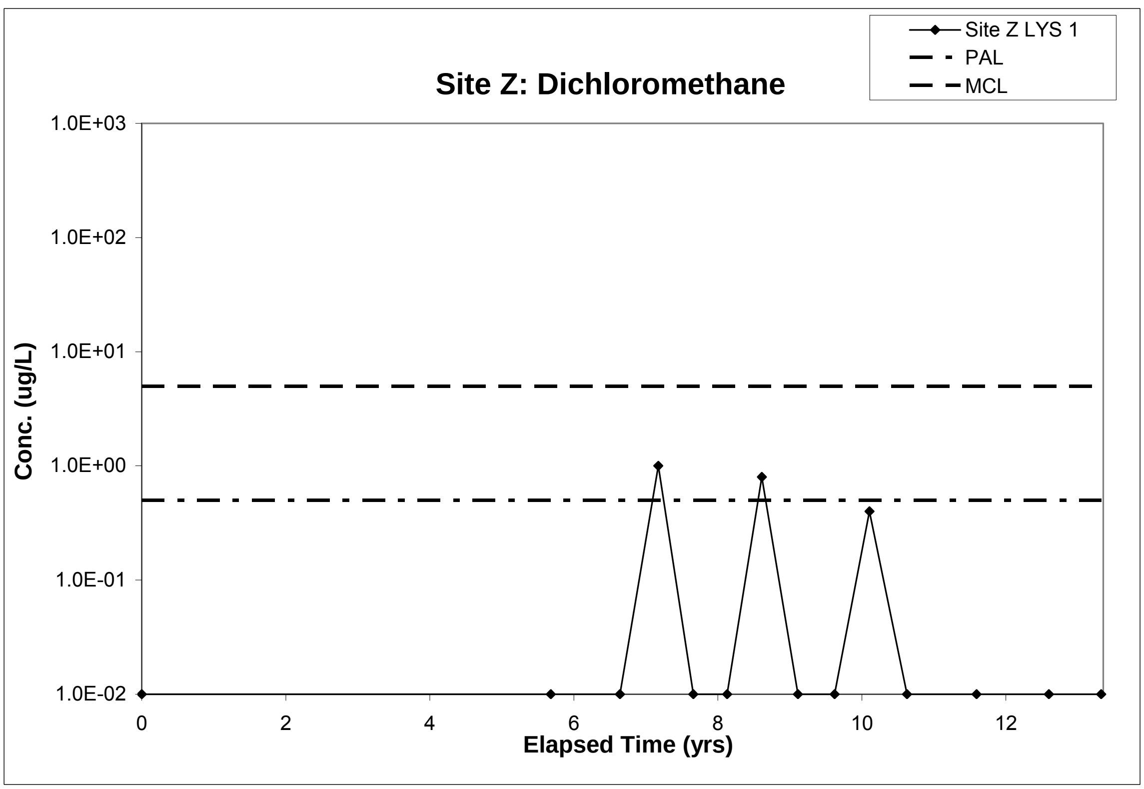

Site M: Dichloromethane
Site M LYS 2
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

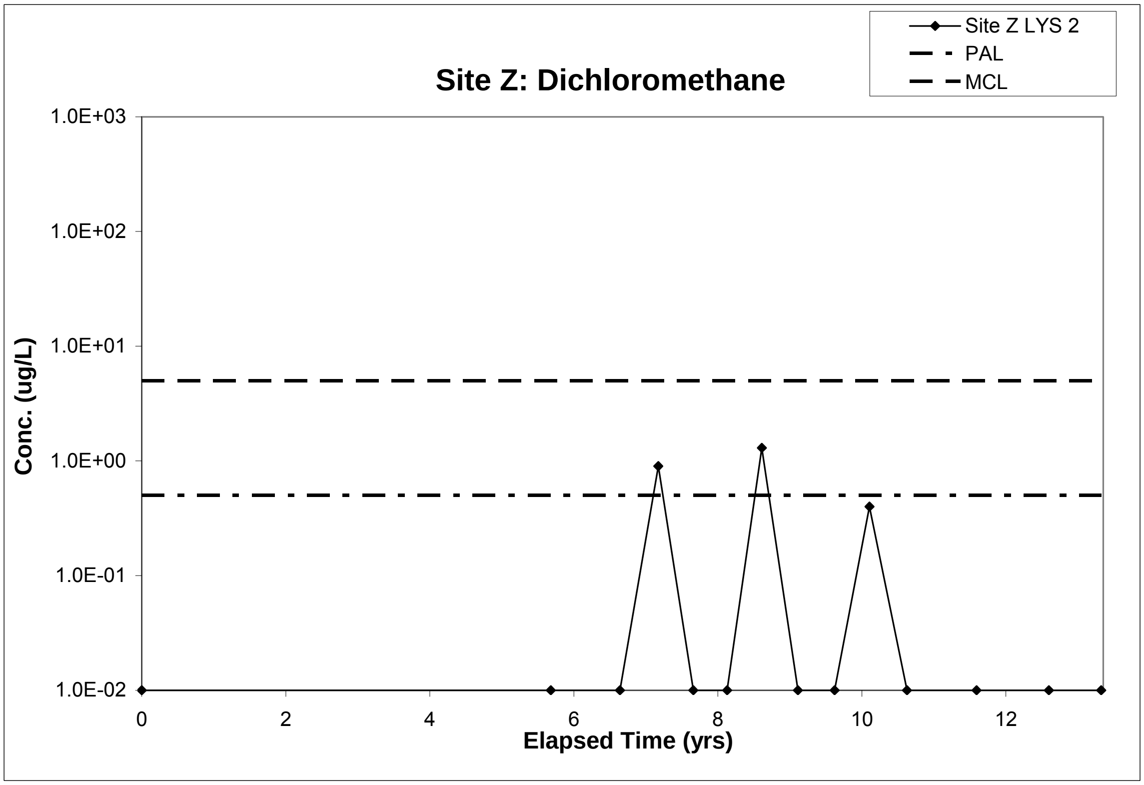

Site O: Dichloromethane
Site O LYS 2
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

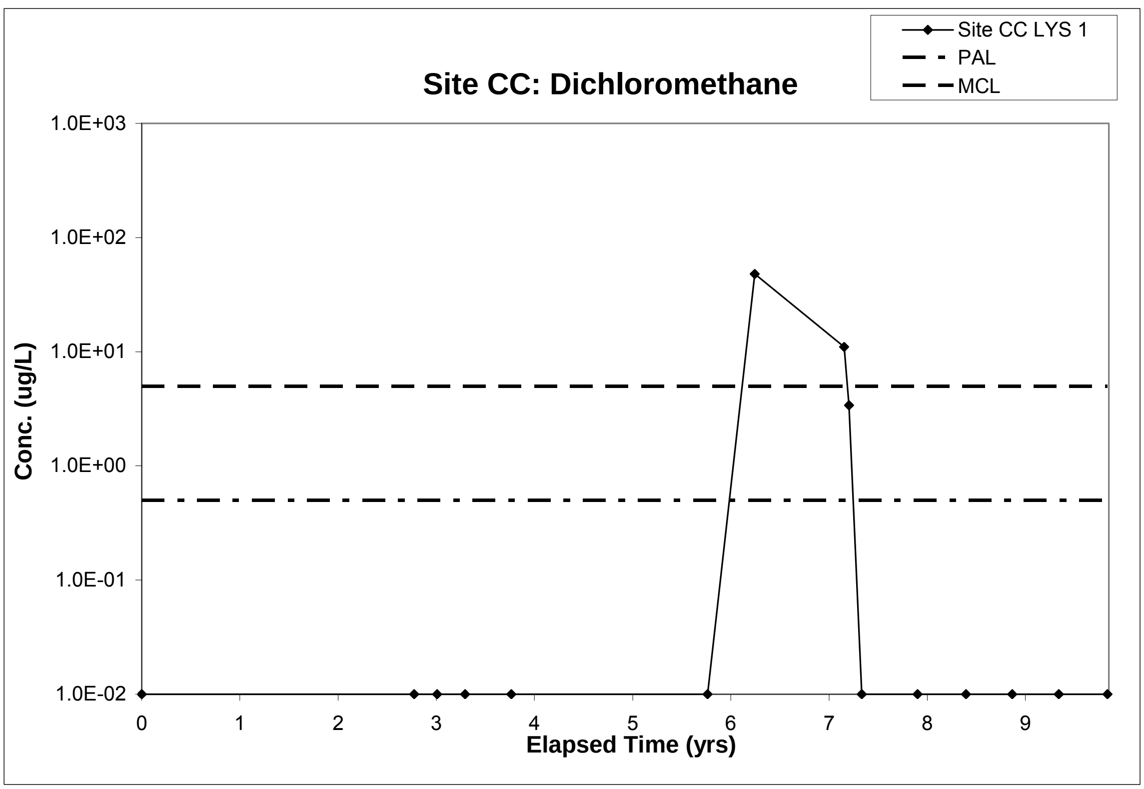

Site O: Dichloromethane
Site O LYS 3
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

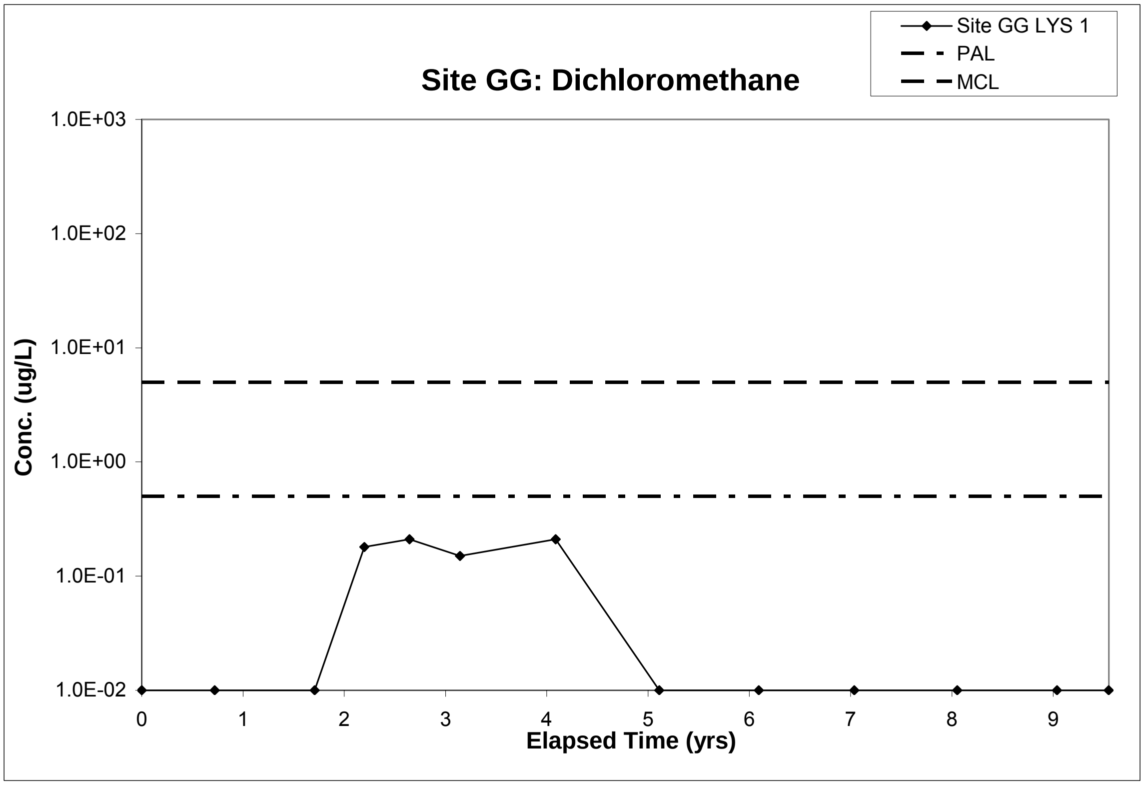

Site U: Dichloromethane
Site U LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

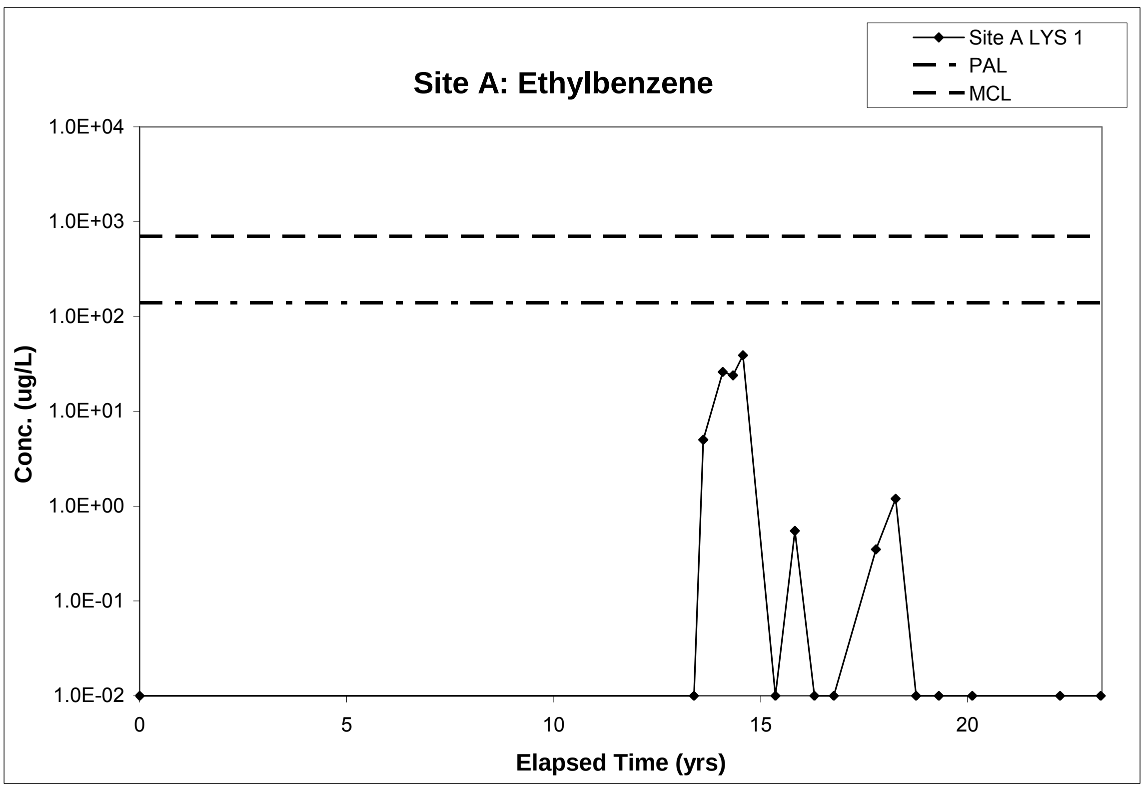

Site Y: Dichloromethane
Site Y LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

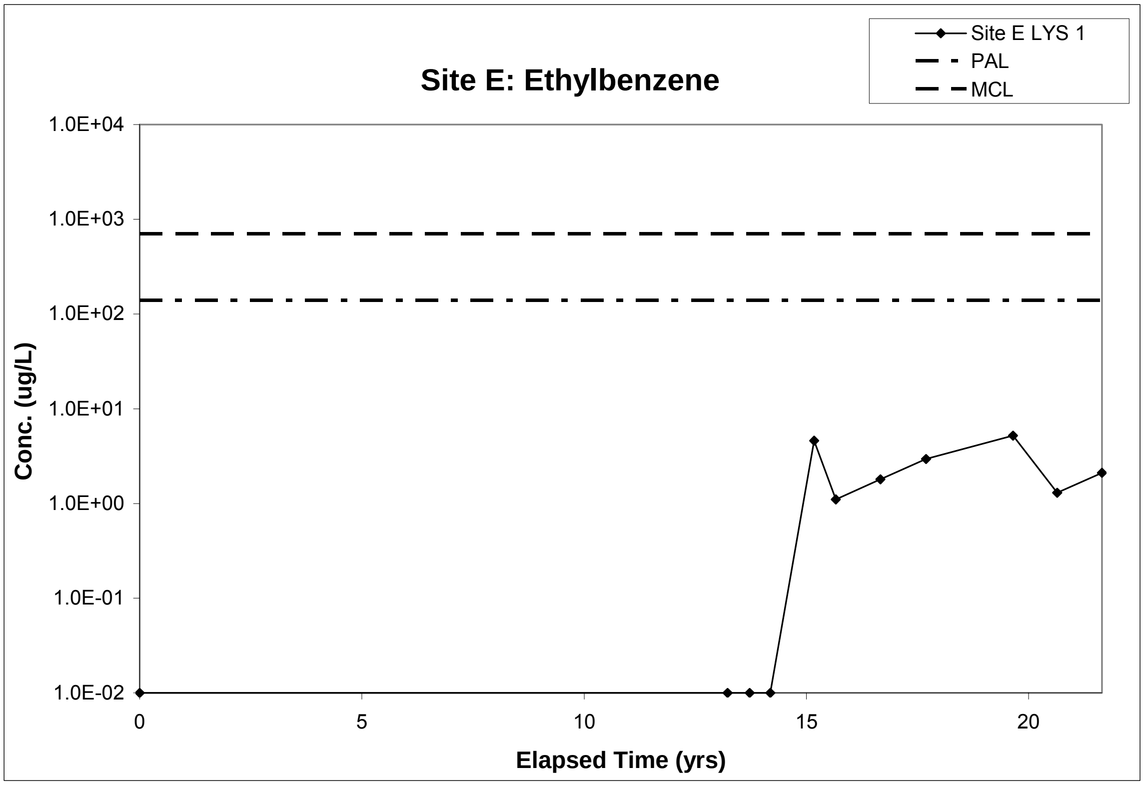

Site Z: Dichloromethane
Site Z LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

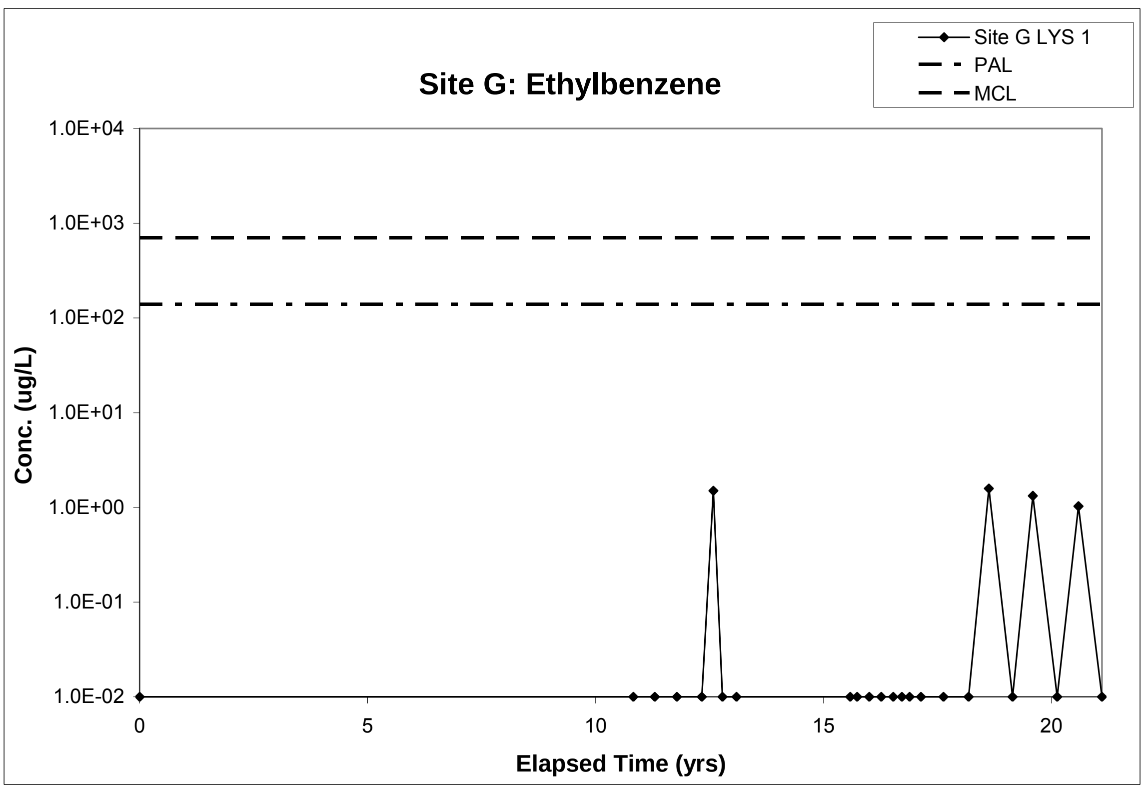

Site Z: Dichloromethane
Site Z LYS 2
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

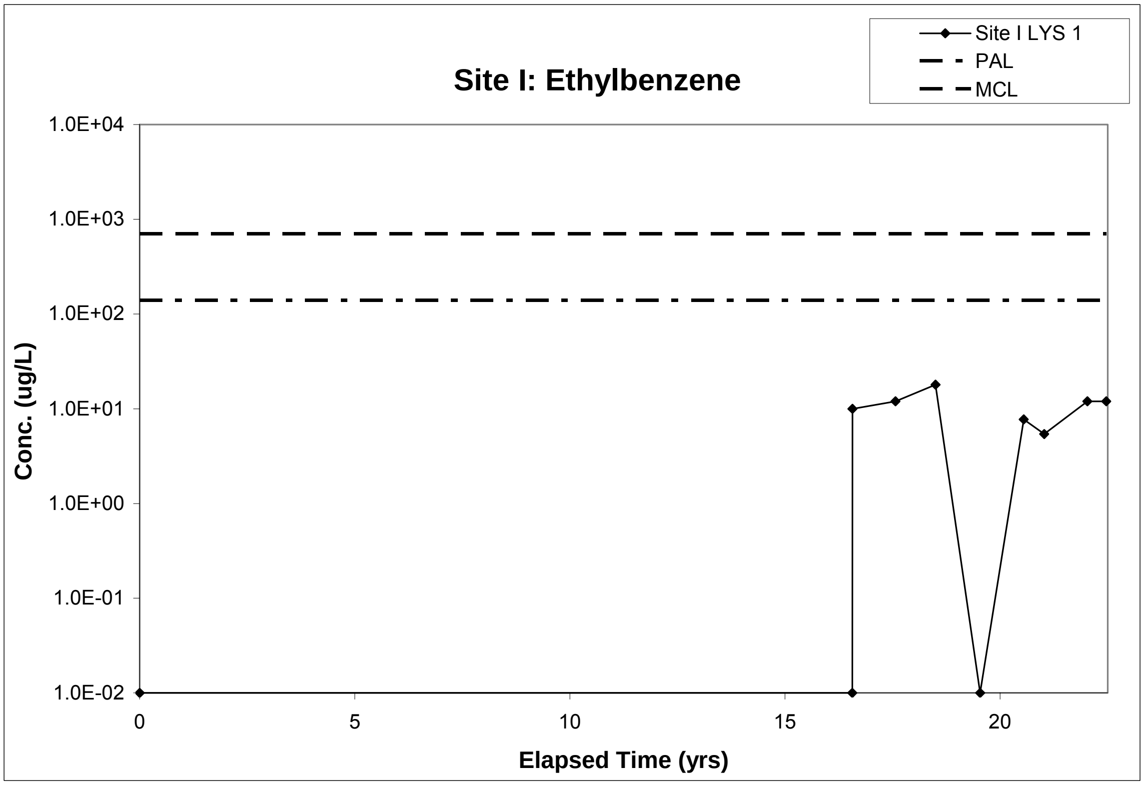

Site CC: Dichloromethane
Site CC LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
9
Elapsed Time (yrs)

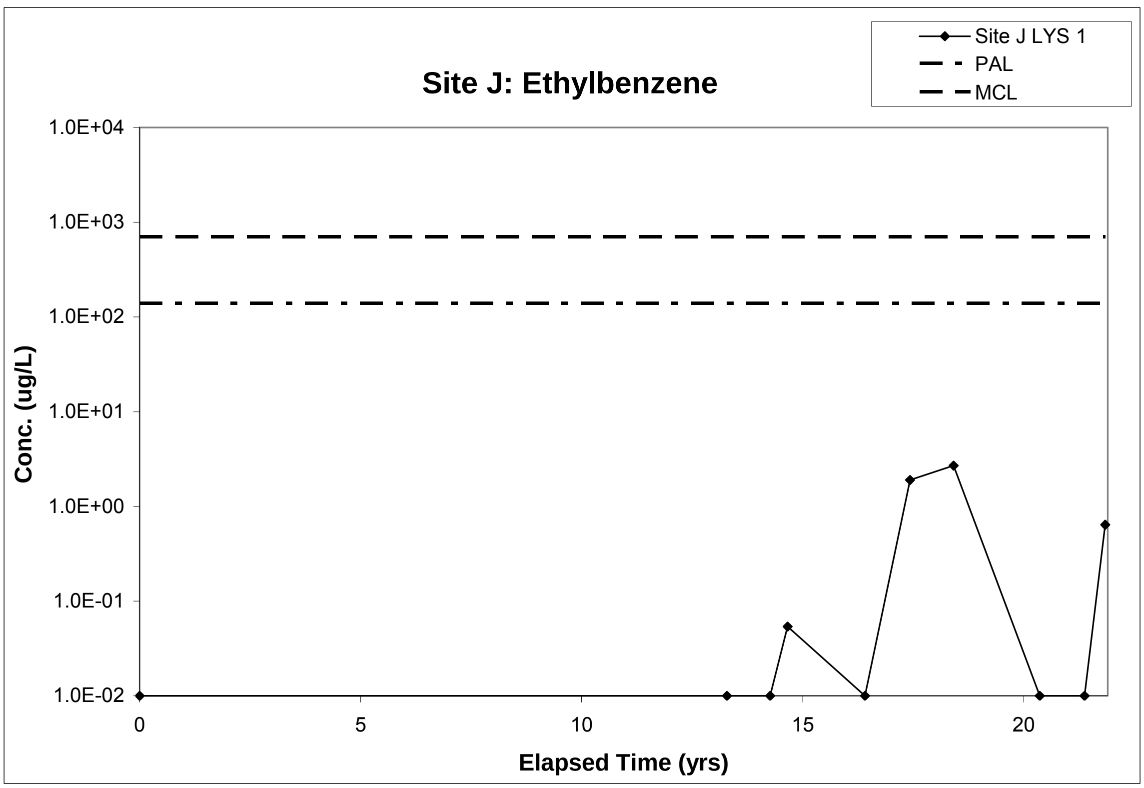

Site GG: Dichloromethane
Site GG LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
9
Elapsed Time (yrs)

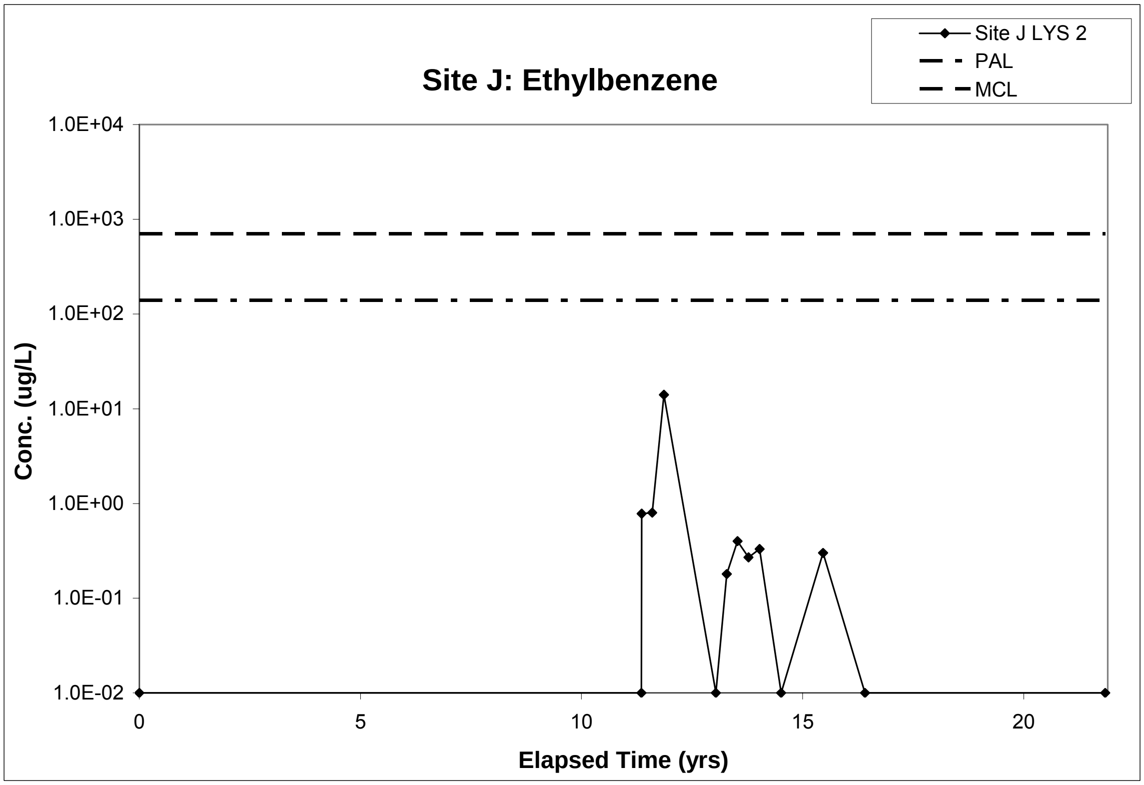

Site A: Ethylbenzene
Site A LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

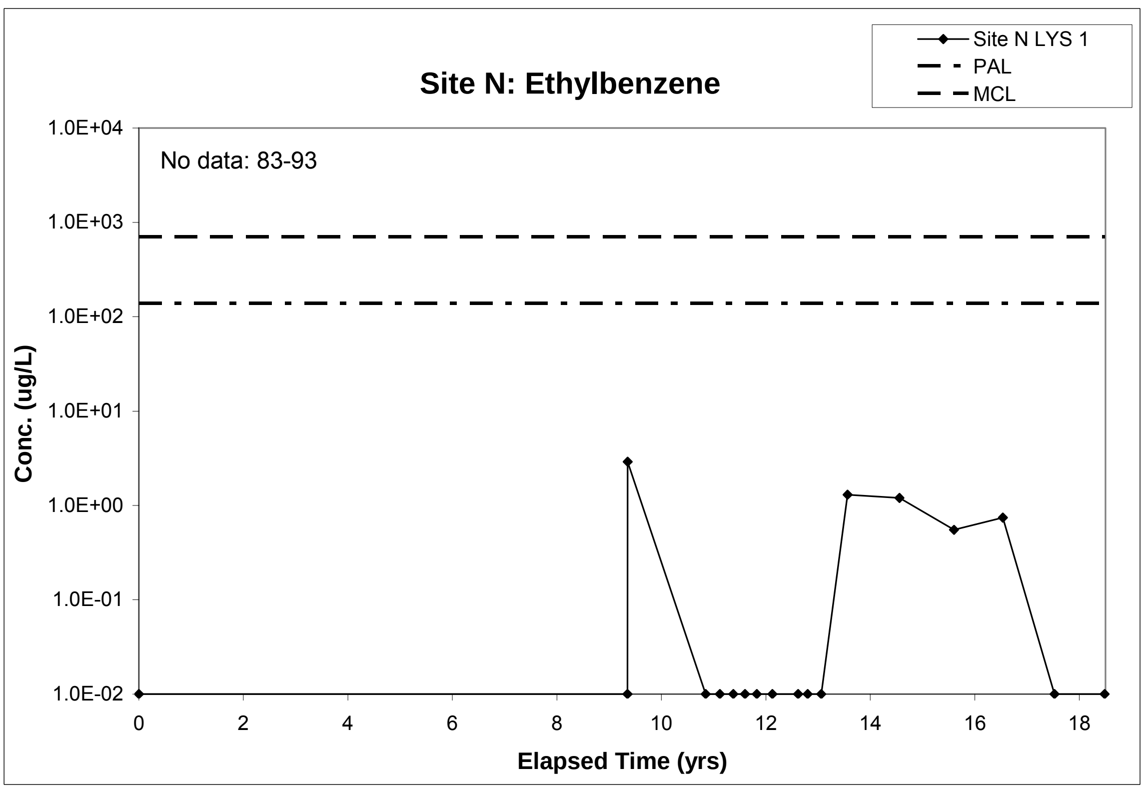

Site E: Ethylbenzene
Site E LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

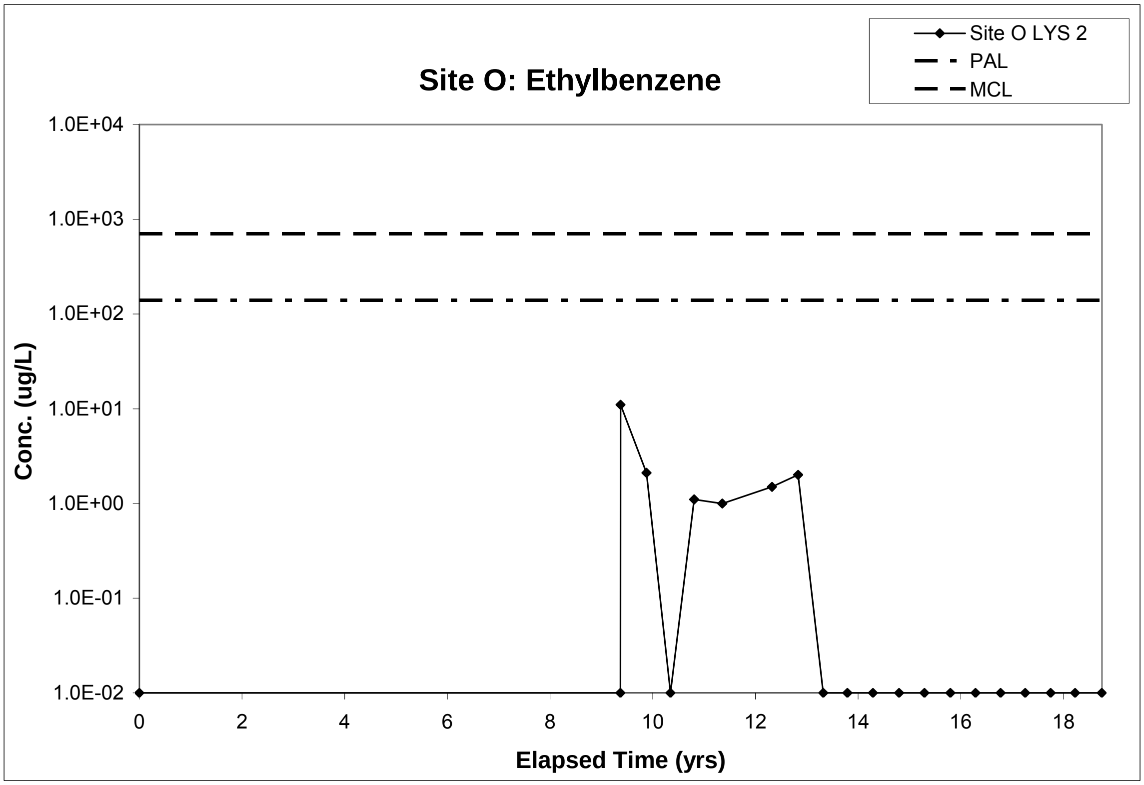

Site G: Ethylbenzene
Site G LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

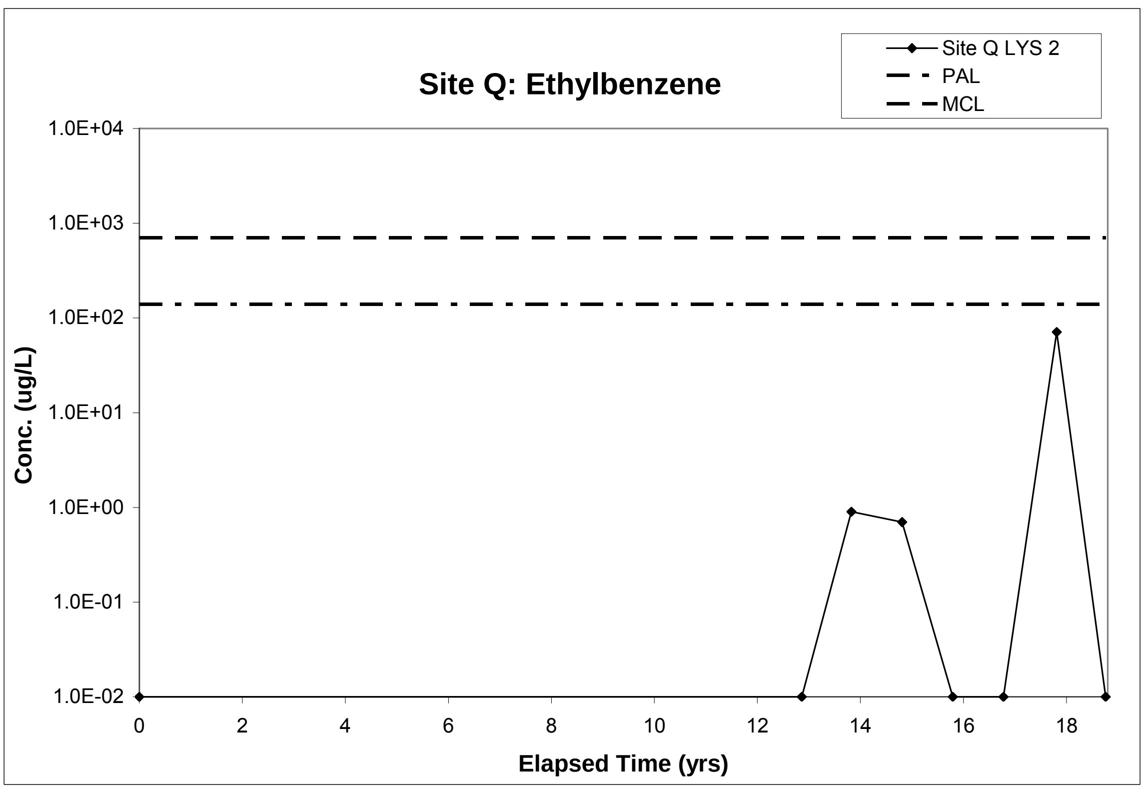

Site I: Ethylbenzene
Site I LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

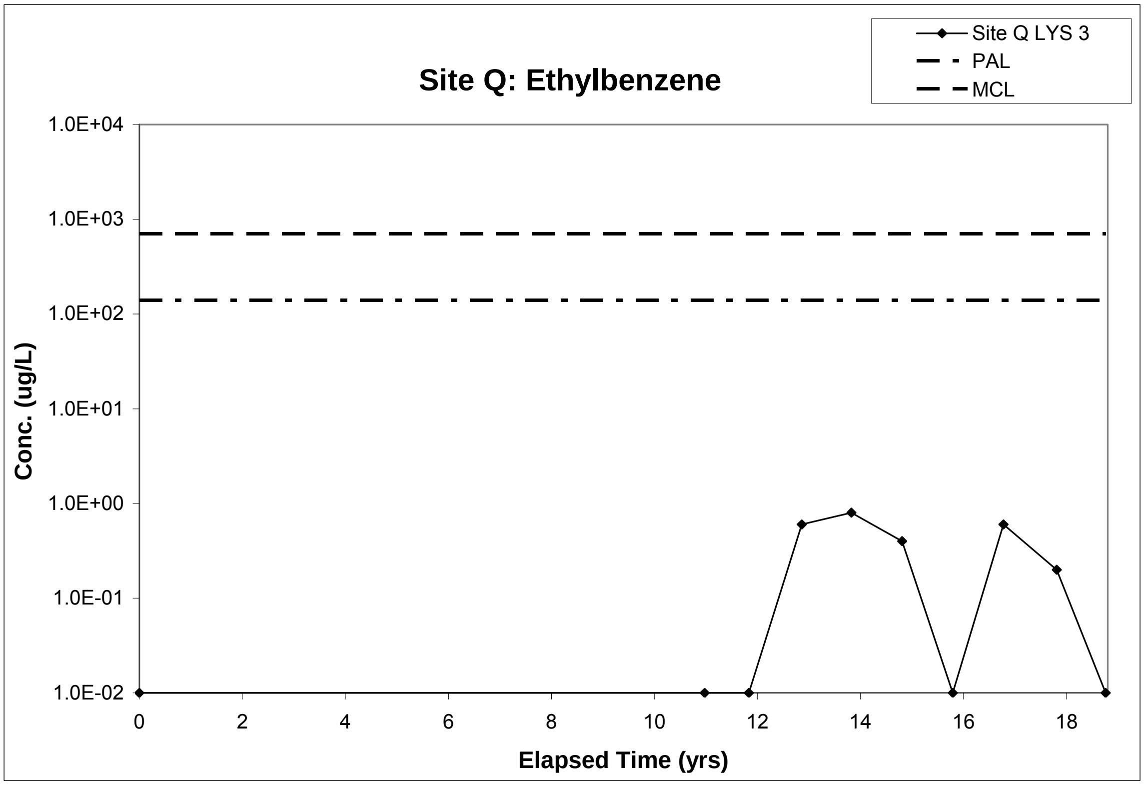

Site J: Ethylbenzene
Site J LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)


Site J: Ethylbenzene
Site J LYS 2
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

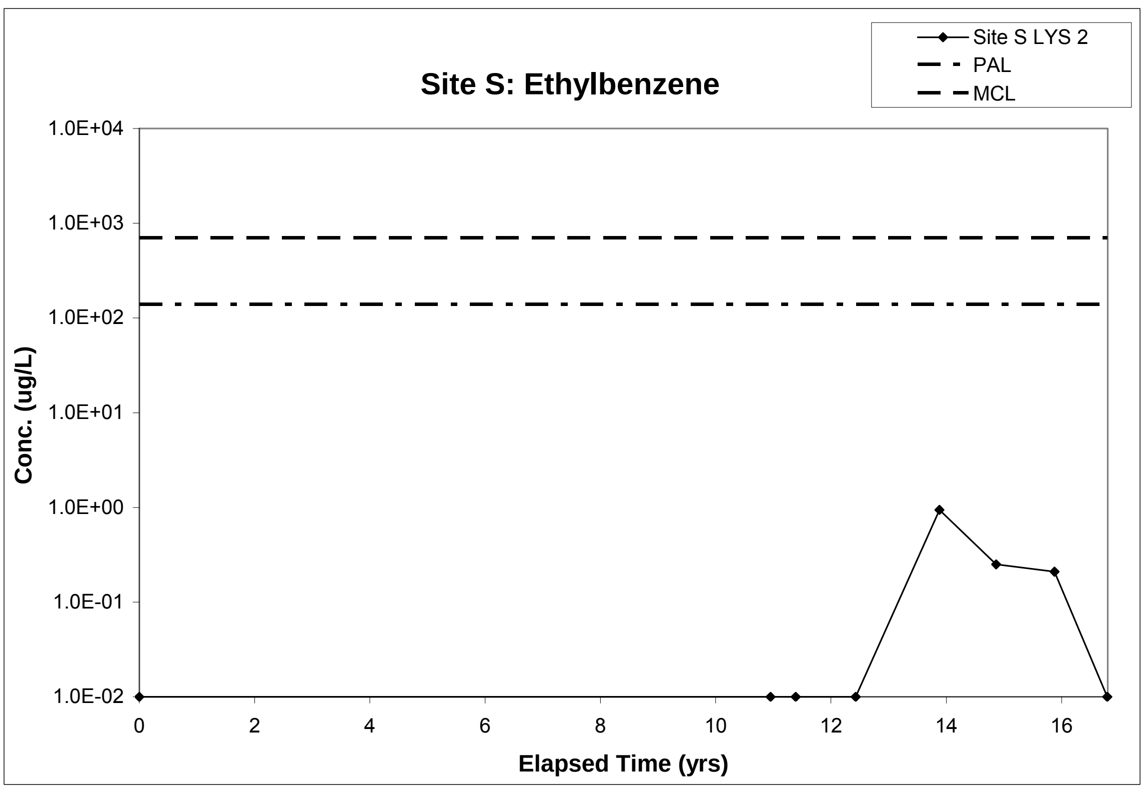

Site N: Ethylbenzene
Site N LYS 1
PAL
MCL
No data: 83-93
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)


Site O: Ethylbenzene
Site O LYS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

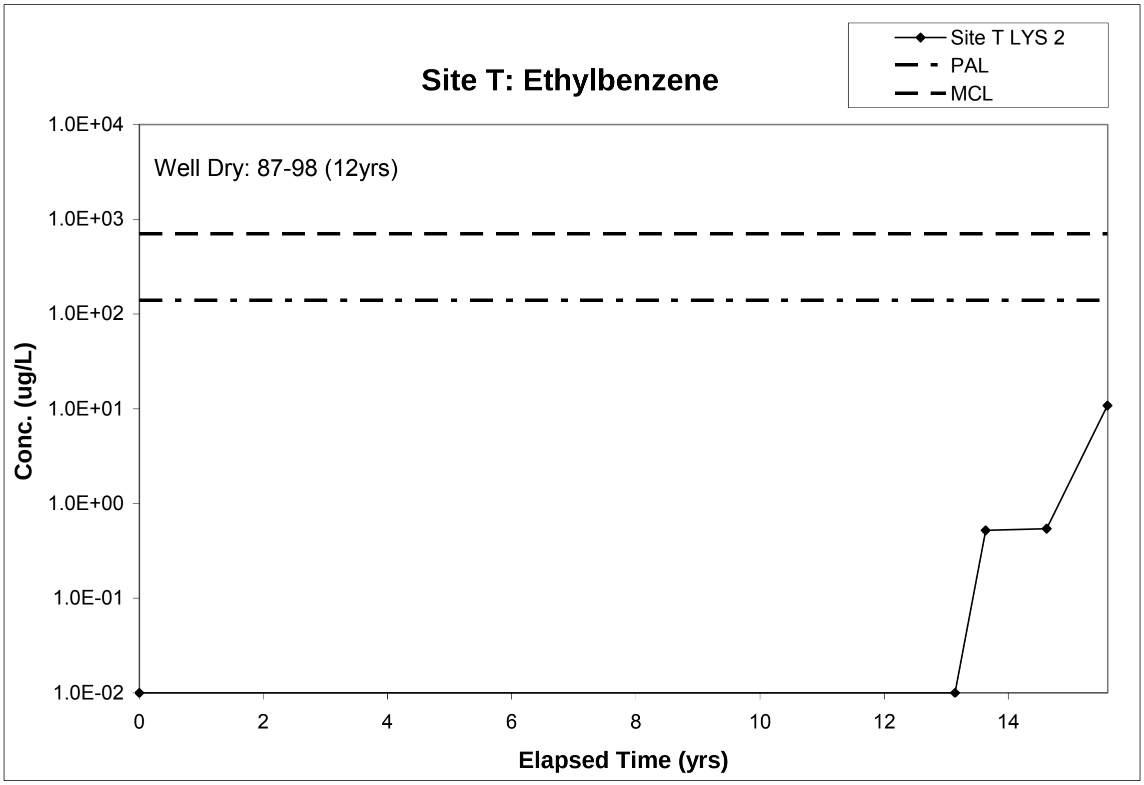

Site Q: Ethylbenzene
Site Q LYS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

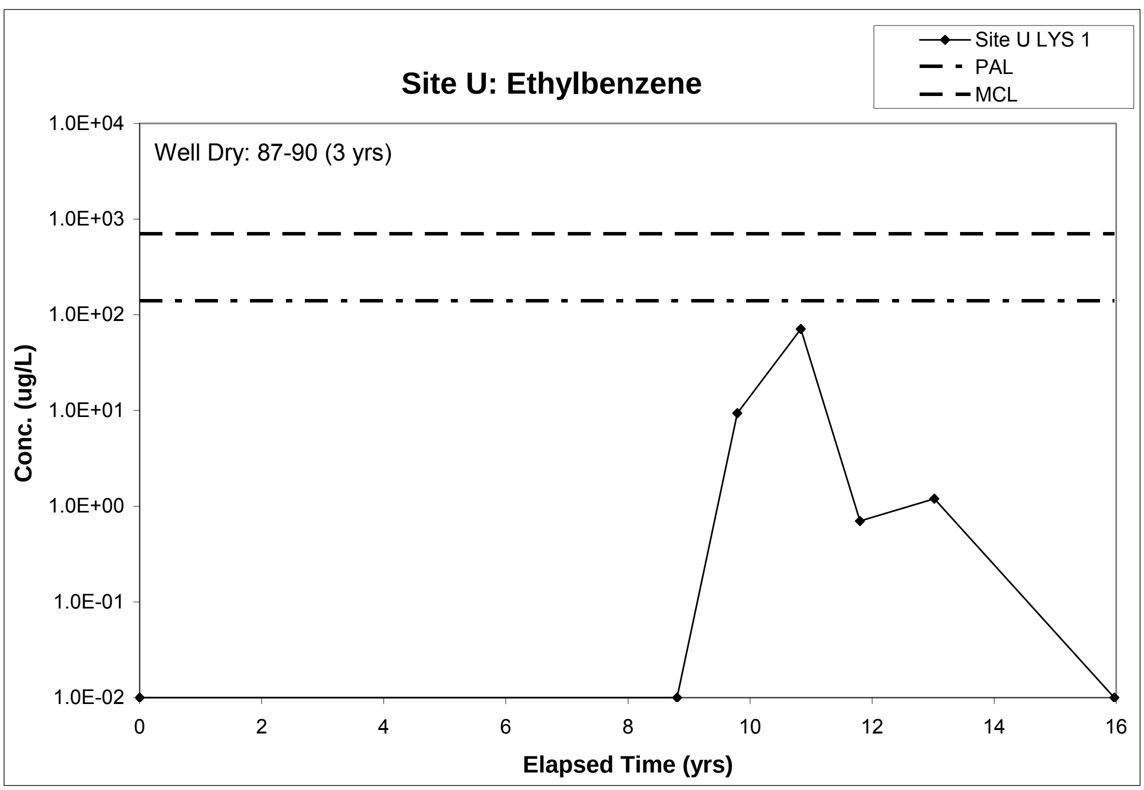


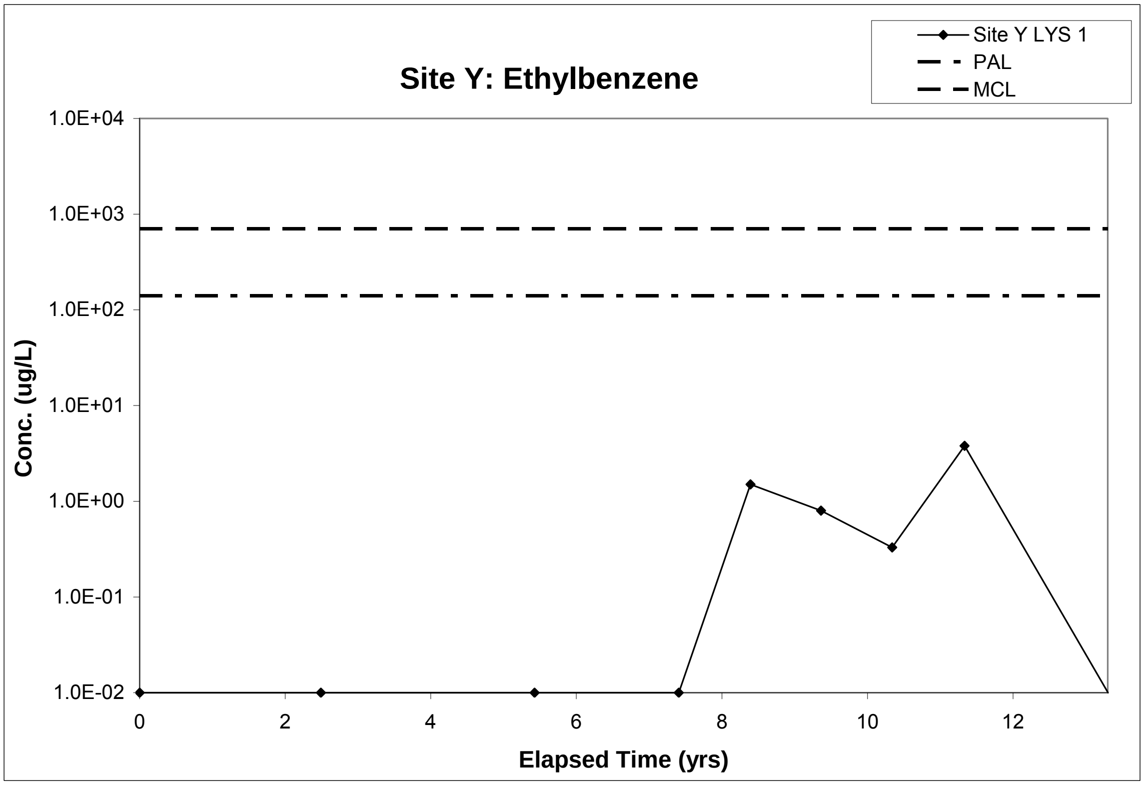
Site Q: Ethylbenzene
Site Q LYS 3
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

