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December 23, 1998

Mr. Scott Cox
Pennsylvania Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110-8200

Re: Harley-Davidson Motor Company
1997-1998 Annual Operations Report
SAIC Project 01-1408-00-1618-101

Dear Mr. Cox:

The enclosed report is being submitted on behalf of Harley-Davidson Motor Company. This report, entitled "Groundwater Extraction and Treatment System Annual Operations Report for the Period July 1, 1997, through June 30, 1998" is for your information.

Please contact me with any questions or comments.

Very truly yours,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Brian D. Sauls, P.G.
Project Manager

BDS:lad
Attachment
cc: Gary Seyler - Harley-Davidson(w/enclosures)
Ralph Golia - Dames and Moore (w/2 enclosures)

3240 Schoolhouse Road, Middletown, Pennsylvania 17057-3595 • (717) 944-5501 • (800) 944-6778

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GROUNDWATER EXTRACTION AND TREATMENT SYSTEM ANNUAL OPERATIONS REPORT FOR THE PERIOD JULY 1, 1997, THROUGH JUNE 30, 1998

SAIC Project 01-1408-00-1618-101

Prepared for

Harley-Davidson Motor Company
York, PA

December 1998

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By

Science Applications International Corporation
3240 Schoolhouse Road
Middletown, PA 17057
(717) 944-5501

December 1998

COMMONWEALTH OF PENNSYLVANIA
REGISTERED
PROFESSIONAL
BRIAN D. SAULS
GEOLOGIST
PG-000305-G

Reviewed by:

Stephen M. Snyder, P.G.
Project Director

Respectfully submitted,

Brian D. Sauls, P.G.
Project Manager

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LIST OF ACRONYMS

cfm	-	cubic feet per minute
DCE	-	1,2-Dichloroethene
DEP	-	Pennsylvania Department of Environmental Protection
GAC	-	granular-activated carbon
gpd	-	gallons per day
gpm	-	gallons per minute
Harley-Davidson	-	Harley-Davidson Motor Company
MCL	-	Maximum contaminant level
mg/l	-	milligrams per liter
NB4	-	North Building 4
NPBA	-	Northeast Property Boundary Area
NPDES	-	National Pollutant Discharge Elimination System
PCE	-	Tetrachloroethene
PTA	-	Packed Tower Aerator
PVC	-	Polyvinyl chloride
R.E. Wright	-	R.E. Wright Environmental, Inc.
RI/FS	-	remedial investigation/feasibility study
SAIC	-	Science Applications International Corporation
SPBA	-	Southeast Property Boundary Area
TCA	-	Trichloroethane
TCE	-	Trichloroethene
TFO	-	Thermal Fume Oxidizer
μg/l	-	micrograms per liter
VOCs	-	volatile organic compounds
WPL	-	West Parking Lot

EXECUTIVE SUMMARY

The groundwater extraction and treatment system located at Harley-Davidson Motor Company (Harley-Davidson) in York, Pennsylvania has operated continuously with few interruptions during the report period (July 1, 1997, through June 30, 1998), meeting its primary goals of: 1) preventing off-site groundwater migration in the Northeast Property Boundary Area (NPBA); 2) removing contaminated groundwater in the Trichloroethane (TCA) Tank Area; 3) removing contaminated groundwater and preventing off-site migration of groundwater in the West Parking Lot (WPL) Area; and 4) removing contaminated groundwater at the former degreaser location in the North Building 4 (NB4) Area.

On average, prior to start-up of the NB4 and WPL wells (WPL groundwater extraction system) in May 1994, the system removed approximately 131 gallons per minute (gpm) of groundwater and 1.2 pounds per day of volatile organic compounds (VOCs). Following start-up (in May 1994) of the WPL groundwater extraction system through June 30, 1998, the groundwater pumping rate increased to an average of 250 gpm and VOC loadings increased to 11 pounds per day. Science Applications International Corporation (SAIC) estimates that during the time period from November 1990 through June 1998, approximately 18,500 pounds of VOCs have been removed by the groundwater treatment system. The total amount of groundwater extracted during the report period was approximately 153 million gallons. This volume is similar to the amount reported in the previous year's report (157 million gallons from July 1996 to June 1997).

Operation of extraction wells in the NPBA resulted in overlapping cones of depression resulting in a trough in the groundwater table. The trough acts as a barrier to groundwater flow, thereby preventing off-site migration of the VOC plume. Similarly, extraction wells CW-8 and CW-16 developed a cone of depression in the TCA Tank Area, which prevented migration of the VOC-contaminated groundwater from this area. To prevent off-site migration of VOC-contaminated groundwater in the WPL Area, four extraction wells were activated during May and June 1994. Groundwater elevations in the WPL indicate that groundwater capture is occurring as a result of the operation of the groundwater extraction system. Extraction well CW-15A, located at the northwestern corner of Building 4, has developed a cone of depression in the groundwater table and is preventing migration of groundwater from this former degreaser location.

The combined influent total VOC concentrations to the Packed Tower Aerator (PTA) averaged approximately 2,300 micrograms per liter (μg/l) during the report period. Trichloroethene (TCE); TCA; 1,2-dichloroethene (DCE); and tetrachloroethene (PCE) are the predominant VOCs comprising the PTA influent chemistry. The PTA effectively removed all VOCs to non-detectable concentrations during the report period with the exception of trace concentrations that were detected in one effluent sample.

During the report period, the extraction wells were sampled two times for VOCs, the off-site water supplies were sampled four times for VOCs and cyanide, and the key monitoring wells were sampled once for VOCs and cyanide. Site-wide water levels were measured twice.

VOC concentrations in extraction and monitoring wells in the NPBA have remained fairly constant or have decreased during the report period. The VOC concentrations in the TCA Tank Area have decreased or remained the same during the report period in six of the seven wells in comparison to the previous report period. VOC concentrations have decreased or remained the same during the report period in eleven of twelve WPL wells.

Off-site sampling of local water supplies (wells and springs) indicates the presence of VOCs in 3 of 4 sampling locations. The three off-site sampling locations contained trace concentrations (less than 10 μg/l) of various VOC compounds (chloroform, PCE, and TCE) with the maximum concentration (5.1 μg/l) detected at RW-5.

1.0 INTRODUCTION

The purpose of this report is to summarize the operating record for the Harley-Davidson Motor Company (Harley-Davidson) groundwater extraction and treatment system, and to present groundwater quality data and groundwater level data monitored across the site. The Harley-Davidson facility is located in Springettsbury Township, York, Pennsylvania, as shown on Figure 1. This report covers a 12-month time period extending from July 1, 1997, through June 30, 1998.

The groundwater extraction portion of the system consists of 15 extraction wells (CW-1, CW-1A, CW-2 through CW-7, CW-7A, CW-8, CW-9, CW-13, CW-15A, CW-16, and CW-17) operating in three separate areas designated the Northeast Property Boundary Area (NPBA), the West Parking Lot (WPL) Area (including the North Building 4 [NB4] Area), and the Trichloroethane (TCA) Tank Area as shown on Figure 2.

Extracted groundwater is piped to the central treatment system, located in the groundwater treatment building, for processing through a Packed Tower Aerator (PTA) system prior to discharge to an unnamed tributary of the Codorus Creek (Figure 1). Figure 3 shows a schematic diagram of the system. Prior to May 1994, PTA off-gases were treated by a granular-activated carbon (GAC) filter system for removal of volatile organic compounds (VOCs) prior to discharge to the atmosphere. Since then, the VOCs have been directed from the PTA through a thermal fume oxidizer (TFO) for destruction prior to discharge.

The groundwater extraction and PTA treatment systems were brought on-line pursuant to an order from the Pennsylvania Department of Environmental Protection (DEP), dated

September 11, 1990. In November 1990, ten extraction wells in the NPBA and TCA Tank Areas were brought on-line, while ongoing studies were performed in the WPL. The WPL Area was brought on-line in May 1994. In conjunction with WPL start-up, PTA off-gases were redirected from the GAC filter to the TFO.

On December 2, 1993, National Pollutant Discharge Elimination System (NPDES) permit No. PA0085677 was issued for the system. This report satisfies Part C, Section 1, Item E of the permit.

The data presented in this report were collected by SAIC under contract to Harley-Davidson, and are summarized in the following chapter format:

1. Chapter 2.0, *Geology and Hydrogeology*, briefly summarizes the hydrogeologic conditions of the site.

2. Chapter 3.0, *Site-Wide Groundwater Monitoring*, summarizes groundwater levels and quality.

3. Chapter 4.0, *Groundwater Collection and Treatment System*, describes the design capacity of the system and presents the record of influent and effluent water quality. The VOC loadings to the PTA and TFO unit also are presented.

4. Chapter 5.0, *NPBA Groundwater Extraction System*, summarizes water levels and VOC concentrations for each extraction well in the NPBA. System performance is evaluated based upon observed trends in these data.

5. Chapter 6.0, *TCA Tank Area, Groundwater Extraction System*, describes operation and performance of extraction wells CW-8 and CW-16 located in this area. Water level and VOC concentration data are used to evaluate system performance.

6. Chapter 7.0, *West Parking Lot, Groundwater Extraction System*, describes the operation of extraction wells in this area. System performance, water level data, and VOC trends are presented.

7. Chapter 8.0, *Off-Site Water Supply*, presents the record of groundwater quality data for off-site locations. System effectiveness at preventing off-site migration is evaluated based upon these data.

8. A summary for the groundwater remediation system operation and maintenance is presented in Chapter 9.0, *Summary*.

2.0 GEOLOGY AND HYDROGEOLOGY

Two geologic rock formations underlie the site. Solution-prone, gray limestone underlies the flat lowland (western) portion of the site, and a quartzitic sandstone underlying the more steeply sloping hills or upland area is present on the eastern part of the site. Groundwater beneath the site generally flows from the upland area at the eastern part of the site westward toward Codorus Creek. A detailed discussion of the geology and hydrogeology is included in SAIC's February 1995 report entitled, "Groundwater Extraction and Treatment System Annual Operations Report."

3.0 SITE-WIDE GROUNDWATER MONITORING

3.1 Groundwater Table

Groundwater levels were monitored across the site twice during the reporting period (November 6, 1997, and May 5, 1998). Water levels in approximately 100 monitoring wells, extraction wells, and piezometers are currently measured on a semiannual basis. Groundwater elevation data is presented in Appendix A, Table A-1. Figure 4 illustrates the groundwater table surface elevation on November 6, 1997.

The general configuration of the water table at the site shows a gradient generally towards the west-southwest. Gradients are relatively steep beneath the eastern half of the site which is underlain by sandstone, and relatively flat beneath the western half of the site which is comprised mostly of limestone.

The November 1997 water level measurements were taken in the middle of a severe drought which caused some of the lowest water levels recorded in southcentral Pennsylvania in several years. These water levels were lower than the November 1996 water levels as explained below:

- The water levels in the eastern portion of the site underlain by sandstone were an average of 8 feet lower than they were in the previous November. This average differential was calculated from wells in the areas not affected by pumping wells of the NPBA extraction system. Wells in sandstone nearest the limestone aquifer, such as at well CW-10, had the largest change due to drainage into the more permeable limestone aquifer. The effect of the drought on the water levels in wells within the influence of the NPBA groundwater extraction system is discussed in Section 5.0.

- Water levels in the limestone aquifer were an average of 3 feet lower than last November, except in the area of CW-9 in the south end of the WPL. The average lowering was caused by the drought conditions, while the water level rises in the south end of the WPL were caused by deactivation of CW-9 due to a mechanical malfunction.

In comparison to the November 1997 water levels, the May 1998 water table was several feet higher on average due to a relatively large amount of precipitation which occurred during the week preceding the May 1998 measurement round compounded by the drought conditions from November.

The principle areas of groundwater table drawdown occur at the three extraction well areas (WPL, TCA, and NPBA) as illustrated on Figure 4. Significant groundwater table drawdown is normally maintained with few exceptions outside of infrequent groundwater extraction system shutdowns due to normal system maintenance.

3.2 Groundwater Quality

In February 1992, a key well sampling program was initiated. Monitoring wells (key wells) were selected based upon location and conditions to provide representative groundwater quality across the site. The key wells were historically sampled annually to establish a data base of groundwater quality and to monitor changes over time. Analytical results from the key monitoring well sampling event, which occurred between October 20 to 23, 1997, are presented on Table A-2.

Analytical results of two rounds (December 1997 and June 1998) of extraction well sampling are presented in Table A-3.

Plate 1 provides a geographical view of groundwater quality with respect to selected VOC compounds. The selected compounds (TCA, DCE, TCE, and PCE) represent the predominant VOCs detected in groundwater on-site. Areas containing the greatest VOC concentrations in the groundwater were found in the WPL/NB4 and TCA Tank Areas. Relatively elevated VOC concentrations were also detected at the NPBA, particularly in extraction well CW-7A.

General groundwater quality trends based on current and past analytical results of samples collected over the last several years from the key wells are presented below. The ability to interpret changes in VOC concentrations over time are complicated by natural fluctuations in the groundwater table (i.e., changes in groundwater flow directions) and by active pumping of the several groundwater extraction wells. However, some general trends are recognized and briefly discussed below.

3.2.1 NPBA

The predominant VOC species at the NPBA are TCE and PCE. Previous reports discuss separate source areas of these two solvents in the NPBA. Three monitoring wells (MW-10, MW-12, and RW-2) were sampled at the NPBA during the report period to help determine the affect of the groundwater remediation system in this area. The total VOC (TVOC) concentrations in monitoring well MW-10 increased from 1986 to 1993 and have generally decreased since then. The 1997 concentration (480 μg/l) increased slightly from the 1996 value (426 μg/l). In MW-12, the TVOCs significantly increased between 1987 to 1990, and have decreased to much lower concentrations and have remained fairly consistent since 1991.

The 1997 concentration at RW-2 decreased considerably relative to the 1995 value (50 μg/l of TCE) and remained the same as the 1996 concentration of 5 μg/l. This off-site monitoring well had concentrations of 2,000 μg/l of TVOCs prior to commencement of the NPBA extraction system. This information clearly demonstrates the effectiveness of the extraction system in improving off-site groundwater quality.

Monitoring well data from the NPBA, combined with groundwater chemistry from the nine active groundwater extraction wells, show significant improvement to the general water quality in the NPBA as a result of the groundwater extraction effort. Eight of the nine NPBA extraction wells appear to have reached asymtotic levels or show consistent downward trends over the last several years.

3.2.2 TCA Tank Area

The groundwater quality in the former TCA tank area is evaluated by analysis of samples collected from five groundwater monitoring wells (MW-32S, MW32D, MW-34S, MW-35D, and MW-54) and extraction wells CW-8 and CW-16. This area is the site of a historic TCA spill. High concentrations of TCA were rapidly reduced in extraction well

CW-8 by pumping, and TCA concentrations have slowly declined in adjacent monitoring wells. The cone of drawdown from the extraction wells has intercepted TCE and PCE sources, which now dominate the TVOCs in extraction wells and monitoring wells. The TVOC concentrations at MW-32S and MW-32D significantly decreased compared to the previous report period concentrations. At well MW-34S, the TVOC concentrations have remained fairly consistent over the last four years. The TVOCs at monitoring well MW-35D have increased approximately 42 percent from the 1996 value after steadily decreasing since it was first monitored in 1989. The TVOC concentrations at MW-54 have continued to decrease since it was first sampled in 1993.

3.2.3 WPL Area

Seven monitoring wells were sampled in the WPL area during the report period (MW-37S, MW-37D, MW-38S, MW-38D, MW-39D, MW-51S, and MW-51D). TCE, PCE, DCE, and TCA have been the predominant VOC compounds detected in this area of the site.

TVOC concentrations in MW-37S increased slightly during the report period but are less than 10 percent of the original concentrations prior to pumping. MW-37D concentrations have decreased significantly (from 31,370 μg/l in 1996 to 4,363 μg/l in 1997) during the report period after consistently increasing since 1992.

At MW-38S, low concentrations of VOCs continue to be present after a large decrease from the 1990 concentration. The TVOC concentrations have fluctuated in MW-38D and have decreased slightly during the current report period.

The predominant VOC at monitoring well MW-39D is TCE. The TVOC concentration has decreased during the current report period after exhibiting several fluctuations. MW-39S was not sampled during the current report period because it was dry.

At wells MW-51S and MW-51D, the dominant VOC is TCE. The TVOC concentrations decreased in both wells during the report period and continue to be far less than the 1991 concentration. Cyanide was also detected at low concentrations in MW-51S during the report period.

Two other key wells which monitor groundwater quality at the site (MW-2 and MW-17) are located in the eastern portion of the Harley-Davidson property:

- MW-2 is located next to a cyanide disposal area near the eastern property boundary of the site. The TVOC concentrations at MW-2 decreased between 1986 and 1994 but have slightly increased since then. The predominant VOCs detected in MW-2 samples are PCE and TCE. Cyanide was also detected in the MW-2 sample at 1.5 milligrams per liter (mg/l) in the October 1997 sample.

- Monitoring well MW-17 is located below the landfill, which is located in the east-central portion of the site. The predominant VOC is TCE. The TCE concentration increased slightly in the sample taken in October 1997 relative to the 1996 sample results.

4.0 GROUNDWATER COLLECTION AND TREATMENT SYSTEM

4.1 System Description

The groundwater collection and treatment system serves to remediate groundwater containing dissolved VOCs in three main areas of the site; NPBA, TCA tank, and WPL. Extraction wells within each of these areas remove groundwater by way of electric submersible pumps controlled by liquid level probes and control circuitry. The water level within each well is maintained between the "on" and "off" probes thus producing an area of drawdown and groundwater capture. The extracted groundwater is conveyed via underground piping to the treatment system where the dissolved VOCs are effectively removed from the groundwater.

The groundwater treatment system is housed in a 30-foot by 40-foot block building attached to the west wall of the industrial wastewater treatment plant. The process flow diagram for the system is presented in Figure 3. The treatment system consists of a 2,600-gallon equalization tank; 5 foot-diameter by 47 foot high PTA capable of treating 400 gallons per minute (gpm) of water; and a TFO/incinerator for PTA off-gas treatment. A 10,000-pound vapor-phase GAC unit serves as backup to the TFO to help assure continuous operation of the groundwater remediation system. If the TFO is shut down due to normal semiannual maintenance or a system malfunction, the WPL portion of the groundwater extraction system is deactivated to prevent excessive VOC loading to the backup GAC unit.

Collected groundwater is pumped from the equalization tank at a maximum flow rate of 400 gpm to the top of the PTA. The water is then distributed evenly over the top of the polypropylene packing and trickles down through the 36-foot packed section of the PTA. Air is moved from an outside source through the PTA column by a 4,000 cubic foot per minute (cfm) centrifugal blower. The VOCs are effectively "stripped" from the water and then destroyed by thermal oxidation as the off-gas passes through the TFO. The treated groundwater flows by gravity from the PTA sump to a storm water sewer and is ultimately discharged to an unnamed tributary of the Codorus Creek.

The groundwater treatment system is equipped with a PC-based Site Boss© monitoring system. Remote computer terminals are located in both Harley-Davidson and SAIC offices where extraction well pumping rates and treatment processes can be monitored and controlled. System and extraction well pumping rates are adjusted manually at the site.

4.2 Record of Groundwater Withdrawal and Chemical Removal

Table 1 presents recorded groundwater withdrawal and total VOC removal that has been accomplished by the groundwater extraction and treatment system. A system-wide total of approximately 18,500 pounds of VOCs has been removed since the groundwater treatment system began operation in November 1990. On average, prior to start-up of WPL system in May 1994, approximately 131 gpm of groundwater and 1.2 pounds per day of total VOCs were being extracted by the system. Since the WPL system became operational, the average groundwater pumping rate increased to approximately 250 gpm with 11 pounds per day of total VOCs being removed.

The total amount of groundwater extracted during the report period was approximately 153 million gallons (419,000 gallons per day [gpd]; 291 gpm). This extraction rate is similar to the previous report period (7/96 - 6/97) where approximately 157 million gallons were extracted (419,000 gpd; 291 gpm). The groundwater remediation system operated effectively throughout the current report period with few exceptions.

