GROUNDWATER EXTRACTION AND TREATMENT SYSTEM ANNUAL OPERATIONS REPORT FOR THE PERIOD JULY 1, 1996, THROUGH JUNE 30, 1997

R.E. Wright Project 7739-104

Prepared for

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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
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, 1996, through June 30, 1997), 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, 1997, the groundwater pumping rate increased to an average of 265 gpm and VOC loadings increased to 12 pounds per day. R.E. Wright Inc. (R.E. Wright) estimates that during the time period from November 1990 through June 1997, approximately 15,500 pounds of VOCs have been removed by the groundwater treatment system. The total amount of groundwater extracted during the report period was approximately 157 million gallons. This volume is 8% greater than the amount reported in the previous year's report (7/95 - 6/96).

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 2,260 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 two effluent samples.

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 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 during the report period in comparison to the previous report period. VOC concentrations have decreased during the report period in all WPL extraction wells.

Off-site sampling of local water supplies (wells and springs) indicate the presence of VOCs in all sampling locations except RW-4. The three other off-site sampling locations contained trace concentrations (less than 10 μg/l) of various VOC compounds (chloroform, methylene chloride, PCE, and TCE). RW-5 was the only sampling location where the MCL was exceeded for an individual VOC.

1.0 INTRODUCTION

The purpose of this report is to summarize the operating record for the 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, 1996, through June 30, 1997.

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 3 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 under a "friendly order" agreement with the Pennsylvania Department of Environmental Protection (DEP), dated September 11, 1990. In November 1990, 10 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 R.E. Wright, 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 R.E. Wright'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 4, 1996, and April 30, 1997). 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 4, 1996.

In comparison to the April 1997 water levels, the November 1996 water table was approximately 1 foot lower in the TCA Tank Area, within approximately 1 to 2 feet difference in the WPL Area, and within 6 feet difference in the NPBA Area under pumping conditions. The difference in water levels at most of the remaining portions of the site were generally less than 3 feet.

The November 1996 groundwater table at the NPBA was generally higher in comparison to that presented in the previous annual report. The November 1996 measurement data represents higher pumping water table conditions for the reasons described in Section 5.2 of this report.

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 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 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 July 15 and 19, 1996, are presented on Table A-2.

Analytical results of two rounds (December 1995 and June 1996) 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 in the following paragraphs.

The predominant VOC specis at the NPBA are TCE and PCE. Previous reports discuss the 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 decreased since then. The compounds TCE and degradation products decreased 20 percent from October 1995 to July 1996. 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 concentration at RW-2 decreased considerably relative to the previous report period (from 50 μg/l of TCE in October 1995 to 5 μg/l in July 1996). 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.

This information, combined with groundwater chemistry from the nine active groundwater extraction wells, show significant improvement to the general water quality in the NPBA areas as a result of the groundwater extraction effort. All extraction wells appear to have reached asymtotic levels or show consistent downward trends over the last few years.

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 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 of unknown location(s), which now dominate the TVOCs in extraction wells and monitoring wells. The TVOC concentrations at MW-32S and MW-32D are similar compared to the previous report period concentrations. At well MW-34S, the TVOC concentrations have remained fairly consistent over the last three years. Monitoring well MW-35D has consistently shown a downward trend in TVOC concentrations since it was first monitored in 1989. Similarly, TVOC concentrations at MW-54 have decreased since it was first sampled in 1994.

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

TVOC concentrations in MW-37S continue to reduce and are less than 10 percent of the original concentrations prior to pumping. MW-37D concentrations have continued to increase, suggesting the possibility of a nearby source.

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 during the current report period.

The predominant VOC at monitoring wells MW-39S and MW-39D is TCE. The TVOC concentration at MW-39S have continued to decrease since 1992, and continue to fluctuate at MW-39D.

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

Two other key wells which monitor groundwater quality at the site (MW-2 and MW-17) are located toward the eastern portion of the Harley-Davidson property. The TVOC concentrations at MW-2 have generally decreased since 1986, but have slightly increased during the current report period. The predominant VOCs detected in MW-2 samples are PCE and TCE. Cyanide was also detected in the MW-2 sample at 1.7 milligrams per liter (mg/l). Monitoring well MW-17 was sampled during the current report period. This well had not been sampled for several years, so a current groundwater quality trend cannot be established. With reference to samples taken prior to 1994, the concentrations show a geneal downward trend. The predominant VOC at MW-17 is TCE.

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 R.E. Wright 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 15,500 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 265 gpm with 12 pounds per day of total VOCs being removed.

The total amount of groundwater extracted during the report period was approximately 157 million gallons (429,000 gallons per day [gpd]; 298 gpm). This extraction rate is slightly (8 percent) greater than during the previous report period (7/95 - 6/96) where approximately 146 million gallons were extracted (399,000 gpd; 277 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 total VOC concentration increased to 4,600 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 2,260 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 23 of the 25 samples. Trace concentrations of VOCs were detected in the May 22, 1997, and June 4, 1997, samples. The presence of VOCs in these effluent samples is believed to be related to maintenance performed on one of the PTA acid wash valves. The PTA sump was subsequently cleaned to remove any VOCs in the PTA effluent water. The VOC concentrations in the two PTA effluent samples collected after the PTA sump cleaning 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. Over 76 million gallons of groundwater were extracted from the NPBA from start-up of the system through June 30, 1997. This extraction system, during the current report period, removed approximately 9 million gallons of groundwater at an average rate of 748,000 gallons per month, or 17 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 4, 1996. Groundwater contours indicate a trough of depression on the groundwater surface which demonstrates capture of local groundwater and prevention of off-site migration.

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 elevation. During the

November 1996 measurement round, water levels were maintained near the design drawdown levels (within five feet), except in four of the nine wells. The April 1997 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. Despite the exceedance of design levels, groundwater table depression as shown on the groundwater contour map (Figure 4) indicates capture was maintained.

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 R.E. Wright 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 on Appendix Tables A-2 and A-3. VOC concentrations have remained fairly constant or have decreased slightly during the report period in each well, except in CW-1A, which experienced a slight increase.

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 61 million gallons of groundwater were extracted from the TCA Tank Area during the report period, averaging approximately 5.1 million gallons per month (117 gpm). The total amount of groundwater extracted during the previous report period was approximately 72 million gallons. The decreases were split evenly between CW-8 and CW-16. The low production from CW-16 in July 1996 was due to deactivation for several days for repairs.

Groundwater elevations for the report period are presented in Table A-1 of Appendix A. The site-wide groundwater contour map (Figure 4) illustrates the cone of depression created by the TCA groundwater extraction wells. Table 3 demonstrates that designed drawdown was achieved in the TCA extraction wells. 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.

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 123,000 to 195,000 gallons. CW-16 has maintained a pumping rate during the report period between 24,000 (excluding the July 1996 data when the pumping system was down for several days) and 36,000 gallons per day (gpd). Pumpage from CW-8 and CW-16 has averaged approximately 4.2 and 0.9 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.

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 significantly during the report period relative to the previous year's concentrations. The VOC concentrations at CW-16, as shown on Figure 18, also decreased and are approximately 33 percent higher than CW-8. 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 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 a 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 became non-operational due to excessive sediment buildup in the well. 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.

7.2 Groundwater Extraction

Since start-up of the WPL groundwater extraction system in May 1994, approximately 200 million gallons of groundwater have been removed through June 30, 1997. The average withdrawal rate during the report period was approximately 6.7 million gallons per month, or approximately 153 gpm with a total amount of approximately 80 million gallons. The total amount of groundwater extracted during the previous report period was approximately 63 million gallons. The primary reason for the lower extraction volume experienced during the previous report period was due to operational difficulties with the TFO during much of March 1996 which necessitated deactivating all of the WPL wells. 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 1996 and April 1997 measurement rounds. Both measurement rounds demonstrate that groundwater levels were within the design limit, except for CW-9 during the April measurement which was three feet above the designed upper limit.

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. The CW-13 pumping system was replaced in February 1997, and maintenance was performed on CW-9 in June 1997. The CW-15A pumping system has experienced a gradual reduction in groundwater pumpage due to sediment build-up in the well; however, the desired drawdown has been maintained. The sediment accumulation in CW-15A will continue to be monitored and addressed, if necessary, to maintain the desired groundwater drawdown and capture area.

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 species 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. Overall, VOC concentrations have decreased over the past year in extraction wells CW-9, CW-13, CW-15A, and CW-17. 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.

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.

Several attempts were made to sample the well at the quarry on Sand Bank Road (RW-6), which has been part of the off-site sampling program. The quarry is no longer active and, the gate to the property has been locked. Consequently, no samples have been obtained during the report period from RW-6.

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. VOCs were detected in samples collected from the RW-5, S-6, and S-7 samples. No VOCs were detected in the RW-4 sample.

In the four RW-5 samples, PCE and TCE were detected. The maximum contaminant level (MCL) for TCE (5 μg/l) was exceeded in two of the four samples. 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 2 to 4 μg/l. The MCL for chloroform is 100 μg/l.

Two of the four S-7 samples contained trace concentrations of VOCs. The March 1997 sample contained 2 μg/l of methylene chloride (MCL is 5 μg/l), while the June 1997 sample contained 1 μg/l of chloroform.

A trip blank sample accompanied each set of off-site samples to help assure a measure of quality control. VOCs were detected in one of the four (December 1996) trip blanks. 1,2-dichloroethane (77 μg/l) and chloroform (2 μg/l) were detected in the December 1996 trip blank. According to EPA data validation procedures, associated samples with detected concentrations of these analytes (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 sample was a chloroform result for S-6 during the December 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. R.E. Wright feels 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.

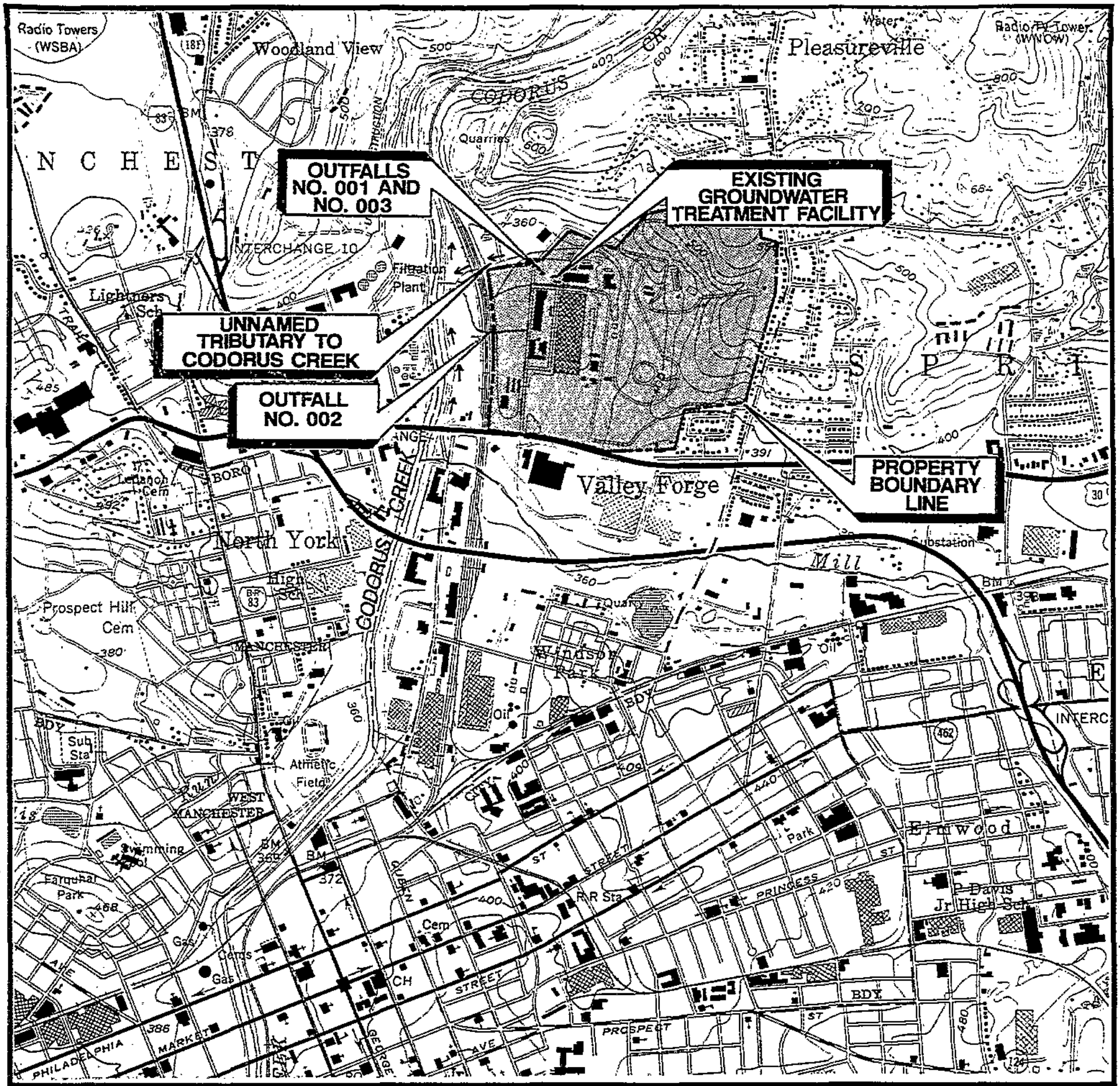
R.E. Wright's February 1995 operations report recommended an "effort be made to locate a source of VOCs near CW-1A and CW-7A, and if appropriate, initiate enhanced remediation." The upcoming site-wide remedial investigation/feasibility study (RI/FS) Work Plan includes investigations in this area.

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.*

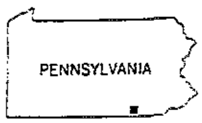
FIGURES



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; checked MCM; date 1/7/93	drawing no. 92548-003-AA