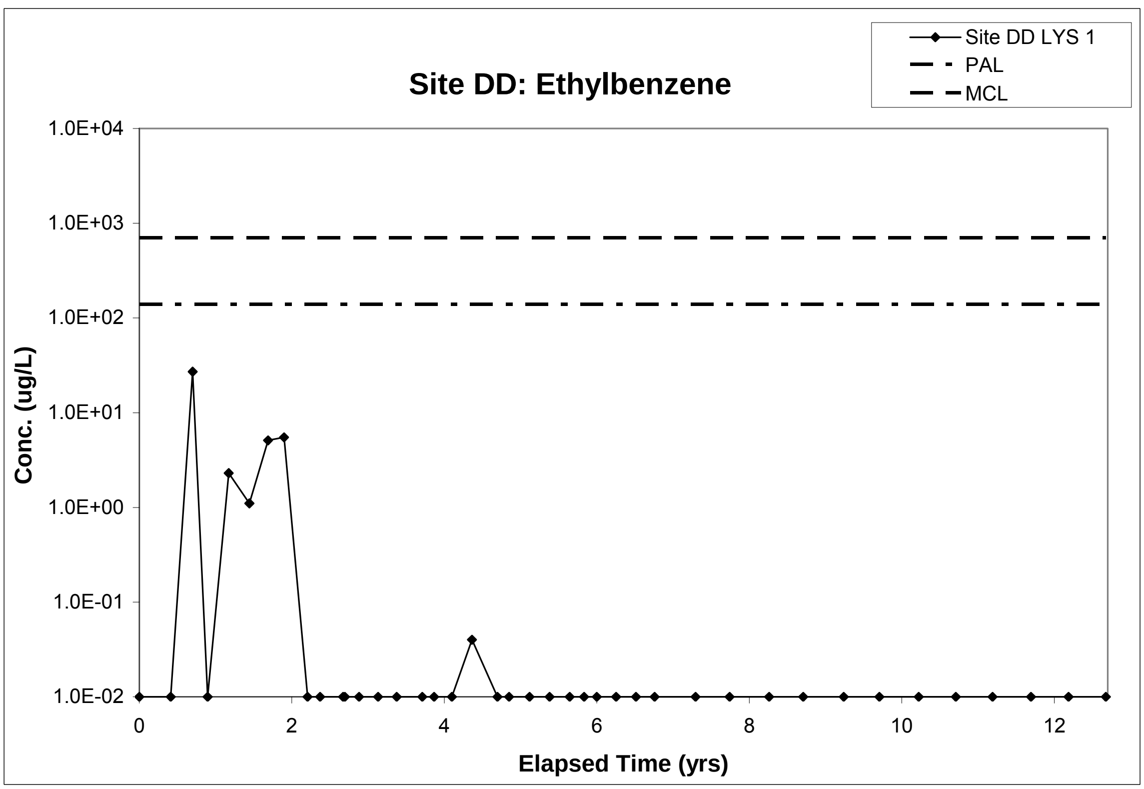


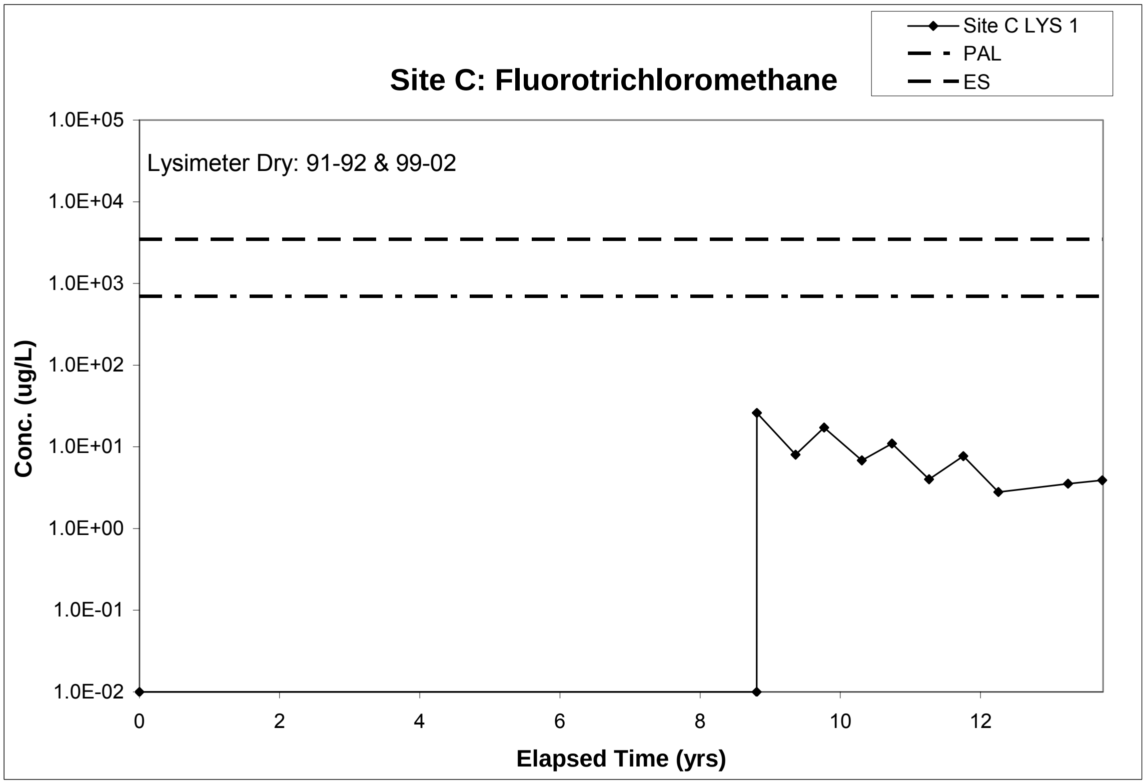
Site S: Ethylbenzene
Site S LYS 2
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

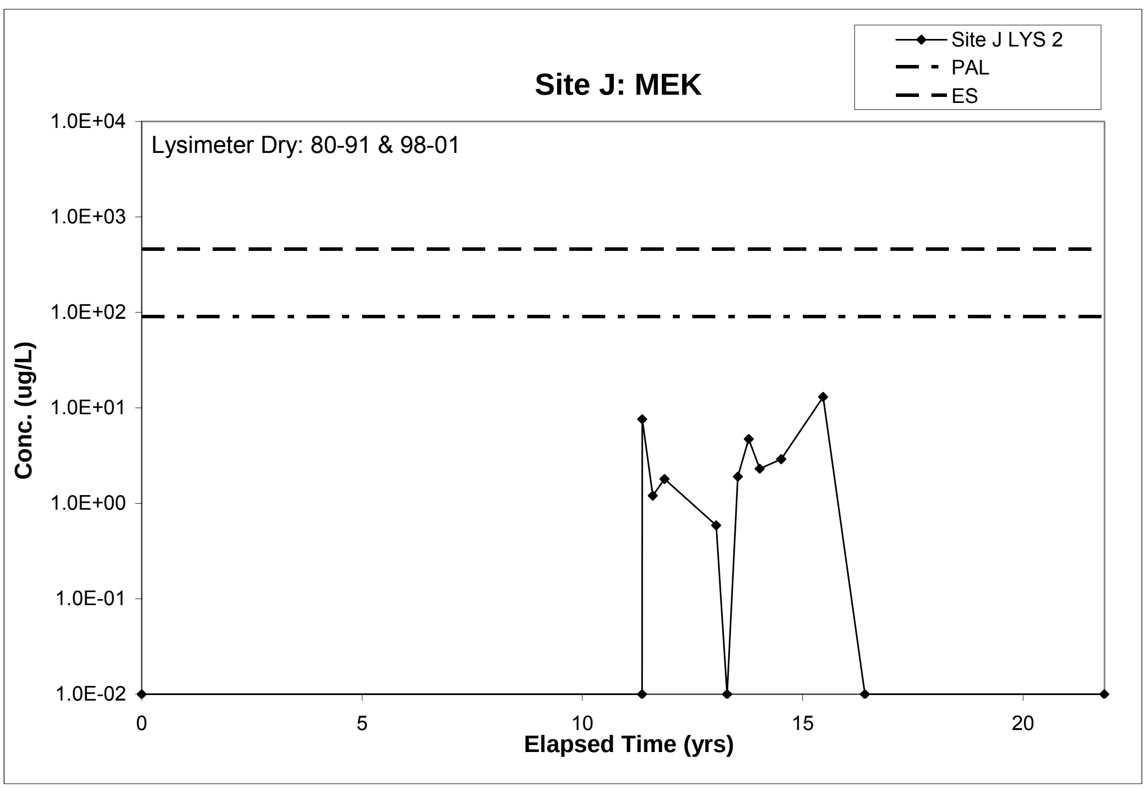

Site T: Ethylbenzene
Site T LYS 2
PAL
MCL
Well Dry: 87-98 (12yrs)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

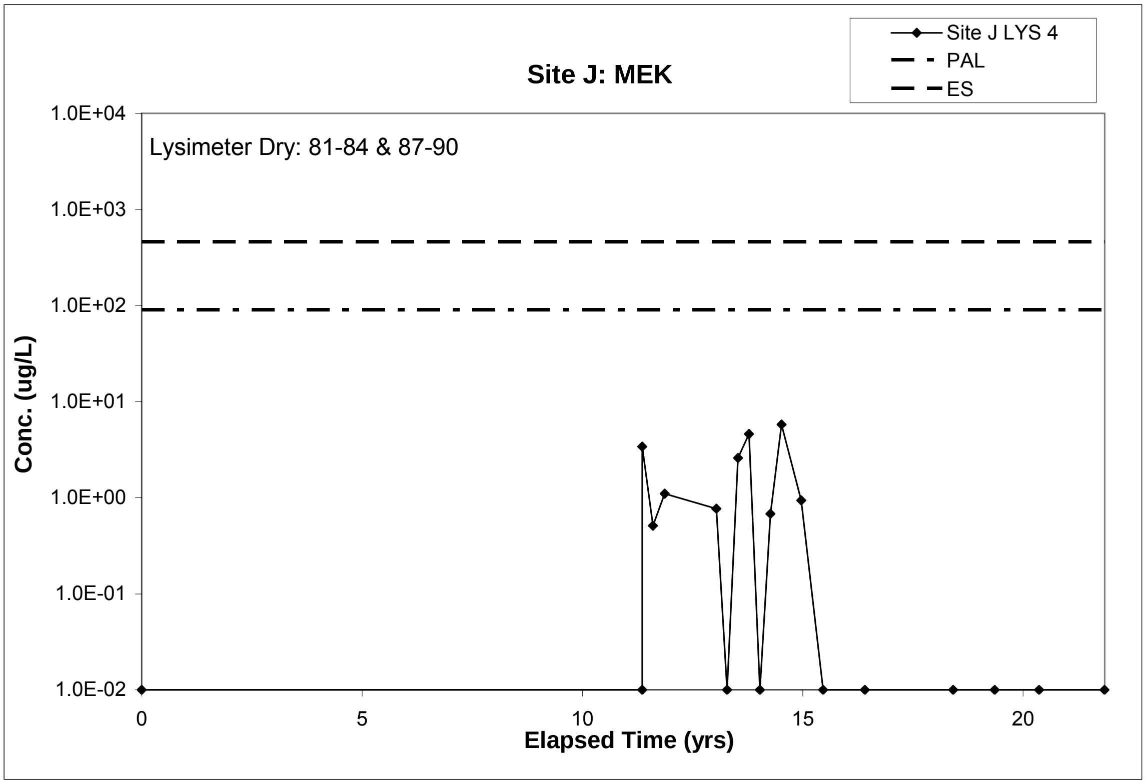

Site U: Ethylbenzene
Site U LYS 1
PAL
MCL
Well Dry: 87-90 (3 yrs)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

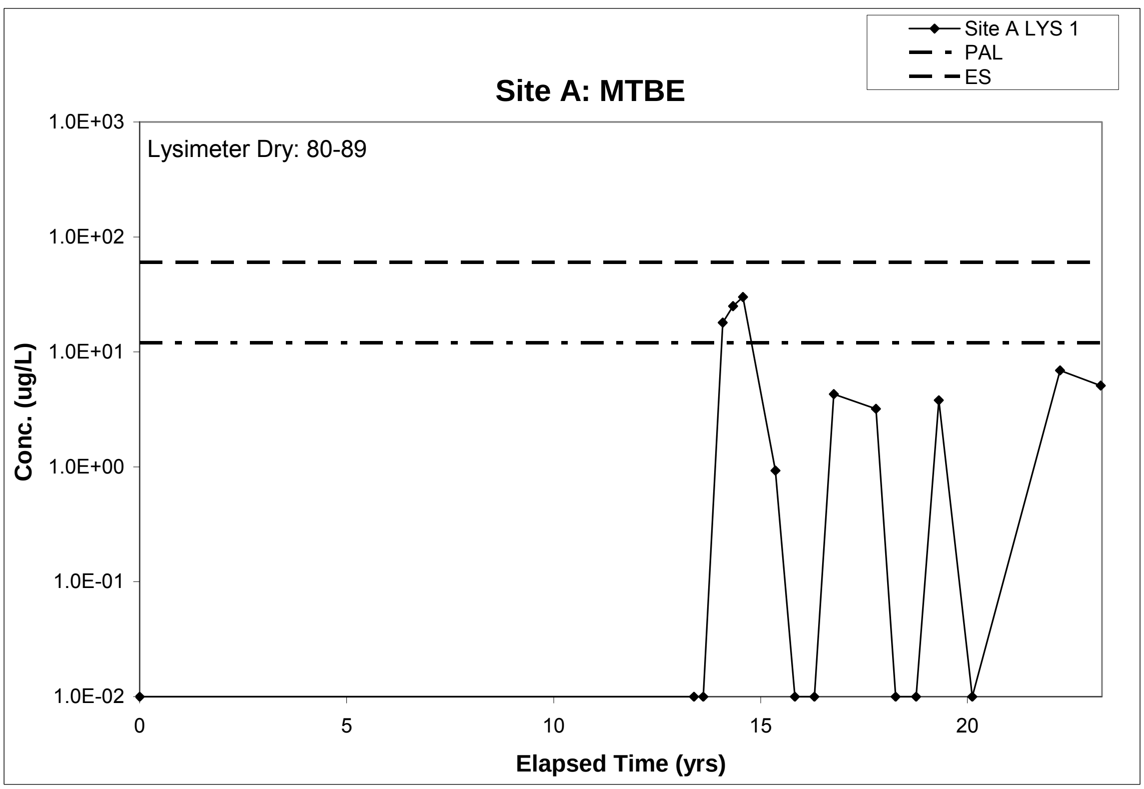

Site Y: Ethylbenzene
Site Y LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

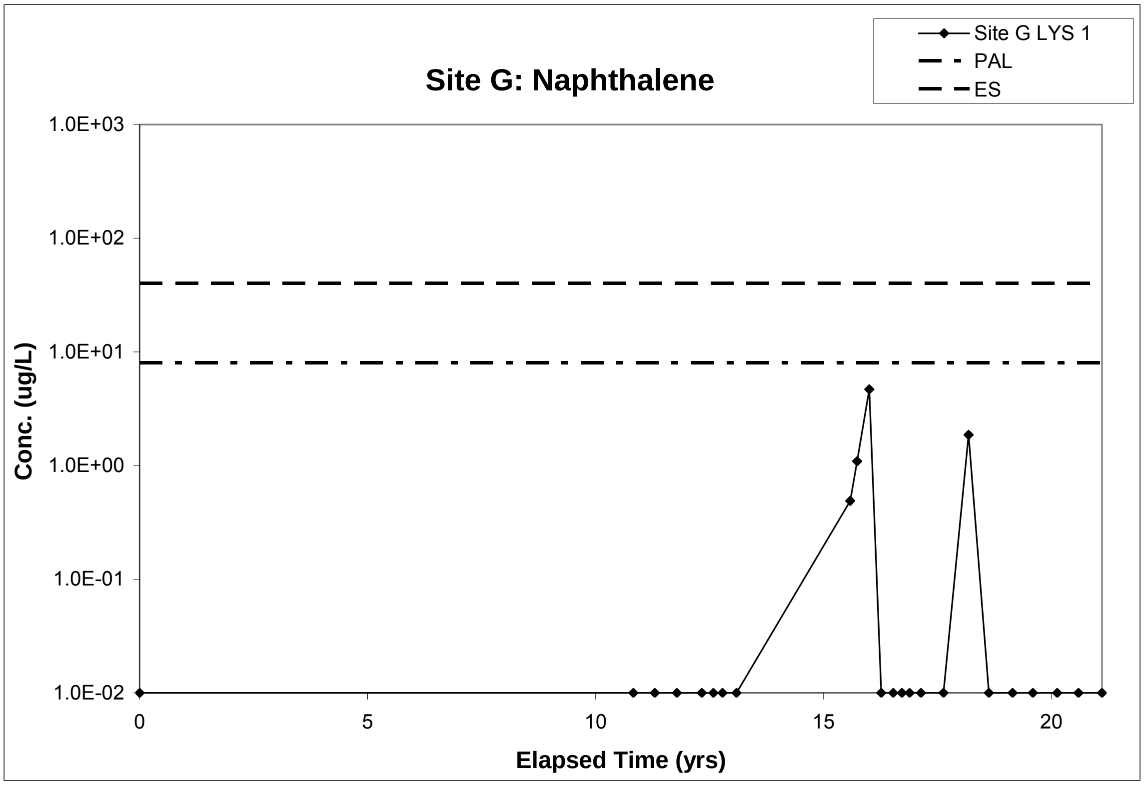

Site DD: Ethylbenzene
Site DD LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)


Site C: Fluorotrichloromethane
Site C LYS 1
PAL
ES
Lysimeter Dry: 91-92 & 99-02
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

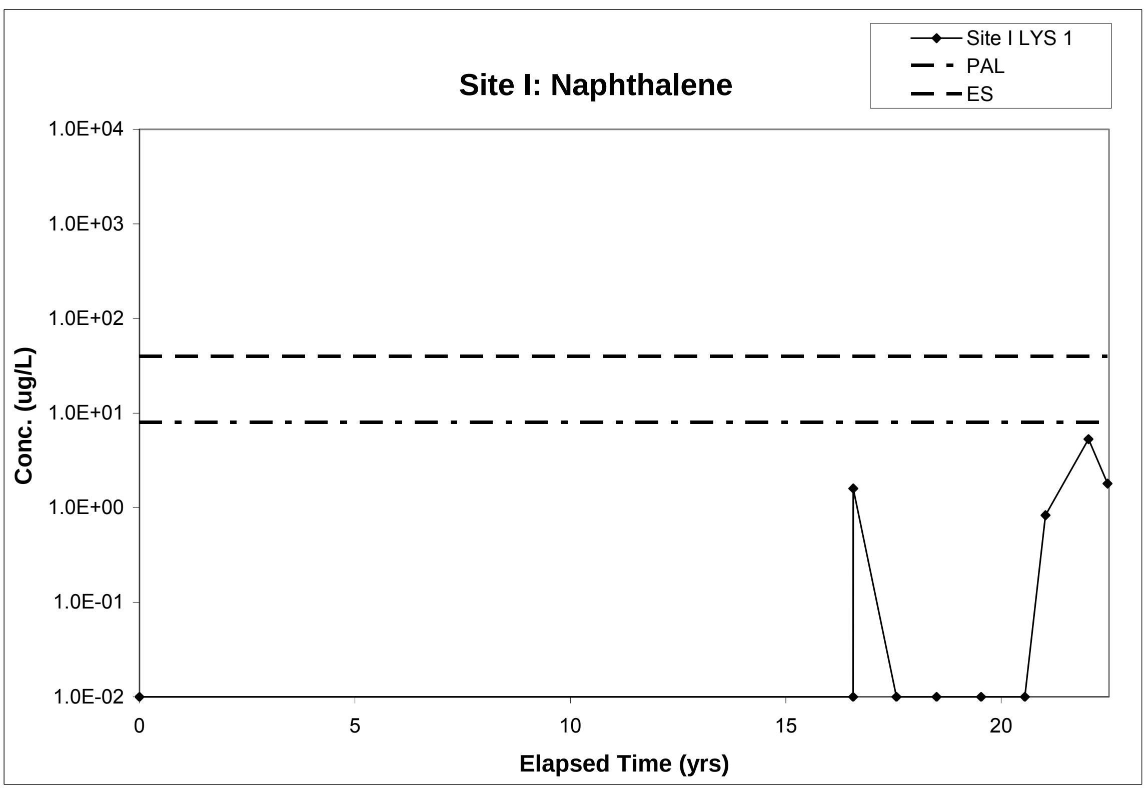

Site J: MEK
Site J LYS 2
PAL
ES
Lysimeter Dry: 80-91 & 98-01
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)


Site J LYS 4
PAL
ES
Site J: MEK
Lysimeter Dry: 81-84 & 87-90
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

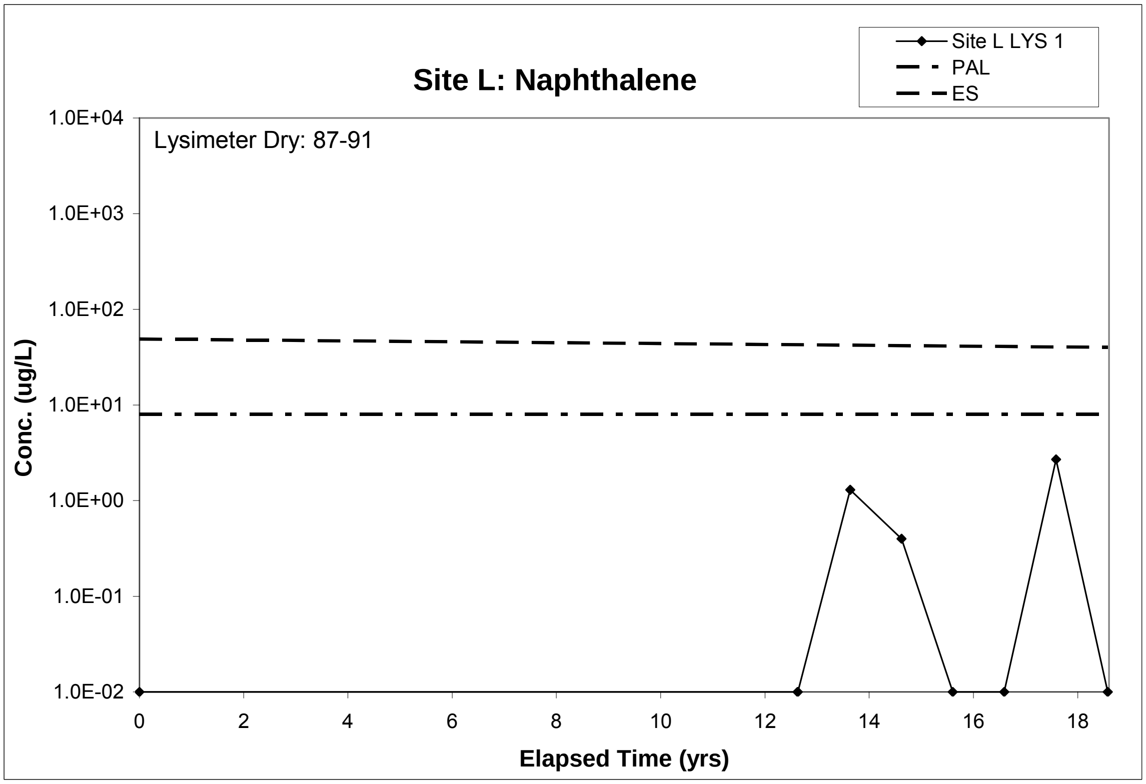

Site A LYS 1
PAL
ES
Site A: MTBE
Lysimeter Dry: 80-89
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

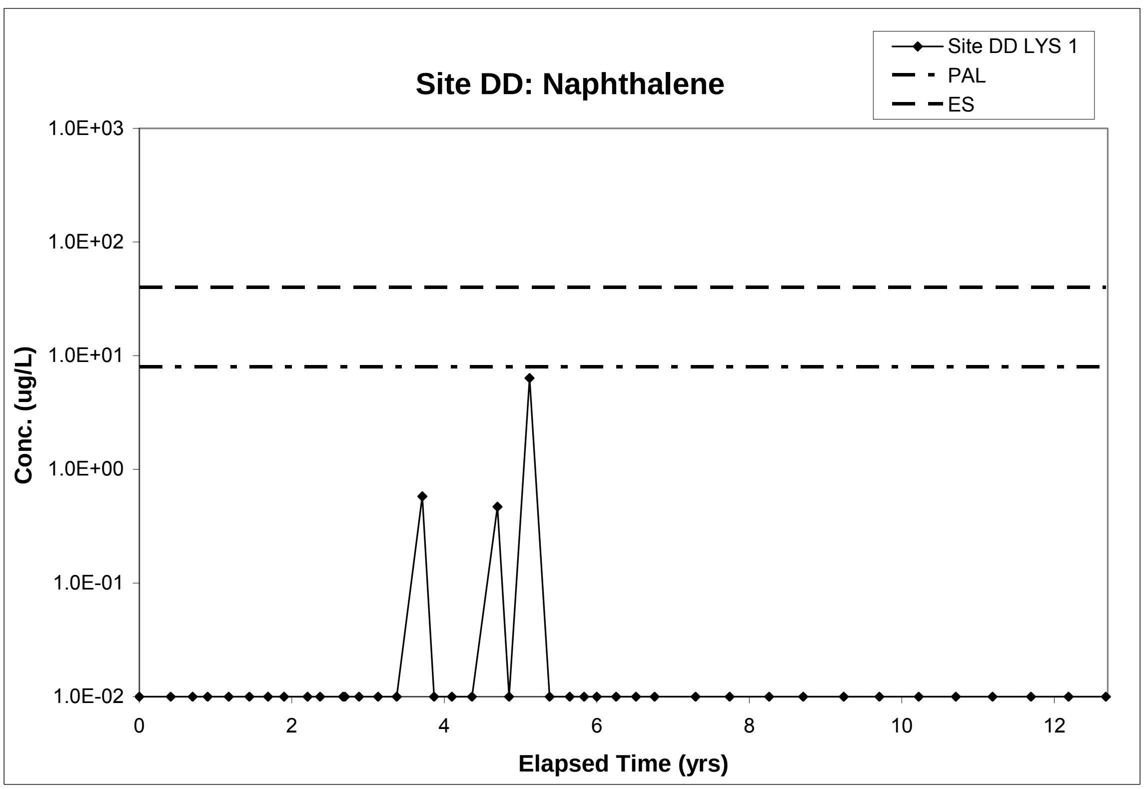


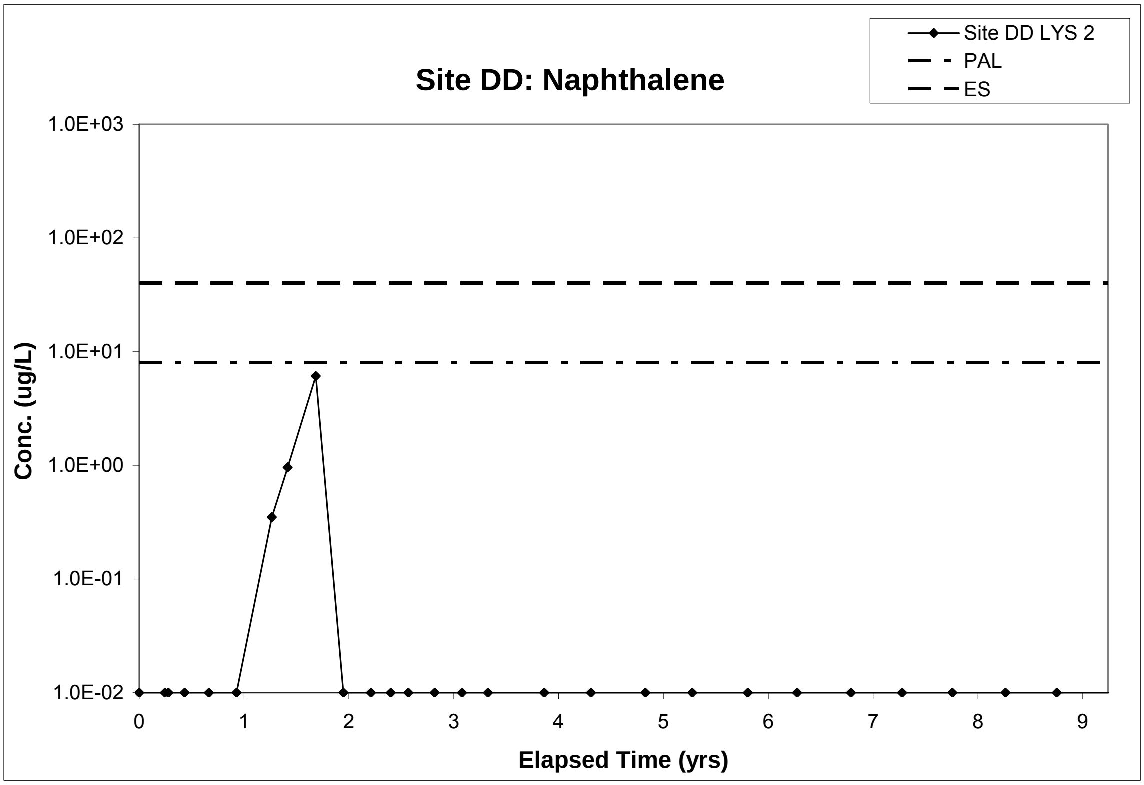
Site G: Naphthalene
Site G LYS 1
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

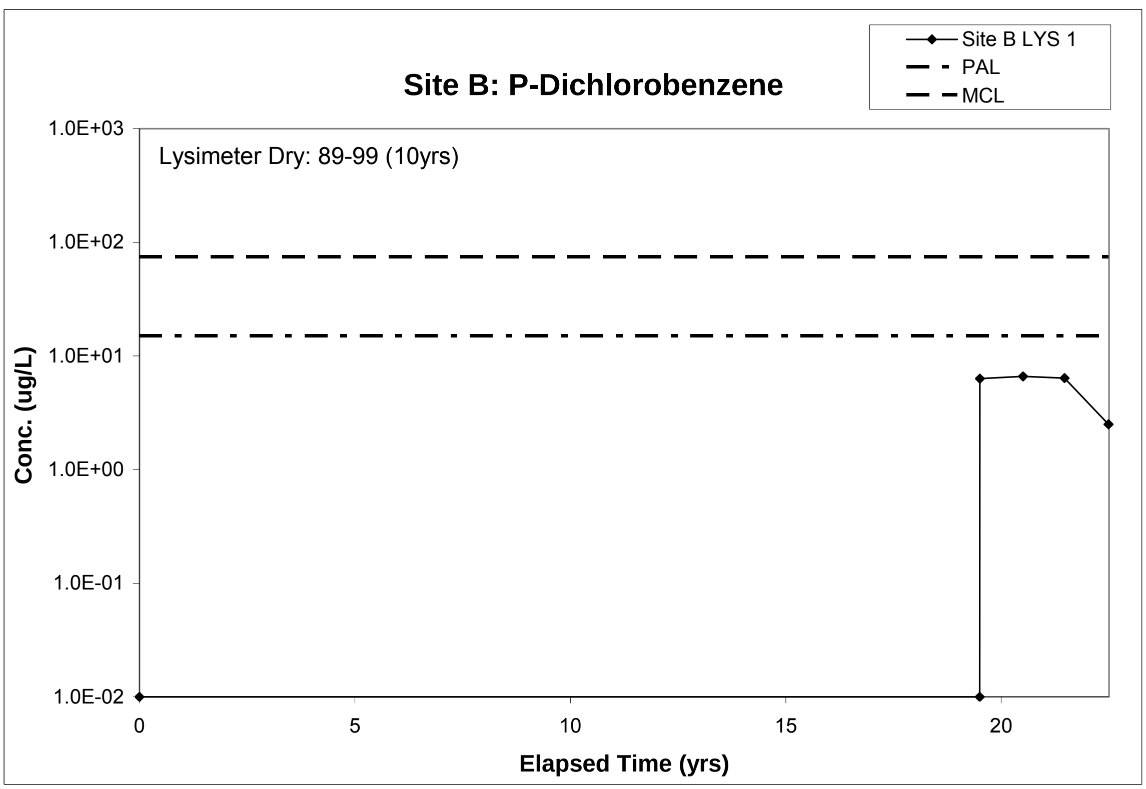


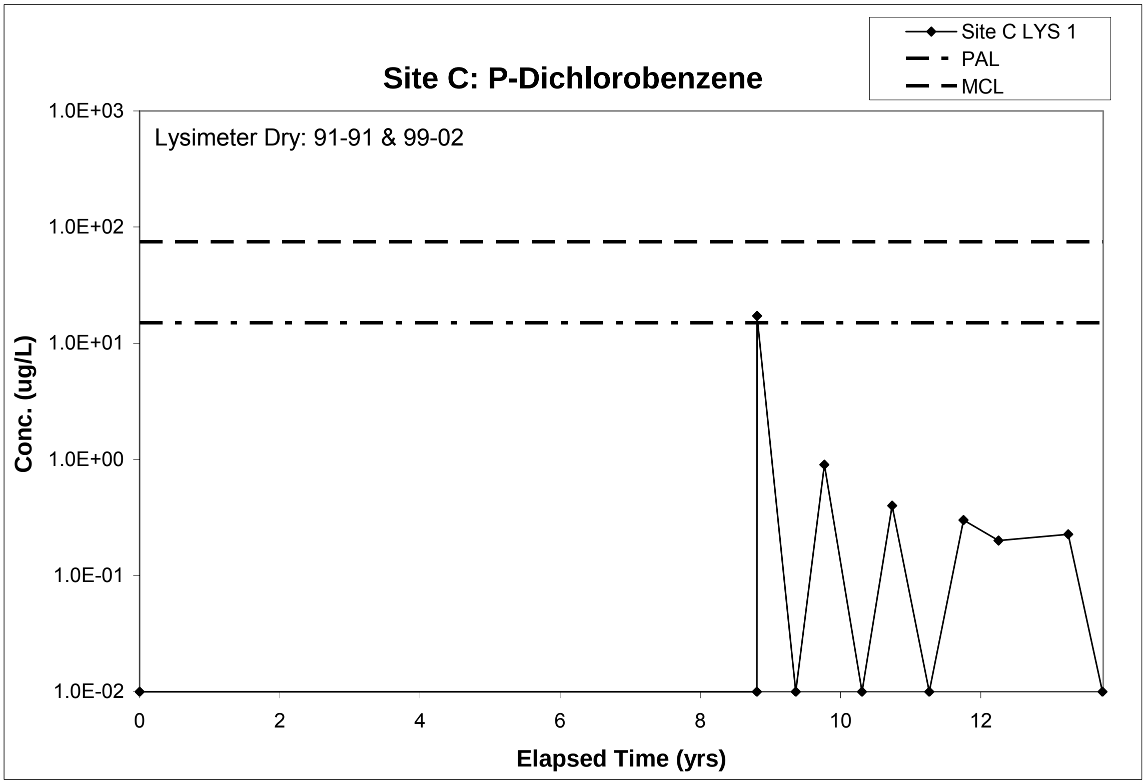
Site I: Naphthalene
Site I LYS 1
PAL
ES
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

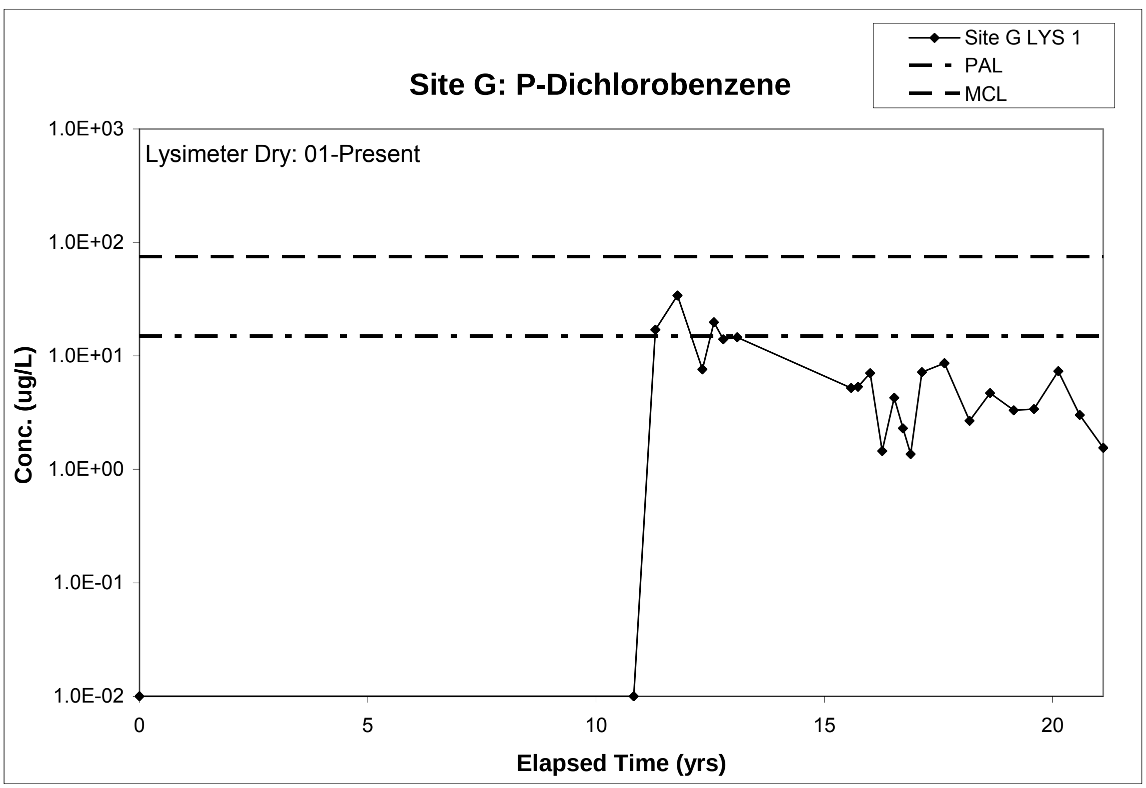

Site L: Naphthalene
Site L LYS 1
PAL
ES
Lysimeter Dry: 87-91
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

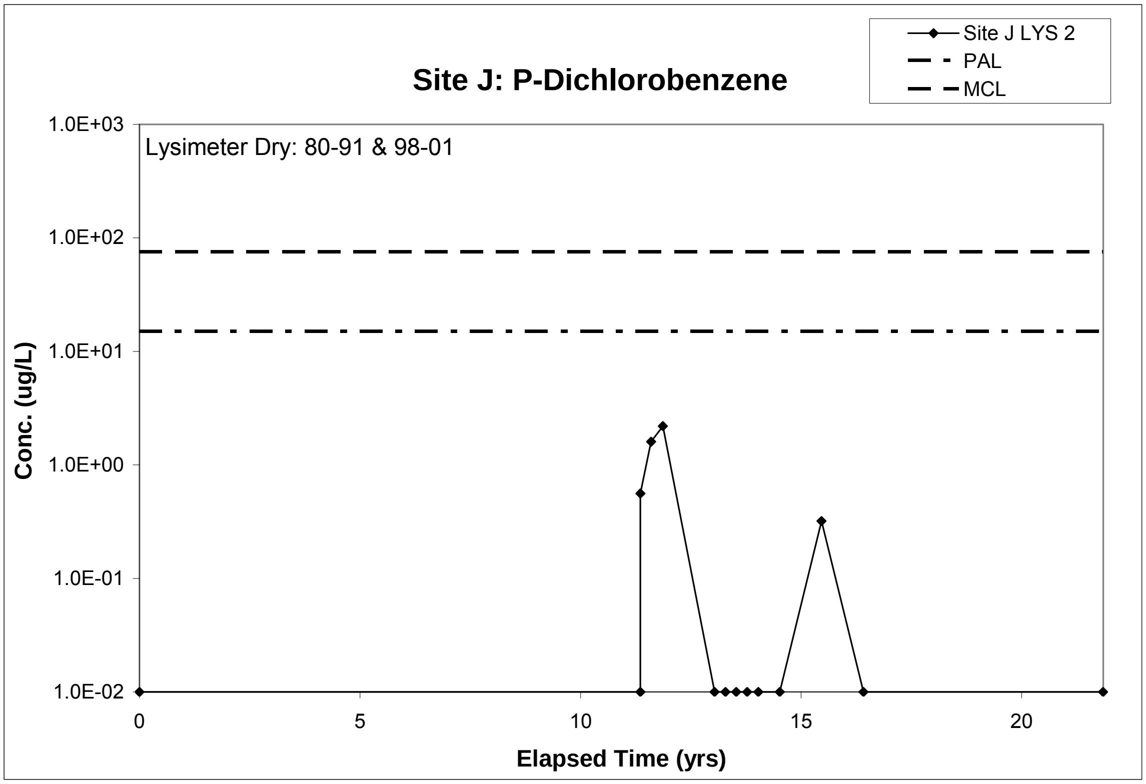

Site DD: Naphthalene
Site DD LYS 1
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

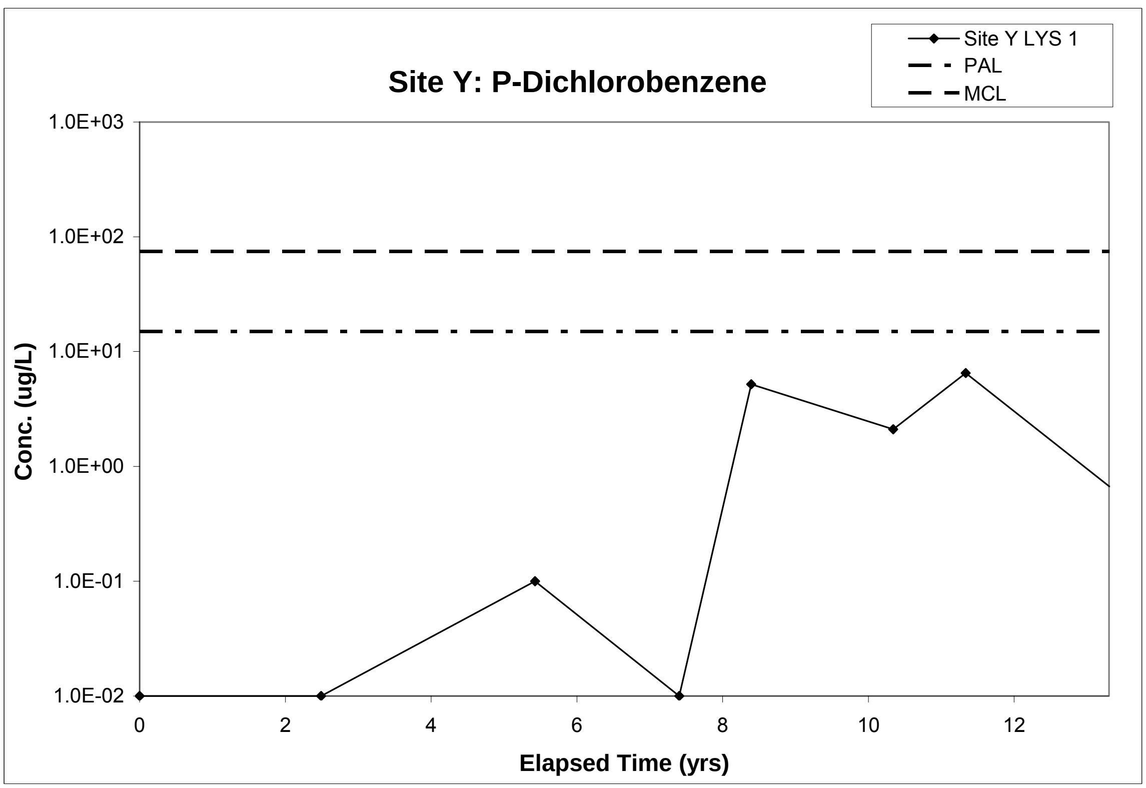

Site DD LYS 2
PAL
ES
Site DD: Naphthalene
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
9
Elapsed Time (yrs)

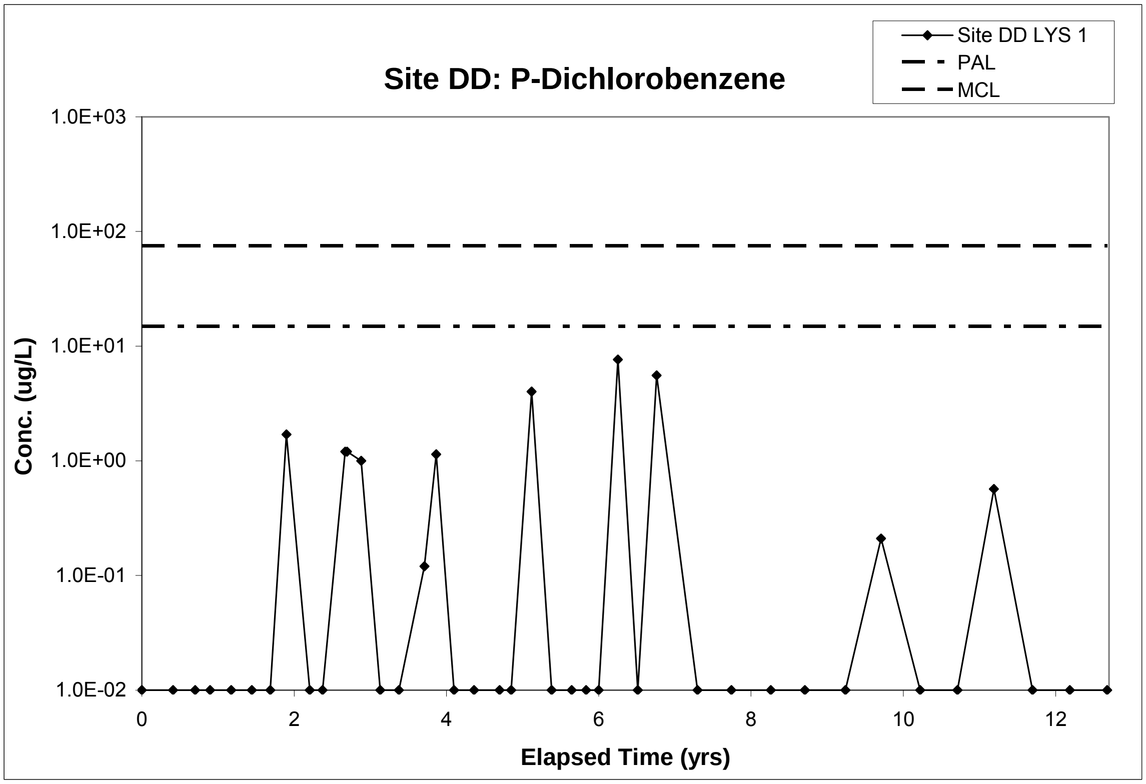

Site B LYS 1
PAL
MCL
Site B: P-Dichlorobenzene
Lysimeter Dry: 89-99 (10yrs)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

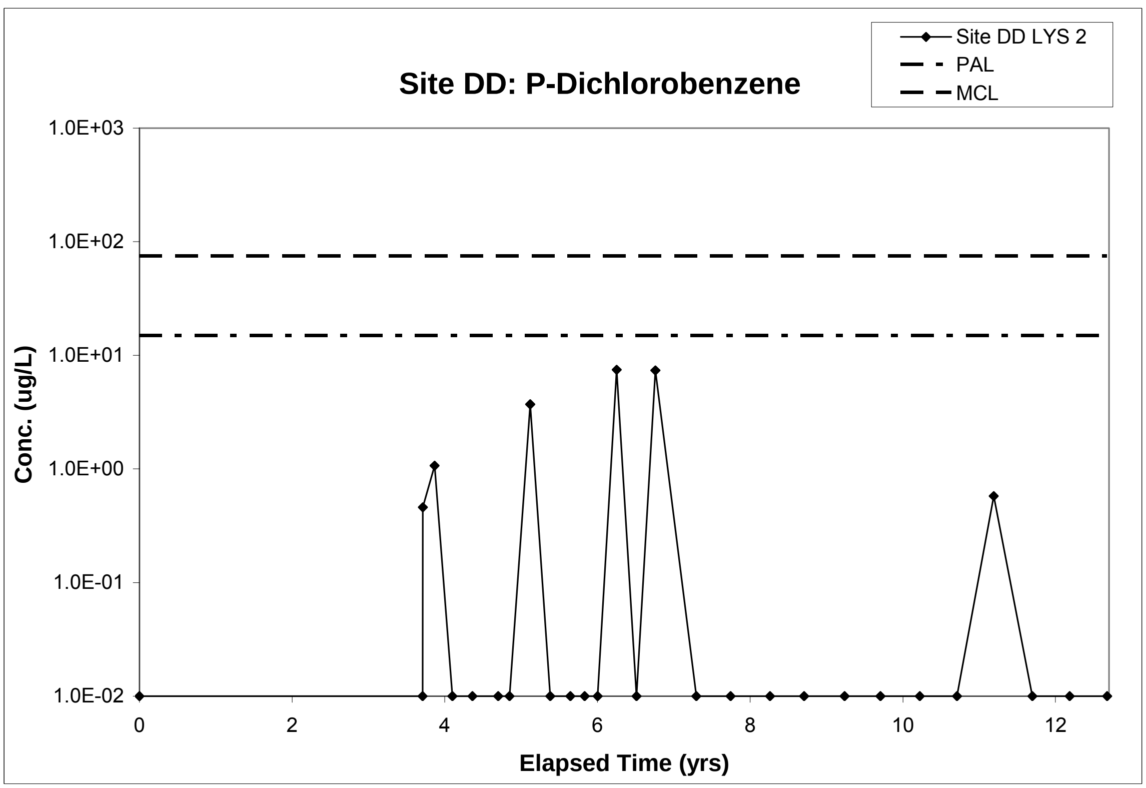

Site C: P-Dichlorobenzene
Site C LYS 1
PAL
MCL
Lysimeter Dry: 91-91 & 99-02
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Conc. (ug/L)
Elapsed Time (yrs)

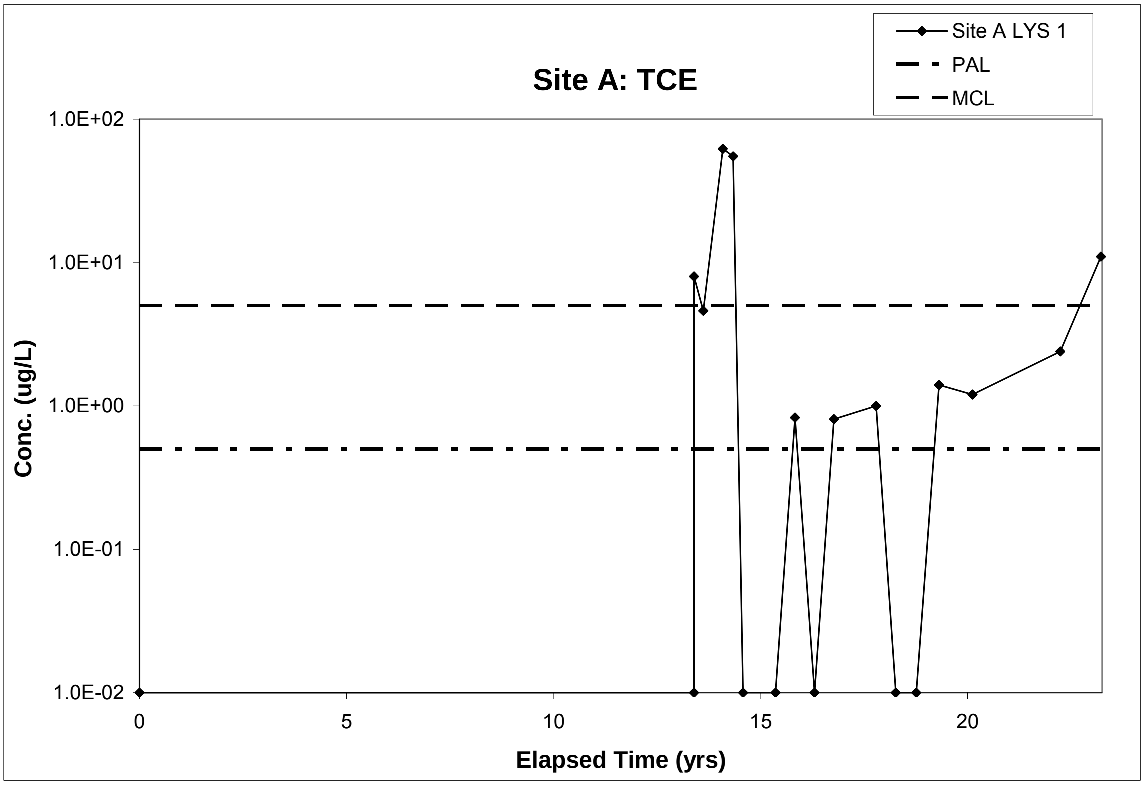

Site G: P-Dichlorobenzene
Site G LYS 1
PAL
MCL
Lysimeter Dry: 01-Present
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Conc. (ug/L)
Elapsed Time (yrs)

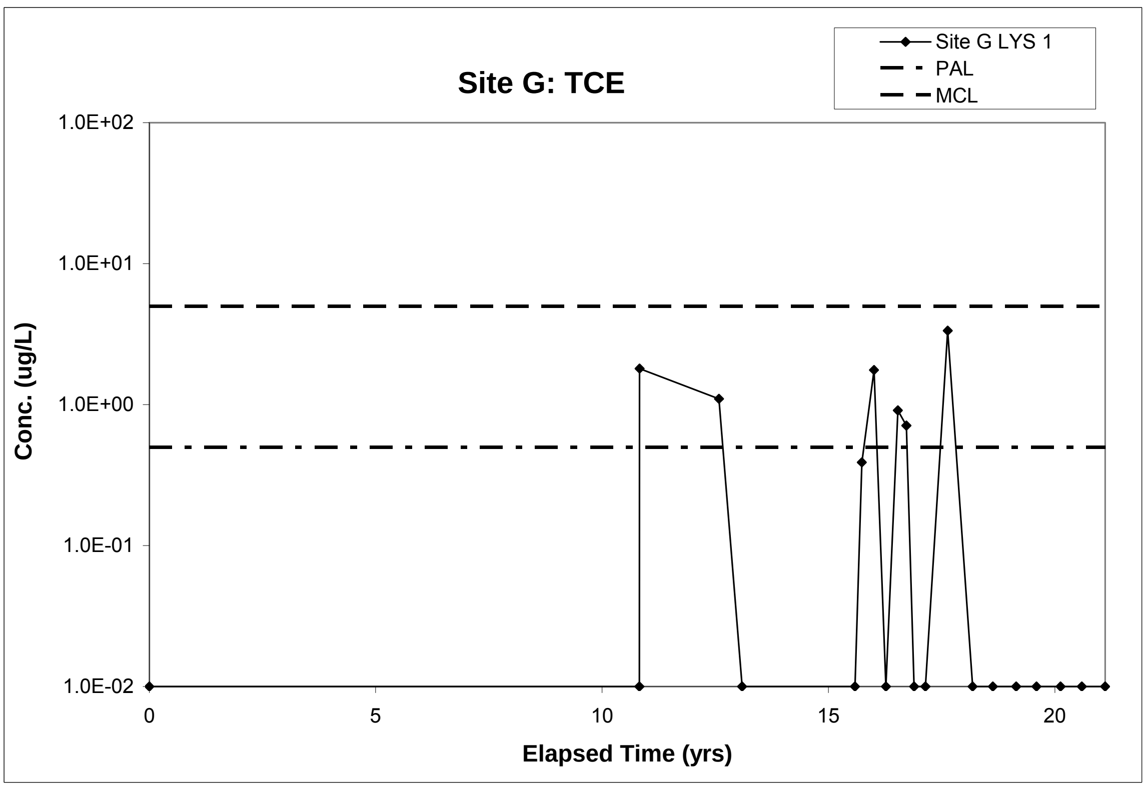

Site J: P-Dichlorobenzene
Site J LYS 2
PAL
MCL
Lysimeter Dry: 80-91 & 98-01
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

