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**Evaluation of Petroleum Fuel Attenuation Rates in the
Western Santa Clara Valley Ground Water Basin**

A Thesis

**Presented to the Department of Geology
San Jose State University**

**In Partial Fulfillment
of the Requirements for the Degree
Master of Science**

**by
Peter Mark Langtry
August, 1997**

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ABSTRACT

EVALUATION OF PETROLEUM FUEL ATTENUATION RATES IN THE WESTERN SANTA CLARA VALLEY GROUND WATER BASIN

by Peter Mark Langtry

Reported fuel leak cases were reviewed at the Santa Clara Valley Water District to evaluate the attenuation of petroleum fuels dissolved in ground water in the approximate western half of the Santa Clara Valley ground water basin. Sites with wells that met the criteria of decreasing concentrations of gasoline range petroleum hydrocarbons, including benzene, were included in this study.

The attenuation rate constants for gasoline range hydrocarbons and benzene were found to have a mean of $-0.002/\text{day}$ and fell within a relatively narrow range, indicating that similar attenuation processes are occurring throughout the study area. Sites with attenuation rate constants above the mean were found to be more likely to follow first order degradation, while sites with attenuation rate constants less than the mean were less likely to follow first order degradation. The attenuation rate constants do not appear to be influenced significantly by environmental conditions or site history factors.

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INTRODUCTION

Many regions of the United States rely upon ground water to supply water for domestic, agricultural, and industrial uses. This reliance upon ground water has focused attention on the quality of ground water resources, with particular emphasis upon protection of human health. The Santa Clara Valley has historically relied heavily upon ground water. Potential impacts to the quality of ground water in the Santa Clara Valley include salt water intrusion, leakage of chemicals from underground storage tanks (USTs), leaching of wastes from septic systems, migration of leachates from landfills, and leaching of residual pesticides in surficial soils. The extent of the Santa Clara Valley ground water basin is shown on Figure 1.

Over 1,000 sites in the Santa Clara Valley with reported leaking USTs have impacted ground water. The majority of the leaking USTs contained gasoline or diesel. The impacts to ground water are commonly limited to uppermost ground water bearing zones (generally shallow) beneath the fuel leak sites. Shallow ground water in the Santa Clara Valley ranges in depth from approximately 5 feet near the San Francisco Bay to 100 feet or greater in the higher elevations of the valley. Relatively few reported cases of petroleum fuel hydrocarbons have impacted domestic or agricultural wells. The majority of these wells generally draw water from deeper aquifers greater than 100 feet below the surface.

The objective of this thesis is to study the degradation of petroleum hydrocarbons in ground water at petroleum fuel leak sites in selected areas of the Santa Clara Valley ground water basin to: 1) determine the observed degradation rates of total petroleum

Figure 1. Map of Santa Clara Valley ground water basin showing approximate boundary of study area.

hydrocarbons (TPH) as gasoline and benzene in the study area, and 2) evaluate whether hydrogeologic and site history factors can be identified that affect the degradation rates.

BACKGROUND

Fate of Petroleum Fuel Contaminants in Ground Water

Concentrations of dissolved petroleum hydrocarbons in ground water decrease by natural attenuation mechanisms that involve chemical, physical, and biological processes. Chemical processes include hydrolysis and other chemical reactions, but are not significant with petroleum fuel compounds (McAllister and Chiang, 1994). Physical processes include volatilization, sorption, and dispersion. Dispersion is the physical mixing and dilution of a solute as it travels through a porous medium, and will result in an apparent attenuation of contaminants over time. Volatilization is the process by which dissolved contaminants volatilize from ground water into soil gas of the vadose zone. The sorption of organic compounds onto aquifer soils depends on the octanol-water partitioning coefficient of the compounds and the organic content of the soils. The physical processes do not reduce the overall mass of the contaminants, although volatilization does result in removal of some contaminants from the ground water. In contrast, degradation does reduce the mass of organic contaminants as a result of biologically mediated and abiotic oxidation. The generalized metabolism of a petroleum hydrocarbon of the empirical formula C_xH_y in the presence of oxygen can be represented by:

In addition, organic compounds can be utilized as a carbon source under anaerobic conditions, with the electron donor being nitrate, nitrite, sulfate, or carbon in the organic

molecule itself. The generalized metabolism of a petroleum hydrocarbon of the empirical formula C_xH_y in the presence of nitrate can be represented by:

The natural biodegradation of petroleum hydrocarbons in ground water has received considerable attention in the last several years. A study performed by Hadley and Armstrong (1991) concluded that biodegradation of benzene in the ground water was the likely reason for the near absence of benzene in drinking water supply wells in California. In addition, Davis et al. (1994), Klecka et al. (1990), and Hutchins et al. (1991) have performed studies which indicated the importance of biological processes on the attenuation of petroleum hydrocarbons in ground water.

The study performed by Davis et al. (1994) focused on ground water impacted with benzene. Based on analyses of ground water samples, laboratory biodegradation tests, and computer modeling, the study concluded that aerobic biodegradation was the primary mechanism for the attenuation of benzene beneath the study site. The aquifer beneath the study site was reported to be unconfined and composed primarily of silty sand. The average rate of benzene loss measured in the laboratory was calculated to be 6.7 $\mu\text{g/day}$ and 13 $\mu\text{g/day}$ at initial concentrations of 1 mg/kg and 10 mg/kg, respectively.

A study of natural biodegradation at the Cliffs-Dow superfund site in Michigan was performed by Klecka et al. (1990). The study demonstrated the occurrence of aerobic biodegradation of phenolic and polycyclic aromatic compounds in an unconfined shallow aquifer. Although observed degradation rates of the compounds based on field analytical data were not discussed, laboratory studies indicated that the degradation of the organic compounds was first order. The aerobic biodegradation laboratory microcosms

reportedly resulted in the mineralization of 60 to 70 percent of the initial mass of the organic substrate after 4 weeks of incubation; the actual rates were not reported.

The study performed by Hutchins et al. (1991) focused on the effects of nitrate addition to ground water contaminated with jet fuel (JP-4). Ground water at the study site was present within a sandy, shallow, unconfined aquifer. The study indicated that aerobic biodegradation and denitrification were the primary factors in observed reductions of petroleum fuels at the study site. Benzene was found to be degraded quickly under aerobic conditions at the site. Toluene, ethylbenzene, and xylene degradation was found to be enhanced under anaerobic, denitrifying conditions.

Most types of petroleum hydrocarbons are biodegradable, including aliphatic, olefinic, and aromatic compounds. However, some types of high molecular weight asphaltines may degrade very slowly (Borden and Bedient, 1986a and 1986b). Limiting factors for the rate of natural biodegradation include the diffusion rate of atmospheric oxygen into the unsaturated soil zone and into the ground water, the availability of necessary inorganic nutrients, and the presence of bacterial species that can metabolize the petroleum hydrocarbon contaminants. Inorganic nutrients required for microbial activity include nitrogen, phosphorus, sulfur, and iron.

Buscheck et al. (1993) predicted the first order attenuation rate of petroleum hydrocarbons at several fuel leak sites using ground water quality monitoring data. By assuming a first order degradation rate for a hydrocarbon contaminant, the change in concentration (C) with time can be represented by:

$$dC/dt = -kC$$

where: t is time (T)

k is the first order degradation rate constant (T^{-1}).

The solution to the above equation can further be represented by the exponential expression:

$$C(t) = C_0 e^{-kt}$$

where: $C(t)$ is the concentration as a function of time t

C_0 is the concentration at $t = 0$.

The ground water quality data used in the decay rate calculation was obtained from one or more monitoring wells located within a shrinking soluble plume. Busheck et al. (1993) noted that first order decay is appropriate for low concentrations (less than 1 part per million {ppm}) of dissolved petroleum hydrocarbons.

A study of fuel leak sites in California with petroleum fuel impacted ground water was performed by Rice et al. (1995) to evaluate trends in both plume lengths and dissolved fuel concentrations. The study identified four stages in the life of a plume of dissolved petroleum fuel, shown on Figure 2. The first stage occurs soon after the petroleum fuels reach the ground water and is characterized by increasing concentrations. During the second stage, the petroleum fuel concentrations are relatively stable. The first and second stages were termed the "active source period," because there is a source of fuel, such as free product or fuel absorbed onto soil particles, that continues to contribute to the dissolved fuel concentrations. When the source is no longer present as a result of remediation and/or natural attenuation, the plume enters the third stage, when the

Figure 2. Hypothetical change in average concentration of dissolved petroleum fuel hydrocarbons during the life of a plume (after Rice et al., 1995). The theoretical linear decay as a result of dispersion only is shown as a dashed line.

concentrations begin to decrease logarithmically. Eventually, the plume enters the fourth stage, which Rice et al. termed the "exhausted plume" phase. This stage was generally characterized by low average benzene concentrations. Of 271 sites in California that met their study criteria (well characterized plumes and site conditions), 8 percent were in the first stage, 16 percent were in the second stage, 59 percent were in the third stage, and 17 percent were in the fourth stage of concentration trends.

The study by Rice et al. (1995) found that sites with significant negative trends in concentration showed a range of attenuation rates. The calculated site average attenuation rate constants ranged from a 90 percentile of -0.002/day (90 percent of values less than -0.002/day) to a 10 percentile of -0.0004/day (10 percent of values less than -

0.0004/day), with a median of -0.0008/day. Since the concentration trends were log-linear, the inverse of the attenuation rates were interpreted as the amount of time required for a decrease in concentration to 10 percent of the original value. These times ranged from approximately 500 to 2,500 days (approximately 1.5 to 7 years) with a median of 1,175 days (approximately 3.2 years). The study concluded that the benzene attenuation rate constants were not normally distributed.

Decreases in concentration as a result of dispersion during transportation would likely be linear, as opposed to the logarithmic decay of biodegradation. The theoretical decrease in concentration as a result of dispersion only is shown on Figure 2. Since the contribution of the various attenuation processes may vary from one location to another, the observed attenuation can theoretically range from linear to logarithmic, with the behavior approaching logarithmic as biological processes become more prominent.

Characteristics of the Santa Clara Valley Ground Water Basin

The aquifers in Santa Clara Valley that are used for drinking water sources are generally present at depths of at least 100 feet. These aquifers have been generally grouped into two areas:

- Forebay areas at the perimeter of the ground water basin, where aquifers are primarily unconfined and consist of alluvial fan and alluvial deposits, and
- Confined ground water zone of the valley consisting of fine and coarse alluvium interbedded with deposits of the San Francisco Bay (State of California Department of Water Resources, 1967).

The shallow, uppermost ground water bearing zones that are most likely to be impacted with petroleum fuels are present at depths of up to approximately 100 feet near the perimeter of the valley (forebay areas) and are as shallow as 5 feet near the San Francisco Bay. These shallow water bearing zones in the northern confined zone are typically heterogeneous and are generally less than approximately 25 feet thick. Due to the low transmissivities and naturally poor ground water quality, these shallow ground water bearing zones are not currently used as a drinking water source. The shallow ground water bearing zones are generally unconfined in the forebay area and confined closer to the bay, as discussed above. However, due to heterogeneities in the shallow sediments, this relationship is not as consistent as it is for the deeper aquifers.

METHODOLOGY

Selection of Study Area

The study focused on reported fuel leaks in the cities of Campbell, Cupertino, Los Altos, Los Gatos, Mountain View, Palo Alto, Santa Clara, Saratoga, and Sunnyvale, which occupy the western portion of the Santa Clara Valley ground water basin (Figure 1). The study area was selected to provide a representative sample of the Santa Clara Valley ground water basin, from the forebay near the base of the foothills to the confined area of the basin closer to the San Francisco Bay.

Selection of Target Petroleum Hydrocarbon Contaminants

This study focused on TPH as gasoline and benzene. Most studies have focused on benzene rather than TPH as gasoline for two primary reasons: 1) benzene is a known carcinogen and therefore poses a significant threat to human health; and 2) laboratory analysis for TPH as gasoline is non-specific and includes petroleum hydrocarbons generally ranging from C-6 to C-18 chain compounds. The TPH as gasoline analysis also includes benzene. The original composition of the petroleum fuel will vary, depending on the year produced and the manufacturer. When released into the environment, the fuels undergo modification as a result of natural attenuation, and the residual fuel composition will be dependent on the age of the release, remedial activities, and natural processes specific to a particular site. As a result of the variability in the composition of the source of the TPH as gasoline, the behavior of TPH as gasoline is more prone to variability between sites than is the behavior of benzene. However, TPH as gasoline was included in

this study since it has generally not been evaluated in previous studies and monitoring data is readily available.

Selection of Sites

This study focused on sites where dissolved hydrocarbon concentrations are decreasing, or in the third phase of the life of a plume as described by Rice et al. (1995). Fuel leak cases within the study area on-file at the SCVWD were the source of the chemical concentration and hydrogeologic data. Cases were eliminated from review if dissolved petroleum fuels displayed increasing, stable, or low concentrations (exhausted plumes). Therefore, the initial step was essentially a sorting process to extract the sites with decreasing concentrations. The reason for a site being eliminated from review was recorded, but it was not the intent of this study to analyze the entire population of fuel leak sites in the study area, only those which showed decreasing concentrations to evaluate causes of natural attenuation.

For fuel leak files reviewed, each file was initially screened to evaluate whether it met the following criteria:

- There were at least four sampling events spanning at least one-year in one or more monitoring wells located within a dissolved petroleum fuel plume down-gradient of the former source area.
- There were soil boring logs available to evaluate soil conditions and hydrogeologic conditions at the site.

- The ground water flow direction beneath the site remained relatively stable. Occasional or seasonal excursions from the predominant ground water flow direction were allowed.

The selection of sites for review was revised part way into the research process. Initially, a database list of the SCVWD sites with ground water impact was compiled. This list consisted of the SCVWD case type "O" sites, which are defined as "other ground water, any other actual or potential use other than drinking water or no beneficial use" (SCVWD, 1995). All fuel leak sites with impacted ground water are listed as "O" case types. Fuel leak cases listed on the database printout in the cities of Campbell, Cupertino, Los Altos, Los Altos Hills, Los Gatos, Mountain View, and Palo Alto were reviewed (total of 173 cases listed on database printout).

Some cases without ground water impact are listed as the "O" case types that were included in the initial database printout. To help reduce research time, a new list was created with the help of Jim Crowley of the SCVWD that listed the initial and current ground water concentrations of TPH. This capability was not available when the research began since the SCVWD had not yet completed expanding their database to include TPH concentrations. For the cities of Santa Clara and Sunnyvale (total of 160 reported fuel leak cases impacting ground water), sites were able to be screened based on the initial and current TPH concentrations. Sites that showed an increase in concentration and those that showed stable concentrations between the initial and current levels were not reviewed. In addition, sites where low concentrations (less than 500 µg/l TPH) were initially detected or where there was no ground water impact were also not reviewed. The selection of the 500 µg/l threshold was based on the results of the first phase of file reviews; sites where

initial concentrations were less than 500 $\mu\text{g/l}$ generally did not have sufficient data or meet the selection criteria.

Many files were not available for review at the time of the research visits to the SCVWD file room. Reasons for this included files being checked out by the case managers and the managers not being present, files being sent out to be placed on microfiche, files checked out for update of the SCVWD database, and other reasons. Since the presence or absence of files was a random event, the missing files are not anticipated to have a significant impact on the overall data set.

Flow charts for the two phases of file review, based on the two database lists, are presented in Figures 3 and 4. A breakdown of the sites reviewed and eliminated is presented below in Table 1.

Table 1. Summary of fuel leak sites eliminated from the study.