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

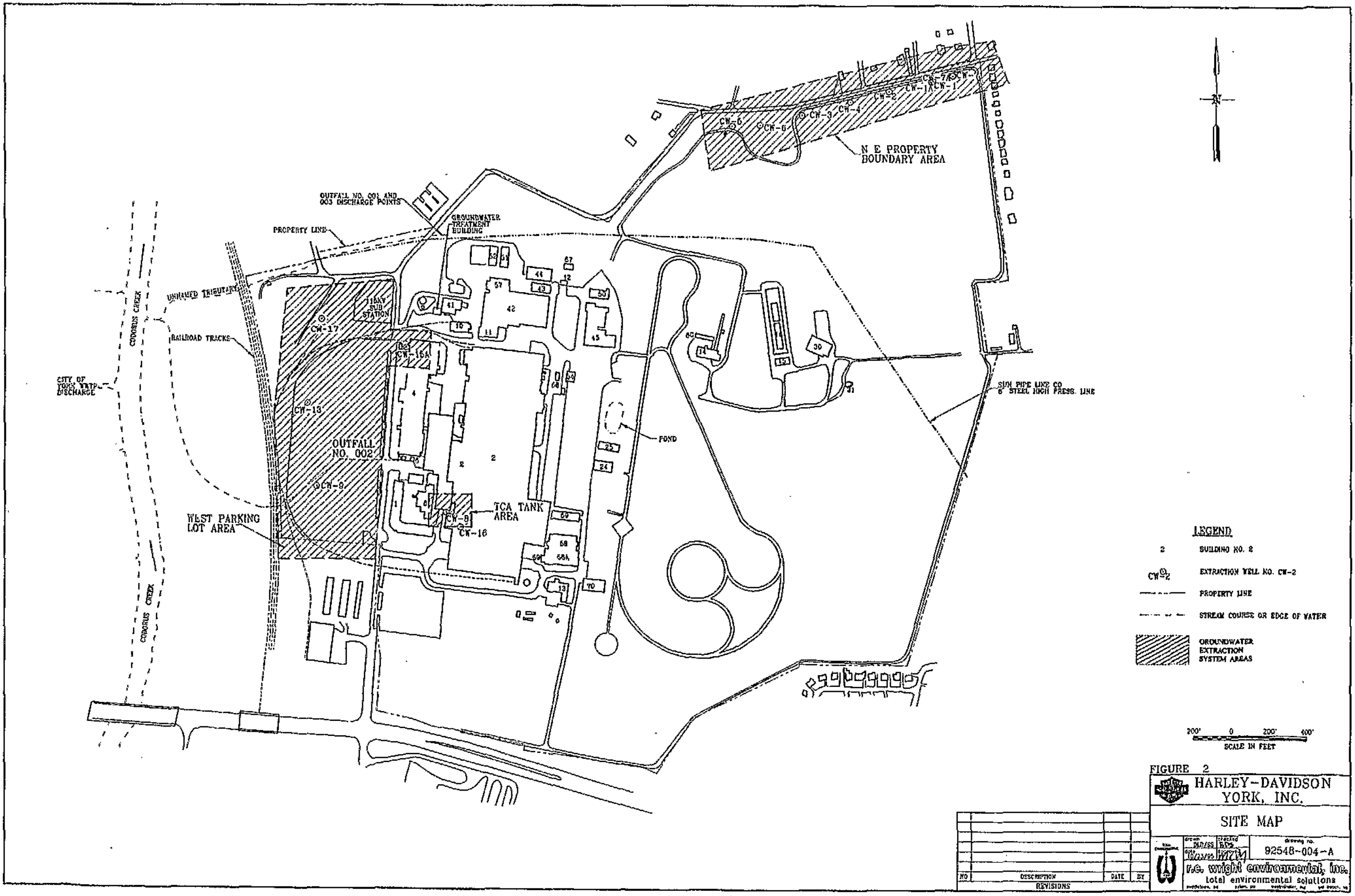


FIGURE 2

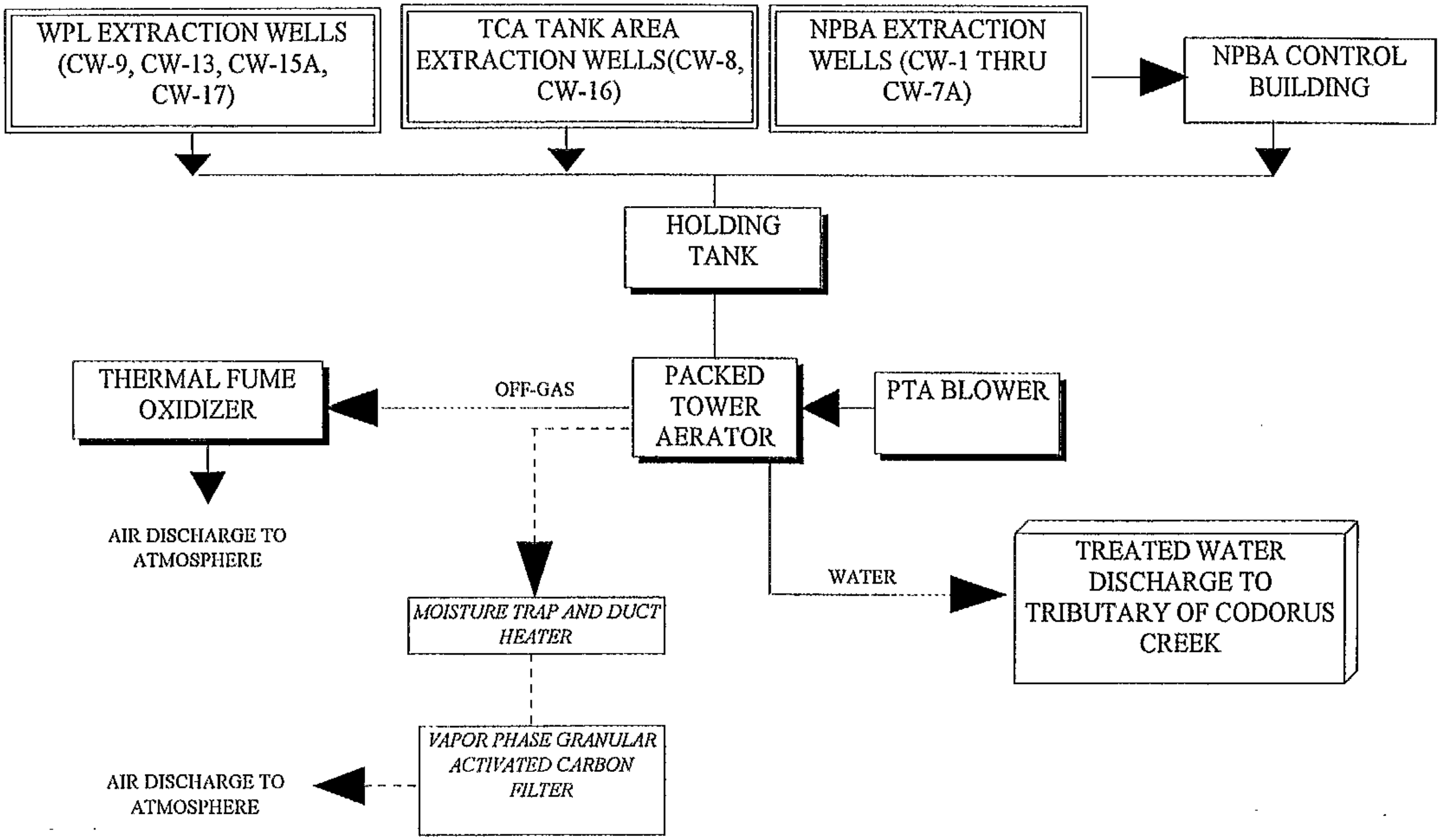
HARLEY-DAVIDSON
YORK, INC.

SITE MAP

drawn DLB/SS | checked | date 10/23/95 | drawing no. 92548-004-A

r.e. wright environmental, inc.
total environmental solutions

FIGURE 3
GROUNDWATER TREATMENT SYSTEM
Harley - Davidson Motor Company



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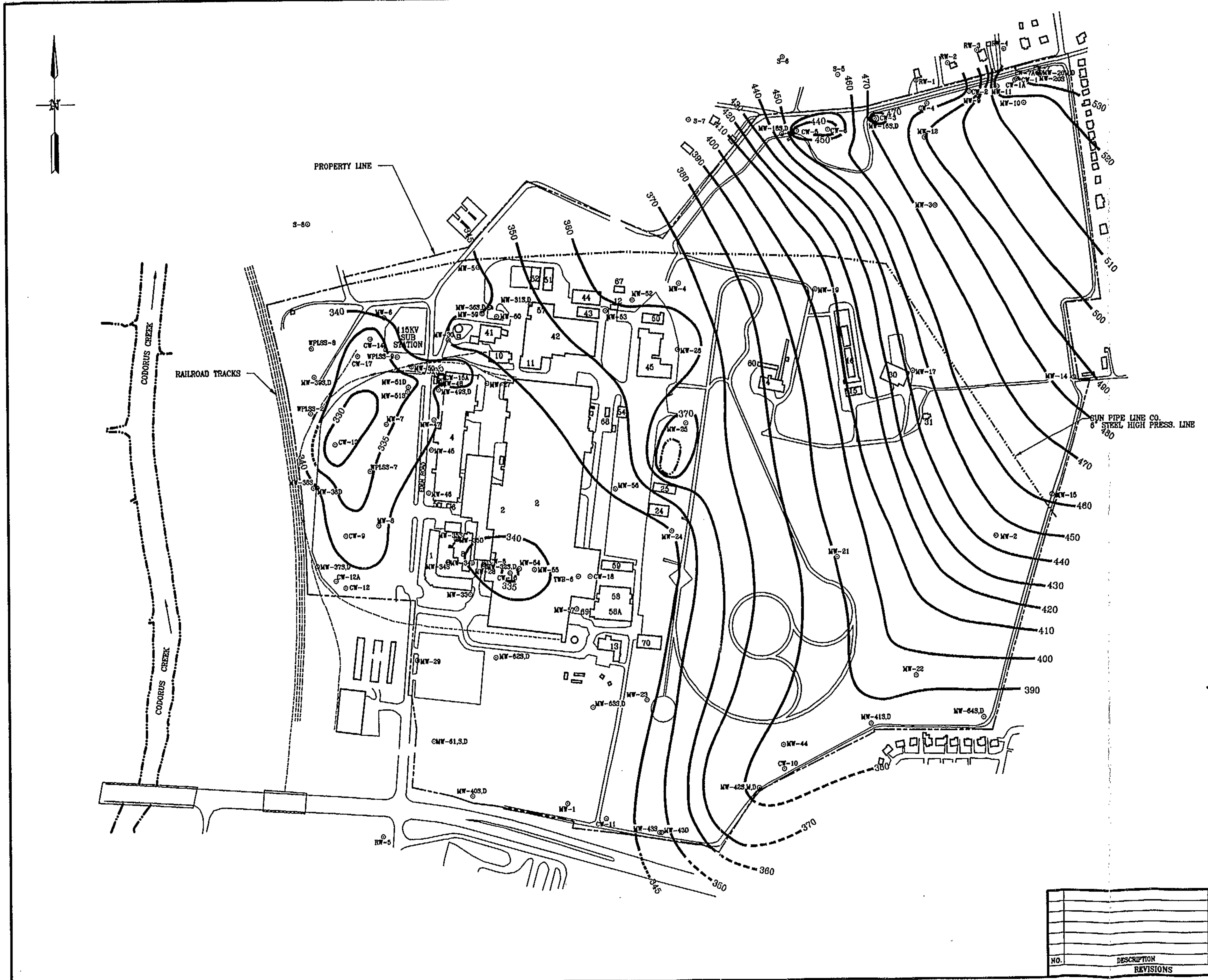


11/4/96 GROUNDWATER SURFACE ELEVATIONS, AND APPROXIMATE DAILY PUMPING RATES FROM "CW" WELLS

HARLEY-DAVIDSON MOTOR COMPANY

WELL ID	ELEVATION *	PUMPAGE **	WELL ID	ELEVATION *
CW-1	NM	3,800	MW-24	344.58
CW-1A	505.98	90	MW-25	371.96
CW-2	481.39	600	MW-26	354.28
CW-3	453.89	7,700	MW-27	342.55
CW-4	476.28	3,300	MW-28	340.45
CW-5	430.85	2,600	MW-29	343.65
CW-6	435.83	4,400	MW-30	345.09
CW-7	488.86	800	MW-31S	348.93
CW-7A	532.68	5	MW-32S	340.41
CW-8	338.50	130,000	MW-33	340.57
CW-9	335.57	63,000	MW-34S	340.59
CW-10	384.02	NO	MW-35S	<342.5
CW-11	342.85	NO	MW-36S	345.49
CW-12	340.85	NO	MW-37S	342.29
CW-12A	340.93	NO	MW-38S	340.31
CW-13	326.08	91,000	MW-39S	339.20
CW-14	333.31	NO	MW-40S	342.73
CW-15	340.21	NO	MW-41S	388.78
CW-15A	334.30	4,300	MW-42S	383.94
CW-16	332.12	36,000	MW-43S	349.22
CW-17	333.22	72,000	MW-44	386.78
CW-18	344.00	NO	MW-45	340.99
MW-1	342.80		MW-46	340.88
MW-2	446.11		MW-47	338.87
MW-3	478.16		MW-48	<340.5
MW-4	366.48		MW-49S	342.99
MW-5	345.05		MW-50S	338.76
MW-6	340.72		MW-51S	334.83
MW-7	333.60		MW-53	358.86
MW-8	339.45		MW-54	339.07
MW-9	507.97		MW-55	339.36
MW-10	516.89		MW-56	348.47
MW-11	521.99		MW-57	343.36
MW-12	494.33		MW-59	345.04
MW-14	489.34		MW-60	346.58
MW-15	464.26		MW-61S	342.63
MW-16S	476.09		MW-62S	342.54
MW-17	445.43		MW-63S	342.90
MW-18S	448.91		MW-64S	384.34
MW-19	405.91		TWB-6	343.98
MW-20S	533.08		WPL-SS-2	338.59
MW-21	391.80		WPL-SS-7	335.21
MW-22	391.04		WPL-SS-8	339.45
MW-23	343.59			

NOTES:
* Elevation in feet above Mean Sea Level.
** Approximate pumpage, in gallons per day.
NO = not operational.
NM = not measured.
"<" = Elevation less than reported value because well was dry at time of water level measurement.

LEGEND

370 — GROUNDWATER ELEVATION CONTOUR LINE; DASHED WHERE INFERRED (CONTOUR INTERVAL VARIABLE).

200' 0 200' 400'
SCALE IN FEET

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

HARLEY-DAVIDSON INC.

GROUNDWATER ELEVATION CONTOUR MAP - NOV. 4, 1996

drawn RAM	checked BDS	approved SMS	figure no. 4
date 04/24/98	date 7-24-98	date 7-24-98	
job no. 01-1408-05-7739-104		file no. 57739-001-D	

SAIC An Employee Owned Company

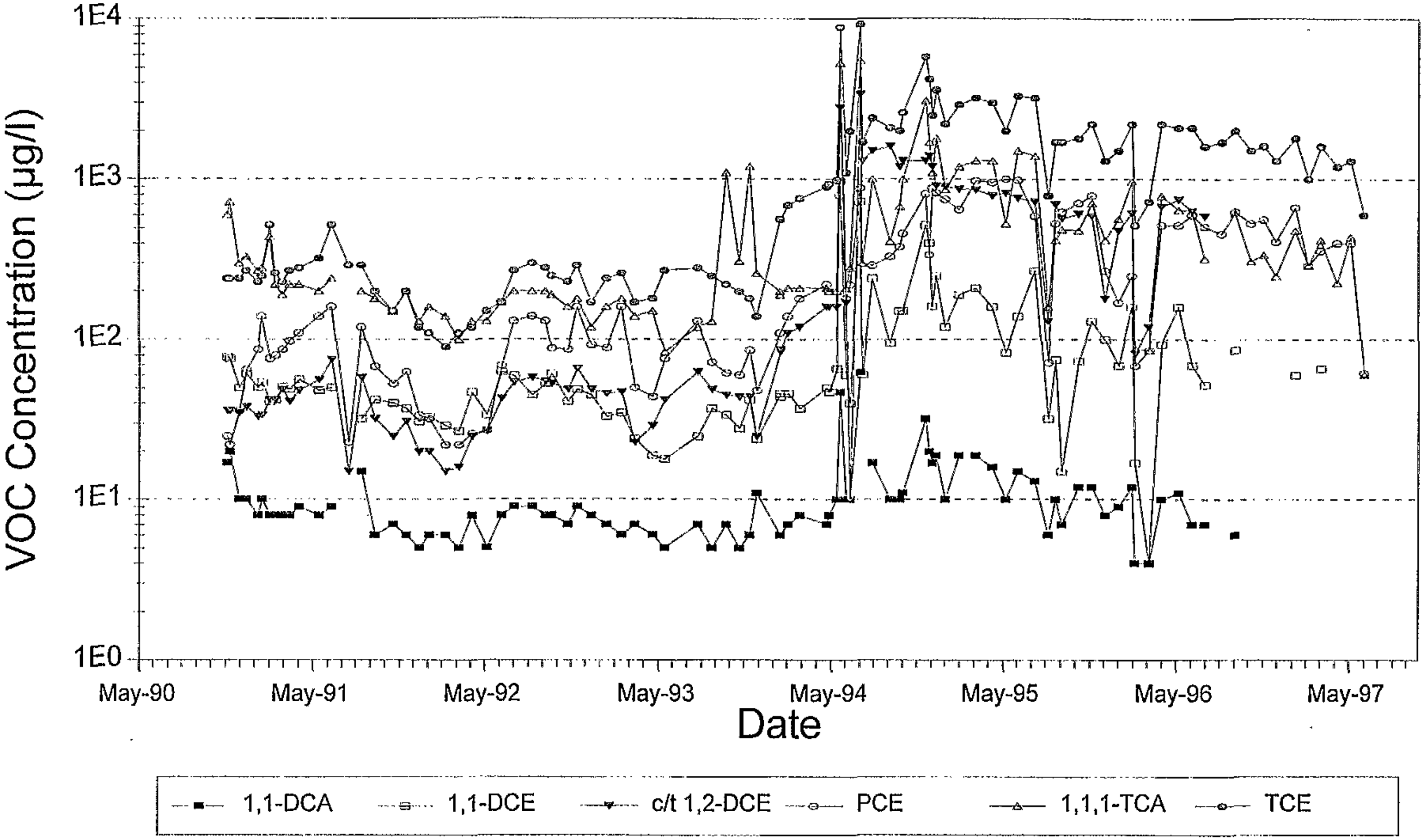
R.E. Wright Environmental
A Subsidiary of Science Applications International Corporation