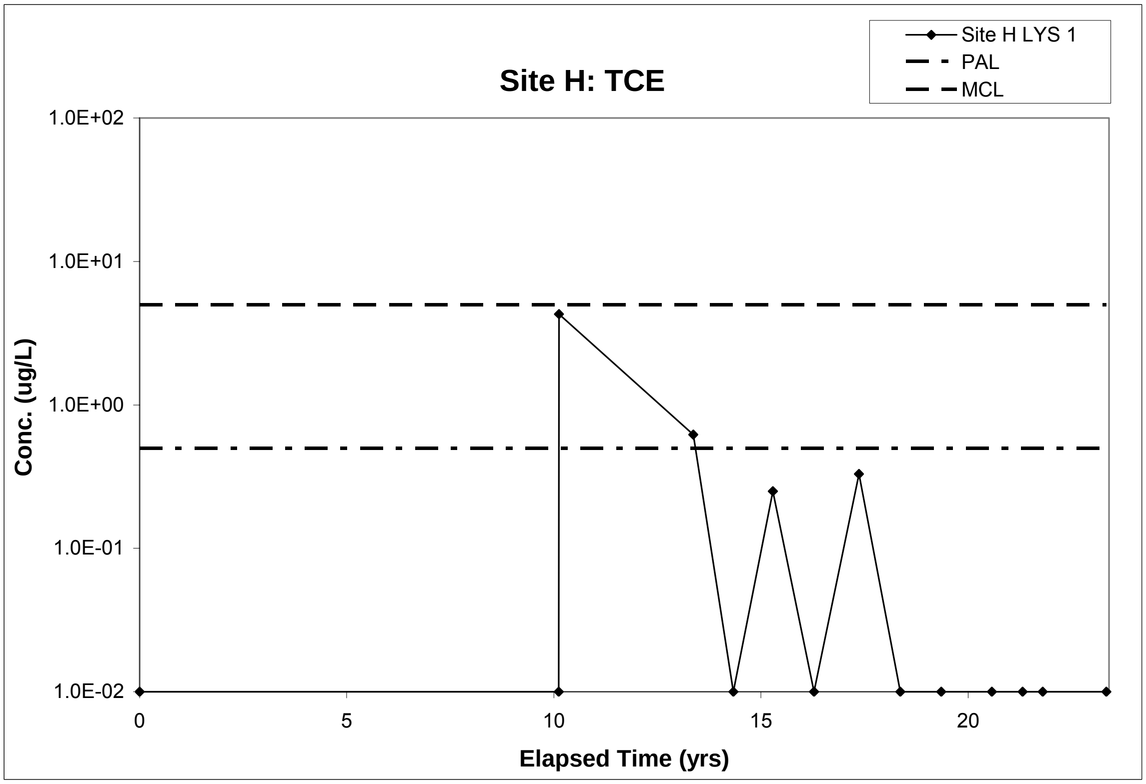

Site Y: P-Dichlorobenzene
Site Y LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

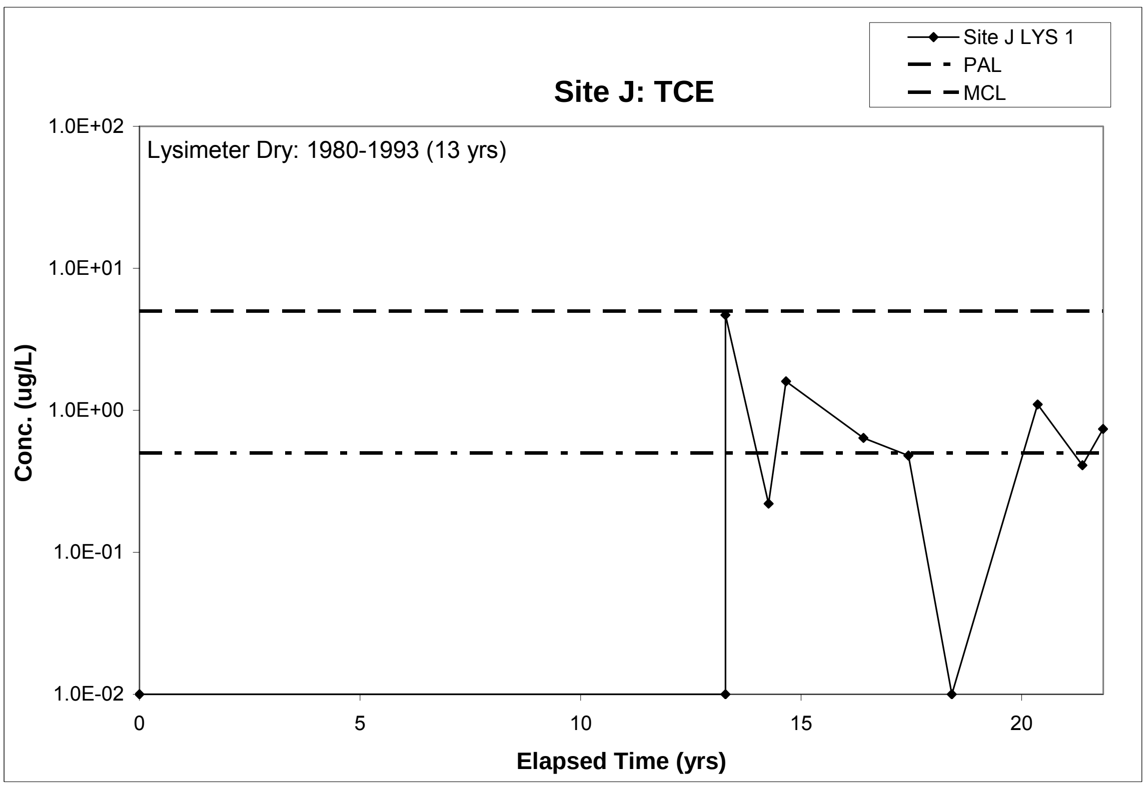

Site DD: P-Dichlorobenzene
Site DD LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

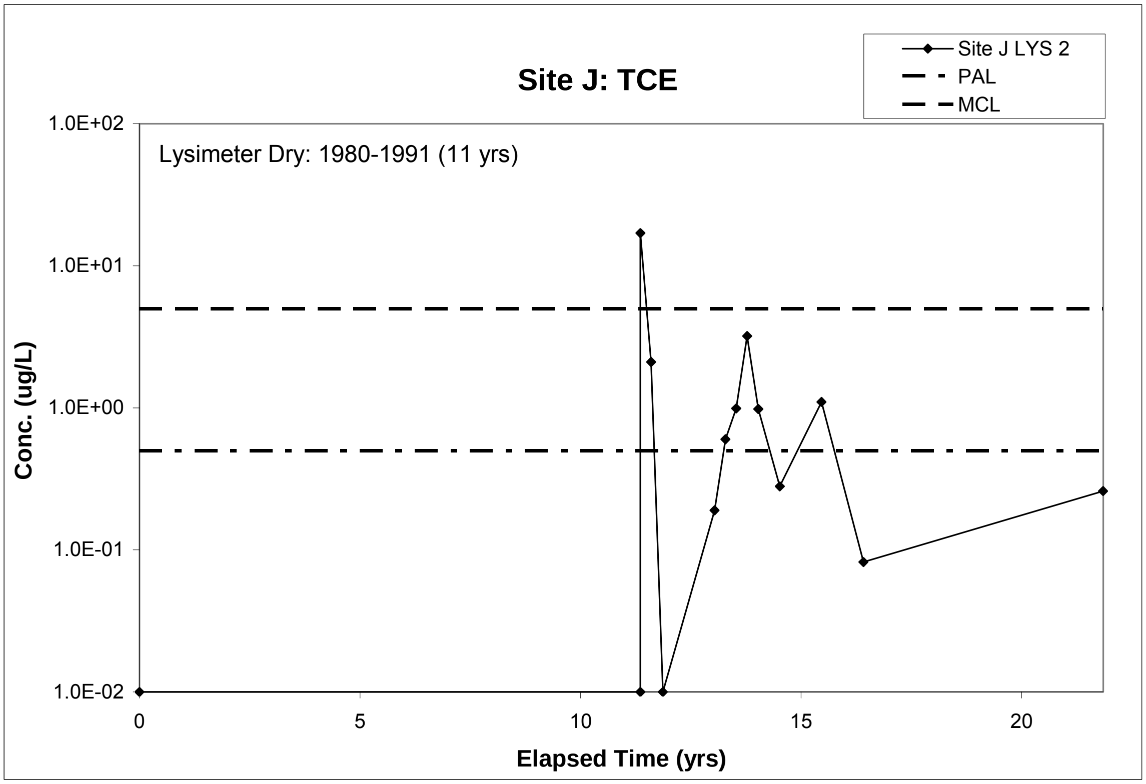

Site DD: P-Dichlorobenzene
Site DD LYS 2
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

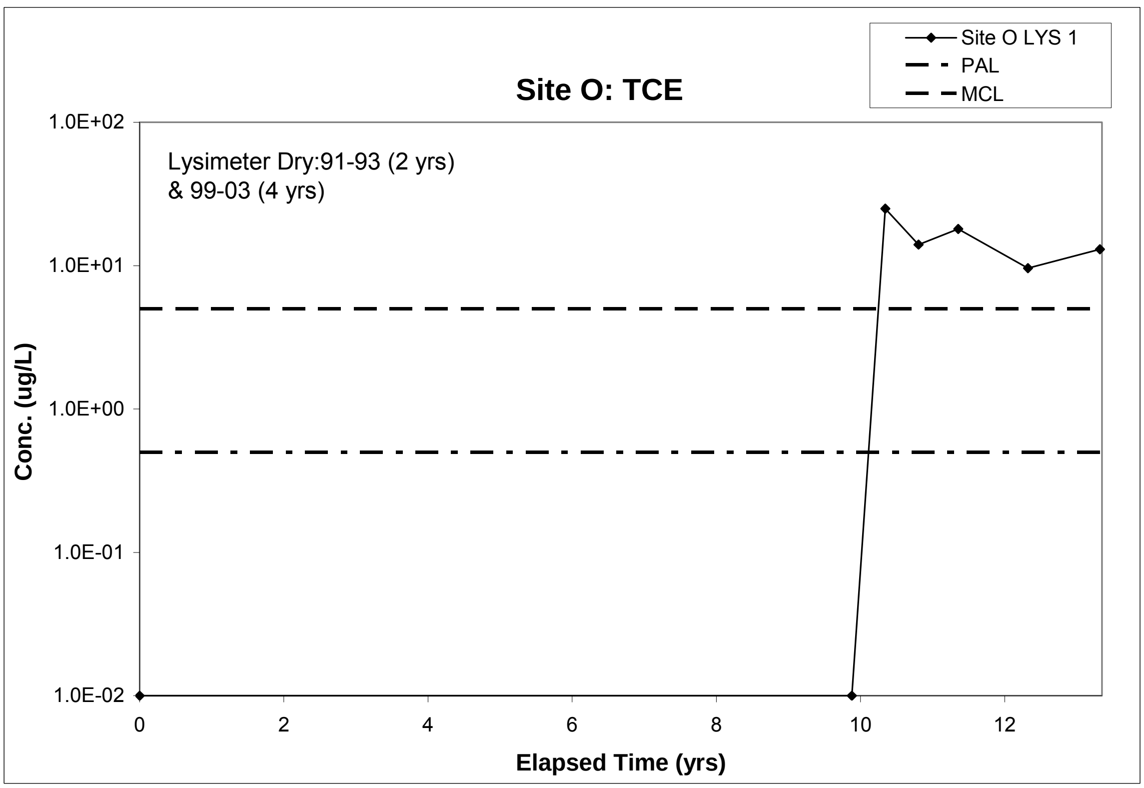

Site A: TCE
Site A LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

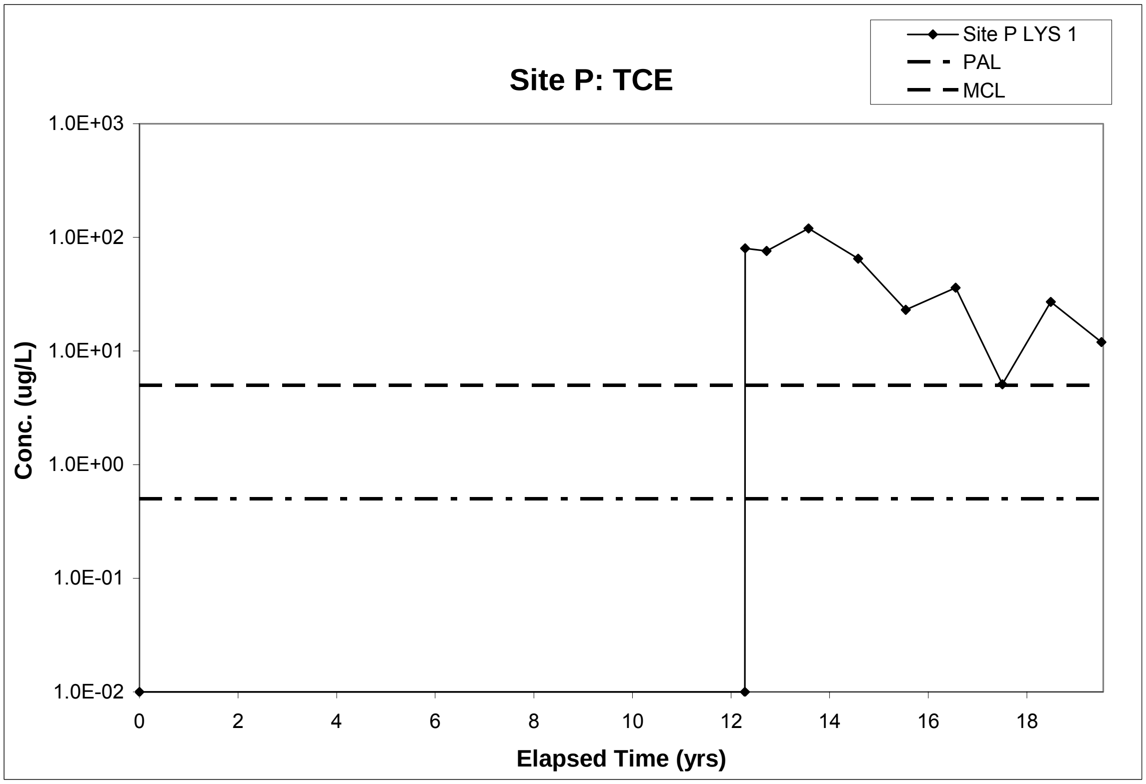

Site G: TCE
Site G LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

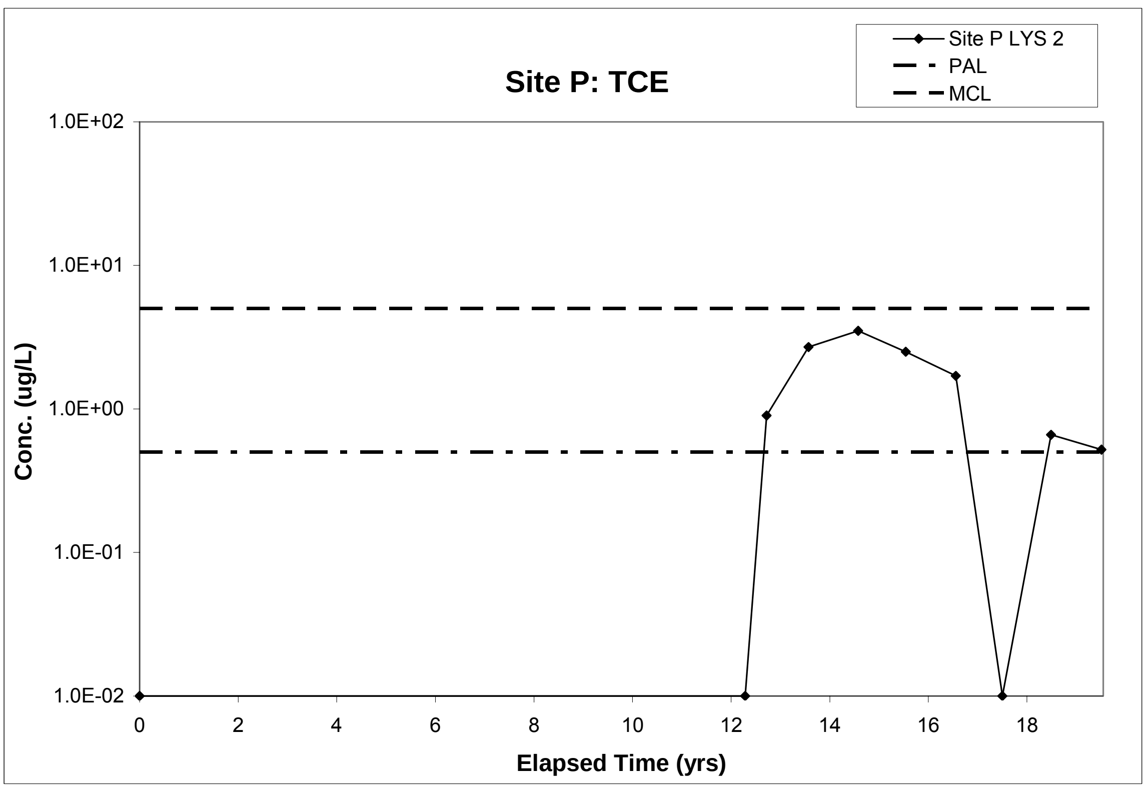

Site H: TCE
Site H LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

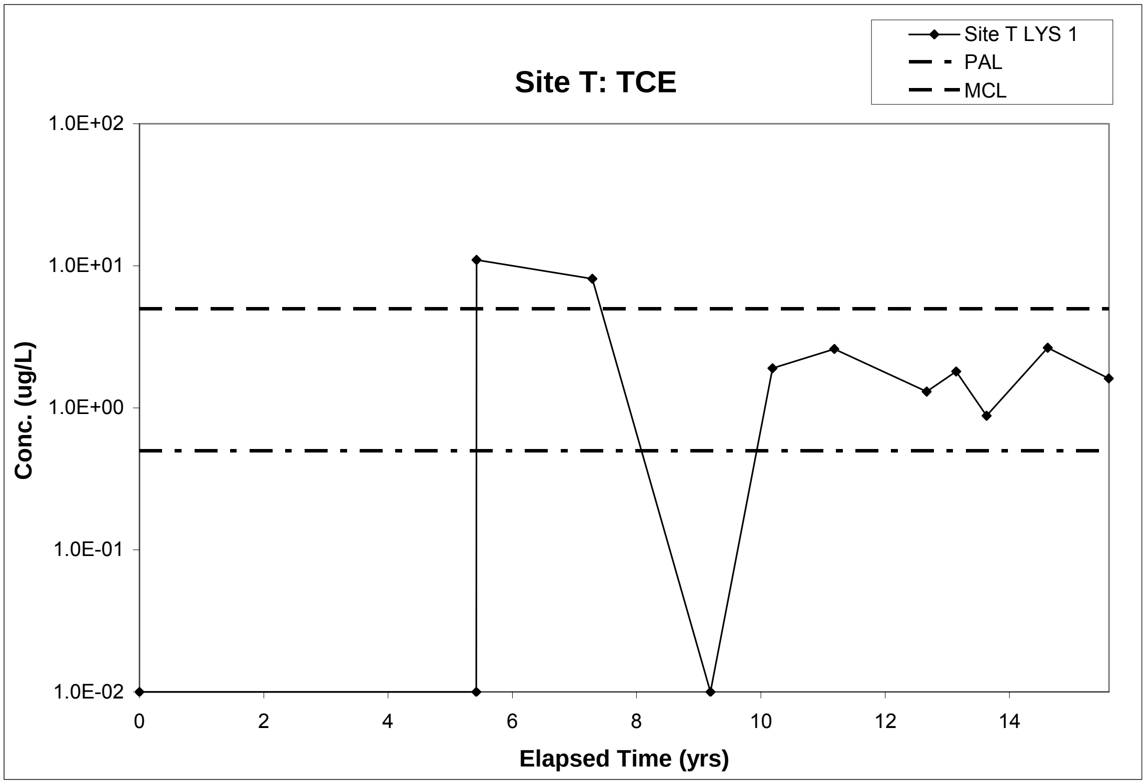

Site J: TCE
Site J LYS 1
PAL
MCL
Lysimeter Dry: 1980-1993 (13 yrs)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

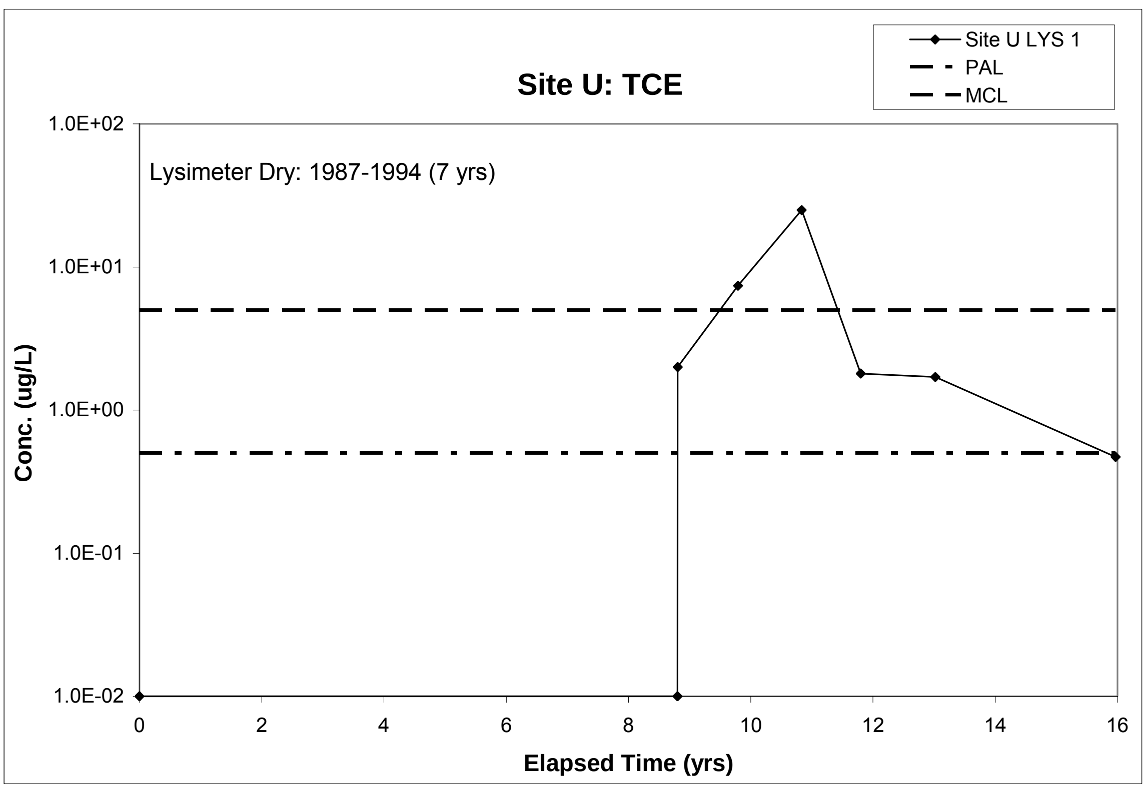

Site J: TCE
Site J LYS 2
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Lysimeter Dry: 1980-1991 (11 yrs)
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

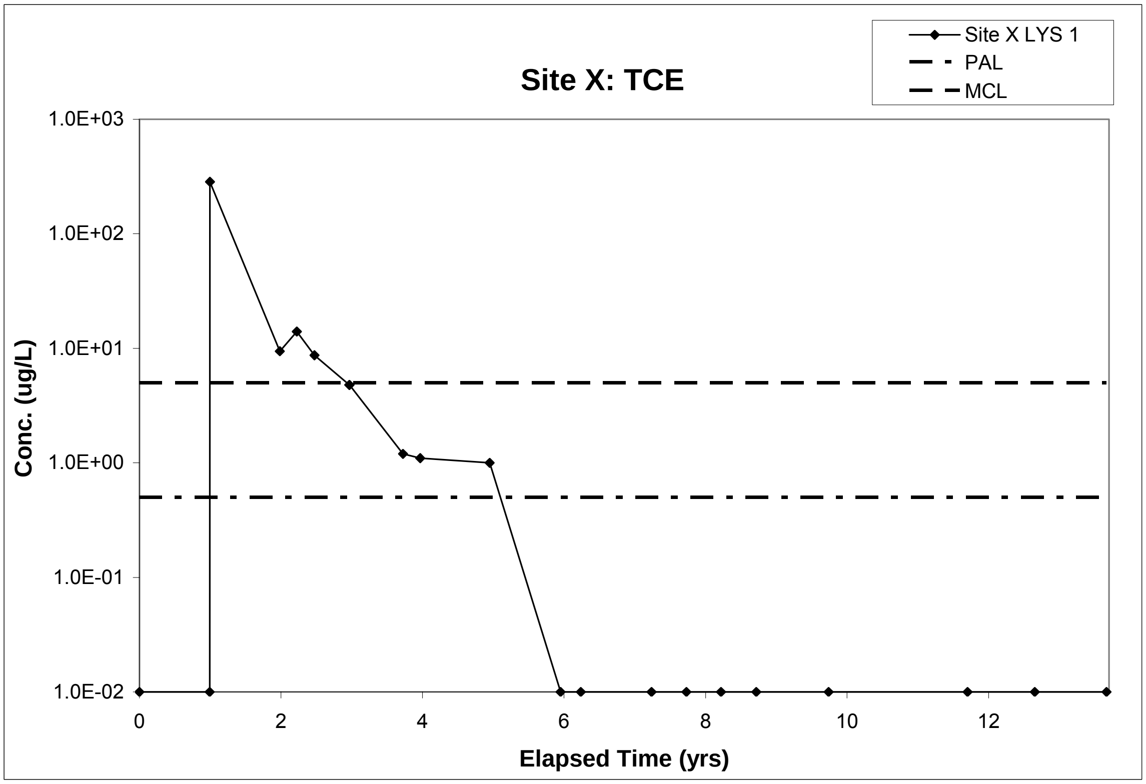

Site O: TCE
Site O LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Lysimeter Dry:91-93 (2 yrs)
& 99-03 (4 yrs)
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

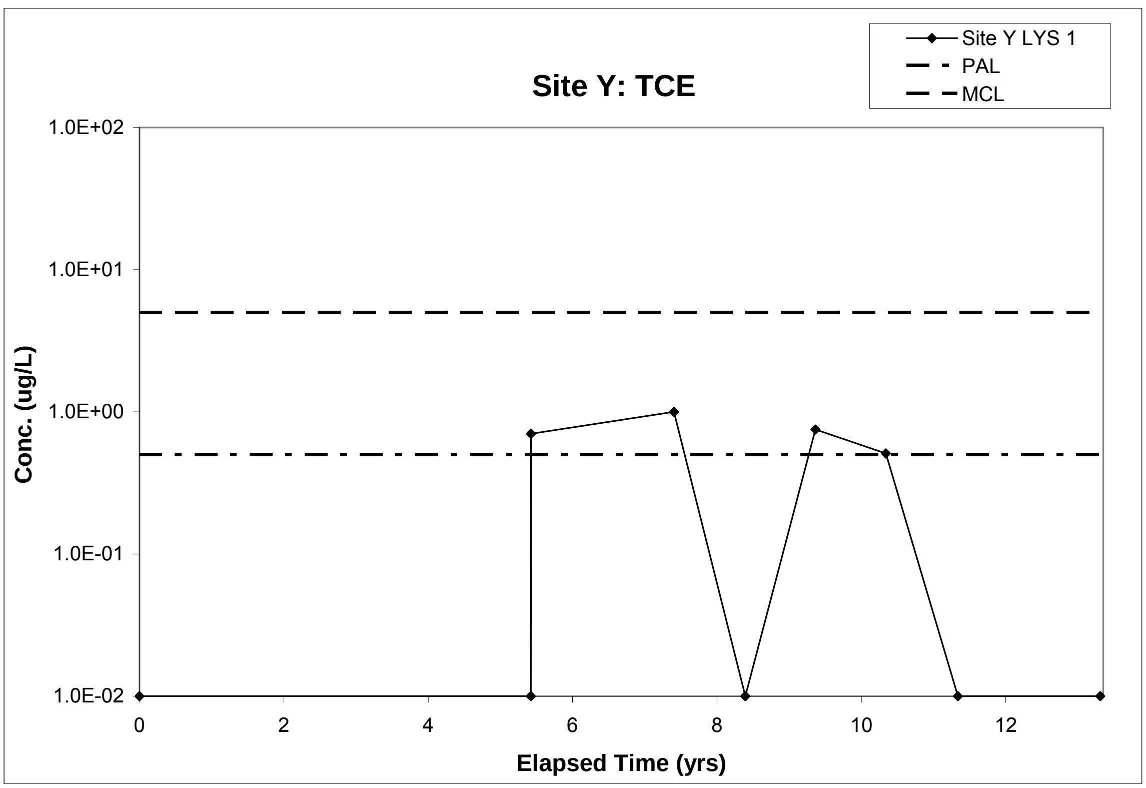

Site P: TCE
Site P LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

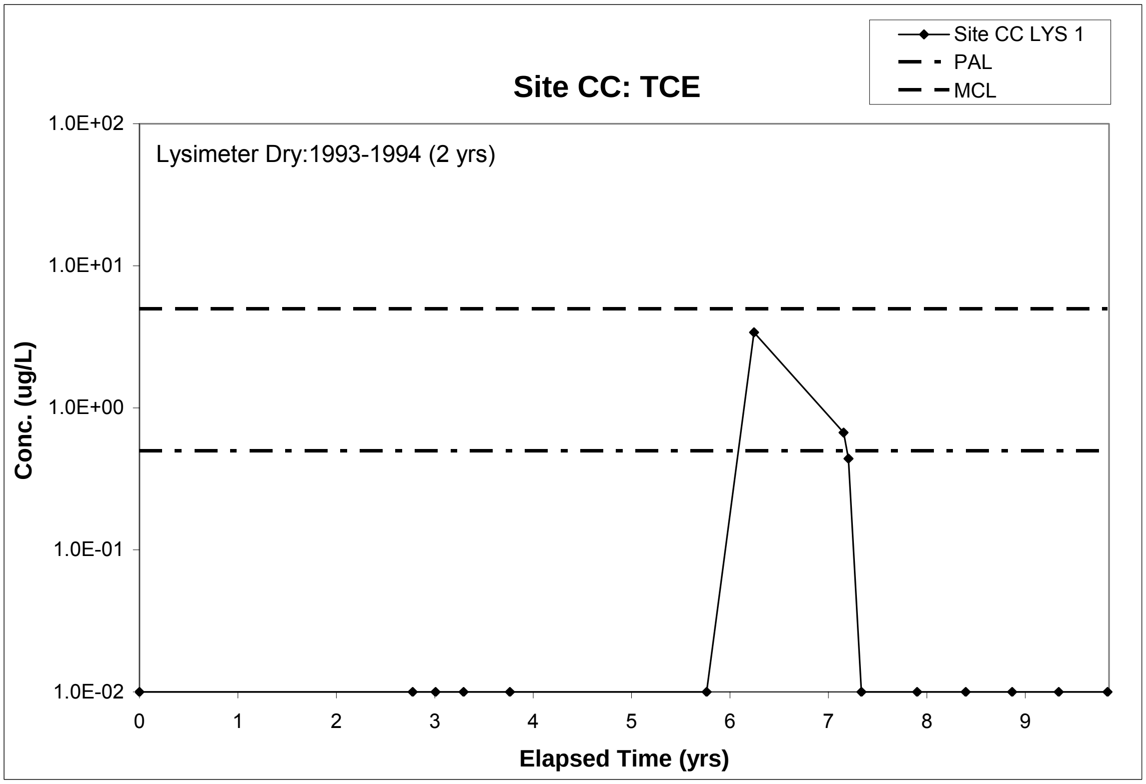

Site P: TCE
Site P LYS 2
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

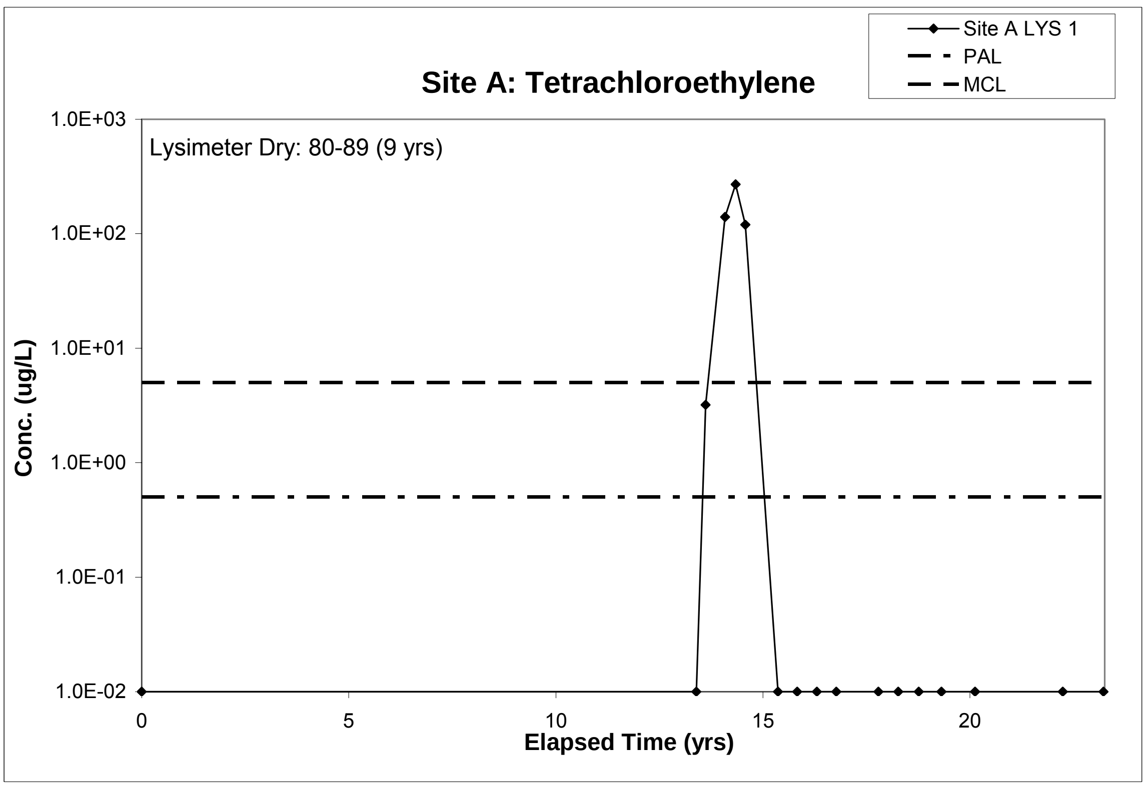

Site T: TCE
Site T LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

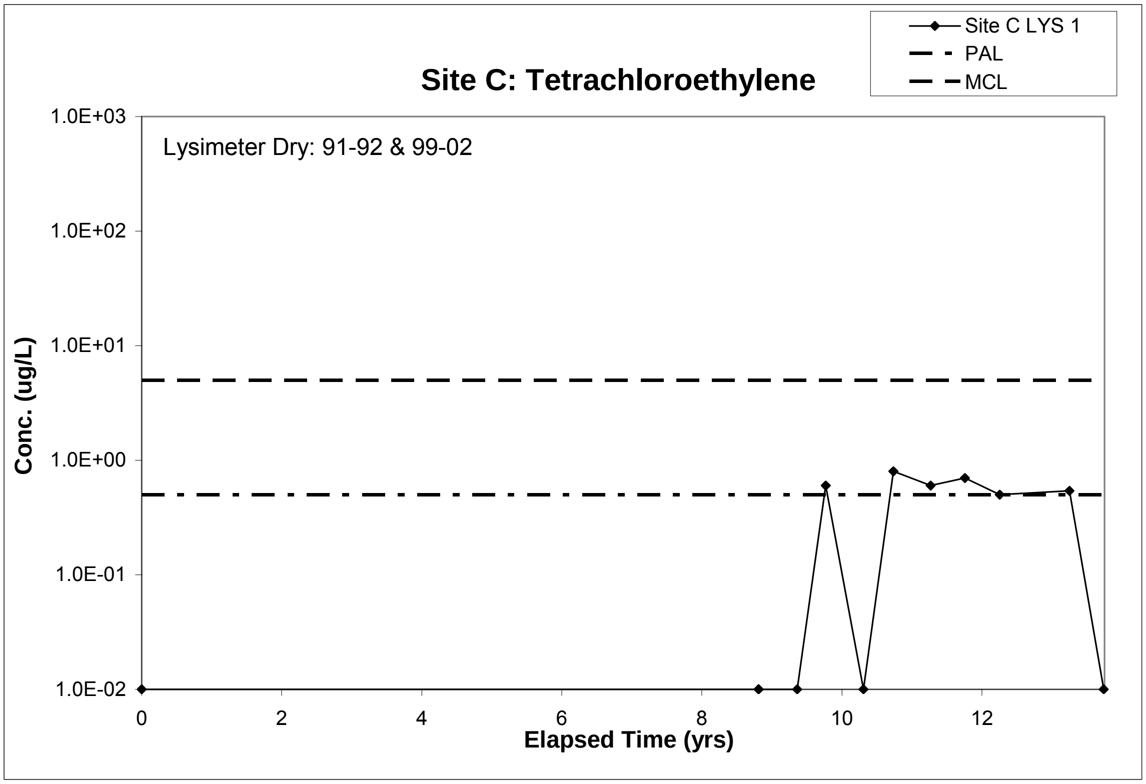

Site U: TCE
Site U LYS 1
PAL
MCL
Lysimeter Dry: 1987-1994 (7 yrs)
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

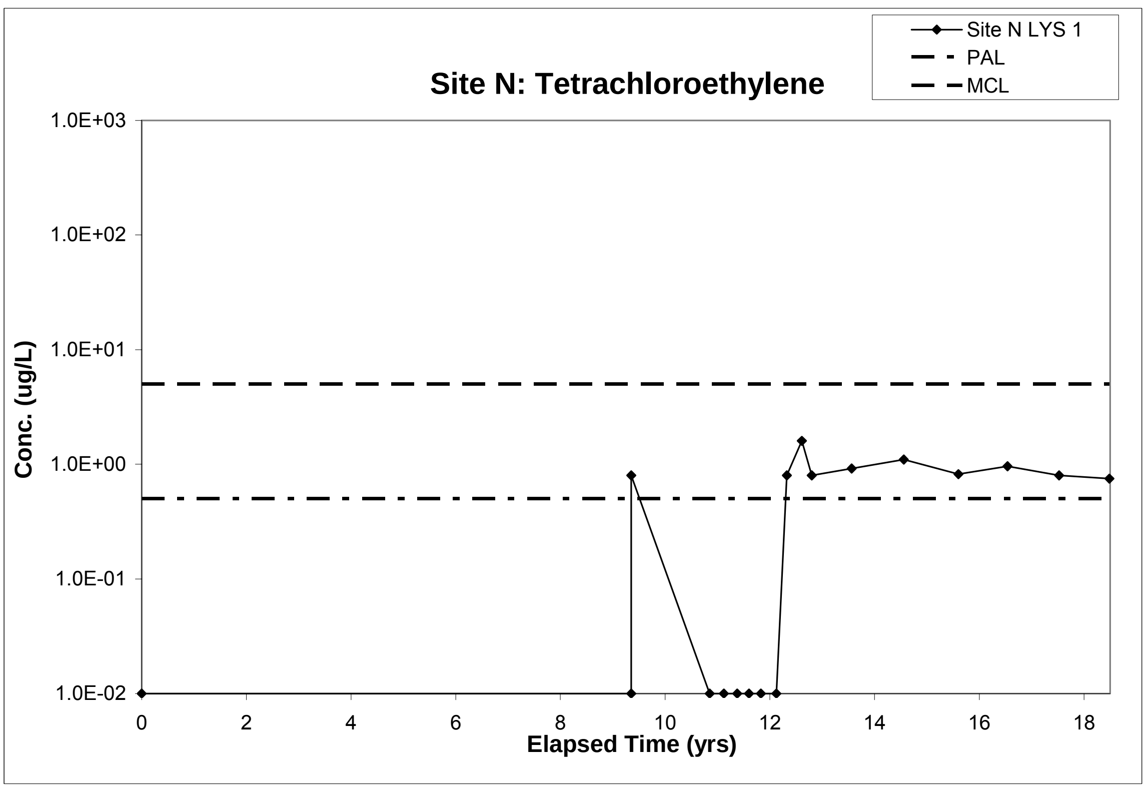

Site X: TCE
Site X LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

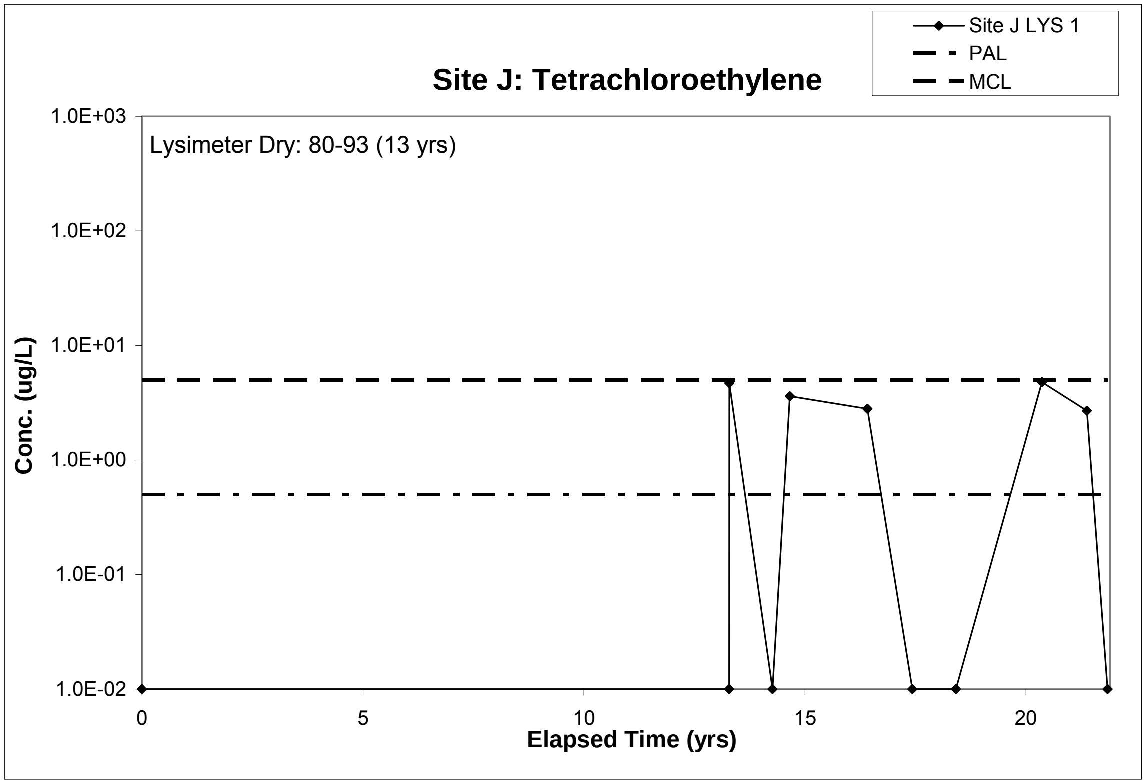

Site Y: TCE
Site Y LYS 1
PAL
MCL
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

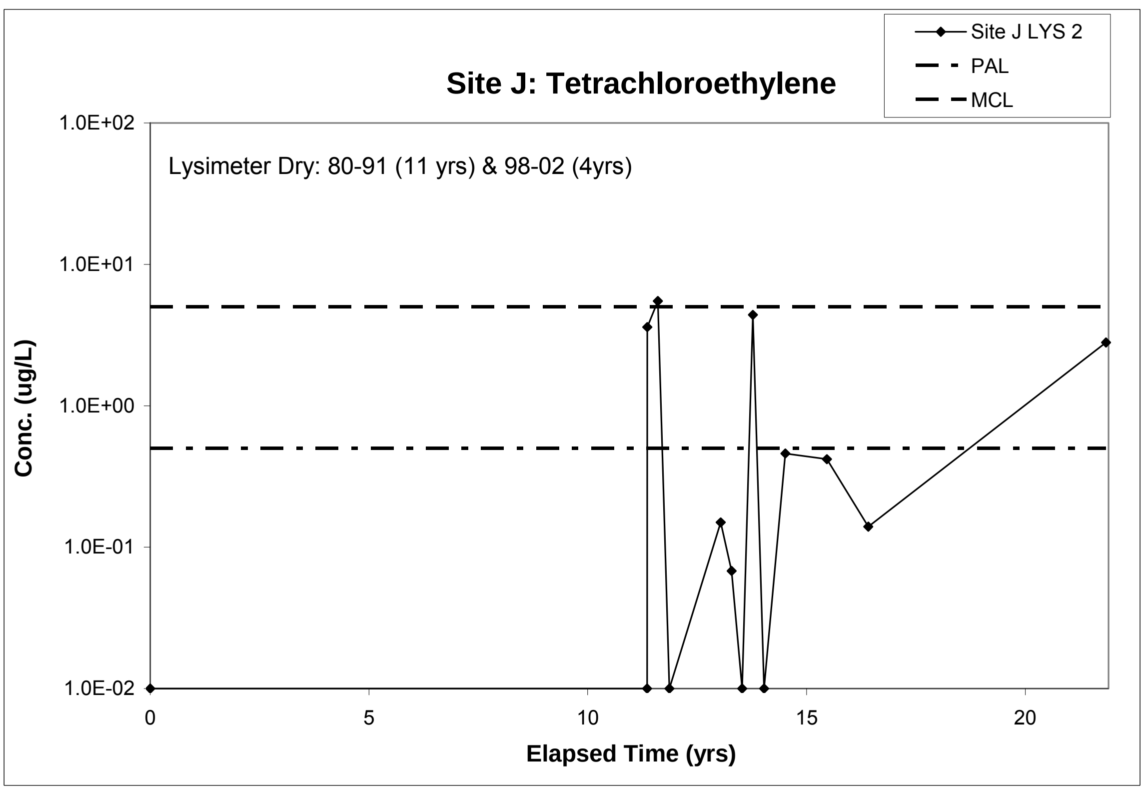

Site CC LYS 1
PAL
MCL
Site CC: TCE
Lysimeter Dry:1993-1994 (2 yrs)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
9
Elapsed Time (yrs)

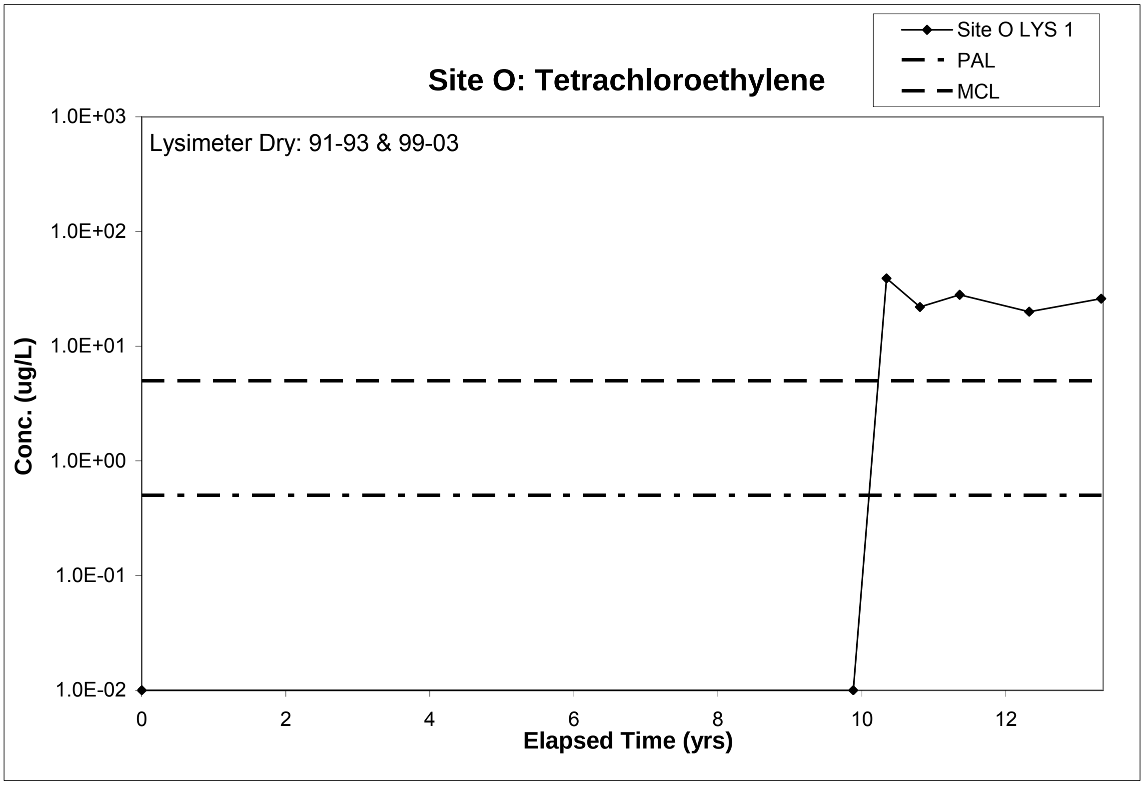

Site A LYS 1
PAL
MCL
Site A: Tetrachloroethylene
Lysimeter Dry: 80-89 (9 yrs)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

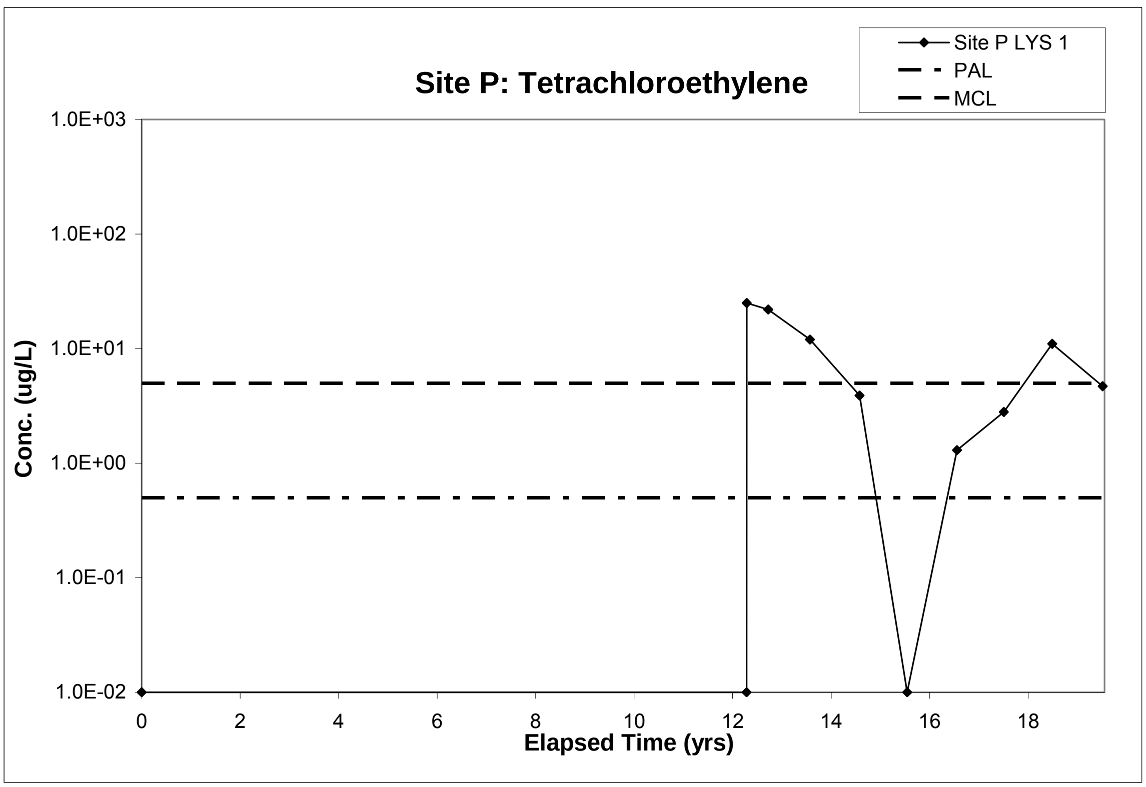

Site C: Tetrachloroethylene
Site C LYS 1
PAL
MCL
Lysimeter Dry: 91-92 & 99-02
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

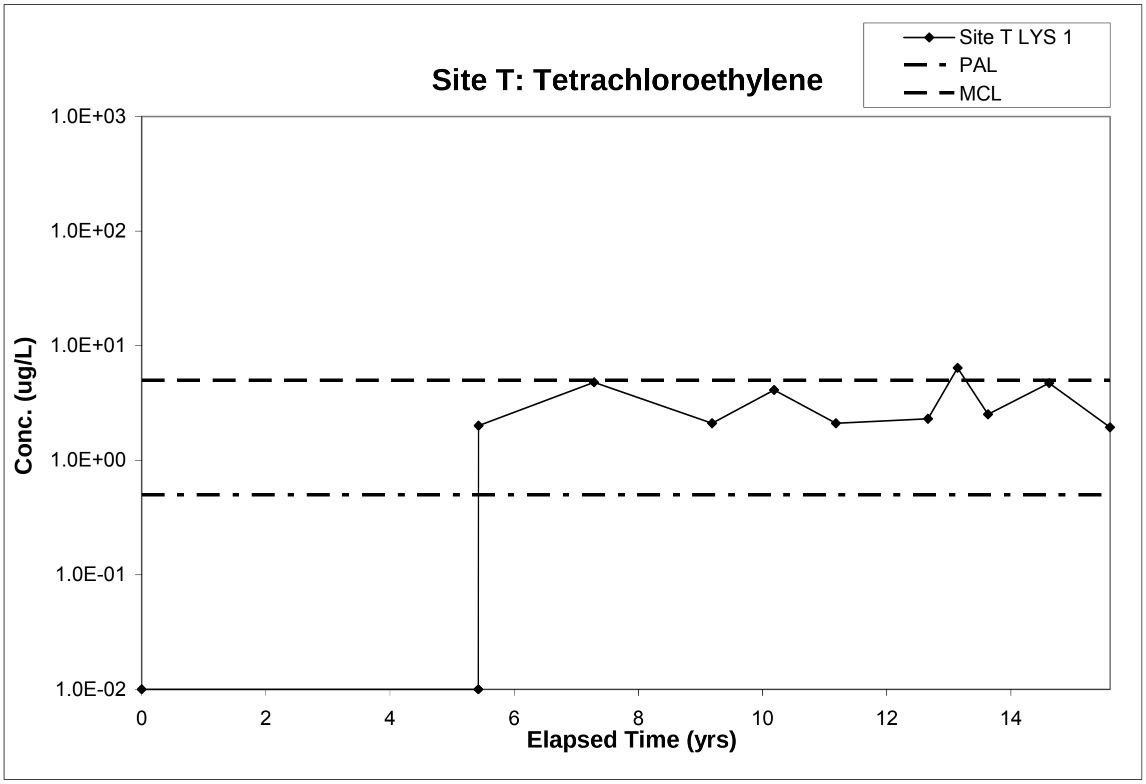

Site N: Tetrachloroethylene
Site N LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