Campbell, Cupertino, Los Altos, Los Gatos, Mountain View, Palo Alto	
Less than 4 consecutive monitoring events with decreasing TPH concentrations	14
No impacted down-gradient wells	1
Ground water flow direction highly variable	3
Free product present in down-gradient well	1
Stable or increasing concentrations	7
No significant impact down-gradient of source (initial concentration less than 500 ppb TPH, sporadic detections of TPH) or no ground water data (soil only)	33
Outside of ground water basin (foothills)	3
Suspect data (poor report quality, incomplete reporting, well screen intervals suspect, up-gradient source possibly contributing to TPH concentrations detected down-gradient of source)	4
Non-fuels reported in TPH analysis	5
Total Eliminated After File Review	71
Files not available to be located for review	67
Files included in study	35

Table 1. (continued) Summary of fuel leak sites eliminated from study

Santa Clara, Sunnyvale	
Sites Eliminated after Initial Screening	
Increasing or stable concentrations	9
No ground water impact or initial concentrations less than 500 ppb TPH	59
Total Eliminated After Initial Screening	64
Sites Eliminated after Review	
Less than 4 consecutive monitoring events with decreasing TPH concentrations	2
No impacted down-gradient wells	3
Ground water flow direction highly variable	3
Free product present in down-gradient well	2
Stable or increasing concentrations	6
No significant impact down-gradient of source (initial concentration less than 500 ppb TPH, sporadic detections of TPH) or no ground water data (soil only)	11
Suspect data (poor report quality, incomplete reporting, well screen intervals suspect, up-gradient source possibly contributing to TPH concentrations detected down-gradient of source)	2
Total Eliminated After File Review	29
Files not able to be located for review	38
Files included in study	29

Data Collection

Files that met the above criteria were then reviewed in further detail to gather data on ground water quality and hydrogeologic conditions. The data were gathered for each well at a site that met the selection criteria. Boring logs were reviewed to assess whether the site is under confined or unconfined conditions, and to record the aquifer materials. The aquifer materials were categorized using the United Soil Classification System. A

Figure 3. Flow chart of file review process for cities of Campbell, Cupertino, Los Altos, Los Altos Hills, Los Gatos, Mountain View, and Palo Alto.

Figure 4. Flow chart of file review process for cities of Sunnyvale and Santa Clara.

summary of the numeric and descriptive information gathered is presented in Table 2 below.

Table 2. Summary of numeric and descriptive information gathered

- Remediation Performed (i.e., none, soil vapor extraction, pump and treat, etc.)
- Aquifer Materials (i.e., clayey sand, silty sand, silt, etc.)
- Confined vs. Unconfined
- Ground Water Elevations and Depths
- Distance from Monitoring Well to Source (UST, fuel pump island, etc.)
- Ground Water Gradient
- Ground Water Quality Data (TPH as gasoline and benzene)
- Dates of Monitoring Events

The data were collected on a two-page form, which is presented in Appendix A. The first page is a summary of site conditions and the second form is for recording contaminant concentration and ground water elevation data. Data were recorded for each monitoring well at a site that met the data screening criteria. When there were tables with historical ground water quality data, a photocopy of the table was used instead of the second page of the data form. Forty-two sites with one well, 18 sites with two wells, and four sites with three wells met the criteria.

Data Analysis

For sites where free product has historically been present, only the data since the disappearance of free product in the selected well was evaluated. In addition, some monitoring wells display an increasing concentration trend early in the monitoring history, possibly as a result of the fuel release impacting ground water. Other monitoring wells show initial relatively stable concentrations down-gradient of the source. Most of these

sites eventually show a decreasing concentration trend, depending on where the data "window" is in relation to the life of the plume. Only the data from the decreasing trend were evaluated, beginning at the highest concentration peak. A minimum of four data points were evaluated, which included a minimum of three detected concentrations and one non-detect (ND) value. For sites where concentration data decreases to ND, the data were evaluated until the first ND value. The ND value(s) were evaluated at one half the detection limit.

Prior to evaluating the data, a log transformation was performed on the concentration values so that the slope (degradation rate) of the least squares regression could be calculated. Analytical results for duplicate samples were averaged. The transformed data for each well that met the selection criteria were plotted and evaluated using Mathcad 6.0 (MathSoft Inc.). For sites where the data plot approximately on a straight line, the degradation can be described as first order decay. Taking the log of both sides of equation (2) yields:

$$\log C(t) = \log(C_0) + kt$$

Mathcad 6.0 was used to calculate the attenuation rate constant (k), the correlation coefficient (r), and the coefficient of determination (r^2) value. The slope of the line and the correlation parameters are estimated by Mathcad using least squares methods. The value of r lies between -1 and +1. A negative value of r indicates a negative relationship between concentration and time, with the relationship becoming more linear as r approaches -1 or +1. The r^2 provides the proportion of the total variability of concentration that can be accounted for by the independent variable time (Ott, 1984). As r^2 approaches 1, the degradation rate approaches first order decay. The ground water

elevations were also plotted on the Mathcad output to qualitatively evaluate sites where there is a relationship between ground water elevations and concentrations. Ground water elevations were plotted on the graphs to evaluate which sites show a relationship between concentrations and ground water elevation. The Mathcad output and graphs for all of the sites are shown in Appendix B.

Statistical Evaluation

The distributions of the TPH as gasoline and benzene degradation rate constants were tested for normal distribution using the chi-square (χ^2) method. The chi-squared tests were performed to back up the histograms of the data, to evaluate whether the observed distributions can be described as normal. The primary purpose of testing for normal distributions is that if a population is normally distributed, further statistical tests can be performed and inferences can be made about the population distribution. These inferences include predicting the percentage of values that lie within a specified number of standard deviations about the mean.

F-tests were also performed to evaluate whether the variances of groupings of data based on aquifer soil types, confined versus unconfined conditions, and remedial activities were statistically different, and therefore possibly from different parent populations. If a set of values appears to be collected from different populations, then there may be different processes operating under each circumstance (i.e., confined versus unconfined aquifer conditions).

To estimate the degree of interrelation between variables, such as monitoring well distance from source versus degradation rate constant, data were plotted against each other and the correlation coefficients were calculated. These plots were performed to help

identify relationships that may influence observed degradation rate constants. Details of the statistical evaluation are presented in the following section.

RESULTS

The results of the individual site/well calculations are summarized in Table C-1 in Appendix C, along with other numeric and non-numeric site conditions. Table C-1 lists values for each well. Average values for sites with two or three wells are shown in bold. The spread sheet was used to plot data graphically and to perform statistical analyses. The spreadsheet enabled the data to be sorted for various conditions, such as confined versus unconfined, remedial activities, and aquifer soil type.

Descriptive Summary of TPH as Gasoline and Benzene Attenuation Rate Constants

The calculated attenuation rates are summarized below in Tables 3 and 4. The data is presented in Table 3 based on individual values for each site, which is either the value for one well or the average of two or three wells, depending on the number of wells meeting the selection criteria at a site. The data is presented in Table 4 based on the values for each individual well. The purpose of analyzing the data by the two approaches in Tables 3 and 4 was to evaluate whether there are differences in distribution of attenuation rate constants between the approaches. If the distributions are similar between the two approaches, then results of this study can be applied to sites where only one well is available down-gradient of the source.

To describe the observed attenuation rate constants, the mean, median (50th percentile), minimum, and maximum values are shown on Tables 3 and 4. In addition, the 5th percentile, 25th percentile, 75th percentile, and 95th percentile are also presented in Tables 3 and 4. These percentages are the level below which a given percentage of values lie. For example, for the 25th percentile, 25 percent of the values are less than the stated

Table 3. Summary of attenuation rate constants (k) by site (includes average value for sites with more than one well)

	No. of Sites	Mean k	5th Percentile k	25th Percentile k	Median (50th Percentile) k	75th Percentile k	95th Percentile k	Minimum k	Maximum k
Confined and Unconfined (combined)									
TPH Gasoline	64	-0.002/day	-0.002/day	-0.001/day	-0.002/day	-0.003/day	-0.004/day	-0.0002/day	-0.009/day
Benzene	51	-0.002/day	-0.0006/day	-0.001/day	-0.002/day	-0.004/day	-0.004/day	-0.0004/day	-0.01/day
Confined									
TPH Gasoline	42	-0.002/day	-0.0002/day	-0.001/day	-0.002/day	-0.003/day	-0.004/day	-0.0002/day	-0.004/day
Benzene	34	-0.002/day	-0.0007/day	-0.001/day	-0.002/day	-0.003/day	-0.004/day	-0.0004/day	-0.01/day
Unconfined									
TPH Gasoline	21	-0.003/day	-0.0008/day	-0.002/day	-0.002/day	-0.004/day	-0.006/day	-0.0003/day	-0.009/day
Benzene	17	-0.003/day	-0.0006/day	-0.001/day	-0.002/day	-0.004/day	-0.006/day	-0.0006/day	-0.007/day

Note: The percentiles are the level below which a given percentage of values lie. For example, for the 25th percentile, 25 percent of the values are less than the stated value and 75 percent of the values are greater than the stated value.

Table 4. Summary of attenuation rate constants (k) by well

	No. of wells	Mean k	5th Percentile k	25th Percentile k	Median (50th Percentile) k	75th Percentile k	95th Percentile k	Minimum k	Maximum k
Confined and Unconfined (combined)									
TPH Gasoline	87	-0.002/day	-0.002/day	-0.001/day	-0.002/day	-0.003/day	-0.005/day	-0.00003/day	-0.02/day
Benzene	54	-0.002/day	-0.0004/day	-0.001/day	-0.002/day	-0.004/day	-0.005/day	-0.0001/day	-0.01/day
Confined									
TPH Gasoline	56	-0.002/day	-0.0002/day	-0.001/day	-0.002/day	-0.003/day	-0.004/day	-0.0002/day	-0.006/day
Benzene	50	-0.002/day	-0.0004/day	-0.001/day	-0.002/day	-0.003/day	-0.005/day	-0.0002/day	-0.01/day
Unconfined									
TPH Gasoline	31	-0.003/day	-0.0001/day	-0.002/day	-0.002/day	-0.003/day	-0.006/day	-0.00003/day	-0.02/day
Benzene	24	-0.003/day	-0.0006/day	-0.001/day	-0.002/day	-0.003/day	-0.006/day	-0.0001/day	-0.007/day

Note: The percentiles are the level below which a given percentage of values lie. For example, for the 25th percentile, 25 percent of the values are less than the stated value and 75 percent of the values are greater than the stated value.

value and 75 percent of the values are greater than the stated value. These percentages were selected to provide a description of the distribution of values around the mean and in the tail regions of the distribution.

The data is categorized in Tables 3 and 4 three ways: 1) confined and unconfined combined, 2) confined, and 3) unconfined. The reason for splitting the data into confined versus unconfined is to evaluate whether there are statistically significant differences in degradation processes between these two hydrogeologic conditions.

Tables 3 and 4 indicate that the attenuation rate constants vary over a relatively narrow range. In addition, there does not appear to be a significant difference in distributions of the attenuation rate data between the data set for individual wells and site averages. An evaluation of the data for confined versus unconfined conditions is discussed below.

Descriptive Summary of TPH as Gasoline and Benzene Coefficients of Determination

To evaluate whether the attenuation of TPH as gasoline and benzene can be described as first order decay (logarithmic), the coefficient of determination (r^2) values were calculated for each site. As r^2 approaches 1, the decay approaches first order. The calculated r^2 for each site are presented below in Tables 5 and 6. The data are presented in Table 5 based on individual values for each site, which is either the value for one well or the average of two or three wells, depending on the number of wells at a site meeting the selection criteria. The data is presented in Table 6 based on values for each individual well. To describe the observed correlations, the mean, median (50th percentile), 75th percentile, and 95th percentile, plus minimum and maximum values are shown.

Table 5. Summary of coefficient of determination (r^2) of TPH as gasoline and benzene by site (includes average value for sites with more than one well)

	Number of Sites	Mean r^2	Median (50th Percentile) r^2	75th Percentile r^2	95th Percentile r^2	Minimum r^2	Maximum r^2
Confined							
TPH Gasoline	40	0.63	0.68	0.76	0.93	0.08	0.99
Benzene	36	0.61	0.67	0.80	0.93	0.07	0.95
Unconfined							
TPH Gasoline	21	0.60	0.70	0.76	0.98	0.08	0.99
Benzene	17	0.57	0.71	0.74	0.86	0.05	0.92

Table 6. Summary of coefficient of determination (r^2) of TPH as gasoline and benzene for individual wells

	Number of Wells	Mean r^2	Median (50th Percentile) r^2	75th Percentile r^2	95th Percentile r^2	Minimum r^2	Maximum r^2
Confined							
TPH Gasoline	56	0.63	0.68	0.81	0.93	0.05	0.99
Benzene	50	0.63	0.72	0.82	0.95	0.006	0.96
Unconfined							
TPH Gasoline	31	0.58	0.72	0.78	0.95	0.002	0.99
Benzene	24	0.57	0.61	0.80	0.95	0.002	0.98

The data are grouped by confined and unconfined ground water conditions. The reason for this grouping is to evaluate whether there are noticeable differences in degradation processes between these two hydrogeologic conditions.

The data presented in Tables 5 and 6 indicates that the coefficient of determination data varies significantly from site to site. There also does not appear to be a significant

difference in the distribution of values between the data set for individual wells and site averages.

Statistical Analysis of Attenuation Rate Constant and Coefficient of Determination Data

Tests for Normal (Gaussian) Distribution of Attenuation Rate Constant Data

Histograms of the TPH as gasoline and benzene attenuation rate constant data generally appear to display normal distributions. The distributions are presented in Figures 5, 6, and 7, grouped as combined confined and unconfined aquifers (Figure 5), confined aquifers only (Figure 6), and unconfined aquifers only (Figure 7). To evaluate whether the distributions can be described as normal, chi-square (χ^2) tests were performed.

The χ^2 method tests how well a distribution of sample values conforms to a normal distribution by using a goodness-of-fit test procedure. A null hypothesis (N_0) is initially stated that the population of the degradation rates from which the sample is drawn is normally distributed with an unknown mean and variance. The alternative hypothesis (N_1) is that the parent population is not normally distributed. The normal distribution is then divided into equal segments, with each segment having equal area under the curve. The probability that a random observation will fall into each segment will then be equal to the area under each curve. If four segments are selected that have equal areas, then a random observation would have a probability of 0.25 of falling into a particular segment. The limits of the equal sized areas, expressed as standard deviations of a normal curve, are $-\infty$ to -0.67, -0.67 to 0, 0 to +0.67, and +0.67 to $+\infty$. The expected frequency of observations falling into each category (one fourth) is then compared to the observed frequency. If the number deviates significantly from expected, the null hypothesis is

Figure 5. Histograms of attenuation rate constants, confined and unconfined aquifers combined.

Figure 6. Histograms of attenuation rate constants, confined aquifers

Figure 7. Histograms of attenuation rate constants, unconfined aquifers

rejected, and the sample distribution is probably not normal (Davis, 1986). A level of significance of 10 percent was selected for the tests, meaning that there is a one in ten chance of rejecting the null hypothesis when it is actually correct.

The first step is to standardize the data using the following equation:

$$Z_i = X_i - X/s$$

where Z_i is the standardized i th value, X_i is the i th value, X is the sample mean, and s is the sample standard deviation. The number of values within each standard deviation range are then summed. The χ^2 is then calculated by the following equation:

$$\chi^2 = \sum (O_j - E_j)^2 / E_j$$

where O_j is the number of observations within the j th class and E_j is the number of observations expected in that class. The χ^2 value is then compared to the critical value at the level of significance (10 percent) and one degree of freedom. If the χ^2 value exceeds the critical value, then the null hypothesis is rejected and the conclusion can be made that the distribution is not normal (Davis, 1986).

The calculations were performed using Excel spreadsheets. The results of the χ^2 tests (Table 7) show that the distribution of benzene attenuation rates is normally distributed and that the TPH as gasoline attenuation rates are normally distributed for confined conditions only. The tests were performed for both TPH as gasoline and benzene under three conditions: 1) where the values for confined and unconfined aquifers were combined; 2) unconfined aquifers only; and 3) confined aquifers only. The χ^2 tests

were performed in these combinations to evaluate differences in the distribution between the groups.

Table 7. Results of χ^2 tests for normal distribution of degradation rate constants

	χ^2 Value	Critical Value	Result
Confined and Unconfined (Combined)			
TPH as Gasoline	10.80	2.71	Hypothesis rejected, population is not normal
Benzene	1.65	2.71	Hypothesis accepted, population is normal
Confined			
TPH as Gasoline	1.05	2.71	Hypothesis accepted, population is normal
Benzene	1.00	2.71	Hypothesis accepted, population is normal
Unconfined			
TPH as Gasoline	3.03	2.71	Hypothesis rejected, population is not normal
Benzene	1.57	2.71	Hypothesis accepted, population is normal

Testing for Normal (Gaussian) Distribution of Coefficient of Determination Data

Histograms of the TPH as gasoline and benzene coefficient of determination (Figures 8, 9, and 10) do not appear to display normal distributions. The data are grouped as combined confined and unconfined (Figure 8), confined only (Figure 9), and unconfined only (Figure 10). To evaluate whether the distributions can be described as normal, a chi-square (χ^2) test was performed on the TPH as gasoline confined aquifer category, since this distribution appeared to be the most "normal" of the graphs (Figure 9).

Figure 8. Histograms of coefficients of determination, confined and unconfined aquifers combined. The x-axis shows the number of values within each range, starting at 0 to 0.1 at the left (numbers are off-set).