From the time the groundwater remediation began operation in November 1990 until start-up of the WPL extraction system in May 1994, the PTA influent concentrations averaged approximately 750 micrograms per liter (μg/l) of total VOCs. Since start-up of the WPL system, the approximate average total VOC concentration increased to 4,100 μg/l. This increase is attributed to the fact that a relatively large volume of groundwater was added to the treatment system containing higher total VOC concentrations than the NPBA pumpage. The average total VOCs detected in the PTA influent samples during the report period were approximately 2,300 μg/l. The trend in PTA influent chemistry is illustrated on Figures 5 and 6.

The PTA effluent concentrations of VOCs have been monitored twice monthly since start-up of the system. Analytical testing results for the reporting period are presented in Table A-4 of Appendix A. The treatment system has maintained non-detectable concentrations of VOCs in the effluent in 25 of the 26 samples. Trace concentrations of VOCs were detected in the October 23, 1997, sample. The VOC concentrations in all subsequent PTA effluent samples collected during the remainder of the report period were below detection limits.

5.0 NPBA GROUNDWATER EXTRACTION SYSTEM

5.1 Groundwater Extraction

Groundwater extraction at the NPBA commenced in November 1990. Nine groundwater extraction wells (CW-1, CW-1A, CW-2, CW-3, CW-4, CW-5, CW-6, CW-7 and CW-7A) pump to the NPBA control building where individual pumping rates are controlled and measured. The groundwater from each well is combined to a common three-inch diameter pipeline to the groundwater treatment system.

Table 2 presents a record of groundwater withdrawals for each extraction well on-site for the period covered by this report. Over 84 million gallons of groundwater were extracted from the NPBA from start-up of the system through June 30, 1998. This extraction system, during the current report period, removed approximately 8.2 million gallons of groundwater at an average rate of 682,000 gallons per month, or 16 gpm.

Measured groundwater levels for the current report period are presented in Table A-1. The groundwater contour map (Figure 4) shows the effect the groundwater extraction system imposed on the water table at the NPBA Area on November 6, 1997. Groundwater contours indicate a trough of depression on the groundwater surface which demonstrates capture of local groundwater and prevention of off-site migration.

Monitoring well MW-16S is located approximately 20 feet west of pumping well CW-3. During the design pumping test performed in May 1988 (R.E. Wright Associates, Inc., 1988), 61 feet of drawdown in CW-3 produced 20 feet of drawdown in MW-16S.

Long-term operation of the system has, over the years, reduced the differential between these wells (MW-16S was at an elevation of 476 feet in November 1996, while CW-3 was at 454 feet, a 22-foot differential). However, the water level differential between these wells increased to 38 feet during November 1997 and was 39 feet in May 1998. This increase is probably caused by decreased well efficiency from biofouling in the wellbore. This is a common occurrence in the wells in the NPBA and indicates the need for continued maintenance to keep the system operational. Although off-site migration is being prevented, the efficiency of the system has degraded and will require treatment at some time in the near future.

Table 3 summarizes measurements of water levels for extraction wells in the NPBA. The table also lists design "pump on" and "pump off" water level elevations. During the November 1997 measurement round, water levels were maintained near the design drawdown levels (within five feet), in all nine wells. The May 1998 measurement round indicates three of the nine extraction wells exhibited higher than designed water levels. The higher than designed pumping water levels are due to an iron fouling condition described below.

5.2 System Operational Conditions

The nine wells in the NPBA generally operated continuously as shown in Table 2 and Figure 7. On occasion, records show obviously diminished groundwater extracted from an individual well. These periods of interrupted pumping were related to various repairs and maintenance of the system. The most significant maintenance item has been iron fouling of the pumps and pipelines of wells CW-2 through CW-6. Iron fouling caused high water level alarms in these wells during parts of the report period due to reduced groundwater extraction rates.

The temporary inability to maintain the desired groundwater drawdown prompted SAIC to replace several groundwater extraction well pumps (which is routinely completed twice per year), and acid clean the underground conveyance piping. The piping was cleaned during the report period and has resulted in the desired maintenance of water levels at the NPBA for several months. Visual observation of the manifold at the NPBA control building confirms the successful cleaning of conveyance piping leading to the building.

Harley-Davidson maintains the flow meters, y-strainers, check valves, and other components of the groundwater extraction system on a twice per month schedule. This maintenance program has successfully kept the system operational.

5.3 Groundwater Chemistry

VOC concentrations over the period of record are displayed in Figures 8 through 16. The groundwater chemistry is shown on Plate 1 and included in Appendix Tables A-2 and A-3. TVOC concentrations for the pumping wells ranged from 9 to 240 μg/l, consisting mostly of TCE and PCE concentrations, and have remained fairly constant or have decreased slightly during the report period compared to previous years in each well. NBPA groundwater chemistry is discussed in more detail in Section 3.2 of this report.

6.0 TCA TANK AREA GROUNDWATER EXTRACTION SYSTEM

6.1 Groundwater Extraction

Groundwater extraction was initiated in November 1990 from CW-8 to prevent TCA migration and remove VOCs from the groundwater in this area. Groundwater extraction was initiated in February 1995 from CW-16 to contain and remediate groundwater beneath the degreaser area inside Building 2. Groundwater from these wells is conveyed approximately 1,000 feet through a 3-inch line to the groundwater treatment system.

Initially, extraction well CW-8 was pumped at a rate higher than necessary to maintain capture. The early goal was to reverse the direction of migration prior to initiation of groundwater pumping planned for the WPL, which would have potentially pulled the western edge of the TCA tank plume further west. Prior to pumping of the WPL, the groundwater treatment plant, which was designed to handle water from the WPL, had excess capacity. Thus, the capacity was utilized to address the TCA tank plume.

Table 2 presents a record of groundwater withdrawals for extraction wells CW-8 and CW-16. Approximately 56 million gallons of groundwater were extracted from the TCA Tank Area during the report period, averaging approximately 4.7 million gallons per month (107 gpm). The total amount of groundwater extracted during the previous report period was similar at approximately 61 million gallons.

Groundwater elevations for the report period are presented in Table A-1 of Appendix A. The site-wide groundwater contour map (Figure 4) illustrates a cone of depression created by the TCA groundwater extraction wells. Table 3 demonstrates that designed drawdown was achieved in the TCA extraction wells during the November 1997 groundwater level measurement round. The May 1998 groundwater level was not measured in extraction well CW-8 due to a small, local sinkhole which developed in late April. CW-8 was deactivated for a 12-day period while the sinkhole was being repaired. Consequently, extraction well CW-16 temporarily exhibited greater pumpage and higher-than-normal groundwater surface elevations during this time as it captured groundwater normally extracted by CW-8. In general, wells CW-8 and CW-16 have been successful in preventing migration of the VOC-contaminated groundwater originating from the TCA tank and degreaser source areas during the report period.

6.2 System Operational Conditions

CW-8 has generally operated continuously during the report period as shown in Table 2. Based on the monthly total flow data, the CW-8 daily pumpage ranged between 103,000 to 171,000 gallons. CW-16 has maintained a pumping rate during the report period between 19,000 and 26,000 gallons per day (gpd). Pumpage from CW-8 and CW-16 has averaged approximately 4.0 and 0.7 million gallons per month, respectively, during the report period. Groundwater depression and capture has been maintained at the TCA Area as demonstrated by the closed contours on Figure 4. Due to the very flat groundwater table, the capture area for these two wells is potentially extensive.

CW-8 and CW-16 are not prone to iron fouling, so bimonthly cleaning of y-strainers is sufficient for these wells. The maintenance program has, with few exceptions, kept these wells operational.

6.3 Groundwater Chemistry

TCA was the most prevalent VOC detected in extraction well CW-8 prior to September 1992, as shown on Figure 17. TCA has generally decreased in concentration since pumping began at CW-8 in November 1990 as a result of pulling water from beyond the TCA plume and presumably as a result of mass removal. Since May 1992, TCE concentrations began to increase in the groundwater chemistry (corresponding with an increase in pumping rate), and since January 1994 TCE has become the dominant VOC detected. The observed changes in groundwater chemistry suggest that pumping has drawn the TCE from a source area separate from the TCA Tank Area.

The VOC concentrations at CW-8 have decreased slightly during the report period relative to the previous year's concentrations. The VOC concentrations at CW-16, as shown on Figure 18, remained approximately the same compared to the previous year's concentration. TVOC concentrations in these wells ranged from 524 μg/l to 930 μg/l during this report period. Refer to Table A-3 in Appendix A for analytical results from samples collected during the report period.

7.0 WEST PARKING LOT GROUNDWATER EXTRACTION SYSTEM

7.1 Description

Three groundwater extraction wells (CW-9, CW-13, and CW-17) operate in the WPL Area of the Harley-Davidson property. One extraction well (CW-15A) is located near the northwest corner of Building 4. These four wells are referred to as the WPL wells. The purpose of the WPL groundwater extraction system is to prevent off-site migration of groundwater containing dissolved VOCs and to control the migration of VOCs in a plume located near the northwest corner of Building 4. Extracted groundwater from the WPL wells is conveyed up to 1,400 feet via underground piping to the groundwater treatment system. The wells are individually piped to the groundwater treatment plant so that flow control, flow measurements and water samples may be obtained for each well at this central location.

Extraction wells CW-9, CW-13, and CW-15A began operation in May 1994, and CW-17 began operating in September 1995. Well CW-17 was a replacement extraction well for CW-14. CW-14 operated as one of the WPL extraction wells between June 1994 and March 1995, when it stopped operating due to excessive sediment buildup in the well.

7.2 Groundwater Extraction

Since start-up of the WPL groundwater extraction system in May 1994, approximately 280 million gallons of groundwater have been removed through June 30, 1997. The average withdrawal rate during the report period was approximately 6.8 million gallons per month, or approximately 156 gpm with a total amount of approximately 82 million gallons. The total amount of groundwater extracted during the previous report period was similar at 80 million gallons. Pumpage data is presented in Table 2. The hydrogeology is similar to that described for the TCA Area (Section 6.2). The capture area imposed on the aquifer by pumping from the WPL wells is illustrated on Figure 4. The capture area encompasses the entire WPL Area and beyond. Groundwater elevations for the report period are shown on Table A-1.

Table 3 presents the designed drawdown levels and the calculated water table elevations for the November 1997 and May 1998 measurement rounds. Both measurement rounds demonstrate that groundwater levels were within the design limit, except for CW-9 during the November 1997 measurement which was eight feet above the designed upper limit. CW-9 was deactivated during this measurement round due to a mechanical malfunction.

In general, pumping and groundwater elevation data from CW-9, CW-13, CW-15A, and CW-17 indicates the WPL groundwater extraction system has been successful in preventing off-site migration of local groundwater.

7.3 System Operational Conditions

The WPL extraction wells operated as designed throughout the report period with few exceptions. Portions of the CW-15A pumping system were replaced in July 1997 and April 1998, and the pump motor was replaced in CW-9 in November 1997.

The only required routine maintenance on the WPL wells is bimonthly cleaning of the y-strainers. The current maintenance program has maintained reliable operation of extraction wells CW-9, CW-13, CW-15A, and CW-17.

7.4 Groundwater Chemistry

VOC concentrations are greatest near the north end of Building 4 (CW-15A). TCE and TCA are the dominant VOC compounds at the northern portion of the WPL Area, whereas PCE dominates to the south. Plate 1 presents a summary of predominant VOC distribution throughout the WPL Area, and Tables A-2 and A-3 in Appendix A detail the chemical analyses performed on groundwater samples collected during the report period.

Trends in the groundwater chemistry from the four individual WPL extraction wells are shown graphically on Figures 19 through 22. TVOC concentrations in these wells ranged from 1,011 to 56,400 μg/l during this report period. Overall, VOC concentrations have remained the same over the past year in extraction wells CW-9, CW-13, CW-15A. At well CW-17, the VOC concentrations increased slightly. Figure 22 includes groundwater quality from samples collected from both CW-14 and CW-17. Even though CW-17 (which is a replacement well for the former extraction well CW-14) is located approximately 130 feet to the southwest of CW-14, the data are combined on one plot to illustrate the overall water quality of the northern portion of the WPL. This combined graph is appropriate since CW-14 and CW-17 intersect the same conduit (open void) and extract groundwater from the same source in the aquifer.

8.0 OFF-SITE WATER SUPPLY WELL MONITORING

A regular quarterly sampling program of off-site groundwater supplies adjacent to and downgradient of the Harley-Davidson property was initiated in April 1988. Four groundwater supplies designated "RW" for a residential well and "S" for a spring sample were included in this sampling program during the report period:

1. RW-4 - Folk residence.
2. RW-5 - Giambalvo Pontiac.
3. S-6 - Hollinger spring.
4. S-7 - Wilhide spring.

Groundwater sampling locations RW-4, S-6, and S-7 are located to the north of the Harley-Davidson property and RW-5 is located southwest of the site as shown on Plate 1. A complete description of baseline sampling of residential wells is contained in the R.E. Wright Environmental, Inc. report, entitled "Report of Investigations in the NPBA, TCA tank, and containment areas of the Harley-Davidson, Inc. York facility," dated August 1988.

The off-site samples were analyzed for VOCs and free and total cyanide. Analytical results for the four locations are presented in Table A-5 of Appendix A.

Analytical results of the samples collected from the off-site wells and springs indicate the absence of cyanide in all locations sampled, except for one of the four S-7 samples where trace concentrations were detected. VOCs were detected in samples collected from the RW-5, S-6, and S-7 samples. No VOCs were detected in the RW-4 samples.

In the four RW-5 samples, TCE was detected at a maximum concentration of 5.1 μg/l. PCE was also detected in one sample at 1.2 μg/l. Both PCE and TCE have been detected in several previous samples collected from RW-5.

In the four S-6 samples, chloroform was consistently detected between a concentration of 4 to 9.7 μg/l.

Three of the four S-7 samples contained trace concentrations of VOCs. The concentrations ranged between 1.4 to 2.8 μg/l of chloroform.

A trip blank sample accompanied each set of off-site samples as part of the quality control procedures. VOCs were detected in one of the four (September 1997) trip blanks where chloroform was detected at 1.2 μg/l. According to EPA data validation procedures, associated samples with detected concentrations of this analyte (up to ten times the concentration detected in the blank) should be qualified with a "B" (on Table A-5) to indicate potential contamination by the blank. The qualified samples were chloroform results for S-6 and S-7 during the September 1997 sampling round.

9.0 SUMMARY

The current bimonthly preventative maintenance program has pro-actively facilitated continuous operation of the groundwater extraction and treatment systems with few exceptions during the report period.

The current groundwater monitoring program involves measuring groundwater levels and sampling/analyzing groundwater from on and off-site locations. The current monitoring program provides sufficient data to assess the effectiveness of the collection and treatment systems.

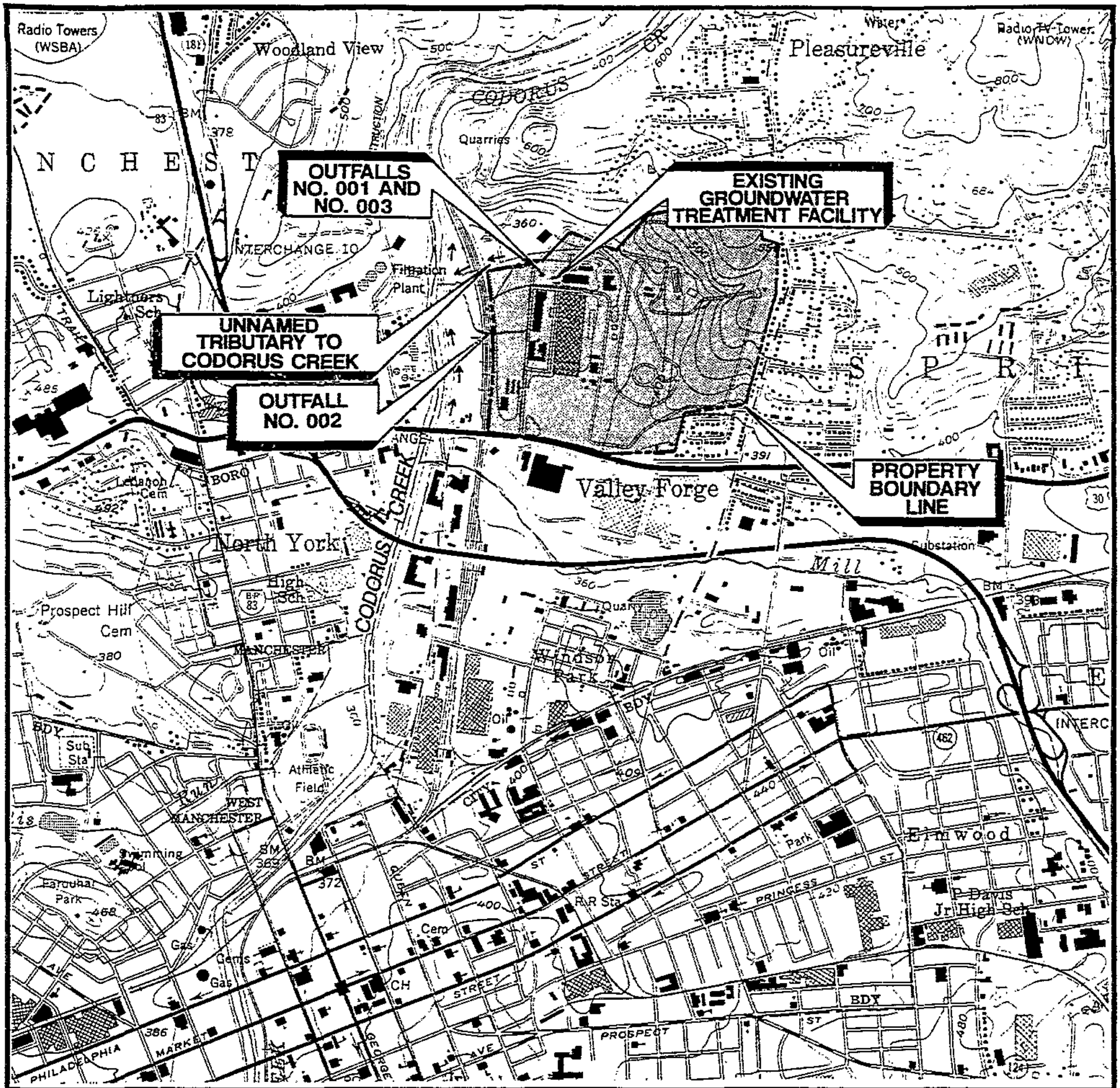
Biweekly monitoring of the Site Boss® system has continued to improve response time to system alarms and has helped optimize operation of the groundwater extraction and treatment systems.