FIGURE 5

Record of Tower Influent Chemistry

Individual VOC Concentrations

Start-up through June 30, 1997



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06/20/97

FIGURE 6

Record of Tower Influent Chemistry

Total VOC Concentrations

Start-up through June 30, 1997

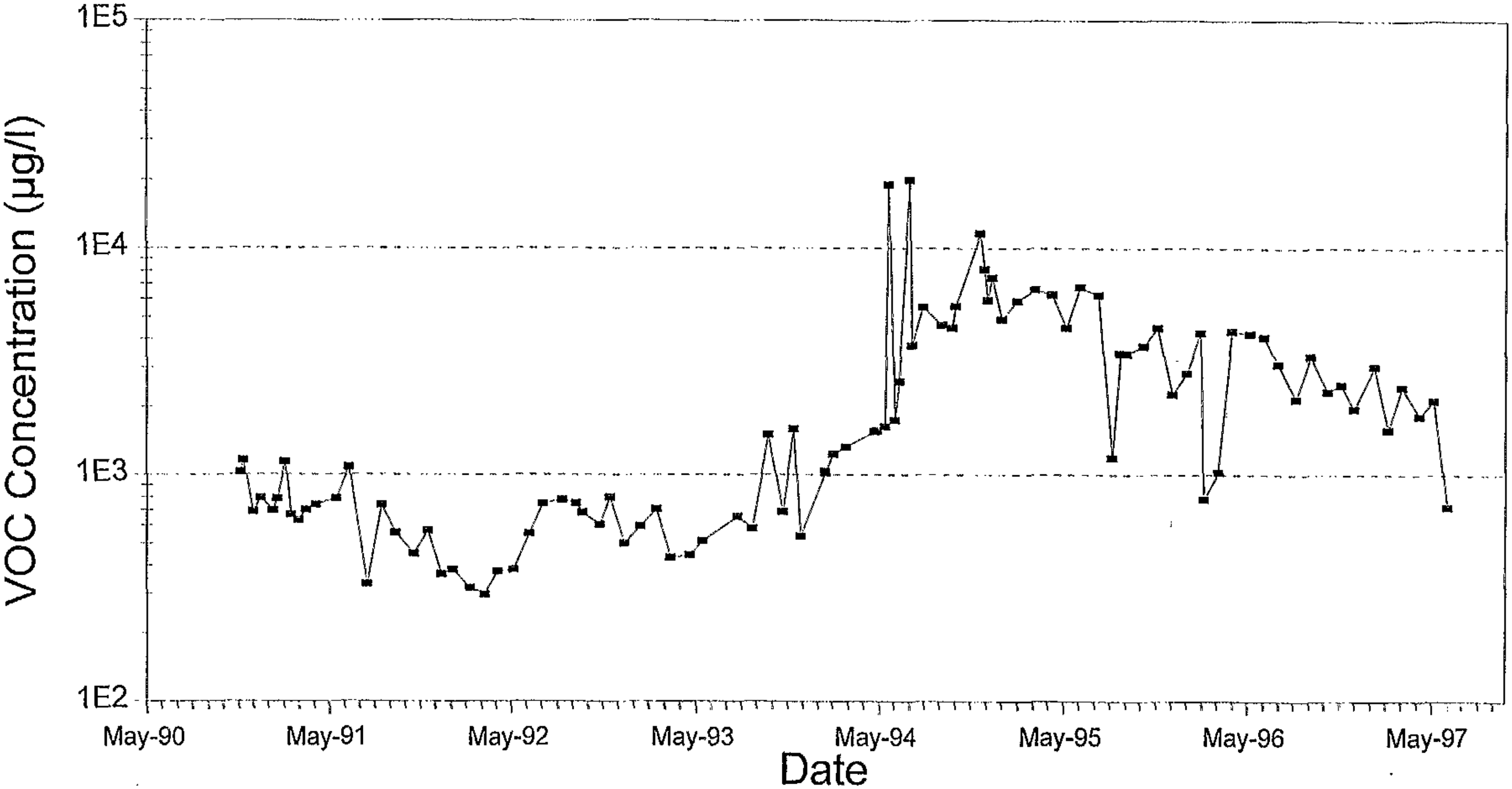

FIGURE 7

GROUNDWATER WITHDRAWALS

GALLONS PER MONTH FOR EACH EXTRACTION WELL AREA

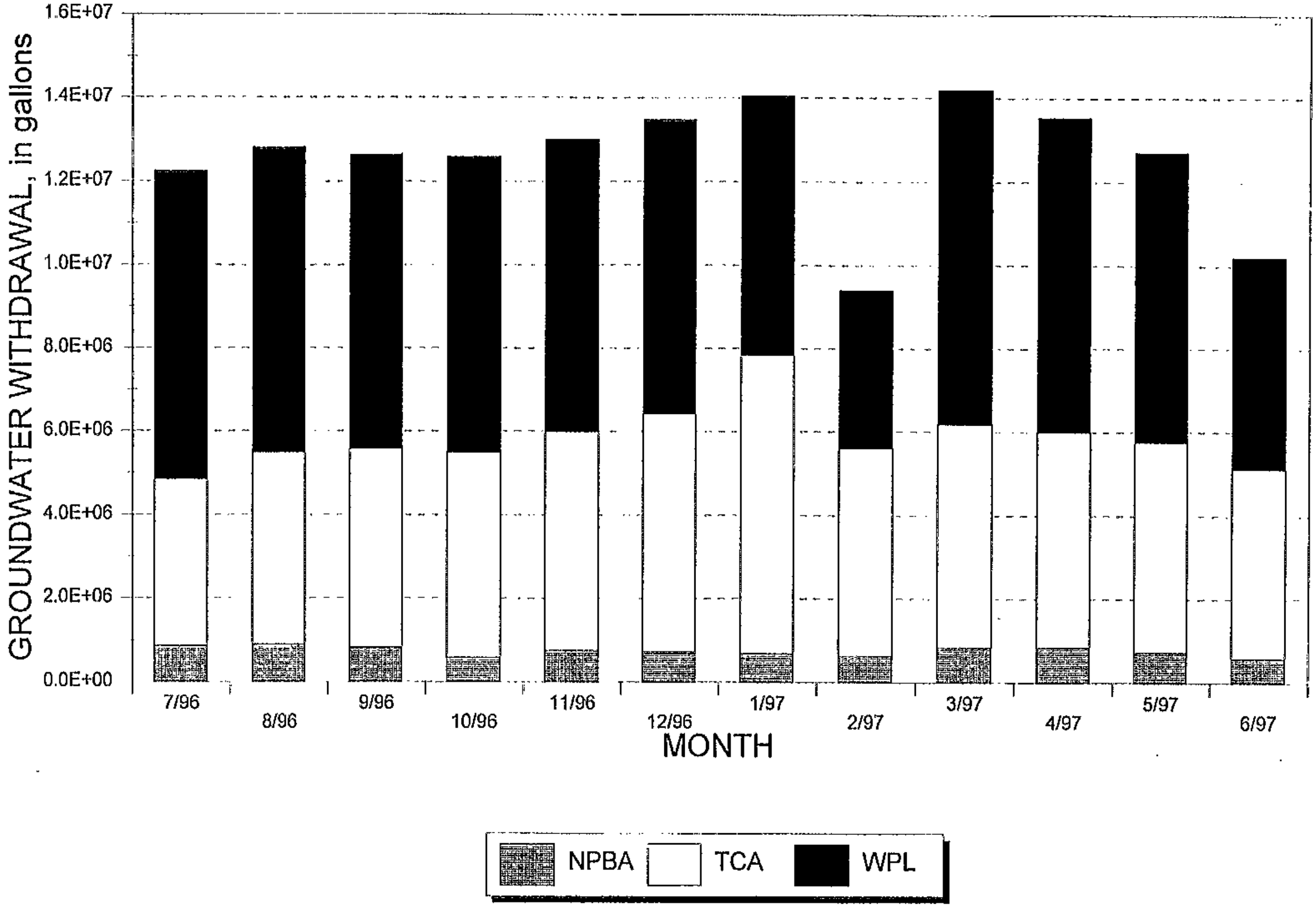

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FIGURE 8

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELL CW-1

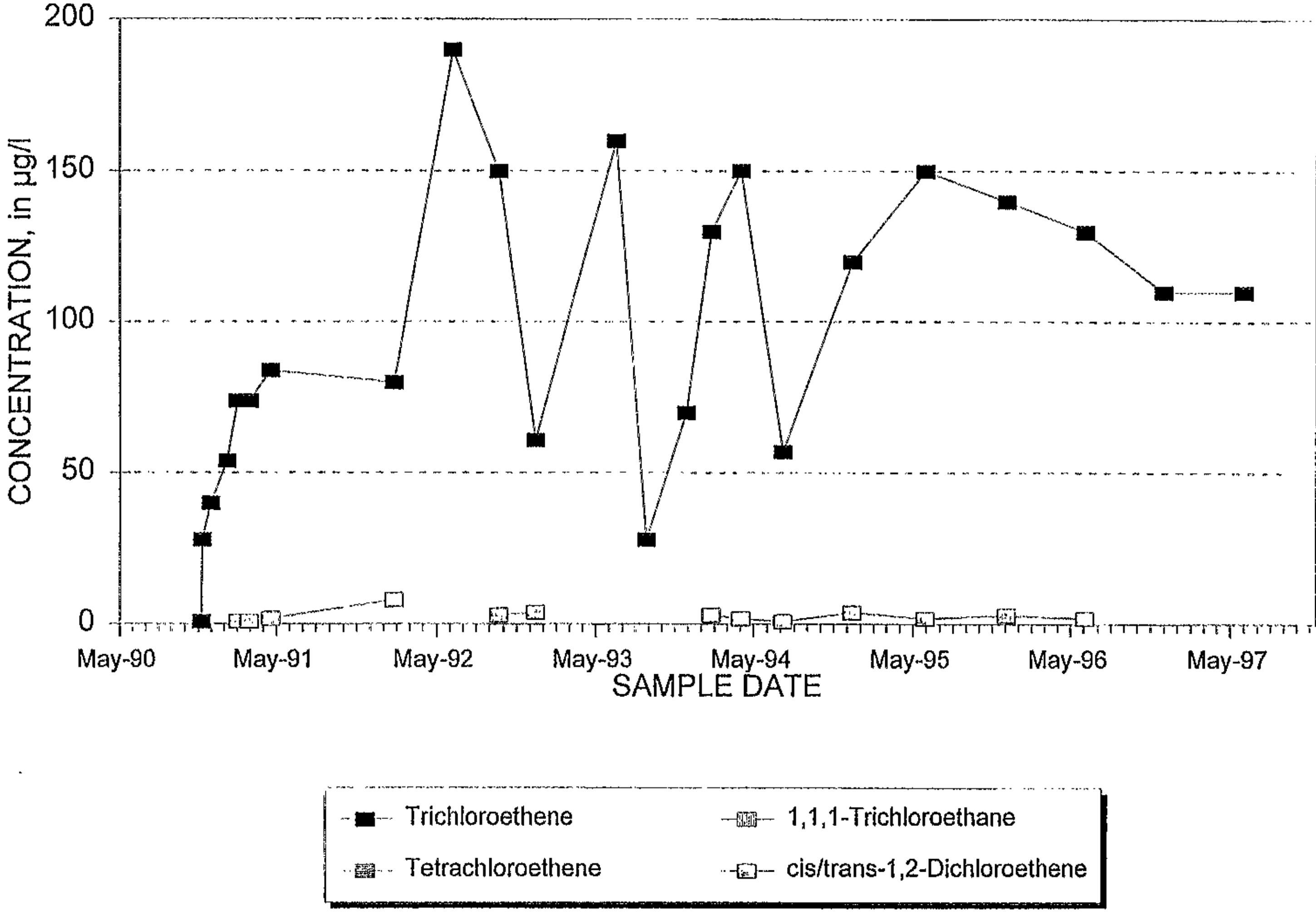

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FIGURE 9

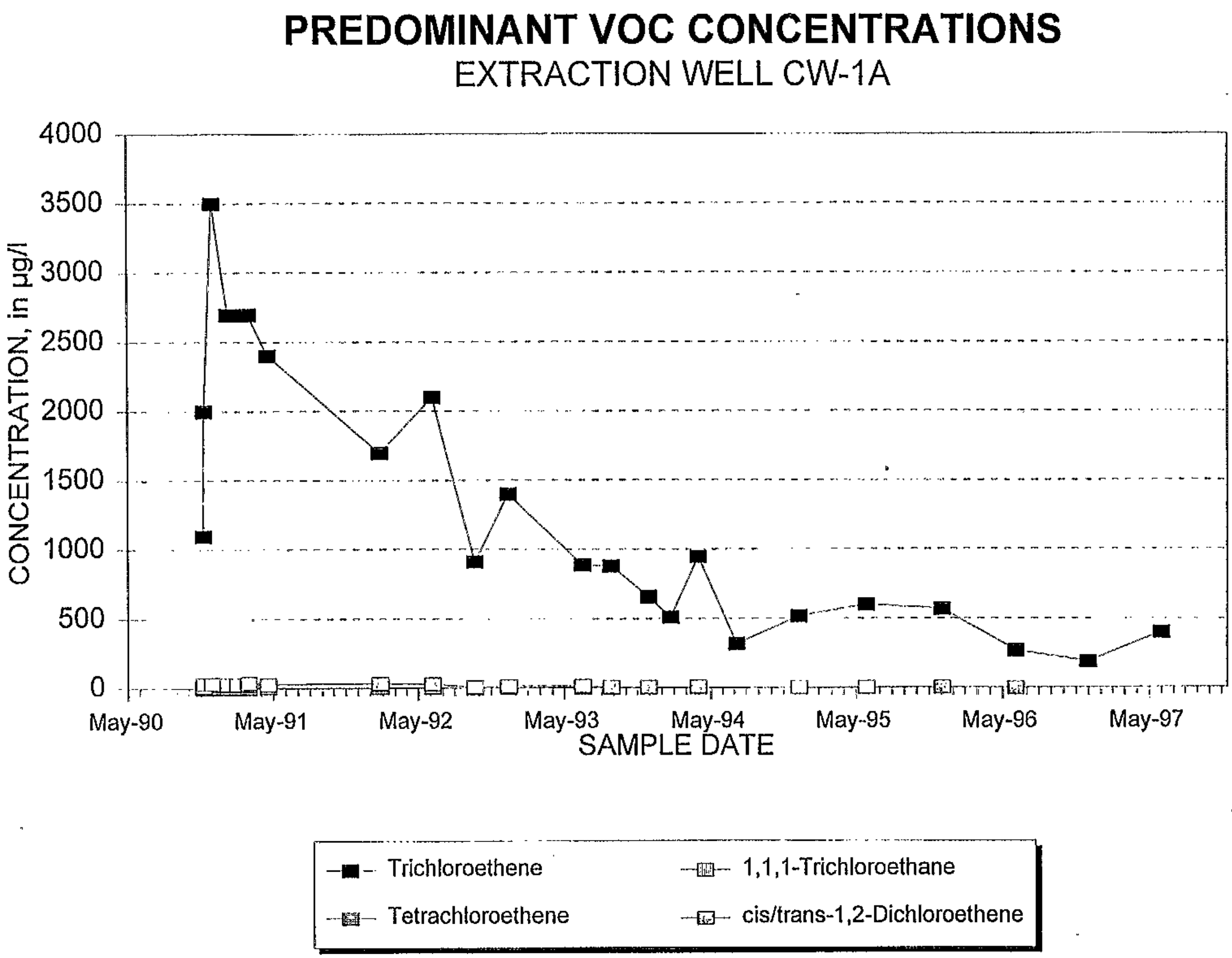

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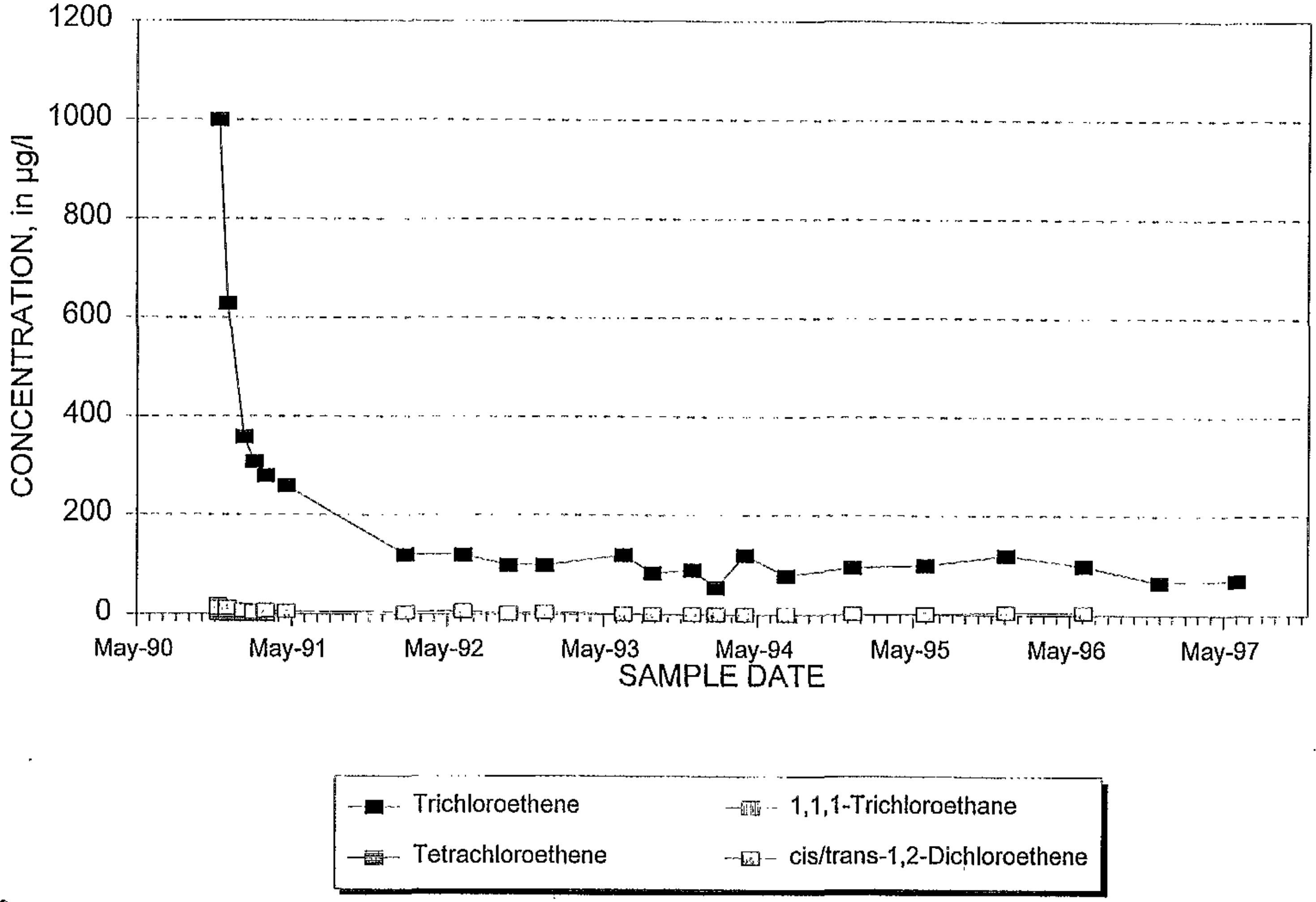
FIGURE 10