Figure 9. Histograms of coefficients of determination, confined aquifers. The x-axis shows the number of values within each range, starting at 0 to 0.1 at the left (numbers are off-set).

Figure 10. Histograms of coefficients of determination, unconfined aquifers. The x-axis shows the number of values within each range, starting at 0 to 0.1 at the left (numbers are off-set).

The χ^2 test was performed using the methodology presented previously. The null hypothesis being tested was that the samples were collected from a normally distributed population. The result of the χ^2 test, presented below in Table 8, indicate that the distribution is not normally distributed.

Table 8. Results of χ^2 test for normal distribution of coefficient of determination (r^2) data.

	χ^2 Value	Critical Value	Result
Confined			
TPH as Gasoline	4.20	2.71	Hypothesis rejected, population is not normal

F-Tests to Compare Benzene Attenuation Rate Constant Distributions for Confined and Unconfined Conditions

To evaluate whether the sample distributions of the benzene attenuation rate constants for confined and unconfined aquifer conditions are significantly different, the equality of variances in attenuation rate constant values between the two categories were evaluated using F-tests. The F-tests evaluate differences in the variances of two sample distributions. If the variances are significantly different, the samples (categories) may have been drawn from different parent populations. If the samples appear to have been drawn from different parent populations, then different degradation processes may be operating under each set of conditions. Benzene was selected for this evaluation since the distribution of benzene attenuation rates appears to be normal.

The F statistic is the ratio of the variances of the two categories that are being compared, with the highest variance in the numerator so that F is always greater than 1. A null hypothesis is stated that the samples are drawn from populations with equal variances.

The ratio of the variances is compared to the critical value of F at a specified level of significance, in this case 5 percent. Degrees of freedom (n-1) for both the numerator and denominator are taken into account. If the ratio does not exceed the critical value, the null hypothesis is accepted (that the samples are from populations with equal variances). If F exceeds the critical value, the null hypothesis is rejected, and we conclude that the variance of the degradation rates is not the same for both samples (Davis, 1986). The results of the F tests, presented below in Table 9, indicate that the populations are different.

Table 9. Results of F-tests for confined versus unconfined aquifer conditions.

Confined category variance = 9.8×10^{-7}

Unconfined category variance = 4.2×10^{-6}

$F = \text{Unconfined variance} / \text{Confined variance} = 4.3$

Degrees of Freedom Confined Category = 41

Degrees of Freedom Unconfined Category = 20

Critical value at 5 percent level of significance = 1.8

Therefore, null hypothesis is rejected (populations are different)

Evaluation of Benzene Attenuation Rate Constant Data Grouped by Soil Type

Benzene attenuation rate constant data was grouped according to the aquifer soil type, using three broad categories dependent upon the presence or absence of silt and clay. The three categories, A, B, and C, generally included the following soil types:

Category A. Clean sand and gravel

Category B. Silty sand, silty gravel, clayey silt

Category C. Clayey sand, clayey gravel, and silty clay

The soil type categorization is considered to be weak as a result of inconsistencies in soil classifications and heterogeneities in shallow aquifers common in the study area. The soil data was only applicable for the location of the monitoring well. In addition, the shallow aquifer soil type assigned to each site sometime required a judgment as to which strata contributed most to the aquifer transitivity. Averaging of multi-strata aquifers and laterally heterogeneous aquifers was outside the scope of this study. Insignificant differences in the sample means and variances between the categories were observed, as shown in Table 10.

Table 10. Summary of benzene attenuation rate constants between aquifer soil type categories.

Category	Number of observations	Mean k	Median k	Variance
A - Clean sand and gravel	11	-0.003	-0.002	1×10^{-6}
B - Silty sand, silty gravel, and clayey silt	18	-0.003	-0.002	6×10^{-6}
C - Clayey Sand, clayey gravel, and silty clay	23	-0.002	-0.002	2×10^{-6}

To evaluate whether the three categories can be described as being derived from the same parent population, the equality of variances in attenuation rate values between the three categories was evaluated using F-tests using the methods presented in the previous section. The results of the F tests, presented below in Table 11, indicate that the sample population variances are the same for categories A versus C, but different for categories A versus B and B versus C.

Table 11. Results of F-tests for aquifer soil type categories

Categories A vs. BCategory A variance = 1×10^{-6} Category B variance = 6×10^{-6}

$$F = B \text{ variance} / A \text{ variance} = 6$$

Degrees of Freedom Category A = 10

Degrees of Freedom Category B = 17

Critical value at 5 percent level of significance = 2.7

Therefore, null hypothesis is rejected (populations are different).

Categories A vs. C

Category A variance = 1×10^{-6} Category C variance = 2×10^{-6}

$$F = B \text{ variance} / A \text{ variance} = 2$$

Degrees of Freedom Category A = 10

Degrees of Freedom Category C = 22

Critical value at 5 percent level of significance = 2.6

Therefore, null hypothesis is accepted (populations are same).

Categories B vs. CCategory B variance = 6×10^{-6} Category C variance = 2×10^{-6}

$$F = B \text{ variance} / A \text{ variance} = 3$$

Degrees of Freedom Category B = 17

Degrees of Freedom Category C = 22

Critical value at 5 percent level of significance = 2.1

Therefore, null hypothesis is rejected (populations are different).

Evaluation of Benzene Attenuation Rate Constant Data Grouped by Remedial Activities

The attenuation rate constants for TPH as gasoline and benzene were sorted based on remedial activities, including no remediation. Combinations of remedial activities were also sorted. The categorized attenuation rates for TPH as gasoline and benzene are summarized below in Tables 12 and 13, respectively, including mean, median, minimum, and maximum values.

To evaluate whether remedial methods at sites affect the benzene attenuation rate constants, F tests were performed between the "no remediation" category and categories of remedial activities. The variances of the remedial method categories tested are presented below in Table 14. The category of ground water pump and treat (alone) and bioenhancement were not included due to small sample size.

Table 12. Summary of TPH as gasoline attenuation rate constants categorized by remedial activity.

Remedial Activities	Number	Mean k	Median k	Minimum k	Maximum k
none	19	-0.002/day	-0.002/day	-0.0002/day	-0.006/day
sve	14	-0.003/day	-0.002/day	-0.0008/day	-0.009/day
ex	12	-0.002/day	-0.002/day	-0.0002/day	-0.004/day
pt	4	-0.002/day	-0.002/day	-0.0002/day	-0.002/day
sve and other	22	-0.002/day	-0.002/day	-0.0008/day	-0.009/day
ex and other	16	-0.002/day	-0.002/day	-0.0002/day	-0.004/day
bio and other	6	-0.002/day	-0.002/day	-0.0003/day	-0.004/day
pt and other	19	-0.002/day	-0.002/day	-0.0002/day	-0.004/day

sve = soil vapor extraction

ex = excavation

pt = ground water pump and treat

bio = bioenhancement (such as the addition of hydrogen peroxide and/or nutrients)

Table 13. Summary of benzene attenuation rates categorized by remedial activity.

Remedial Activities	Number	Mean k	Median k	Minimum k	Maximum k
none	18	-0.002/day	-0.002/day	-0.0004/day	-0.007/day
sve	7	-0.003/day	-0.002/day	-0.001/day	-0.004/day
ex	9	-0.002/day	-0.002/day	-0.0004/day	-0.004/day
pt	4	-0.002/day	-0.002/day	-0.0006/day	-0.003/day
sve and other	19	-0.003/day	-0.002/day	-0.0007/day	-0.01/day
ex and other	11	-0.003/day	-0.003/day	-0.0004/day	-0.004/day
bio and other	5	-0.002/day	-0.002/day	-0.0006/day	-0.003/day
pt and other	14	-0.003/day	-0.002/day	-0.0006/day	-0.001/day

sve = soil vapor extraction

ex = excavation

pt = ground water pump and treat

bio = bioenhancement (such as the addition of hydrogen peroxide and/or nutrients)

Table 14. Variance of benzene attenuation rate constants between remedial method categories.

Category	Number of observations	Variance
no remediation	18	3×10^{-6}
sve only	7	1×10^{-6}
excavation only	9	2×10^{-6}
sve alone and in combination with other methods	19	4×10^{-6}
excavation alone and in combination with other methods	11	2×10^{-6}
Pump and Treat alone and in combination with other methods	14	5×10^{-6}

As in the previous section, F-tests were performed to test the null hypothesis that the samples are drawn from populations with equal variances. The results of the F tests, presented below in Table 15, indicate that the samples were drawn from populations with equal variances.

Table 15. Results of F-tests for remedial method categories.

No remediation vs. SVE onlyNo remediation category variance = 3×10^{-6} SVE only category variance = 1×10^{-6}

$$F = 3 \times 10^{-6} / 1 \times 10^{-6} = 3$$

Degrees of Freedom, no remediation category = 17

Degrees of Freedom, SVE category = 6

Critical value at 5 percent level of significance = 3.91

Therefore, null hypothesis is accepted (populations are same)

No remediation vs. Excavation onlyNo remediation category variance = 3×10^{-6} Excavation only category variance = 2×10^{-6}

$$F = 3 \times 10^{-6} / 2 \times 10^{-6} = 1.5$$

Degrees of Freedom, no remediation category = 17

Degrees of Freedom, excavation category = 8

Critical value at 5 percent level of significance = 3.19

Therefore, null hypothesis is accepted (populations are same)

No remediation vs. SVE alone and in combination with other methodsNo remediation category variance = 3×10^{-6} SVE combination category variance = 4×10^{-6}

$$F = 4 \times 10^{-6} / 3 \times 10^{-6} = 1.3$$

Degrees of Freedom, no remediation category = 17

Degrees of Freedom, SVE combination category = 18

Critical value at 5 percent level of significance = 2.28

Therefore, null hypothesis is accepted (populations are same)

Table 15. (continued) Results of F-tests for remedial method categories.

No remediation vs. Excavation alone and in combination with other methods

No remediation category variance = 3×10^{-6}

Excavation combination category variance = 2×10^{-6}

$$F = 3 \times 10^{-6} / 2 \times 10^{-6} = 1.5$$

Degrees of Freedom, no remediation category = 17

Degrees of Freedom, excavation combination category = 10

Critical value at 5 percent level of significance = 2.84

Therefore, null hypothesis is accepted (populations are same)

No remediation vs. ground water pump and treat alone and in combination with other methods

No remediation category variance = 3×10^{-6}

Pump and treat combination category variance = 5×10^{-6}

$$F = 5 \times 10^{-6} / 3 \times 10^{-6} = 1.8$$

Degrees of Freedom, no remediation category = 17

Degrees of Freedom, excavation combination category = 13

Critical value at 5 percent level of significance = 2.5

Therefore, null hypothesis is accepted (populations are same)

Attenuation Rate Constants as Function of Parameters

Relationship of Attenuation Rate Constant to Coefficient of Determination (r^2)

To evaluate whether a relationship exists between the attenuation rate constants and r^2 for TPH as gasoline and benzene, the two variables were plotted against each other, as shown in Figure 11 and 12. The correlation coefficients for the relationship between the two values are also presented in the figures. According to Davis (1986), the significance of the correlation coefficients can be tested if both variables are normally

distributed. Therefore, since the r^2 values are not normally distributed, the level of significance of the correlation values could not be calculated.

Relationship of Attenuation Rates to Ground Water Depth Range and Distance from Source

Attenuation rate constants for TPH as gasoline and benzene are plotted against ground water depth range in Figures 13 and 14. The ground water depth range is the difference between the maximum and minimum ground water depths during the time period under consideration. The correlation coefficients between TPH as gasoline and benzene to ground water depth range are -0.10 and -0.12, respectively. A level of significance was not calculated for the correlation coefficients since the distribution of the ground water depth range does not appear to be normal. However, based on the low correlations, the patterns shown on Figures 13 and 14 appear to be random, indicating that the ground water depth range does not play a significant role in attenuation rate.

The attenuation rate constants for TPH as gasoline and benzene are shown plotted against distance from source in Figures 15 and 16. The correlation coefficients between TPH as gasoline and benzene attenuation rate constants to the distance from source are 0.07 and 0.02, respectively. The low correlation coefficients between the data indicate that there is no relationship between the observed degradation rates and the distance from source.

Effect of Ground Water Elevations on Attenuation Rate Constants and Coefficient of Determination

Ground water elevations were plotted on the Mathcad worksheets to evaluate sites where there was an apparent relationship to concentrations and ground water elevation.

Correlation coefficient = -0.52

Figure 11. TPH as gasoline attenuation rate constant versus coefficient of determination (confined and unconfined aquifers combined).

Correlation coefficient = -0.61

Figure 12. Benzene attenuation rate constant versus coefficient of determination (confined and unconfined aquifers combined).

Correlation coefficient = -0.10

Figure 13. TPH as gasoline attenuation rate constant versus ground water depth range (maximum minus minimum elevations).

Correlation coefficient = -0.12

Figure 14. Benzene attenuation rate constant versus ground water depth range (maximum minus minimum elevations).

Correlation coefficient = 0.07

Figure 15. TPH as gasoline attenuation rate constant versus distance from source (confined and unconfined combined).

Correlation coefficient = 0.02

Figure 16. Benzene attenuation rate constant versus distance from source (confined and unconfined combined).

The Mathcad worksheets are presented in Appendix B. Fluctuating ground water elevations may affect the degradation rates of TPH as gasoline and benzene if residual petroleum hydrocarbons are absorbed onto soil at the source area. When ground water elevations increase during winter, the absorbed hydrocarbons may become mobilized in the ground water, which would increase concentrations.

Ground water elevations were qualitatively compared to TPH as gasoline and benzene concentrations. In general, if both ground water elevations and concentrations showed an increase or decrease during more than half of the sample events, the well was recorded as showing a relationship between the two. The magnitude of the increase or decrease was not taken into consideration. A summary of the correlation and attenuation rate values for TPH as gasoline and benzene for sites with a elevation/concentration relationship are presented below in Table 16. The summary presented in Table 16 indicates that sites where concentrations of TPH as gasoline and benzene appear to be influenced by ground water elevation fluctuations have lower attenuation rate constants and coefficients of determination than sites with no ground water elevation relationship. The evaluation was performed on individual wells instead of average site values for sites with more than one well since some sites had wells with wells that both did and did not display a relationship between elevation and concentration.

Table 16. Summary of sites with relationship between ground water elevation and TPH as gasoline and benzene concentration.

	Number of Wells	Mean	Median
Degradation Rate (k)			
TPH Gasoline	20	-0.002	-0.001
Benzene	12	-0.001	-0.001

Table 16 (continued). Summary of sites with relationship between ground water elevation and TPH as gasoline and benzene concentration.

	Number of Wells	Mean	Median
Coefficient of Determination (r^2)			
TPH Gasoline	20	0.40	0.41
Benzene	12	0.34	0.30

Spatial Distribution of Attenuation Rate Constant for Benzene

To qualitatively evaluate whether the attenuation rate constant varies with distance down-gradient from the source, the attenuation rate constants were compared to distance from source for sites with benzene data available for two or three monitoring wells. The results of the comparison suggest that the attenuation rate constants generally appear to decrease with increasing distance from the source (Table 17). The magnitude of the change was not taken into consideration, since the degree of change appeared to vary significantly from site to site. Not included in Table 17 are three sites with multiple wells meeting the study criteria but that did not have benzene data and one site with two down-gradient wells that were equidistant from the source.

Table 17. Summary of sites showing increase or decrease in attenuation rate constant with distance from source.

Number of sites with benzene data from two or more wells down-gradient of source	18
Sites with decreasing benzene attenuation rate constants with distance from source	12
Sites with increasing benzene attenuation rate constants with distance from source	4
Initial decrease with distance, then increase	1
No significant change with distance from source	1

DISCUSSION

Range of Attenuation Rate Constants

The attenuation rate constants were found to vary over a relatively narrow range. The TPH as gasoline attenuation rate constants (combined confined and unconfined sites) ranged from -0.0002/day to -0.009/day, with a mean of -0.002/day. Benzene attenuation rate constants ranged from -0.0004/day to -0.01/day, with a mean of -0.002/day. The relatively narrow range of the attenuation rate constants suggests that similar degradation processes occur throughout the study area.

There was not a significant difference in the comparison between the data for individual wells versus site averages. This indicates that the attenuation rate constant observed in one well at a site may behave independently from attenuation rate constants observed in other wells on the same site. Because the hydrogeologic characteristics are most likely relatively uniform within sites, the variability of attenuation rate constants within single sites suggests that factors other than hydrogeologic characteristics control the attenuation rate constants.