10.0 REFERENCES

R. E. Wright Associates, Inc.; August 1988; *Report of Investigations in the Northeastern Property Boundary, TCA Tank, and Containment Areas of the Harley-Davidson, Inc. York Facility.*

R. E. Wright Environmental, Inc.; February 1995; *Groundwater Extraction and Treatment System Annual Operations Report*; *Harley-Davidson, Inc., York, Pennsylvania.*

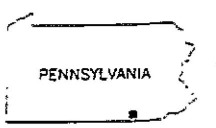
FIGURES



NOTE: BASE MAP FROM THE YORK, PA USGS 7 1/2 MINUTE TOPOGRAPHIC QUADRANGLE (PR 1990)

2000' 0 2000'

SCALE IN FEET



QUADRANGLE LOCATION

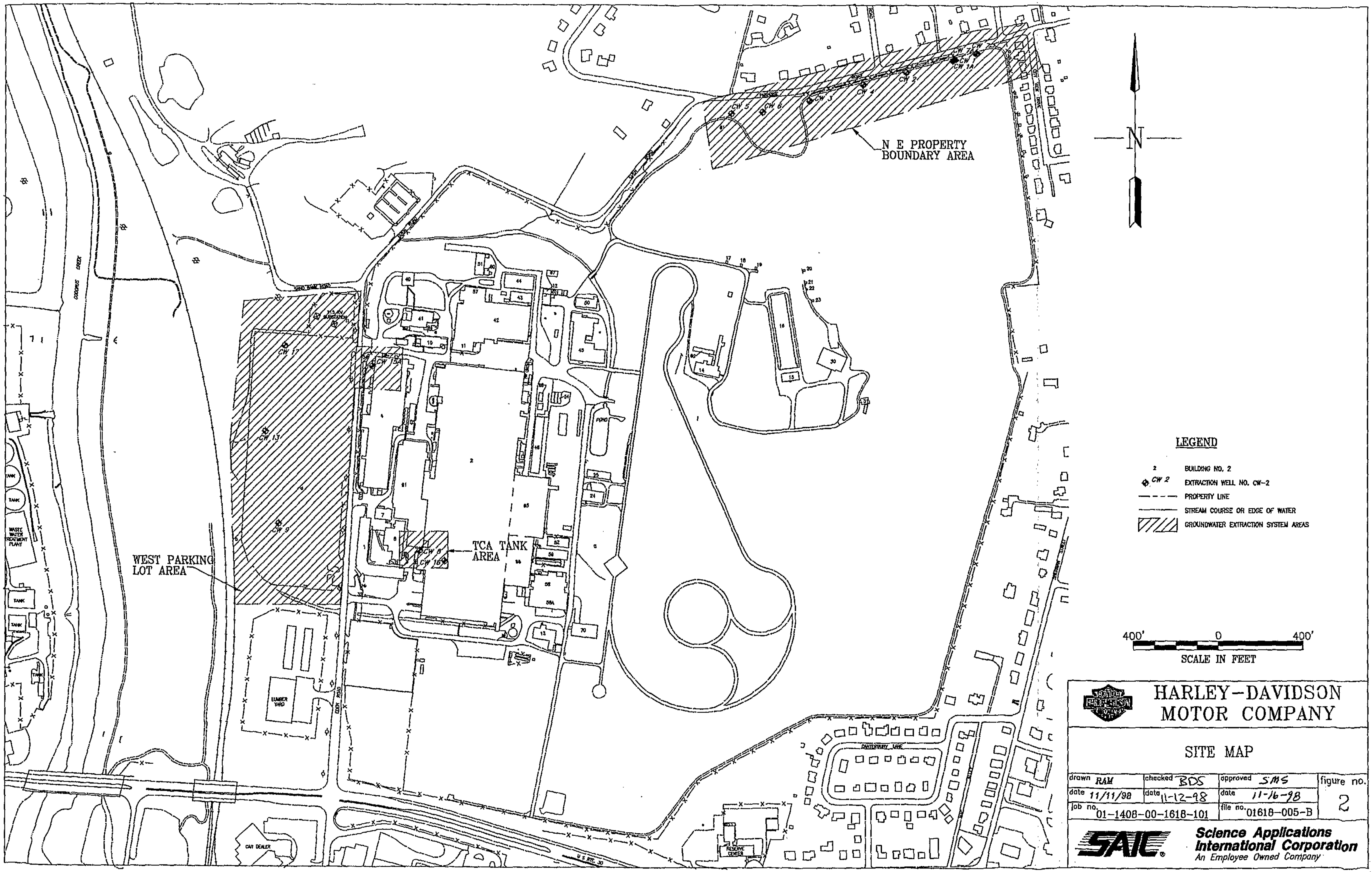
FIGURE 1

HARLEY-DAVIDSON, INC.
YORK FACILITY

SITE LOCATION MAP

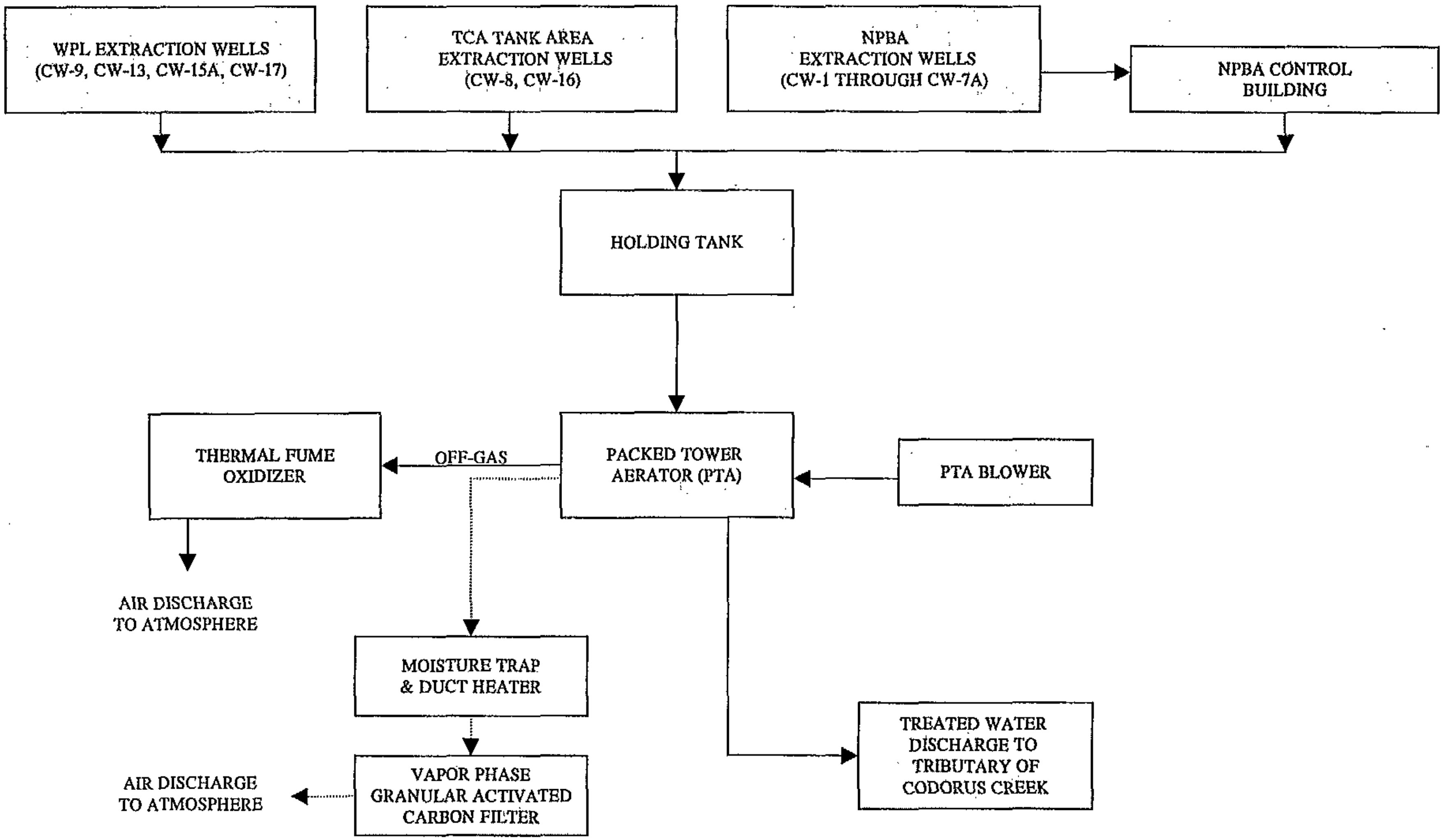
drawn SS	approved MCM	drawing no.
checked MCM	date 1/7/93	92548-003-AA

r.e. wright environmental, inc.
total environmental solutions
middletown, pa wayne, pa westminster, md.



N E PROPERTY
BOUNDARY AREA
N
LEGEND
BUILDING NO. 2
EXTRACTION WELL NO. CW-2
PROPERTY LINE
STREAM COURSE OR EDGE OF WATER
GROUNDWATER EXTRACTION SYSTEM AREAS
WEST PARKING
LOT AREA
TCA TANK
AREA
LUMBER YARD
CAR DEALER
RESERVE CENTER
CANTERBURY LANE
U S RTE. 30
TANK
WASTE WATER TREATMENT PLANT
POND
400'
0
400'
SCALE IN FEET
HARLEY-DAVIDSON
MOTOR COMPANY
SITE MAP
drawn RAM
checked BDS
approved SMS
figure no.
2
date 11/11/98
date 11-12-98
date 11-16-98
job no. 01-1408-00-1618-101
file no. 01618-005-B
SAIC
Science Applications
International Corporation
An Employee Owned Company

FIGURE 3
GROUNDWATER TREATMINT SYSTEM
Harley-Davidson Motor Company



11/6/97 GROUNDWATER SURFACE ELEVATIONS & APPROXIMATE DAILY PUMPING RATES FROM "CW" WELLS HARLEY-DAVIDSON MOTOR COMPANY				
WELL ID	ELEVATION *	PUMPAGE **	WELL ID	ELEVATION *
CW-1	493.43	3,600	MW-24	342.29
CW-1A	505.18	10	MW-25	359.17
CW-2	478.99	70	MW-26	NM
CW-3	435.78	2,900	MW-27	339.81
CW-4	454.77	2,600	MW-28	338.54
CW-5	423.75	900	MW-29	341.07
CW-6	412.62	4,200	MW-30	341.40
CW-7	489.28	500	MW-31S	343.33
CW-7A	525.12	0	MW-32S	338.46
CW-8	336.50	114,000	MW-33	338.44
CW-9	341.62	8	MW-34S	339.70
CW-10	367.36	NO	MW-35S	<342.6
CW-11	340.72	NO	MW-36S	341.92
CW-12	340.28	NO	MW-37S	342.84
CW-12A	341.09	NO	MW-38S	339.76
CW-13	321.17	90,800	MW-39S	<337.6
CW-14	330.47	NO	MW-40S	340.74
CW-15	NM	NO	MW-41S	378.41
CW-15A	328.82	4,200	MW-42S	<376.4
CW-16	334.77	18,900	MW-43S	342.52
CW-17	330.12	62,200	MW-44	369.60
CW-18	NM	NO	MW-45	339.06
MW-1	340.71		MW-46	339.30
MW-2	439.53		MW-47	336.34
MW-3	472.31		MW-48	<339.9
MW-4	356.03		MW-49S	339.91
MW-5	341.61		MW-50S	335.64
MW-6	339.51		MW-51S	332.90
MW-7	330.58		MW-53	349.46
MW-8	341.09		MW-54	335.34
MW-9	503.71		MW-55	335.89
MW-10	506.28		MW-56	NM
MW-11	510.33		MW-57	340.97
MW-12	487.54		MW-59	341.58
MW-14	484.95		MW-60	342.90
MW-15	463.24		MW-61S	339.52
MW-16S	473.70		MW-62S	339.76
MW-17	442.25		MW-63S	340.80
MW-18S	442.11		MW-64S	<377.3
MW-19	401.64		TWB-6	NM
MW-20S	525.38		WPL-SS-2	Dry
MW-21	384.58		WPL-SS-7	333.28
MW-22	381.47		WPL-SS-8	Dry
MW-23	341.02			

NOTES:
* Elevation in feet above Mean Sea Level.
** Approximate gallons pumped on 11-6-97.
NO = not operational.
NM = not measured.
"<" = Elevation less than reported value because well was dry at time of water level measurement.

LEGEND

430 — GROUNDWATER ELEVATION CONTOUR LINE, DASHED WHERE INFERRED (CONTOUR INTERVAL VARIABLE).

400' 0 400'
SCALE IN FEET

HARLEY-DAVIDSON MOTOR COMPANY

GROUNDWATER ELEVATION CONTOUR MAP - NOVEMBER 6, 1997

drawn RAM	checked BDS	approved SMS	figure no.
date 11/03/98	date 11-16-98	date 11-16-98	4
job no. 01-1408-00-1618-101		file no. 01618-004-B	