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELL CW-2



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06/20/97

FIGURE 11

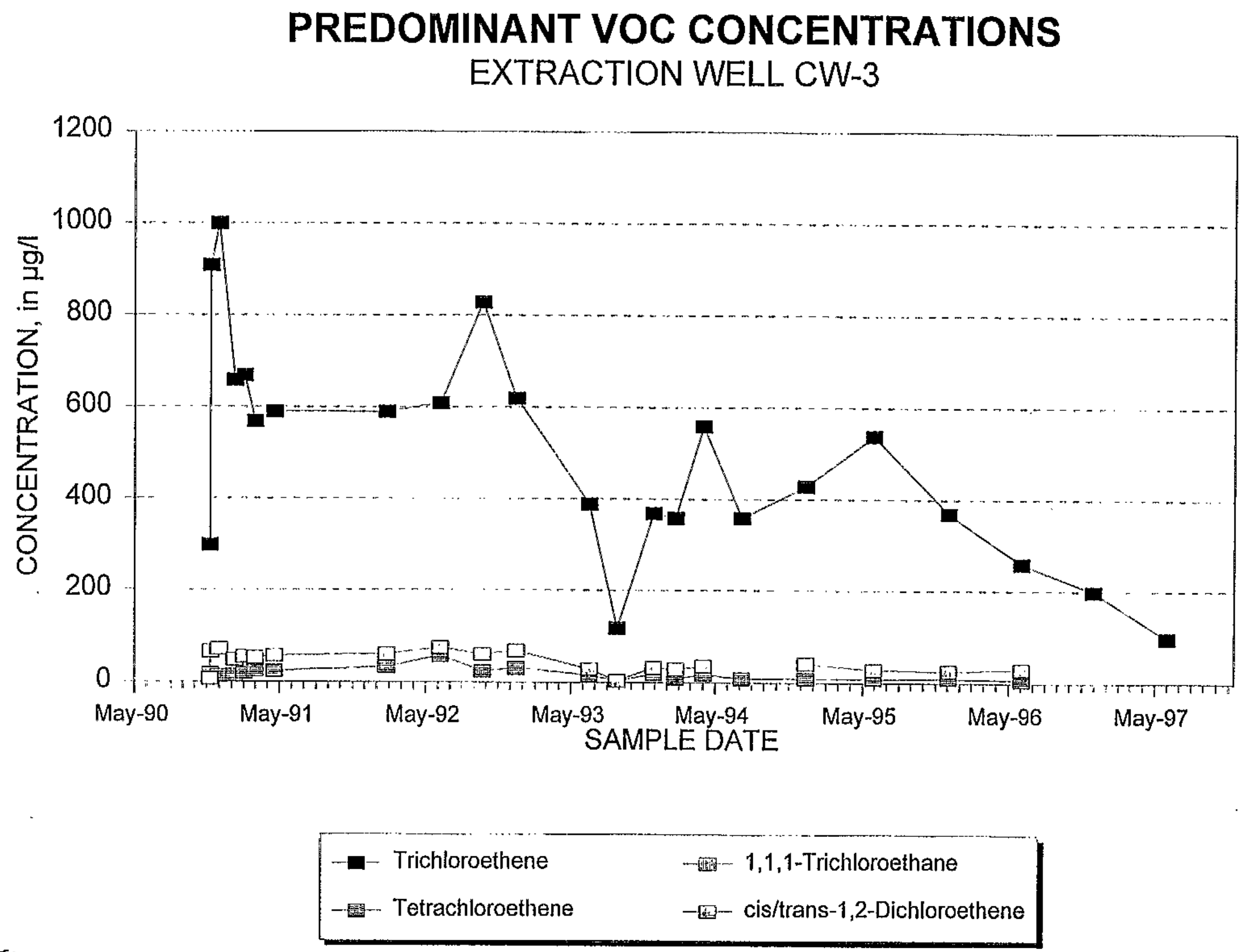

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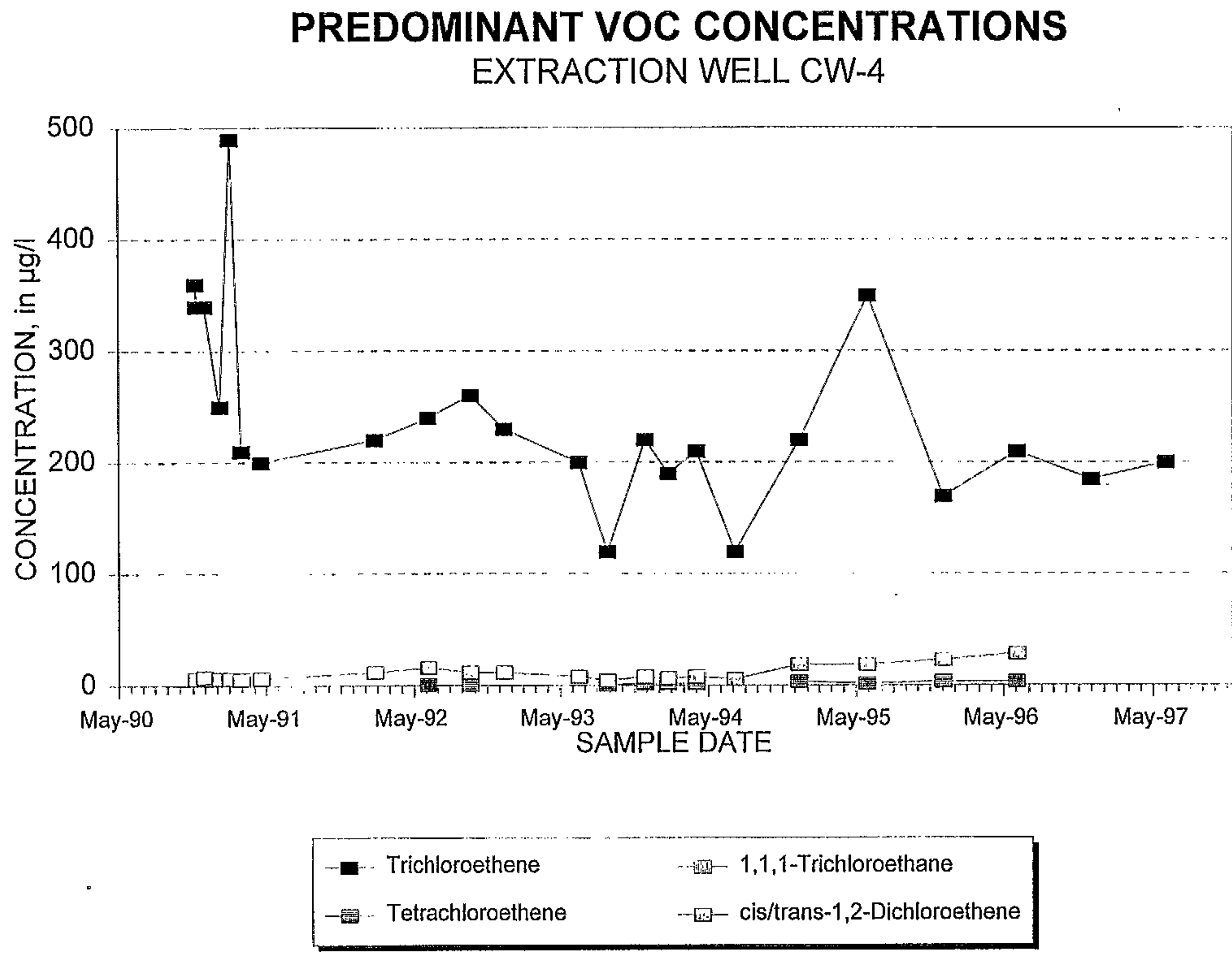
FIGURE 12