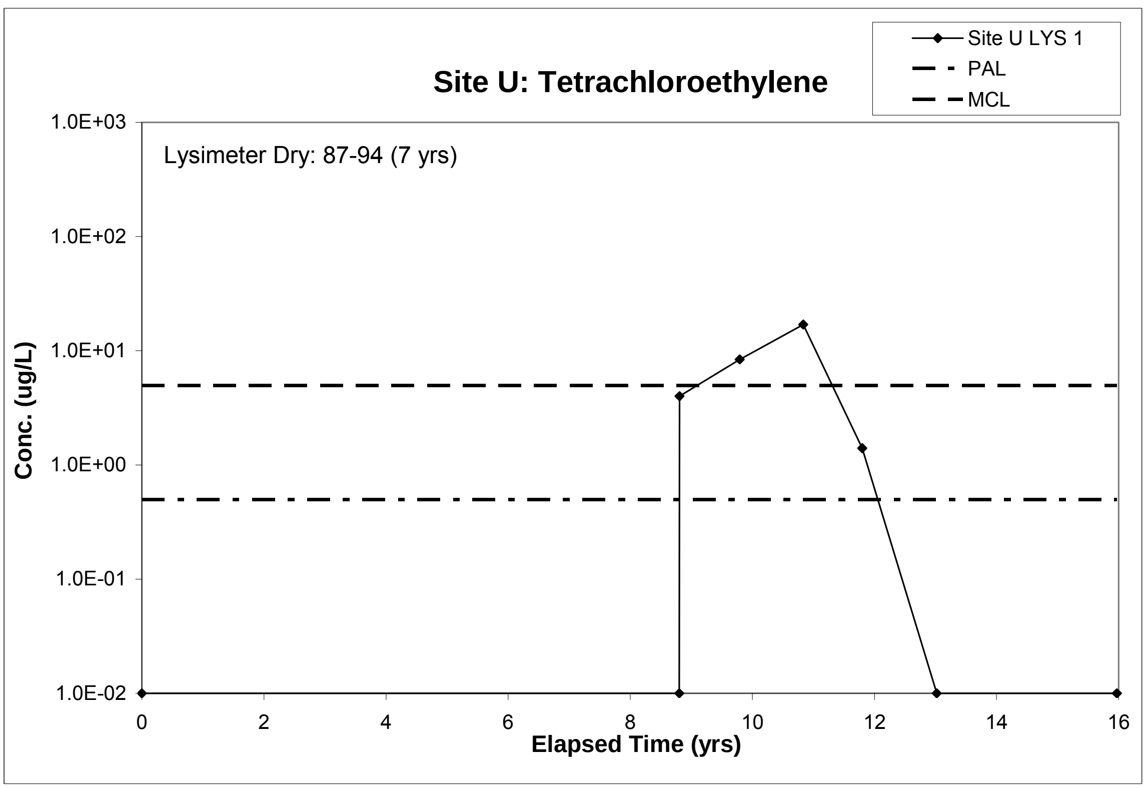

Site J: Tetrachloroethylene
Site J LYS 1
PAL
MCL
Lysimeter Dry: 80-93 (13 yrs)
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

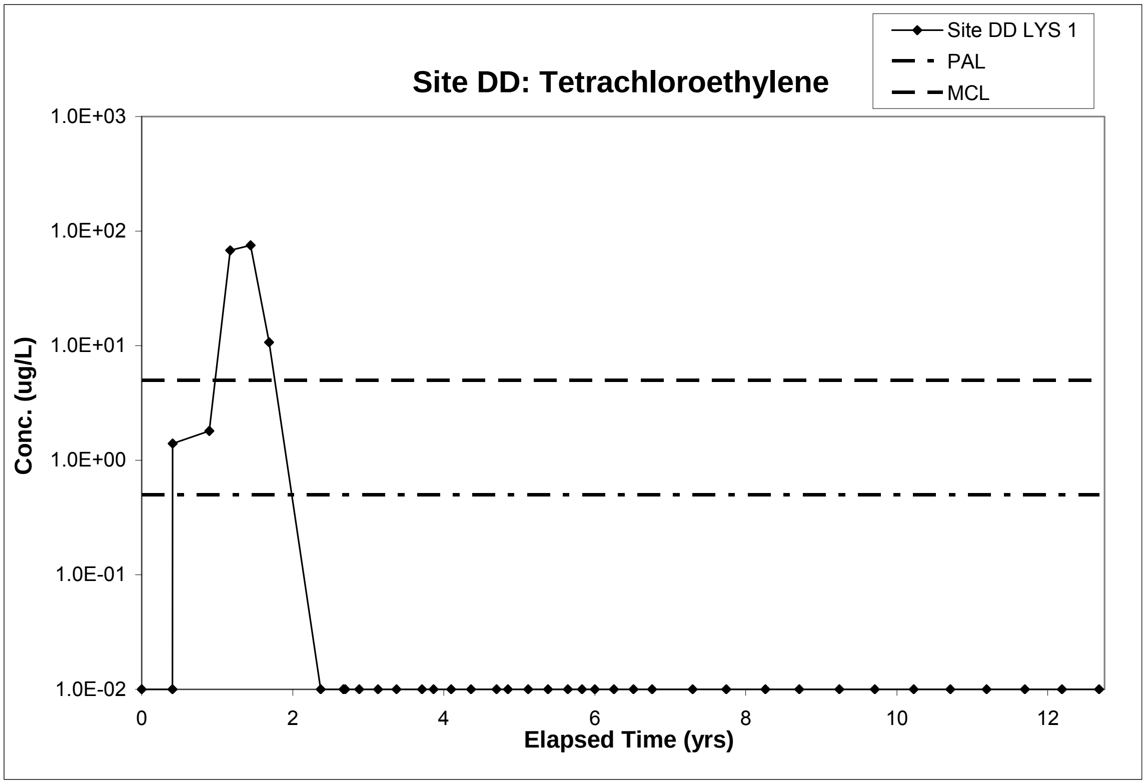

Site J: Tetrachloroethylene
Site J LYS 2
PAL
MCL
Lysimeter Dry: 80-91 (11 yrs) & 98-02 (4yrs)
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

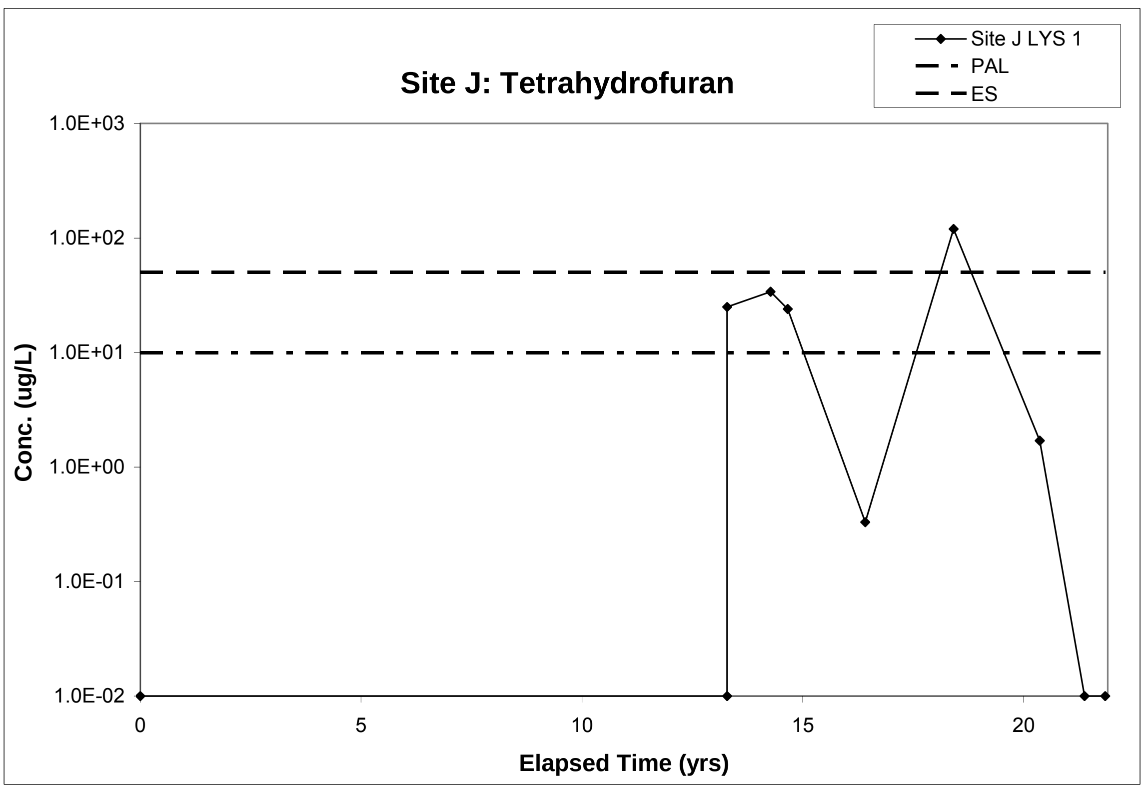

Site O: Tetrachloroethylene
Site O LYS 1
PAL
MCL
Lysimeter Dry: 91-93 & 99-03
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

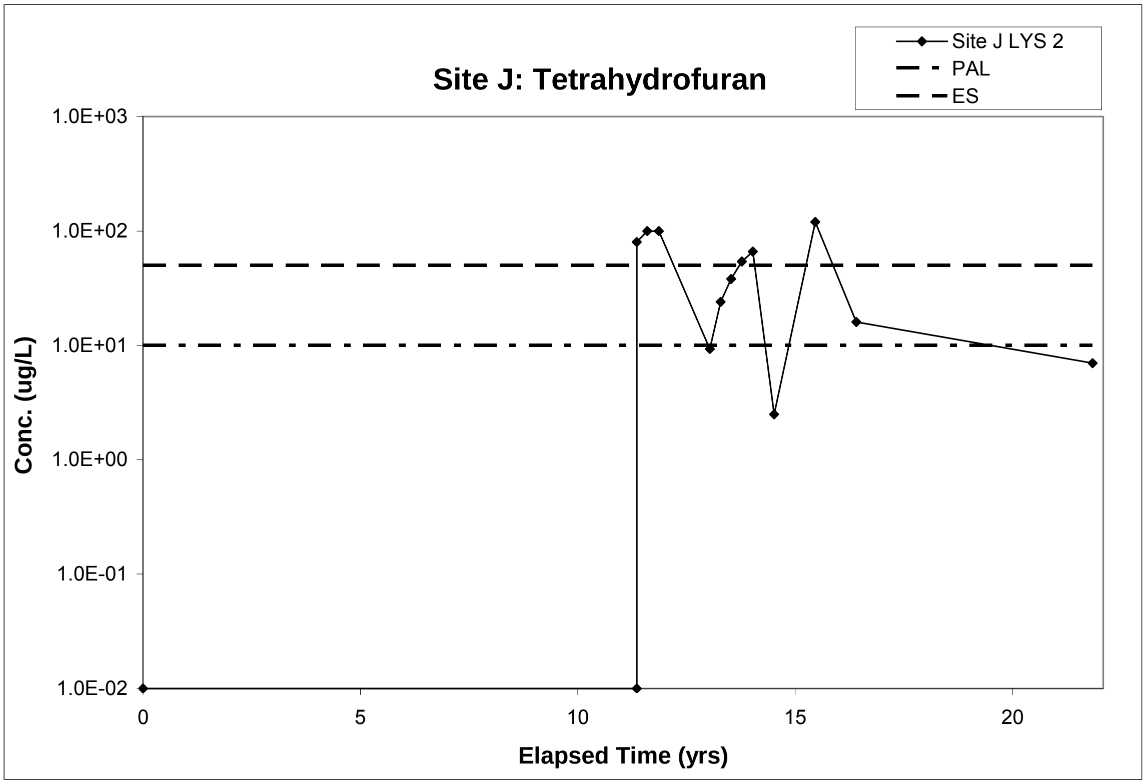

Site P: Tetrachloroethylene
Site P LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

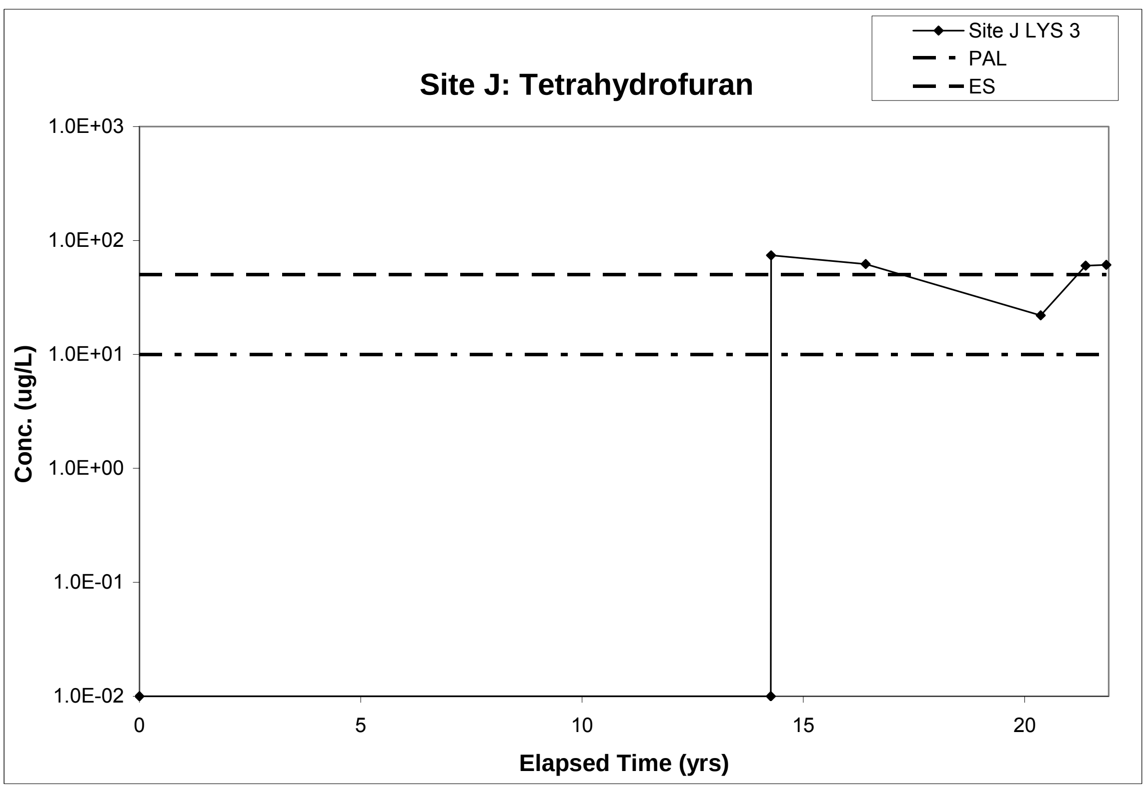

Site T: Tetrachloroethylene
Site T LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

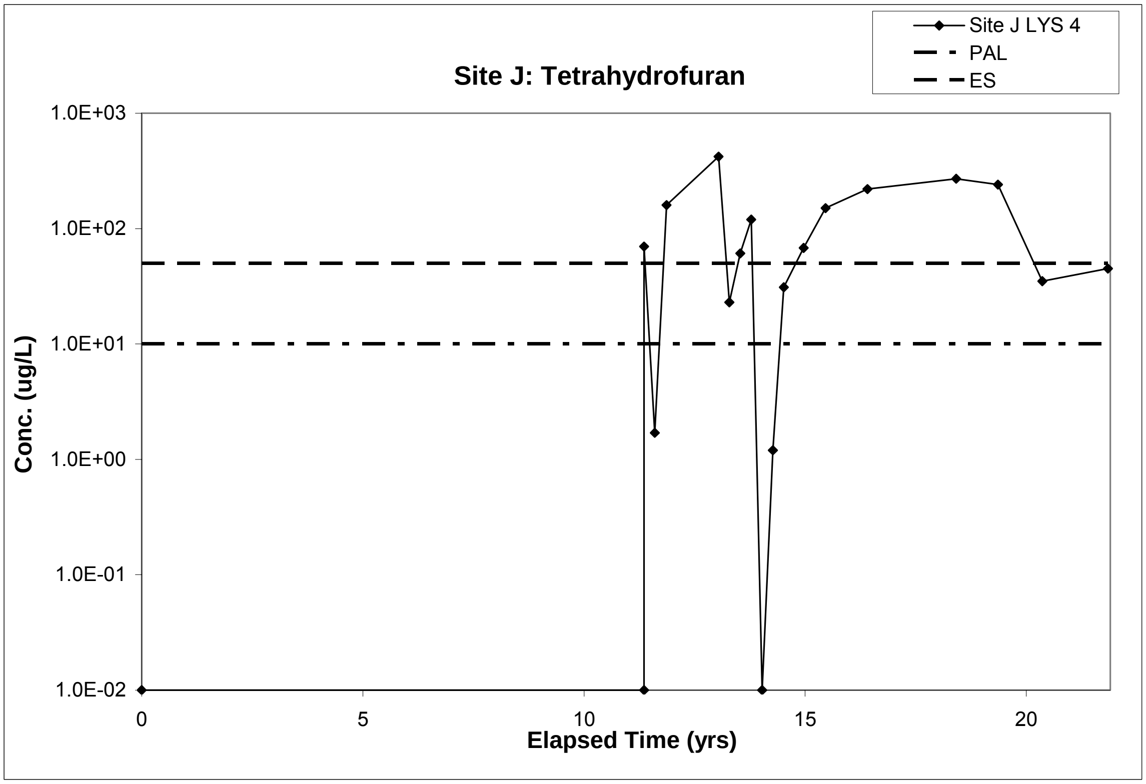

Site U: Tetrachloroethylene
Site U LYS 1
PAL
MCL
Lysimeter Dry: 87-94 (7 yrs)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

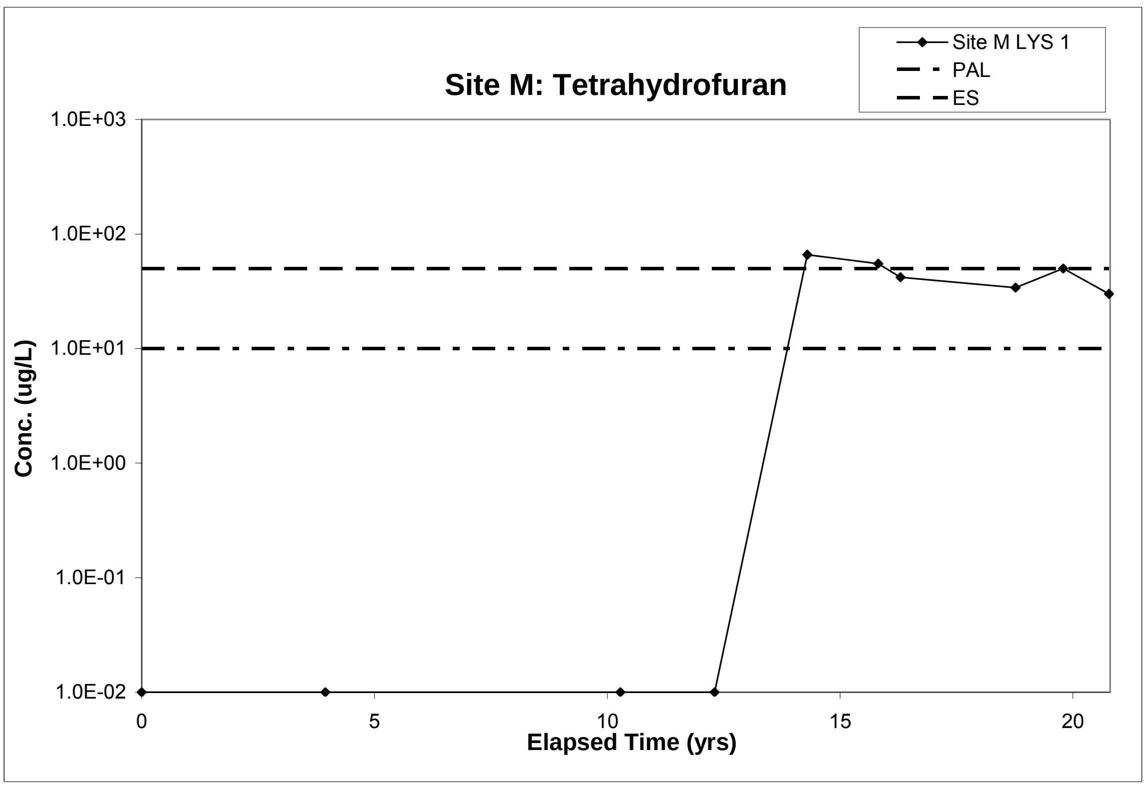

Site DD: Tetrachloroethylene
Site DD LYS 1
PAL
MCL
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

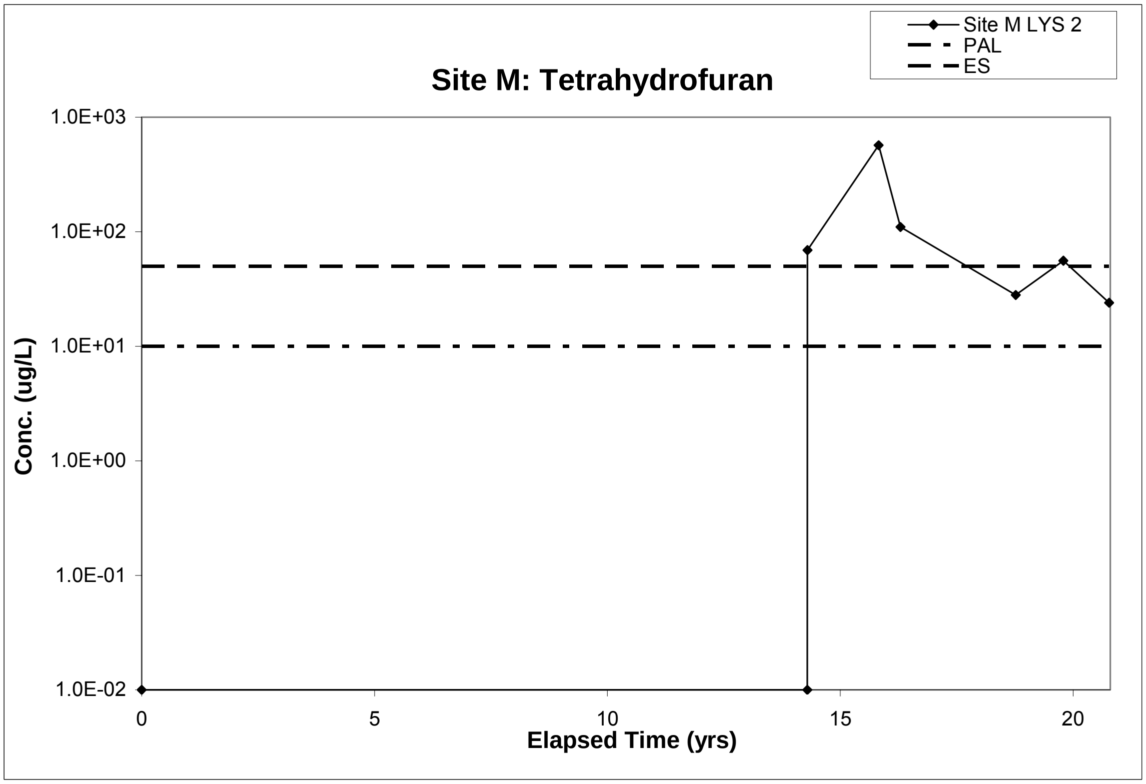

Site J: Tetrahydrofuran
Site J LYS 1
PAL
ES
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

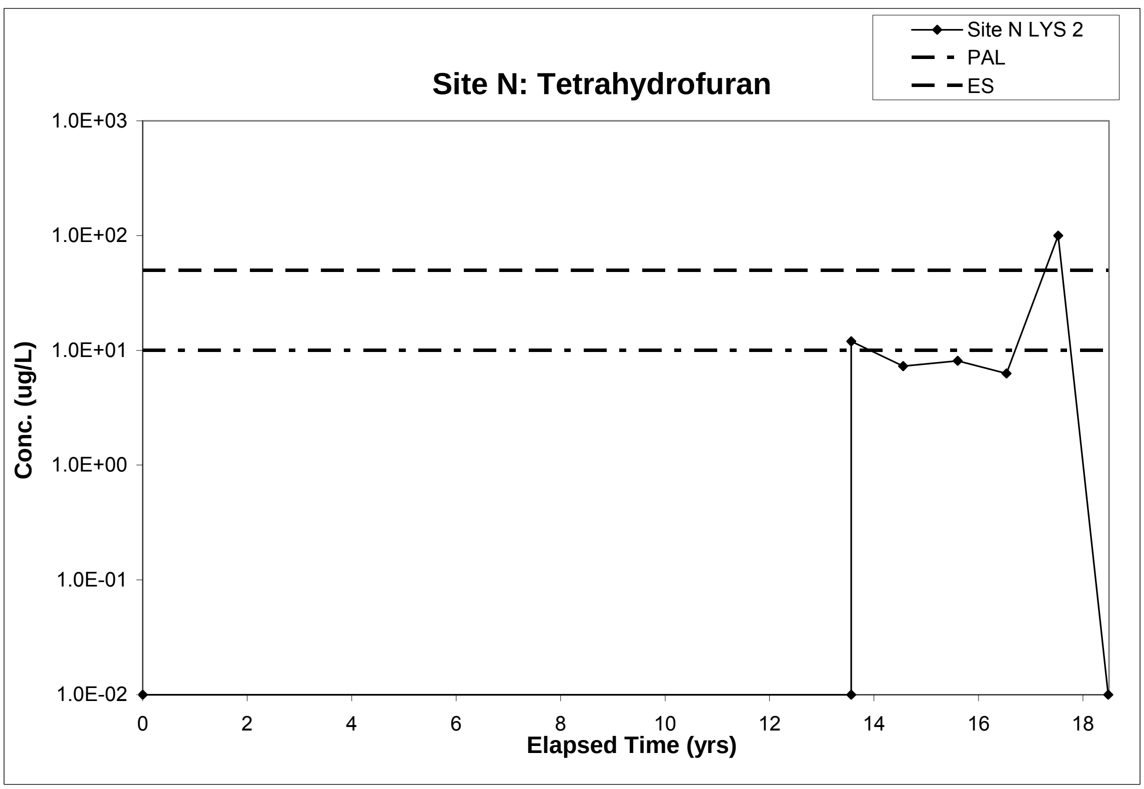

Site J: Tetrahydrofuran
Site J LYS 2
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

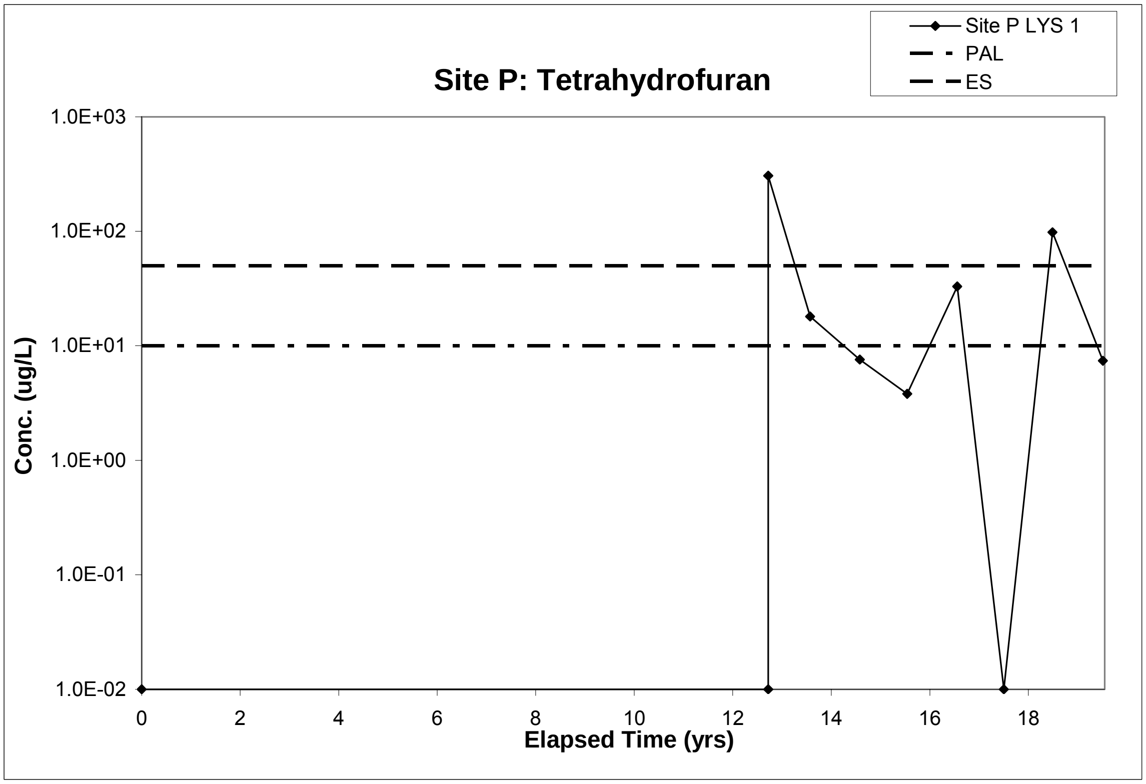

Site J: Tetrahydrofuran
Site J LYS 3
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

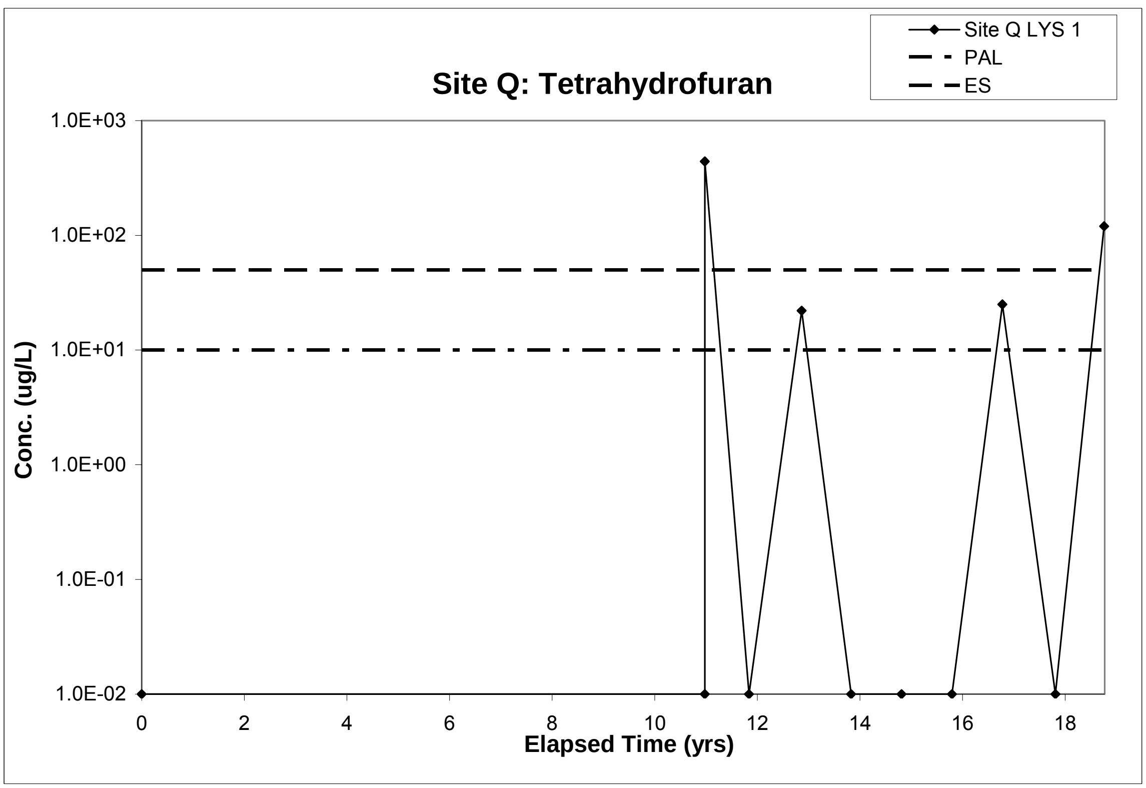

Site J: Tetrahydrofuran
Site J LYS 4
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

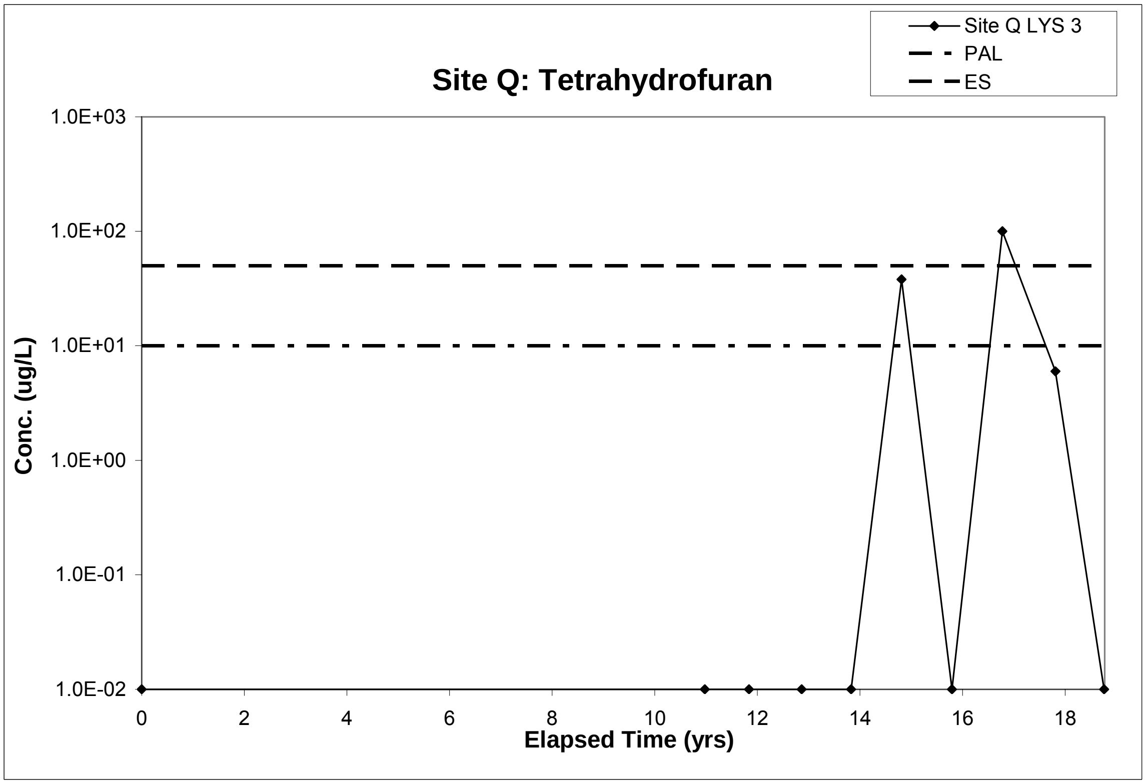

Site M: Tetrahydrofuran
Site M LYS 1
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)


Site M: Tetrahydrofuran
Site M LYS 2
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

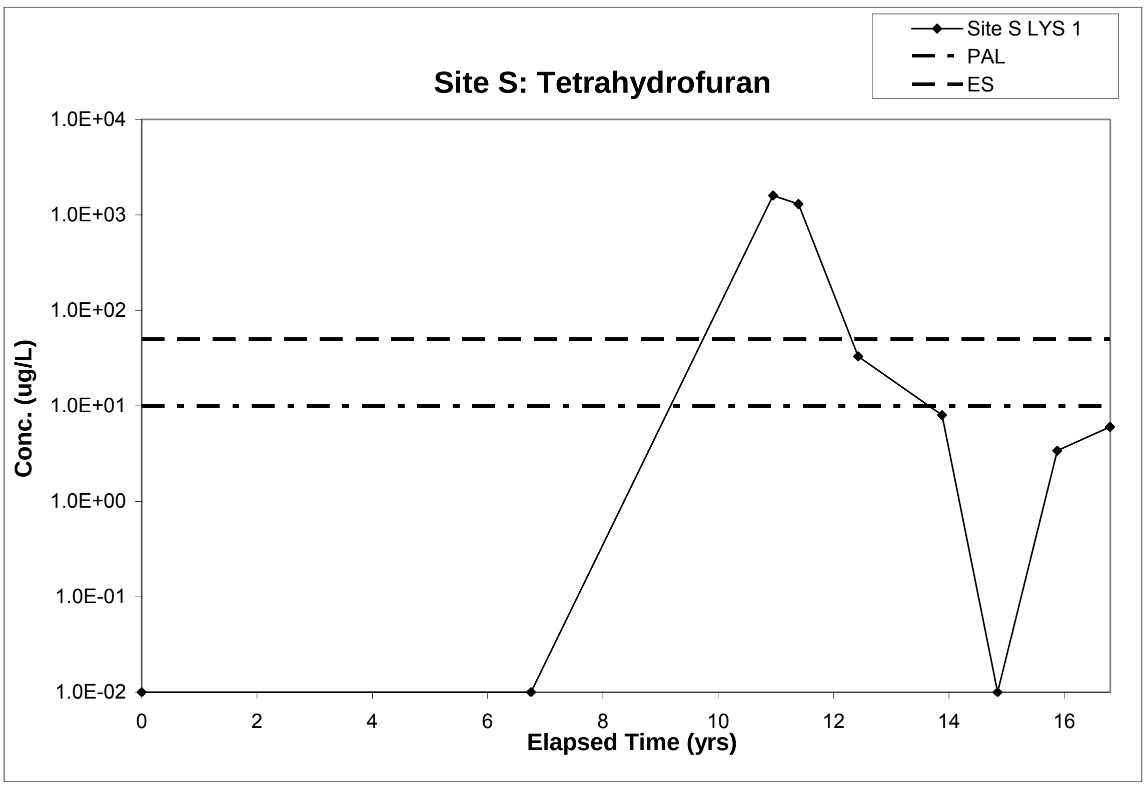

Site N: Tetrahydrofuran
Site N LYS 2
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)


Site P: Tetrahydrofuran
Site P LYS 1
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

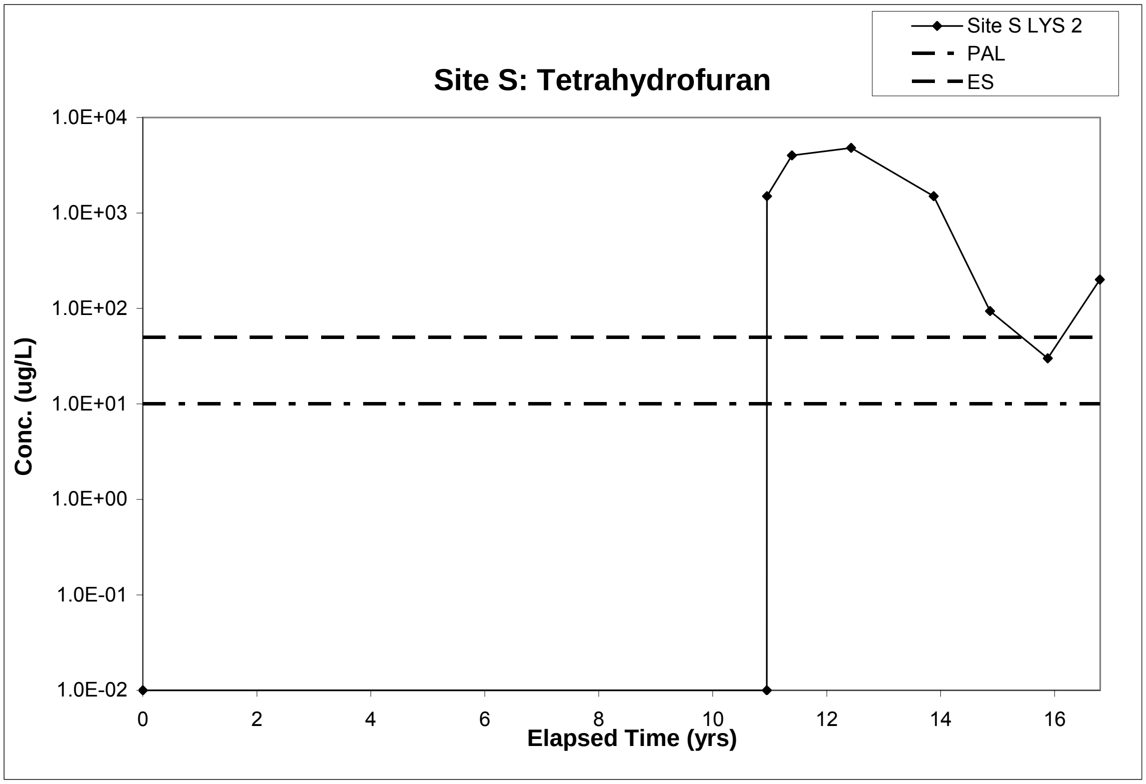

Site Q: Tetrahydrofuran
Site Q LYS 1
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

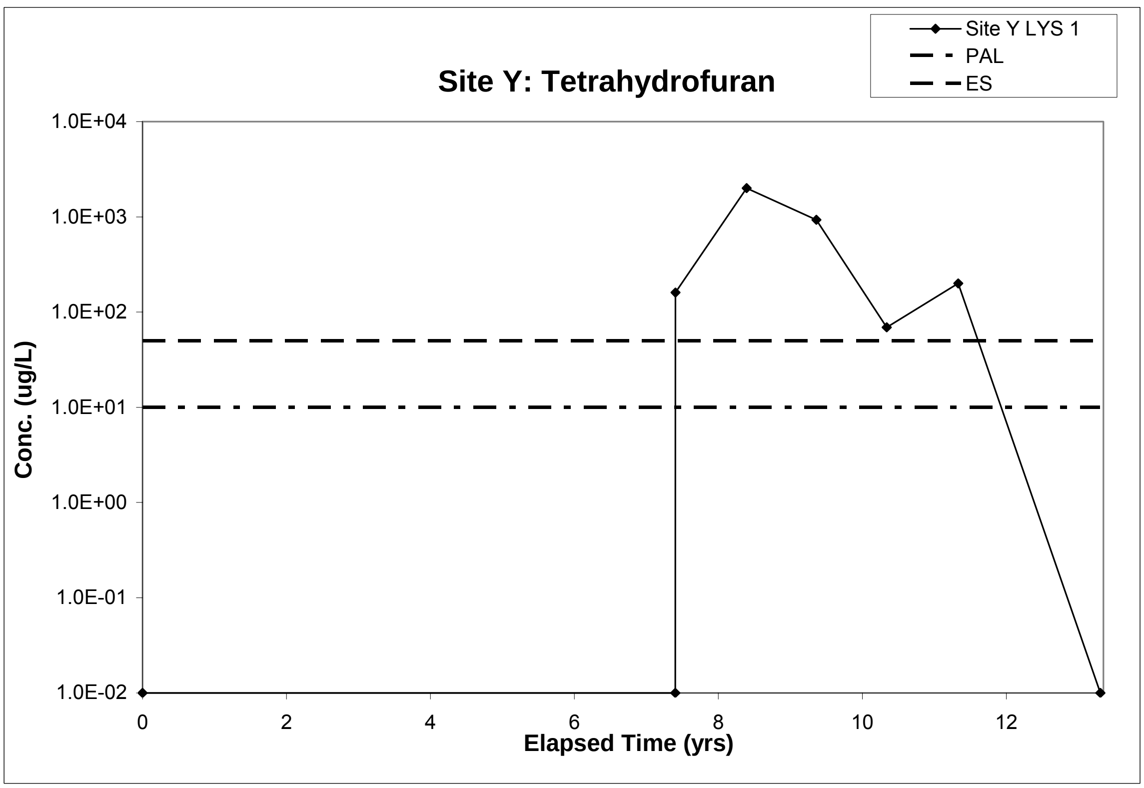


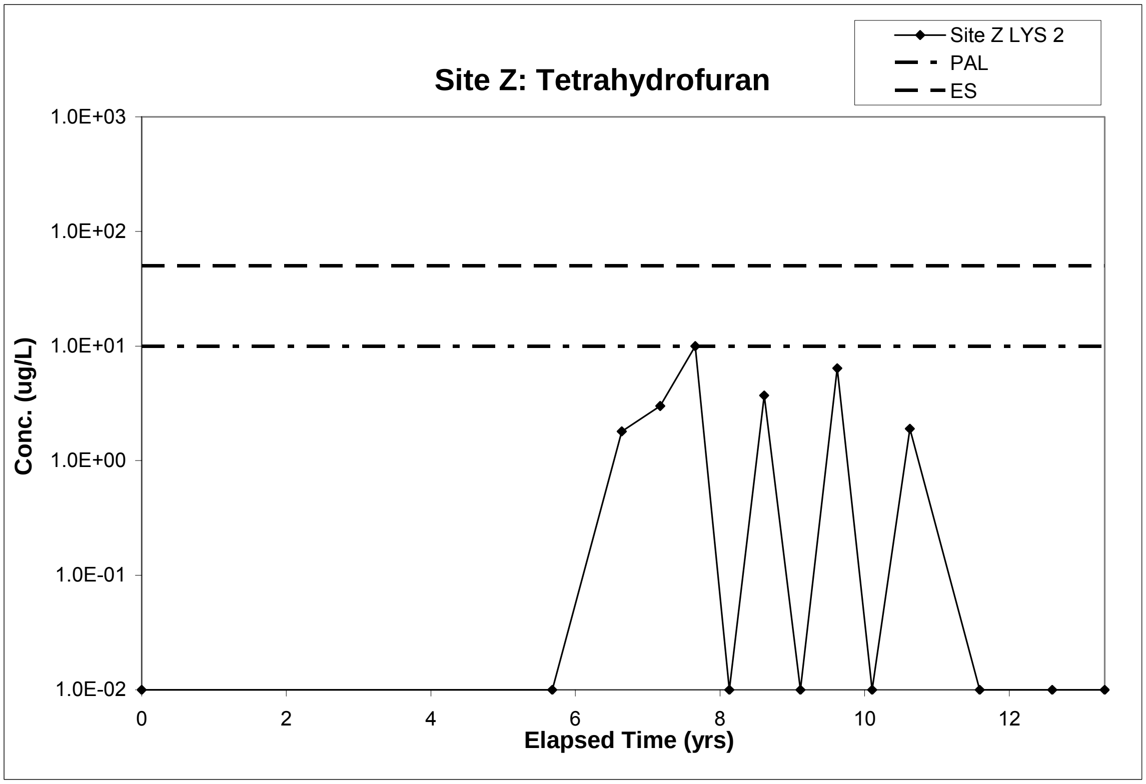
Site Q LYS 3
PAL
ES
Site Q: Tetrahydrofuran
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

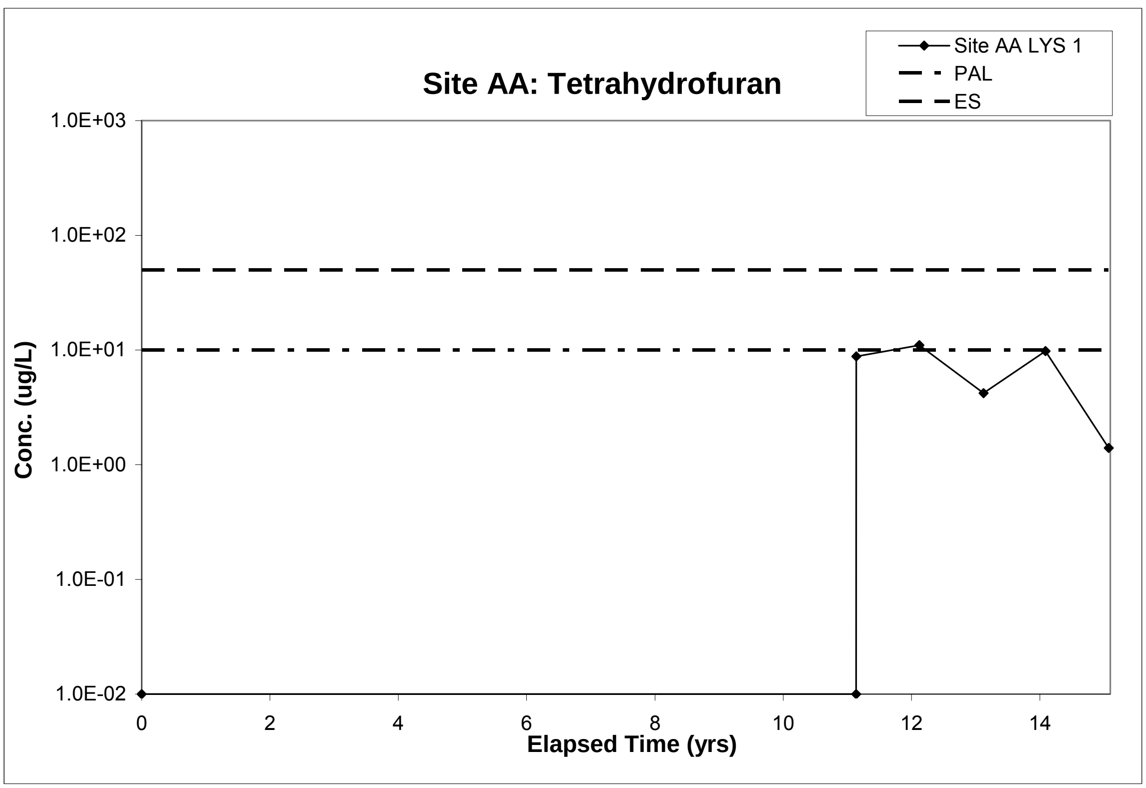


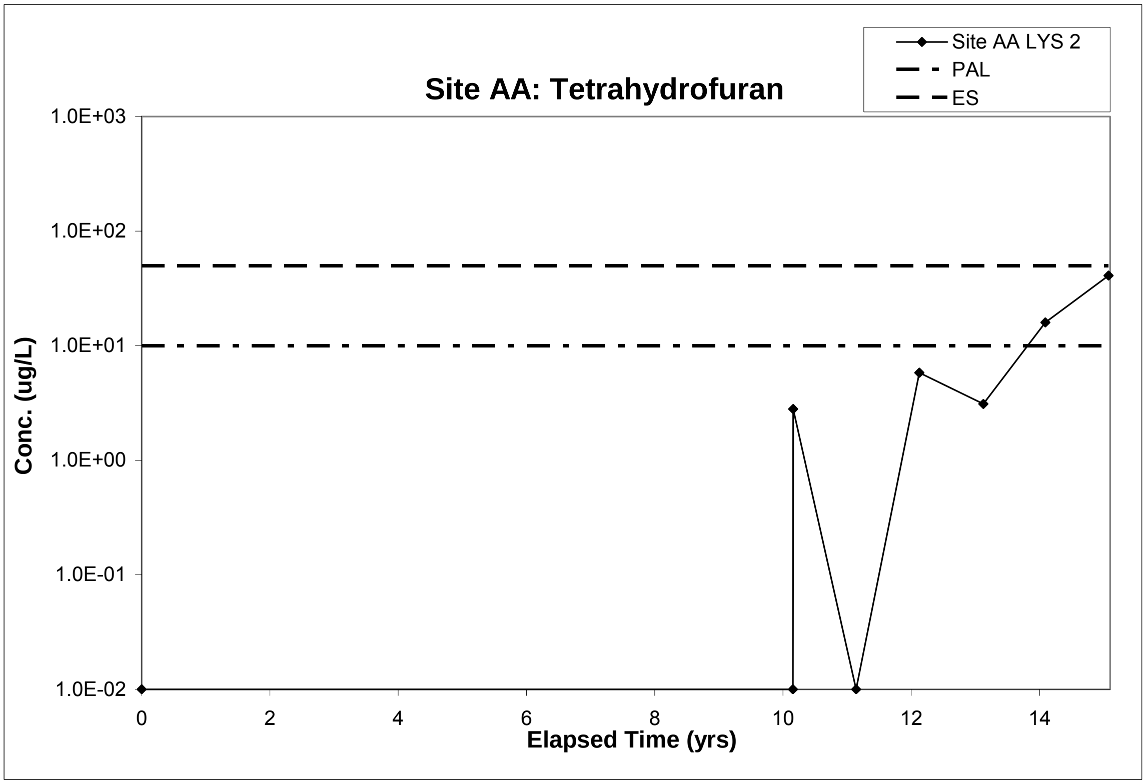
Site S LYS 1
PAL
ES
Site S: Tetrahydrofuran
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

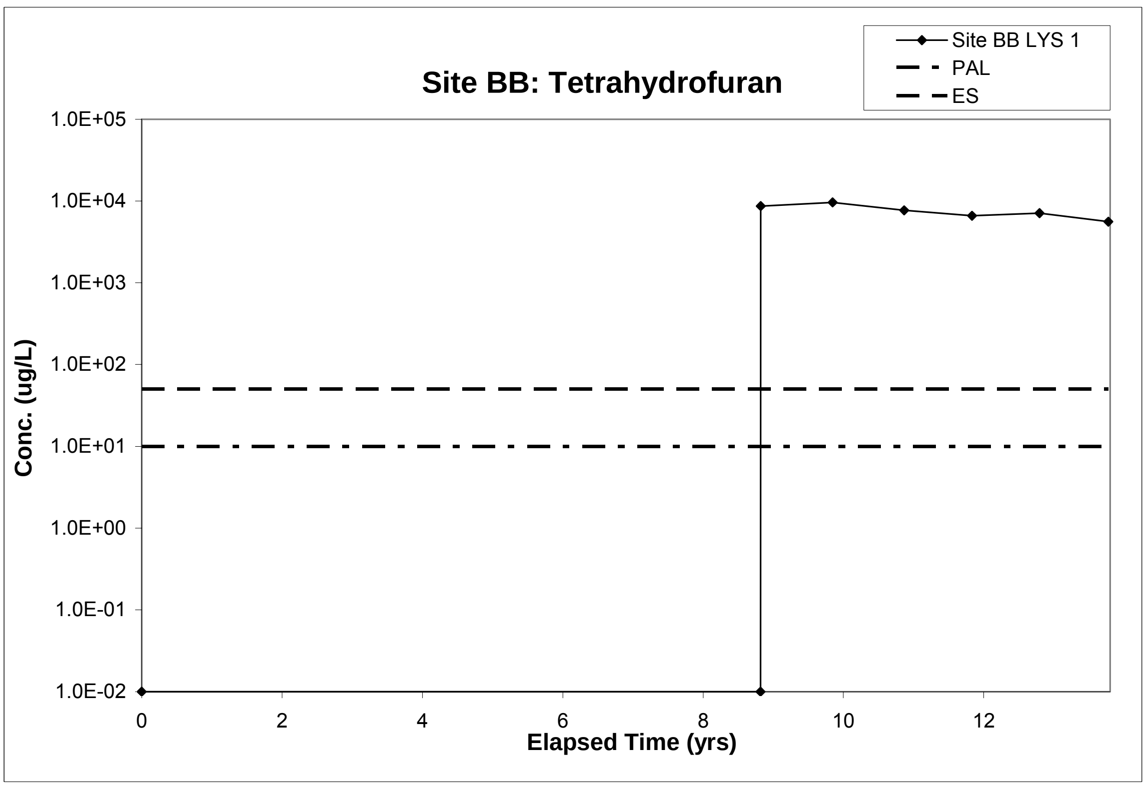

Site S LYS 2
PAL
ES
Site S: Tetrahydrofuran
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