SAIC Science Applications International Corporation
An Employee Owned Company

FIGURE 5

Record of Tower Influent Chemistry

Individual VOC Concentrations

Start-up through June 30, 1998

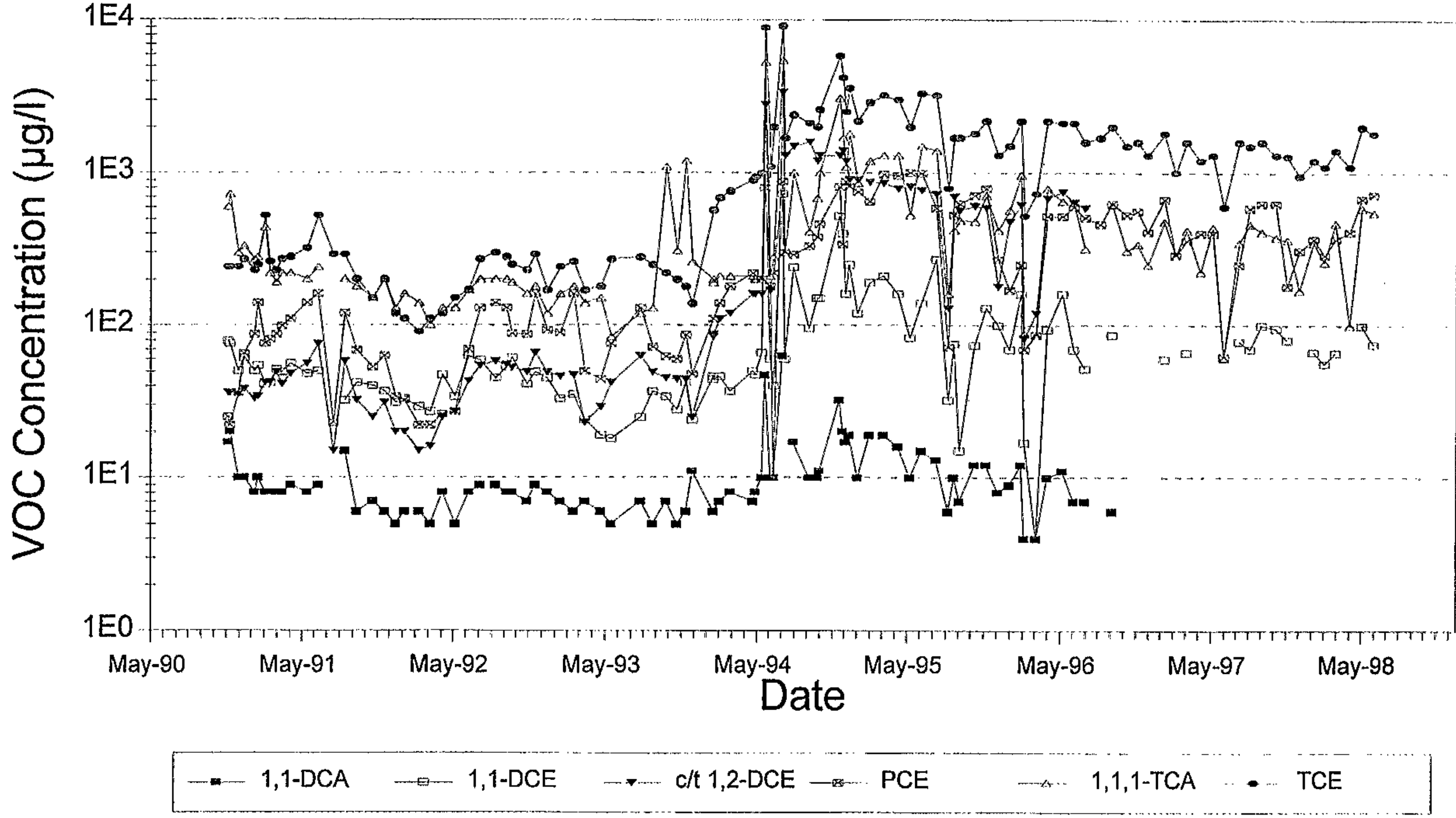


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FIGURE 6

Record of Tower Influent Chemistry

Total VOC Concentrations

Start-up through June 30, 1998

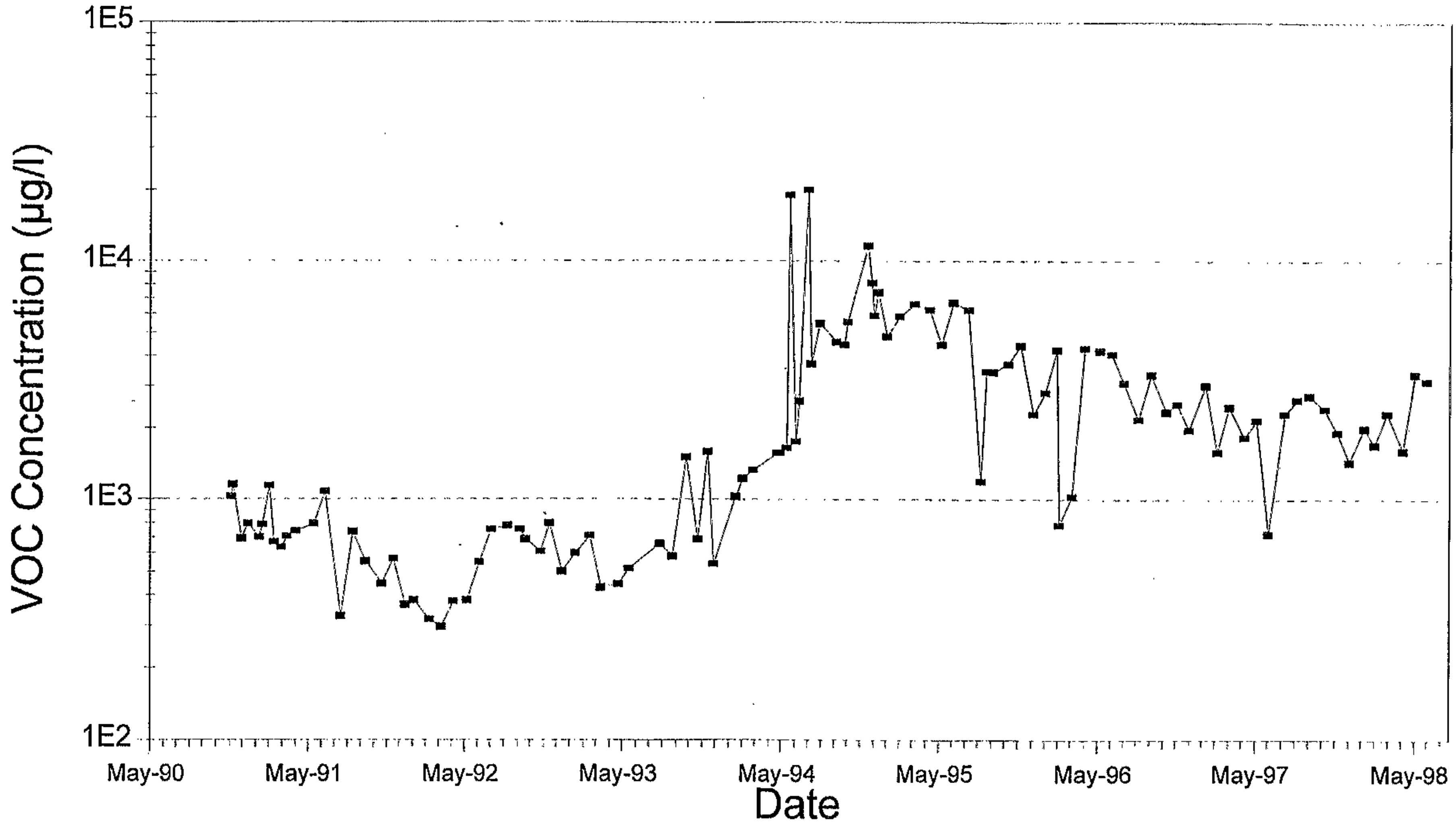

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FIGURE 7

GROUNDWATER WITHDRAWALS

GALLONS PER MONTH FOR EACH EXTRACTION WELL AREA

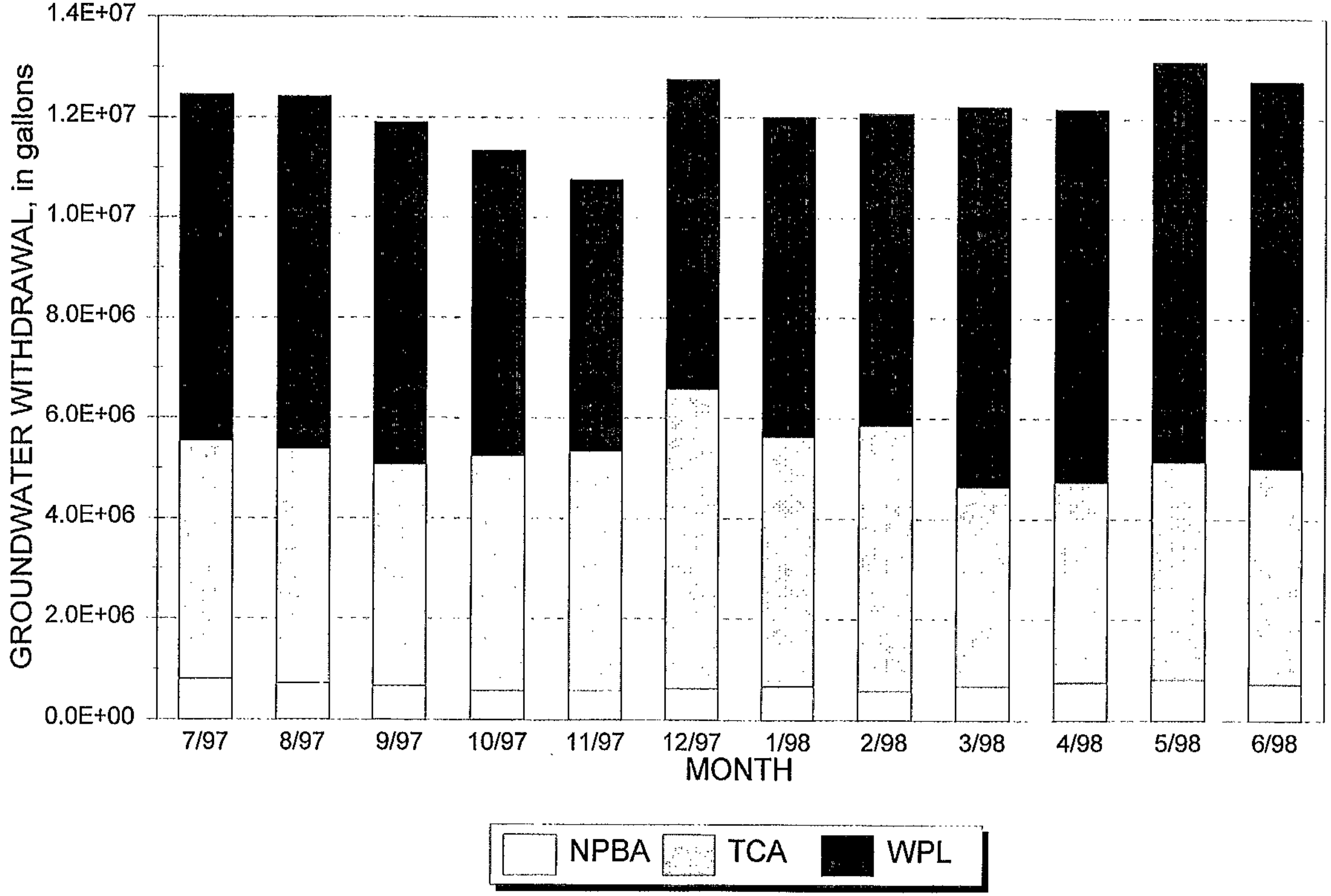

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FIGURE 8

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELL CW-1

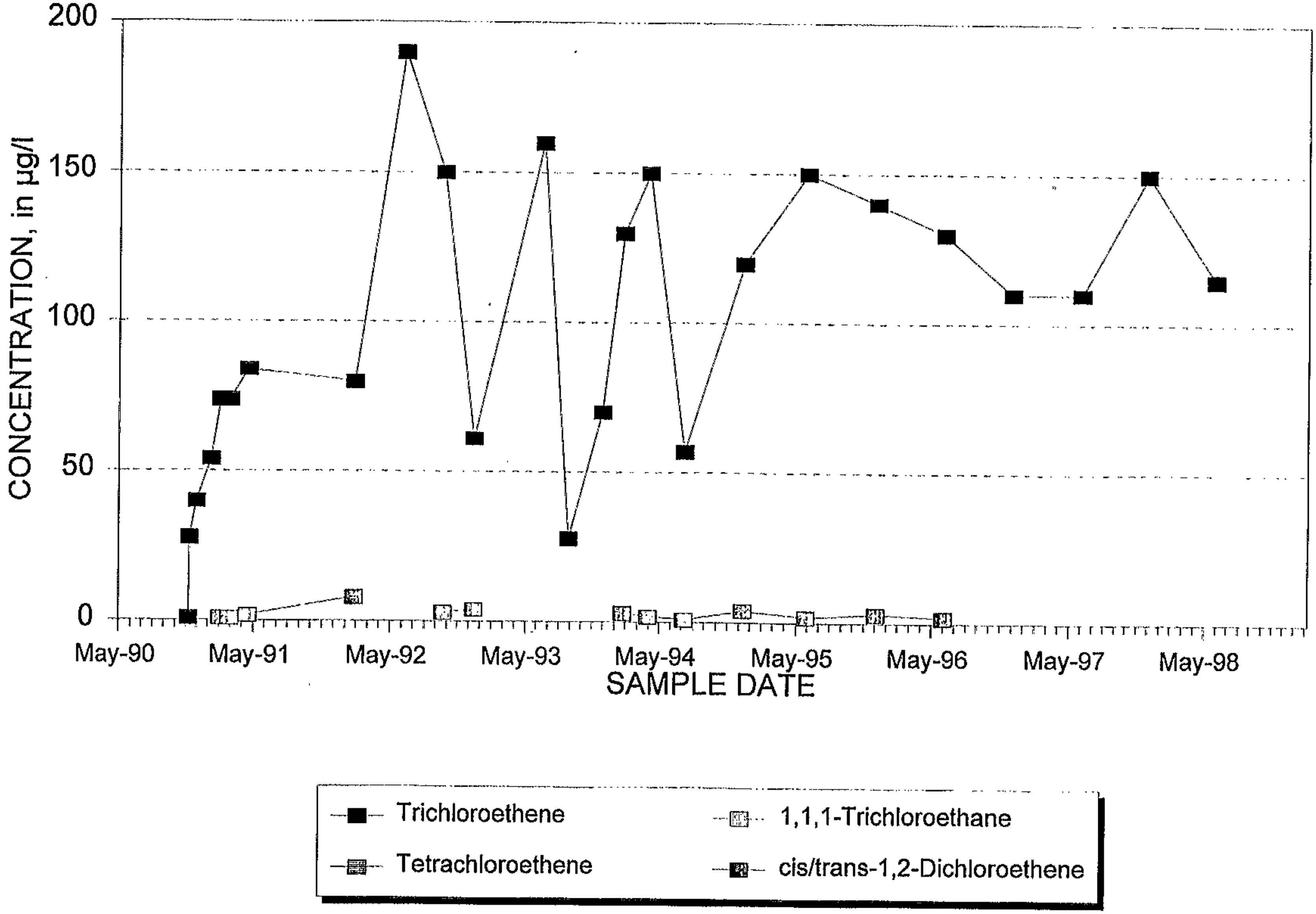

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FIGURE 9

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELL CW-1A

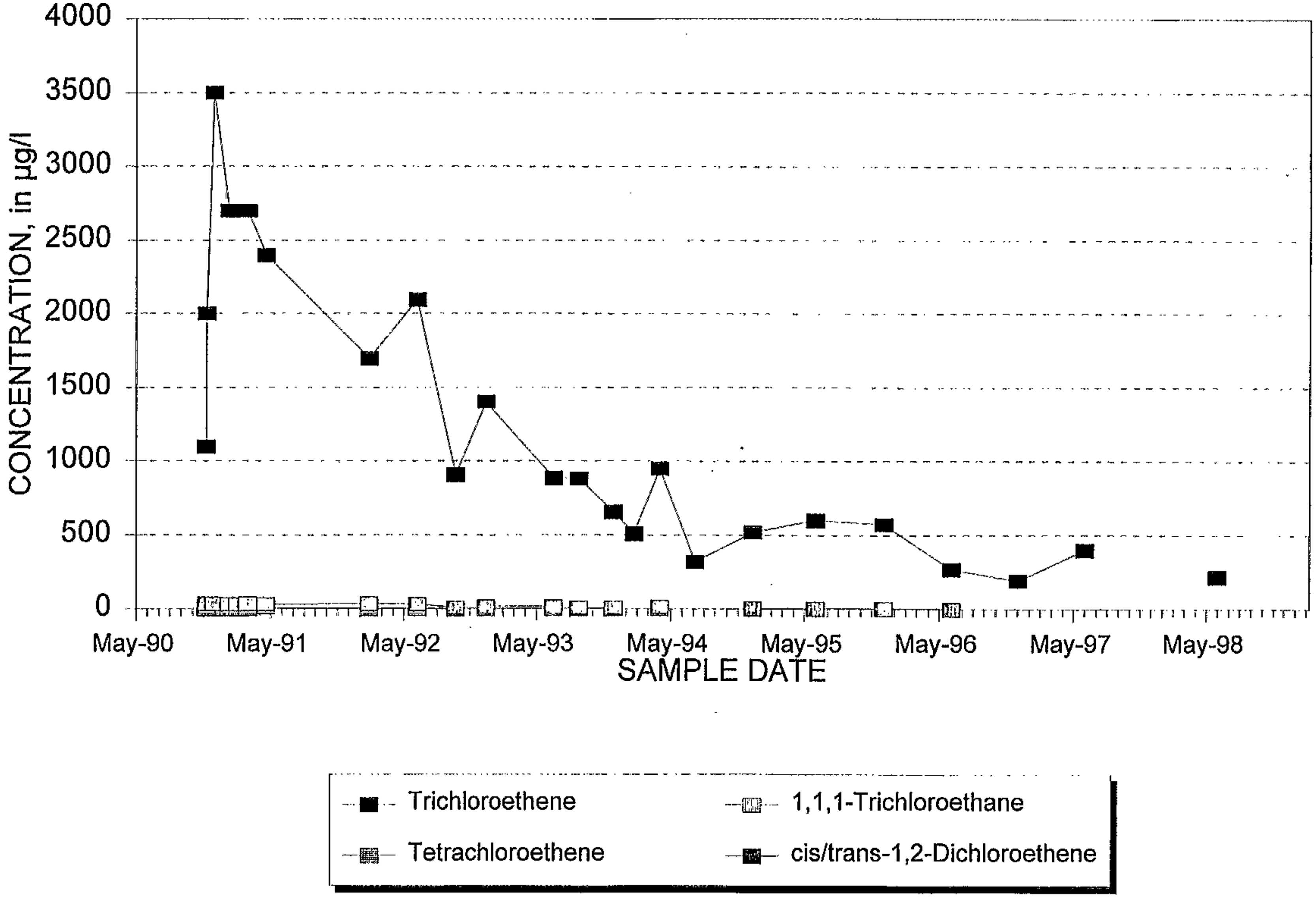

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FIGURE 10

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELL CW-2

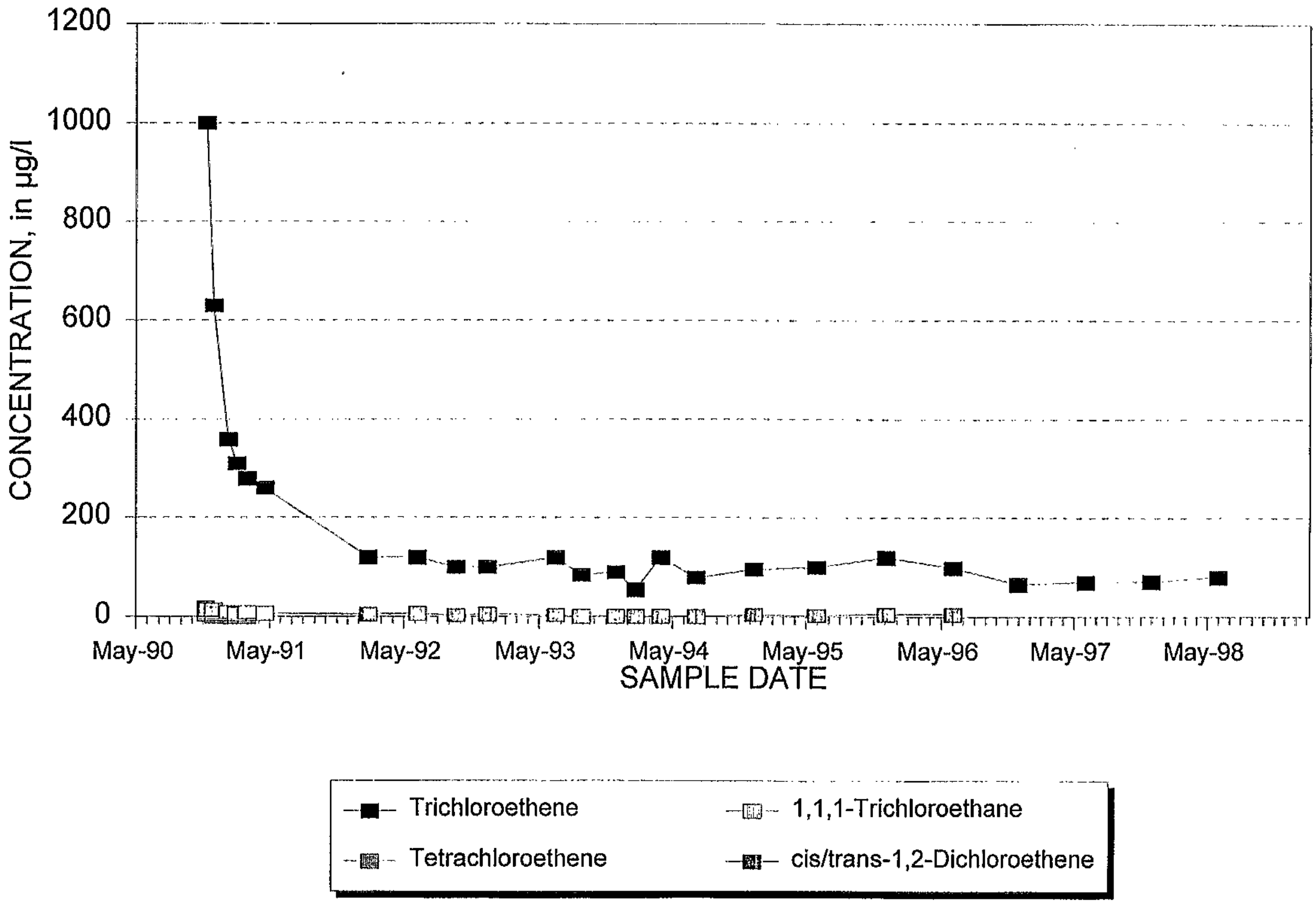

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FIGURE 11

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELL CW-3

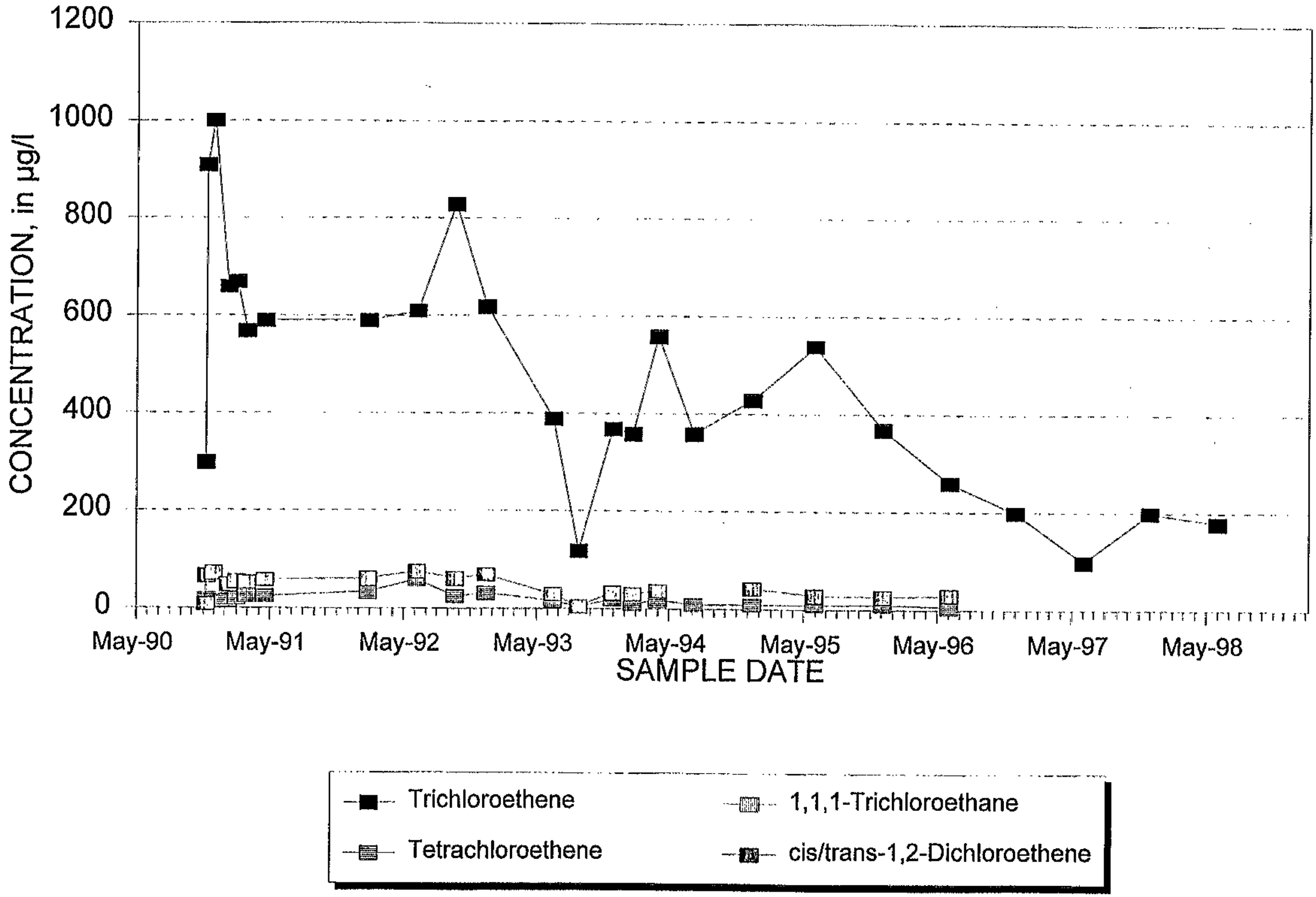