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06/20/97

FIGURE 13

PREDOMINANT VOC CONCENTRATIONS
EXTRACTION WELL CW-5

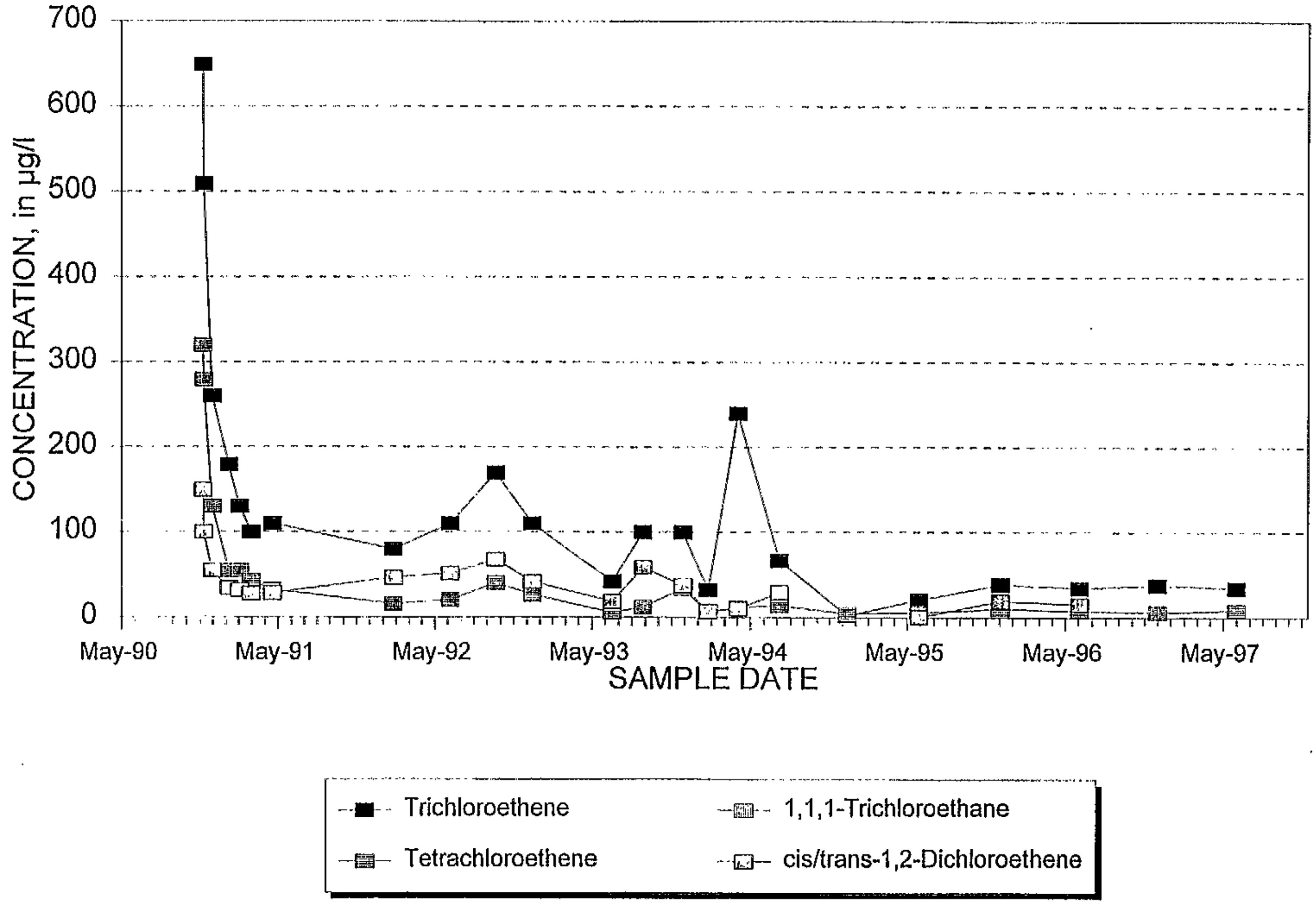

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FIGURE 14

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELL CW-6

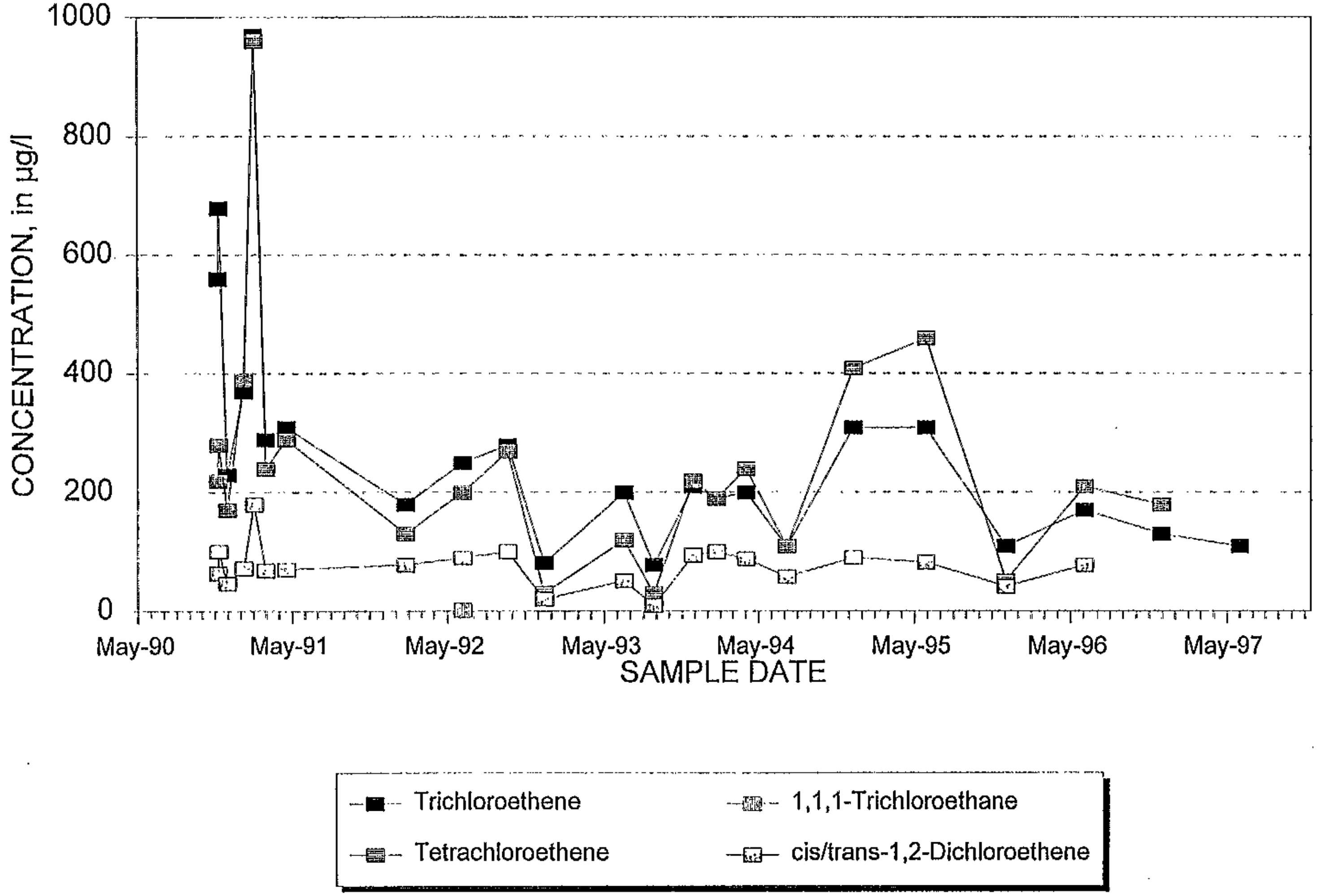

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FIGURE 15

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELL CW-7

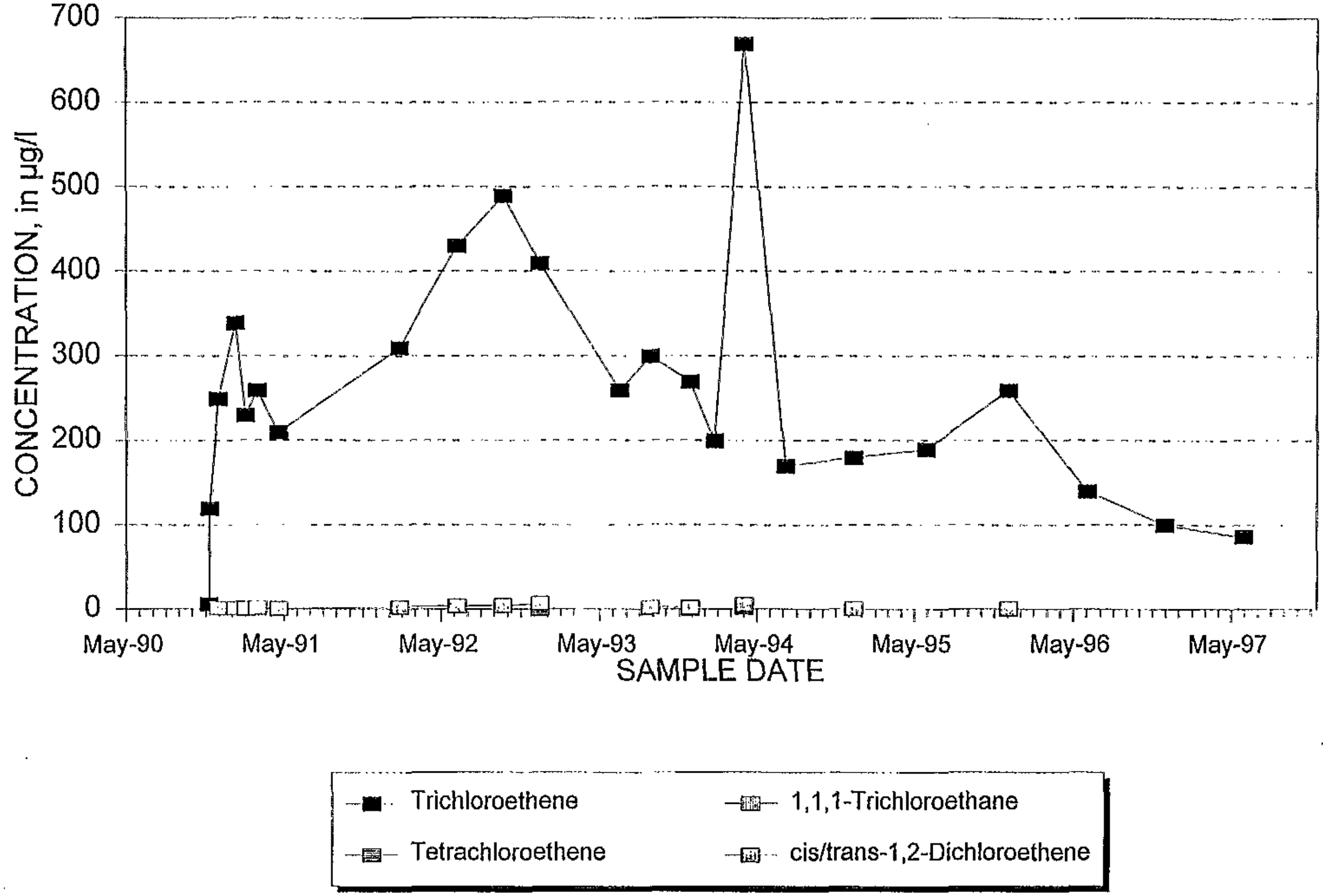

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FIGURE 16

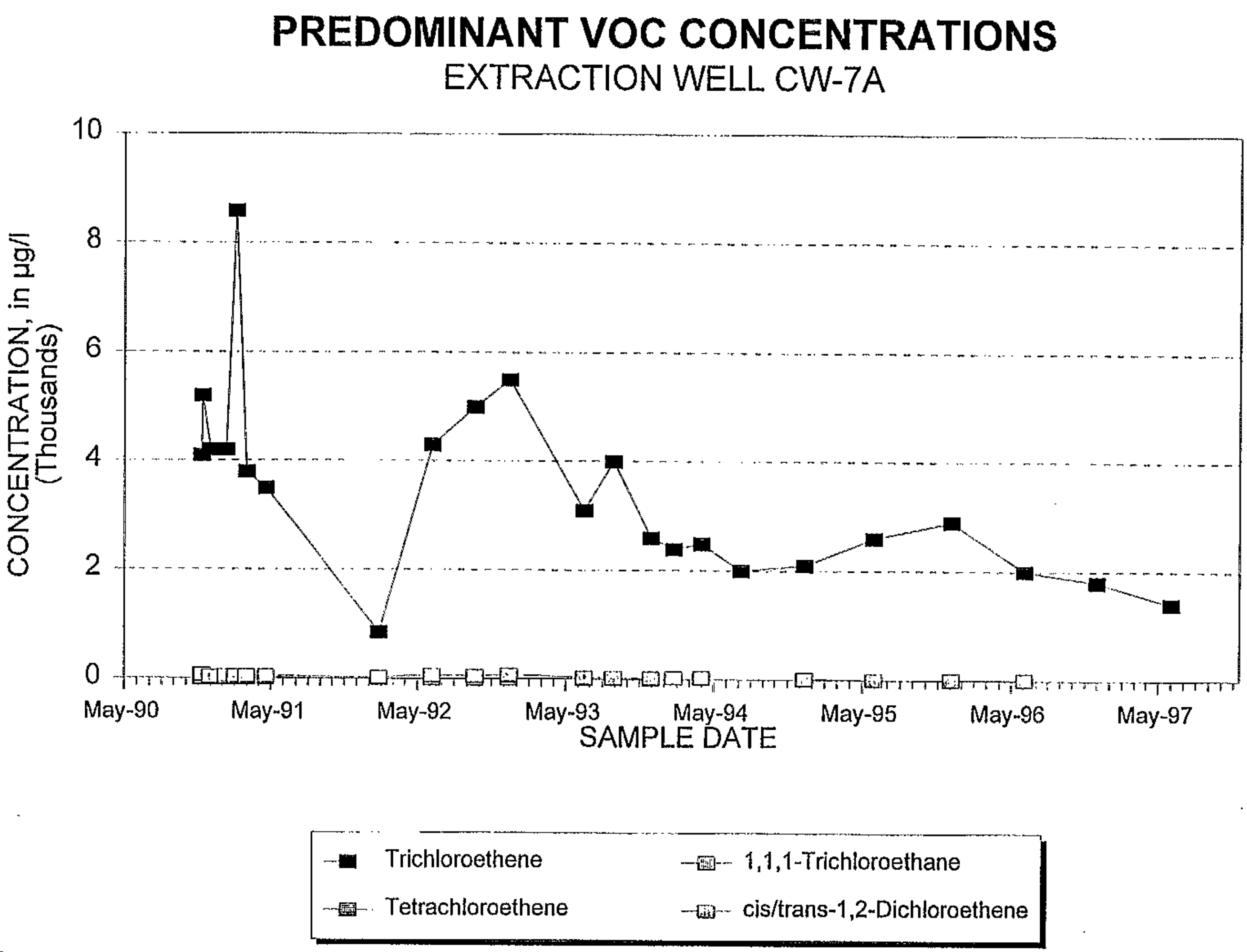

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FIGURE 17

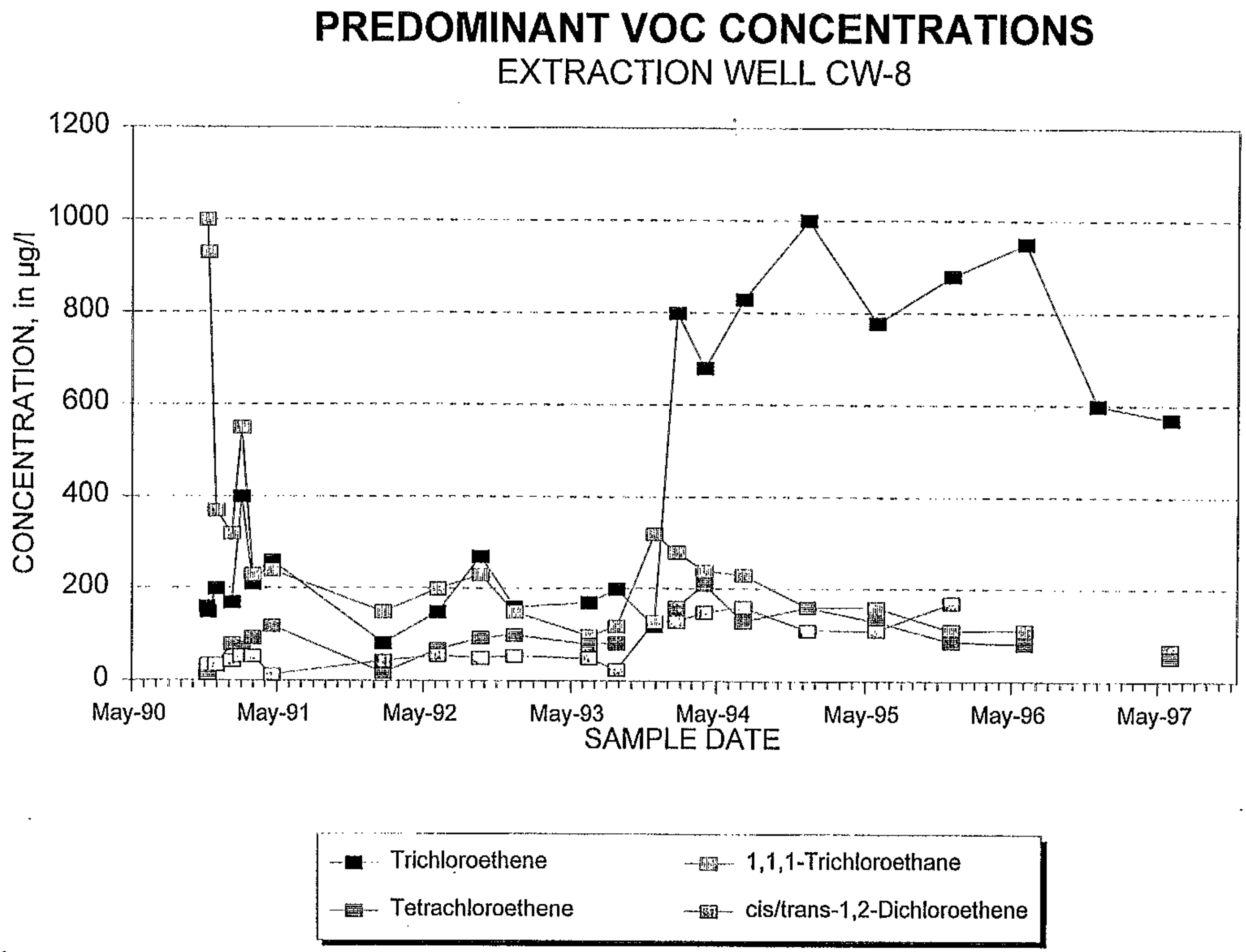

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FIGURE 18

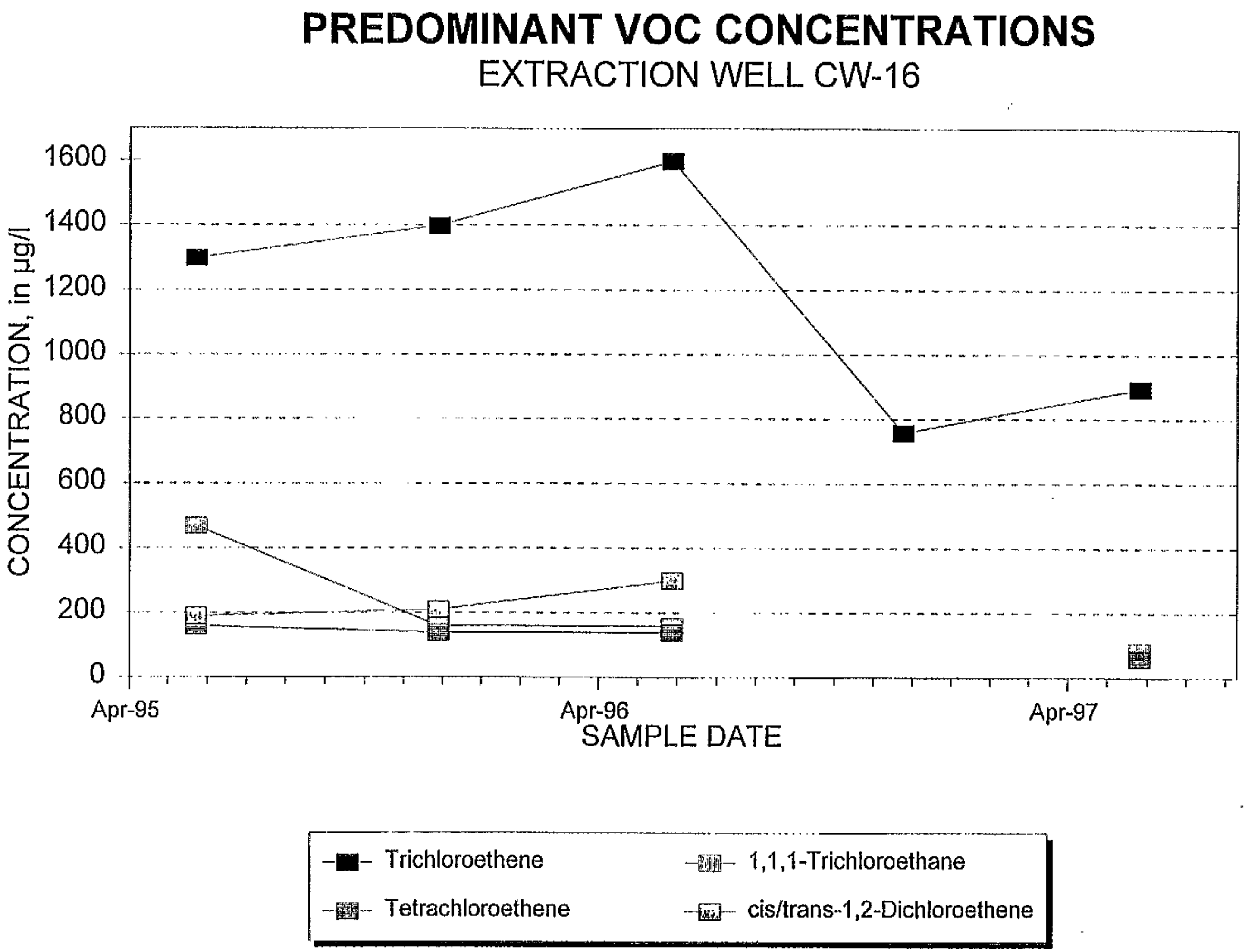

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FIGURE 19

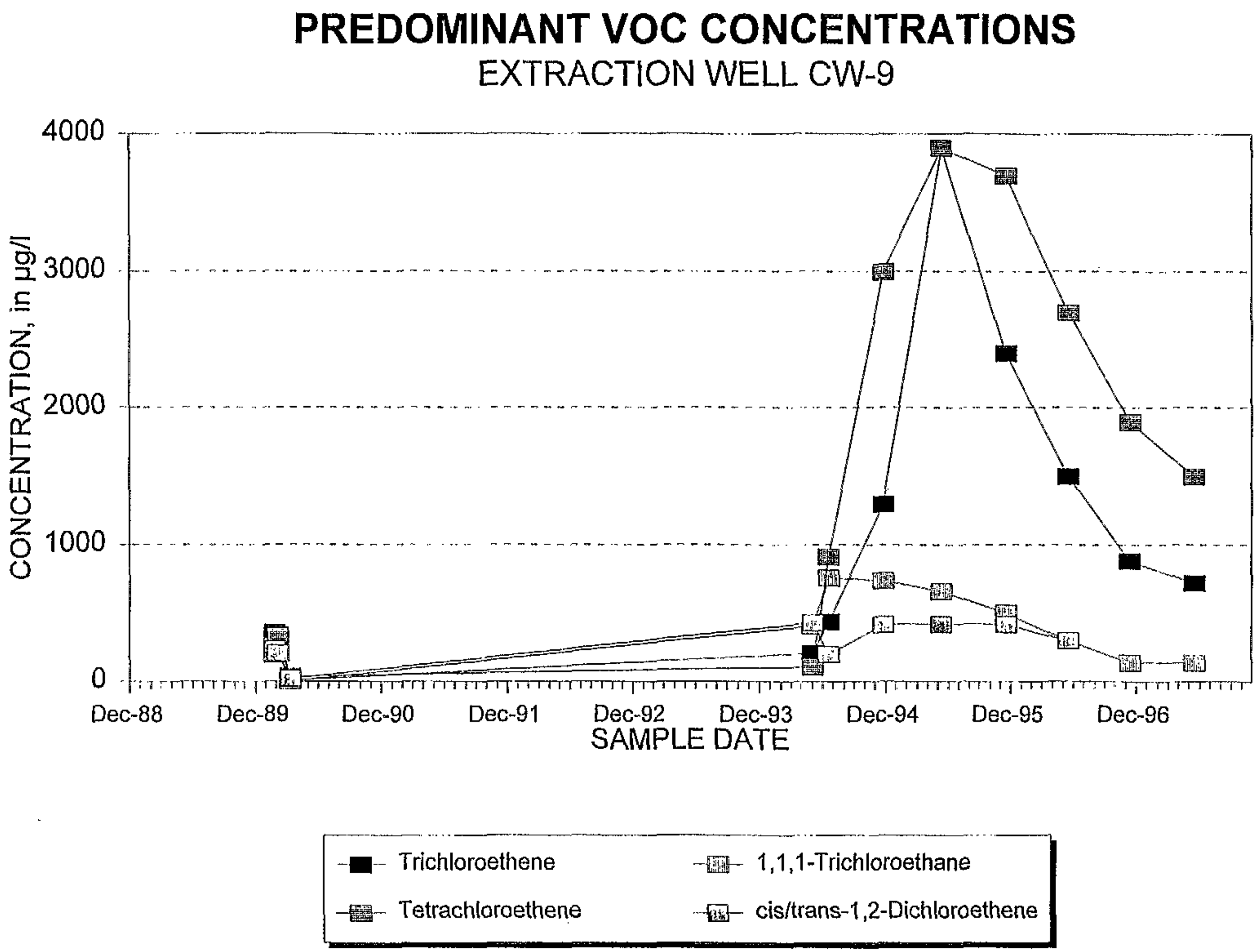

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FIGURE 20

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELL CW-13

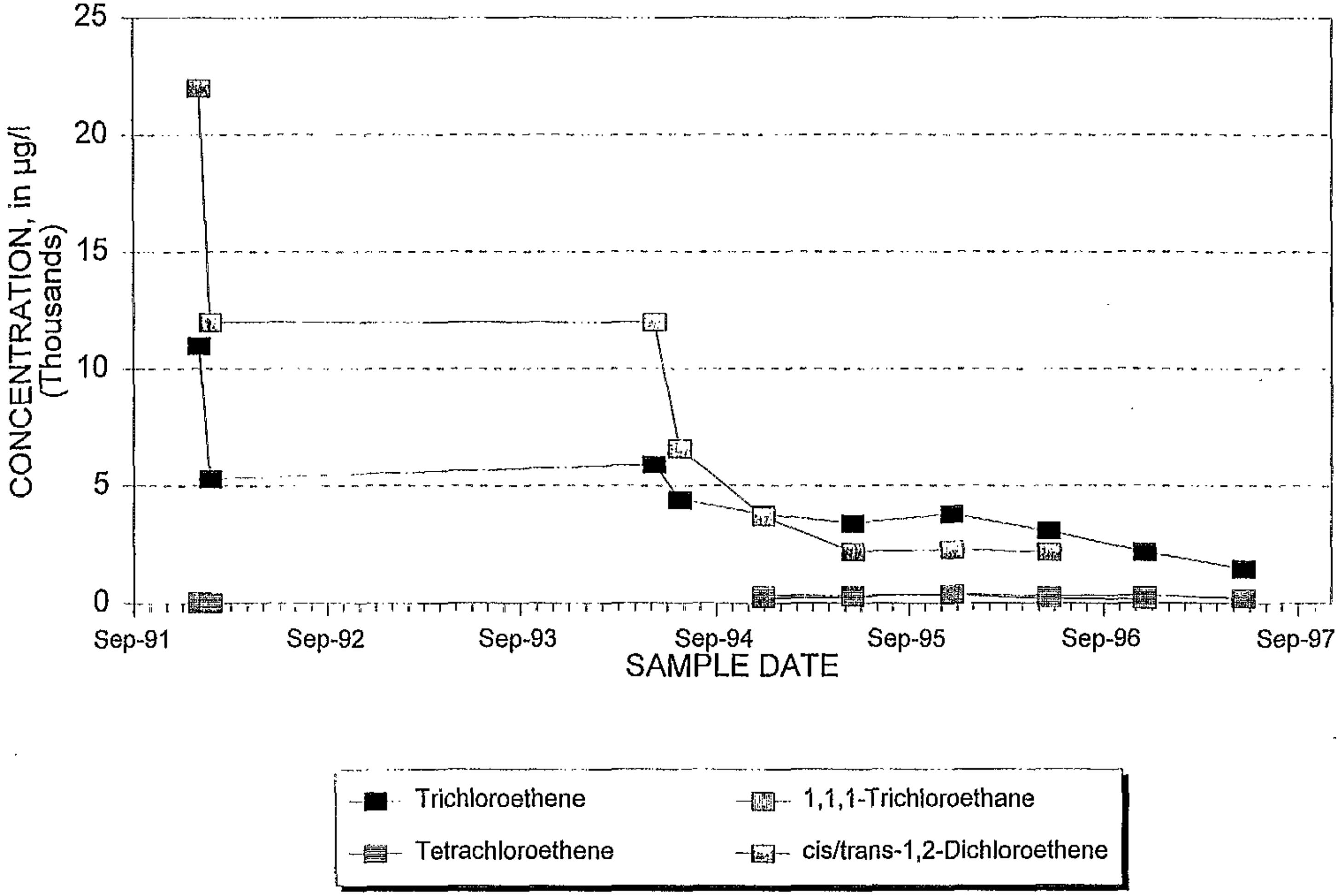

FIGURE 21

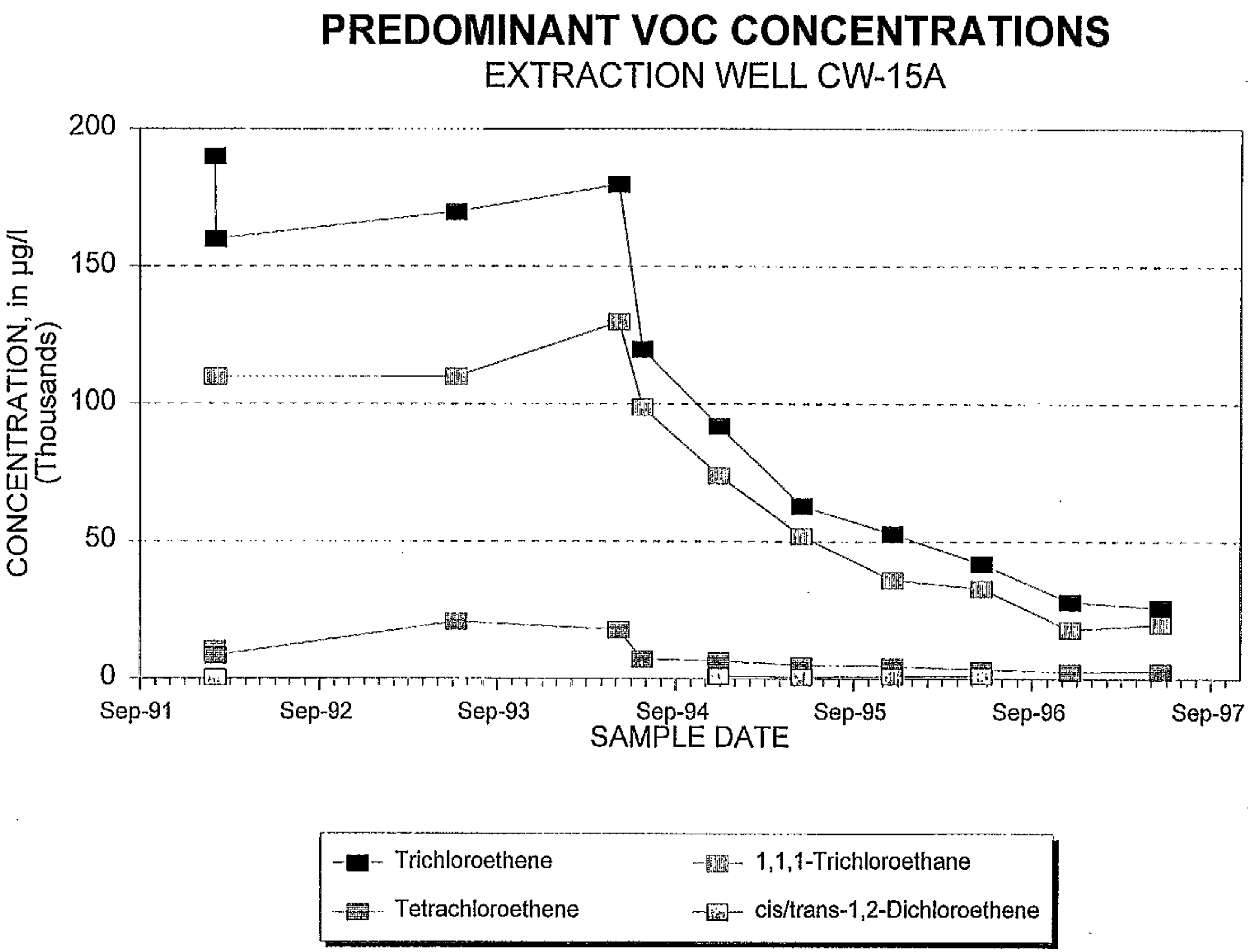