Predicted Behavior of Benzene Attenuation Duration

A mean benzene attenuation rate constant for combined confined and unconfined aquifers of -0.0023/day was observed, with a standard deviation of 0.0017. Because the distribution was found to be normally distributed, approximately 68 percent of the values can be expected to fall within one standard deviation on either side of the mean value. In addition, approximately 95 percent of the values can be expected to fall within plus or minus two standard deviations (Davis, 1986). Therefore, approximately 68 percent of

sites with decreasing concentrations of benzene can be expected to have attenuation rates ranging from $-0.004/\text{day}$ to $-0.0006/\text{day}$. Assuming log linear degradation, the inverse of the attenuation rates provides the duration for the concentrations to decrease to one tenth of an initial value. Therefore, approximately 68 percent of sites with decreasing concentrations of benzene would be expected to take between 250 and 1,666 days (approximately 0.7 to 4.6 years) to decrease to 10 percent of an initial value. Only 5 percent of sites would be expected to have benzene attenuation rates exceed approximately $-0.006/\text{day}$, which corresponds to a duration of 166 days (approximately 0.45 year). The lower 5 percent of attenuation rates is not able to be accounted for using standard deviations, because two standard deviations would place the degradation rate greater than 0. This overlaps the portion of the population of sites where attenuation rates are stable or increasing, which were eliminated from this study.

To provide a tool that can be used to predict length of time for an initial concentration of benzene to reach 1 part per billion (ppb), the attenuation rate constants for the mean ($-0.0023/\text{day}$), plus one standard deviation ($-0.004/\text{day}$), and minus one standard deviation ($-0.0006/\text{day}$) of all sites are plotted against time (Figure 17). The concentration of 1 ppb benzene is the maximum contaminant level (MCL) for drinking water established by the California Environmental Protection Agency (EPA). The logarithmic concentrations are plotted along the y-axis, and time is presented along the x-axis. To predict how long it will take for a particular concentration of benzene to decay to a concentration of 1 ppb, the user would read from the y axis the initial concentration to the three diagonal lines, and then down to the corresponding time. For example, using Figure 17, the mean length of time to reach 1 ppb benzene corresponding to an initial concentration of 30 ppb is approximately 2.1 years. In addition, 68 percent of sites would be expected to decrease from a level of 30 ppb to 1 ppb benzene between

Figure 17. Time required for benzene to decrease from an initial concentration to the MCL (1 $\mu\text{g/l}$) for mean (-0.0023/day), plus one standard deviation (-0.004/day), and minus one standard deviation (-0.0006/day).

approximately 1 and 6.7 years (plus and minus one standard deviation of the attenuation rate constants).

Relationship of Attenuation Rate Constants to Coefficients of Determination

The coefficients of determination show a very wide range and a non-normal distribution. Figures 11 and 12 indicate that sites with attenuation rate constants greater than -0.002/day generally displayed coefficients of determination greater than 0.5. This suggests that first order degradation contributes significantly to sites where attenuation rates are generally above the median. This emphasizes the importance of biodegradation at these sites, since biological degradation tends to follow first order kinetics. Sites with degradation rate constants less than -0.002/day displayed a wide range of coefficients of

determination. This indicates that biodegradation may be less significant at some sites, with other degradation mechanisms playing a more significant role.

Although the coefficients of determination are relatively low (0.5 to 0.8) by general standards, the amount of variability, or "noise," of the concentration versus time plots shown in Appendix B appears to be consistent for environmental data. Sites with moderate levels of coefficients of determination behave relatively linearly. Some "noise" is typically introduced in environmental data as a result of variability in ground water flow directions, irregular rate of input of contaminants into ground water, variable well sampling procedures, and variable analytical/sample preparation practices at different laboratories, among other reasons.

Degradation Rate Constants as a Function of Aquifer Conditions and Soil Types

The mean degradation rate constants for TPH as gasoline and benzene were slightly higher for unconfined conditions versus confined conditions (-0.003/day versus -0.002/day). However, the differences do not appear to be significant, based on the similarity between the means, range, and distribution of the values (see Tables 3 and 4). This suggests that there are similar degradation processes operating under each of the hydrogeologic conditions. The results of the F-test between the sample variances of the confined and unconfined categories suggested that there was a significant difference in the benzene degradation rate coefficients between unconfined and confined aquifers. However, the results of the F-test may be influenced by variability in the data, since the populations qualitatively appear to be similar.

The comparison of degradation rate constants categorized by aquifer soil types did not appear to indicate that there is a significant difference between sites with aquifers composed of clean sands/gravel than those with clayey soils. There was a significant

difference in the sample populations between clean sands/gravels and sites with silty soils and between sites with silty and clayey soils. These results do not correspond with what is intuitively expected. As a result of the differences in clay content and porosity, a difference between clean sands/gravels with clayey soils would be expected. The results may reflect inconsistent soil classification practices in the field or may be coincidental. In addition, a more detailed study with larger samples may need to be performed to identify differences in degradation processes between aquifer soil types.

Degradation Rate Constants as a Function of Remedial Activities

Benzene degradation rate constants categorized by remedial activity did not show significant differences in sample variations between the category of "no remediation" and those with various remedial activities. These results indicate that there is no significant difference between the distribution of values between the categories. However, increases in mean degradation rate constants were observed ($-0.003/\text{day}$ versus $-0.002/\text{day}$) for sites where soil vapor extraction, excavation, and pump and treat were performed, although the differences may not be significant.

Degradation Rate Constants as a Function of Ground Water Elevation Fluctuations

Comparison of values between Table 16 to Tables 3, 4, 5, and 6 indicates that sites where concentrations of TPH as gasoline and benzene appear to be influenced by ground water elevation fluctuations have lower mean degradation rate constants and coefficients of determination than sites with no ground water elevation relationship. The decreased degradation rate constants may be a result of remobilization of residual contaminants. This could occur when an increase in ground water elevation results in ground water coming into contact with residual fuel hydrocarbons absorbed onto soil.

The cause of the decrease in the mean coefficients of determination may be a result of fluctuating water levels causing greater variability in the concentrations.

Spatial Distribution of Degradation Rate Constants

The degradation rate constants generally appear to decrease with increasing distance down-gradient from the source. This may be the result of a depletion of oxygen within the plume down-gradient of the source that may reduce biologically mediated degradation rates. The sites showing increases in degradation rate constants may be the result of the placement of monitoring wells off-set from the center line of the petroleum plume. Such off-set monitoring wells, although down-gradient of the source, may not be capturing the most highly contaminated ground water but rather ground water closer to the lateral fringe of the plume where oxygen is available by transverse mixing with uncontaminated ground water. These results appear to be consistent with the findings of a study by Borden (1986a), where high degradation rates were observed near the source of a dissolved petroleum plume as a result of the presence of dissolved oxygen. The degradation rates decreased down-gradient of the source as a result of a zone of oxygen depletion along the centerline of a plume. Dissolved oxygen was found to increase in concentration away from the centerline, with increasing degradation rates associated with the increased dissolved oxygen.

Comparison of Results to Previous Studies

A previous study by Rice et al. (1995) concluded that benzene attenuation rate constants are not normally distributed while this study found them to be normally distributed. In addition, the mean degradation rate constant value ($-0.0008/\text{day}$) was also

different from that found in this study ($-0.0023/\text{day}$). The previous study included sites from many different ground water basins in California. Therefore, the difference in the results between this study and the Rice et al. study may be the result of different processes operating in various ground water basins across California. Attenuation processes within a ground water basin may reflect basin characteristics, such as depth to ground water, soil types, ground water chemistry, and hydrogeologic conditions. Therefore, application of the results of this study to sites outside of the study area may be inappropriate. The differences between the studies suggest the need to study the behavior of other ground water basins in detail.

Ground Water Gradient

The hydraulic gradient information collected for each site was not used to perform any analyses. This is because of the high variability of the gradient observed at many sites over time and also spatially across sites. As a result, it was not possible to assign one meaningful hydraulic gradient value to a particular site.

CONCLUSIONS

The primary conclusions of this study are as follows:

1. The values of the attenuation rate constants fall within a relatively narrow range, indicating that similar attenuation processes are occurring throughout the study area. These attenuation rate constants are greater than those found for California as a whole (Rice et al., 1995) indicating that they may reflect conditions specific to the study area and should not necessarily be applied to other areas.
2. The higher the attenuation rate constants, the more likely the attenuation will be first order. This most likely points to biodegradation, which generally follow first order kinetics, as a major cause of concentration decreases at these sites. The lower degradation rates (less than the median rate) display a higher degree of variation of the coefficient of determination, indicating that attenuation processes other than biodegradation may play a more significant role at some of these sites. Such processes could include dispersion during contaminant transport, which would result in an apparent degradation as a result of dilution.
3. The attenuation rate constants do not appear to be influenced significantly by environmental conditions and site history factors, which suggests that the attenuation processes that are occurring tend to be independent of these influences. However, further study with larger sample populations may be needed in order to more

confidently determine whether there are significant differences in attenuation rate constants between categories based on soil types and remedial methods.

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APPENDIX A. EXAMPLES OF DATA COLLECTION FORMS

DATA LOG

SCVWD Site #: _____

Site Address: _____

Site Name: _____

Site Location: _____

Contaminant Released: TPHg TPHd Other: _____

Source Removed: Y/N

Free Product: Y/N

Remediation activities: _____

Hydrogeologic Conditions:

Confined/Unconfined

Vadose Zone soil type: _____ Aquifer thickness: _____

Aquifer soil type: _____

Ground water flow direction: _____ Ground Water Gradient: _____

Data Evaluation Results:

Monitoring Well: _____ Distance/direction from source: _____

Average Ground Water Depth: _____ Ground Water Depth Range: _____

Parameter	TPHg	Benzene	TPHd	
Deg. Rate				
Correlation				
R ²				

Monitoring Well: _____ Distance/direction from source: _____

Average Ground Water Depth: _____ Ground Water Depth Range: _____

Parameter	TPHg	Benzene	TPHd	
Deg. Rate				
Correlation				
R ²				

Analytical Data: SCVWD Site #: _____

Site Address: _____

Monitoring Well: _____ Distance/direction from source: _____

(Concentrations in ppb)

[illegible]

APPENDIX B. MATHCAD 6.0 WORK SHEETS

LEGEND

SCVWD Site Number:

Site Address:

Site Name:

City:

Contaminant: TPH Gasoline

$i = 0..14$

This is the number of data points
minus one (n-1)

$a = \text{slope}(x,y)$ $a = -0.0011(k)$

$b = \text{intercept}(x,y)$ $b = 5.3265$

$\text{corr}(x,y) = -0.8992$ (r)

$\text{corr}(x,y)^2 = 0.8086$ (r^2)

Days	LogC	G.W. Elev
0	5.8	0
91	4.9	0
184	4.7	0.2
273	5.1	1.3
344	5.0	1.8
470	4.7	2.1
560	4.9	2.6
$x = 644$	$y = 4.6$	$d = 2.9$
738	4.5	3.1
834	4.4	3.1
931	4.2	3.4
1016	4.2	4.6
1115	4.3	5.2
1197	4.1	5.4
1283	3.6	5.8

LogC = log of concentration (ppb)

G.W. Elev. = ground water elevation (ft)

Squares = concentration data points

Circles = ground water elevation

Dashed line = least squares regression line

SCVWD Site Number : 07S1W27EO1
 Site Address: 921 Hamilton Avenue
 Site Name: Exxon #7-7121
 City: Campbell

Contaminant: TPHg

i = 0..4

Days	LogC	GW Elev
0	3.04	0
146	2.78	2.26
x = 203	y = 1.4	d = 2.15
327	2.69	2.45
389	1.4	1.46

Note: This site has two decreasing trends, one beginning in 1990 and the second beginning in 1993. The second trend was used.

a = slope(x,y) a = -0.0031

b = intercept(x,y) b = 2.9303

corr(x,y) = -0.603

corr(x,y)² = 0.3637

Note: Ground water elevations adjusted to fit graph. 0 feet = 124.58 feet

SCVWD Site Number : 07S1W27EO1

Site Address: 921 Hamilton Avenue

Site Name: Exxon #7-7121

City: Campbell

Contaminant: Benzene

$i = 0..4$

Days	LogC	GE Elev
0	1.57	0
146	1.49	2.26
x = 203	y = -0.3	d = 2.15
327	1.11	2.45
389	-0.3	1.46

Note: This site has two decreasing trends, one beginning in 1990 and the second beginning in 1993. The second trend was used.

$a = \text{slope}(x, y) \quad a = -0.0038$

$b = \text{intercept}(x, y) \quad b = 1.5247$

$\text{corr}(x, y) = -0.6193$

$\text{corr}(x, y)^2 = 0.3835$

Note: Ground water elevations adjusted to fit graph. 0 feet = 124.58 feet

SCVWD Site Number : 07S1W33R01F
 Site Address: 800 San Thomas Aquino
 Site Name: Bartyzel Property
 City: Campbell

Contaminant: TPHg

$i = 0..5$

Days	LogC	GW Elev
0	3.96	0
99	2.99	.89
251	3.32	5.14
349	3.18	7.04
425	2.61	6.86
494	2.90	1.03

Note: Ground water elevations were adjusted to fit the graph. 0 ft = 208.17 ft.

$a = \text{slope}(x, y) \quad a = -0.0018$

$b = \text{intercept}(x, y) \quad b = 3.6492$

$\text{corr}(x, y) = -0.7519$

$\text{corr}(x, y)^2 = 0.5653$

SCVWD Site Number : 07S1W33R01F
 Site Address: 800 San Thomas Aquino
 Site Name: Bartyzel Property
 City: Campbell

Contaminant: Benzene

$i = 0..5$

Days	LogC	GW Elev
0	3.96	0
99	2.99	.89
251	3.32	5.14
349	3.18	7.04
425	2.61	6.86
494	2.90	1.03

$a = \text{slope}(x, y) \quad a = -0.0018$
 $b = \text{intercept}(x, y) \quad b = 3.6492$
 $\text{corr}(x, y) = -0.7519$
 $\text{corr}(x, y)^2 = 0.5653$

Note: Ground water elevations were adjusted to fit the graph. 0 ft = 208.17 ft.

SCVWD Site Number 07s1w27f01:
 Site Address: 535 W. Hamilton Ave
 Site Name: Campbell Chevron
 City: Campbell

	Days	LogC	G.W. Elev
	0	4.2	6.83
	29	3.9	.22
Contaminant: TPH Gasoline (mw-1)	49	2.8	0
	x = 74	y = 2.4	d = 0
	114	2.6	0
	128	2.5	11.69
	151	1.4	14.99

i = 0..6

a = slope(x,y) a = -0.0155

b = intercept(x,y) b = 4.0338

corr(x,y) = -0.9041

corr(x,y)² = 0.8173

Note: Ground water elevations have been adjusted to fit the graph. 0 feet = 100.83 feet. Two elevation data points shown did not have data and were input as 0.

SCVWD Site Number 07s1w27f01:
 Site Address: 535 W. Hamilton Ave
 Site Name: Campbell Chevron
 City: Campbell

Contaminant: Benzene (MW-1)

$i = 0..5$

Days	LogC	G.W. Elev
0	2	2.95
105	1.5	4.67
207	1.2	8.37
309	.4	14.22
352	.23	0
399	-0.6	0

$a = \text{slope}(x, y) \quad a = -0.006$

$b = \text{intercept}(x, y) \quad b = 2.1568$

$\text{corr}(x, y) = -0.9684$

$\text{corr}(x, y)^2 = 0.9378$

Note: Ground water elevations were adjusted to fit the graph. 0 ft = 100.25 ft.

SCVWD Site Number 07s1w27f01
 Site Address: 535 W. Hamilton Ave
 Site Name: Campbell Chevron
 City: Campbell

Contaminant: Benzene (mw-3)

$i = 0..4$

Days	LogC	G.W. Elev
0	1.5	5.5
350	.8	2.8
x = 455	y = .3	d = 0
539	.8	1
642	-0.6	2.7

$a = \text{slope}(x,y) \quad a = -0.0027$

$b = \text{intercept}(x,y) \quad b = 1.6203$

$\text{corr}(x,y) = -0.8479$

$\text{corr}(x,y)^2 = 0.719$

Note: Ground water elevations have been adjusted to fit the graph. 0 feet = 102.25 feet/2

SCVWD Site Number 07s1w27f01:
 Site Address: 535 W. Hamilton Ave
 Site Name: Campbell Chevron
 City: Campbell

Contaminant: TPH Gasoline (mw-3)

$i = 0..9$

Days	LogC	G.W. Elev
0	3.8	5.5
350	3.1	2.8
455	3.3	0
539	3.1	1
642	2.1	2.7
762	2.5	6
784	.4	1.2
796	2.9	1.4
824	1.8	1.8
844	1.4	.4

$a = \text{slope}(x,y) \quad a = -0.0028$

$b = \text{intercept}(x,y) \quad b = 4.1121$

$\text{corr}(x,y) = -0.7357$

$\text{corr}(x,y)^2 = 0.5412$

Note: Ground water elevations have been adjusted to fit the graph. 0 feet = 102.25 feet/2

SCVWD Site Number : 08S1WO3FO1F

Site Address: 700 Hacienda Ave.