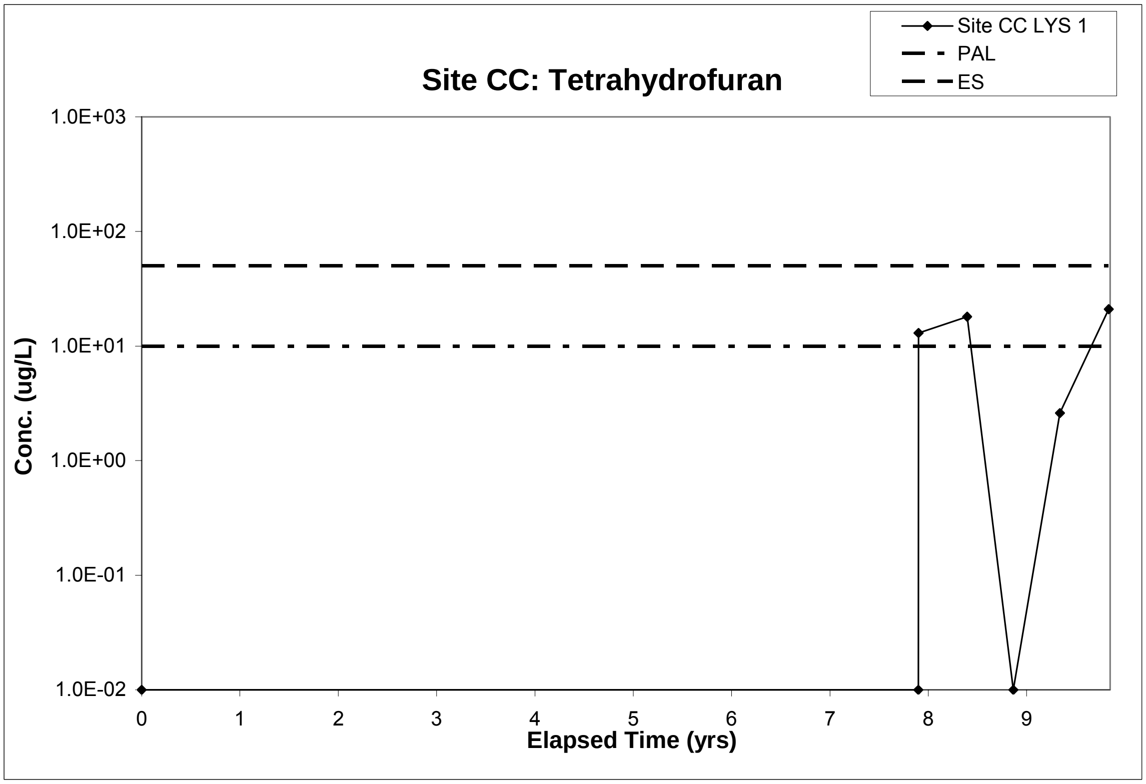

Site Y LYS 1
PAL
ES
Site Y: Tetrahydrofuran
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

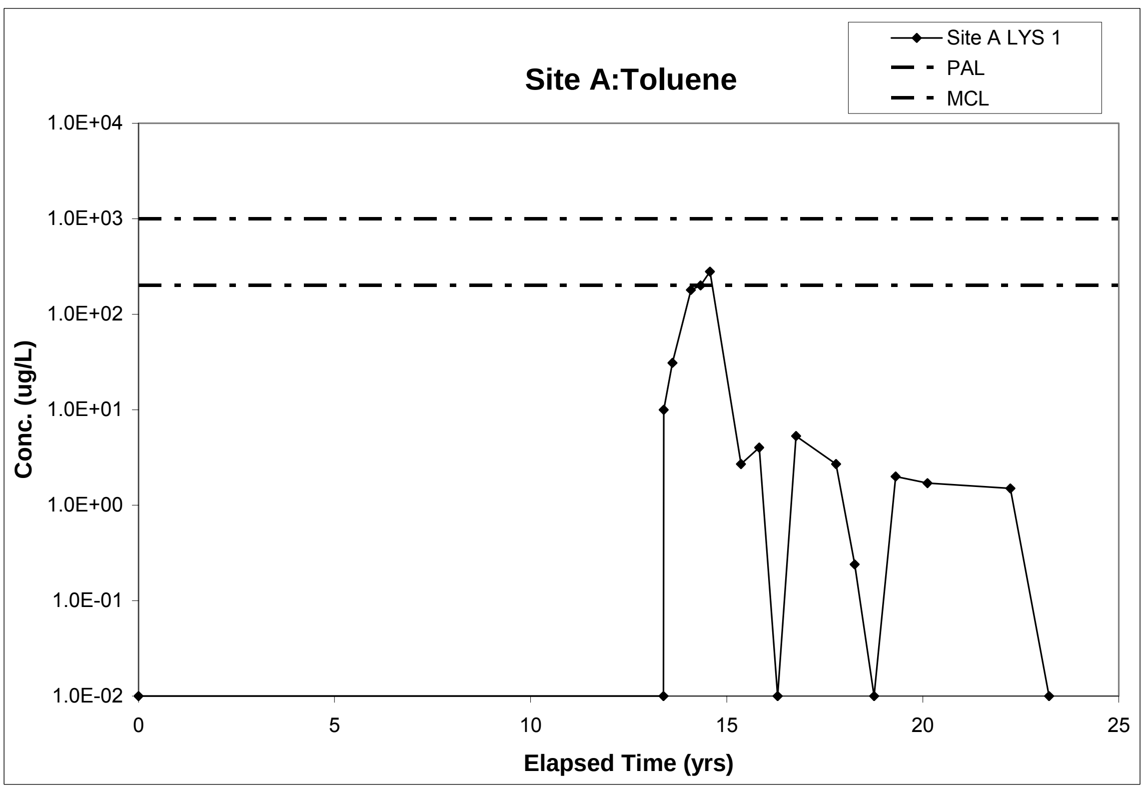

Site Z: Tetrahydrofuran
Site Z LYS 2
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

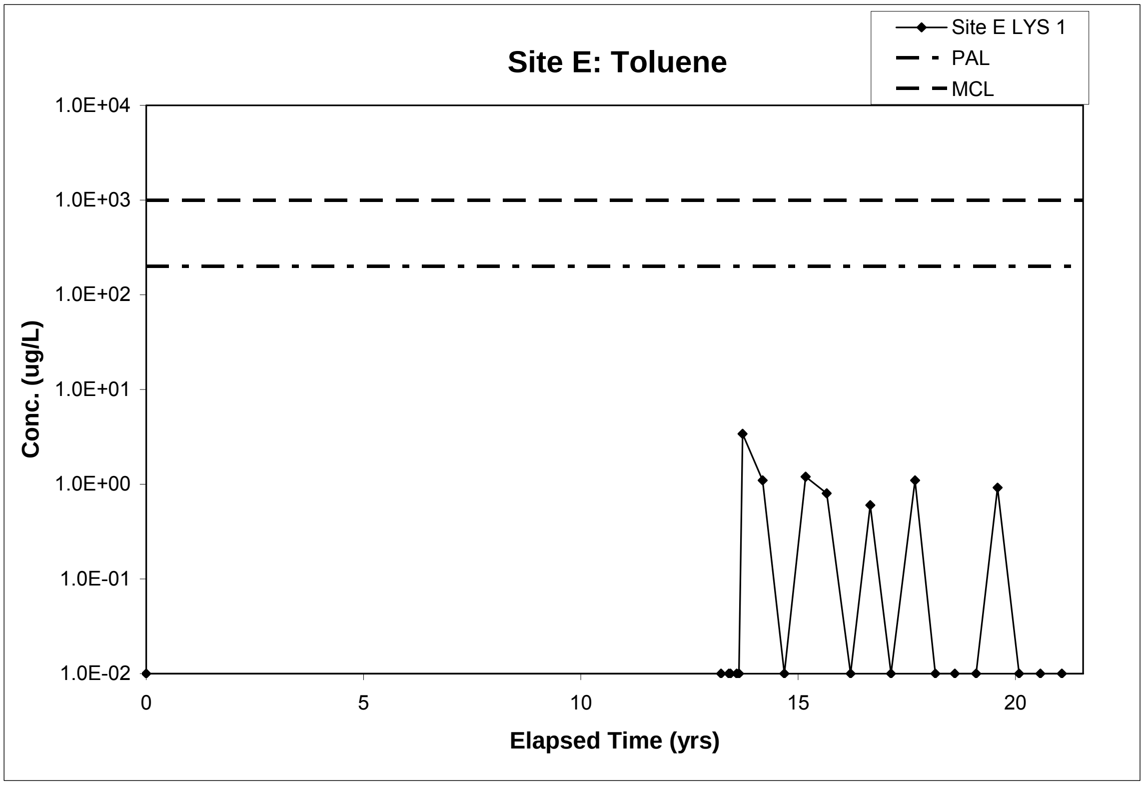

Site AA: Tetrahydrofuran
Site AA LYS 1
PAL
ES
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

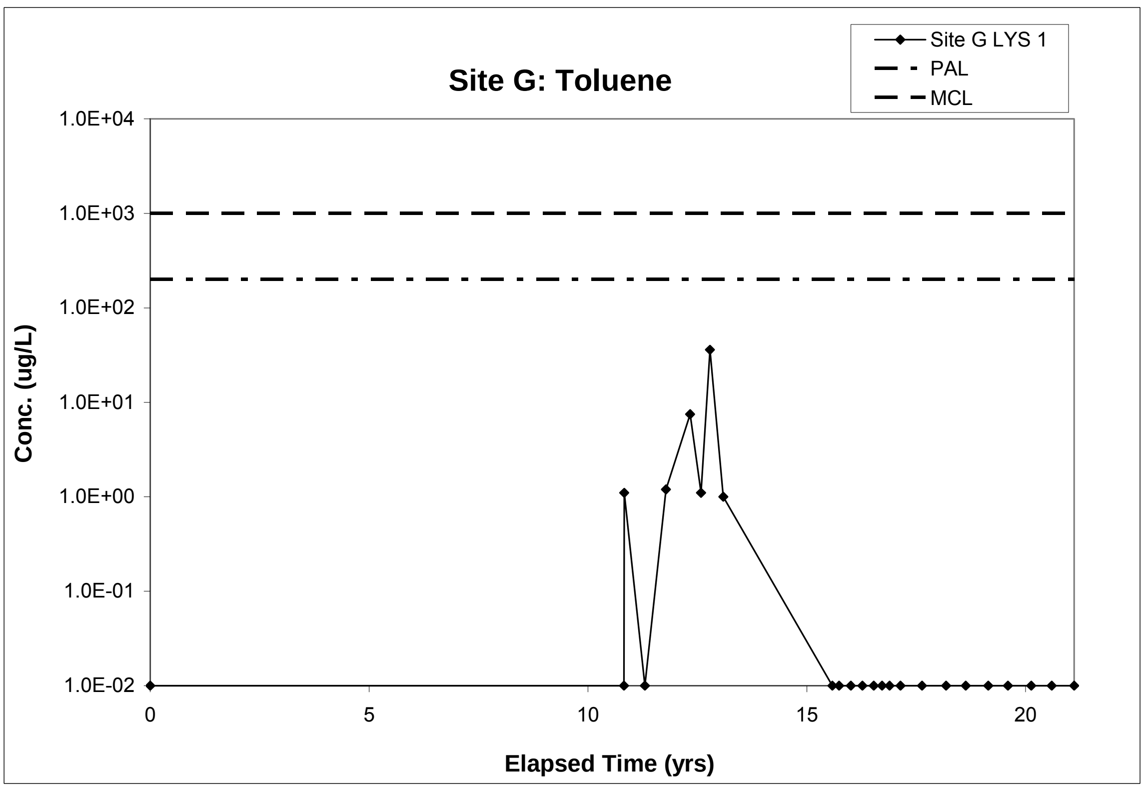

Site AA: Tetrahydrofuran
Site AA LYS 2
PAL
ES
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

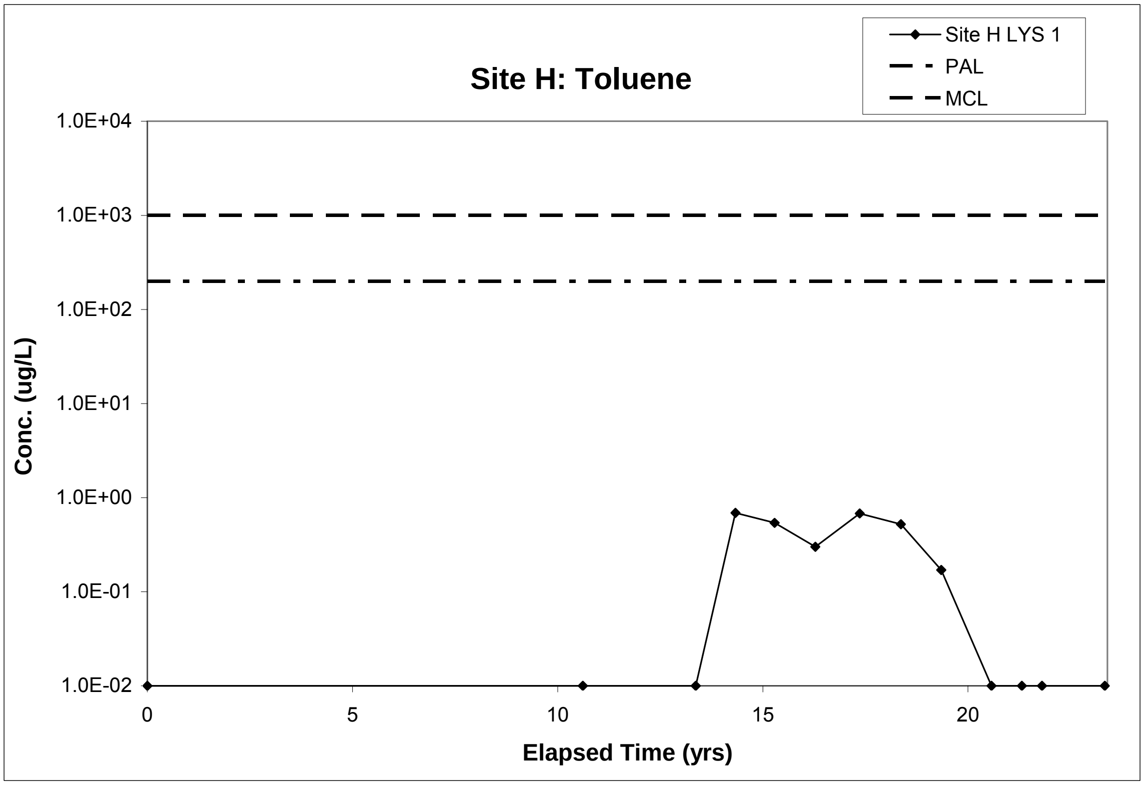

Site BB: Tetrahydrofuran
Site BB LYS 1
PAL
ES
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

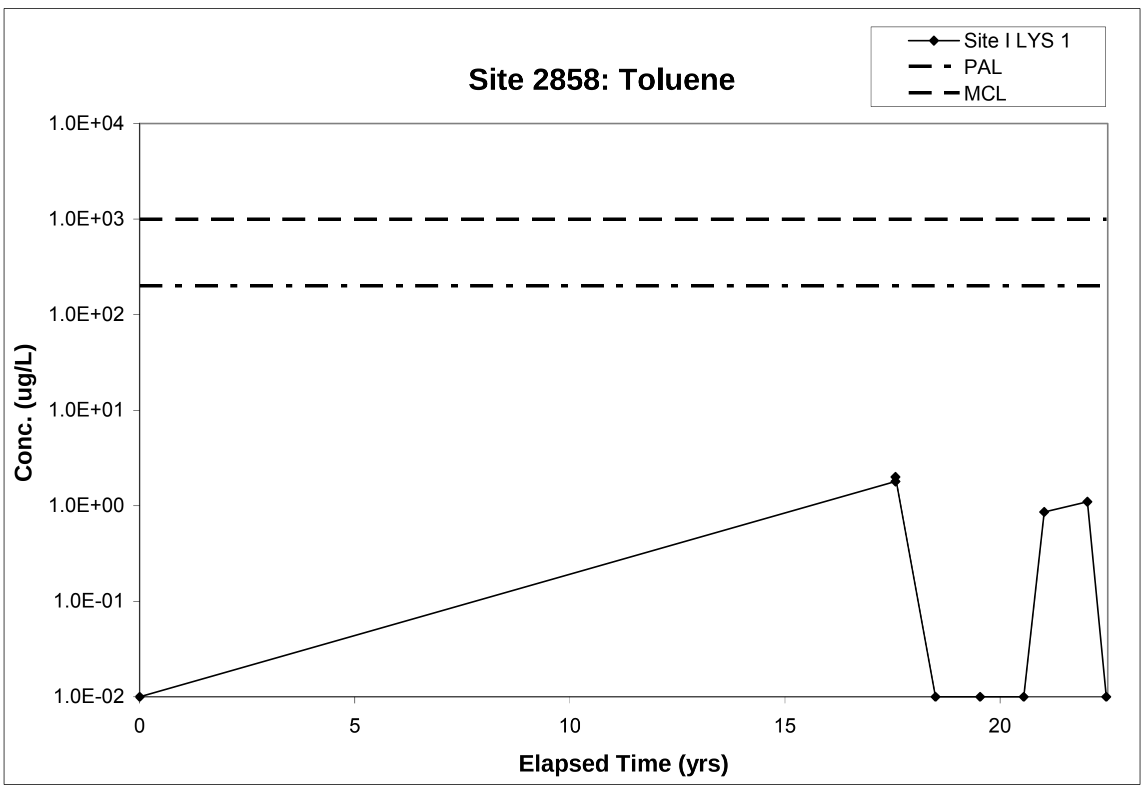

Site CC: Tetrahydrofuran
Site CC LYS 1
PAL
ES
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
1
2
3
4
5
6
7
8
9
Elapsed Time (yrs)

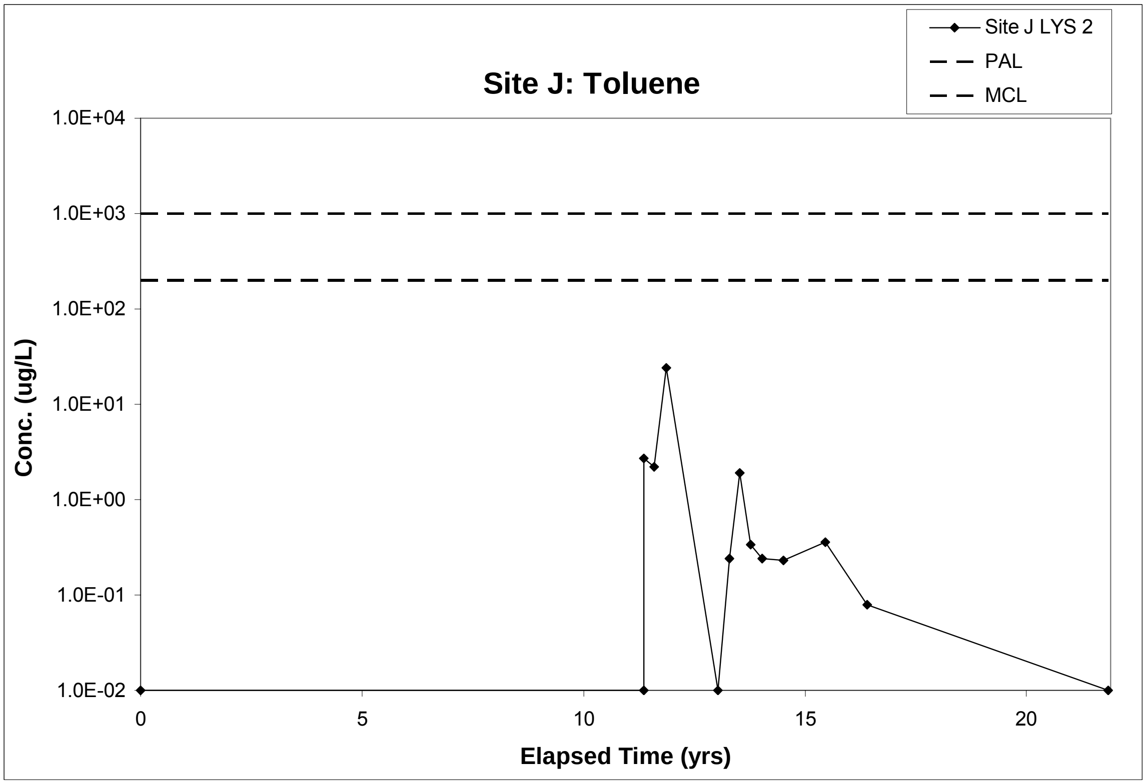

Site A:Toluene
Site A LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
25
Elapsed Time (yrs)

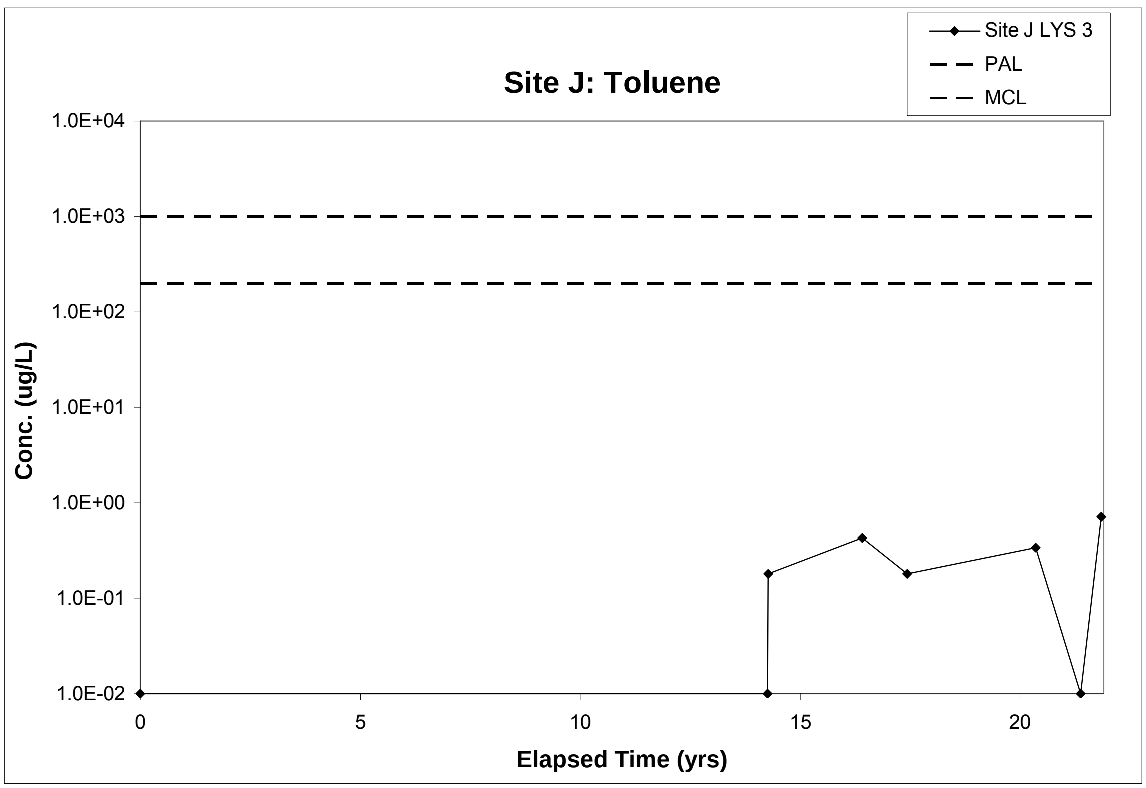

Site E: Toluene
Site E LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

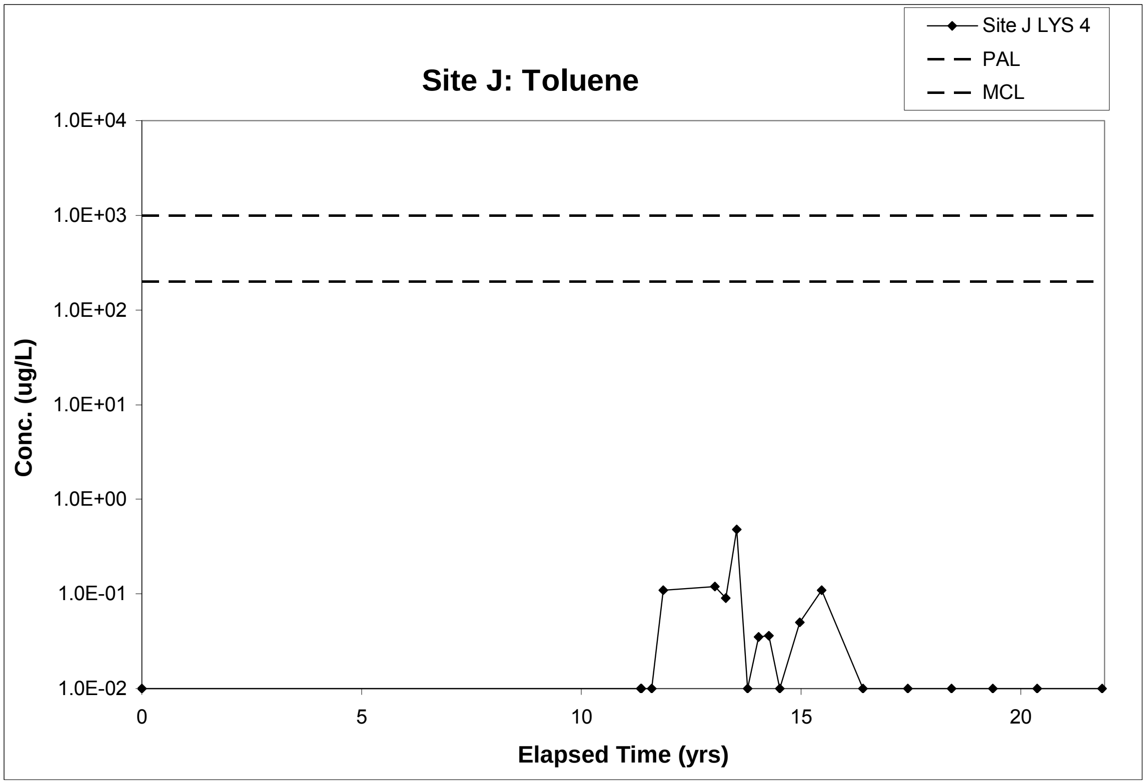

Site G: Toluene
Site G LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

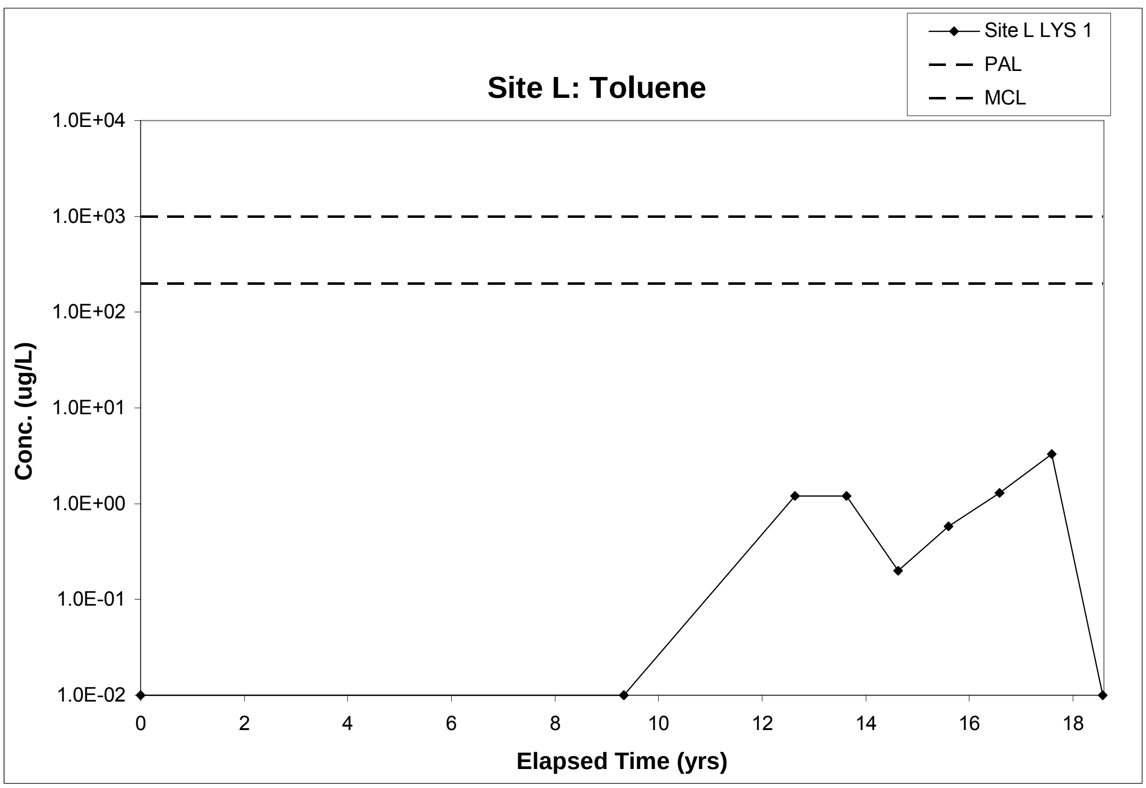

Site H: Toluene
Site H LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

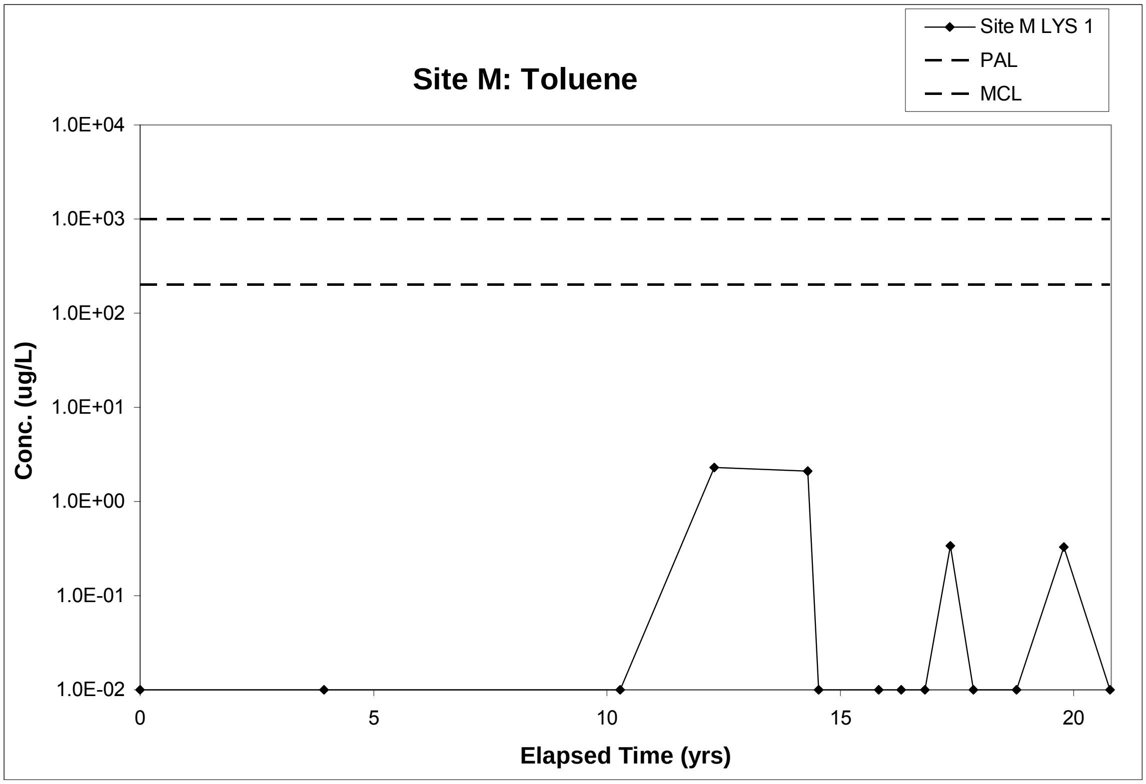

Site 2858: Toluene
Site I LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

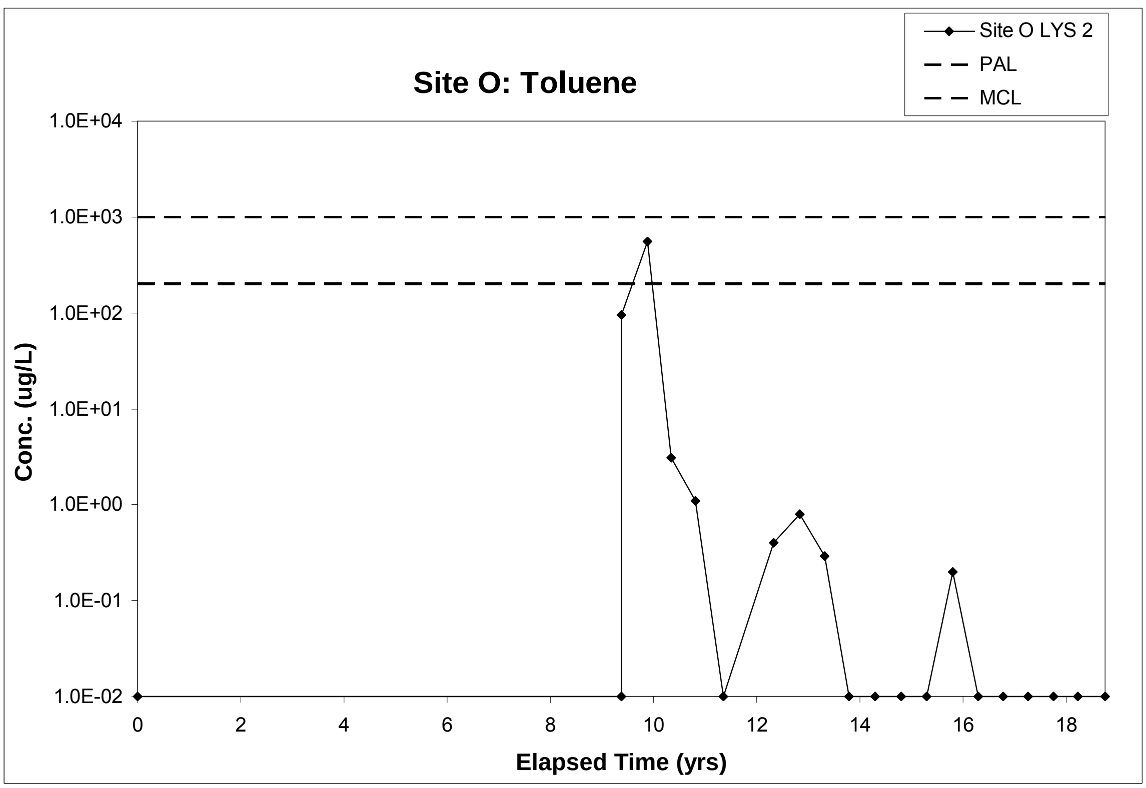

Site J LYS 2
PAL
MCL
Site J: Toluene
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

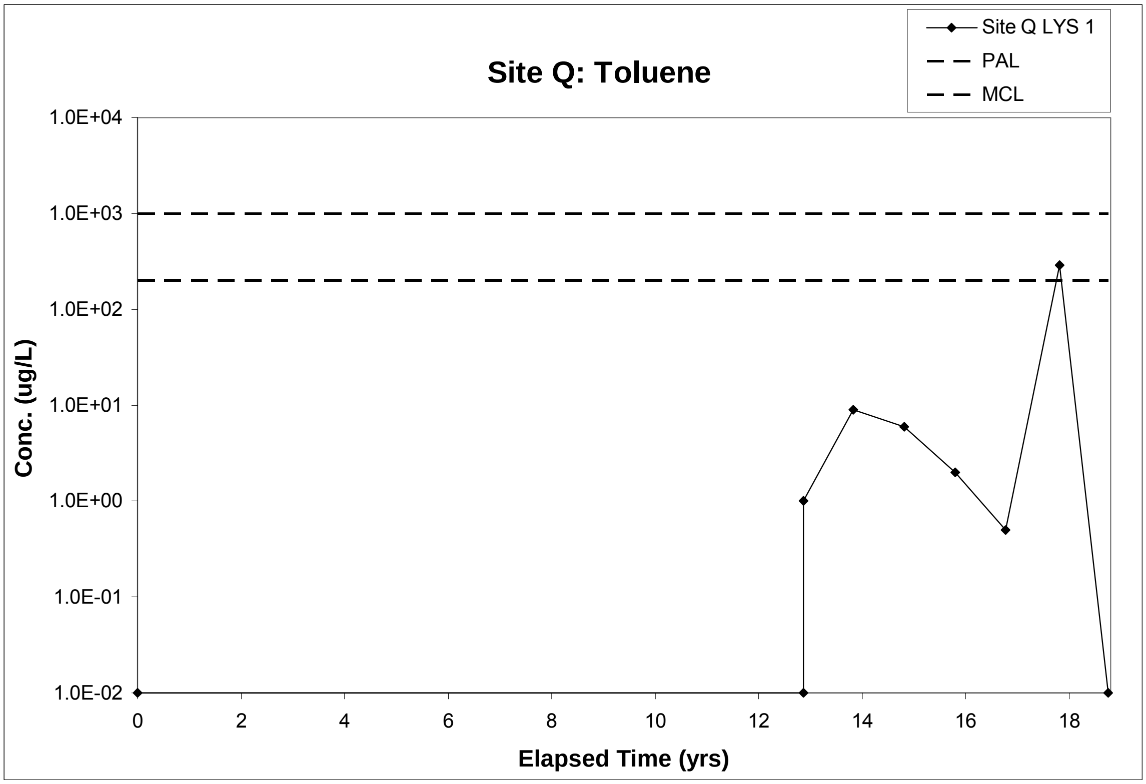

Site J LYS 3
PAL
MCL
Site J: Toluene
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

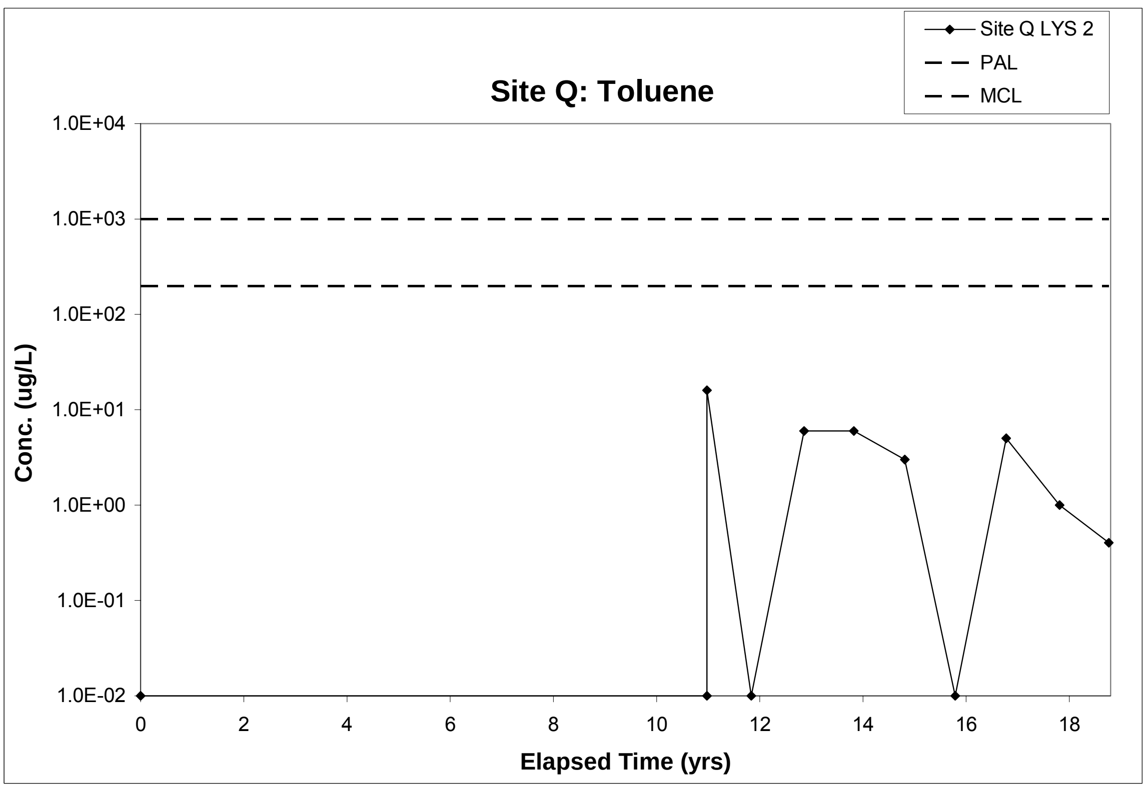

Site J: Toluene
Site J LYS 4
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

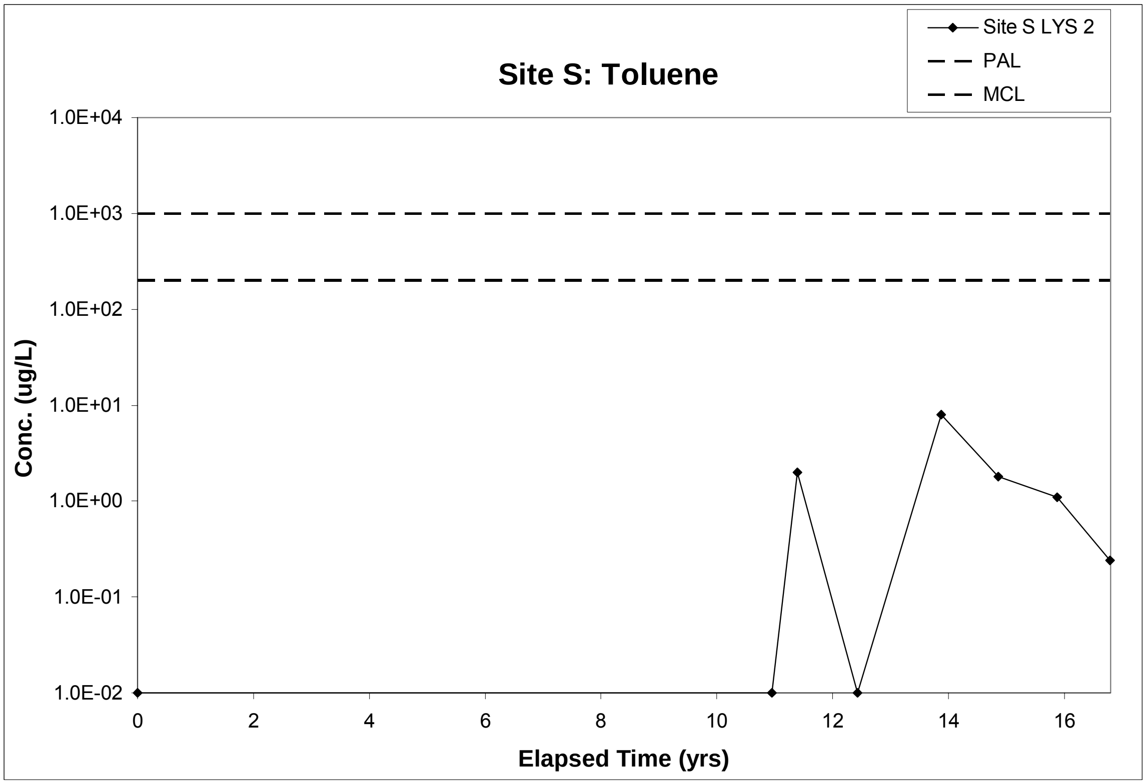

Site L: Toluene
Site L LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

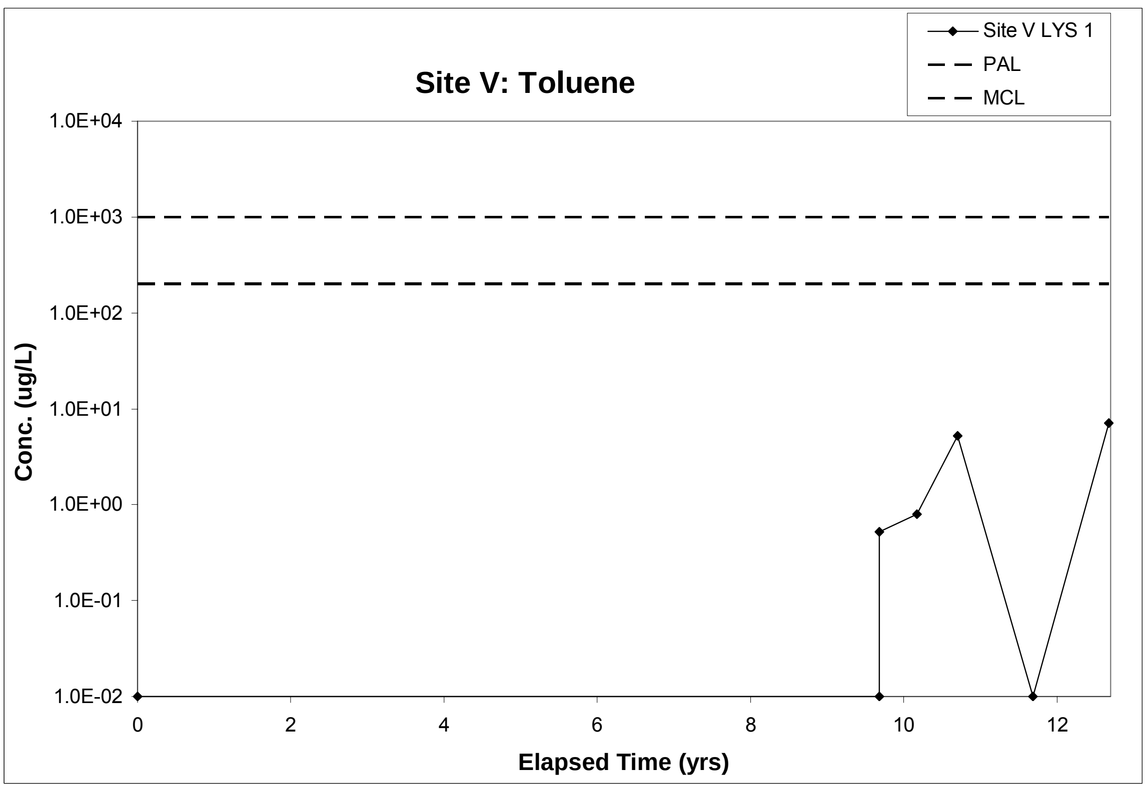

Site M: Toluene
Site M LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

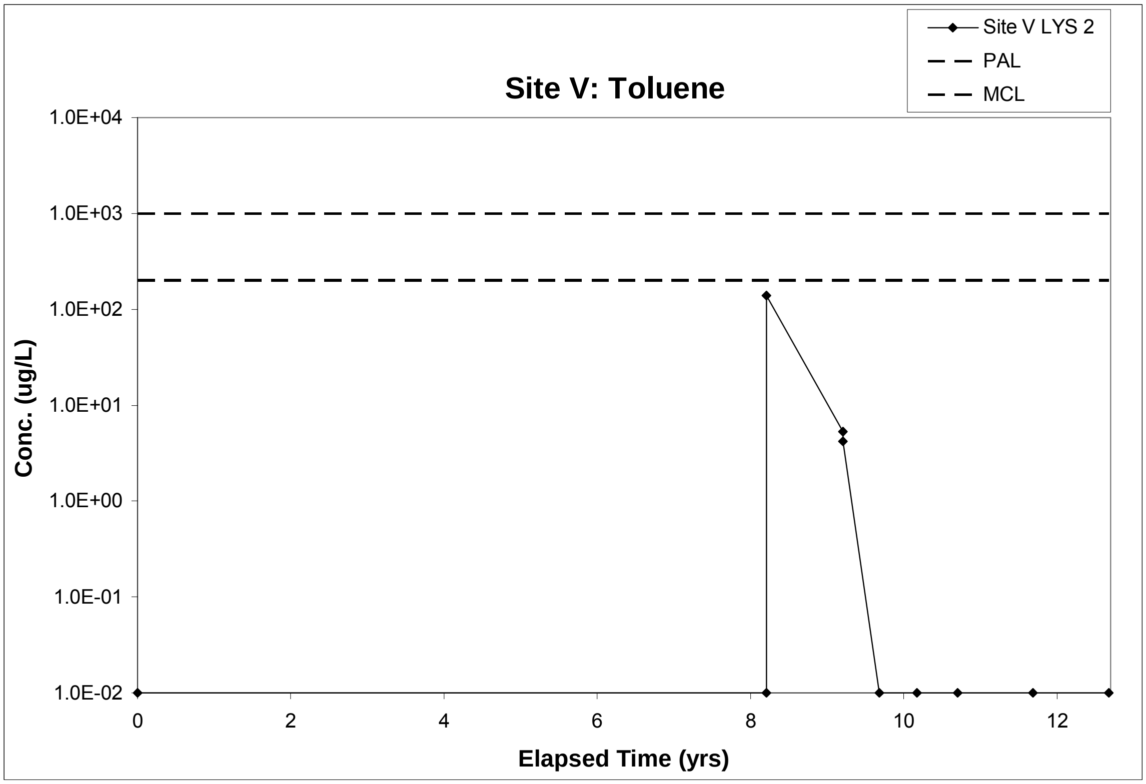

Site O: Toluene
Site O LYS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

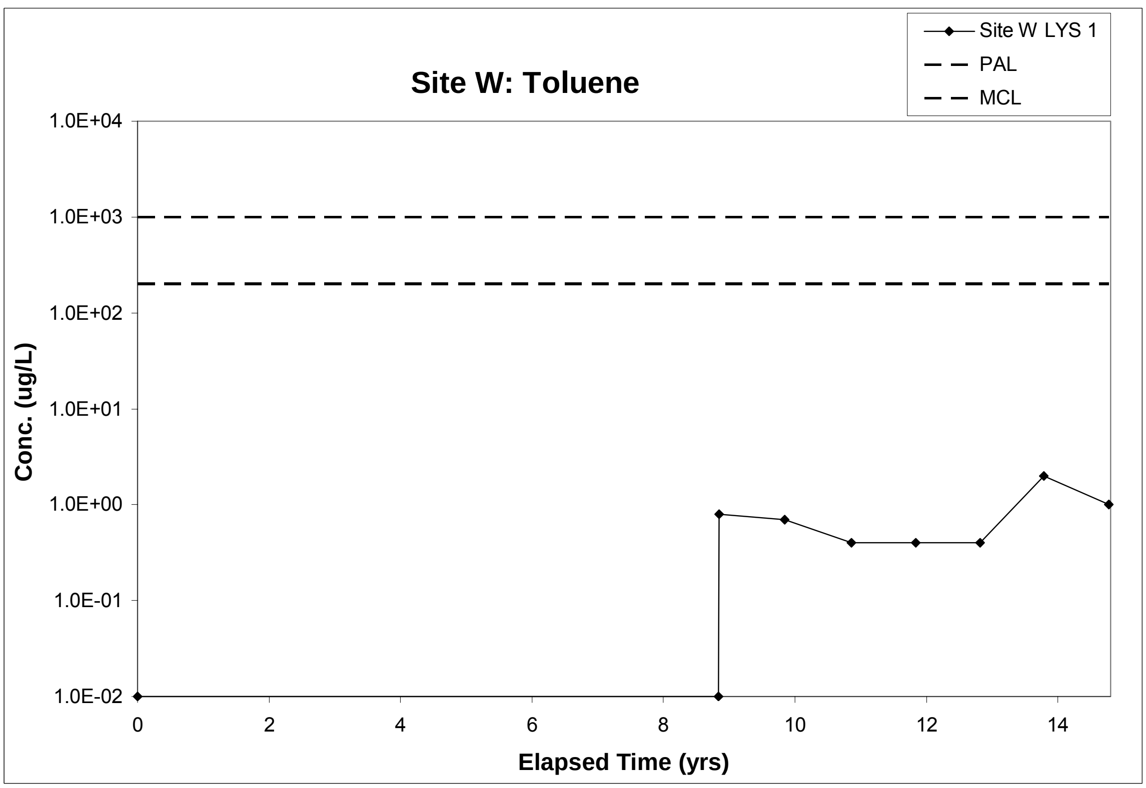

Site Q: Toluene
Site Q LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

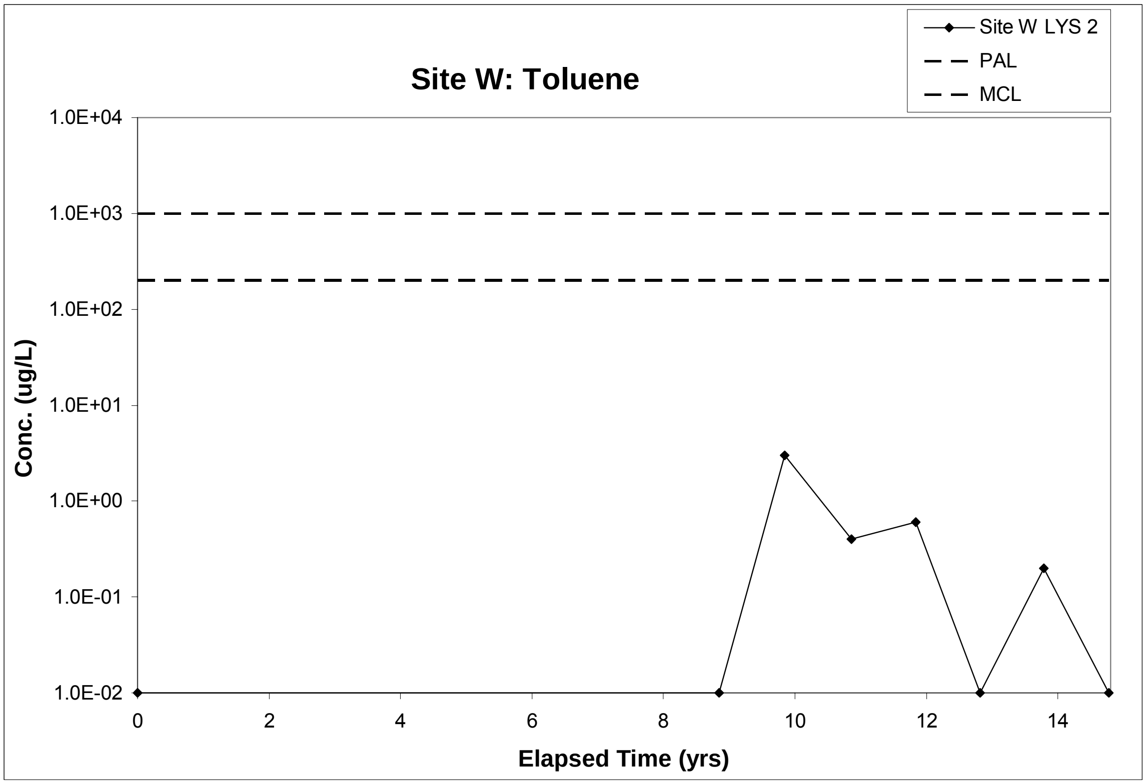

Site Q: Toluene
Site Q LYS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)