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FIGURE 12

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELL CW-4

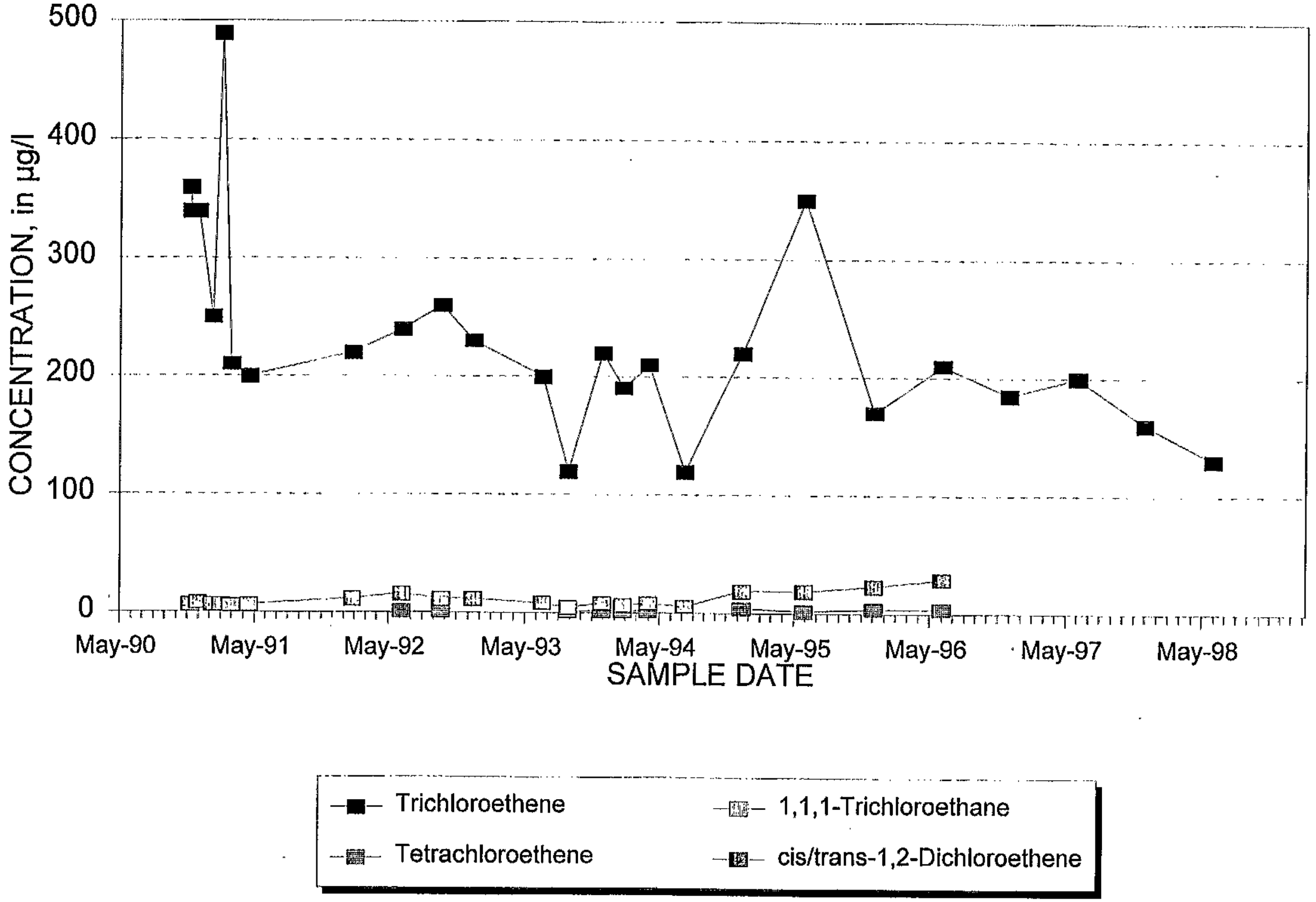

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FIGURE 13

PREDOMINANT VOC CONCENTRATIONS
EXTRACTION WELL CW-5

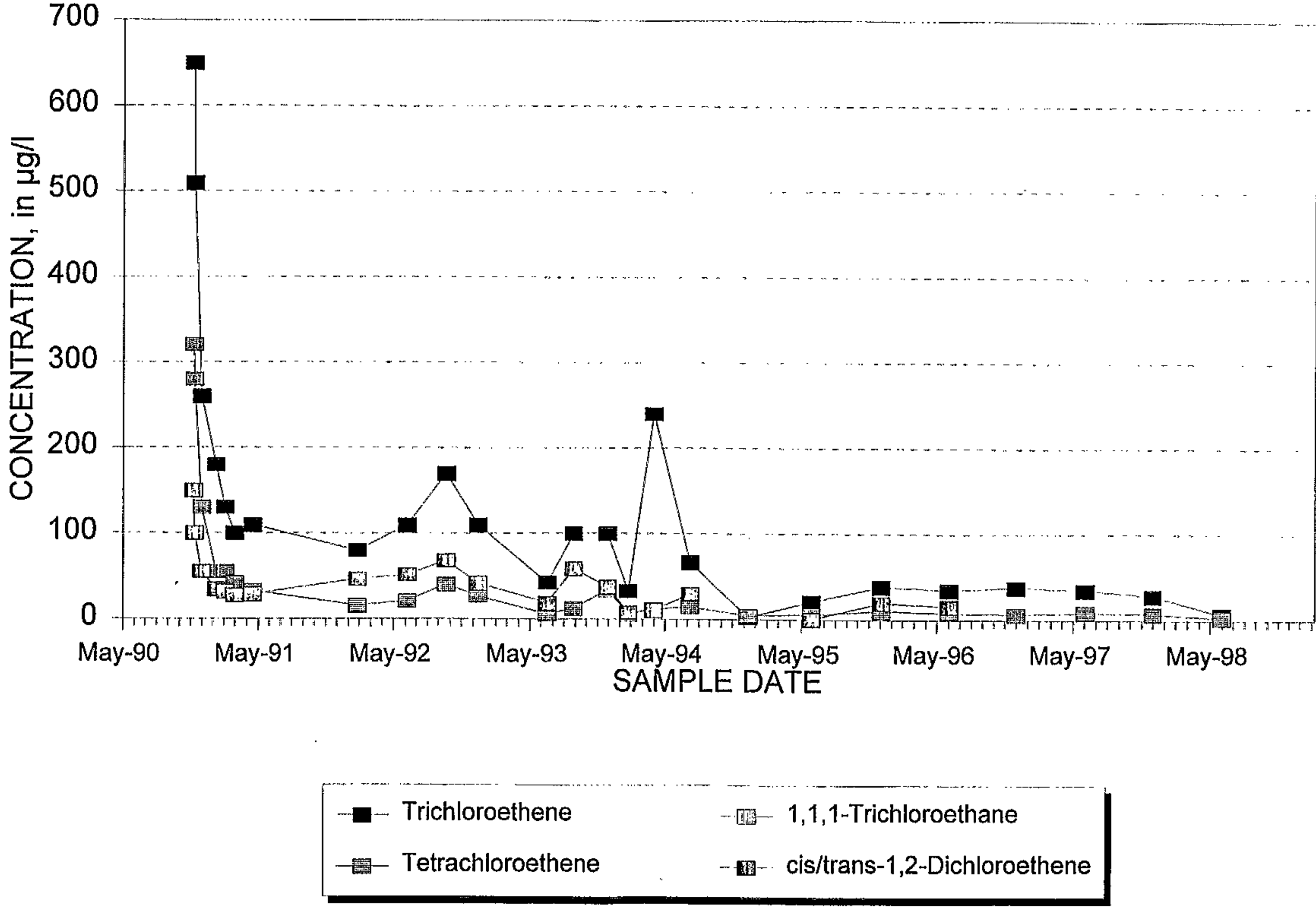

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FIGURE 14

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELL CW-6

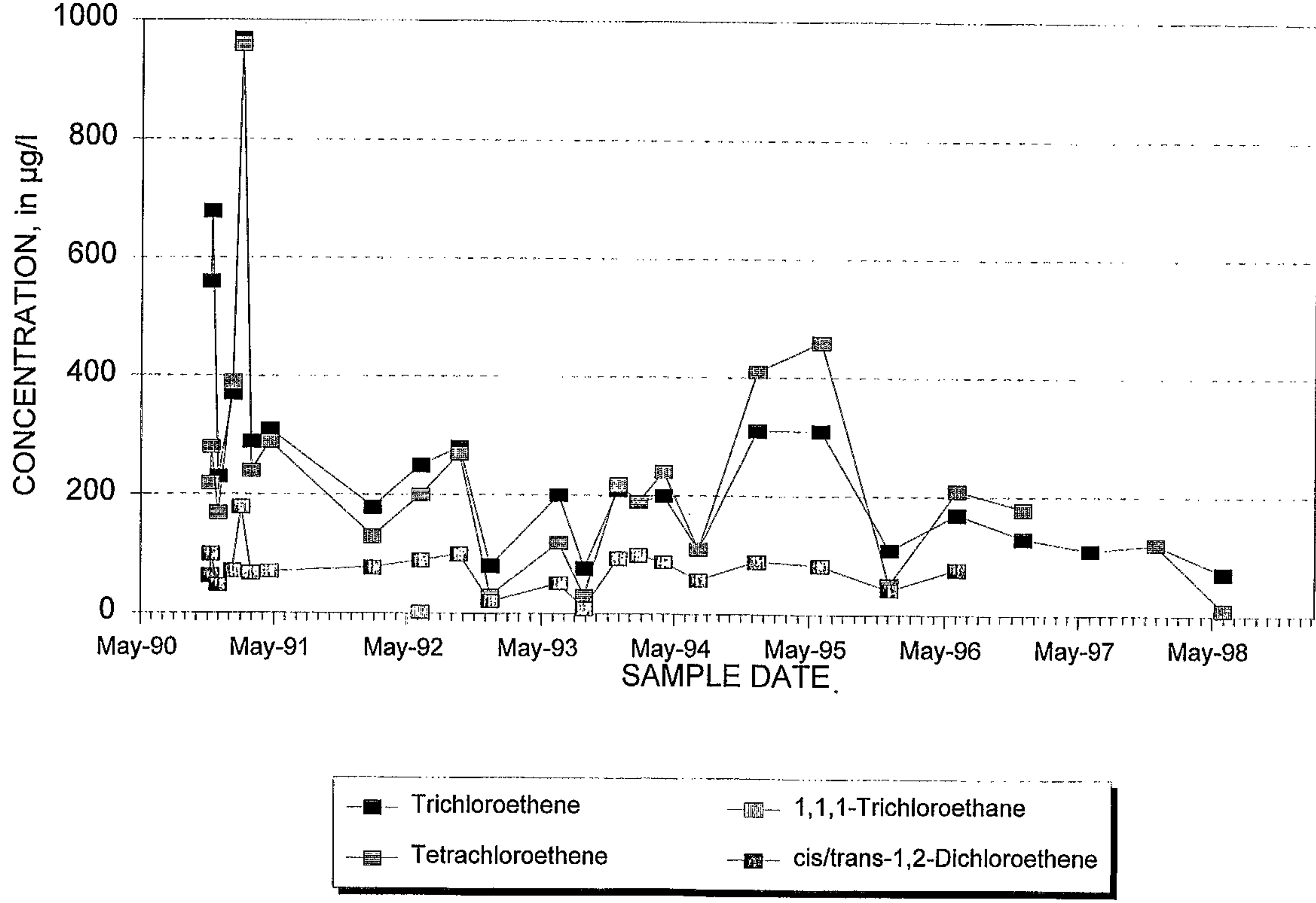

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FIGURE 15

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELL CW-7

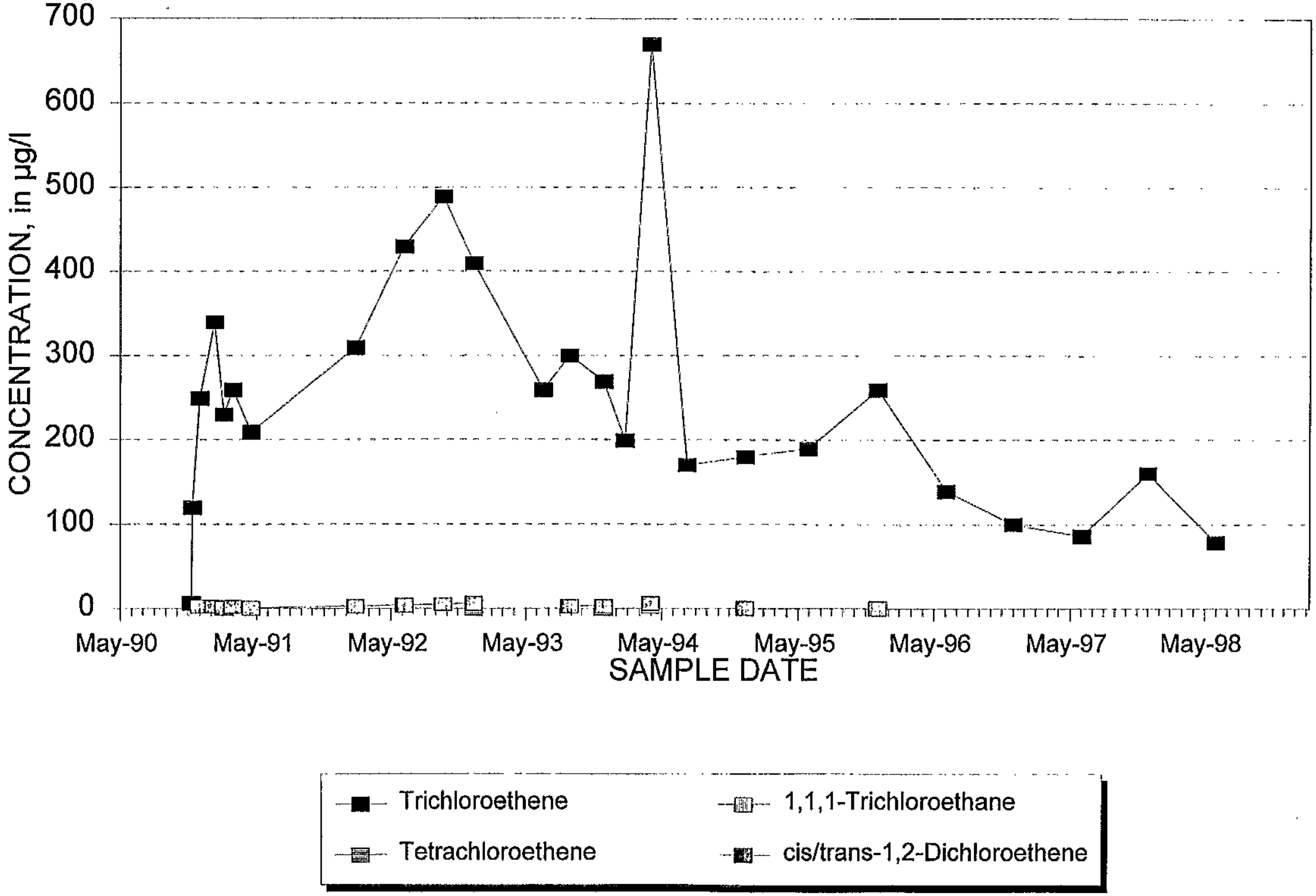

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FIGURE 16

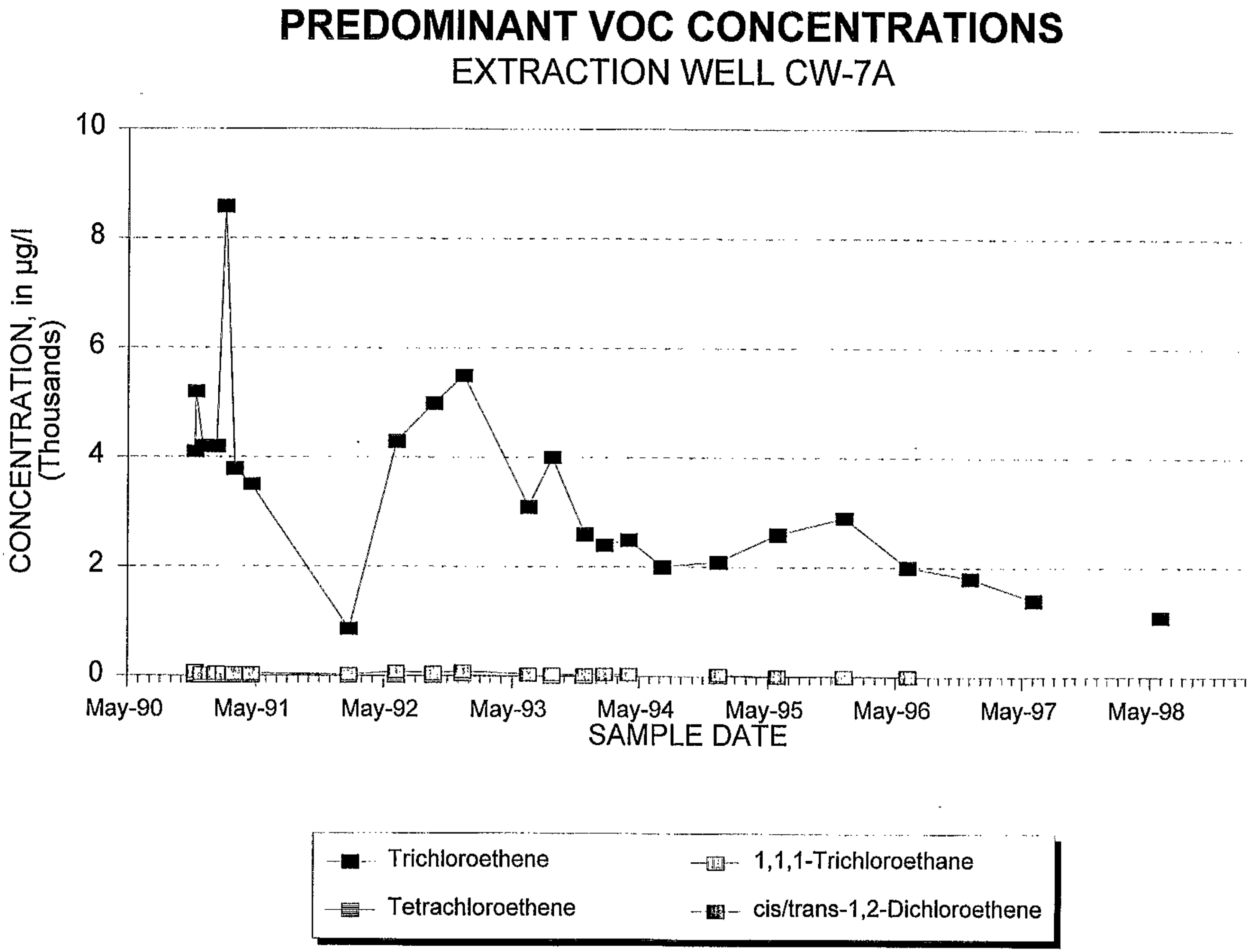

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FIGURE 17

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELL CW-8

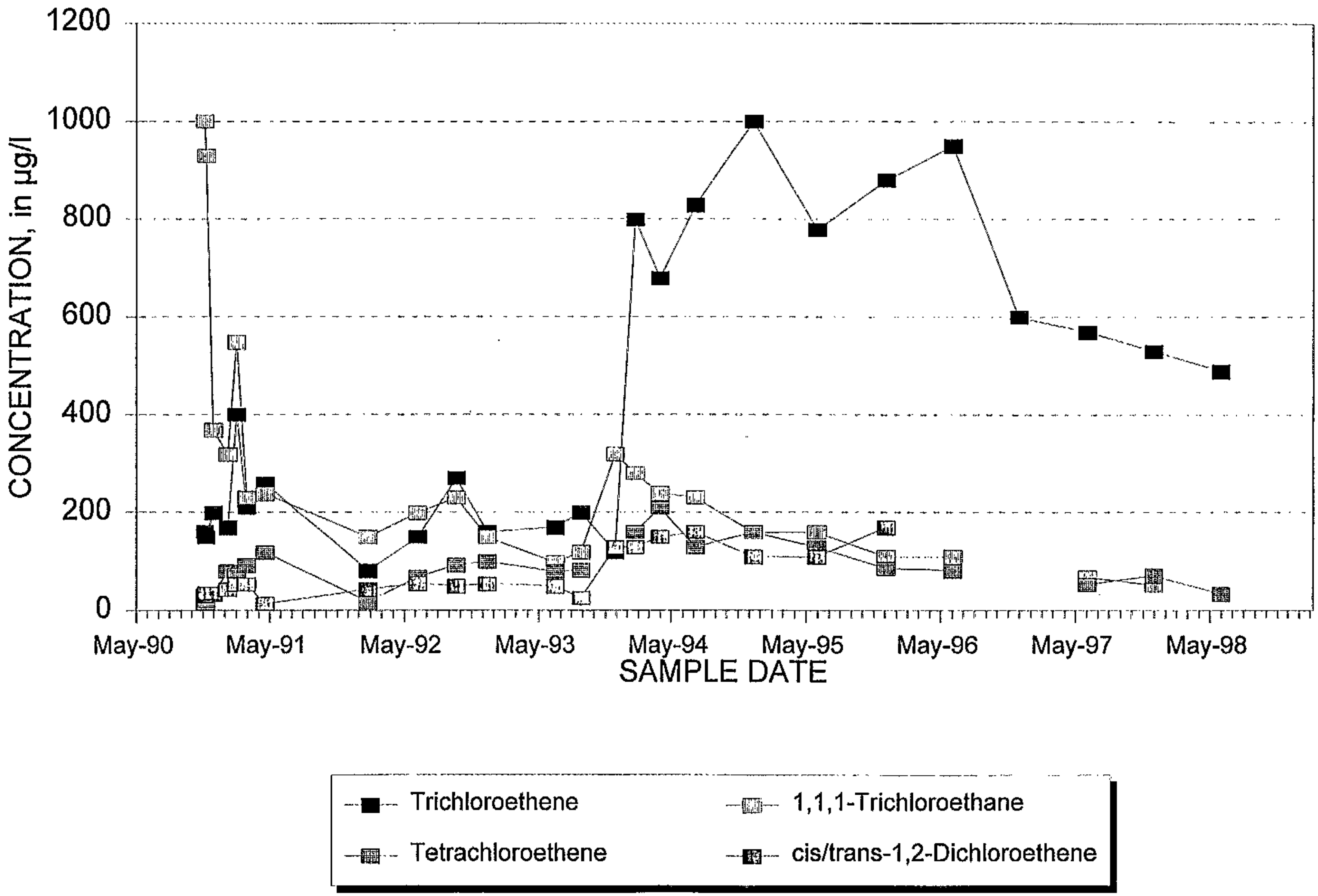

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FIGURE 18

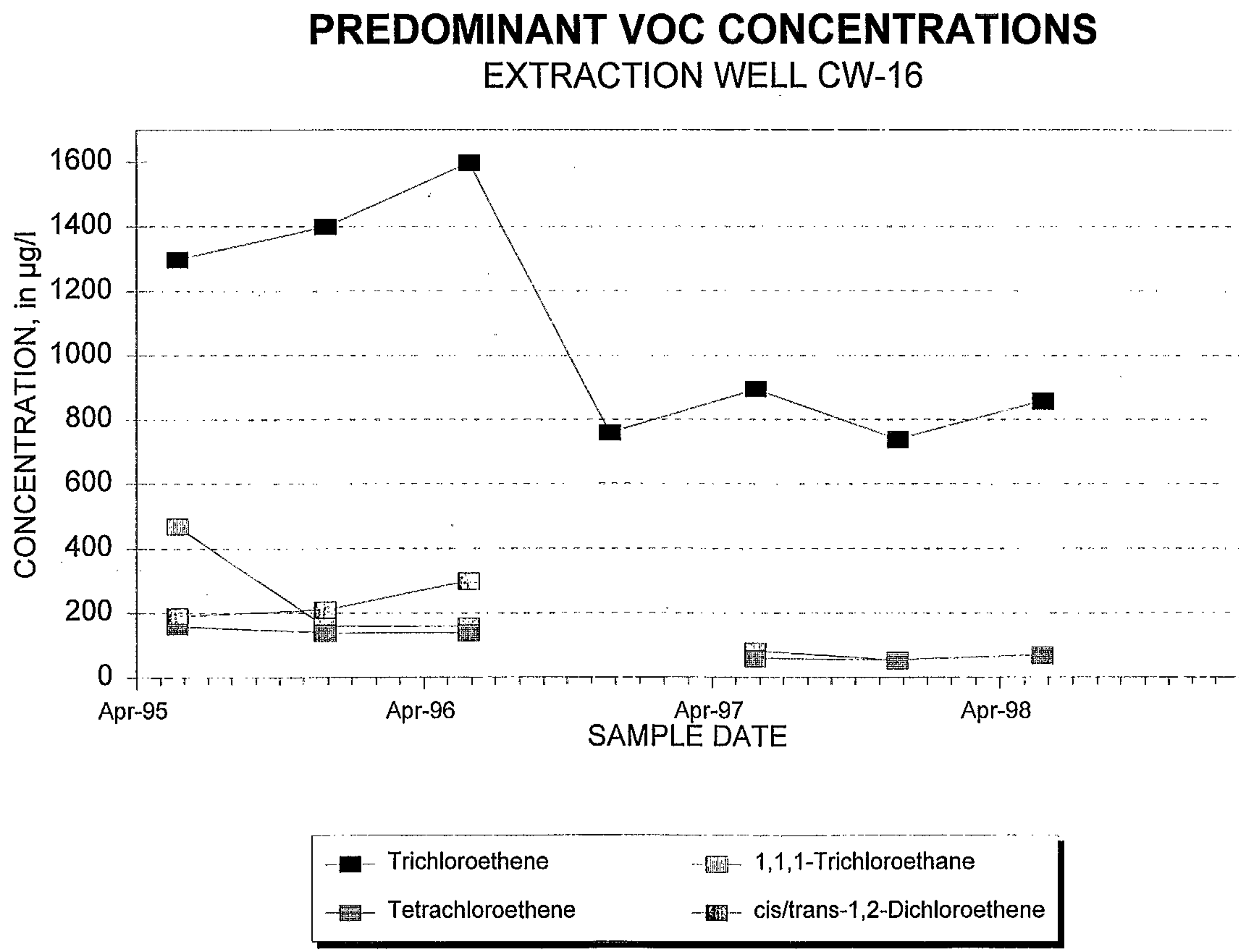

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FIGURE 19

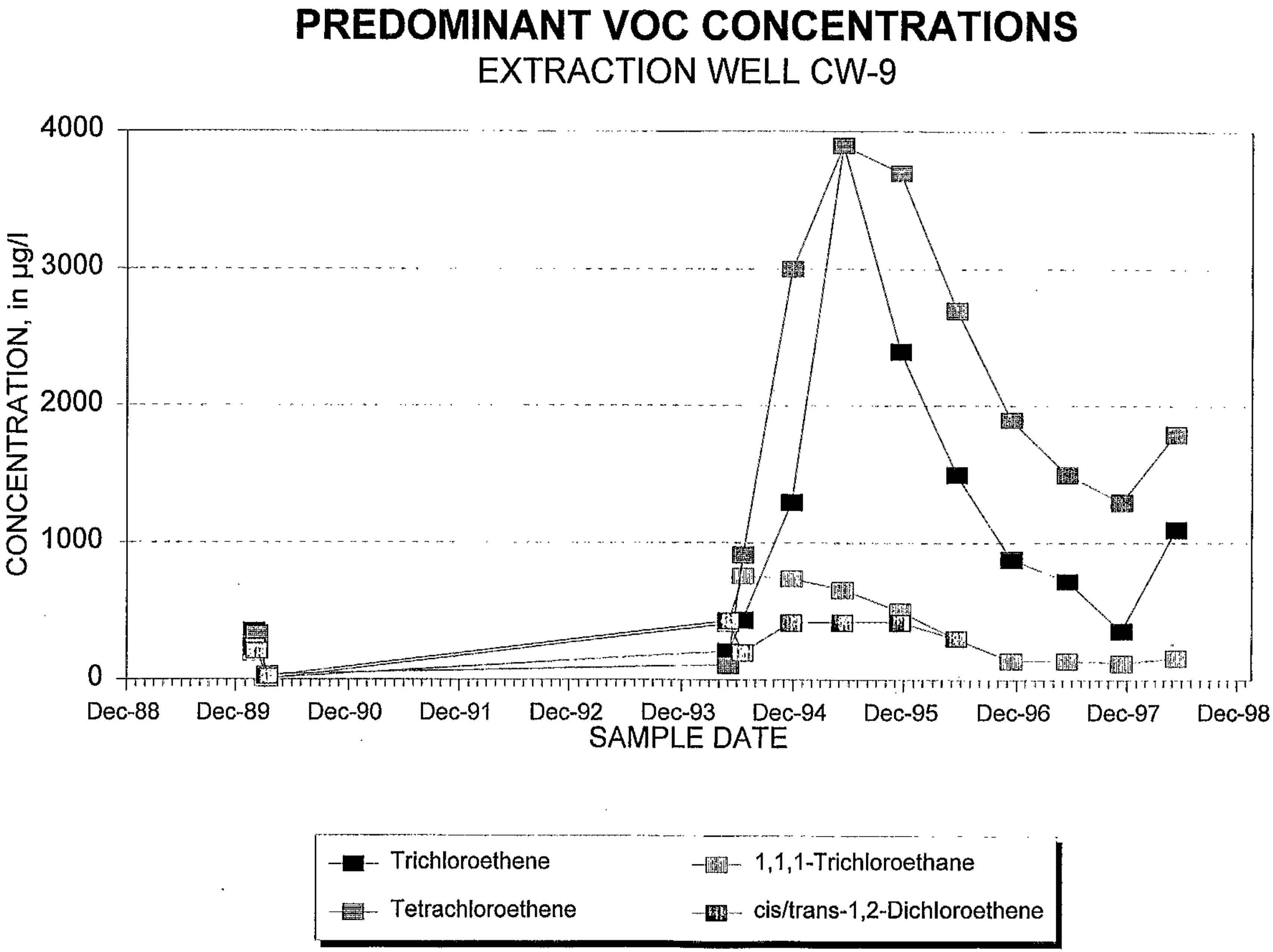

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FIGURE 20

PREDOMINANT VOC CONCENTRATIONS
EXTRACTION WELL CW-13

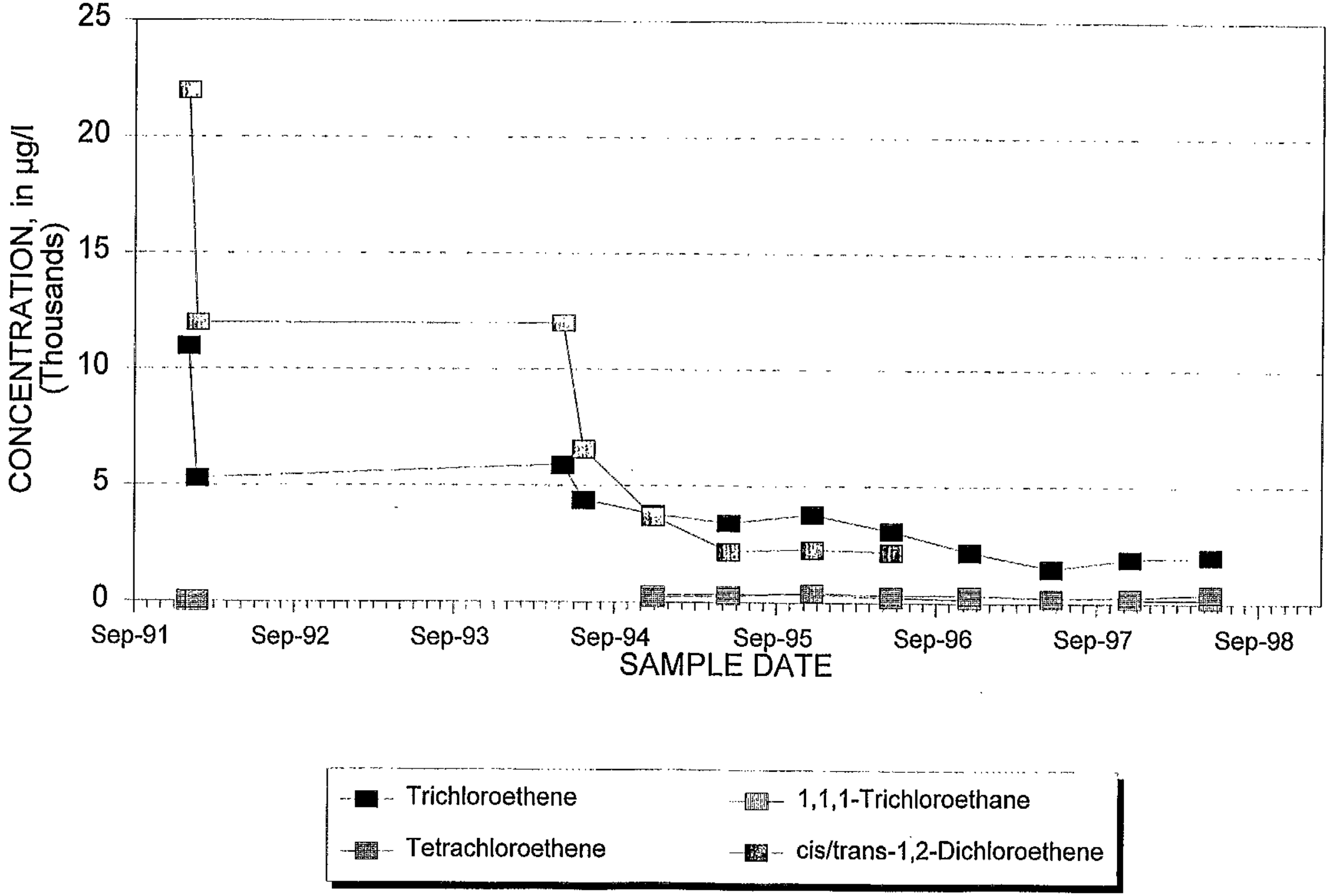