Site Name: Exxon #7-0201

City: Campbell

Contaminant: TPH Gasoline

$i = 0..3$

Days	LogC	G.W. Elev
0	3.1	1.21
135	2.3	1.13
193	1.8	1.51
286	1.4	1.0

Note: The ground water elevations have been adjusted to fit the graph. 1.0 ft = 209.99 ft

$a = \text{slope}(x, y) \quad a = -0.0061$

$b = \text{intercept}(x, y) \quad b = 3.0841$

$\text{corr}(x, y) = -0.9948$

$\text{corr}(x, y)^2 = 0.9895$

SCVWD Site Number : 08S1WO3FO1F

Site Address: 700 Hacienda Ave.

Site Name: Exxon #7-0201

City: Campbell

Contaminant: Benzene

$i = 0..4$

Days	LogC	G.W. Elev
0	2.2	1.25
91	1.3	1.0
$x = 138$	$y = 1.7$	$d = 1.08$
273	.8	1.0
331	-0.3	1.38

$a = \text{slope}(x,y) \quad a = -0.0066$

$b = \text{intercept}(x,y) \quad b = 2.2355$

$\text{corr}(x,y) = -0.9273$

$\text{corr}(x,y)^2 = 0.86$

Note: The ground water elevations have been adjusted to fit the graph. 1.0 ft. = 210.12 ft.

SCVWD Site Number : 07S1W35P01F

Site Address: 420 McGlincey Lane

Site Name: Cushman Construction

City: Campbell

	Days	LogC	G.W. Elev
Contaminant: TPH Gasoline	0	4.3	3.64
	71	4	0
	151	3.6	2.17
	273	3.7	4.54
i = 0..3	x =	y =	d =

Note: Ground water elevations were adjusted to fit the graph. 0 ft = 196.74 ft.

a = slope(x,y) a = -0.0023

b = intercept(x,y) b = 4.1793

corr(x,y) = -0.8356

corr(x,y)² = 0.6982

SCVWD Site Number : 07S1W35P01F

Site Address: 420 McGlincey Lane

Site Name: Cushman Construction

City: Campbell

Contaminant: Benzene

$i = 0.3$

Days

$x =$
0
71
151
273

LogC

$y =$
.7
.5
0
.6

G.W.
Elev

$d =$
3.64
0
2.17
4.54

$a = \text{slope}(x, y) \quad a = -5.7035 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 0.5206$

$\text{corr}(x, y) = -0.2148$

$\text{corr}(x, y)^2 = 0.0461$

Note: Ground water elevations were adjusted to fit the graph. 0 ft = 196.74 ft.

SCVWD Site Number : 07S135B02F
 Site Address: 790 E. CAMPBELL AVE.
 Site Name: COAST OIL #51
 City: CAMPBELL

	Days	LogC	G.W. Elev
	0	2	3.1
Contaminant: Benzene	192	.8	2.2
	281	.3	3.14
$i = 0..5$	360	.08	2.1
	452	.6	0
	554	-0.6	3.2

$a = \text{slope}(x,y)$ $a = -0.004$

$b = \text{intercept}(x,y)$ $b = 1.7516$

$\text{corr}(x,y) = -0.9016$

$\text{corr}(x,y)^2 = 0.8129$

Note: Ground water elevations were adjusted to fit the graph. 0 ft = +2.42 ft/4

SCVWD Site Number : 07S135B02F
 Site Address: 790 E. CAMPBELL AVE.
 Site Name: COAST OIL #51
 City: CAMPBELL

	Days	LogC	G.W. Elev
	0	4.2	3.1
	192	2.9	2.2
Contaminant: TPH Gasoline	281	2.6	3.1
	$x = 360$	$y = 2.2$	$d = 2.1$
$i = 0..6$	452	2.7	0
	554	1.9	3.2
	632	2.2	5.2

$a = \text{slope}(x, y) \quad a = -0.003$

$b = \text{intercept}(x, y) \quad b = 3.739$

$\text{corr}(x, y) = -0.8694$

$\text{corr}(x, y)^2 = 0.7558$

Note: Ground water elevations were adjusted to fit the graph. 0 ft = 12.42 ft/4

SCVWD Site Number : 06S2W30R01F
 Site Address: 330 South San Antonio Rd.
 Site Name: Unocal #5957
 City: Los Altos

Contaminant: TPH Gasoline

$i = 0..5$

Days	LogC	G.W. Elev
0	4.08	0
110	3.58	0
208	3.28	4.2
281	2.56	3.6
377	2.08	3.3
468	1.4	4.6

$a = \text{slope}(x, y) \quad a = -0.0058$

$b = \text{intercept}(x, y) \quad b = 4.2155$

$\text{corr}(x, y) = -0.9895$

$\text{corr}(x, y)^2 = 0.9792$

Note: The ground water elevations have been modified to fit the graph. 0 feet = 45.15 / 4

SCVWD Site Number : 06S2W30R01F
 Site Address: 330 South San Antonio Rd.
 Site Name: Unocal #5957
 City: Los Altos

Contaminant: Benzene

$i = 0..7$

Days	LogC	G.W. Elev
0	3.8	0
110	3.5	0
208	2.6	4.2
281	.93	3.6
377	1.2	3.3
468	-0.6	4.6
551	.4	5
641	1.3	4.2

$a = \text{slope}(x,y) \quad a = -0.0056$

$b = \text{intercept}(x,y) \quad b = 3.4885$

$\text{corr}(x,y) = -0.8085$

$\text{corr}(x,y)^2 = 0.6536$

Note: The ground water elevations have been modified to fit the graph. 0 feet = 45.15 /4

SCVWD Site Number : 06s2w19a01f

Site Address: 988 N. San Antonio Rd.

Site Name: Arco #0707

City: Los Altos

Contaminant: TPH Gasoline
Monitoring well A-1

$i = 0.6$

Days

LogC

G.W.
Elev

0

3.8

3.6

86

3.6

0

176

3.7

2.17

$x = 267$

$y = 2.4$

$d = 7.7$

389

1.7

8.11

449

2.3

7.31

567

1.4

0

$a = \text{slope}(x, y) \quad a = -0.0045$

$b = \text{intercept}(x, y) \quad b = 3.9528$

$\text{corr}(x, y) = -0.9282$

$\text{corr}(x, y)^2 = 0.8615$

Note: The ground water elevations have been modified to fit the graph. 0 feet = 30.65 feet. The last date did not have a ground water elevation so 0 was input.

SCVWD Site Number : 06s2w19a01f
 Site Address: 988 N. San Antonio Rd.
 Site Name: Arco #0707
 City: Los Altos

	Days	LogC	G.W. Elev
	0	4	1.81
	60	3.5	1.02
Contaminant: TPH Gasoline	179	2.8	0
Monitoring well A-2	253	2.1	.69
	356	2.1	.63
	447	2	0
	546	1.4	3.79
	636	2.4	7.87

$a = \text{slope}(x,y) \quad a = -0.0031$

$b = \text{intercept}(x,y) \quad b = 3.4877$

$\text{corr}(x,y) = -0.8159$

$\text{corr}(x,y)^2 = 0.6658$

Note: The ground water elevations have been modified to fit the graph. 0 feet = 36.99 feet. The third date did not have a ground water elevation so 0 was input.

SCVWD Site Number : 06s2w19a01f

Site Address: 988 N. San Antonio Rd.

Site Name: Arco #0707

City: Los Altos

Contaminant: TPH Gasoline

Monitoring well A-4

i = 0..6

Days	LogC	G.W. Elev
0	4.7	0
86	4.1	3.49
177	3.5	3.26
x = 268	y = 2.9	d = 5.21
390	3.5	10.87
450	3.2	11.21
568	1.4	10.44

a = slope(x,y) a = -0.0044

b = intercept(x,y) b = 4.5492

corr(x,y) = -0.8684

corr(x,y)² = 0.7542

Note: The ground water elevations have been modified to fit the graph. 0 feet = 27.44 feet. The last date did not have a ground water elevation so 0 was input.

SCVWD Site Number : 08S1W1MO3

Site Address: 700 Blossom Hill Road

Site Name: Exxon #7-0223

City: Los Gatos

Contaminant: TPH Gasoline

$i = 0.5$

Days	LogC	G.W. Elev
0	4.4	.76
80	3.8	3.65
159	3.5	.48
257	3.1	0
329	3	.48
432	4.3	8.9

$a = \text{slope}(x,y) \quad a = -9.9146 \cdot 10^{-4}$

$b = \text{intercept}(x,y) \quad b = 3.891$

$\text{corr}(x,y) = -0.2696$

$\text{corr}(x,y)^2 = 0.0727$

Note: Ground water elevations have been modified to fit the graph. 0 ft = 310.14

SCVWD Site Number : 08S1W21D01F
 Site Address: 155 North Santa Cruz Ave
 Site Name: Mobil
 City: Los Gatos

Contaminant: TPH Gasoline

$i = 0..11$

$MU - C$

$a = \text{slope}(x,y) \quad a = -1.3354 \cdot 10^{-4}$

$b = \text{intercept}(x,y) \quad b = 3.0272$

$\text{corr}(x,y) = -0.1218$

$\text{corr}(x,y)^2 = 0.0148$

Days	LogC	G.W. Elev
0	3.6	2.74
111	3.2	2.43
216	2.7	1.19
299	2.1	.93
384	3.2	6.75
475	3	3.28
563	2.9	.6
654	2.8	2.12
734	2.9	2.06
830	3.1	2.81
918	3	2.29
1007	3	1.65

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 379.57 ft

SCVWD Site Number : 08S1W21D01F
 Site Address: 155 North Santa Cruz Ave
 Site Name: Mobil
 City: Los Gatos

	Days	LogC	G.W. Elev
	0	2.2	6.75
	91	1.9	3.28
Contaminant: Benzene	179	2.1	.6
	270	1.8	2.12
	350	1.6	2.06
	446	1.8	2.81
	534	1.8	2.24
	623	1.8	1.65

$i = 0..7$

$x =$

$y =$

$d =$

$mw - c$

$a = \text{slope}(x,y) \quad a = -5.8656 \cdot 10^{-4}$

$b = \text{intercept}(x,y) \quad b = 2.0578$

$\text{corr}(x,y) = -0.6683$

$\text{corr}(x,y)^2 = 0.4466$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 379.57 ft

SCVWD Site Number : 08S1W21D01F
 Site Address: 155 North Santa Cruz Ave
 Site Name: Mobil
 City: Los Gatos

Contaminant: Benzene MW-F

i = 0..10

Days	LogC	G.W. Elev
0	2.6	1.41
14	1.7	.23
137	1	0
272	2.4	5.3
366	2.1	2.19
x = 455	y = 2	d = 1.57
545	1.5	1.15
625	1.5	1.17
715	1.6	1.57
806	1.9	1.39
896	1.1	.65

a = slope(x,y) a = $-6.3506 \cdot 10^{-4}$

b = intercept(x,y) b = 2.0425

corr(x,y) = -0.3954

corr(x,y)² = 0.1564

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 379.57 ft

SCVWD Site Number : 08S1W21D01F
 Site Address: 155 North Santa Cruz Ave
 Site Name: Mobil
 City: Los Gatos

$i = 0..10$

Days	LogC	G.W. Elev
0	3.7	1.41
14	2.8	.23
137	2.6	0
272	3.4	5.3
366	3.4	2.19
x = 455	y = 2.9	d = 1.57
545	2.6	1.15
625	2.8	1.17
715	3	1.57
806	3.3	1.39
896	2.3	.65

a = slope(x,y) $a = -5.0693 \cdot 10^{-4}$

b = intercept(x,y) $b = 3.2045$

corr(x,y) = -0.3713

corr(x,y)² = 0.1378

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 379.57 ft

SCVWD Site Number: 08S1W13JO1F
 Site Address: 13980 Blossom Hill Road
 Site Name: Chevron #9-1538
 City: Los Gatos

	Days	LogC	G.W. Elev
	0	3.6	.57
	70	3	0
Contaminant: TPH Gasoline	136	1.4	0
$i = 0..5$	226	2.8	.77
	339	3.1	2.93
	424	1.4	2.37

$a = \text{slope}(x,y) \quad a = -0.0028$

$b = \text{intercept}(x,y) \quad b = 3.1111$

$\text{corr}(x,y) = -0.4912$

$\text{corr}(x,y)^2 = 0.2413$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 247.13

SCVWD Site Number: 08S1W16N04F
 Site Address: 275 Saratoga Ave
 Site Name: Chevron #97162
 City: Los Gatos

Contaminant: TPH Gasoline - MW-8

$i = 0..7$

Days	LogC	G.W. Elev
0	3.4	.38
92	2.7	1.68
181	3	2.44
272	2.9	.5
369	2.5	0
454	3.3	.68
557	3.2	4.39
639	2.9	.97

$a = \text{slope}(x, y) \quad a = -6.647 \cdot 10^{-5}$

$b = \text{intercept}(x, y) \quad b = 3.0088$

$\text{corr}(x, y) = -0.0491$

$\text{corr}(x, y)^2 = 0.0024$

SCVWD Site Number: 08S16N04F
 Site Address: 275 Saratoga Ave
 Site Name: Chevron #97162
 City: Los Gatos

Contaminant: Benzene - MW-5

$i = 0..5$

Days	LogC	G.W. Elev
0	2.9	3.32
91	1.6	.61
188	1.8	0
274	2.4	.36
377	2.1	7.23
459	1.1	1.26

$a = \text{slope}(x, y) \quad a = -0.0021$

$b = \text{intercept}(x, y) \quad b = 2.4722$

$\text{corr}(x, y) = -0.5799$

$\text{corr}(x, y)^2 = 0.3363$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 387.6 ft.

SCVWD Site Number: 08S16N04F

Site Address: 275 Saratoga Ave

Site Name: Chevron #97162

City: Los Gatos

	Days	LogC	G.W. Elev
	0	4	3.32
	91	2.5	.61
Contaminant: TPH Gasoline - MW-5	188	2.7	0
i = 0..5	274	3.3	.36
	377	3.5	7.23
	459	2.3	1.26

a = slope(x,y) a = -0.0015

b = intercept(x,y) b = 3.3926

corr(x,y) = -0.3904

corr(x,y)² = 0.1524

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 387.6 ft.

SCVWD Site Number: 08S16N04F	Days	LogC	G.W. Elev
Site Address: 275 Saratoga Ave	0	1.9	3.26
Site Name: Chevron #97162	93	.6	.8
City: Los Gatos	198	1.3	.38
	290	1	1.68
Contaminant: Benzene - MW-8	379	1.1	2.44
$i = 0..9$	470	.5	.5
	567	.5	0
	652	1.2	.68
	755	1.3	4.39
	837	.5	.97

$$a = \text{slope}(x,y) \quad a = -1.1225 \cdot 10^{-4}$$

$$b = \text{intercept}(x,y) \quad b = 0.9176$$

$$\text{corr}(x,y) = -0.0464$$

$$\text{corr}(x,y)^2 = 0.0022$$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 386.7 ft.