Site S: Toluene
Site S LYS 2
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

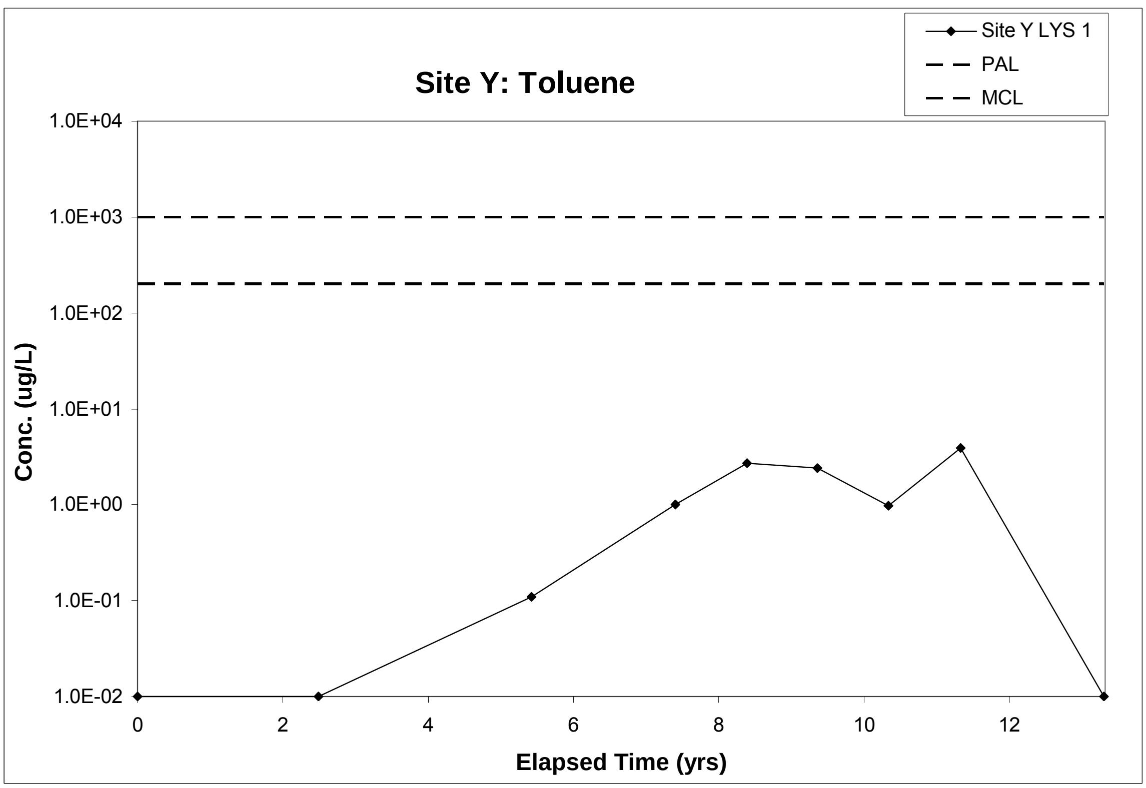

Site V: Toluene
Site V LYS 1
PAL
MCL
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)


Site V LYS 2
PAL
MCL
Site V: Toluene
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

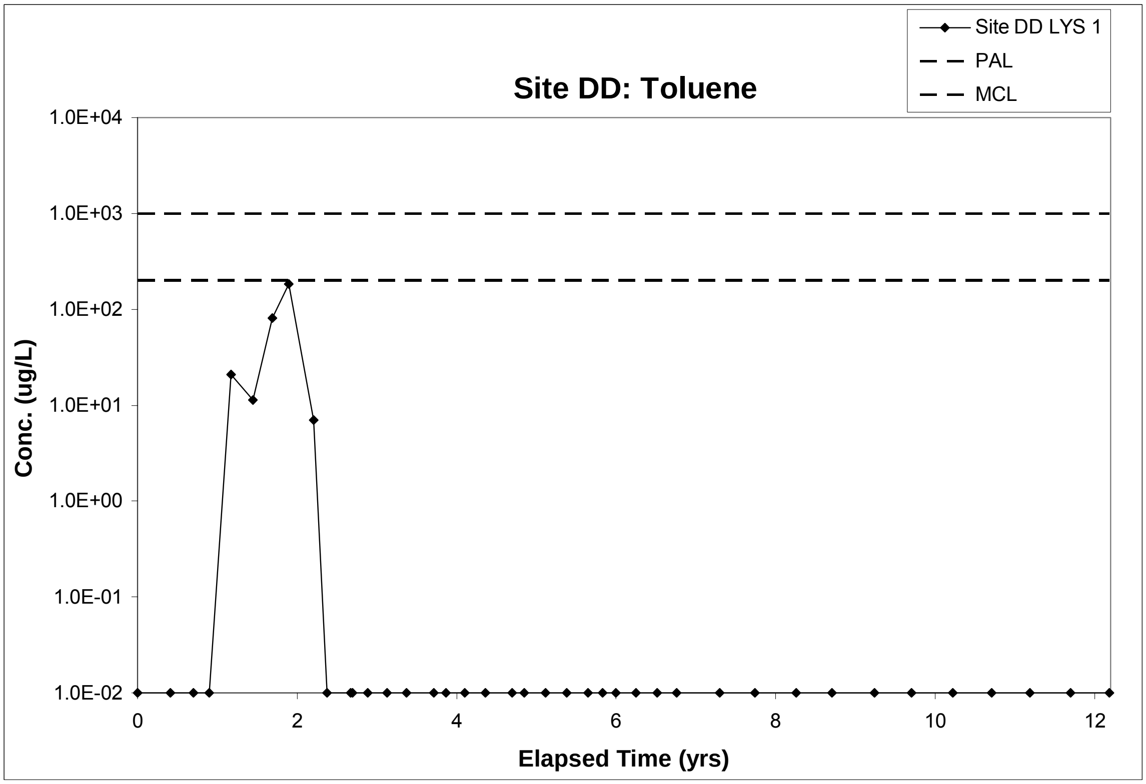

Site W LYS 1
PAL
MCL
Site W: Toluene
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

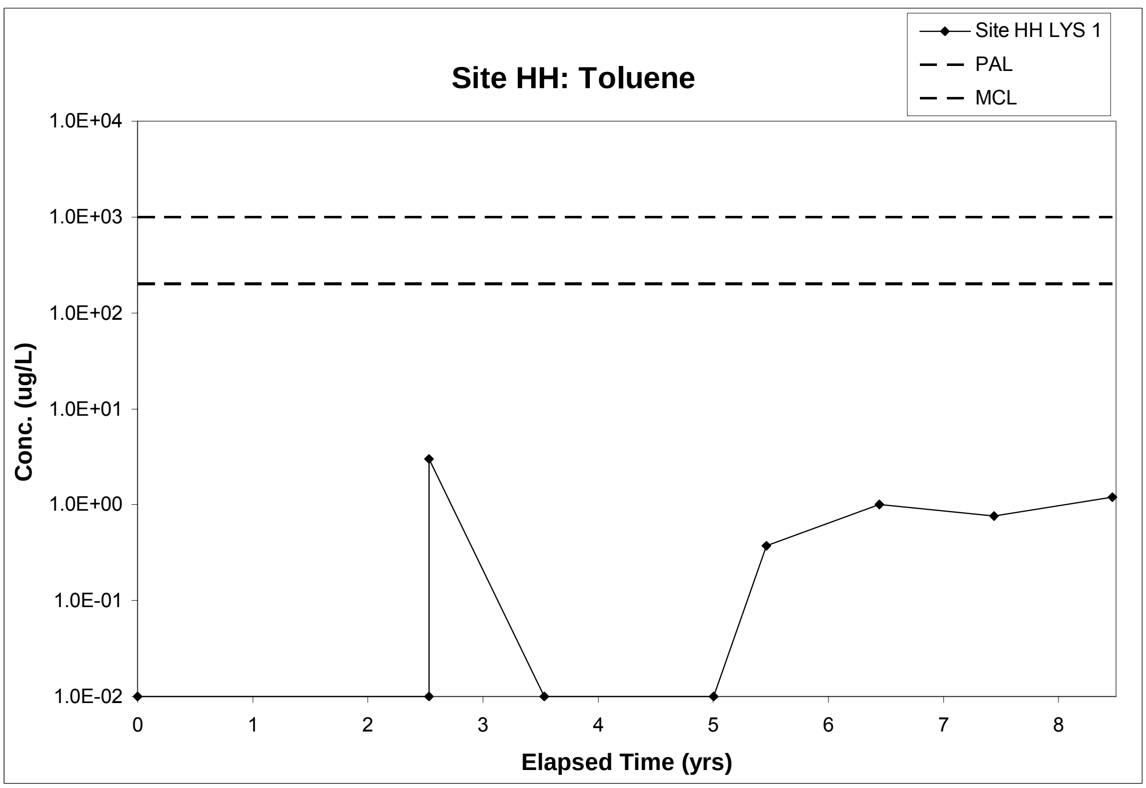


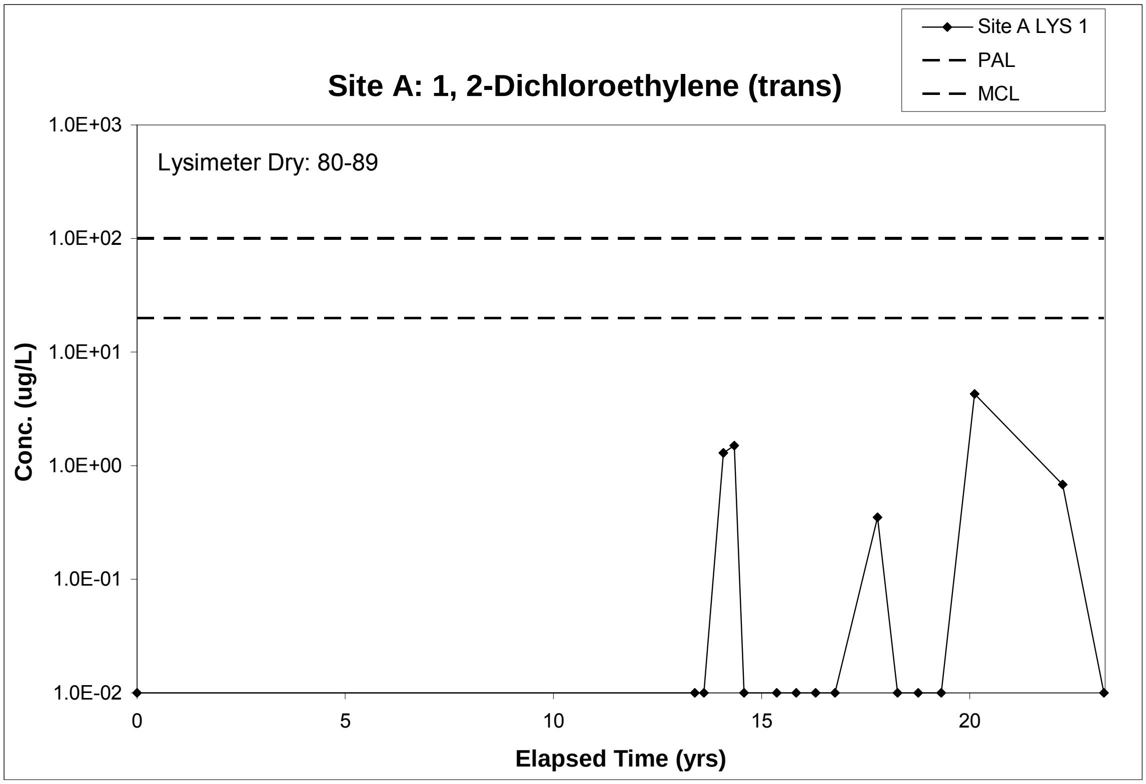
Site W: Toluene
Site W LYS 2
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

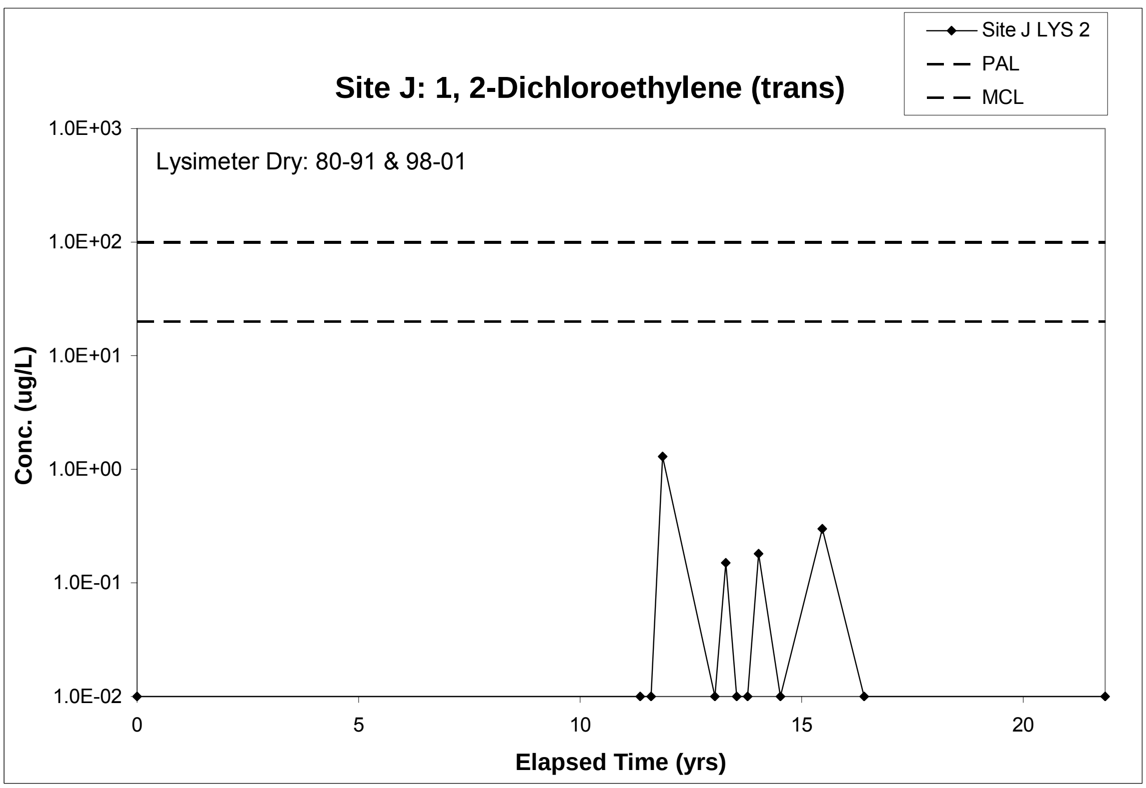


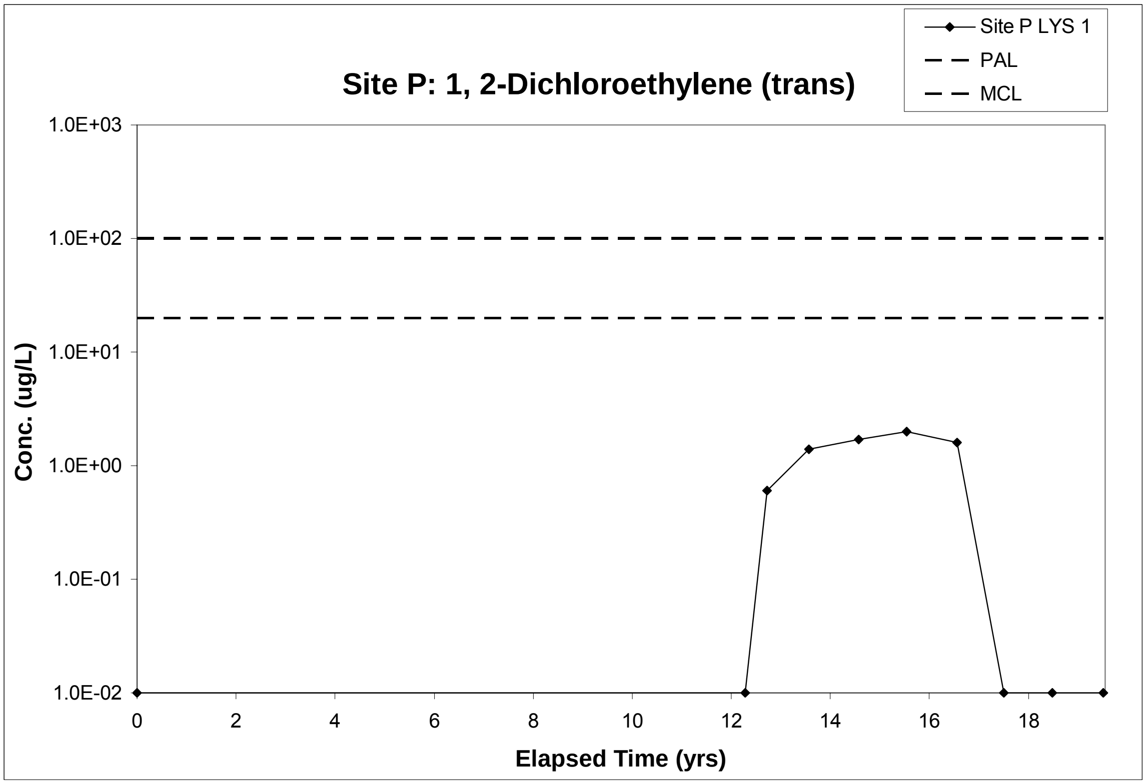
Site Y: Toluene
Site Y LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)


Site DD: Toluene
Site DD LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

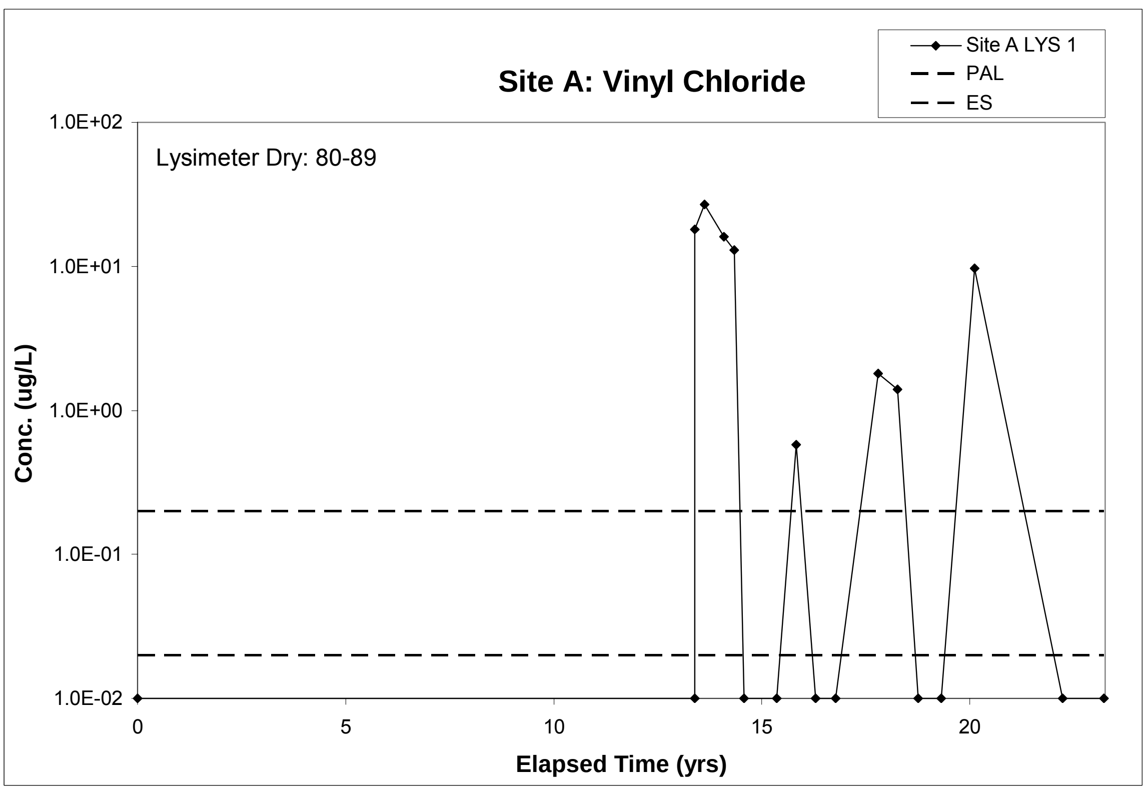

Site HH: Toluene
Site HH LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)


Site A: 1, 2-Dichloroethylene (trans)
Site A LYS 1
PAL
MCL
Lysimeter Dry: 80-89
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

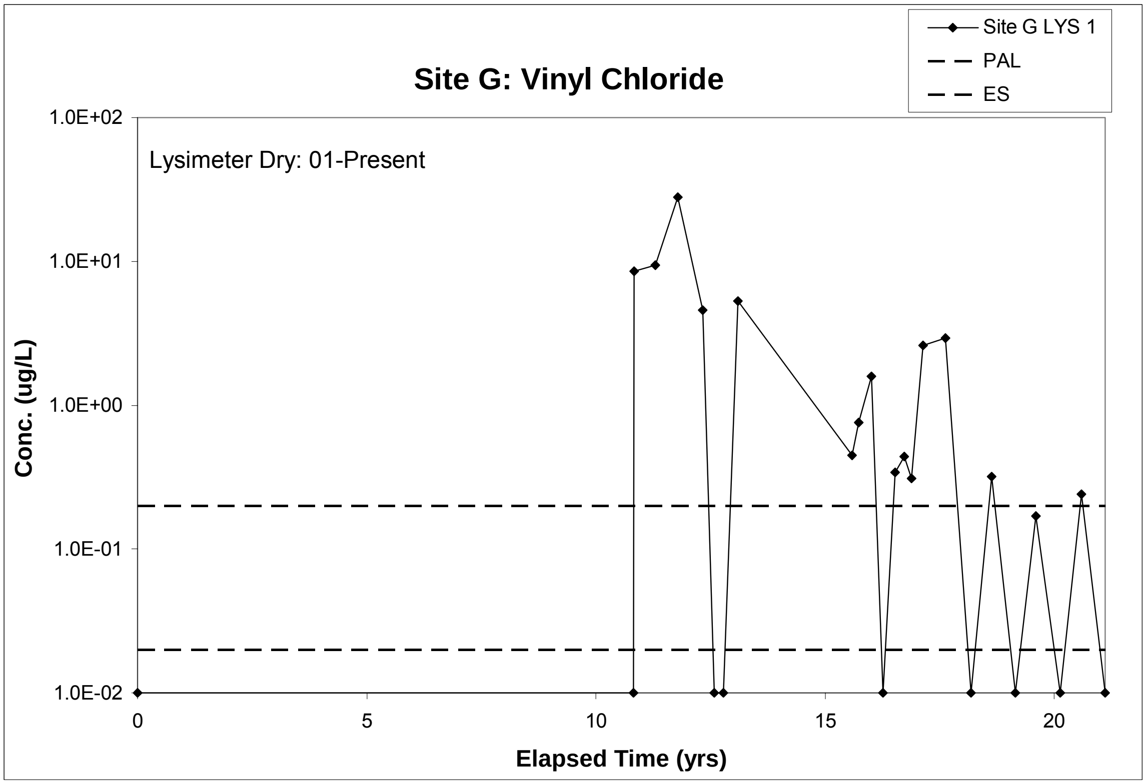

Site J: 1, 2-Dichloroethylene (trans)
Site J LYS 2
PAL
MCL
Lysimeter Dry: 80-91 & 98-01
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

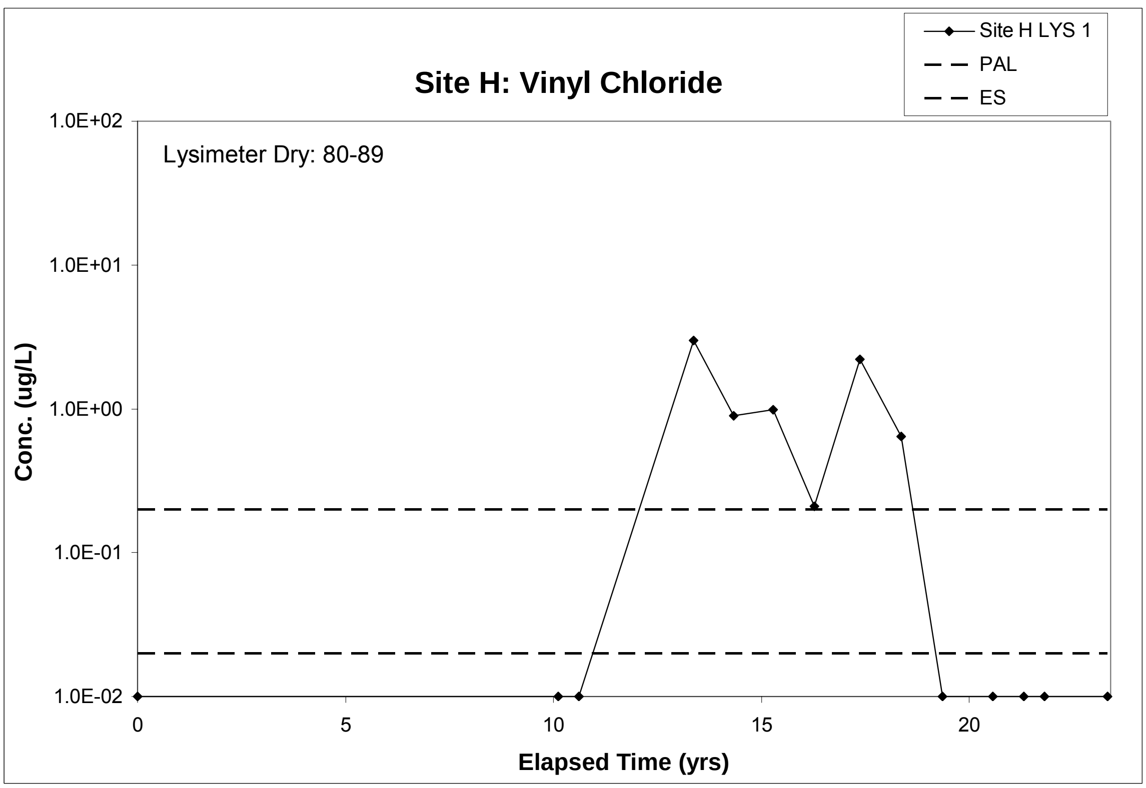


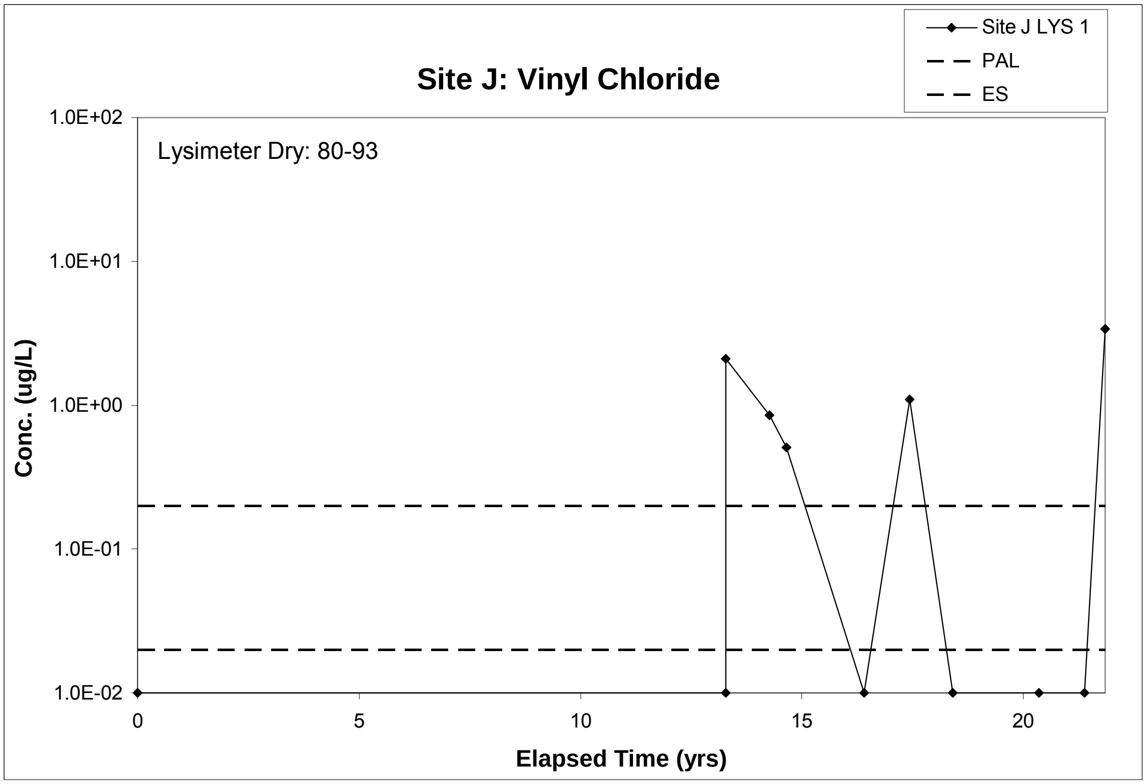
Site P: 1, 2-Dichloroethylene (trans)
Site P LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

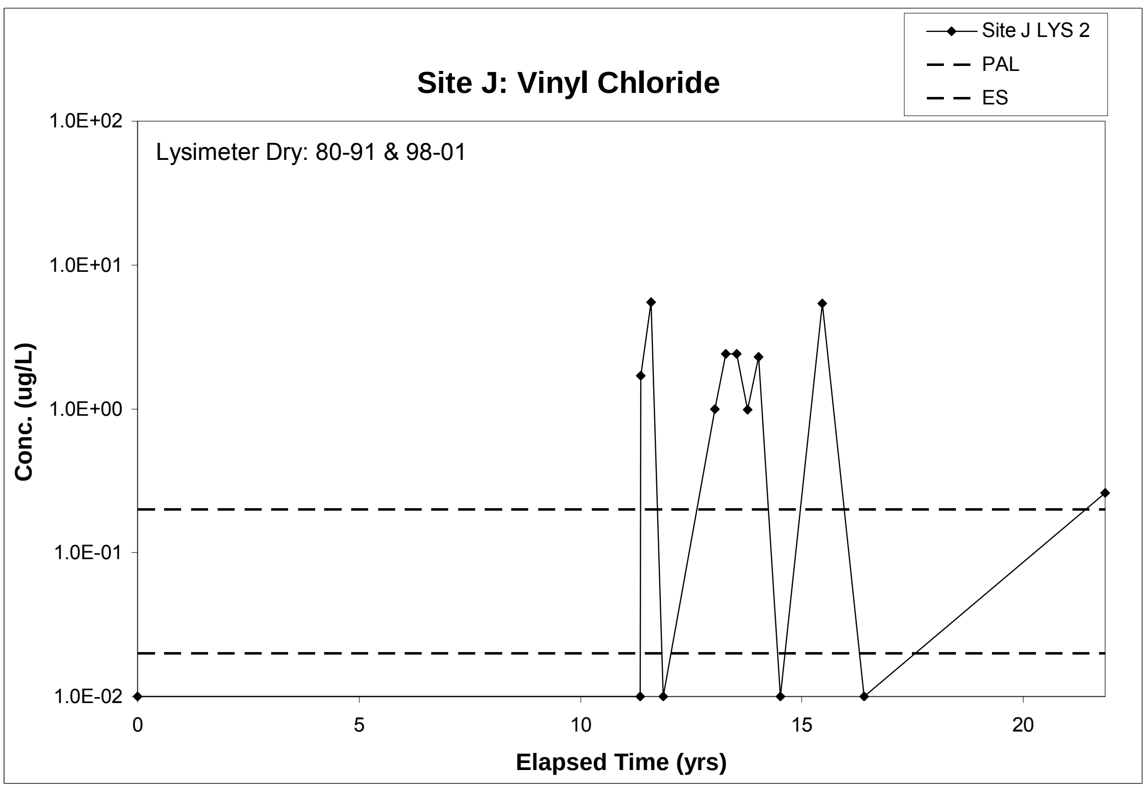


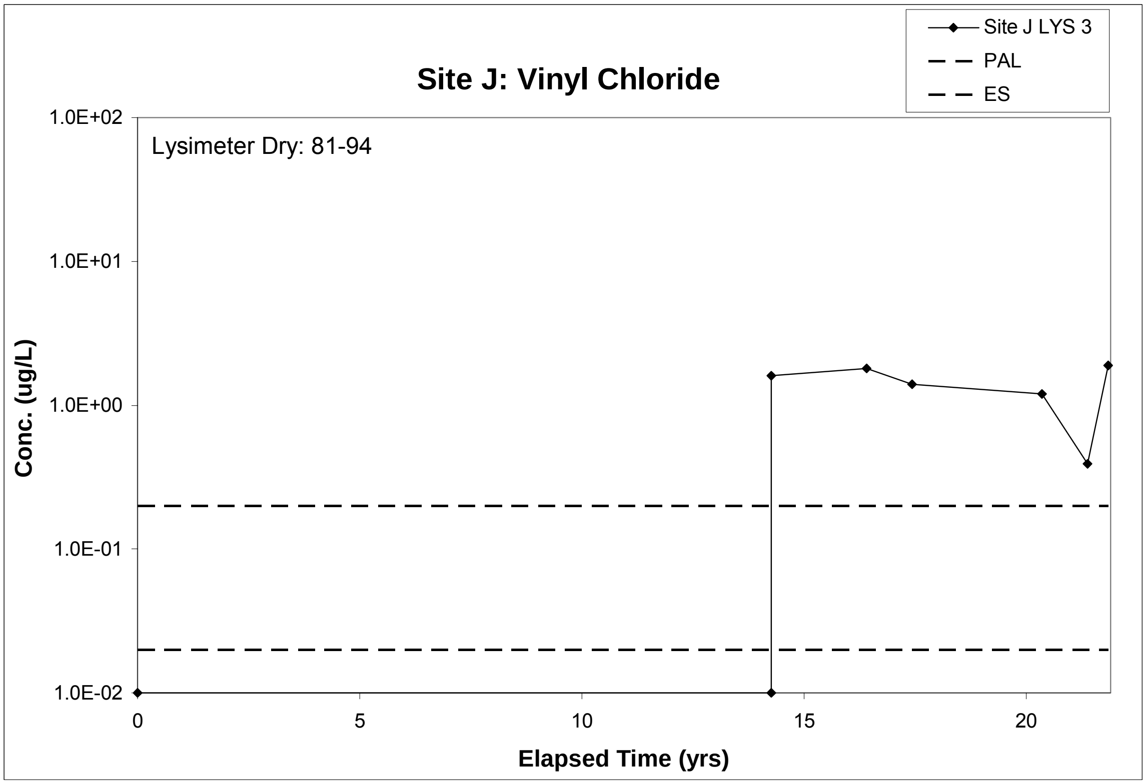
Site A: Vinyl Chloride
Site A LYS 1
PAL
ES
Lysimeter Dry: 80-89
Conc. (ug/L)
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

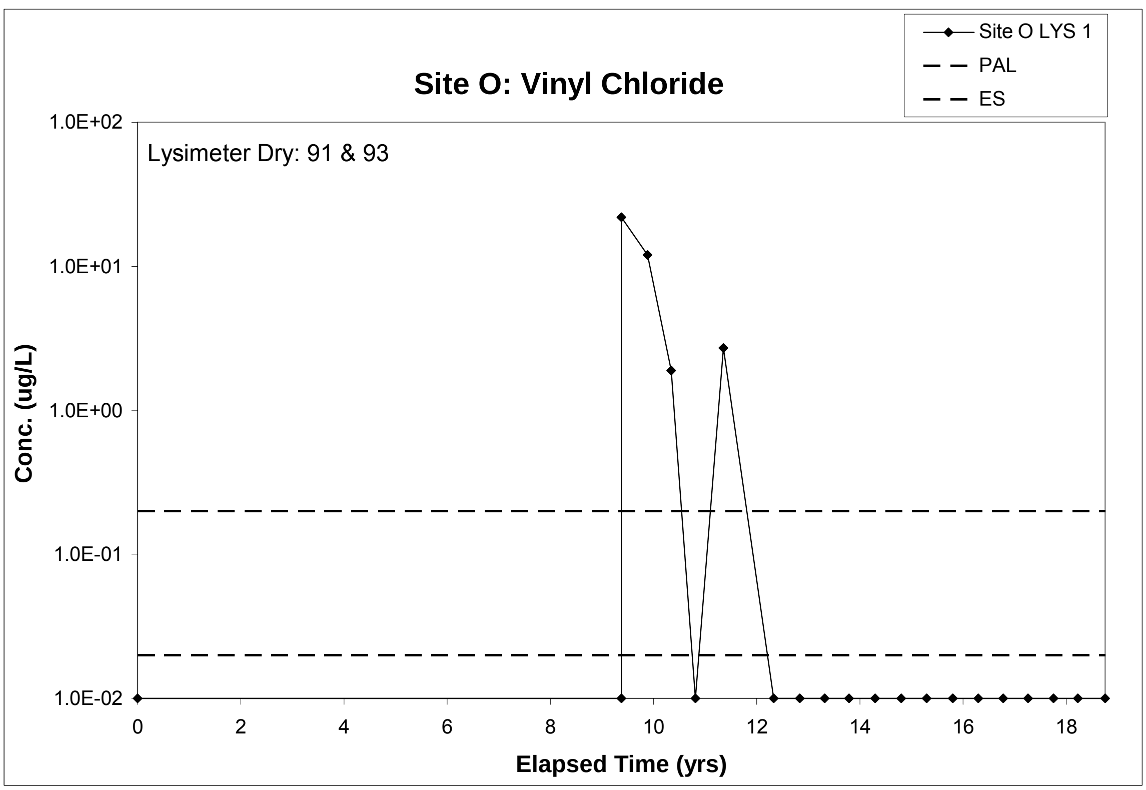

Site G: Vinyl Chloride
Site G LYS 1
PAL
ES
Lysimeter Dry: 01-Present
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

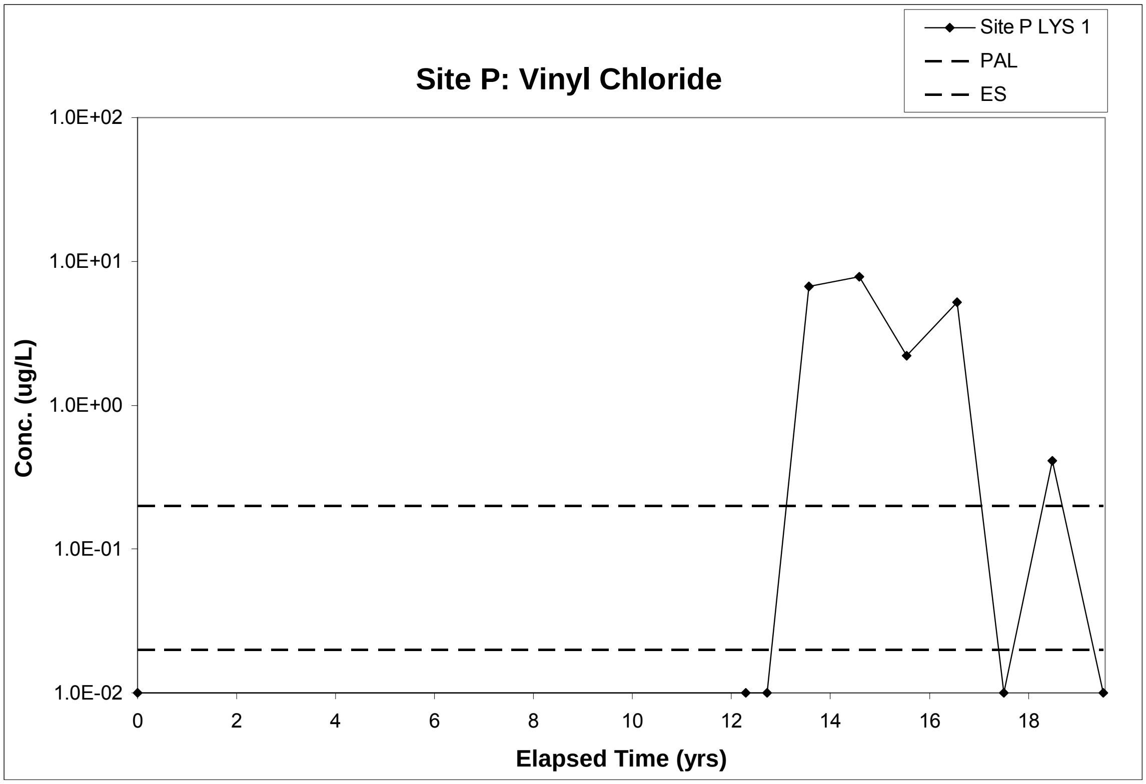

Site H: Vinyl Chloride
Site H LYS 1
PAL
ES
Lysimeter Dry: 80-89
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

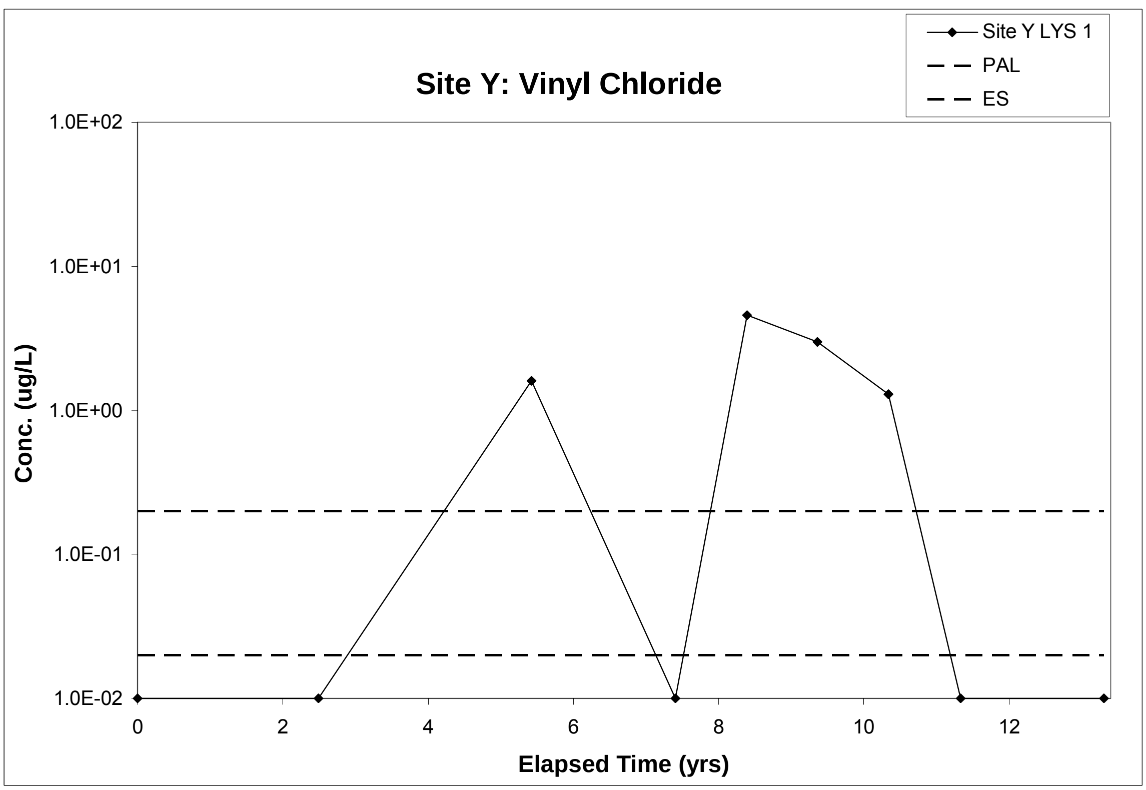

Site J: Vinyl Chloride
Site J LYS 1
PAL
ES
Lysimeter Dry: 80-93
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

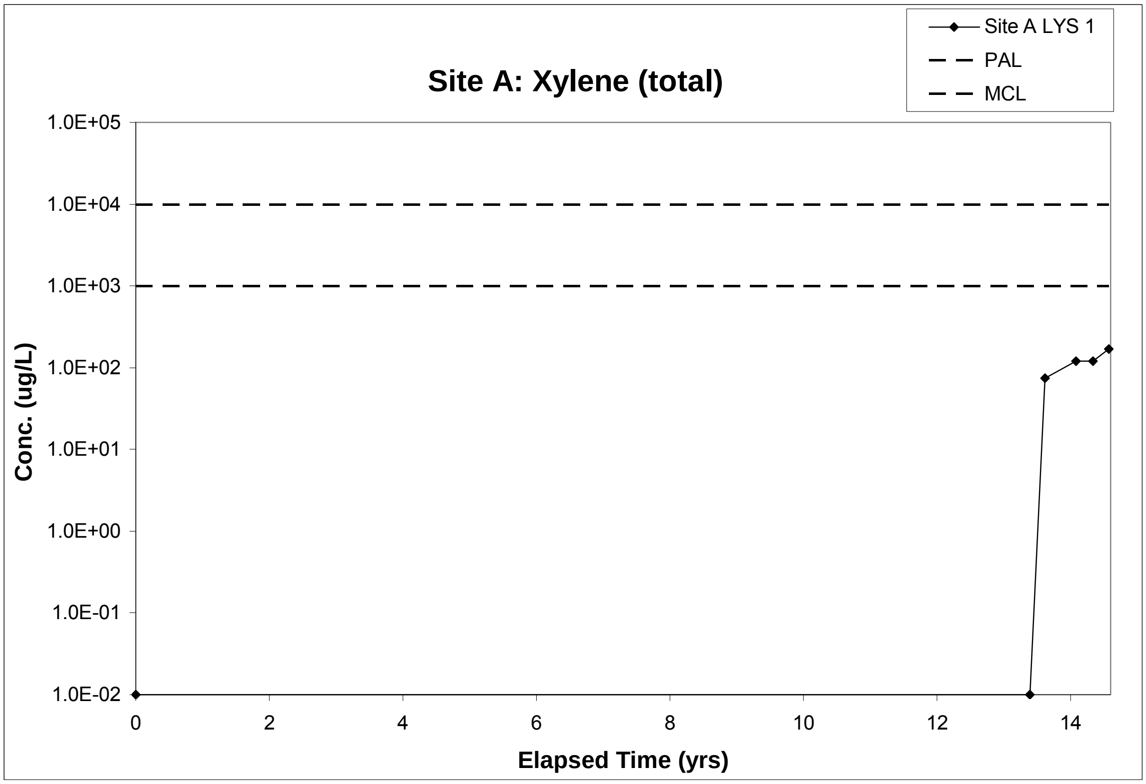

Site J: Vinyl Chloride
Site J LYS 2
PAL
ES
Lysimeter Dry: 80-91 & 98-01
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

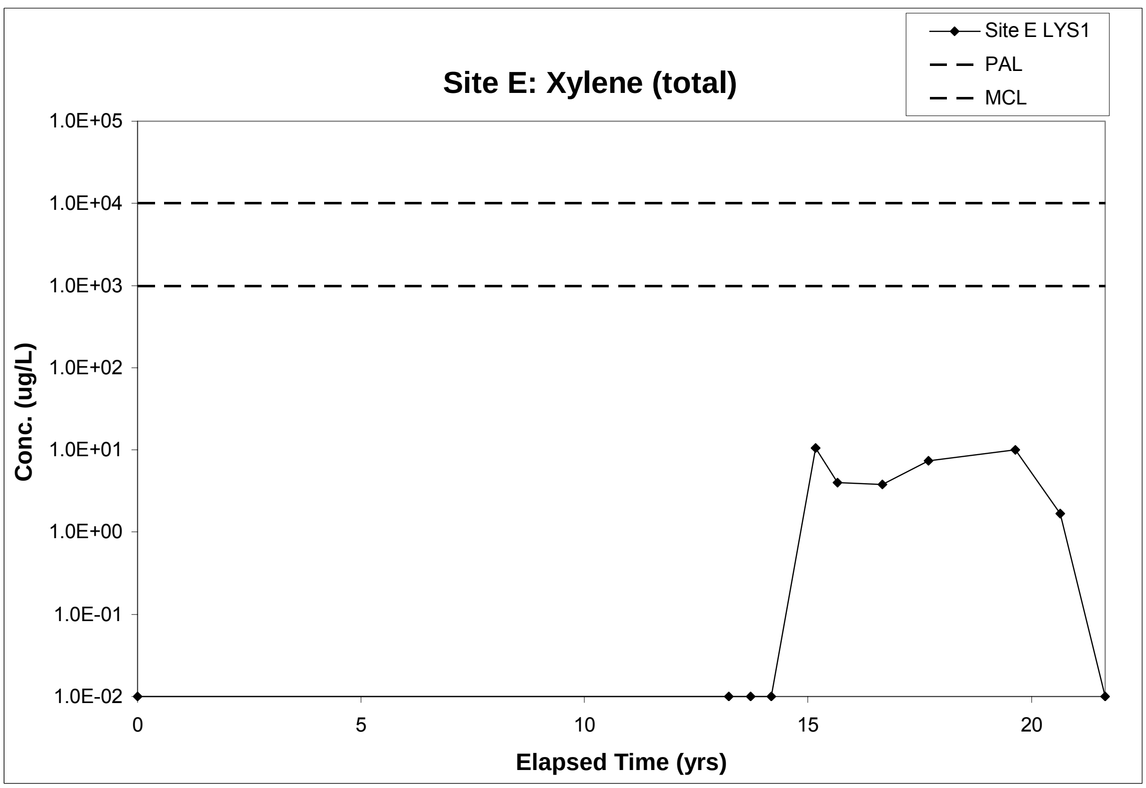

Site J: Vinyl Chloride
Site J LYS 3
PAL
ES
Lysimeter Dry: 81-94
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
5
10
15
20
Elapsed Time (yrs)

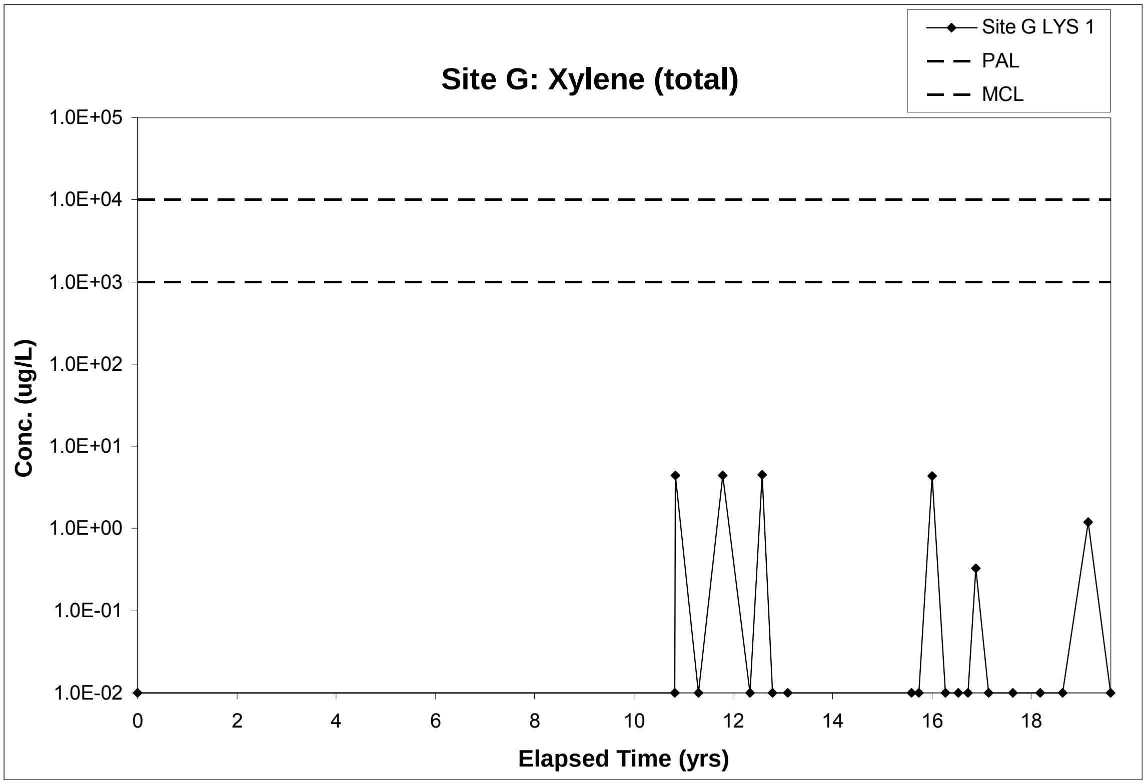

Site O: Vinyl Chloride
Site O LYS 1
PAL
ES
Lysimeter Dry: 91 & 93
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