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FIGURE 21

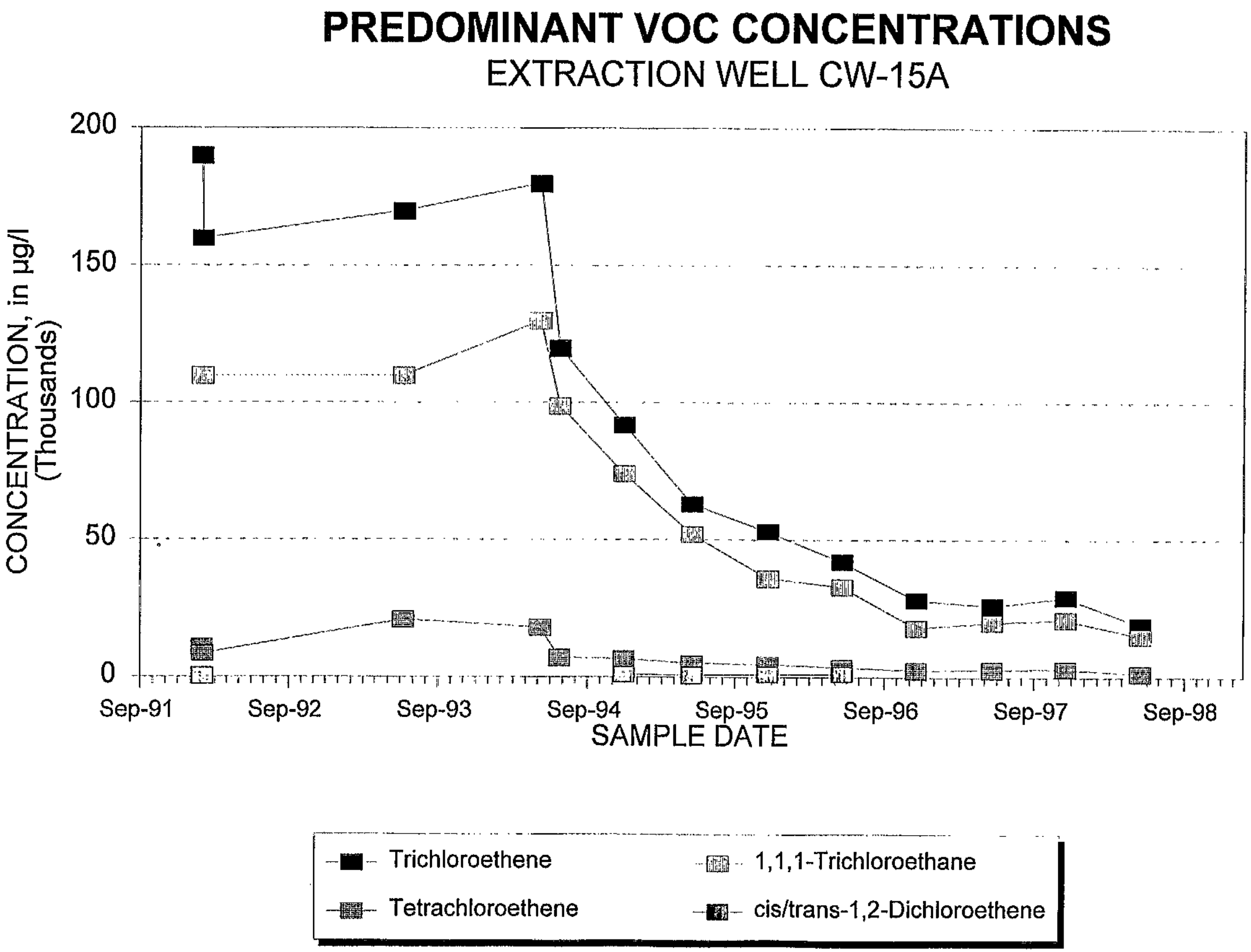

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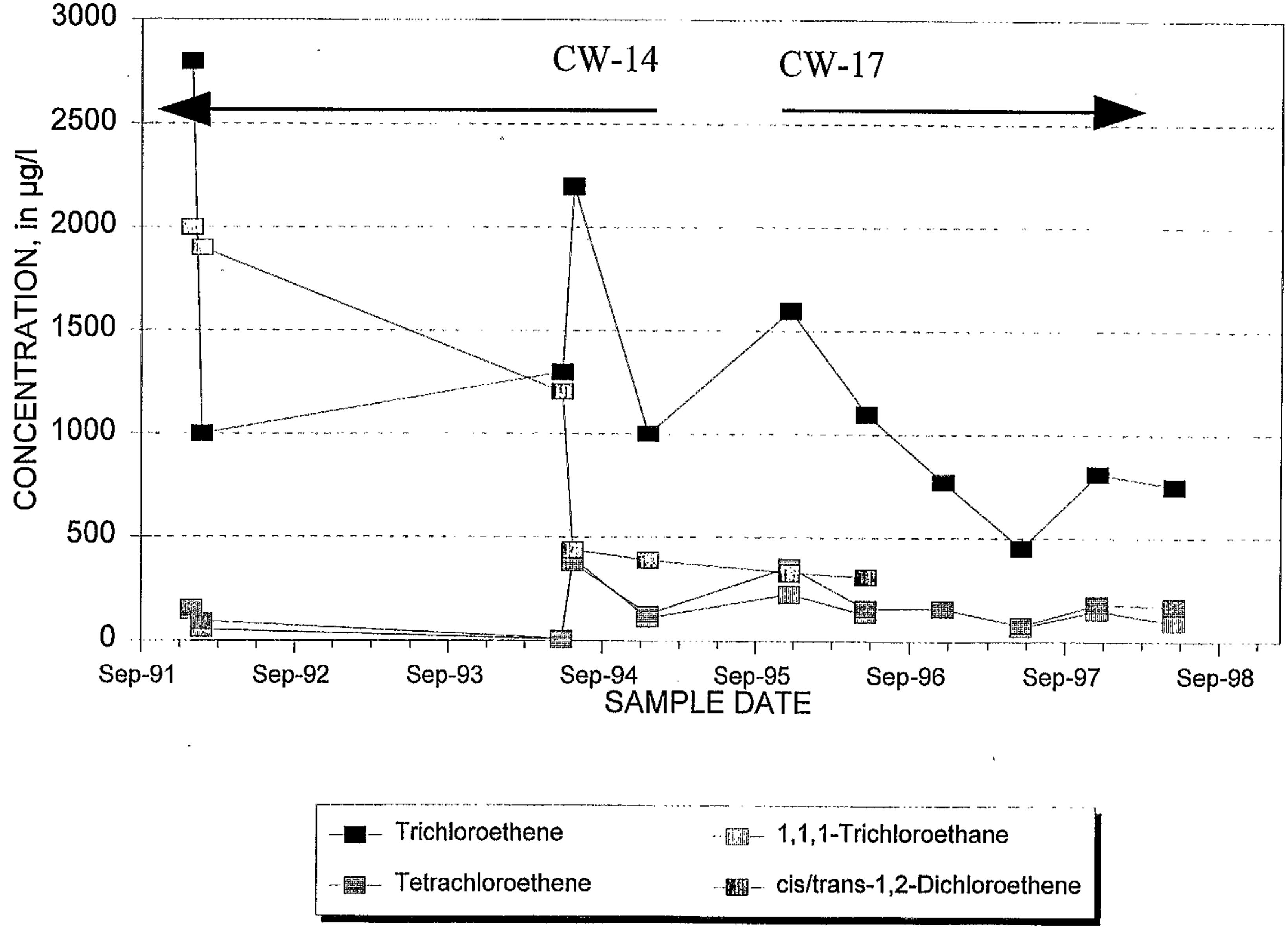
FIGURE 22

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELLS CW-14 & CW-17



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TABLES

TABLE 1

VOCs REMOVED FROM COLLECTED GROUNDWATER

GROUNDWATER TREATMENT SYSTEM

JULY 1, 1997 - JUNE 30, 1998

Harley - Davidson Motor Company

DATE	MONTHLY GROUNDWATER WITHDRAWAL (gallons)	AVERAGE MONTHLY TOTAL VOCs (ppb)	ESTIMATED MONTHLY VOC REMOVAL (pounds)
JUL 97	13,432,300	2,278	255
AUG 97	13,443,100	2,620	294
SEP 97	12,953,300	2,740	296
OCT 97	12,430,800	2,405	250
NOV 97	11,495,600	1,909 *	183
DEC 97	12,495,700	1,445 *	151
JAN 98	12,722,700	1,987	211
FEB 98	12,010,800	1,706	171
MAR 98	12,683,800	2,306	244
APR 98	12,835,500	1,610	173
MAY 98	12,567,200	3,369	354
JUN 98	14,404,100	3,145	378

ANNUAL TOTALS

YEAR	YEARLY GROUNDWATER WITHDRAWAL (gallons)		ESTIMATED YEARLY VOC REMOVAL (pounds)
1990 (NOV & DEC)	12,954,886		92
1991	62,458,393		357
1992	66,081,120		322
1993	72,198,940		421
1994	88,387,251		3,905
1995	141,357,856		5,572
1996	152,168,899		3,631
1997	150,246,400		2,675
JAN 98 - JUN 98	77,224,100		1,531

*Average of duplicate analysis.