SCVWD Site Number: 08S1W16N03f
 Site Address: 255 Saratoga Avenue
 Site Name: Shell Service Station
 City: Los Gatos

Contaminant: TPH Gasoline

$i = 0..9$

Days	LogC	G.W. Elev
0	4.7	6.9
79	2.9	2.3
184	2.7	1.4
274	3.3	1.4
364	3.6	4.1
457	2.6	2.2
549	2	1.7
650	2.1	0
739	1.7	4.1
830	1.4	1.7

$a = \text{slope}(x, y) \quad a = -0.003$

$b = \text{intercept}(x, y) \quad b = 3.9326$

$\text{corr}(x, y) = -0.8523$

$\text{corr}(x, y)^2 = 0.7265$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 384.88 ft

SCVWD Site Number: 08S1W16N03f
 Site Address: 255 Saratoga Avenue
 Site Name: Shell Service Station
 City: Los Gatos

	Days	LogC	G.W. Elev
	0	2.5	6.9
	79	1	2.3
	184	1.1	1.4
Contaminant: Benzene	274	1.6	1.4
$i = 0..7$	364	1.5	4.1
	457	1.6	2.2
	549	-2	1.7
	650	-6	0

$a = \text{slope}(x, y) \quad a = -0.0034$

$b = \text{intercept}(x, y) \quad b = 2.136$

$\text{corr}(x, y) = -0.7543$

$\text{corr}(x, y)^2 = 0.569$

Note: Ground water elevation have been adjusted to fit the graph. 0 ft = 384.88 ft

	Days	LogC	G.W. Elev.
SCVWD Site Number : 06s2wW17N02F	0	4.95	0
Site Address: 2595 California Street	293	4.85	0
Site Name: Shell	482	4.76	0
City: Mountain View	758	4.71	0
	826	4.62	0
Contaminant: TPHG	920	4.18	0
	969	4.23	.93
$i = 0..17$	1075	4.2	3.68
	1188	3.8	5.27
	1248	3.79	5.69
	1348	3.82	5.16
	1449	3.79	5.14
	1523	3.8	4.41
	1622	4	5.17
	1723	3.75	3.86
	1814	2.94	5.3
	1905	3.08	6.61
	1992	3.86	6.87

$$a = \text{slope}(x, y) \quad a = -8.8902 \cdot 10^{-4}$$

$$b = \text{intercept}(x, y) \quad b = 5.1066$$

$$\text{corr}(x, y) = -0.8885$$

$$\text{corr}(x, y)^2 = 0.7895$$

Note: Ground water elevation has been adjusted to fit the graph. 0 feet equals 28.06 feet.
Missing data points are noted on graph

	Days	LogC	G.W Elev.
	0	4.2	0
SCVWD Site Number : 06S2W17N02F	293	4.08	0
Site Address: 2595 California Street	482	3.95	0
Site Name: Shell	758	3.6	0
City: Mountain View	826	3.56	0
	920	3.18	0
Contaminant: Benzene	969	3.18	0
	1075	3.18	.93
	1188	2.57	3.68
	1248	2.8	5.27
	1348	3.04	5.69
	1449	3.23	5.16
	1523	3.15	5.14
	1622	3.18	4.41
	1723	3.18	5.17
	1814	3.56	3.86
	1905	1.61	5.3
	1992	2.69	6.61
		3.43	6.87

$i = 0.17$

$x =$

$y =$

$d =$

$a = \text{slope}(x, y) \quad a = -6.927 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 4.046$

$\text{corr}(x, y) = -0.648$

$\text{corr}(x, y)^2 = 0.42$

Note: Ground water elevation has been adjusted to fit the graph. 0 feet equals 28.06 feet.
Missing data points are noted on graph

SCVWD Site Number : 06S2WO9N01F

Site Address: 1036 N. Rengstorff Ave

Site Name: Texaco

City: Mountain View

Contaminant: TPHg

$i = 0..5$

Days

LogC

0

3.52

82

3.3

183

3.32

516

1.4

605

2.57

695

1.4

Note: Data was evaluated up to first two consecutive NDs.

$a = \text{slope}(x,y)$ $a = -0.0029$

$b = \text{intercept}(x,y)$ $b = 3.5853$

$\text{corr}(x,y) = -0.873$

$\text{corr}(x,y)^2 = 0.7621$

Note: Insufficient ground water elevation data to plot on graph.

SCVWD Site Number : 06S2W15E02F

Site Address: 1250 L'Avenida Street

Site Name: Rudolph and Sletton

City: Mountain View

Contaminant: TPHg

$i = 0..7$

$x =$

$y =$

$d =$

Days	LogC	GW Depth
0	3.4	2.0
96	1.85	1.23
176	2.77	1.8
224	2.18	1.75
399	2.08	1.65
472	2.18	1
584	1.9	2
731	1.76	1.2

$a = \text{slope}(x,y) \quad a = -0.0015$

$b = \text{intercept}(x,y) \quad b = 2.7629$

$\text{corr}(x,y) = -0.678$

$\text{corr}(x,y)^2 = 0.4597$

Note: Ground water depth has been adjusted to fit the graph. 1.0 feet equals 8.0 feet.

SCVWD Site Number : 06S2W15M01F
 Site Address: 1080 Linda Vista Ave.
 Site Name: Rob-Jack Corp.
 City: Mt. View

Contaminant: TPHg

$i = 0..11$

Days	LogC	GW Depth (ft)
0	2.79	0
101	2.54	0
331	2.11	0
537	2.76	5.38
668	2.51	2.73
782	2.36	3.55
862	2.59	3.86
960	2.36	1.03
1095	2.34	.08
1360	2.36	0
1459	2.38	.63
1635	2.08	.43

$a = \text{slope}(x, y) \quad a = -2.3495 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 2.6233$

$\text{corr}(x, y) = -0.557$

$\text{corr}(x, y)^2 = 0.3102$

Note: Ground water depth has been adjusted to fit the graph. 0 feet equals 8.67 feet.

SCVWD Site Number : 06S2W15M01F

Site Address: 1080 Linda Vista Ave.

Site Name: Rob-Jack Corp.

City: Mt. View

Contaminant: Benzene

$i = 0.5$

Days	LogC	GW Depth
0	1.95	0
436	.08	4.35
567	0	1.7
681	1.04	2.52
761	.56	2.83
859	0	0

$a = \text{slope}(x,y) \quad a = -0.0018$

$b = \text{intercept}(x,y) \quad b = 1.571$

$\text{corr}(x,y) = -0.6956$

$\text{corr}(x,y)^2 = 0.4838$

Note: Ground water depth has been adjusted to fit the graph. 0 feet equals 9.7 feet.

SCVWD Site Number : 06S2W2703F
 Site Address: 45 West El Camino Real
 Site Name:Chevron #9.0699
 City: Mountain View

	Days	LogC	G.W. Elev.
	0	3.69	0
Contaminant: TPg	91	3.36	.59
	178	2.89	2.41
i = 0..6	x = 261	y = 2.23	d = 6.29
	359	2.74	4.92
	447	2.2	3.2
	539	1.4	8.58

a = slope(x,y) a = -0.0037

b = intercept(x,y) b = 3.6371

corr(x,y) = -0.9277

corr(x,y)² = 0.8606

SCVWD Site Number : 06S2W2703F
 Site Address: 45 West El Camino Real
 Site Name:Chevron #9.0699
 City: Mountain View

	Days	LogC	G.W. Elev.
Contaminant: Benzene	0	2.46	0
i = 0..6	91	2	.59
	178	1.11	2.41
x = 261		y = 1.08	d = 6.29
	359	1.23	4.92
	447	.65	3.2
	539	-.6	8.58

a = slope(x,y) a = -0.0047

b = intercept(x,y) b = 2.3872

corr(x,y) = -0.9255

corr(x,y)² = 0.8565

	Days	LogC	G.W. Elev
SCVWD Site Number : 06S2W22C02F	0	3.9	1.69
Site Address: 495 MOFFETT BLVD	121	3.3	4.42
Site Name: EXXON	216	3.2	2.64
City: MT. VIEW	286	3	0
Contaminant: TPH Gasoline	397	3.7	9.15
	467	3.2	9.42
i = 0..14	601	3.6	7.73
	x = 658	y = 2.8	d = 7.79
	745	3.5	8.72
	823	2.3	8.66
	919	2	8.15
	1012	1.9	8.06
a = slope(x,y) a = -0.0013	1104	2.2	11.31
b = intercept(x,y) b = 3.7417	1196	2.7	12.74
corr(x,y) = -0.7812	1293	2.0	9.93
corr(x,y) ² = 0.6103			

Note: Elevations have been adjusted to fit on the graph. 0 feet = 30.09 feet

SCVWD Site Number : 06S2W22C02F
 Site Address: 495 MOFFETT BLVD
 Site Name: EXXON
 City: MT. VIEW

Contaminant: Benzene

$i = 0..14$

Days	LogC	G.W. Elev
0	3	1.69
121	2.4	4.42
216	2.5	2.64
286	2.4	0
397	2.7	9.15
467	2.7	9.42
601	1.9	7.73
$x = 658$	$y = 2.1$	$d = 7.79$
745	3	8.72
823	1.2	8.66
919	.57	8.15
1012	1.1	8.06
1104	1.2	11.31
1196	2.1	12.74
1293	1.3	9.93

$a = \text{slope}(x,y) \quad a = -0.0013$

$b = \text{intercept}(x,y) \quad b = 2.884$

$\text{corr}(x,y) = -0.7019$

$\text{corr}(x,y)^2 = 0.4927$

Note: Elevations have been adjusted to fit on the graph. 0 feet = 30.09 feet

SCVWD Site Number : 06S2WS6H02F

Site Address: 789 E. Evelyn Ave

Site Name: H&M Station

City: Mt. View

Contaminant: TPH Gasoline

$i = 0..3$

Days

LogC

0

4.4

2089

$y = 2.9$

2191

3

2281

1.4

$a = \text{slope}(x, y) \quad a = -9.3364 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 4.4564$

$\text{corr}(x, y) = -0.835$

Note: No ground water elevation data

$\text{corr}(x, y)^2 = 0.6973$

SCVWD Site Number : 06S2WS6H02F

Site Address: 789 E. Evelyn Ave

Site Name: H&M Station

City: Mt. View

	Days	LogC
	0	3.7
Contaminant: Benzene	2089	1.3
	x = 2191	y = 1.9
i = 0..4	2281	.3
	2345	1.2

a = slope(x,y) a = -0.0012

b = intercept(x,y) b = 3.7337

corr(x,y) = -0.8449

Note: No ground water elevation data

corr(x,y)² = 0.7138

SCVWD Site Number: 06S2W08K05F
 Site Address: 840 San Antonio Road
 Site Name: Arco #1326
 City: Palo Alto

Contaminant: TPH Gasoline - A-2

$i = 0..17$

$a = \text{slope}(x, y) \quad a = -6.0731 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 3.8782$

$\text{corr}(x, y) = -0.8075$

$\text{corr}(x, y)^2 = 0.652$

Days	LogC	G.W. Elev
0	4.4	1.5
104	4.0	.6
185	3.5	1.7
291	3.2	1.1
370	3.6	1.4
471	4.0	2.0
558	3.5	1.3
648	3.3	1.0
758	3.6	1.6
821	3.1	2.2
933	3.2	1.1
1024	3.2	1.6
1115	3.3	3.0
1199	3.2	2.0
1319	2.9	1.3
1396	3.0	1.5
1537	3.0	2.3
2104	2.8	2.1

Note: Ground water elevations have been adjusted to fit the graph by adding 2 ft. 0 ft elevation datum (second to last elevation) had no elevation data: 0 was input.

	Days	LogC	G.W. Elev
SCVWD Site Number: 06S2W08K05F	0	3.1	1.5
Site Address: 840 San Antonio Road	114	2.9	1.3
Site Name: Arco #1326	210	2.7	1.5
City: Palo Alto	314	2.6	.6
	395	2.5	1.7
Contaminant: Benzene - A-2	501	2.1	1.1
i = 0..19	580	1.8	1.4
	681	3.1	2.0
	768	2.2	1.3
	858	2.0	1.0
x =	968	1.9	1.6
	1031	1.6	2.2
	1143	2.0	1.1
	1234	2.0	1.6
	1325	1.8	3.0
	1409	1.7	2.0
	1529	1.5	1.3
	1606	1.8	1.5
	1747	1.3	2.3
	2104	1.0	2.1

a = slope(x,y) $a = -8.6295 \cdot 10^{-4}$

b = intercept(x,y) $b = 2.879$

corr(x,y) = -0.8723

corr(x,y)² = 0.7609

Note: Ground water elevations have been adjusted to fit the graph by adding 2 ft. 0 ft elevation datum (second to last elevation) had no elevation data: 0 was input.

SCVWD Site Number: 06S2W08K05F
 Site Address: 840 San Antonio Road
 Site Name: Arco #1326
 City: Palo Alto

Contaminant: TPH Gasoline - A-4

$i = 0..9$

Days	LogC	G.W. Elev
0	4.2	1.3
84	3.7	1.8
204	3.4	1.2
291	2.9	1.2
430	3.3	1.8
501	3.3	1.5
597	2.8	1.0
690	2.0	1.6
818	3.3	1.9
910	3.3	1.4

$a = \text{slope}(x, y) \quad a = -0.0011$

$b = \text{intercept}(x, y) \quad b = 3.6961$

$\text{corr}(x, y) = -0.5591$

$\text{corr}(x, y)^2 = 0.3126$

Note: Ground water elevations have been adjusted to fit the graph by adding 2 ft. The fifth elevation data point was input as 0 since no datum for date.

SCVWD Site Number: 06S2W08K05F
 Site Address: 840 San Antonio Road
 Site Name: Arco #1326
 City: Palo Alto

Contaminant: Benzene - A-4

$i = 0.13$

$a = \text{slope}(x, y) \quad a = -9.5608 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 2.47$

$\text{corr}(x, y) = -0.712$

$\text{corr}(x, y)^2 = 0.507$

Days	LogC	G.W. Elev
0	2.7	1.6
62	2.6	1.1
93	2.3	1.0
184	2.2	1.3
275	2.5	1.3
359	2.3	1.8
479	1.7	1.2
566	1.5	1.2
705	1.8	1.8
776	1.7	1.5
872	1.1	1.0
965	1.0	1.6
1093	2.2	1.9
1185	1.7	1.4

Note: Ground water elevations have been adjusted to fit the graph by adding 2 ft. The ninth elevation data point was input as 0 since no datum for date.

SCVWD Site Number: 06S2W08K05F
 Site Address: 840 San Antonio Road
 Site Name: Arco #1326
 City: Palo Alto

Contaminant: TPH Gasoline - A-5

$i = 0.9$

$x =$

$y =$

$d =$

Days	LogC	G.W. Elev
0	4.0	2.4
85	3.7	1.8
144	2.7	1.3
221	2.4	1.2
361	3.3	2.1
432	2.8	1.5
528	1.8	1.1
621	2.8	1.4
718	3.6	1.8
810	3.2	1.4

$a = \text{slope}(x,y) \quad a = -5.4389 \cdot 10^{-4}$

$b = \text{intercept}(x,y) \quad b = 3.2432$

$\text{corr}(x,y) = -0.2281$

$\text{corr}(x,y)^2 = 0.052$

Note: Ground water elevations have been adjusted to fit the graph by adding 2 ft.

SCVWD Site Number: 06S2W08K05F
 Site Address: 840 San Antonio Road
 Site Name: Arco #1326
 City: Palo Alto

Contaminant: Benzene - A-5

$i = 0..8$

Days	LogC	G.W. Elev
0	3.0	1.8
59	1.7	1.3
136	1.4	1.2
261	2.1	2.1
x = 347	y = 1.7	d = 1.5
443	.8	1.1
536	1.1	1.4
633	2.7	1.8
725	2.3	1.4

$a = \text{slope}(x,y) \quad a = -2.1346 \cdot 10^{-4}$

$b = \text{intercept}(x,y) \quad b = 1.9411$

$\text{corr}(x,y) = -0.0753$

$\text{corr}(x,y)^2 = 0.0057$

Note: Ground water elevations have been adjusted to fit the graph by adding 2 ft.

SCVWD Site Number: 06S3W02DO5f

Site Address: 355 Alma Street

Site Name: Shel

City: Palo Alto

Contaminant: TPH Gasoline

$i = 0..5$

Days	LogC	G.W. Elev
0	3.8	0
81	2.6	1.91
170	2.5	.74
267	2.4	.29
347	3	3.22
387	1.4	1.36

$a = \text{slope}(x, y) \quad a = -0.0036$

$b = \text{intercept}(x, y) \quad b = 3.3686$

$\text{corr}(x, y) = -0.6974$

$\text{corr}(x, y)^2 = 0.4864$

Note: Ground water elevations have been modified to fit the graph. 0 ft = 14.94 ft. First data point was assigned 0 since no elevation data available for date.

SCVWD Site Number: 06S3W02D05f

Site Address: 355 Alma Street

Site Name: Shel

City: Palo Alto

Days

LogC

G.W.
Elev

Contaminant: Benzene

$i = 0.11$

$x =$

$y =$

$d =$

$a = \text{slope}(x, y) \quad a = -0.0036$

$b = \text{intercept}(x, y) \quad b = 3.0958$

$\text{corr}(x, y) = -0.8721$

$\text{corr}(x, y)^2 = 0.7605$

Note: Ground water elevations have been modified to fit the graph. 0 ft = 14.94 ft. *is data point*

assigned 0 since no elev. data ~~available~~ for date.