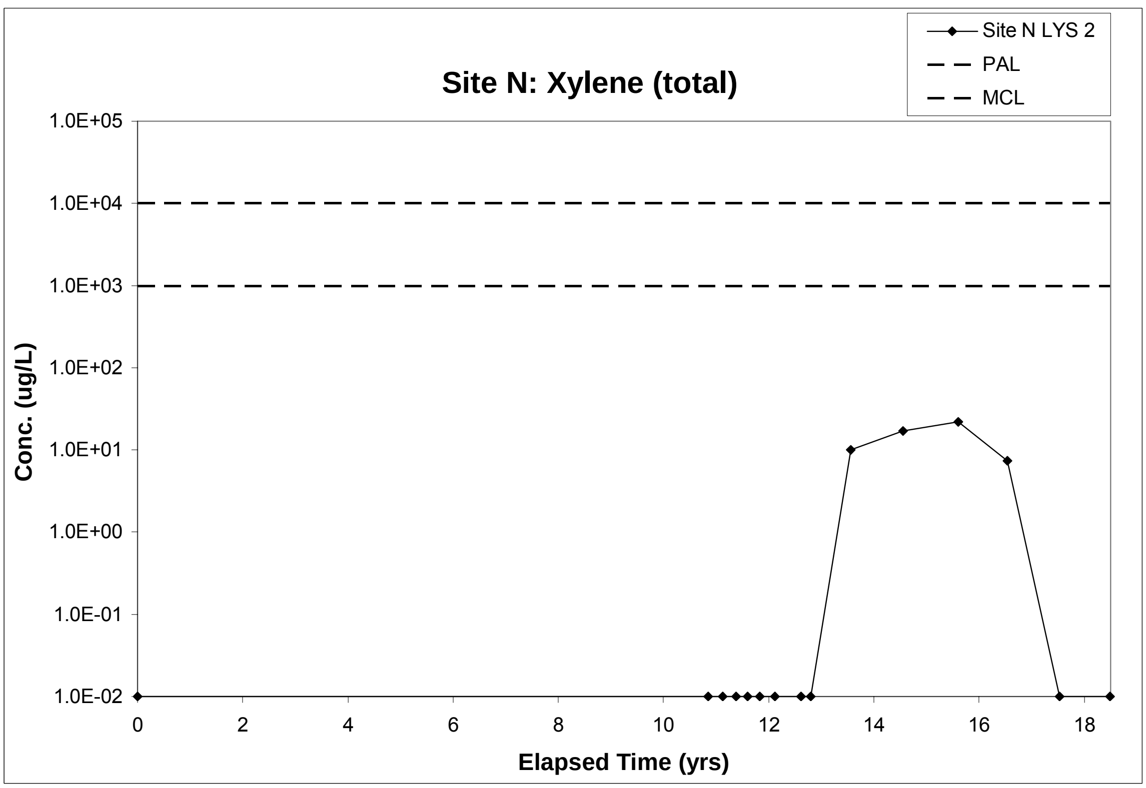

Site P: Vinyl Chloride
Site P LYS 1
PAL
ES
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

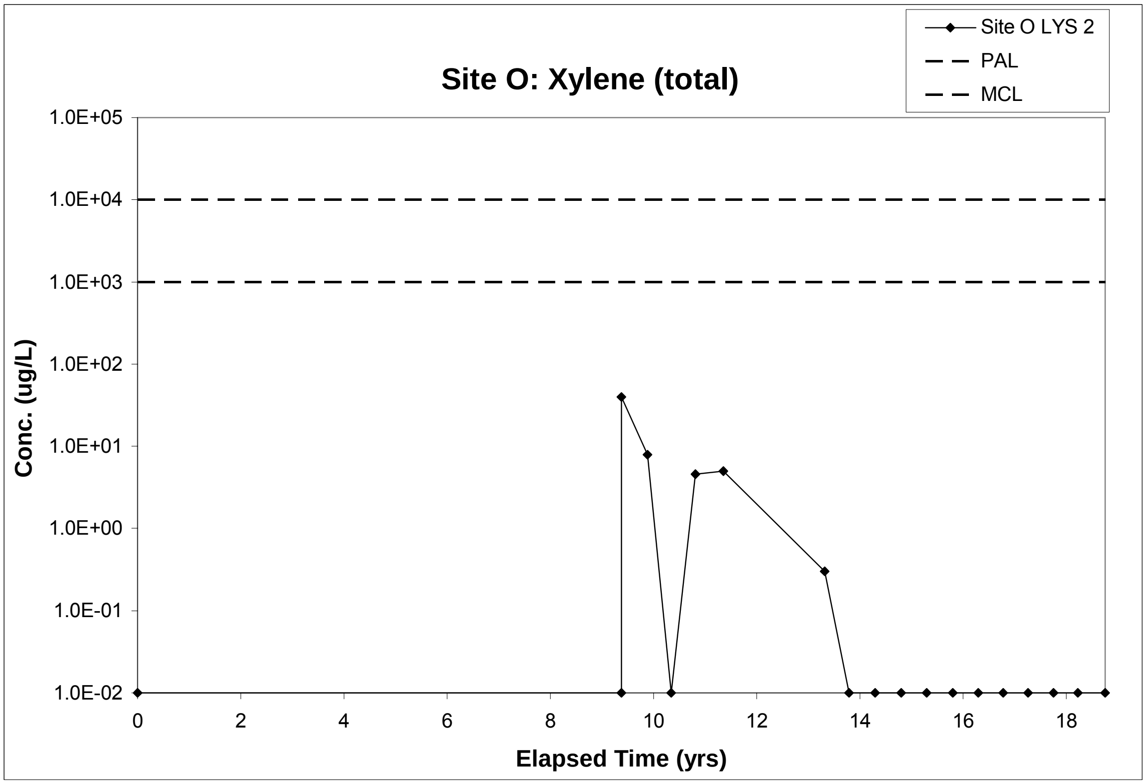

Site Y: Vinyl Chloride
Site Y LYS 1
PAL
ES
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
Elapsed Time (yrs)

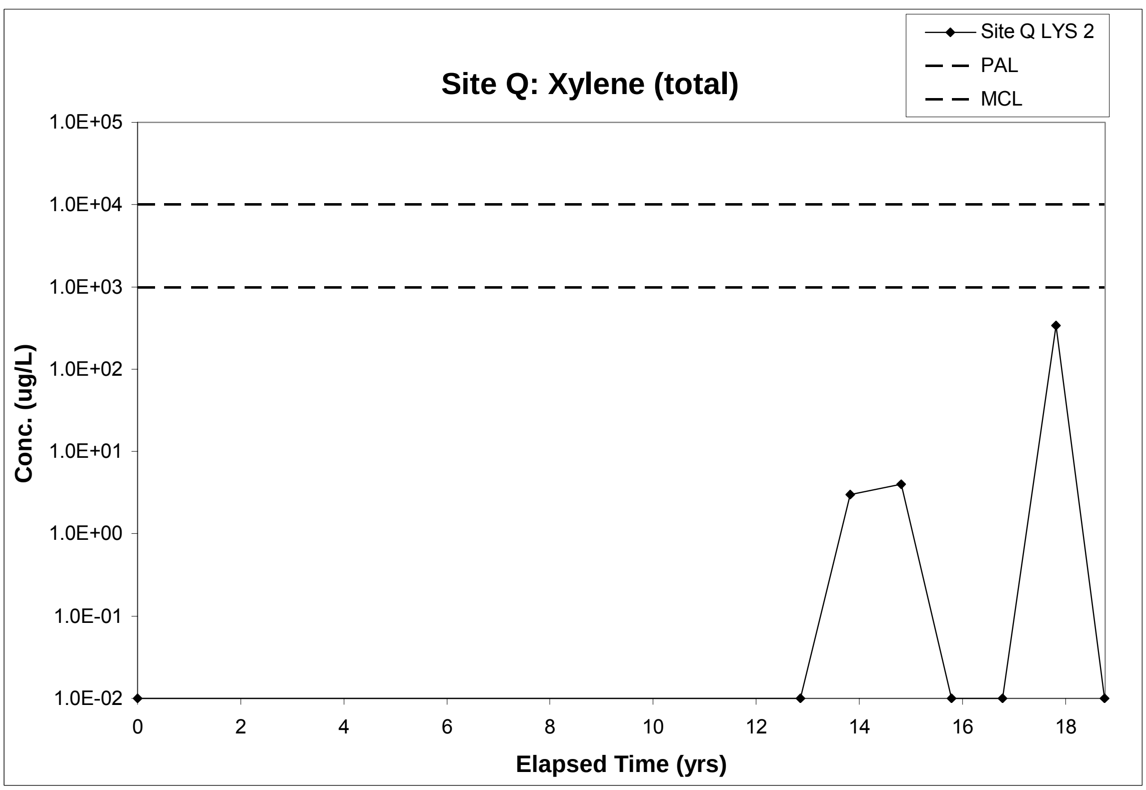

Site A: Xylene (total)
Site A LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
Elapsed Time (yrs)

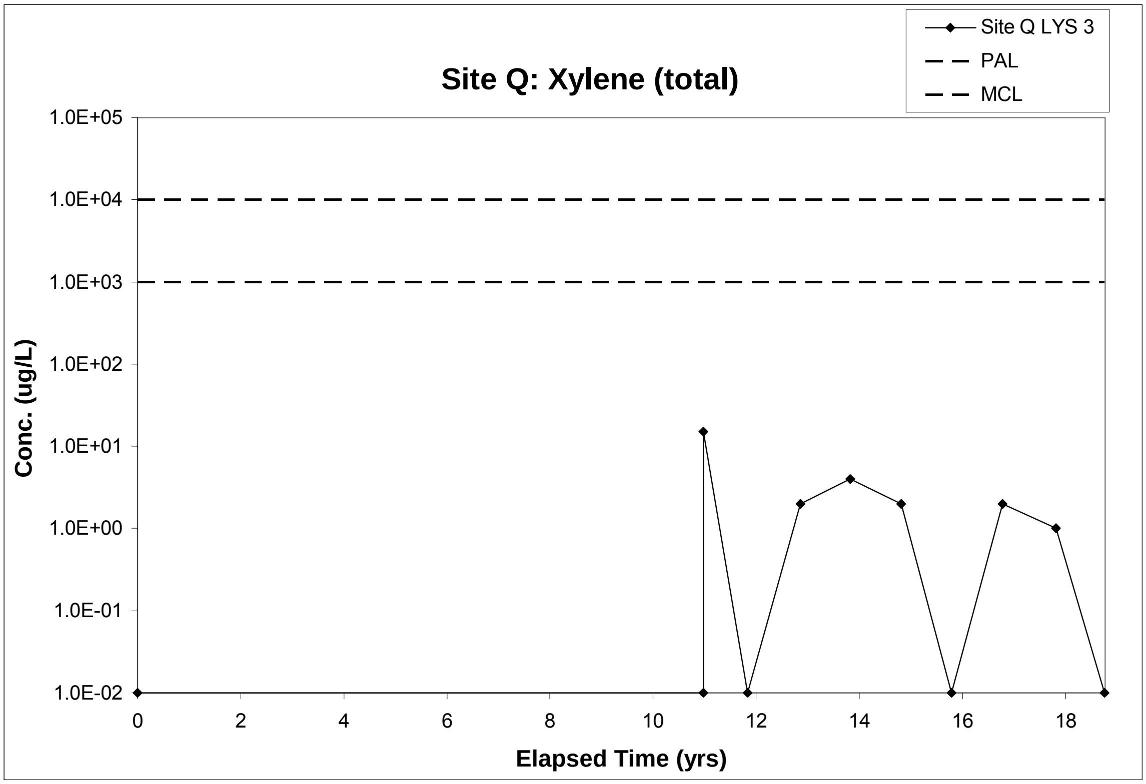

Site E: Xylene (total)
Site E LYS1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

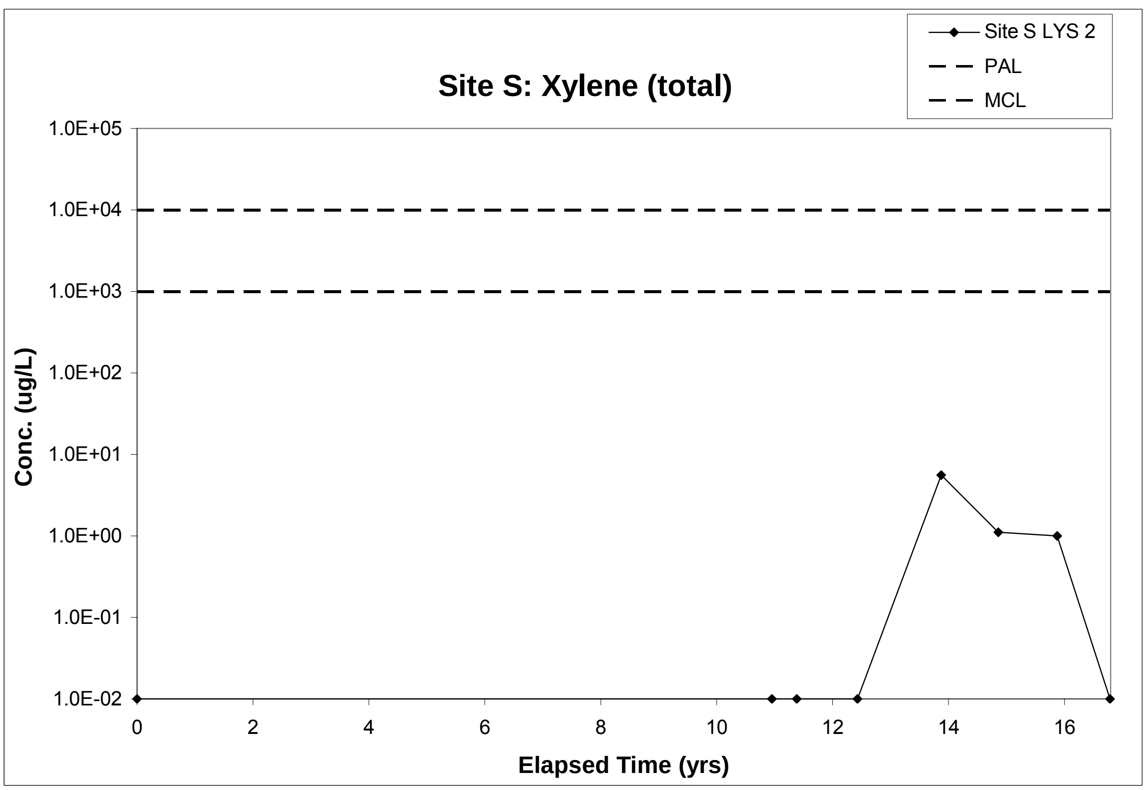

Site G LYS 1
PAL
MCL
Site G: Xylene (total)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

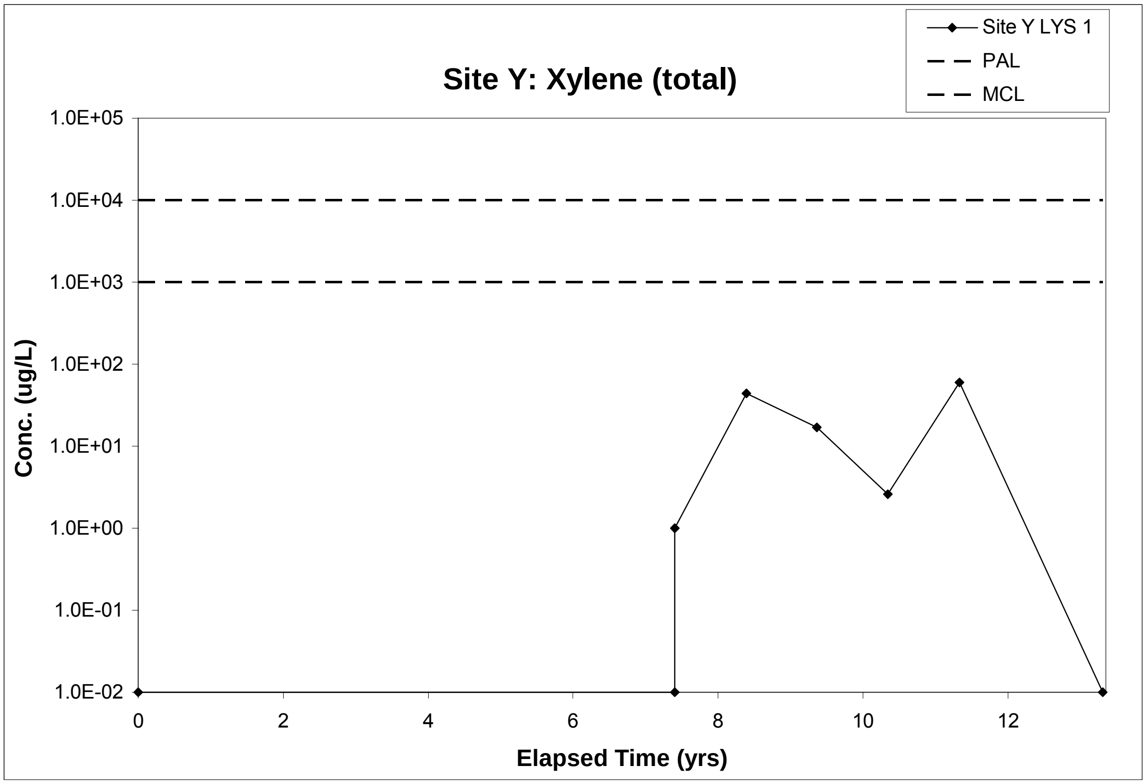

Site N LYS 2
PAL
MCL
Site N: Xylene (total)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

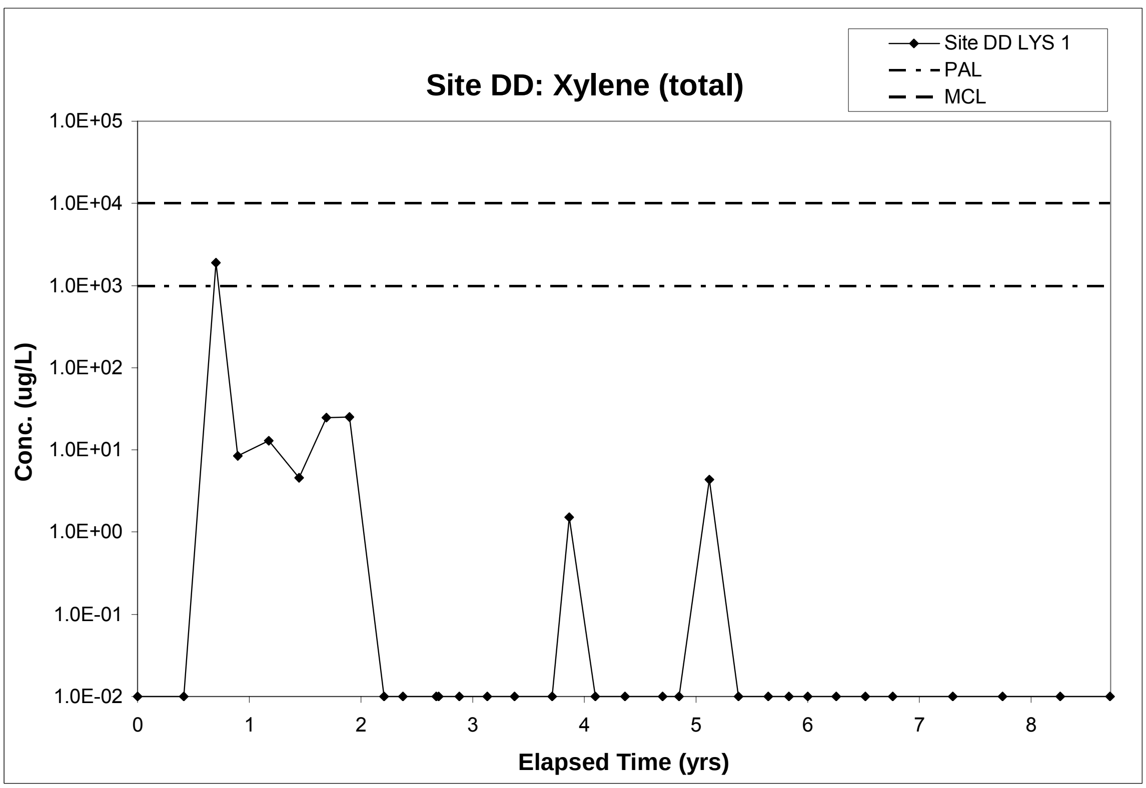

Site O LYS 2
PAL
MCL
Site O: Xylene (total)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

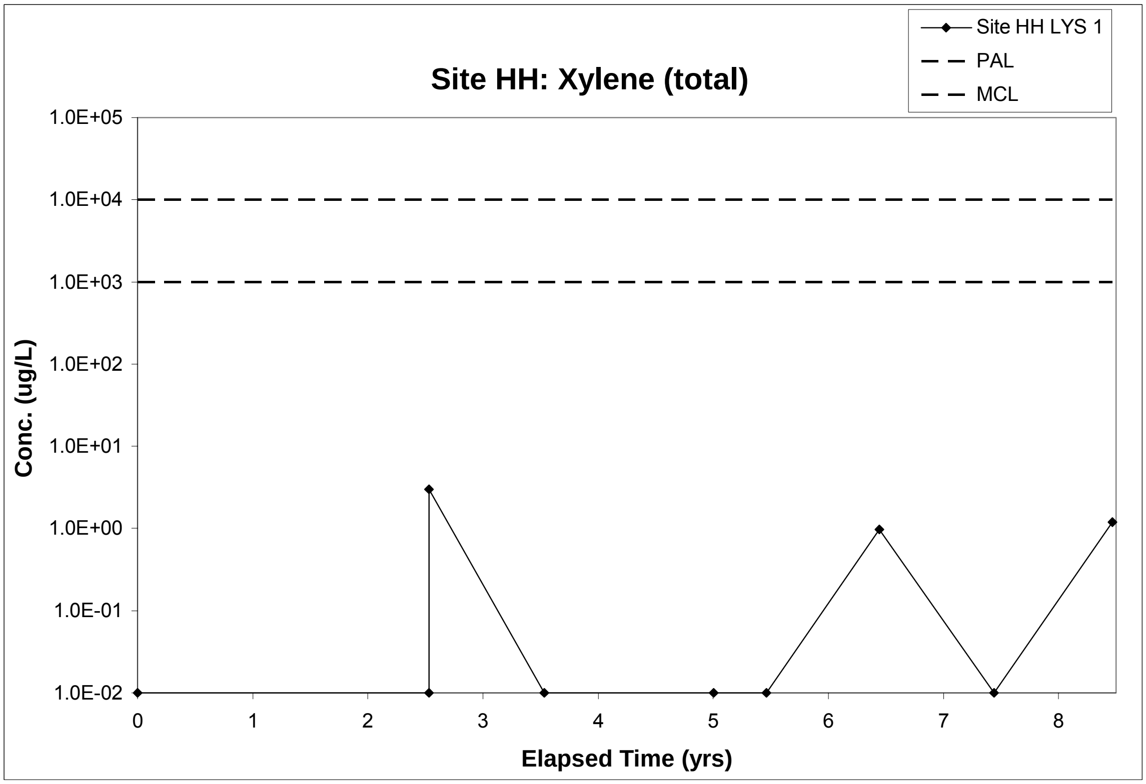

Site Q LYS 2
PAL
MCL
Site Q: Xylene (total)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

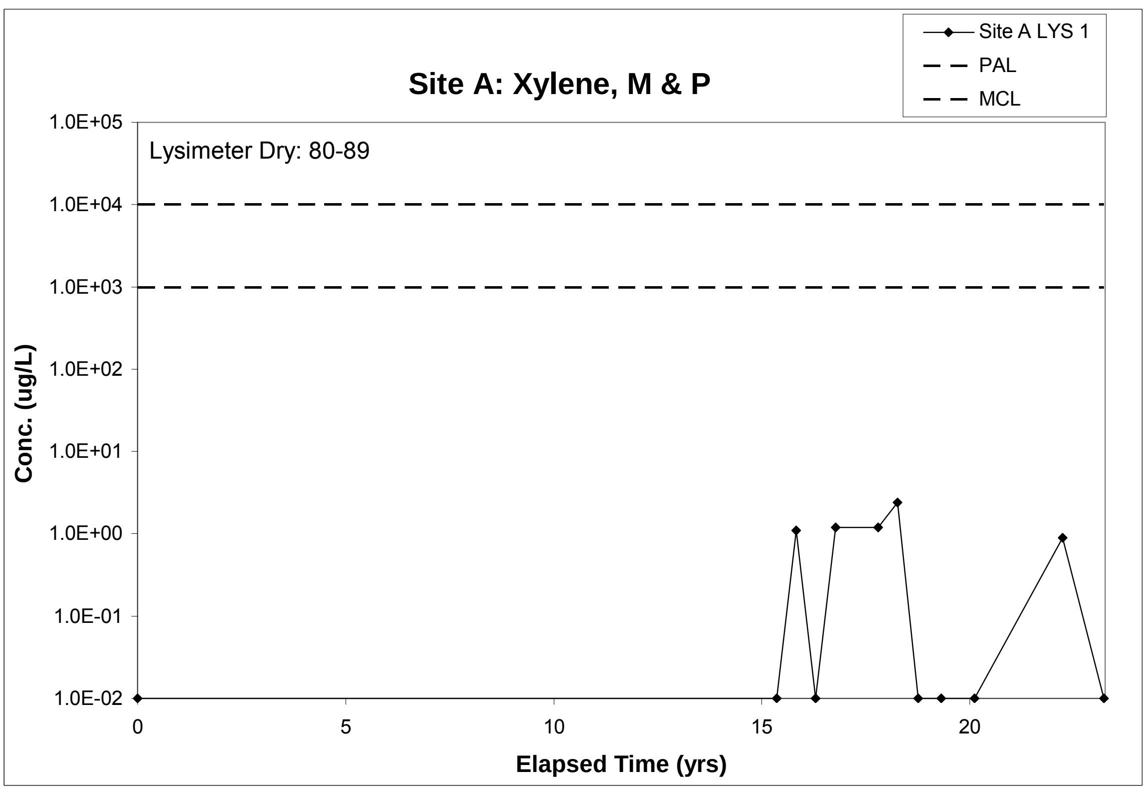

Site Q: Xylene (total)
Site Q LYS 3
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

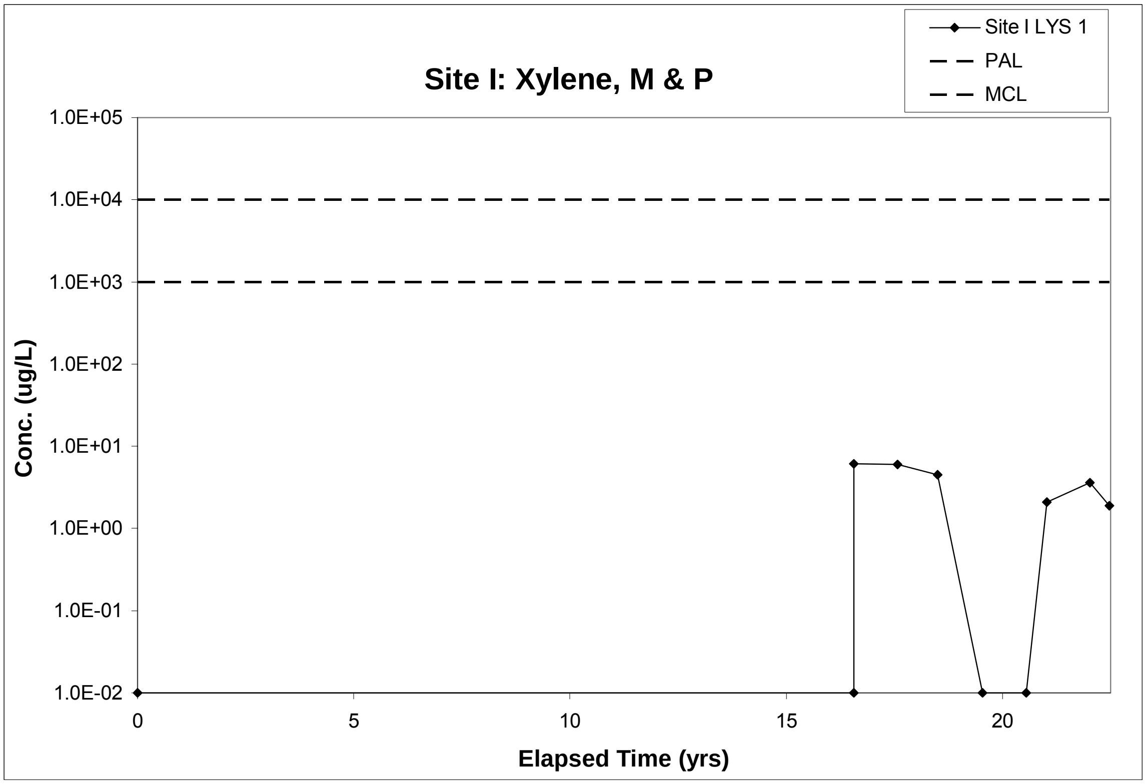

Site S: Xylene (total)
Site S LYS 2
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
Elapsed Time (yrs)

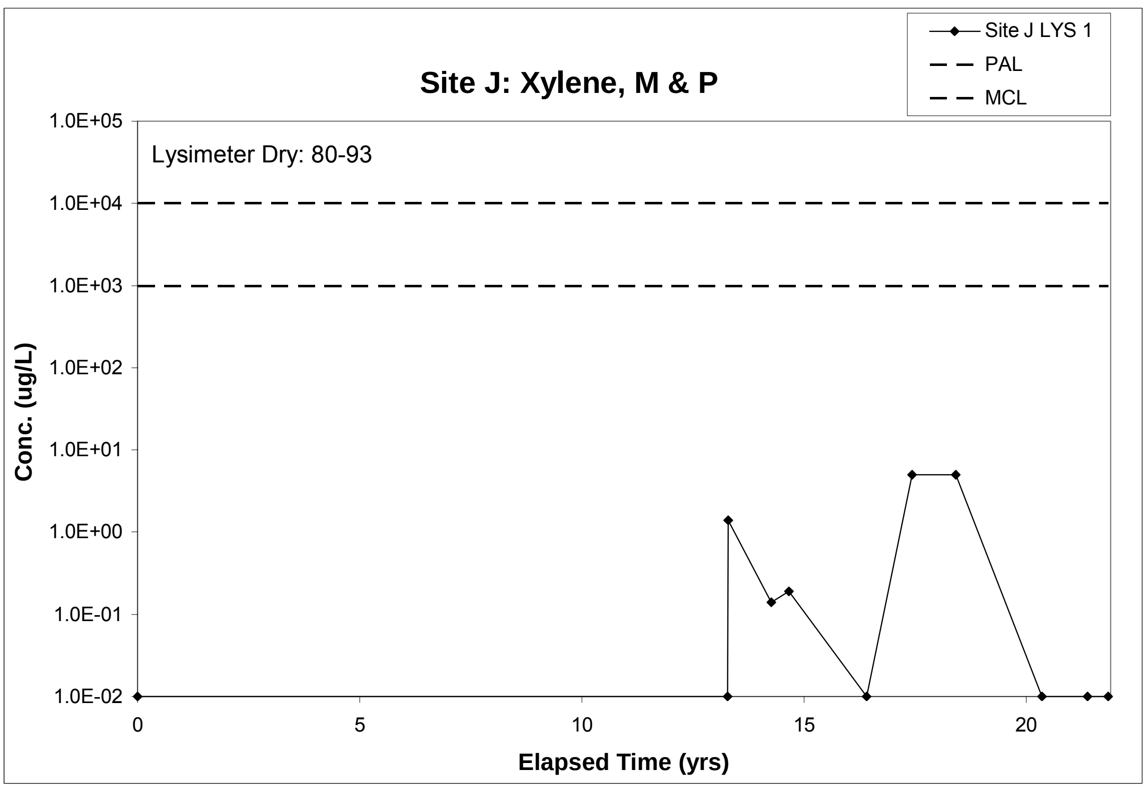

Site Y: Xylene (total)
Site Y LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
Elapsed Time (yrs)

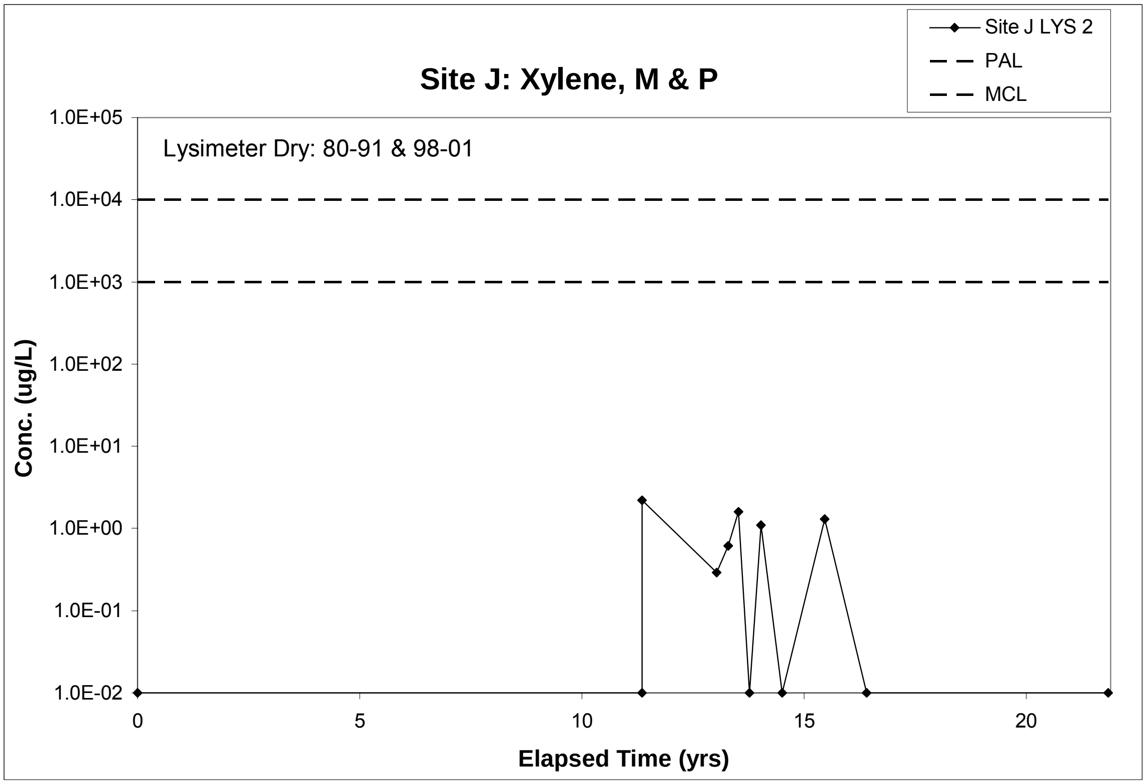

Site DD: Xylene (total)
Site DD LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

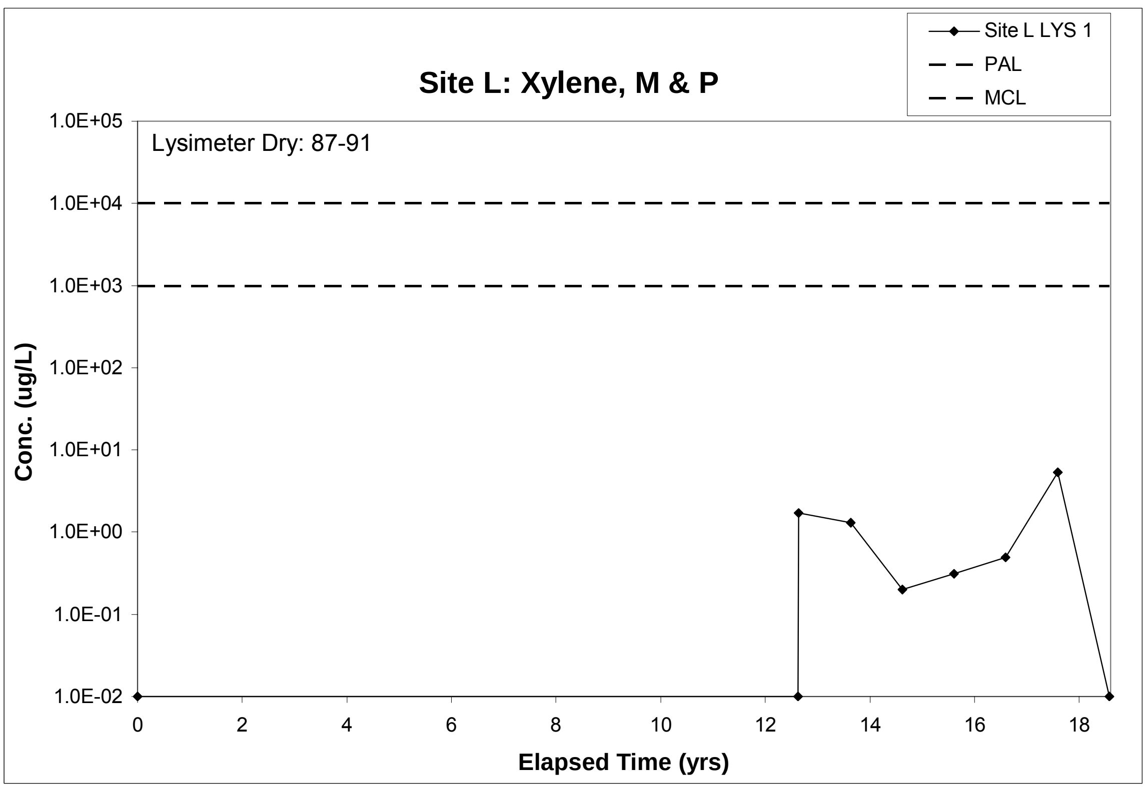

Site HH: Xylene (total)
Site HH LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
1
2
3
4
5
6
7
8
Elapsed Time (yrs)

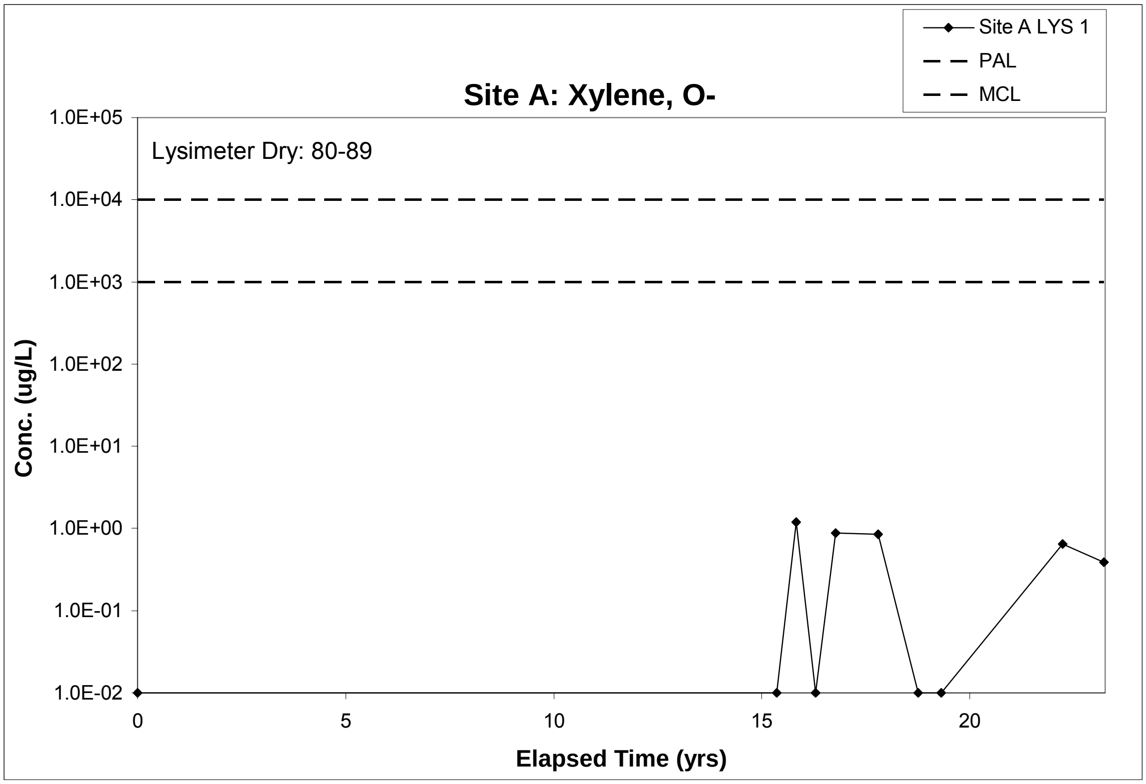

Site A: Xylene, M & P
Site A LYS 1
PAL
MCL
Lysimeter Dry: 80-89
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

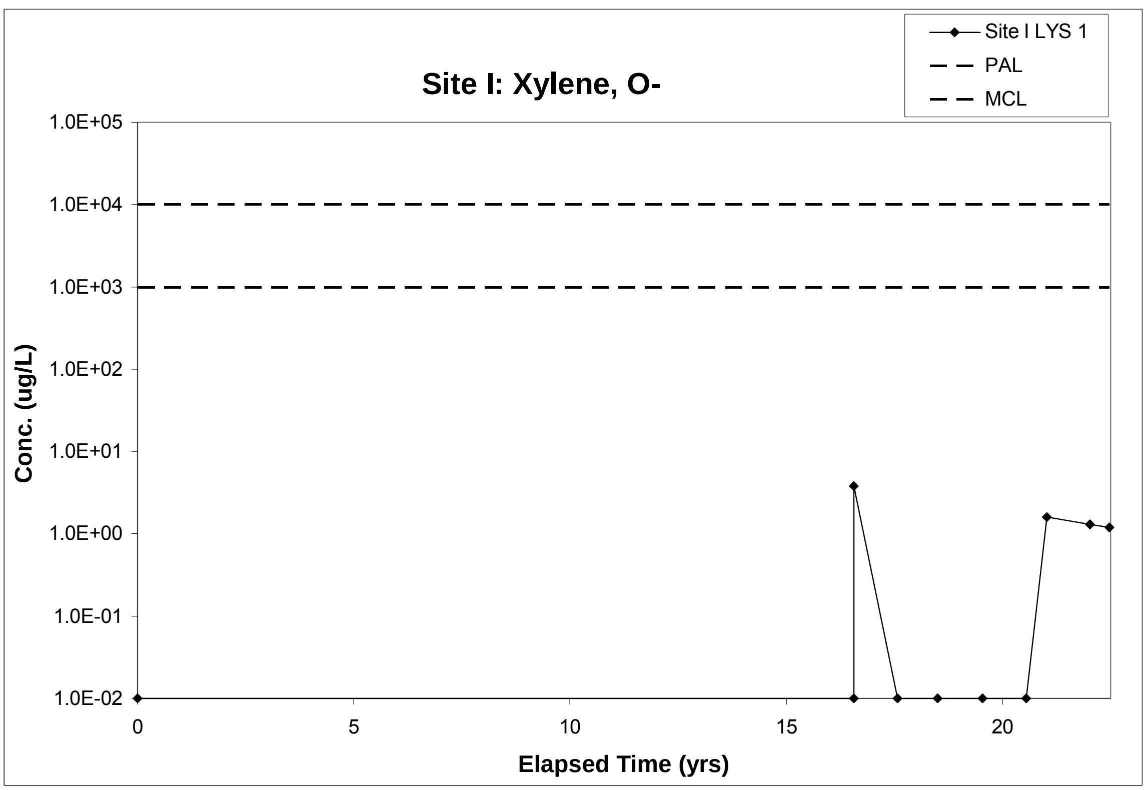

Site I: Xylene, M & P
Site I LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

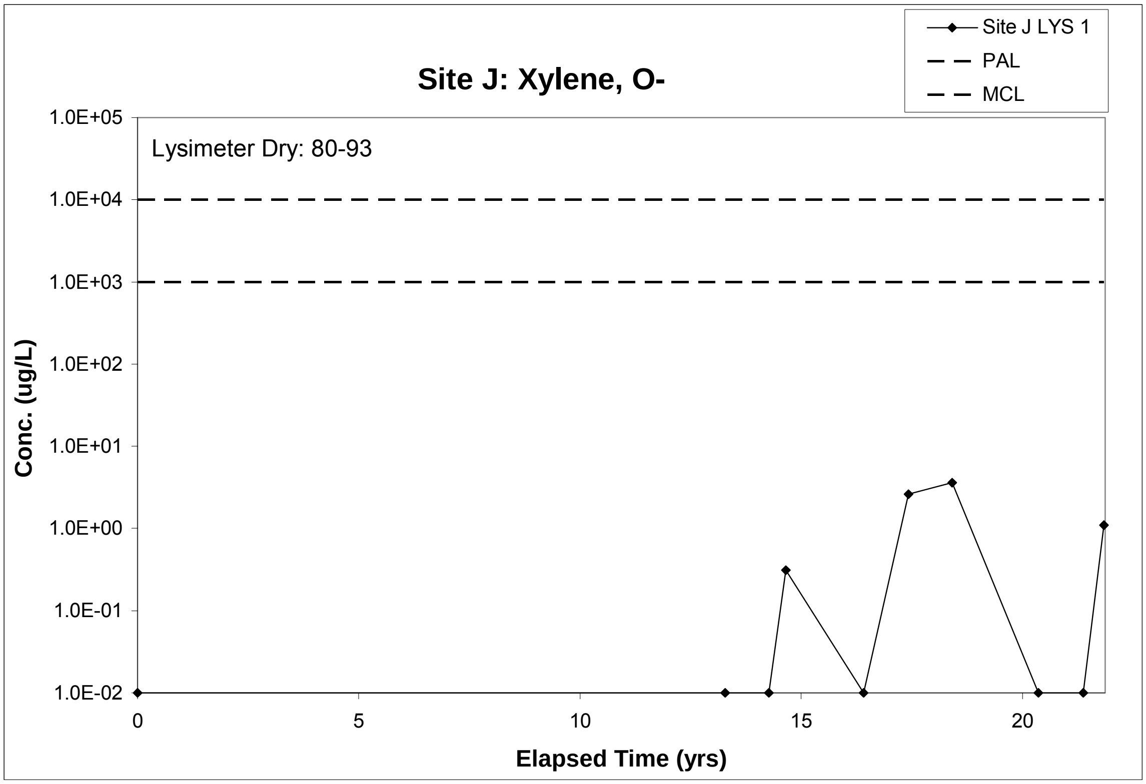

Site J: Xylene, M & P
Site J LYS 1
PAL
MCL
Lysimeter Dry: 80-93
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

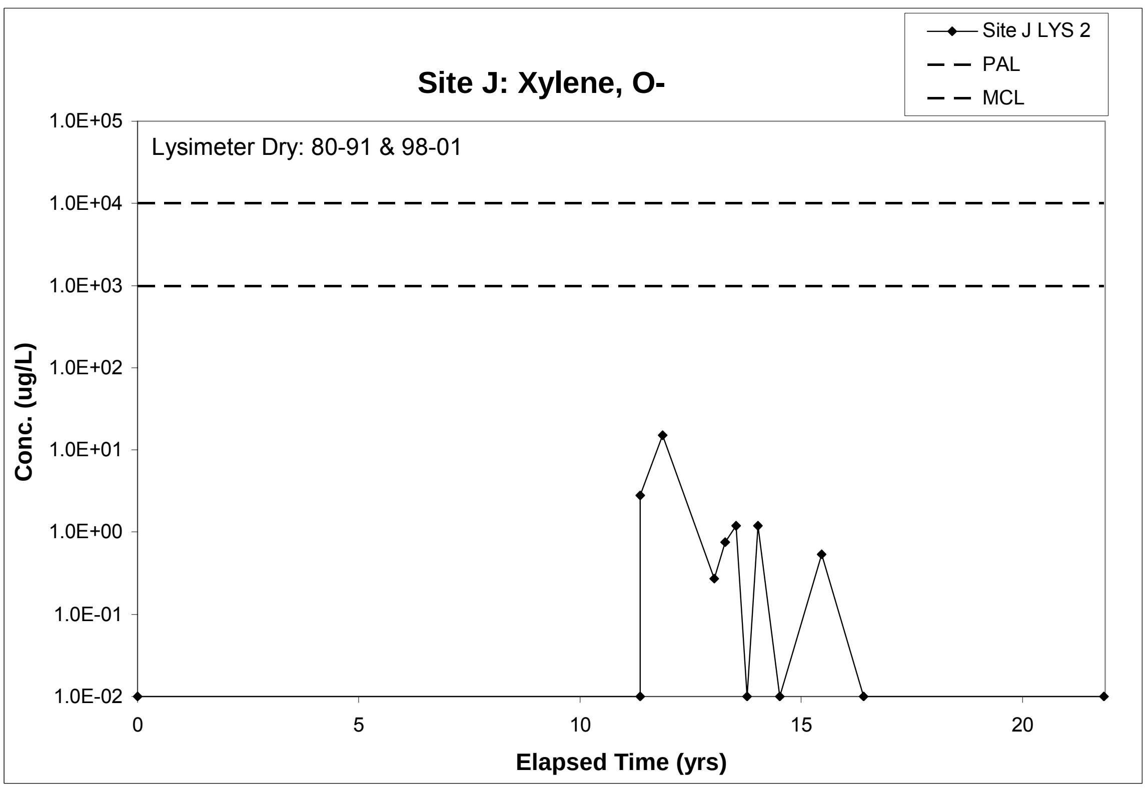

Site J: Xylene, M & P
Site J LYS 2
PAL
MCL
Lysimeter Dry: 80-91 & 98-01
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)

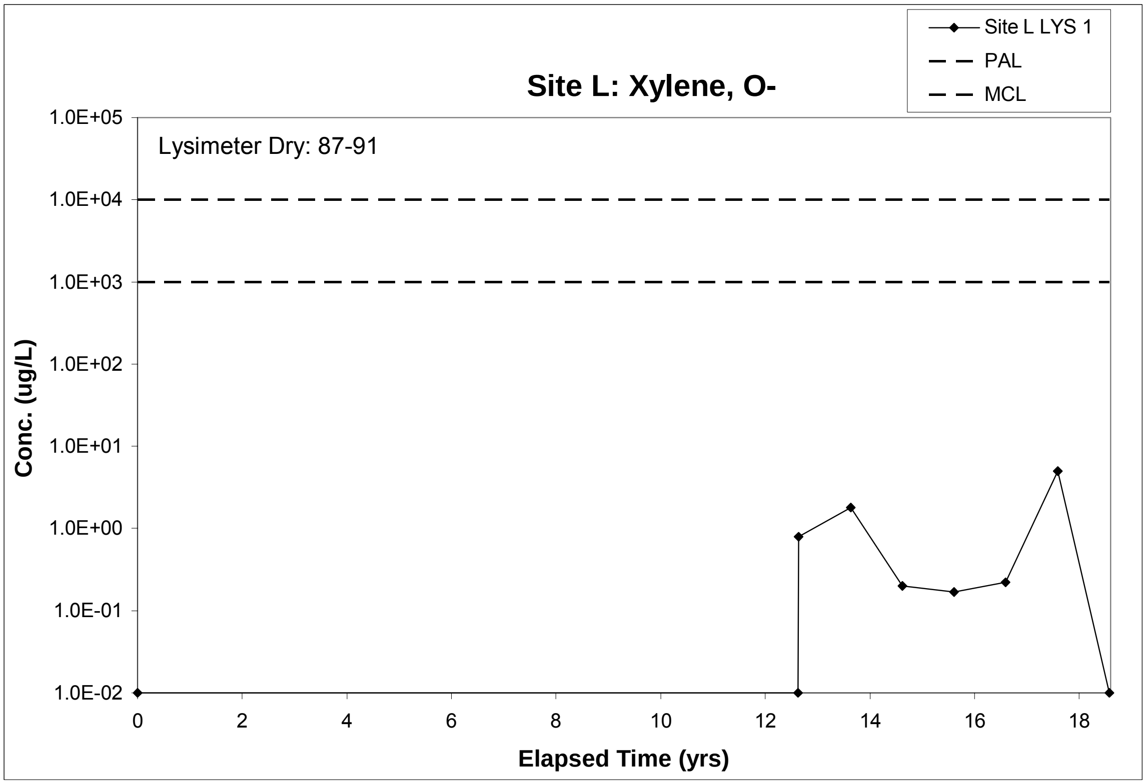

Site L: Xylene, M & P
Site L LYS 1
PAL
MCL
Lysimeter Dry: 87-91
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

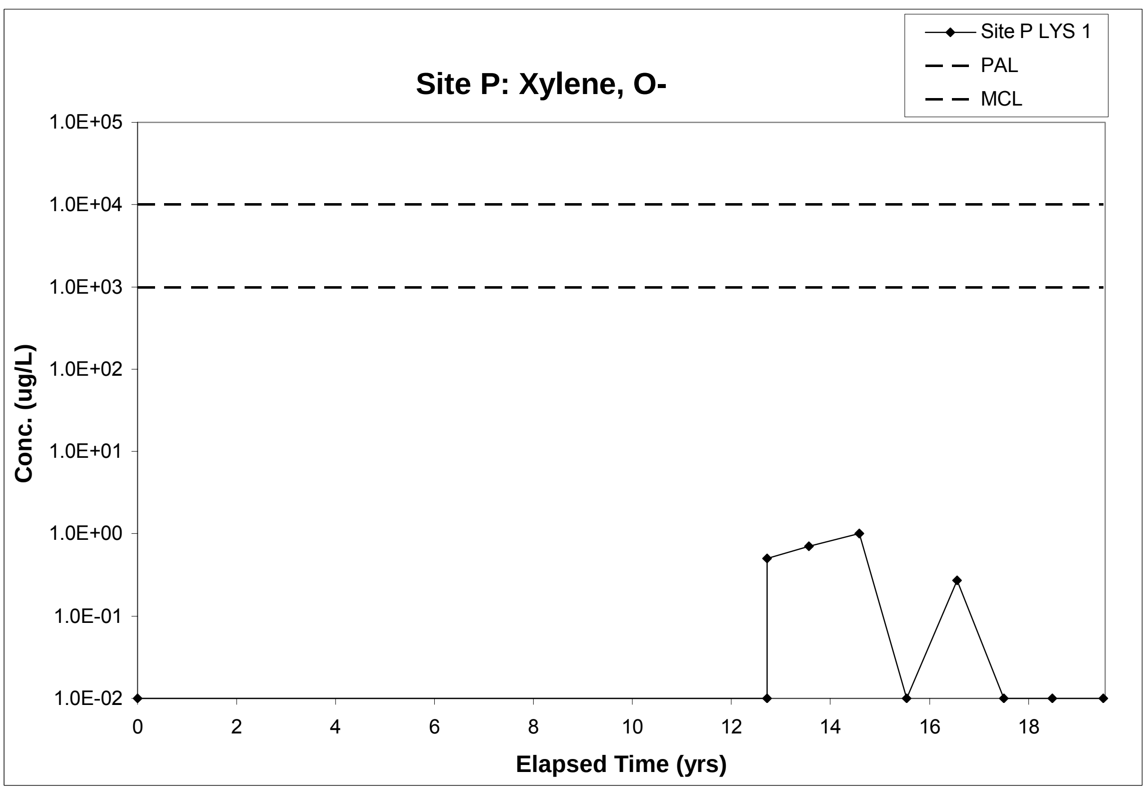

Site A: Xylene, O-
Site A LYS 1
PAL
MCL
Lysimeter Dry: 80-89
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)