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TABLE 2

RECORD OF GROUNDWATER WITHDRAWALS

GALLONS PER MONTH FOR EACH EXTRACTION WELL
JULY 1, 1997 - JUNE 30, 1998
HARLEY-DAVIDSON MOTOR COMPANY

	NPBA WELLS										TCA WELLS			WPL WELLS					MONTHLY
MONTH	CW-1	CW-1A	CW-2	CW-3	CW-4	CW-5	CW-6	CW-7	CW-7A	SUBTOTAL	CW-8	CW-16	SUBTOTAL	CW-9	CW-13	CW-15A	CW-17	SUBTOTAL	TOTAL
7/97	167,291	231	4,016	153,906	117,984	43,109	276,587	21,266	2,600	786,990	4,005,100	750,090	4,755,190	1,851,309	3,142,468	85,886	1,833,834	6,913,497	12,455,677
8/97	159,896	1	2,507	162,431	115,024	27,332	245,383	20,277	0	732,851	3,977,300	667,900	4,645,200	2,452,917	2,986,564	111,386	1,489,646	7,040,513	12,418,564
9/97	145,157	589	3,288	95,141	108,088	25,052	259,039	19,254	0	655,608	3,798,700	633,520	4,432,220	2,469,031	2,751,155	127,928	1,470,532	6,818,646	11,906,474
10/97	138,340	725	4,962	87,811	98,936	20,050	207,385	18,222	1,063	577,494	3,982,600	683,390	4,665,990	1,107,944	3,056,635	132,980	1,803,922	6,101,481	11,344,965
11/97	129,930	817	1,475	120,312	95,978	40,948	185,038	19,773	0	594,271	4,043,900	700,880	4,744,780	250,145	2,990,884	143,981	2,038,104	5,423,114	10,762,165
12/97	143,144	672	535	136,658	98,064	36,104	181,246	20,967	1	617,391	5,306,700	661,820	5,968,520	1,124,553	2,927,704	134,274	1,995,975	6,182,506	12,768,417
1/98	160,502	1,738	358	127,140	93,793	74,747	173,930	22,945	3,837	658,990	4,271,600	714,910	4,986,510	1,106,382	3,061,004	174,211	2,028,942	6,370,539	12,016,039
2/98	165,830	276	3,639	65,618	112,543	62,029	143,446	22,653	16,065	592,099	4,623,100	640,350	5,263,450	1,181,883	2,909,855	226,704	1,916,515	6,234,957	12,090,506
3/98	199,039	5,346	9,081	87,643	131,933	47,722	143,554	28,969	35,339	688,626	3,184,800	776,140	3,960,940	2,138,288	3,070,020	257,743	2,114,286	7,580,337	12,229,903
4/98	193,091	1,088	7,128	151,836	113,895	6	230,818	26,332	22,427	746,621	3,219,200	779,030	3,998,230	2,360,387	2,941,408	53,379	2,081,874	7,437,048	12,181,899
5/98	193,084	1,723	8,078	184,427	101,498	13,767	256,364	27,111	29,470	815,522	3,562,000	767,040	4,329,040	2,691,148	2,924,050	285,261	2,098,923	7,999,382	13,143,944
6/98	188,629	1,984	8,492	207,054	23,420	17,446	242,992	23,689	1,063	714,769	3,722,600	578,630	4,301,230	2,570,827	2,839,251	247,552	2,077,797	7,735,427	12,751,426
TOTALS	1,983,933	15,190	53,559	1,579,977	1,211,156	408,312	2,545,782	271,458	111,865	8,181,232	47,697,600	8,353,700	56,051,300	21,304,814	35,600,998	1,981,285	22,950,350	81,837,447	146,069,979

TABLE 3

GROUNDWATER EXTRACTION WELL PUMPING ELEVATIONS

Harley-Davidson Motor Company

EXTRACTION SYSTEM LOCATION	Well No.	Reference Elevation (ft AMSL)	Range(ft AMSL)		Groundwater Elev. (ft AMSL)	
			Pump On (High)	Pump Off (Low)	11/6/97	5/5/98
NPBA	CW-1	570.88	496.4	493.4	493.43	492.43
	CW-1A	569.93	510.4	507.4	505.18	507.84
	CW-2	557.79	484.3	481.3	478.99	482.01
	CW-3	519.43	441.4	438.4	435.78	437.09
	CW-4	542.32	458.8	455.8	454.77	455.62
	CW-5	472.06	426.6	423.6	423.75	454.68
	CW-6	486.98	416.5	413.5	412.62	461.98
	CW-7	574.61	494.1	491.1	489.28	488.59
	CW-7A	574.71	524.2	521.2	525.12	537.64
WPL	CW-9	360.79	333.8	328.8	341.62	335.65
	CW-13	361.64	327.6	322.6	321.17	324.72
	CW-15A	362.57	333.5	328.5	328.82	329.22
	CW-17	361.67	335.7	330.7	330.12	334.98
TCA	CW-8	363.84	339.8	335.8	336.50	NM
	CW-16	364.32	334.3	329.3	334.77	342.90

Notes:

ft AMSL - feet above mean sea level

NM - Not Measured

APPENDIX A

Data Tables

Table A-1,	Site-Wide Groundwater Level and Elevation Data
Table A-2,	Groundwater Quality Analyses, Key Monitoring Well Samples
Table A-3,	Groundwater Quality Analyses, Extraction Well Samples
Table A-4,	Water Quality Analyses, Packed Tower Aerator Samples
Table A-5,	Groundwater Quality Analyses, Off-Site Samples

Table A-1

Site-Wide Groundwater Levels and Elevation Data Harley-Davidson Motor Company					
	Reference	11/06/97		05/05/98	
	Elevation	Depth	Water Level	Depth	Water Level
Well	(ft AMSL)	(feet)	(ft AMSL)	(feet)	(ft AMSL)
CW-1	570.88	77.45	493.43	78.45	492.43
CW-1A	569.93	64.75	505.18	62.09	507.84
CW-2	557.79	78.80	478.99	75.78	482.01
CW-3	519.43	83.65	435.78	82.34	437.09
CW-4	542.32	87.55	454.77	86.70	455.62
CW-5	472.06	48.31	423.75	17.38	454.68
CW-6	486.98	74.36	412.62	25.00	461.98
CW-7	574.61	85.33	489.28	86.02	488.59
CW-7A	574.71	49.59	525.12	37.07	537.64
CW-8	363.84	27.34	336.50	NM	--
CW-9	360.79	19.17	341.62	25.14	335.65
CW-10	417.43	50.07	367.36	33.51	383.92
CW-11	374.30	33.58	340.72	28.80	345.50
CW-12	362.06	21.78	340.28	18.73	343.33
CW-12A	362.18	21.09	341.09	19.80	342.38
CW-13	361.64	40.47	321.17	36.92	324.72
CW-14	362.08	31.61	330.47	27.06	335.02
CW-15	362.81	NM	--	NM	--
CW-15A	362.57	33.75	328.82	33.35	329.22
CW-16	364.32	29.55	334.77	21.42	342.90
CW-17	361.67	31.55	330.12	26.69	334.98
CW-18	365.76	NM	--	19.19	346.57
MW-1	376.35	35.64	340.71	30.87	345.48
MW-2	509.44	69.91	439.53	60.82	448.62
MW-3	542.11	69.80	472.31	60.83	481.28
MW-4	397.82	41.79	356.03	26.93	370.89
MW-5	370.80	29.19	341.61	22.02	348.78
MW-6	361.06	21.55	339.51	18.10	342.96
MW-7	362.18	31.60	330.58	27.07	335.11
MW-8	360.55	19.46	341.09	20.01	340.54
MW-9	559.76	56.05	503.71	51.83	507.93
MW-10	568.75	62.47	506.28	55.79	512.96
MW-11	565.11	54.78	510.33	33.13	531.98
MW-12	536.69	49.15	487.54	38.15	498.54
MW-14	520.39	35.44	484.95	28.59	491.80
MW-15	524.90	61.66	463.24	50.18	474.72
MW-16S	517.50	43.80	473.70	41.49	476.01
MW-16D	517.50	16.99	500.51	9.57	507.93
MW-17	458.03	15.78	442.25	11.83	446.20
MW-18S	465.37	23.26	442.11	20.14	445.23
MW-18D	465.37	23.83	441.54	20.40	444.97
MW-19	428.20	26.56	401.64	20.18	408.02
MW-20S	575.34	49.96	525.38	37.50	537.84
MW-20M	575.21	41.81	533.40	41.86	533.35
MW-20D	575.21	54.17	521.04	44.01	531.20
MW-21	426.76	42.18	384.58	30.87	395.89
MW-22	448.57	67.10	381.47	55.17	393.40
MW-23	374.07	33.05	341.02	27.83	346.24
MW-24	375.44	33.15	342.29	28.16	347.28
MW-25	381.73	22.56	359.17	6.32	375.41
MW-26	377.52	NM	--	NM	--
MW-27	362.26	22.45	339.81	16.38	345.88
MW-28	363.96	25.42	338.54	18.88	345.08
MW-29	365.63	24.56	341.07	14.07	351.56
MW-30	364.99	23.59	341.40	16.71	348.28
MW-31S	368.31	24.98	343.33	15.26	353.05
MW-31D	368.31	25.07	343.24	15.34	352.97

Table A-1

Site-Wide Groundwater Levels and Elevation Data

Harley-Davidson Motor Company

Well	Reference Elevation (ft AMSL)	11/06/97 Depth (feet)	11/06/97 Water Level (ft AMSL)	05/05/98 Depth (feet)	05/05/98 Water Level (ft AMSL)
MW-32S	363.46	25.00	338.46	18.46	345.00
MW-32D	363.46	24.67	338.79	18.44	345.02
MW-33	364.94	26.50	338.44	20.03	344.91
MW-34S	362.12	22.42	339.70	17.15	344.97
MW-34D	362.12	23.18	338.94	17.18	344.94
MW-35S	361.58	DRY	<342.6	16.58	345.00
MW-35D	361.59	22.80	338.79	16.62	344.97
MW-36S	372.30	30.38	341.92	22.66	349.64
MW-36D	372.30	30.56	341.74	23.49	348.81
MW-37S	360.83	17.99	342.84	18.02	342.81
MW-37D	360.83	18.64	342.19	19.77	341.06
MW-38S	359.47	19.71	339.76	19.10	340.37
MW-38D	359.48	21.44	338.04	19.91	339.57
MW-39S	361.56	DRY	<337.6	21.29	340.27
MW-39D	361.56	25.93	335.63	22.29	339.27
MW-40S	375.83	35.09	340.74	30.40	345.43
MW-40D	375.83	35.15	340.68	30.42	345.41
MW-41S	426.08	47.67	378.41	33.86	392.22
MW-41D	426.08	36.85	389.23	36.04	390.04
MW-42S	411.39	DRY	<376.4	27.53	383.86
MW-42M	411.39	44.23	367.16	27.64	383.75
MW-42D	411.39	58.81	352.58	42.83	368.56
MW-43S	380.93	38.41	342.52	28.76	352.17
MW-43D	381.31	38.33	342.98	29.87	351.44
MW-44	417.37	47.77	369.60	30.36	387.01
MW-45	361.13	22.07	339.06	17.05	344.08
MW-46	360.25	20.95	339.30	16.05	344.20
MW-47	361.74	25.40	336.34	21.11	340.63
MW-48	362.85	DRY	<339.9	22.05	340.80
MW-49S	363.02	23.11	339.91	17.85	345.17
MW-49D	363.02	22.80	340.22	17.36	345.66
MW-50S	361.72	25.49	335.64	NM	--
MW-50D	361.69	24.58	336.56	NM	--
MW-51S	363.46	30.56	332.90	19.54	343.92
MW-51D	363.86	65.74	298.12	20.27	343.59
MW-52	368.52	19.80	348.72	6.24	362.28
MW-53	368.25	18.79	349.46	6.07	362.18
MW-54	364.98	29.64	335.34	NM	--
MW-55	364.89	29.00	335.89	NM	--
MW-56	373.03	NM	--	20.45	352.58
MW-57	366.02	25.05	340.97	20.06	345.96
MW-59	373.19	31.61	341.58	24.61	348.58
MW-60	369.15	26.25	342.90	18.95	350.20
MW-61S	373.87	34.35	339.52	28.71	345.16
MW-61D	373.87	34.62	339.25	29.47	344.40
MW-62S	371.28	31.52	339.76	26.61	344.67
MW-62D	371.27	31.85	339.42	26.08	345.19
MW-63S	374.95	34.15	340.80	29.39	345.56
MW-63D	374.96	34.15	340.81	29.35	345.61
MW-64S	417.26	DRY	<377.3	30.95	386.31
MW-64D	417.27	64.10	353.17	56.36	360.91
TWB-6	366.76	NM	--	NM	--
WPL-SS-2	363.21	DRY	--	24.28	338.93
WPL-SS-7	361.92	28.64	333.28	25.77	336.15
WPL-SS-8	365.26	DRY	--	24.65	340.61

NM = Not Measured

TABLE A-2

GROUNDWATER QUALITY ANALYSES

KEY MONITORING WELL SAMPLES (July 1, 1997 - June 30, 1998)

VOLATILE ORGANIC COMPOUND AND CYANIDE CONCENTRATIONS

Harley-Davidson Motor Company

Sample ID		MW-2	MW-10	MW-12	MW-17	MW-32S	MW-32D	MW-34S	MW-35D	MW-37S	MW-37D	MW-38S	MW-38D	MW-39D	MW-51S	MW-51D	MW-54	RW-2(Sigler)	Field Blank	Field Blank	Trip Blank	Trip Blank
Lab ID		10096203	10096206	10097301	10096204	10092001	10096202	10092002	10092003	10087201	10087202	10087203	10087204	10087205	10087206	10092004	10097302	10087207	10092006	10096205	10092005	10096201
Sample Date		10/22/97	10/22/97	10/23/97	10/22/97	10/21/97	10/22/97	10/21/97	10/21/97	10/20/97	10/20/97	10/20/97	10/20/97	10/20/97	10/20/97	10/21/97	10/23/97	10/20/97	10/21/97	10/22/97	10/21/97	10/22/97
Parameter	Units																					
1,1,1-TRICHLOROETHANE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	1	260	83	19	15	74	760	2	39	1	1,500	21	1,600	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1,2,2-TETRACHLOROETHANE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1,2-TRICHLOROETHANE	ug/l	N.D.@2	N.D.@10	N.D.@2	N.D.@2	N.D.@20	N.D.@20	N.D.@10	N.D.@10	N.D.@2	N.D.@40	N.D.@2	N.D.@10	N.D.@2	N.D.@100	N.D.@10	N.D.@40	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
1,1-DICHLOROETHANE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	36	48	N.D.@5.0	N.D.@5.0	7	28	1	13	2	54	37	160	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1-DICHLOROETHENE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	78	92	8	8	3	75	N.D.@1	N.D.@5.0	N.D.@1	660	36	1,000	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,2-DICHLOROETHANE	ug/l	N.D.@2	N.D.@10	N.D.@2	N.D.@2	N.D.@20	N.D.@20	N.D.@10	N.D.@10	N.D.@2	N.D.@40	N.D.@2	N.D.@10	N.D.@2	N.D.@100	N.D.@10	N.D.@40	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
1,2-DICHLOROPROPANE	ug/l	N.D.@2	N.D.@10	N.D.@2	N.D.@2	N.D.@20	N.D.@20	N.D.@10	N.D.@10	N.D.@2	N.D.@40	N.D.@2	N.D.@10	N.D.@2	N.D.@100	N.D.@10	N.D.@40	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
2-BUTANONE	ug/l	N.D.@10	N.D.@50	N.D.@10	N.D.@10	N.D.@100	N.D.@100	N.D.@50	N.D.@50	N.D.@10	N.D.@200	N.D.@10	N.D.@50	N.D.@10	N.D.@500	N.D.@50	N.D.@200	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10
2-CHLOROETHYLVINYL ETHER	ug/l	N.D.@5	N.D.@25	N.D.@5	N.D.@5	N.D.@50	N.D.@50	N.D.@25	N.D.@25	N.D.@5	N.D.@100	N.D.@5	N.D.@25	N.D.@5	N.D.@250	N.D.@25	N.D.@100	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5
2-HEXANONE	ug/l	N.D.@5	N.D.@25	N.D.@5	N.D.@5	N.D.@50	N.D.@50	N.D.@25	N.D.@25	N.D.@5	N.D.@100	N.D.@5	N.D.@25	N.D.@5	N.D.@250	N.D.@25	N.D.@100	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5
4-METHYL-2-PENTANONE	ug/l	N.D.@5	N.D.@25	N.D.@5	N.D.@5	N.D.@50	N.D.@50	N.D.@25	N.D.@25	N.D.@5	N.D.@100	N.D.@5	N.D.@25	N.D.@5	N.D.@250	N.D.@25	N.D.@100	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5
ACETONE	ug/l	N.D.@15	N.D.@75	N.D.@15	N.D.@15	N.D.@150	N.D.@150	N.D.@75	N.D.@75	N.D.@15	N.D.@300	N.D.@15	N.D.@75	N.D.@15	N.D.@750	N.D.@75	N.D.@300	N.D.@15	N.D.@15	N.D.@15	N.D.@15	N.D.@15
BENZENE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
BROMODICHLOROMETHANE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
BROMOFORM	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
BROMOMETHANE	ug/l	N.D.@3	N.D.@15	N.D.@3	N.D.@3	N.D.@30	N.D.@30	N.D.@15	N.D.@15	N.D.@3	N.D.@60	N.D.@3	N.D.@15	N.D.@3	N.D.@150	N.D.@15	N.D.@60	N.D.@3	N.D.@3	N.D.@3	N.D.@3	N.D.@3
CARBON DISULFIDE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CARBON TETRACHLORIDE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CHLOROBENZENE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CHLORODIBROMOMETHANE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CHLOROETHANE	ug/l	N.D.@2	N.D.@10	N.D.@2	N.D.@2	N.D.@20	N.D.@20	N.D.@10	N.D.@10	N.D.@2	N.D.@40	N.D.@2	N.D.@10	N.D.@2	N.D.@100	N.D.@10	N.D.@40	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
CHLOROFORM	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CHLOROMETHANE	ug/l	N.D.@3	N.D.@15	N.D.@3	N.D.@3	N.D.@30	N.D.@30	N.D.@15	N.D.@15	N.D.@3	N.D.@60	N.D.@3	N.D.@15	N.D.@3	N.D.@150	N.D.@15	N.D.@60	N.D.@3	N.D.@3	N.D.@3	N.D.@3	N.D.@3
ETHYLBENZENE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
METHYLENE CHLORIDE	ug/l	N.D.@2	N.D.@10	N.D.@2	N.D.@2	N.D.@20	N.D.@20	N.D.@10	N.D.@10	N.D.@2	N.D.@40	N.D.@2	N.D.@10	N.D.@2	N.D.@100	N.D.@10	N.D.@40	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
STYRENE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TETRACHLOROETHENE	ug/l	250	N.D.@5.0	5	3	N.D.@10	78	220	90	280	1,800	N.D.@1	13	3	2,000	60	68	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TOLUENE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TRICHLOROETHENE	ug/l	120	480	320	120	43	1,000	280	280	55	1,700	N.D.@1	220	110	6,200	710	790	5	N.D.@1	N.D.@1	N.D.@1	N.D.@1
VINYL ACETATE	ug/l	N.D.@5	N.D.@25	N.D.@5	N.D.@5	N.D.@50	N.D.@50	N.D.@25	N.D.@25	N.D.@5	N.D.@100	N.D.@5	N.D.@25	N.D.@5	N.D.@250	N.D.@25	N.D.@100	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5
VINYL CHLORIDE	ug/l	N.D.@2	N.D.@10	N.D.@2	N.D.@2	N.D.@20	N.D.@20	N.D.@10	N.D.@10	4	N.D.@40	N.D.@2	10	N.D.@2	N.D.@100	14	N.D.@40	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
XYLENES, TOTAL	ug/l	N.D.@3	N.D.@15	N.D.@3	N.D.@3	N.D.@30	N.D.@30	N.D.@15	N.D.@15	N.D.@3	N.D.@60	N.D.@3	N.D.@15	N.D.@3	N.D.@150	N.D.@15	N.D.@60	N.D.@3	N.D.@3	N.D.@3	N.D.@3	N.D.@3
CIS-1,3-DICHLOROPROPENE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TRANS 1,2-DICHLOROETHENE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TRANS-1,3-DICHLOROPROPENE	ug/l	N.D.@1	N.D.@5.0	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@20	N.D.@1	N.D.@5.0	N.D.@1	N.D.@50	N.D.@5.0	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TOTAL VOCs	ug/l	370	480	325	124	417	1,301	527	393	423	4,363	4	295	116	10,414	878	3,618	5	0	0	0	0
CYANIDE, FREE	mg/l	1.5	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	0.02	N.D.@0.005	N.A.	N.D.@0.005	N.A.	N.A.	N.A.	N.A.
CYANIDE, TOTAL	mg/l	1.5	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	0.02	N.D.@0.005	N.A.	N.D.@0.005	N.A.	N.A.	N.A.	N.A.