SCVWD Site Number: 06S2W07CO1f
 Site Address: 3011 Middlefield Road
 Site Name: Shell
 City: Palo Alto

	Days	LogC	G.W. Elev
Contaminant: TPH Gasoline	0	3.8	2.15
	111	3.6	1.27
	192	3.4	1.96
	277	3	3.5

i = 0..3

a = slope(x,y) a = -0.0028

b = intercept(x,y) b = 3.8578

corr(x,y) = -0.9721

corr(x,y)² = 0.945

SCVWD Site Number: 06S3W11A02F

Site Address: 1795 El Camino Real

Site Name: Fill'em Fast

City: Palo Alto

Contaminant: TPH Gasoline

$i = 0..8$

$x = 489$

$y = 2.9$

$d = 1.8$

582

3

1

651

3

1

741

3.3

2.6

846

2.6

4.2

$a = \text{slope}(x,y) \quad a = -0.0011$

$b = \text{intercept}(x,y) \quad b = 3.6559$

$\text{corr}(x,y) = -0.8061$

$\text{corr}(x,y)^2 = 0.6498$

Note: Ground water elevations have been modified to fit the graph. 0 ft = 10.14 ft

SCVWD Site Number: 06S3W11A02F
 Site Address: 1795 El Camino Real
 Site Name: Fill'em Fast
 City: Palo Alto

	Days	LogC	G.W. Elev
	0	2.9	1.4
	211	2.2	.6
Contaminant: Benzene	318	2	.8
	x = 411	y = 2.1	d = 0
i = 0..6	480	2.1	0
	570	2.6	1.6
	675	1.6	3.3

a = slope(x,y) a = -0.0012

b = intercept(x,y) b = 2.6647

corr(x,y) = -0.6381

corr(x,y)² = 0.4071

Note: Ground water elevations have been
 modified to fit the graph. 0 ft = 11.09 ft.

SCVWD Site Number: 06S3W11A01F
 Site Address: 1885 El Camino Real
 Site Name: Shell
 City: Palo Alto

Contaminant: TPH Gasoline - S-5

$i = 0..12$

Days	LogC	G.W. Elev
0	5.1	.3
87	3.7	.2
157	3.6	0
264	4.1	1.2
371	4.4	0
444	3.7	2.6
$x = 541$	$y = 3.4$	$d = 1.8$
605	3.4	2
708	3.3	2.5
789	3.3	2.6
877	2.9	2.4
968	3.3	2
1057	3.7	5.2

$a = \text{slope}(x,y) \quad a = -0.0011$

$b = \text{intercept}(x,y) \quad b = 4.2734$

$\text{corr}(x,y) = -0.6697$

$\text{corr}(x,y)^2 = 0.4485$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 8.78 ft. There was no elevation data point for the second 0 value, so 0 was input.

SCVWD Site Number: 06S3W11A01F

Site Address: 1885 El Camino Real

Site Name: Shell

City: Palo Alto

	Days	LogC	G.W. Elev
	0	4.4	0
	107	4.2	.5
Contaminant: TPH Gasoline - S-8	181	3.4	.7
	278	3.1	.8
i = 0.. 10	342	3.2	1.4
	x = 445	y = 3.8	d = 1.4
	526	3	1.3
	614	2.2	.7
	705	2.8	2
	794	2.3	3.9
	876	2.5	3.3

a = slope(x,y) a = -0.0022

b = intercept(x,y) b = 4.139

corr(x,y) = -0.8611

corr(x,y)² = 0.7414

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 9.91 ft.

SCVWD Site Number: 06S3W11A01F
 Site Address: 1885 El Camino Real
 Site Name: Shell
 City: Palo Alto

	Days	LogC	G.W. Elev
	0	3.5	.5
	74	2.4	.7
Contaminant: Benzene	171	2	.8
	235	1.4	1.4
$i = 0..8$	$x = 338$	$y = 1.4$	$d = 1.4$
	419	1	1.3
	507	.08	.7
	598	1	2
	687	.6	3.9

$a = \text{slope}(x, y) \quad a = -0.0048$

$b = \text{intercept}(x, y) \quad b = 2.9588$

$\text{corr}(x, y) = -0.9279$

$\text{corr}(x, y)^2 = 0.861$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 9.91 ft.

SCVWD Site Number: 06S3W12E01F

Site Address: 2200 El Camino Real

Site Name: Shell

City: Palo Alto

Contaminant: TPH Gasoline - MW-6

$i = 0..5$

Days	LogC	G.W. Elev
0	4.9	4.1
91	4.9	4.1
194	4.7	.3
277	4.6	.9
376	4.1	0
464	1.4	3.4

$a = \text{slope}(x, y) \quad a = -0.0061$

$b = \text{intercept}(x, y) \quad b = 5.5248$

$\text{corr}(x, y) = -0.7839$

$\text{corr}(x, y)^2 = 0.6145$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 13.25 ft.

SCVWD Site Number: 06S3W12E01F
 Site Address: 2200 El Camino Real
 Site Name: Shell
 City: Palo Alto

Contaminant: Benzene - MW-6

$i = 0..9$

Days	LogC	G.W. Elev
0	3.7	.4
92	3.7	.1
170	3.7	4.1
267	3.6	4.1
366	2.6	.3
449	2.7	.9
548	2.2	0
636	.8	3.4
814	1.6	2.6
831	.2	0

$a = \text{slope}(x,y) \quad a = -0.0031$

$b = \text{intercept}(x,y) \quad b = 3.9363$

$\text{corr}(x,y) = -0.8718$

$\text{corr}(x,y)^2 = 0.76$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 13.25 ft.

SCVWD Site Number: 06S3W12E01F	Days	LogC	G.W. Elev
Site Address: 2200 El Camino Real			
Site Name: Shell			
City: Palo Alto	0	4.9	0
	91	4.6	3.3
	194	4.5	.6
Contaminant: TPH Gasoline - MW-8	277	4.8	1.1
	376	3.3	.6
	464	3.4	3.1
	558	2.4	1.3
	642	1.4	1.5

$i = 0..7$ $x =$ $y =$ $d =$

$a = \text{slope}(x, y) \quad a = -0.0052$

$b = \text{intercept}(x, y) \quad b = 5.3521$

$\text{corr}(x, y) = -0.922$

$\text{corr}(x, y)^2 = 0.8501$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 13.39 ft.

SCVWD Site Number: 06S3W12E01F

Site Address: 2200 El Camino Real

Site Name: Shell

City: Palo Alto

Contaminant: Benzene - MW-8

$i = 0..8$

Days	LogC	G.W. Elev
0	2.7	.3
78	2.5	0
169	2.7	3.3
272	2.5	.6
x = 355	y = 2.6	d = 1.1
454	1	.6
542	1.6	3.1
636	.3	1.3
720	0	1.5

$a = \text{slope}(x,y) \quad a = -0.0039$

$b = \text{intercept}(x,y) \quad b = 3.1494$

$\text{corr}(x,y) = -0.8906$

$\text{corr}(x,y)^2 = 0.7932$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 13.39 ft.

SCVWD Site Number: 06S3W12E01F
 Site Address: 2200 El Camino Real
 Site Name: Shell
 City: Palo Alto

Contaminant: TPH Gasoline - MW-11

$i = 0..15$

$a = \text{slope}(x,y) \quad a = -8.1342 \cdot 10^{-4}$

$b = \text{intercept}(x,y) \quad b = 4.3038$

$\text{corr}(x,y) = -0.8155$

$\text{corr}(x,y)^2 = 0.665$

Days	LogC	G.W. Elev
0	4.3	4
86	4.2	3
169	4.2	1
251	4	1
347	3.8	0
458	3.8	5.3
540	3.8	3.6
632	3.9	2.9
710	3.7	2.6
801	3.9	6.9
904	3.8	3.1
987	3.9	3.4
1086	3.5	2.3
1176	3.7	6.4
1270	3	6.1
1353	2.6	3.9

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 10.91 ft.

SCVWD Site Number: 06S3W12E01F
 Site Address: 2200 El Camino Real
 Site Name: Shell
 City: Palo Alto

Contaminant: Benzene - MW-11

$i = 0..16$

$a = \text{slope}(x, y) \quad a = -7.4261 \cdot 10^{-4}$
 $b = \text{intercept}(x, y) \quad b = 3.565$
 $\text{corr}(x, y) = -0.9252$
 $\text{corr}(x, y)^2 = 0.8559$

Days	LogC	G.W. Elev
0	3.5	.8
110	3.5	.4
196	3.5	3
279	3.5	1
361	3.4	1
457	3	0
568	2.9	5.3
650	3.2	3.6
x = 742	y = 3	d = 2.9
820	2.9	2.6
911	2.8	6.9
1014	2.9	3.1
1097	3	3.4
1196	2.6	2.3
1286	2.8	6.4
1380	2.4	6.1
1463	2.4	3.9

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 10.91 ft.

SCVWD Site Number: 06S2W08N01F
 Site Address: 3900 Middlefield Rd.
 Site Name: Shell
 City: Palo Alto

	Days	LogC	G.W. Elev
	0	4.9	.4
	69	4.2	.2
	146	3.8	0
Contaminant: TPH Gasoline - S-3	271	4.3	.6
$i = 0..9$	336	4	.7
	432	3.8	0
	508	3.3	0
	597	3.9	1.5
	717	3.2	0
	777	2.5	.8

$a = \text{slope}(x,y) \quad a = -0.0021$

$b = \text{intercept}(x,y) \quad b = 4.6036$

$\text{corr}(x,y) = -0.8524$

$\text{corr}(x,y)^2 = 0.7267$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 6.0 ft (rounded). There was no elevation data point for the 9th date, so 0 was input.

SCVWD Site Number: 06S2W08N01F

Site Address: 3900 Middlefield Rd.

Site Name: Shell

City: Palo Alto

Contaminant: TPH Gasoline - S-4

	Days	LogC	G.W. Elev
	0	4	.7
	98	3.8	.7
	173	3.8	0
$i = 0..6$	$x = 233$	$y = 3.5$	$d = 1.4$
	327	3.9	1.3
	414	3.5	.8
	514	3.5	.8

$a = \text{slope}(x,y) \quad a = -8.4818 \cdot 10^{-4}$

$b = \text{intercept}(x,y) \quad b = 3.9274$

$\text{corr}(x,y) = -0.7215$

$\text{corr}(x,y)^2 = 0.5205$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 6.0 ft (rounded).

SCVWD Site Number: 06S2W08N01F
 Site Address: 3900 Middlefield Rd.
 Site Name: Shell
 City: Palo Alto

	Days	LogC	G.W. Elev
Contaminant: Benzene - S-4 i = 0..8	0	2.4	0
	127	1.5	.6
	192	.4	.7
	290	1	.1
	x = 365	y = 1.7	d = 0
	425	.4	1.4
	519	1.3	1.3
	606	1.2	.8
	706	1.1	.8

$$a = \text{slope}(x,y) \quad a = -9.8761 \cdot 10^{-4}$$

$$b = \text{intercept}(x,y) \quad b = 1.5767$$

$$\text{corr}(x,y) = -0.3655$$

$$\text{corr}(x,y)^2 = 0.1336$$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 6.0 ft (rounded).

SCVWD Site Number: 06S3W12E02F
 Site Address: 1963 El Camino Real
 Site Name: Arco Station #589
 City: Palo Alto

Contaminant: TPH Gasoline - MW-8⁷

i = 0..8

Days	LogC	G.W. Elev
0	3.8	1.4
124	3.3	.6
210	3.2	.1
331	3.1	0
x = 402	y = 2.8	d = .8
502	3	.3
604	2.5	0
704	2.8	3.5
792	2.3	2.9

a = slope(x,y) a = -0.0015

b = intercept(x,y) b = 3.6048

corr(x,y) = -0.923

corr(x,y)² = 0.8519

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 10.4 ft (rounded). Elevation datum for fourth date not available; 0 input.

SCVWD Site Number: 06S3W12E02F
 Site Address: 1963 El Camino Real
 Site Name: Arco Station #589
 City: Palo Alto

	Days	LogC	G.W. Elev
Contaminant: Benzene - mw- ⁷⁸	0	3	1.4
	124	2.4	.6
	210	2.1	.1
	331	1.9	0
$i = 0..8$	$x = 402$	$y = 1.6$	$d = .8$
	502	1.8	.3
	604	1.6	0
	704	1.4	3.5
	792	.7	2.9

$a = \text{slope}(x,y) \quad a = -0.0023$

$b = \text{intercept}(x,y) \quad b = 2.7598$

$\text{corr}(x,y) = -0.9426$

$\text{corr}(x,y)^2 = 0.8884$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 10.4 ft (rounded). Elevation datum for fourth date not available: 0 input.

SCVWD Site Number: 06S3W12E02F
 Site Address: 1963 El Camino Real
 Site Name: Arco Station #589
 City: Palo Alto

	Days	LogC	G.W. Elev
	0	4.5	.2
Contaminant: TPH Gasoline - MW-11	97	4	.6
	188	4	.5
$i = 0..9$	276	3.8	0
	367	3.6	2.4
$x =$	456	3.4	3.2
	580	3.2	2.4
	636	2.7	2.1
	756	2.3	0
	924	1.4	2.2

$a = \text{slope}(x,y)$ $a = -0.003$

$b = \text{intercept}(x,y)$ $b = 4.5855$

$\text{corr}(x,y) = -0.9713$

$\text{corr}(x,y)^2 = 0.9434$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 8.3 ft (rounded). Elevation datum for ninth date not available: 0 input.

SCVWD Site Number: 06S3W12E02F
 Site Address: 1963 El Camino Real
 Site Name: Arco Station #589
 City: Palo Alto

Contaminant: Benzene - MW-11

$i = 0..11$

Days	LogC	G.W. Elev
0	2.4	.2
97	2.3	.6
188	2.4	.5
276	2.1	0
367	1.8	2.4
456	1	3.2
580	1.2	2.4
636	1.6	2.1
756	.9	0
924	-.05	2.2
1026	.4	2
1125	1.7	5.3

$a = \text{slope}(x,y) \quad a = -0.0016$

$b = \text{intercept}(x,y) \quad b = 2.3612$

$\text{corr}(x,y) = -0.7586$

$\text{corr}(x,y)^2 = 0.5755$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 8.3 ft (rounded). Elevation datum for ninth date not available: 0 input.

SCVWD Site Number: 06S2W17B02F
 Site Address: 699 San Antonio Rd
 Site Name: Arco #0716
 City: Palo Alto

Contaminant: TPH Gasoline - A-3

$i = 0..11$

Days	LogC	G.W. Elev
0	4.5	2.7
91	3.4	4.3
188	3.6	3.7
297	3.4	3
372	2.9	2.9
512	2.2	3.6
589	2	3.58
689	2.2	3.2
777	2.1	3.3
870	2.4	4.6
958	2.1	3.2
1051	2.1	3.1

$a = \text{slope}(x,y) \quad a = -0.002$

$b = \text{intercept}(x,y) \quad b = 3.822$

$\text{corr}(x,y) = -0.8708$

$\text{corr}(x,y)^2 = 0.7584$

SCVWD Site Number: 06S2W17B02F
 Site Address: 699 San Antonio Rd
 Site Name: Arco #0716
 City: Palo Alto

	Days	LogC	G.W. Elev
	0	1.1	3.7
Contaminant: Benzene - A-3	109	.9	3
$i = 0..4$	$x = 184$	$y = .5$	$d = 2.9$
	324	-.2	3.6
	401	-.6	3.5

$a = \text{slope}(x, y) \quad a = -0.0044$

$b = \text{intercept}(x, y) \quad b = 1.2412$

$\text{corr}(x, y) = -0.9881$

$\text{corr}(x, y)^2 = 0.9762$

Note: Ground water elevations have been adjusted to fit the graph. Elevations have been divided by 2.

SCVWD Site Number: 06S2W17B02F
 Site Address: 699 San Antonio Rd
 Site Name: Arco #0716
 City: Palo Alto

Contaminant: TPH Gasoline - A-6

$i = 0..10$

Days	LogC	G.W. Elev
0	4.1	.7
61	3	1.6
171	4	0
262	3.9	.8
352	2.7	3.2
$x = 449$	$y = 2.8$	$d = 2.1$
558	2.9	.7
633	3.2	.5
773	2	1.9
850	2	1.7
951	1.4	1

$a = \text{slope}(x, y) \quad a = -0.0023$

$b = \text{intercept}(x, y) \quad b = 3.9758$

$\text{corr}(x, y) = -0.8523$

$\text{corr}(x, y)^2 = 0.7264$

SCVWD Site Number: 06S2W17B02F
 Site Address: 699 San Antonio Rd
 Site Name: Arco #0716
 City: Palo Alto

Contaminant: Benzene - A-6

$i = 0..10$

Days	LogC	G.W. Elev
0	2.1	.7
61	1.2	1.6
171	2	0
262	1.4	.8
352	1	3.2
x = 449	y = 1.3	d = 2.1
558	1	.7
633	.7	.5
773	.3	1.9
850	-.05	1.7
951	-.6	1

$a = \text{slope}(x,y) \quad a = -0.0023$

$b = \text{intercept}(x,y) \quad b = 2.0169$

$\text{corr}(x,y) = -0.9196$

$\text{corr}(x,y)^2 = 0.8456$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 4.8 ft (rounded).