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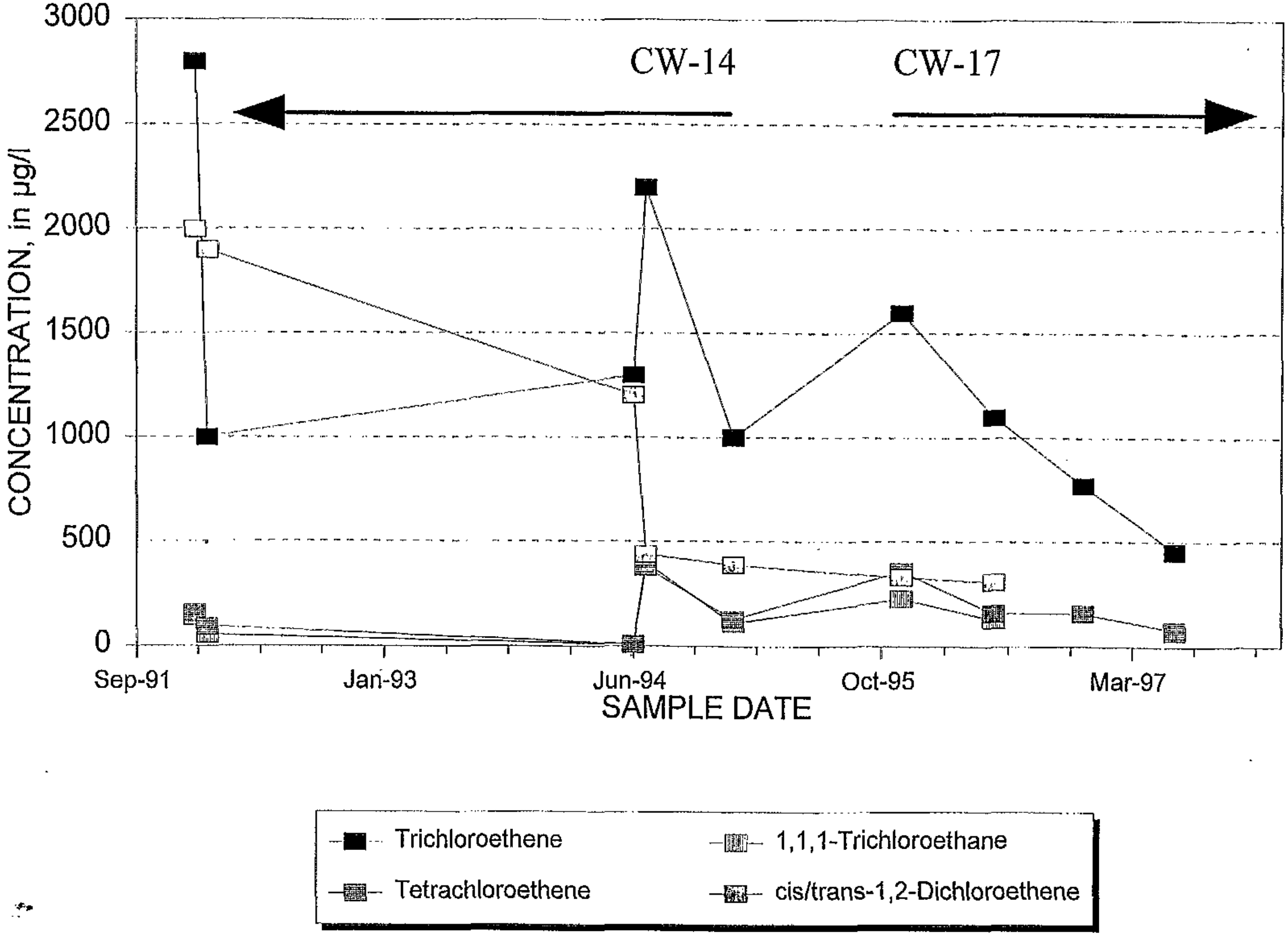
FIGURE 22

PREDOMINANT VOC CONCENTRATIONS

EXTRACTION WELLS CW-14 & CW-17



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04/23/98

TABLES

TABLE 1

VOCs REMOVED FROM COLLECTED GROUNDWATER

GROUNDWATER TREATMENT SYSTEM
JULY 1, 1996 - JUNE 30, 1997
Harley - Davidson Motor Company

DATE	MONTHLY GROUNDWATER WITHDRAWAL (gallons)	AVERAGE MONTHLY TOTAL VOCs (ppb)	ESTIMATED MONTHLY VOC REMOVAL (pounds)
JUL 96	13,773,500	3,084	355
AUG 96	14,033,900	2,160	253
SEP 96	13,930,200	3,348	389
OCT 96	13,744,700	2,340	269
NOV 96	13,717,700	2,500	286
DEC 96	13,493,400	1,960	221
JAN 97	12,863,700	3,010	323
FEB 97	9,208,600	1,580	121
MAR 97	14,217,600	2,446	290
APR 97	13,665,400	1,825	208
MAY 97	13,254,000	2,140	237
JUN 97	10,786,300	723	65

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
JAN 97 - JUN 97	73,995,600		1,245

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TABLE 2

RECORD OF GROUNDWATER WITHDRAWALS

GALLONS PER MONTH FOR EACH EXTRACTION WELL
JULY 1, 1996 - JUNE 30, 1997
Harley-Davidson Motor Company