N.D.@1- Not detected at indicated concentration.

TABLE A-3

GROUNDWATER QUALITY ANALYSES
EXTRACTION WELL SAMPLES (July 1, 1997 - June 30, 1998)
VOLATILE ORGANIC COMPOUND CONCENTRATIONS

Harley-Davidson Motor Company

Sample ID		CW-1	CW-1	CW-1(dup)	CW-1A	CW-1A(dup)	CW-2	CW-2	CW-3	CW-3	CW-4	CW-4	CW-5	CW-5(dup)	CW-5	CW-6	CW-6	CW-7
Lab ID		10241206	B12606-1	B12606-1	B12606-2	B12606-2	10241207	B12606-3	10241208	B12606-4	10241209	B12606-5	10241210	10241210	B12606-6	10241301	B12606-7	10241302
Sample Date		12/02/97	6/02/98	6/02/98	6/02/98	6/02/98	12/02/97	6/02/98	12/02/97	6/02/98	12/02/97	6/02/98	12/02/97	12/02/97	6/02/98	12/02/97	6/02/98	12/02/97
Parameter	Units																	
1,1,1-TRICHLOROETHANE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
1,1,2,2-TETRACHLOROETHANE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
1,1,2-TRICHLOROETHANE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
1,1-DICHLOROETHANE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
1,1-DICHLOROETHENE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
1,2-DICHLOROETHANE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
1,2-DICHLOROPROPANE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
1,3-DICHLOROPROPYLENE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
2-CHLOROETHYLVINYL ETHER	ug/l	N.D.@50	N.D.@50	N.D.@50	N.D.@200	N.D.@200	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@100	N.D.@100	N.D.@10	N.D.@10	N.D.@10	N.D.@50	N.D.@100	N.D.@50
BENZENE	ug/l	N.D.@10	N.D.@10	N.D.@10	N.D.@40	N.D.@40	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@20	N.D.@20	N.D.@2	N.D.@2	N.D.@2	N.D.@10	N.D.@20	N.D.@10
BROMOFORM	ug/l	N.D.@10	N.D.@10	N.D.@10	N.D.@40	N.D.@40	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@20	N.D.@20	N.D.@2	N.D.@2	N.D.@2	N.D.@10	N.D.@20	N.D.@10
CARBON TETRACHLORIDE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
CHLOROBENZENE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
CHLOROETHANE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
CHLOROFORM	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
DIBROMOCHLOROMETHANE	ug/l	N.D.@10	N.D.@10	N.D.@10	N.D.@40	N.D.@40	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@20	N.D.@20	N.D.@2	N.D.@2	N.D.@2	N.D.@10	N.D.@20	N.D.@10
DICHLOROBROMOMETHANE	ug/l	N.D.@10	N.D.@10	N.D.@10	N.D.@40	N.D.@40	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@20	N.D.@20	N.D.@2	N.D.@2	N.D.@2	N.D.@10	N.D.@20	N.D.@10
ETHYLBENZENE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
METHYL BROMIDE	ug/l	N.D.@25	N.D.@25	N.D.@25	N.D.@100	N.D.@100	N.D.@25	N.D.@25	N.D.@25	N.D.@25	N.D.@50	N.D.@50	N.D.@5	N.D.@5	N.D.@5	N.D.@25	N.D.@50	N.D.@25
METHYL CHLORIDE	ug/l	N.D.@25	N.D.@25	N.D.@25	N.D.@100	N.D.@100	N.D.@25	N.D.@25	N.D.@25	N.D.@25	N.D.@50	N.D.@50	N.D.@5	N.D.@5	N.D.@5	N.D.@25	N.D.@50	N.D.@25
METHYLENE CHLORIDE	ug/l	N.D.@10	N.D.@10	N.D.@10	N.D.@40	N.D.@40	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@20	N.D.@20	N.D.@2	N.D.@2	N.D.@2	N.D.@10	N.D.@20	N.D.@10
TETRACHLOROETHENE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	8	7	2.7	120	11	N.D.@5.0
TOLUENE	ug/l	N.D.@10	N.D.@10	N.D.@10	N.D.@40	N.D.@40	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@20	N.D.@20	N.D.@2	N.D.@2	N.D.@2	N.D.@10	N.D.@20	N.D.@10
TRICHLOROETHENE	ug/l	150	120	110	220	220	72	81	200	180	160	130	29	28	6.7	120	71	160
VINYL CHLORIDE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
TRANS 1,2-DICHLOROETHENE	ug/l	N.D.@5.0	N.D.@5	N.D.@5	N.D.@20	N.D.@20	N.D.@5.0	N.D.@5	N.D.@5.0	N.D.@5	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@1	N.D.@5.0	N.D.@10	N.D.@5.0
TOTAL VOCs	ug/l	150	120	110	220	220	72	81	200	180	160	130	37	35	9.4	240	82	160

N.D.@1 - Not detected at indicated concentration.

TABLE A-3

GROUNDWATER QUALITY ANALYSES
EXTRACTION WELL SAMPLES (July 1, 1997 - June 30, 1998)
VOLATILE ORGANIC COMPOUND CONCENTRATIONS

Harley-Davidson Motor Company

Sample ID		CW-7	CW-7A	CW-8	CW-8	CW-9	CW-9(dup)	CW-9	CW-13	CW-13	CW-15A	CW-15A	CW-16	CW-16	CW-17	CW-17
Lab ID		B12606-8	B12606-9	10241303	B12606-10	10241306	10241306	B12605-1	10241307	B12605-2	10241305	B12606-12	10241304	B12606-11	10241308	B12605-3
Sample Date		6/02/98	6/02/98	12/02/97	6/02/98	12/02/97	12/02/97	6/02/98	12/02/97	6/02/98	12/02/97	6/02/98	12/02/97	6/02/98	12/02/97	6/02/98
Parameter	Units															
1,1,1-TRICHLOROETHANE	ug/l	N.D.@10	N.D.@100	53	N.D.@20	130	120	160	170	170	21,000	15,000	54	N.D.@50	150	91
1,1,2,2-TETRACHLOROETHANE	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@1000	N.D.@1000	N.D.@50	N.D.@50	N.D.@20	N.D.@50
1,1,2-TRICHLOROETHANE	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@1000	N.D.@1000	N.D.@50	N.D.@50	N.D.@20	N.D.@50
1,1-DICHLOROETHANE	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@1000	N.D.@1000	N.D.@50	N.D.@50	N.D.@20	N.D.@50
1,1-DICHLOROETHENE	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	56	N.D.@50	3,500	2,100	N.D.@50	N.D.@50	75	N.D.@50
1,2-DICHLOROETHANE	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@1000	N.D.@1000	N.D.@50	N.D.@50	N.D.@20	N.D.@50
1,2-DICHLOROPROPANE	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@1000	N.D.@1000	N.D.@50	N.D.@50	N.D.@20	N.D.@50
1,3-DICHLOROPROPYLENE	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@1000	N.D.@1000	N.D.@50	N.D.@50	N.D.@20	N.D.@50
2-CHLOROETHYLVINYL ETHER	ug/l	N.D.@100	N.D.@1000	N.D.@200	N.D.@200	N.D.@500	N.D.@500	N.D.@500	N.D.@500	N.D.@500	N.D.@10000	N.D.@10000	N.D.@500	N.D.@500	N.D.@200	N.D.@500
BENZENE	ug/l	N.D.@20	N.D.@200	N.D.@40	N.D.@40	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@2000	N.D.@2000	N.D.@100	N.D.@100	N.D.@40	N.D.@100
BROMOFORM	ug/l	N.D.@20	N.D.@200	N.D.@40	N.D.@40	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@2000	N.D.@2000	N.D.@100	N.D.@100	N.D.@40	N.D.@100
CARBON TETRACHLORIDE	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@1000	N.D.@1000	N.D.@50	N.D.@50	N.D.@20	N.D.@50
CHLOROBENZENE	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@1000	N.D.@1000	N.D.@50	N.D.@50	N.D.@20	N.D.@50
CHLOROETHANE	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@1000	N.D.@1000	N.D.@50	N.D.@50	N.D.@20	N.D.@50
CHLOROFORM	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@1000	N.D.@1000	N.D.@50	N.D.@50	N.D.@20	N.D.@50
DIBROMOCHLOROMETHANE	ug/l	N.D.@20	N.D.@200	N.D.@40	N.D.@40	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@2000	N.D.@2000	N.D.@100	N.D.@100	N.D.@40	N.D.@100
DICHLOROBROMOMETHANE	ug/l	N.D.@20	N.D.@200	N.D.@40	N.D.@40	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@2000	N.D.@2000	N.D.@100	N.D.@100	N.D.@40	N.D.@100
ETHYLBENZENE	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@1000	N.D.@1000	N.D.@50	N.D.@50	N.D.@20	N.D.@50
METHYL BROMIDE	ug/l	N.D.@50	N.D.@500	N.D.@100	N.D.@100	N.D.@250	N.D.@250	N.D.@250	N.D.@250	N.D.@250	N.D.@5000	N.D.@5000	N.D.@250	N.D.@250	N.D.@100	N.D.@250
METHYL CHLORIDE	ug/l	N.D.@50	N.D.@500	N.D.@100	N.D.@100	N.D.@250	N.D.@250	N.D.@250	N.D.@250	N.D.@250	N.D.@5000	N.D.@5000	N.D.@250	N.D.@250	N.D.@100	N.D.@250
METHYLENE CHLORIDE	ug/l	N.D.@20	N.D.@200	N.D.@40	N.D.@40	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@2000	N.D.@2000	N.D.@100	N.D.@100	N.D.@40	N.D.@100
TETRACHLOROETHENE	ug/l	N.D.@10	N.D.@100	72	34	1,300	1,300	1,800	290	420	2,900	1,500	56	70	180	170
TOLUENE	ug/l	N.D.@20	N.D.@200	N.D.@40	N.D.@40	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@2000	N.D.@2000	N.D.@100	N.D.@100	N.D.@40	N.D.@100
TRICHLOROETHENE	ug/l	79	1,100	530	490	370	350	1,100	1,900	2,000	29,000	19,000	740	860	810	750
VINYL CHLORIDE	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@1000	N.D.@1000	N.D.@50	N.D.@50	N.D.@20	N.D.@50
TRANS 1,2-DICHLOROETHENE	ug/l	N.D.@10	N.D.@100	N.D.@20	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@1000	N.D.@1000	N.D.@50	N.D.@50	N.D.@20	N.D.@50
TOTAL VOCs	ug/l	79	1,100	655	524	1,800	1,770	3,060	2,416	2,590	56,400	37,600	850	930	1,215	1,011

N.D.@1 - Not detected at indicated concentration.

TABLE A-4
WATER QUALITY ANALYSES
PACKED TOWER AERATOR SAMPLES (July 1, 1997 - June 30, 1998)
VOLATILE ORGANIC COMPOUND CONCENTRATIONS

Harley - Davidson Motor Company

Sample ID		PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.
Lab ID		9777001	9814801	9857802	9906001	9940702	9987901	10056802	10102501	10156202	10200201	10260502	10331001	10413202
Sample Date		07/10/97	07/24/97	08/07/97	08/21/97	09/04/97	09/18/97	10/09/97	10/23/97	11/06/97	11/20/97	12/04/97	12/18/97	01/08/98
Parameter	Units													
1,1,1-TRICHLOROETHANE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1-DICHLOROETHANE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1-DICHLOROETHENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,2-DICHLOROETHANE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CHLOROBENZENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CHLOROFORM	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	6.2	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
DICHLOROBROMOMETHANE	ug/l	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
TETRACHLOROETHENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	2.5	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TRICHLOROETHENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	3.2	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
VINYL CHLORIDE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TRANS 1,2-DICHLOROETHENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TOTAL VOCs	ug/l	0	0	0	0	0	0	0	11.9	0	0	0	0	0

Sample ID		PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.(dup)	PTA Effl.	PTA Effl.	PTA Effl.(dup)	PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.	PTA Effl.
Lab ID		10477801	B0546802	B0632601	B0702202	B0702202	B0794701	B0925502	B0925502	B1031701	B11072-2	B12080-1	B12605-10	B13541-1
Sample Date		1/21/98	2/3/98	2/18/98	3/3/98	3/3/98	3/17/98	4/7/98	4/7/98	4/23/98	05/05/98	05/22/98	06/02/98	06/16/98
Parameter	Units													
1,1,1-TRICHLOROETHANE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1-DICHLOROETHANE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1-DICHLOROETHENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,2-DICHLOROETHANE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CHLOROBENZENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CHLOROFORM	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
DICHLOROBROMOMETHANE	ug/l	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
TETRACHLOROETHENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TRICHLOROETHENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
VINYL CHLORIDE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TRANS 1,2-DICHLOROETHENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TOTAL VOCs	ug/l	0	0	0	0	0	0	0	0	0	0	0	0	0

Sample ID		PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.(dup)	PTA Infl.	PTA Infl.(dup)	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.
Lab ID		9777002	9857801	9940701	10056801	10156201	10156201	10260501	10260501	10413201	B0546801	B0702201	B0925501	B11072-1	B12605-9
Sample Date		07/10/97	08/07/97	09/04/97	10/09/97	11/06/97	11/06/97	12/04/97	12/04/97	01/08/98	02/03/98	03/03/98	04/07/98	05/05/98	06/02/98
Parameter	Units														
1,1,1-TRICHLOROETHANE	ug/l	350	460	410	380	370	355	170	170	350	260	470	100	590	550
1,1-DICHLOROETHANE	ug/l	N.D.@50	N.D.@50	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
1,1-DICHLOROETHENE	ug/l	78	70	100	95	85	76	N.D.@50	N.D.@50	67	56	66	N.D.@50	99	75
1,2-DICHLOROETHANE	ug/l	N.D.@50	N.D.@50	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
CHLOROBENZENE	ug/l	N.D.@50	N.D.@50	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
CHLOROFORM	ug/l	N.D.@50	N.D.@50	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
DICHLOROBROMOMETHANE	ug/l	N.D.@100	N.D.@100	N.D.@40	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100
TETRACHLOROETHENE	ug/l	250	590	630	630	190	172	300	320	370	290	370	410	680	720
TRICHLOROETHENE	ug/l	1600	1500	1600	1300	1300	1270	960	970	1200	1100	1400	1100	2000	1800
VINYL CHLORIDE	ug/l	N.D.@50	N.D.@50	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
TRANS 1,2-DICHLOROETHENE	ug/l	N.D.@50	N.D.@50	N.D.@20	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
TOTAL VOCs	ug/l	2278	2620	2740	2405	1945	1873	1430	1460	1987	1706	2306	1610	3369	3145

N.D.@1 - Not detected at indicated concentration.

TABLE A-5
GROUNDWATER QUALITY ANALYSES
OFF-SITE SAMPLES (July 1, 1997 - June 30, 1998)
VOLATILE ORGANIC COMPOUND AND CYANIDE CONCENTRATIONS
Harley - Davidson Motor Company

Sample ID		RW-4 (FOLK)				RW-5 (GIAMBALVO)				S-6 (TATE-formerly Hollinger)				S-7 (HERMANN-formerly Hunter)				Trip Blank			
Lab ID		9940706	10241203	B07022-5	B12605-6	9940707	10241204	B07022-6	B12605-7	9940704	10241201	B07022-3	B12605-4	9940705	10241202	B07022-4	B12605-5	9940703	10241205	B07022-7	B12605-8
Sample Date		09/04/97	12/02/97	03/03/98	06/02/98	09/04/97	12/02/97	03/03/98	06/02/98	09/04/97	12/02/97	03/03/98	06/02/98	09/04/97	12/02/97	03/03/98	06/02/98	09/04/97	12/02/97	03/03/98	06/02/98
Parameter	Units																				
1,1,1-TRICHLOROETHANE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1,2,2-TETRACHLOROETHANE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1,2-TRICHLOROETHANE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1-DICHLOROETHANE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1-DICHLOROETHENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,2-DICHLOROETHANE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,2-DICHLOROPROPANE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,3-DICHLOROPROPYLENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
2-CHLOROETHYLVINYL ETHER	ug/l	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10
BENZENE	ug/l	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
BROMOFORM	ug/l	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
CARBON TETRACHLORIDE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CHLOROBENZENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CHLOROETHANE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CHLOROFORM	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	4 B	4.1	5.2	9.7	1.4 B	1.8	N.D.@1	2.8	1.2	N.D.@1	N.D.@1	N.D.@1
DIBROMOCHLOROMETHANE	ug/l	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
DICHLOROBROMOMETHANE	ug/l	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
ETHYLBENZENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
METHYL BROMIDE	ug/l	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5
METHYL CHLORIDE	ug/l	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5
METHYLENE CHLORIDE	ug/l	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
TETRACHLOROETHENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	1.2	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TOLUENE	ug/l	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
TRICHLOROETHENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	5.1	2.8	1.7	1.3	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
VINYL CHLORIDE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TRANS 1,2-DICHLOROETHENE	ug/l	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TOTAL VOCs	ug/l	0	0	0	0	6.3	2.8	1.7	1.3	4	4.1	5.2	9.7	1.4	1.8	0	2.8	1.2	0	0	0
CYANIDE, FREE	mg/l	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	0.009	N.D.@0.005	N.D.@0.005	N.A.	N.A.	N.A.	N.A.
CYANIDE, TOTAL	mg/l	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.D.@0.005	0.009	N.D.@0.005	N.D.@0.005	N.A.	N.A.	N.A.	N.A.

N.D.@1 - Not detected at indicated concentration.
B - Analyte detected in associated trip blank.

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

HARLEY-DAVIDSON MOTOR COMPANY

SELECTED VOC CHEMISTRY
JULY 1, 1997 THROUGH JUNE 30, 1998

drawn RAM	checked BDS	approved SMS	plate
date 08/28/98	date 8-28-98	date 11/16/98	1
job no. 01-1408-00-1618-101		file no. 01618-001-D	

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