Site I: Xylene, O-
Site I LYS 1
PAL
MCL
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)


Site J: Xylene, O-
Site J LYS 1
PAL
MCL
Lysimeter Dry: 80-93
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)


Site J: Xylene, O-
Site J LYS 2
PAL
MCL
Lysimeter Dry: 80-91 & 98-01
Conc. (ug/L)
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
0
5
10
15
20
Elapsed Time (yrs)


Site L LYS 1
PAL
MCL
Site L: Xylene, O-
Lysimeter Dry: 87-91
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)


Site P LYS 1
PAL
MCL
Site P: Xylene, O-
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
Conc. (ug/L)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (yrs)

Appendix F: Summary Data for creating each of the lysimeter VOC conc. records

Landfill Sites	Lysimeter Monitoring Points	1,1,1-Trichloroethane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	-	-	-	-	-	-	-	-	-
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	0.5	4	1.8	0	0	7	10	Decreasing	Decreasing
Site E	LYS PT 1									
Site G	LYS PT 1	-	-	-	-	-	-	-	-	-
Site H	LYS PT 1	0.4	9.1	3.2	0	0	4	13	NS	NS
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.9	50	11.3	1	0	11	19	Decreasing	Decreasing
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	0.3	24	4.4	0	0	7	9	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2									
	LYS PT 3									
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1									
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	1.7	174	31.9	1	0	6	19	NS*	NS*
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1									
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2									
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2									
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	1,1-Dichloroethane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	0.4	50	17.1	0	0	11	16	Decreasing	NS
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	0.4	7.3	3.2	0	0	6	10	NS	NS
Site E	LYS PT 1	0.3	1.5	1.1	0	0	4	10	NS	NS
Site G	LYS PT 1	0.1	1.8	1.1	0	0	4	23	NS	NS
Site H	LYS PT 1	0.5	2.8	1.2	0	0	4	13	NS	NS
Site I	LYS PT 1									
Site J	LYS PT 1	0.3	7.3	3.4	0	0	9	9	NS	NS
	LYS PT 2	0.1	17	5.5	0	0	11	12	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4									
Site L	LYS PT 1									
Site M	LYS PT 1									
	LYS PT 2	0.5	2.4	1.2	0	0	7	11	NS	Decreasing
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2									
Site O	LYS PT 1									
	LYS PT 2	0.4	85	14.6	1	0	14	19	NS	Decreasing
	LYS PT 3	1.4	4.6	2.8	0	0	4	7	NS	NS
Site P	LYS PT 1	0.3	22	10.5	0	0	7	9	Decreasing	Decreasing
	LYS PT 2									
Site Q	LYS PT 1									
	LYS PT 2									
	LYS PT 3									
Site S	LYS PT 1	0.5	5.2	3.4	0	0	7	11	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	1.1	180	39.5	1	0	6	6	NS	NS
Site V	LYS PT 1									
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1									
	LYS PT 2									
Site X	LYS PT 1									
Site Y	LYS PT 1	0.7	10	4.2	0	0	7	8	NS	NS
Site Z	LYS PT 1									
	LYS PT 2									
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2									
Site BB	LYS PT 1									
Site CC	LYS PT 1	0.2	64	9.2	0	0	9	14	NS*	NS*
Site DD	LYS PT 1	11.2	32.2	18.5	0	0	3	40	NS	NS
	LYS PT 2									
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Chloroform								
		Min Conc. (µg/l)	Max Conc. (µg/l)	Avg Conc. (µg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	-	-	-	-	-	-	-	-	-
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	-	-	-	-	-	-	-	-	-
Site H	LYS PT 1	0.38	5.9	2.07	5	0	9	13	NS	Decreasing
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	1,2-Dichloropropane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	-	-	-	-	-	-	-	-	-
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	-	-	-	-	-	-	-	-	-
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	0.1	1.9	0.8	3	0	6	9	NS	NS
	LYS PT 2	0.7	8	3	9	2	9	12	Decreasing	Decreasing
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Acetone								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	-	-	-	-	-	-	-	-	-
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	1.8	4.7	2.9	0	0	3	4	NS	NS
Site G	LYS PT 1	-	-	-	-	-	-	-	-	-
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	2.3	9.6	4.9	0	0	7	9	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	1.4	11	5.4	1	0	8	14	NS	NS
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	8.1	220	73.5	1	0	4	8	NS	NS
	LYS PT 2	13	510	133.8	1	0	5	6	NS	NS
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	3.1	5.6	4.1	0	0	4	6	NS	NS
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	2.9	31	13.4	0	0	5	10	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	9.2	5700	1908	1	1	3	10	NS	NS
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Benzene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	1.1	7.8	3.4	9	2	9	17	NS	NS
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	0.1	0.6	0.3	1	0	3	10	NS	NS
Site G	LYS PT 1	0.2	9.4	1.7	12	2	19	23	Increasing	Increasing
Site H	LYS PT 1	0.1	0.4	0.3	0	0	3	13	NS	NS
Site I	LYS PT 1	5.1	9	6.9	6	6	6	8	Decreasing	NS
Site J	LYS PT 1	0.1	1	0.6	4	0	6	9	NS	NS
	LYS PT 2	0.2	5.5	1.2	4	1	9	12	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	0.1	1.2	0.7	4	0	6	8	NS	NS
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.3	3.8	1.1	7	0	10	11	NS	NS
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	0.1	20	4.7	6	1	7	9	Decreasing*	Decreasing
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.4	30	8.7	5	2	5	7	NS	NS
	LYS PT 3	2	8	4.4	5	2	5	9	NS	NS
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.6	3.2	1.5	4	0	7	10	NS	NS
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	0.2	20	5.8	2	1	4	6	NS	NS
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	0.1	0.5	0.4	1	0	3	8	NS	NS
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	0.3	2.5	1.4	2	0	3	39	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Chlorobenzene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	-	-	-	-	-	-	-	-	-
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	0.2	46	5.1	1	0	22	23	NS*	NS*
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	11	71	34.7	5	0	7	9	Increasing	Increasing
Site J	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Chloroethane								
		Min Conc. (µg/l)	Max Conc. (µg/l)	Avg Conc. (µg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	0.4	23	7.4	0	0	5	16	NS	NS
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	0.2	3.6	1.9	0	0	7	23	NS	NS
Site H	LYS PT 1	0.6	1.8	1.3	0	0	5	13	NS	NS
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.8	4.4	2.1	0	0	5	11	Decreasing	Decreasing
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	17	240	96	3	0	6	19	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Chloromethane								
		Min Conc. (µg/l)	Max Conc. (µg/l)	Avg Conc. (µg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	-	-	-	-	-	-	-	-	-
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	2.1	4.5	3.4	6	3	6	23	NS	NS
Site H	LYS PT 1	0.3	2.6	1	4	0	5	13	NS	NS
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.2	0.4	0.35	3	0	4	12	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	0.1	0.7	0.3	2	0	5	18	NS	NS
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	1.6	7.4	5	3	3	3	4	NS	NS
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	0.1	0.4	0.2	1	0	3	12	NS	NS
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	cis-1,2-Dichloroethene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	0.8	480	75.6	4	3	13	16	NS	NS
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	0.2	12.6	3.8	1	0	7	19	NS	NS
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	0.1	17	4.1	2	0	7	9	NS	NS
	LYS PT 2	0.2	40	11.8	2	0	8	11	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.3	10	3.1	1	0	4	19	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	0.2	55	20.6	6	0	9	9	Decreasing	Decreasing
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	0.8	2	1.5	0	0	5	11	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	0.8	150	41.5	2	1	4	6	NS	NS
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Dichlorodifluoromethane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	3.1	52	19.7	0	0	3	15	NS	NS
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	2.3	19	8.2	0	0	3	4	NS	NS
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	0.6	13.4	4.7	0	0	12	16	NS	NS
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	62	140	92.6	0	0	8	8	NS	NS
Site J	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.4	1.5	0.9	0	0	6	8	NS	NS
	LYS PT 3	0.7	1.1	0.9	0	0	3	5	NS	NS
	LYS PT 4	0.1	0.2	0.19	0	0	3	13	NS	NS
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.3	0.7	0.4	0	0	4	11	NS	NS
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.3	8.4	2.6	0	0	7	19	Decreasing	Decreasing
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	0.4	7	3	0	0	4	9	NS	Decreasing
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Dichloromethane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	-	-	-	-	-	-	-	-	-
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	2.1	5.3	3.6	4	1	4	10	NS	NS
Site E	LYS PT 1	0.6	4.7	2.4	3	0	3	10	NS	NS
Site G	LYS PT 1	-	-	-	-	-	-	-	-	-
Site H	LYS PT 1	0.1	1025	147.3	5	1	7	13	Decreasing*	Decreasing*
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	0.2	24	8.5	2	1	3	9	NS	NS
	LYS PT 2	0.1	14	3.1	4	2	10	12	Decreasing	Decreasing
	LYS PT 3	0.2	0.3	0.25	0	0	3	6	NS	Increasing
	LYS PT 4	0.1	3.7	1.4	1	0	3	18	NS	NS
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	0.4	1.4	0.9	3	0	4	12	NS	NS
	LYS PT 2	0.5	1.9	1.1	4	0	4	11	NS	NS
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	1	310	52.6	6	1	6	19	NS	NS
	LYS PT 3	1.2	5.2	2.7	3	1	3	7	NS	NS
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	1.4	31	11.3	3	1	3	6	NS	NS
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	0.8	9	3.5	6	2	6	8	NS	NS
Site Z	LYS PT 1	0.4	1	0.7	2	0	3	13	NS	NS
	LYS PT 2	0.4	1.3	0.9	2	0	3	13	NS	NS
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	3.4	48	20.8	3	2	3	14	NS	NS
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	0.15	0.21	0.2	0	0	4	12	NS	NS
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Ethylbenzene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	0.35	39	13.7	0	0	7	16	NS	Decreasing
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	1.1	5.2	2.7	0	0	7	10	NS	NS
Site G	LYS PT 1	1	1.6	1.4	0	0	4	23	NS	NS
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	5.4	18	11	0	0	7	8	NS	NS
Site J	LYS PT 1	0.64	2.7	1.75	0	0	3	9	NS	NS
	LYS PT 2	0.2	14	2.1	0	0	8	12	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.6	2.9	1.3	0	0	5	16	NS	NS
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	1	11	3.1	0	0	6	19	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.7	71	24.2	0	0	3	7	NS	NS
	LYS PT 3	0.2	0.8	0.5	0	0	5	9	NS	NS
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.2	0.9	0.5	0	0	3	7	NS	NS
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.5	10.8	4	0	0	3	4	NS	NS
Site U	LYS PT 1	0.7	71	20.6	0	0	4	6	NS	NS
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	0.3	3.8	1.6	0	0	4	8	NS	NS
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	1.1	27	8.2	0	0	5	40	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Methyl Ethyl Ketone Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	-	-	-	-	-	-	-	-	-
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	-	-	-	-	-	-	-	-	-
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.59	13	4	0	0	9	12	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	0.51	5.8	2.3	0	0	9	17	NS	NS
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Methyl Teriary Butyl Ester								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	0.93	30	10.8	3	0	9	16	NS	NS
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	-	-	-	-	-	-	-	-	-
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Fluorotrichloromethane								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	-	-	-	-	-	-	-	-	-
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	2.8	26	9.1	0	0	10	10	Decreasing	Decreasing
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	-	-	-	-	-	-	-	-	-
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	0.49	8.2	3.67	0	0	4	8	NS	NS
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	p-Dichlorobenzene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	-	-	-	-	-	-	-	-	-
Site B	LYS PT 1	2.5	6.6	5.5	0	0	4	4	NS	NS
Site C	LYS PT 1	0.2	17.2	3.2	1	0	6	10	NS	Decreasing
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	1.36	34	8	3	0	22	23	Decreasing	Decreasing
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.32	2.2	1.2	0	0	4	12	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	0.1	6.5	2.9	0	0	5	7	NS	NS
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	0.12	7.6	2.2	0	0	11	40	NS	NS
	LYS PT 2	0.46	7.5	3.4	0	0	6	26	NS	NS
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Trichloroethylene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	0.81	62	13.5	11	4	11	16	NS	NS
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	0.39	3.35	1.43	6	0	7	19	NS	NS
Site H	LYS PT 1	0.25	4.3	1.38	2	0	4	12	NS	NS
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	0.22	4.7	1.24	5	0	8	9	NS	NS
	LYS PT 2	0.082	17	2.43	7	1	11	12	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	9.6	25	15.9	5	5	5	6	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	5.1	120	49.3	9	9	9	9	Decreasing	Decreasing
	LYS PT 2	0.52	3.5	1.78	7	0	7	9	NS	NS
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	0.88	2.65	3.54	9	2	9	10	Decreasing	Decreasing
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	0.47	25	6.95	5	2	6	6	NS	NS
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	1	285	36.7	9	4	9	19	Decreasing*	Decreasing*
Site Y	LYS PT 1	0.51	1	0.74	4	0	4	7	NS	NS
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	0.44	3.4	1.5	2	0	3	14	Decreasing	NS
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Tetrachloroethylene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	3.2	270	133	4	3	4	16	NS	NS
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	0.5	0.8	0.623	6	0	6	10	NS	NS
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	-	-	-	-	-	-	-	-	-
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	2.7	4.8	3.72	5	0	5	9	NS	NS
	LYS PT 2	0.14	5.5	1.75	4	1	9	12	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	0.75	1.6	0.94	10	0	10	16	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	20	39	27	5	5	5	6	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	1.3	25	10.3	8	4	8	9	Decreasing	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	1.94	6.4	3.3	10	1	10	10	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	1.4	17	7.7	4	2	4	6	NS	NS
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	1.4	75.3	31.4	5	3	5	37	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Tetrahydrofuran Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	-	-	-	-	-	-	-	-	-
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	-	-	-	-	-	-	-	-	-
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	0.33	120	34.2	4	1	6	8	NS	NS
	LYS PT 2	2.5	120	51.4	9	6	12	12	NS	NS
	LYS PT 3	22	74	55.8	5	4	5	5	NS	NS
	LYS PT 4	1.2	420	120	14	10	16	17	NS	NS
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	30	66	46.2	6	3	6	9	NS	NS
	LYS PT 2	24	570	143	6	4	6	6	NS	NS
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	6.3	100	26.7	2	1	5	6	NS	NS
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	3.8	306	67.7	4	2	7	8	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	22	440	152	4	2	4	9	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	6	100	48	2	1	3	9	NS	NS
Site S	LYS PT 1	3.4	1600	492	3	2	6	8	NS	Decreasing
	LYS PT 2	30	4800	1990	7	5	7	7	NS	Decreasing
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	69	2000	672	5	5	5	6	NS	NS
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	1.8	10	4.47	1	0	6	13	NS	NS
Site AA	LYS PT 1	1.4	11	7.04	1	0	5	5	NS	NS
	LYS PT 2	2.8	41	13.7	2	0	5	6	NS	NS
Site BB	LYS PT 1	5600	9600	7550	6	6	6	6	Decreasing	Decreasing
Site CC	LYS PT 1	2.6	21	13.7	3	0	4	5	NS	NS
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Toluene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	0.24	280	55.5	2	0	13	16	NS	Decreasing
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	0.6	3.4	1.3	0	0	7	23	NS	NS
Site G	LYS PT 1	1	36	7.98	0	0	6	23	NS	NS
Site H	LYS PT 1	0.17	0.69	0.483	0	0	6	12	NS	NS
Site I	LYS PT 1	0.86	2	1.44	0	0	4	8	NS	NS
Site J	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.23	24	3.58	0	0	9	12	NS	Decreasing
	LYS PT 3	0.18	0.71	0.368	0	0	5	6	NS	NS
	LYS PT 4	0.11	0.48	0.205	0	0	4	18	NS	NS
Site L	LYS PT 1	0.2	3.3	1.29	0	0	6	8	NS	NS
Site M	LYS PT 1	0.33	2.3	1.27	0	0	4	13	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.2	560	82.6	1	0	8	19	NS	Decreasing
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.5	290	51.4	1	0	6	7	NS	NS
	LYS PT 3	0.4	16	5.34	0	0	7	9	Decreasing	Decreasing
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.24	8	2.6	0	0	5	7	NS	NS
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	0.52	7.12	3.42	0	0	4	5	NS	NS
	LYS PT 2	4.2	140	49.8	0	0	3	8	NS	NS
Site W	LYS PT 1	0.4	2	0.81	0	0	7	7	NS	NS
	LYS PT 2	0.2	3	1.1	0	0	4	7	NS	NS
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	0.11	3.9	1.85	0	0	6	8	NS	NS
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	7	184	60.9	0	0	5	39	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	0.37	3	1.27	0	0	5	7	NS	NS

Landfill Sites	Lysimeter Monitoring Points	Vinyl Chloride								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	0.58	27	10.9	8	8	8	16	NS	NS
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	0.17	28	4.12	16	15	16	23	Decreasing	Decreasing
Site H	LYS PT 1	0.21	3	1.32	6	6	6	13	NS	NS
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	0.51	3.4	1.59	5	5	5	9	NS	NS
	LYS PT 2	0.26	5.5	2.44	9	9	9	12	NS	Decreasing
	LYS PT 3	0.39	1.9	1.38	6	6	6	6	NS	NS
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	1.9	22	9.65	4	4	4	19	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	0.41	7.8	4.46	5	5	5	9	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	1.3	4.6	2.63	4	4	4	8	NS	NS
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Xylene O, M, and P-								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	75	170	121	0	0	4	5	NS	Decreasing
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	1.67	10.5	6.23	0	0	6	10	NS	NS
Site G	LYS PT 1	0.33	4.5	3.36	0	0	6	20	NS	NS
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	-	-	-	-	-	-	-	-	-
Site J	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	-	-	-	-	-	-	-	-	-
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	7.4	22	14.1	0	0	4	14	NS	NS
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	0.3	40	11.6	0	0	5	17	NS	Decreasing
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	3	340	115	0	0	3	7	NS	NS
	LYS PT 3	1	15	4.33	0	0	6	9	NS	Decreasing
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	1	5.6	2.57	0	0	3	7	NS	NS
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	1	60	24.9	0	0	5	6	NS	NS
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	1.51	1900	247	1	0	8	32	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	0.98	3	1.73	0	0	3	7	NS	NS

Landfill Sites	Lysimeter Monitoring Points	Xylene, M&P								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	0.89	2.4	1.36	0	0	5	11	NS	NS
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	-	-	-	-	-	-	-	-	-
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	1.9	6.1	4.03	0	0	6	8	Decreasing	Decreasing
Site J	LYS PT 1	0.14	5	2.35	0	0	5	9	Increasing	NS
	LYS PT 2	0.29	2.2	1.18	0	0	6	10	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	0.2	5.3	1.55	0	0	6	7	NS	NS
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Xylene, O-								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	0.39	1.2	0.794	0	0	5	9	Decreasing	Decreasing
Site B	LYS PT 1	-	-	-	-	-	-	-	-	-
Site C	LYS PT 1	-	-	-	-	-	-	-	-	-
Site E	LYS PT 1	-	-	-	-	-	-	-	-	-
Site G	LYS PT 1	-	-	-	-	-	-	-	-	-
Site H	LYS PT 1	-	-	-	-	-	-	-	-	-
Site I	LYS PT 1	1.2	3.8	1.98	0	0	4	8	Decreasing	Decreasing
Site J	LYS PT 1	0.31	3.6	1.9	0	0	4	9	NS	NS
	LYS PT 2	0.27	15	3.11	0	0	7	11	NS	NS
	LYS PT 3	-	-	-	-	-	-	-	-	-
	LYS PT 4	-	-	-	-	-	-	-	-	-
Site L	LYS PT 1	0.17	5	1.37	0	0	6	7	NS	NS
Site M	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site N	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site O	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site P	LYS PT 1	0.27	1	6.18	0	0	4	8	NS	NS
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site Q	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
	LYS PT 3	-	-	-	-	-	-	-	-	-
Site S	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site T	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site U	LYS PT 1	-	-	-	-	-	-	-	-	-
Site V	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site W	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site X	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Y	LYS PT 1	-	-	-	-	-	-	-	-	-
Site Z	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site AA	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site BB	LYS PT 1	-	-	-	-	-	-	-	-	-
Site CC	LYS PT 1	-	-	-	-	-	-	-	-	-
Site DD	LYS PT 1	-	-	-	-	-	-	-	-	-
	LYS PT 2	-	-	-	-	-	-	-	-	-
Site GG	LYS PT 1	-	-	-	-	-	-	-	-	-
Site HH	LYS PT 1	-	-	-	-	-	-	-	-	-

Landfill Sites	Lysimeter Monitoring Points	Trans-1,2-dichloroethene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1	0.35	4.3	1.63	0	0	5	16	NS	NS
Site B	LYS PT 1									
Site C	LYS PT 1									
Site E	LYS PT 1									
Site G	LYS PT 1									
Site H	LYS PT 1									
Site I	LYS PT 1									
Site J	LYS PT 1									
	LYS PT 2	0.15	1.3	0.483	0	0	4	12	NS	NS
	LYS PT 3									
	LYS PT 4									
Site L	LYS PT 1									
Site M	LYS PT 1									
	LYS PT 2									
Site N	LYS PT 1									
	LYS PT 2									
Site O	LYS PT 1									
	LYS PT 2									
	LYS PT 3									
Site P	LYS PT 1	0.6	2	1.46	0	0	5	9	NS	NS
	LYS PT 2									
Site Q	LYS PT 1									
	LYS PT 2									
	LYS PT 3									
Site S	LYS PT 1									
	LYS PT 2									
Site T	LYS PT 1									
	LYS PT 2									
Site U	LYS PT 1									
Site V	LYS PT 1									
	LYS PT 2									
Site W	LYS PT 1									
	LYS PT 2									
Site X	LYS PT 1									
Site Y	LYS PT 1									
Site Z	LYS PT 1									
	LYS PT 2									
Site AA	LYS PT 1									
	LYS PT 2									
Site BB	LYS PT 1									
Site CC	LYS PT 1									
Site DD	LYS PT 1									
	LYS PT 2									
Site GG	LYS PT 1									
Site HH	LYS PT 1									

Landfill Sites	Lysimeter Monitoring Points	Naphthalene								
		Min Conc. (μg/l)	Max Conc. (μg/l)	Avg Conc. (μg/l)	Number Detects > PAL	Number Detects > ES	Number Detects	Number Samples	Statistically Significant Trend	Statistically Significant Trend (Ln C)
Site A	LYS PT 1									
Site B	LYS PT 1									
Site C	LYS PT 1									
Site E	LYS PT 1									
Site G	LYS PT 1	0.49	4.68	2.03	0	0	4	23	NS	NS
Site H	LYS PT 1									
Site I	LYS PT 1	0.83	5.3	2.38	0	0	4	8	NS	NS
Site J	LYS PT 1									
	LYS PT 2									
	LYS PT 3									
	LYS PT 4									
Site L	LYS PT 1	0.4	2.7	1.47	0	0	3	7	NS	NS
Site M	LYS PT 1									
	LYS PT 2									
Site N	LYS PT 1									
	LYS PT 2									
Site O	LYS PT 1									
	LYS PT 2									
	LYS PT 3									
Site P	LYS PT 1									
	LYS PT 2									
Site Q	LYS PT 1									
	LYS PT 2									
	LYS PT 3									
Site S	LYS PT 1									
	LYS PT 2									
Site T	LYS PT 1									
	LYS PT 2									
Site U	LYS PT 1									
Site V	LYS PT 1									
	LYS PT 2									
Site W	LYS PT 1									
	LYS PT 2									
Site X	LYS PT 1									
Site Y	LYS PT 1									
Site Z	LYS PT 1									
	LYS PT 2									
Site AA	LYS PT 1									
	LYS PT 2									
Site BB	LYS PT 1									
Site CC	LYS PT 1									
Site DD	LYS PT 1	0.47	6.36	2.5	0	0	3	40	NS	NS
	LYS PT 2	0.35	6.1	2.5	0	0	3	27	NS	Increasing
Site GG	LYS PT 1									
Site HH	LYS PT 1									

Appendix G: Comparison of relative concentrations (C/C_o) from the pooled field data with analytical solution results

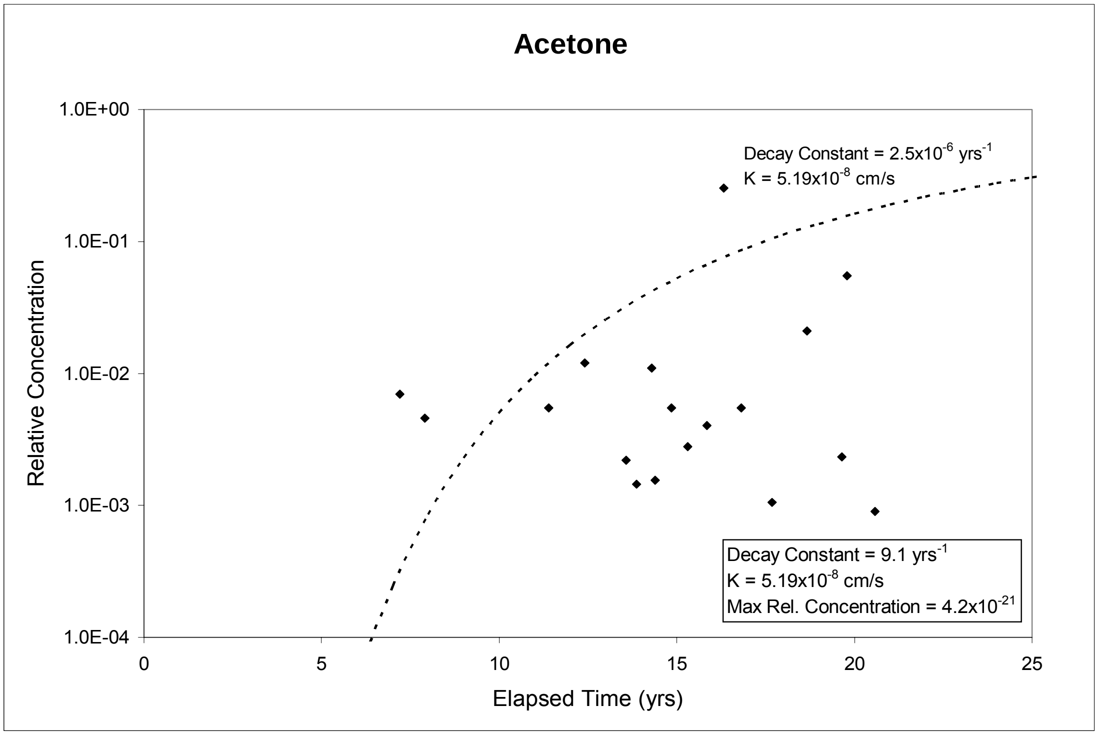


Figure C1. Relative concentration of acetone from field data and the results from varying parameters in the analytical solution.

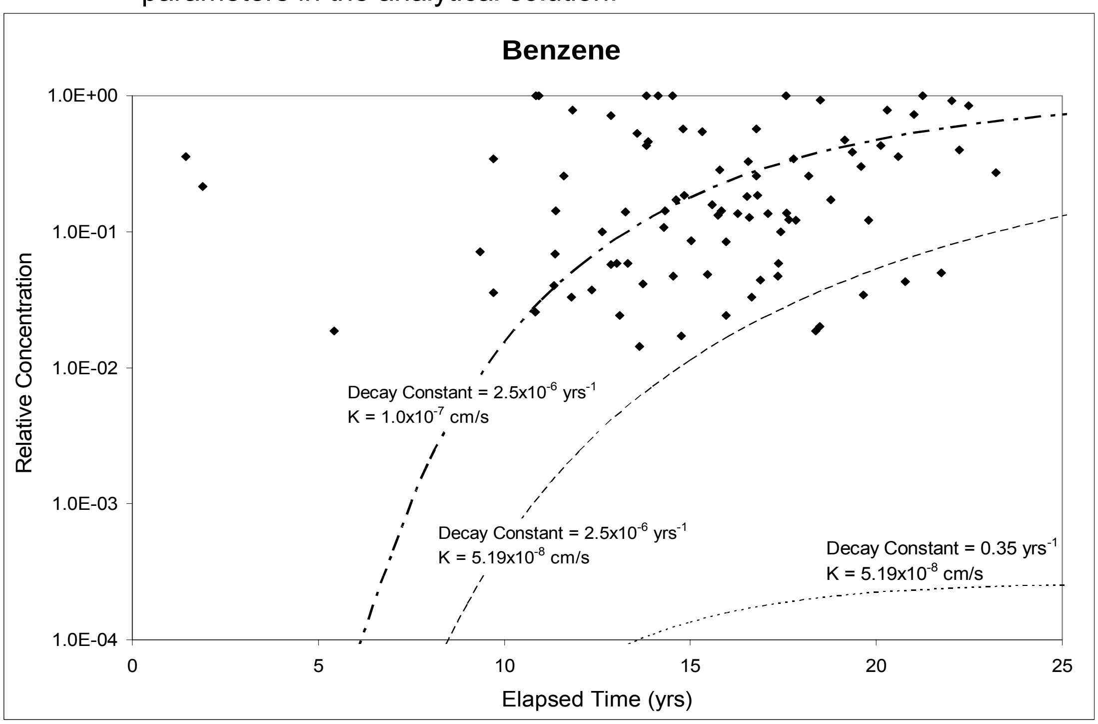


Figure C2. Relative concentration of benzene from field data and the results from varying parameters in the analytical solution.

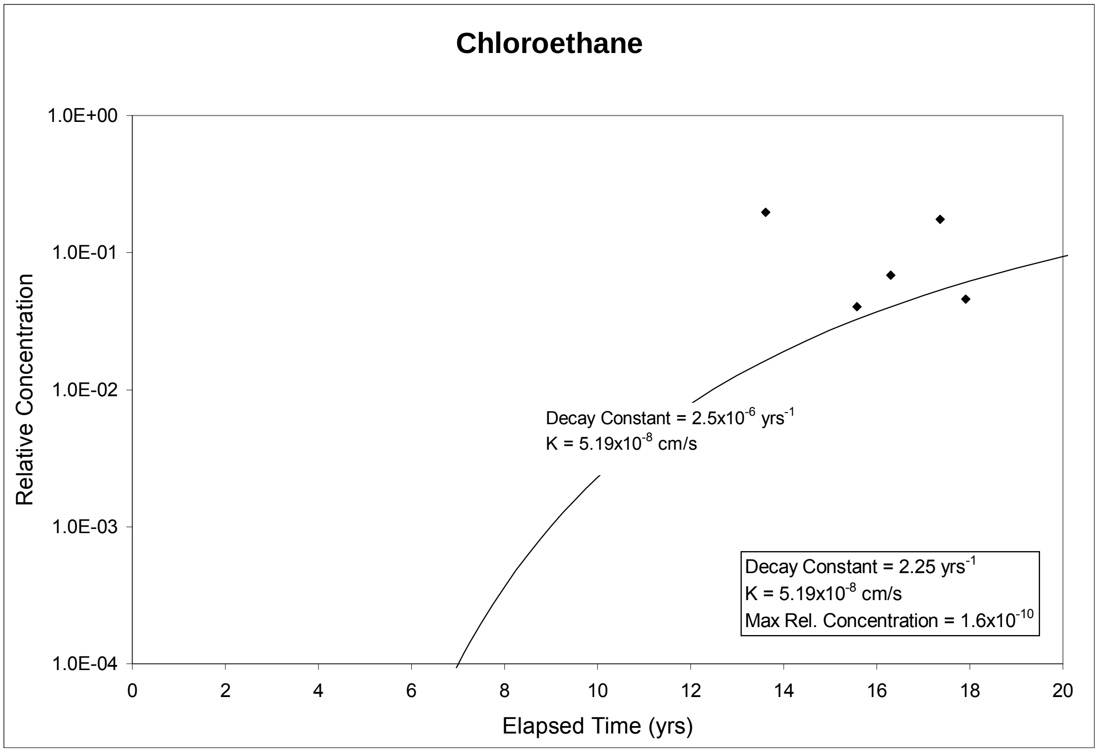


Figure C3. Relative concentration of chloroethane from field data and the results from varying parameters in the analytical solution

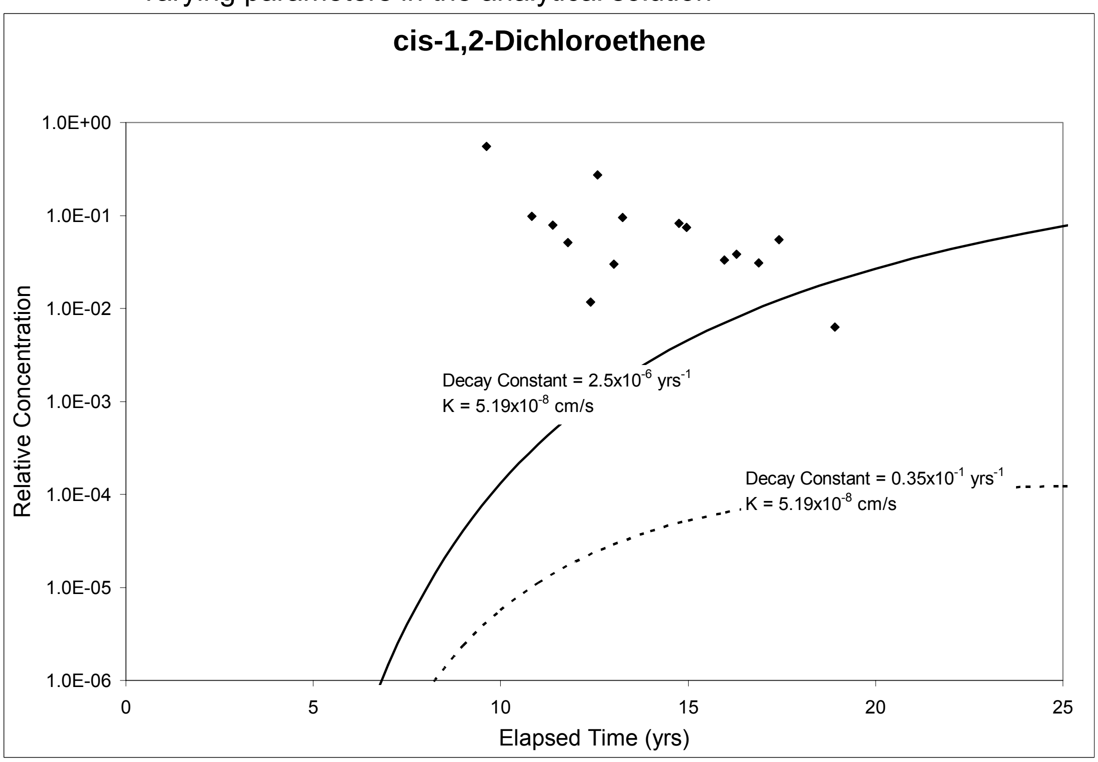


Figure C4. Relative concentration of 1,2-dichloroethene (cis) from field data and the results from varying parameters in the analytical solution

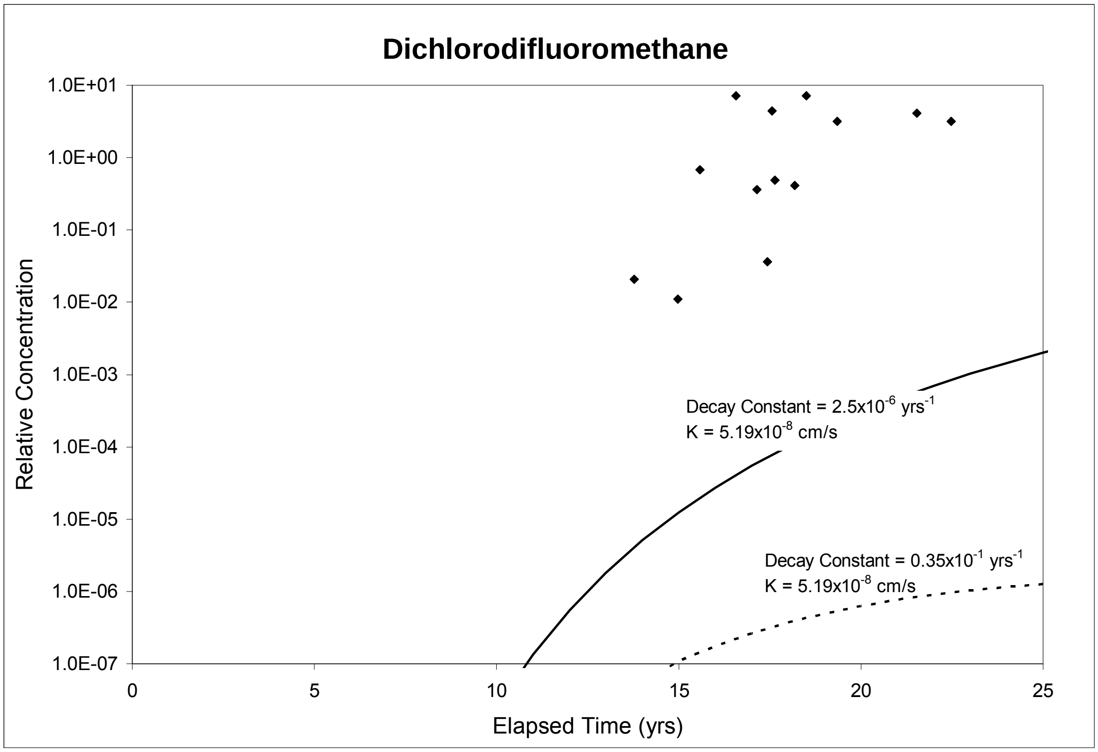


Figure C5. Relative concentration of dichlorodifluoromethane from field data and the results from varying parameters in the analytical solution

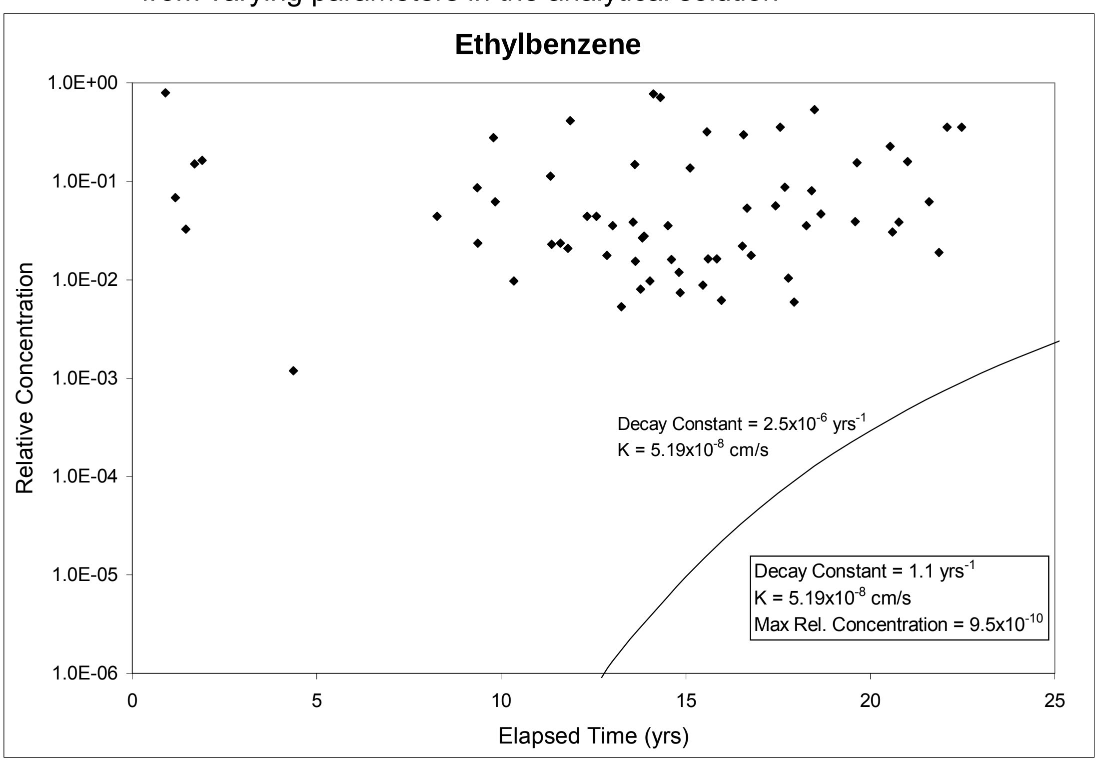


Figure C6. Relative concentration of ethylbenzene from field data and the results from varying parameters in the analytical solution

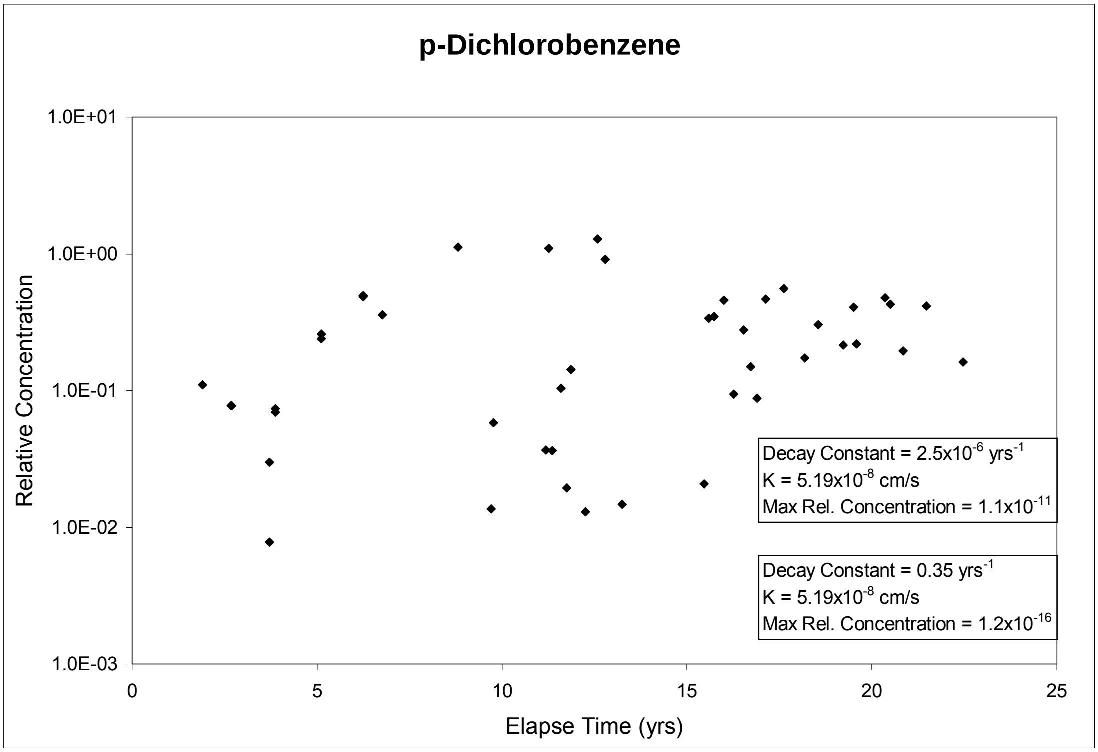


Figure C7. Relative concentration of p-dichlorobenzene from field data and the results from varying parameters in the analytical solution

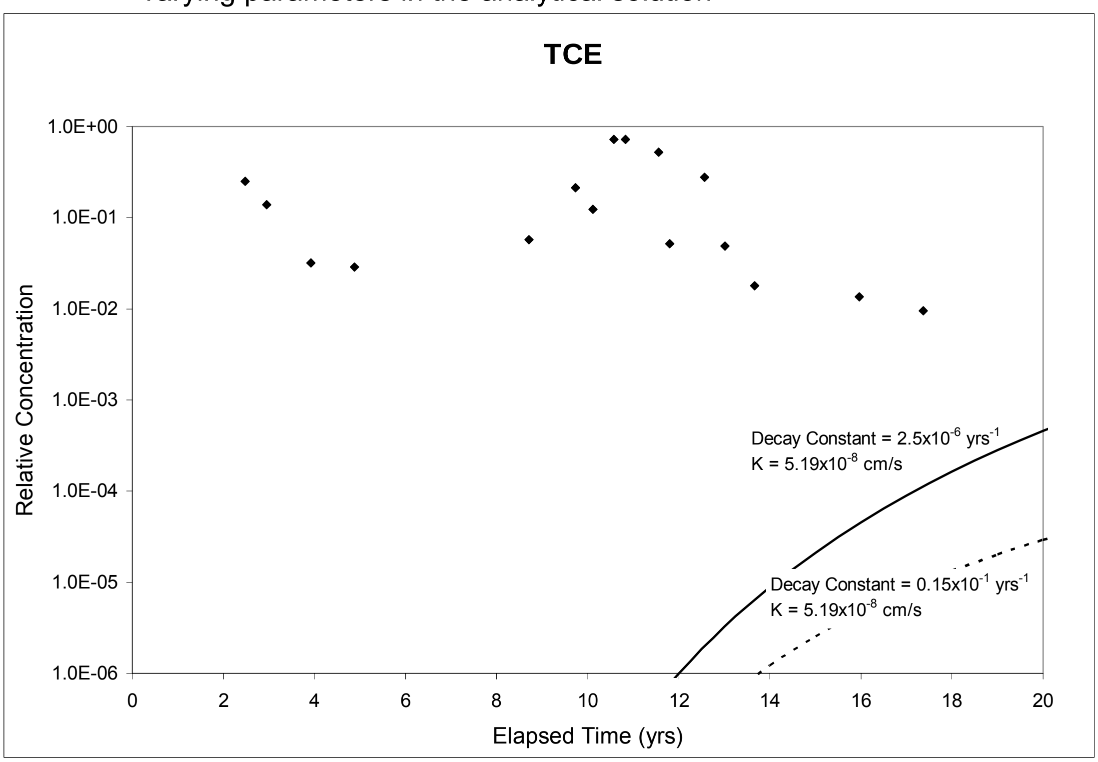


Figure C8. Relative concentration of trichloroethylene (TCE) from field data and the results from varying parameters in the analytical solution

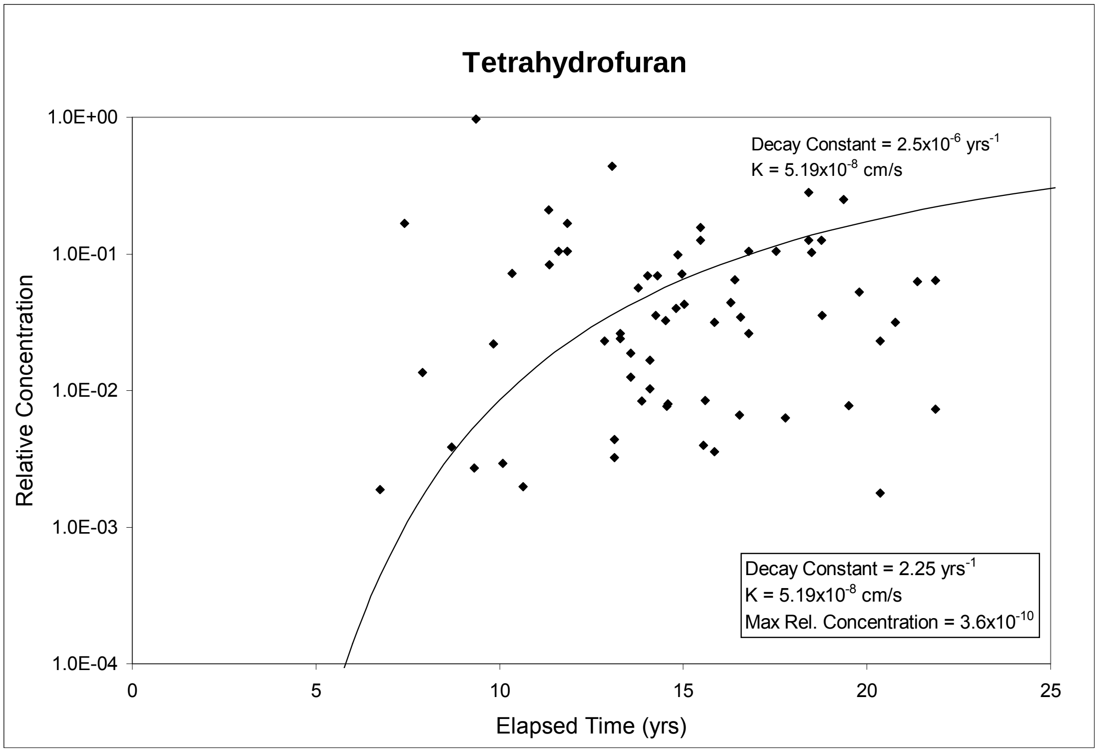


Figure C9. Relative concentration of tetrahydrofuran from field data and the results from varying parameters in the analytical solution

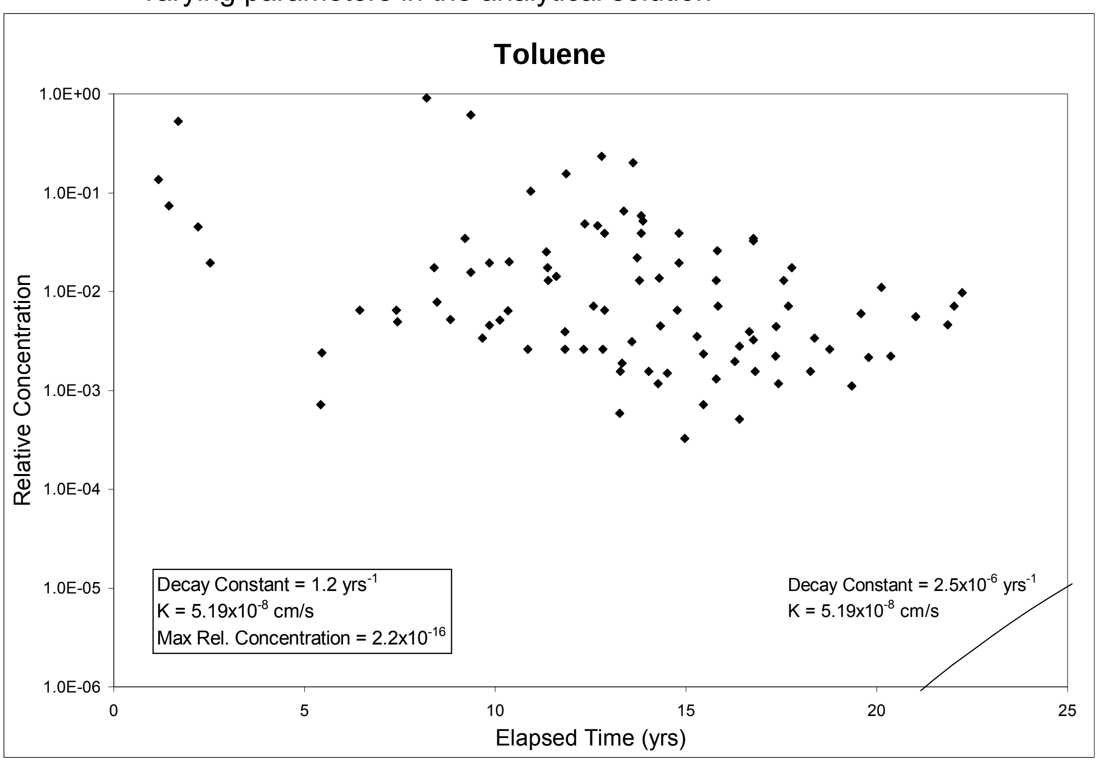


Figure C10. Relative concentration of toluene from field data and the results from varying parameters in the analytical solution.

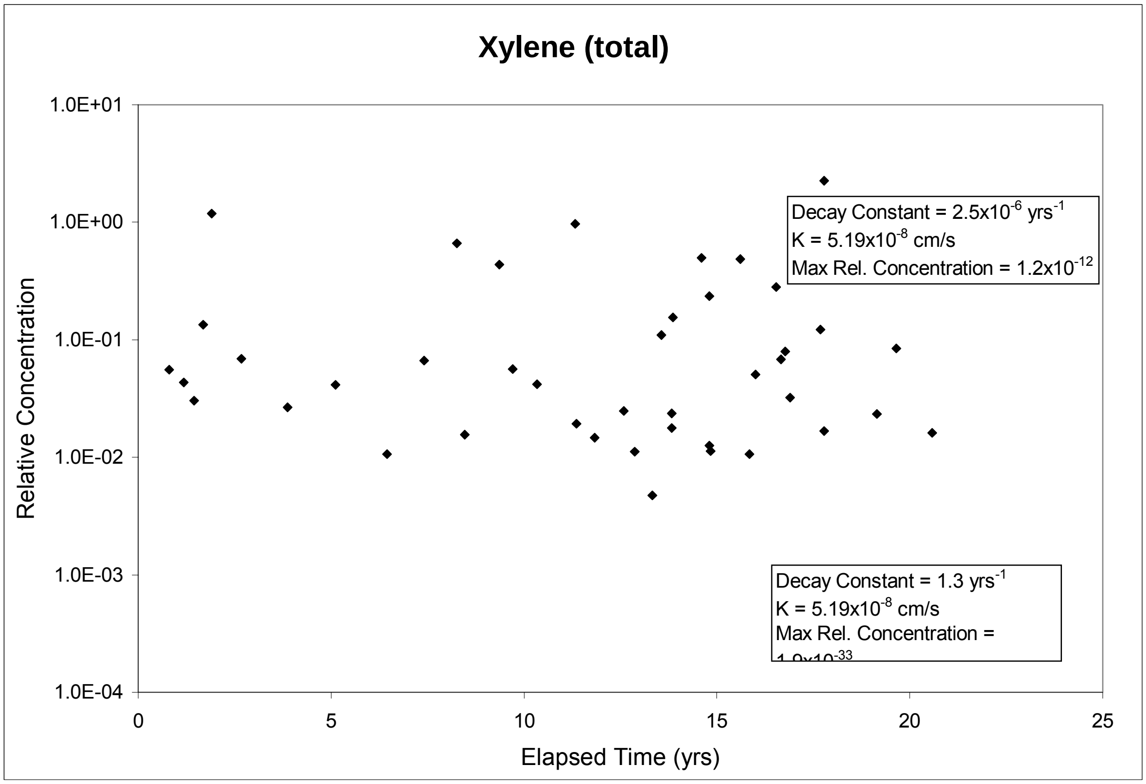


Figure C11. Relative concentration of xylene (total) from field data and the results from varying parameters in the analytical solution