	NPBA EXTRACTION WELLS										TCA WELLS			WPL EXTRACTION 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
7/96	236,489	2,534	14,074	60,706	136,172	94,023	274,822	23,590	17,524	659,934	3,837,600	174,950	4,012,750	2,104,585	2,926,802	276,032	2,074,026	7,381,445	12,254,129
8/96	228,356	2,317	11,711	192,142	102,076	87,283	232,917	22,986	15,835	895,623	3,786,200	819,430	4,605,630	2,063,023	3,013,083	244,987	1,987,841	7,308,934	12,810,187
9/96	204,607	1,464	10,503	207,668	83,004	70,172	207,971	19,304	13,386	818,079	3,696,500	1,080,980	4,777,480	1,894,430	2,989,634	175,284	1,978,528	7,037,876	12,633,435
10/96	99,457	2,115	13,631	85,490	87,214	75,427	183,146	22,238	12,386	581,106	3,808,800	1,114,330	4,923,130	1,943,124	2,861,807	155,756	2,117,310	7,077,997	12,582,233
11/96	158,878	3,142	10,380	146,349	127,510	85,885	213,781	23,555	7,626	776,906	4,132,600	1,079,830	5,212,430	1,911,216	2,824,119	107,492	2,177,866	7,020,693	13,010,029
12/96	152,904	2,676	14,158	34,369	129,011	128,073	195,239	27,073	50,159	733,662	4,593,100	1,105,300	5,698,400	2,118,144	2,744,222	146,427	2,046,325	7,055,118	13,487,180
1/97	169,142	3,283	12,728	11,185	142,249	93,474	203,019	25,489	36,281	696,850	6,052,500	1,104,550	7,157,050	1,774,245	2,317,957	133,377	1,978,836	6,204,415	14,058,315
2/97	146,048	2,500	10,790	84,815	112,268	69,470	155,408	21,906	23,190	626,395	4,012,500	986,190	4,998,690	1,484,266	250,122	77,398	1,967,993	3,779,799	9,406,884
3/97	185,847	3,513	12,233	139,131	128,867	11,789	291,646	25,440	36,127	834,595	4,439,100	925,280	5,364,380	2,089,986	3,660,845	78,627	2,170,857	8,006,315	14,205,290
4/97	174,761	869	7,666	175,304	117,574	61,212	243,077	24,000	31,626	836,109	4,262,000	901,830	5,163,830	2,304,566	3,046,632	82,889	2,122,617	7,556,704	13,556,643
5/97	161,137	569	3,692	113,438	99,918	74,322	241,430	22,891	19,950	737,347	4,202,900	828,030	5,030,930	2,255,282	2,572,238	122,007	2,003,487	6,953,014	12,721,291
6/97	89,374	1,416	6,393	31,462	90,330	61,507	258,878	21,480	13,752	574,592	3,834,700	718,630	4,553,330	770,225	2,514,835	124,235	1,675,128	5,084,423	10,212,345
TOTALS	2,009,000	26,418	127,959	1,282,059	1,356,193	912,437	2,701,338	279,952	277,842	8,973,198	50,658,700	10,839,330	61,498,030	22,713,112	31,728,296	1,724,511	24,300,814	80,466,733	150,937,961

TABLE 3

GROUNDWATER EXTRACTION WELL PUMPING ELEVATIONS

Harley-Davidson Motor Company

Project 7739

EXTRACTION SYSTEM LOCATION	Well No.	Reference Elevation (ft AMSL)	Range(ft AMSL)		Groundwater Elev. (ft AMSL)	
			Pump On (High)	Pump Off (Low)	11/4/96	4/30/97
NPBA	CW-1	570.88	496.4	493.4	NM	497.26
	CW-1A	569.93	510.4	507.4	505.98	507.81
	CW-2	557.79	484.3	481.3	481.39	501.14 OL
	CW-3	519.43	441.4	438.4	453.98	444.93
	CW-4	542.32	458.8	455.8	476.28	458.69
	CW-5	472.06	426.6	423.6	430.85	424.86
	CW-6	486.98	416.5	413.5	435.83	424.03
	CW-7	574.61	494.1	491.1	488.86	500.94
	CW-7A	574.71	524.2	521.2	532.68	525.21
WPL	CW-9	360.79	333.8	328.8	335.57	333.60
	CW-13	361.64	327.6	322.6	326.08	337.22 OL
	CW-15A	362.57	333.5	328.5	334.30	339.94
	CW-17	361.67	335.7	330.7	333.22	334.23
TCA	CW-8	363.84	339.8	335.8	338.50	337.87
	CW-16	364.32	334.3	329.3	332.12	329.92

Notes:

ft AMSL - feet above mean sea level

NM - Not Measured

OL - Pump Off Line

APPENDIX A

Data Tables

Table A-1

Site-Wide Groundwater Levels and Elevation Data
Harley-Davidson Motor Company

Well	Reference Elevation (ft AMSL)	11/4/96 Depth (feet)	11/4/96 Water Level (ft AMSL)	04/30/97 Depth (feet)	04/30/97 Water Level (ft AMSL)
CW-1	570.88	NM	--	73.62	497.26
CW-1A	569.93	63.95	505.98	62.12	507.81
CW-2	557.79	76.40	481.39	56.65	501.14
CW-3	519.43	65.54	453.89	74.50	444.93
CW-4	542.32	66.04	476.28	83.63	458.69
CW-5	472.06	41.21	430.85	47.20	424.86
CW-6	486.98	51.15	435.83	62.95	424.03
CW-7	574.61	85.75	488.86	73.67	500.94
CW-7A	574.71	42.03	532.68	49.50	525.21
CW-8	363.84	25.34	338.50	25.97	337.87
CW-9	360.79	25.22	335.57	27.19	333.60
CW-10	417.43	33.41	384.02	36.25	381.18
CW-11	374.30	31.45	342.85	32.16	342.14
CW-12	362.06	21.21	340.85	22.08	339.98
CW-12A	362.18	21.25	340.93	22.58	339.60
CW-13	361.64	35.56	326.08	24.42	337.22
CW-14	362.08	28.77	333.31	27.99	334.09
CW-15	362.81	22.60	340.21	NM	--
CW-15A	362.57	28.27	334.30	22.63	339.94
CW-16	364.32	32.20	332.12	34.40	329.92
CW-17	361.67	28.45	333.22	27.44	334.23
CW-18	365.76	21.76	344.00	22.64	343.12
MW-1	376.35	33.55	342.80	34.25	342.10
MW-2	509.44	63.33	446.11	62.80	446.64
MW-3	542.11	63.95	478.16	62.36	479.75
MW-4	397.82	31.34	366.48	27.56	370.26
MW-5	370.80	25.75	345.05	23.91	346.89
MW-6	361.06	20.34	340.72	20.50	340.56
MW-7	362.18	28.58	333.60	27.29	334.89
MW-8	360.55	21.10	339.45	23.01	337.54
MW-9	559.76	51.79	507.97	52.67	507.09
MW-10	568.75	51.86	516.89	57.47	511.28
MW-11	565.11	43.12	521.99	44.20	520.91
MW-12	536.69	42.36	494.33	36.53	500.16
MW-14	520.39	31.05	489.34	31.19	489.20
MW-15	524.90	60.64	464.26	60.35	464.55
MW-16S	517.50	41.41	476.09	40.75	476.75
MW-16D	517.50	8.16	509.34	11.95	505.55
MW-17	458.03	12.60	445.43	12.32	445.71
MW-18S	465.37	16.46	448.91	19.90	445.47
MW-18D	465.37	15.64	449.73	19.82	445.55
MW-19	428.20	22.29	405.91	21.46	406.74
MW-20S	575.34	42.26	533.08	45.53	529.81
MW-20M	575.21	41.12	534.09	41.20	534.01
MW-20D	575.21	47.14	528.07	48.86	526.35
MW-21	426.76	34.96	391.80	33.35	393.41
MW-22	448.57	57.53	391.04	56.75	391.82
MW-23	374.07	30.48	343.59	31.28	342.79
MW-24	375.44	30.86	344.58	31.58	343.86
MW-25	381.73	9.77	371.96	9.75	371.98
MW-26	377.52	23.24	354.28	21.18	356.34
MW-27	362.26	19.71	342.55	19.49	342.77
MW-28	363.96	23.51	340.45	24.36	339.60
MW-29	365.63	21.98	343.65	NM	--
MW-30	364.99	19.90	345.09	18.55	346.44
MW-31S	368.31	19.38	348.93	16.53	351.78
MW-31D	368.31	19.56	348.75	16.70	351.61

Table A-1

Site-Wide Groundwater Levels and Elevation Data Harley-Davidson Motor Company					
	Reference	11/4/96		04/30/97	
	Elevation	Depth	Water Level	Depth	Water Level
Well	(ft AMSL)	(feet)	(ft AMSL)	(feet)	(ft AMSL)
MW-32S	363.46	23.05	340.41	23.90	339.56
MW-32D	363.46	22.53	340.93	23.31	340.15
MW-33	364.94	24.37	340.57	NM	--
MW-34S	362.12	21.53	340.59	22.34	339.78
MW-34D	362.12	21.66	340.46	22.51	339.61
MW-35S	361.58	DRY	--	DRY	--
MW-35D	361.59	21.10	340.49	21.87	339.72
MW-36S	372.30	26.81	345.49	24.93	347.37
MW-36D	372.30	27.16	345.14	25.40	346.90
MW-37S	360.83	18.54	342.29	19.14	341.69
MW-37D	360.83	20.80	340.03	22.52	338.31
MW-38S	359.47	19.16	340.31	20.61	338.86
MW-38D	359.48	20.65	338.83	21.13	338.35
MW-39S	361.56	22.36	339.20	22.60	338.96
MW-39D	361.56	23.06	338.50	22.70	338.86
MW-40S	375.83	33.10	342.73	33.83	342.00
MW-40D	375.83	33.11	342.72	33.83	342.00
MW-41S	426.08	37.30	388.78	36.01	390.07
MW-41D	426.08	37.25	388.83	37.10	388.98
MW-42S	411.39	27.45	383.94	30.32	381.07
MW-42M	411.39	25.55	385.84	30.42	380.97
MW-42D	411.39	42.71	368.68	44.15	367.24
MW-43S	380.93	31.71	349.22	32.42	348.51
MW-43D	381.31	32.71	348.60	33.37	347.94
MW-44	417.37	30.59	386.78	32.63	384.74
MW-45	361.13	20.14	340.99	20.86	340.27
MW-46	360.25	19.37	340.88	20.24	340.01
MW-47	361.74	22.87	338.87	23.56	338.18
MW-48	362.85	DRY	--	DRY	--
MW-49S	363.02	20.03	342.99	19.23	343.79
MW-49D	363.02	19.69	343.33	19.00	344.02
MW-50S	361.72	22.96	338.76	23.30	338.42
MW-50D	361.69	22.35	339.34	22.56	339.13
MW-51S	363.46	28.63	334.83	28.03	335.43
MW-51D	363.86	29.96	333.90	28.49	335.37
MW-52	368.52	NM	--	7.53	360.99
MW-53	368.25	9.39	358.86	7.56	360.69
MW-54	364.98	25.91	339.07	26.42	338.56
MW-55	364.89	25.53	339.36	26.29	338.60
MW-56	373.03	24.56	348.47	22.90	350.13
MW-57	366.02	22.66	343.36	23.42	342.60
MW-59	373.19	28.15	345.04	26.47	346.72
MW-60	369.15	22.57	346.58	20.55	348.60
MW-61S	373.87	31.24	342.63	32.12	341.75
MW-61D	373.87	32.28	341.59	32.90	340.97
MW-62S	371.28	28.74	342.54	29.79	341.49
MW-62D	371.27	29.90	341.37	30.30	340.97
MW-63S	374.95	32.05	342.90	32.78	342.17
MW-63D	374.96	31.61	343.35	32.15	342.81
MW-64S	417.26	32.92	384.34	33.00	384.26
MW-64D	417.27	58.87	358.40	60.10	357.17
TWB-6	366.76	22.78	343.98	DRY	--
WPL-SS-2	363.21	24.62	338.59	25.18	338.03
WPL-SS-7	361.92	26.71	335.21	25.16	336.76
WPL-SS-8	365.26	25.81	339.45	26.08	339.18

NM = Not Measured

TABLE A-2
GROUNDWATER QUALITY ANALYSES
KEY MONITORING WELL SAMPLES (July 1, 1996 - June 30, 1997)
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-39S	MW-39D	MW-51S	MW-51D	MW-54	RW-2(Sigler)	Field Blank	Field Blank	Trip Blank	Trip Blank
Lab ID		8606301	8602601	8609101	8602602	8602604	8602605	8606303	8606304	8598501	8598502	8598505	8598506	8598503	8598504	8602603	8606302	8606305	8615601	8606307	8609102	8602606	8606306
Sample Date		07/17/96	07/16/96	07/18/96	07/16/96	07/16/96	07/16/96	07/17/96	07/17/96	07/15/96	07/15/96	07/15/96	07/15/96	07/15/96	07/15/96	07/16/96	07/17/96	07/17/96	07/19/96	07/17/96	07/18/96	07/16/96	07/17/96
Parameter	Units																						
1,1,1-TRICHLOROETHANE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	1	640	250	22	16	23	2100	4	49	N.D.@5.0	9	1400	70	1400	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1,2,2-TETRACHLOROETHANE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	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.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1-DICHLOROETHANE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	35	61	N.D.@5.0	N.D.@5.0	3	N.D.@200	1	11	N.D.@5.0	N.D.@5.0	N.D.@50	34	70	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,1-DICHLOROETHENE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	98	110	6	6	N.D.@1	230	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	670	52	690	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,2-DICHLOROETHANE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
1,2-DICHLOROPROPANE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
2-BUTANONE	ug/l	N.D.@40	N.D.@100	N.D.@200	N.D.@20	N.D.@200	N.D.@400	N.D.@100	N.D.@100	N.D.@20	N.D.@4000	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@200	N.D.@400	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@20
2-CHLOROETHYLVINYL ETHER	ug/l	N.D.@20	N.D.@50	N.D.@100	N.D.@10	N.D.@100	N.D.@200	N.D.@50	N.D.@50	N.D.@10	N.D.@2000	N.D.@10	N.D.@50	N.D.@50	N.D.@50	N.D.@500	N.D.@100	N.D.@200	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10
2-HEXANONE	ug/l	N.D.@20	N.D.@50	N.D.@100	N.D.@10	N.D.@100	N.D.@200	N.D.@50	N.D.@50	N.D.@10	N.D.@2000	N.D.@10	N.D.@50	N.D.@50	N.D.@50	N.D.@500	N.D.@100	N.D.@200	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10
4-METHYL-2-PENTANONE	ug/l	N.D.@20	N.D.@50	N.D.@100	N.D.@10	N.D.@100	N.D.@200	N.D.@50	N.D.@50	N.D.@10	N.D.@2000	N.D.@10	N.D.@50	N.D.@50	N.D.@50	N.D.@500	N.D.@100	N.D.@200	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10
ACETONE	ug/l	N.D.@40	N.D.@100	N.D.@200	N.D.@20	N.D.@200	N.D.@400	N.D.@100	N.D.@100	N.D.@20	N.D.@4000	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@200	N.D.@400	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@20
BENZENE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
BROMOFORM	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CARBON DISULFIDE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CARBON TETRACHLORIDE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CHLOROBENZENE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
CHLOROETHANE	ug/l	N.D.@4.0	N.D.@10	N.D.@20	N.D.@2	N.D.@20	N.D.@40	N.D.@10	N.D.@10	N.D.@2	N.D.@400	N.D.@2	N.D.@10	N.D.@10	N.D.@10	N.D.@100	N.D.@20	N.D.@40	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
CHLOROFORM	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
DIBROMOCHLOROMETHANE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
DICHLOROBROMOMETHANE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
ETHYLBENZENE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
METHYL BROMIDE	ug/l	N.D.@4.0	N.D.@10	N.D.@20	N.D.@2	N.D.@20	N.D.@40	N.D.@10	N.D.@10	N.D.@2	N.D.@400	N.D.@2	N.D.@10	N.D.@10	N.D.@10	N.D.@100	N.D.@20	N.D.@40	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
METHYL CHLORIDE	ug/l	N.D.@4.0	N.D.@10	N.D.@20	N.D.@2	N.D.@20	N.D.@40	N.D.@10	N.D.@10	N.D.@2	N.D.@400	N.D.@2	N.D.@10	N.D.@10	N.D.@10	N.D.@100	N.D.@20	N.D.@40	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
METHYLENE CHLORIDE	ug/l	N.D.@4.0	N.D.@10	N.D.@20	N.D.@2	N.D.@20	N.D.@40	N.D.@10	N.D.@10	N.D.@2	N.D.@400	N.D.@2	N.D.@10	N.D.@10	N.D.@10	N.D.@100	N.D.@20	N.D.@40	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
STYRENE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TETRACHLOROETHENE	ug/l	210	N.D.@5.0	N.D.@10	2	150	230	150	53	97	21000	1	22	8	17	1900	100	130	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TOLUENE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TRICHLOROETHENE	ug/l	68	370	300	99	930	2700	240	150	20	7500	2	230	170	540	6700	1400	1100	5	N.D.@1	N.D.@1	N.D.@1	N.D.@1
VINYL ACETATE	ug/l	N.D.@20	N.D.@50	N.D.@100	N.D.@10	N.D.@100	N.D.@200	N.D.@50	N.D.@50	N.D.@10	N.D.@2000	N.D.@10	N.D.@50	N.D.@50	N.D.@50	N.D.@500	N.D.@100	N.D.@200	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10
VINYL CHLORIDE	ug/l	N.D.@4.0	N.D.@10	N.D.@20	N.D.@2	N.D.@20	N.D.@40	N.D.@10	N.D.@10	N.D.@2	N.D.@400	N.D.@2	N.D.@10	N.D.@10	N.D.@10	N.D.@100	N.D.@20	N.D.@40	N.D.@2	N.D.@2	N.D.@2	N.D.@2	N.D.@2
XYLENES, TOTAL	ug/l	N.D.@10	N.D.@25	N.D.@50	N.D.@5	N.D.@50	N.D.@100	N.D.@25	N.D.@25	N.D.@5	N.D.@1000	N.D.@5	N.D.@25	N.D.@25	N.D.@25	N.D.@250	N.D.@50	N.D.@100	N.D.@5	N.D.@5	N.D.@5	N.D.@5	N.D.@5
CIS 1,2-DICHLOROETHENE	ug/l	N.D.	56	10	N.D.	200	690	46	51	17	540	N.D.	N.D.	N.D.	320	1000	870	360	N.D.	N.D.	N.D.	N.D.	N.D.
CIS-1,3-DICHLOROPROPENE	ug/l	N.D.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	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.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	31	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	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.@2.0	N.D.@5.0	N.D.@10	N.D.@1	N.D.@10	N.D.@20	N.D.@5.0	N.D.@5.0	N.D.@1	N.D.@200	N.D.@1	N.D.@5.0	N.D.@5.0	N.D.@5.0	N.D.@50	N.D.@10	N.D.@20	N.D.@1	N.D.@1	N.D.@1	N.D.@1	N.D.@1
TOTAL VOCs	ug/l	278	426	310	102	2053	4072	464	276	160	31370	8	312	178	886	11670	2526	3750	5	0	0	0	0
CYANIDE, FREE	mg/l	1.7	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	0.01	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.A.	N.A.	N.A.	N.A.
CYANIDE, TOTAL	mg/l	1.7	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	0.01	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.A.	N.A.	N.A.	N.A.

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

TABLE A-3

GROUNDWATER QUALITY ANALYSES
EXTRACTION WELL SAMPLES (July 1, 1996 - June 30, 1997)
VOLATILE ORGANIC COMPOUND CONCENTRATIONS

Harley-Davidson Motor Company

Sample ID		CW-7A	CW-7A	CW-8	CW-8	CW-9	CW-9	CW-13	CW-13	CW-15A	CW-15A	CW-16	CW-16	CW-16	CW-17	CW-17	CW-17
Lab ID		9062101	9646609	9062102	9646610	9062103	9649902	9062104	9649903	9062005	9649901	9062106	9646508	9646508(dup)	9062107	9649904	9649904(dup)
Sample Date		12/02/96	06/04/97	12/02/96	06/04/97	12/02/96	06/05/97	12/02/96	06/05/97	12/02/96	06/05/97	12/02/96	06/04/97	06/04/97	12/02/96	06/05/97	06/05/97
Parameter	Units																
1,1,1-TRICHLOROETHANE	ug/l	N.D.@100	N.D.@100	N.D.@50	68	140	140	180	N.D.@100	18000	20000	N.D.@100	78	87	N.D.@50	72	72
1,1,2,2-TETRACHLOROETHANE	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@1000	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
1,1,2-TRICHLOROETHANE	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@1000	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
1,1-DICHLOROETHANE	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@1000	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
1,1-DICHLOROETHENE	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	2400	2400	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
1,2-DICHLOROETHANE	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@1000	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
1,2-DICHLOROPROPANE	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@1000	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
1,3-DICHLOROPROPYLENE	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@1000	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
2-CHLOROETHYLVINYL ETHER	ug/l	N.D.@1000	N.D.@1000	N.D.@500	N.D.@200	N.D.@1000	N.D.@1000	N.D.@1000	N.D.@1000	N.D.@10000	N.D.@10000	N.D.@1000	N.D.@500	N.D.@500	N.D.@500	N.D.@500	N.D.@500
BENZENE	ug/l	N.D.@200	N.D.@200	N.D.@100	N.D.@40	N.D.@200	N.D.@200	N.D.@200	N.D.@200	N.D.@2000	N.D.@2000	N.D.@200	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100
BROMOFORM	ug/l	N.D.@200	N.D.@200	N.D.@100	N.D.@40	N.D.@200	N.D.@200	N.D.@200	N.D.@200	N.D.@2000	N.D.@2000	N.D.@200	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100
CARBON TETRACHLORIDE	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@1000	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
CHLOROBENZENE	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@1000	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
CHLOROETHANE	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@1000	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
CHLOROFORM	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@1000	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
DIBROMOCHLOROMETHANE	ug/l	N.D.@200	N.D.@200	N.D.@100	N.D.@40	N.D.@200	N.D.@200	N.D.@200	N.D.@200	N.D.@2000	N.D.@2000	N.D.@200	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100
DICHLOROBROMOMETHANE	ug/l	N.D.@200	N.D.@200	N.D.@100	N.D.@40	N.D.@200	N.D.@200	N.D.@200	N.D.@200	N.D.@2000	N.D.@2000	N.D.@200	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100
ETHYLBENZENE	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@1000	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
METHYL BROMIDE	ug/l	N.D.@500	N.D.@500	N.D.@250	N.D.@100	N.D.@500	N.D.@500	N.D.@500	N.D.@500	N.D.@5000	N.D.@5000	N.D.@500	N.D.@250	N.D.@250	N.D.@250	N.D.@250	N.D.@250
METHYL CHLORIDE	ug/l	N.D.@500	N.D.@500	N.D.@250	N.D.@100	N.D.@500	N.D.@500	N.D.@500	N.D.@500	N.D.@5000	N.D.@5000	N.D.@500	N.D.@250	N.D.@250	N.D.@250	N.D.@250	N.D.@250
METHYLENE CHLORIDE	ug/l	N.D.@200	N.D.@200	N.D.@100	N.D.@40	N.D.@200	N.D.@200	N.D.@200	N.D.@200	N.D.@2000	N.D.@2000	N.D.@200	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100
TETRACHLOROETHENE	ug/l	N.D.@100	N.D.@100	N.D.@50	54	1900	1500	340	230	2600	2800	N.D.@100	57	65	160	78	78
TOLUENE	ug/l	N.D.@200	N.D.@200	N.D.@100	N.D.@40	N.D.@200	N.D.@200	N.D.@200	N.D.@200	N.D.@2000	N.D.@2000	N.D.@200	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100
TRICHLOROETHENE	ug/l	1800	1400	600	570	880	720	2200	1500	28000	26000	760	900	890	770	450	460
VINYL CHLORIDE	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@1000	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
TRANS 1,2-DICHLOROETHENE	ug/l	N.D.@100	N.D.@100	N.D.@50	N.D.@20	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@1000	N.D.@1000	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50
TOTAL VOCs	ug/l	1800	1400	600	692	2920	2360	2720	1730	51000	51200	760	1035	1042	930	600	610

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

TABLE A-3
GROUNDWATER QUALITY ANALYSES
EXTRACTION WELL SAMPLES (July 1, 1996 - June 30, 1997)
VOLATILE ORGANIC COMPOUND CONCENTRATIONS
Harley-Davidson Motor Company

Sample ID		CW-1	CW-1	CW-1A	CW-1A	CW-1A	CW-2	CW-2	CW-3	CW-3	CW-4	CW-4	CW-4	CW-5	CW-5	CW-6	CW-6	CW-7	CW-7
Lab ID		9062003	9646601	9062004	9646602	9646602(dup)	9062105	9646603	9062006	9646604	9062007	9062007(dup)	9646605	9062008	9646606	9062009	9646607	9062010	9646608
Sample Date		12/02/96	06/04/97	12/02/96	06/04/97	06/04/97	12/02/96	06/04/97	12/02/96	06/04/97	12/02/96	12/02/96	06/04/97	12/02/96	06/04/97	12/02/96	06/04/97	12/02/96	06/04/97
Parameter	Units																		
1,1,1-TRICHLOROETHANE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
1,1,2,2-TETRACHLOROETHANE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
1,1,2-TRICHLOROETHANE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
1,1-DICHLOROETHANE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
1,1-DICHLOROETHENE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
1,2-DICHLOROETHANE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
1,2-DICHLOROPROPANE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
1,3-DICHLOROPROPYLENE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
2-CHLOROETHYLVINYL ETHER	ug/l	N.D.@100	N.D.@50	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@50	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@10	N.D.@10	N.D.@100	N.D.@100	N.D.@100	N.D.@50
BENZENE	ug/l	N.D.@20	N.D.@10	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@10	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@2	N.D.@2	N.D.@20	N.D.@20	N.D.@20	N.D.@10
BROMOFORM	ug/l	N.D.@20	N.D.@10	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@10	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@2	N.D.@2	N.D.@20	N.D.@20	N.D.@20	N.D.@10
CARBON TETRACHLORIDE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
CHLOROBENZENE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
CHLOROETHANE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
CHLOROFORM	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
DIBROMOCHLOROMETHANE	ug/l	N.D.@20	N.D.@10	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@10	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@2	N.D.@2	N.D.@20	N.D.@20	N.D.@20	N.D.@10
DICHLOROBROMOMETHANE	ug/l	N.D.@20	N.D.@10	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@10	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@2	N.D.@2	N.D.@20	N.D.@20	N.D.@20	N.D.@10
ETHYLBENZENE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
METHYL BROMIDE	ug/l	N.D.@50	N.D.@25	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@25	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@5	N.D.@5	N.D.@50	N.D.@50	N.D.@50	N.D.@25
METHYL CHLORIDE	ug/l	N.D.@50	N.D.@25	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@25	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@5	N.D.@5	N.D.@50	N.D.@50	N.D.@50	N.D.@25
METHYLENE CHLORIDE	ug/l	N.D.@20	N.D.@10	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@10	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@2	N.D.@2	N.D.@20	N.D.@20	N.D.@20	N.D.@10
TETRACHLOROETHENE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	7	9	180	N.D.@10	N.D.@10	N.D.@5.0
TOLUENE	ug/l	N.D.@20	N.D.@10	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@10	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@20	N.D.@2	N.D.@2	N.D.@20	N.D.@20	N.D.@20	N.D.@10
TRICHLOROETHENE	ug/l	110	110	190	400	400	67	71	200	99	180	190	200	38	35	130	110	100	86
VINYL CHLORIDE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
TRANS 1,2-DICHLOROETHENE	ug/l	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@5	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@10	N.D.@1	N.D.@1	N.D.@10	N.D.@10	N.D.@10	N.D.@5.0
TOTAL VOCs	ug/l	110	110	190	400	400	67	71	200	99	180	190	200	45	44	310	110	100	86

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

TABLE A-4
WATER QUALITY ANALYSES
PACKED TOWER AERATOR SAMPLES (July 1, 1996 - June 30, 1997)
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.
Lab ID		8568002	8625701	8676601	8723101	8773702	8851201	8902803	8942601	8982101	9045401	9062002	9124501
Sample Date		07/03/96	07/24/96	08/08/96	08/21/96	09/05/96	09/26/96	10/10/96	10/24/96	11/06/96	11/22/96	12/02/96	12/19/96
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
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
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
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
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
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
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
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
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
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
TRANS 1,2-DICHLOROETHENE	ug/l	N.A.	N.D.@1	N.D.@1	N.D.@1	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-DICHLOROETHENE (TOTAL)	ug/l	N.D.@1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
TOTAL VOCs	ug/l	0	0	0	0	0	0	0	0	0	0	0	0

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		9178502	9214101	9269302	9304801	9353301	9399401	9475402	9517201	9563101	9609001	9646502	9676501	9706801
Sample Date		01/10/97	01/23/97	02/07/97	02/20/97	03/06/97	03/20/97	04/10/97	04/24/97	05/08/97	05/22/97	06/04/97	06/12/97	06/19/97
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.@1	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	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	3	2	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
1,2-DICHLOROETHENE (TOTAL)	ug/l	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
TOTAL VOCs	ug/l	0	0	0	0	0	0	0	0	0	4	2	0	0

Sample ID		PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.	PTA Infl.
Lab ID		8568001	8676602	8773701	8902802	8982102	9062001	9178501	9269301	9353302	9475401	9475401(dup)	9563102	9646501
Sample Date		07/03/96	08/08/96	09/05/96	10/10/96	11/06/96	12/02/96	01/10/97	02/07/97	03/06/97	04/10/97	04/10/97	05/08/97	06/04/97
Parameter	Units													
1,1,1-TRICHLOROETHANE	ug/l	320	N.D.@50	620	310	340	250	480	290	420	220	230	440	61
1,1-DICHLOROETHANE	ug/l	7	N.D.@50	6	N.D.@50	N.D.@50	N.D.@100	N.D.@50	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@20
1,1-DICHLOROETHENE	ug/l	52	N.D.@50	86	N.D.@50	N.D.@50	N.D.@100	60	N.D.@100	66	N.D.@50	N.D.@50	N.D.@50	N.D.@20
1,2-DICHLOROETHANE	ug/l	N.D.@5	N.D.@50	N.D.@5	N.D.@50	N.D.@50	N.D.@100	N.D.@50	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@20
CHLOROBENZENE	ug/l	N.D.@5	N.D.@50	N.D.@5	N.D.@50	N.D.@50	N.D.@100	N.D.@50	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@20
CHLOROFORM	ug/l	N.D.@5	N.D.@50	N.D.@5	N.D.@50	N.D.@50	N.D.@100	N.D.@50	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@20
DICHLOROBROMOMETHANE	ug/l	N.D.@10	N.D.@100	N.D.@10	N.D.@100	N.D.@100	N.D.@200	N.D.@100	N.D.@200	N.D.@100	N.D.@100	N.D.@100	N.D.@100	N.D.@40
TETRACHLOROETHENE	ug/l	510	460	630	530	560	410	670	290	360	400	400	400	62
TRICHLOROETHENE	ug/l	1600	1700	2000	1500	1600	1300	1800	1000	1600	1200	1200	1300	600
VINYL CHLORIDE	ug/l	5	N.D.@50	N.D.@5	N.D.@50	N.D.@50	N.D.@100	N.D.@50	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@20
TRANS 1,2-DICHLOROETHENE	ug/l	N.A.	N.D.@50	N.D.@5	N.D.@50	N.D.@50	N.D.@100	N.D.@50	N.D.@100	N.D.@50	N.D.@50	N.D.@50	N.D.@50	N.D.@20
1,2-DICHLOROETHENE (TOTAL)	ug/l	590	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
TOTAL VOCs	ug/l	3084	2160	3342	2340	2500	1960	3010	1580	2446	1820	1830	2140	723

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

TABLE A-5
GROUNDWATER QUALITY ANALYSES
OFF-SITE SAMPLES (July 1, 1996 - June 30, 1997)
VOLATILE ORGANIC COMPOUND AND CYANIDE CONCENTRATIONS
Harley - Davidson Motor Company

Sample ID		RW-4	RW-4	RW-4	RW-4	RW-5	RW-5	RW-5	RW-5	S-6	S-6	S-6	S-6	S-7	S-7	S-7	S-7	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Lab ID		8765303	9064303	9353403	9646505	8765304	9064304	9353404	9646506	8765301	9064301	9353401	9646503	8765302	9064302	9353402	9646504	8765305	9064305	9353405	9646507
Sample Date		09/04/96	12/03/96	03/06/97	06/04/97	09/04/96	12/03/96	03/06/97	06/04/97	09/04/96	12/03/96	03/06/97	06/04/97	09/04/96	12/03/96	03/06/97	06/04/97	09/04/96	12/03/96	03/06/97	06/04/97
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	77	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	2	2 B	3	4	N.D.@1	N.D.@1	N.D.@1	1	N.D.@1	2	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	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	2	2	1	1	N.D.@1	N.D.@1	N.D.@1	N.D.@1	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	9	6	3	4	N.D.@1	N.D.@1	N.D.@1	N.D.@1	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	11	8	4	5	2	2	3	4	0	0	2	1	0	79	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	N.D.@0.005	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	N.D.@0.005	N.D.@0.005	N.D.@0.005	N.A.	N.A.	N.A.	N.A.

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

LEGEND

⊙MW-2 MONITORING WELL LOCATION

10/96 – DATE SAMPLED
<1 – 1, 1, 1 – TCA (ppb)
1 – CIS/TRANS-1, 2-DCE (ppb)
120 – TCE (ppb)
360 – PCE (ppb)
481 – TOTAL VOLATILE ORGANIC COMPOUNDS (ppb)

200' 0 200' 400'
SCALE IN FEET

NO.	DESCRIPTION	DATE	BY

REVISIONS

HARLEY–DAVIDSON INC.

SELECTED VOC CHEMISTRY
JULY 1, 1996 THROUGH JUNE 30, 1997

drawn RAM	checked BDS	approved SMS	plate
date 06/20/97	date 4/30/98	date 4/30/98	1
job no. 01-1408-05-7739-104		file no. 96003-005-D	

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