SCVWD Site Number: 06S2W07C02F
 Site Address: 2995 Middlefield Rd.
 Site Name: Arco #4430
 City: Palo Alto

Contaminant: TPH Gasoline - MW-4

i = 0..9

Days	LogC	G.W. Elev
0	4.8	3.4
110	3.9	3.3
199	4	2.2
275	2.7	1.8
365	4.2	4.8
457	4	4.4
554	3.6	3.4
637	3	2.9
721	1.4	4.0
1091	3.2	5.2

a = slope(x,y) a = -0.0017

b = intercept(x,y) b = 4.228

corr(x,y) = -0.5757

corr(x,y)² = 0.3314

Note: Ground water elevations have been rounded to the nearest 0.1 ft.

SCVWD Site Number: 06S2W07C02F
 Site Address: 2995 Middlefield Rd.
 Site Name: Arco #4430
 City: Palo Alto

Contaminant: Benzene - MW-4

$i = 0..9$

Days	LogC	G.W. Elev
0	2.8	3.4
110	1.3	3.3
199	1.9	2.2
275	1.2	1.8
365	2.3	4.8
457	1.4	4.4
554	1.1	3.4
637	.5	2.9
721	.1	4.0
1091	1	5.2

$a = \text{slope}(x, y) \quad a = -0.0017$

$b = \text{intercept}(x, y) \quad b = 2.0922$

$\text{corr}(x, y) = -0.6713$

$\text{corr}(x, y)^2 = 0.4506$

Note: Ground water elevations have been rounded to the nearest 0.1 ft.

SCVWD Site Number: 06S2W07C02F
 Site Address: 2995 Middlefield Rd.
 Site Name: Arco #4430
 City: Palo Alto

	Days	LogC	G.W. Elev
Contaminant: TPH Gasoline - MW-5	0	3.8	4.6
	92	3.6	4.3
	188	3.3	3.3
	271	2.7	2.7
	355	2.6	3.9
	727	3	5.0

$i = 0..5$

$x =$

$y =$

$d =$

$a = \text{slope}(x,y) \quad a = -0.0012$

$b = \text{intercept}(x,y) \quad b = 3.4858$

$\text{corr}(x,y) = -0.6194$

$\text{corr}(x,y)^2 = 0.3836$

Note: Ground water elevations have been rounded to the nearest 0.1 ft.

SCVWD Site Number: 06S2W07C02F
 Site Address: 2995 Middlefield Rd.
 Site Name: Arco #4430
 City: Palo Alto

Contaminant: Benzene - MW-5

$i = 0..5$

Days	LogC	G.W. Elev
0	2.5	4.6
92	2.1	4.3
188	1.7	3.3
271	.6	2.7
355	1.1	3.9
727	2	5.0

$a = \text{slope}(x,y) \quad a = -6.1635 \cdot 10^{-4}$

$b = \text{intercept}(x,y) \quad b = 1.8344$

$\text{corr}(x,y) = -0.2251$

$\text{corr}(x,y)^2 = 0.0507$

Note: Ground water elevations have been rounded to the nearest 0.1 ft.

SCVWD Site Number: 06S2W07P01F
 Site Address: 3401 Alma St
 Site Name: Chevron
 City: Palo Alto

Contaminant: TPH Gasoline - MW-1

$i = 0..16$

$a = \text{slope}(x,y) \quad a = -0.0015$

$b = \text{intercept}(x,y) \quad b = 4.1623$

$\text{corr}(x,y) = -0.8637$

$\text{corr}(x,y)^2 = 0.746$

Days	LogC	G.W. Elev
0	4.8	2.1
112	4.4	.8
183	3.6	0
274	3.5	.1
370	3.4	2.7
461	3.8	1.2
546	2.7	.5
641	2.7	1.7
$x = 747$	$y = 2.9$	$d = 5.5$
820	3.1	4.7
910	2.6	3.36
1016	2.7	3.4
1117	2.8	4.6
1217	2.8	3.9
1294	2.7	3.0
1384	2.4	3.3
1476	1.4	6.7

SCVWD Site Number: 06S2W07P01F	Days	LogC	G.W. Elev
Site Address: 3401 Alma St	0	3.6	1.7
Site Name: Chevron	112	3.6	.4
City: Palo Alto	274	2.0	.2
	370	2.0	2.3
Contaminant: Benzene - VE-2	461	1.4	.9
i = 0..9	546	1.1	0
	644	0.5	1.2
	720	-0.6	5.0
	793	-0.1	4.1
	882	-0.6	2.8

a = slope(x,y) a = -0.0052

b = intercept(x,y) b = 3.7723

corr(x,y) = -0.9793

corr(x,y)² = 0.9591

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 9.01 ft.

SCVWD Site Number: 06S2W07P01F	Days	LogC	G.W. Elev
Site Address: 3401 Alma St			
Site Name: Chevron			
City: Palo Alto			
	0	5.2	1.6
	625	4.7	1.7
Contaminant: TPH Gasoline - VE-2	737	4.6	.4
	899	3.9	.2
i = 0..16	995	3.6	2.3
	1086	3.1	.9
	1171	3.4	0
	1269	3.3	1.2
	x = 1345	y = 1.4	d = 5.0
	1418	2.9	4.1
a = slope(x,y) a = -0.0017	1507	2.2	2.8
b = intercept(x,y) b = 5.2827	1614	2.5	2.9
corr(x,y) = -0.852	1695	2.4	4.2
corr(x,y) ² = 0.7258	1795	2.7	3.4
	1871	2.8	2.5
	1961	2.7	2.9
	2053	1.4	7.5

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 9.01 ft.

SCVWD Site Number: 06S2W08Q01F
 Site Address: 780 San Antonio Rd.
 Site Name: Beacon #590
 City: Palo Alto

	Days	LogC	G.W. Elev
	0	2.9	0
Contaminant: TPH Gasoline	89	2.1	0.6
	180	2.7	1.0
$i = 0..6$	$x = 306$	$y = 2.6$	$d = 0.5$
	397	1.4	0.1
	487	1.8	0.5
	578	1.4	1.3

$a = \text{slope}(x,y) \quad a = -0.0023$

$b = \text{intercept}(x,y) \quad b = 2.8029$

$\text{corr}(x,y) = -0.7916$

$\text{corr}(x,y)^2 = 0.6266$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 6.92 ft.

SCVWD Site Number: 06S2W08Q01F
 Site Address: 780 San Antonio Rd.
 Site Name: Beacon #590
 City: Palo Alto

Contaminant: Benzene

$i = 0..7$

Days	LogC	G.W. Elev
0	1.2	0
89	0.7	0.6
180	0.9	1.0
306	1.3	.05
397	-0.6	0.1
487	0.5	0.5
578	-0.3	1.3
669	-0.6	0.8

$a = \text{slope}(x, y) \quad a = -0.0025$

$b = \text{intercept}(x, y) \quad b = 1.2402$

$\text{corr}(x, y) = -0.7651$

$\text{corr}(x, y)^2 = 0.5854$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = ____ ft.

SCVWD Site Number: 06S2W18C01F

Site Address: 4073 El Camino Real

Site Name: Beacon #463

City: Palo Alto

Contaminant: TPH Gasoline

$i = 0..9$

Days	LogC	G.W. Elev
0	4.5	3.6
74	4.3	3.7
507	1.4	1.7
598	3.6	2.0
694	3.9	1.9
790	3.2	1.8
882	2.9	2.7
917	2.6	2.6
1007	2.7	1.3
1101	2.7	0

$a = \text{slope}(x, y) \quad a = -0.0015$

$b = \text{intercept}(x, y) \quad b = 4.1456$

$\text{corr}(x, y) = -0.5918$

$\text{corr}(x, y)^2 = 0.3502$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 14.4 ft./2

SCVWD Site Number: 06S2W18D01F
 Site Address: 3972 El Camino Real
 Site Name: Chevron #3173
 City: Palo Alto

Contaminant: TPH Gasoline

i = 0..29

a = slope(x,y) a = $-1.8519 \cdot 10^{-4}$

b = intercept(x,y) b = 3.9851

corr(x,y) = -0.4193

corr(x,y)² = 0.1758

Days	LogC	G.W. Elev
0	4.8	0
374	4.3	0
499	4.1	0
595	3.8	3.1
688	3.6	3.1
779	3.9	3.5
828	3.8	3.7
945	3.7	3.8
1038	3.5	3.6
1145	3.5	4.0
1232	3.7	4.4
1335	3.7	4.5
1404	3.3	4.3
1487	3.5	4.1
1581	3.6	4.6
1687	4.0	4.6
1779	3.4	3.4
1858	3.5	3.9
1942	3.5	4.1
2111	3.4	1.7
2201	3.5	1.4
2278	3.6	1.9
2383	3.0	2.3
2479	3.9	1.8
2572	3.4	1.7
2668	3.1	2.6
2760	3.2	2.6
2848	4.0	0
2922	3.9	0
3013	4.2	3

x =

y =

d =

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 14.7 ft/2

SCVWD Site Number: 06S2W18D01F

Site Address: 3972 El Camino Real

Site Name:Chevron #3173

City: Palo Alto

	Days	LogC	G.W. Elev
	0	3.1	0
Contaminant: Benzene	125	3.0	0
i = 0..28	221	2.9	3.1
	314	2.9	3.1
	405	2.9	3.5
	454	2.8	3.7
	571	2.5	3.8
	664	2.0	3.6
	771	2.3	4.0
	858	2.0	4.4
	961	2.0	4.5
	1030	1.7	4.3
	1113	1.4	4.1
	1207	1.9	4.6
	x = 1313	y = 1.9	d = 4.6
a = slope(x,y) a = $-5.4459 \cdot 10^{-4}$	1405	1.6	3.4
b = intercept(x,y) b = 2.6971	1484	1.4	3.9
corr(x,y) = -0.7389	1568	1.1	4.1
corr(x,y) ² = 0.546	1737	1.6	1.7
	1827	1.5	1.4
	1904	1.6	1.9
	2014	1.2	2.3
	2105	1.6	1.8
	2198	1.5	1.7
	2294	1.5	2.6
	2386	1.5	2.6
	2474	1.5	0
	2548	2.0	0
	2639	2.3	3

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 14.7 ft/2.

SCVWD Site Number: 07S1W03G04
 Site Address: 1995 Warburton Ave
 Site Name: Arco #2082
 City: Santa Clara

	Days	LogC	G.W. Elev
Contaminant: TPH Gasoline, A-1	0	4.0	0
	90	3.3	3.7
$i = 0..4$	$x = 175$	$y = 3.1$	$d = 5.0$
	274	2.2	4.2
	374	2.6	4.5

$a = \text{slope}(x,y) \quad a = -0.0041$

$b = \text{intercept}(x,y) \quad b = 3.7976$

$\text{corr}(x,y) = -0.8895$

$\text{corr}(x,y)^2 = 0.7913$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 49.15 ft.

SCVWD Site Number: 07S1W03G04
 Site Address: 1995 Warburton Ave
 Site Name: Arco #2082
 City: Santa Clara

Contaminant: Benzene, 4 - 1

$i = 0.4$

Days	LogC	G.W. Elev
0	3.0	0
90	2.0	3.7
x = 175	y = 1.7	d = 5.0
274	0.9	4.2
374	1.6	4.5

$a = \text{slope}(x,y) \quad a = -0.0041$

$b = \text{intercept}(x,y) \quad b = 2.5905$

$\text{corr}(x,y) = -0.7937$

$\text{corr}(x,y)^2 = 0.6299$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 49.15 ft.

SCVWD Site Number: 07S1W03G04	Days	LogC	G.W. Elev
Site Address: 1995 Warburton Ave	0	2.6	0
Site Name: Arco #2082	88	2.2	0
City: Santa Clara	257	1.9	5.5
	389	1.7	5.0
Contaminant: Benzene, A-2	444	1.0	5.0
	560	1.1	6.7
i = 0..11	x = 578	y = 1.4	d = 6.8
	672	1.6	0
	866	1.8	9.3
	951	0.8	10.1
	1050	0.3	9.4
	1150	0.4	9.7

a = slope(x,y) a = -0.0016

b = intercept(x,y) b = 2.3363

corr(x,y) = -0.8456

corr(x,y)² = 0.715

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 44.0 ft. No elevation data was available for the eighth date, so 0 was input.

SCVWD Site Number: 07S1W03G04
 Site Address: 1995 Warburton Ave
 Site Name: Arco #2082
 City: Santa Clara

Contaminant: TPH Gasoline, A-2

i = 0..11

Days	LogC	G.W. Elev
0	4.4	0
88	4.2	0
257	4.1	5.5
389	4.0	5.0
444	3.5	5.0
560	3.2	6.7
578	3.6	6.8
672	3.8	0
866	3.9	9.3
951	3.2	10.1
1050	2.8	9.4
1150	2.4	9.7

a = slope(x,y) a = -0.0014

b = intercept(x,y) b = 4.3946

corr(x,y) = -0.851

corr(x,y)² = 0.7242

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 44.0 ft. No elevation data was available for the eighth date, so 0 was input.

SCVWD Site Number: 07S1W03M01F
 Site Address: 2320 El Camino Real
 Site Name: Arco #0606
 City: Santa Clara

	Days	LogC	G.W. Elev
	0	3.9	0
	128	3.6	0
Contaminant: TPH Gasoline	201	3.7	1.8
	295	3.6	1.3
$i = 0..8$	$x = 399$	$y = 3.2$	$d = .8$
	502	2.5	7.2
	594	2.4	6.3
	682	2.1	5.7
	768	1.8	5.2

$a = \text{slope}(x, y) \quad a = -0.0029$

$b = \text{intercept}(x, y) \quad b = 4.1288$

$\text{corr}(x, y) = -0.9687$

$\text{corr}(x, y)^2 = 0.9384$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 53.55 ft. No elevation data was available for the second data point, so 0 was input.

SCVWD Site Number: 07S1W03M01F	Days	LogC	G.W. Elev
Site Address: 2320 El Camino Real	0	1.5	0.1
Site Name: Arco #0606	35	1.4	0
City: Santa Clara	163	1.0	0
Contaminant: Benzene	236	0.9	1.8
	330	0.6	1.3
	434	0.3	0.8
	537	-0.2	7.2
	629	0.4	6.3
	717	-0.1	5.7
	803	-0.6	5.2

$i = 0..9$

$a = \text{slope}(x, y) \quad a = -0.0023$

$b = \text{intercept}(x, y) \quad b = 1.4305$

$\text{corr}(x, y) = -0.952$

$\text{corr}(x, y)^2 = 0.9063$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 53.55 ft. There was no elevation data for the third date so 0 was input.

SCVWD Site Number: 07S1W09G02F
 Site Address: 2800 Homestead
 Site Name: Arco #2153
 City: Santa Clara

Contaminant: TPH Gasoline

$i = 0..9$

Days	LogC	G.W. Elev
0	4.0	0.2
68	3.9	0
186	2.8	0
282	3.2	1.5
358	3.3	0.8
458	3.5	0.4
555	3.1	4.5
651	3.3	6.6
724	3.2	6.0
820	2.2	4.7

$a = \text{slope}(x,y) \quad a = -0.0012$

$b = \text{intercept}(x,y) \quad b = 3.7575$

$\text{corr}(x,y) = -0.6715$

$\text{corr}(x,y)^2 = 0.4509$

y_i	$x_i - b$	d_i
4.0	3.7575	0.2425
3.9	3.6575	0.2425
2.8	2.5575	0.2425
3.2	2.9575	0.2425
3.3	3.0575	0.2425
3.5	3.2575	0.2425
3.1	2.8575	0.2425
3.3	3.0575	0.2425
3.2	2.9575	0.2425
2.2	1.9575	0.2425

SCVWD Site Number: 07S1W09G02F	Days	LogC	G.W. Elev
Site Address: 2800 Homestead	0	2.8	0.2
Site Name: Arco #2153	68	2.7	0
City: Santa Clara	186	1.0	0
	282	1.8	1.5
Contaminant: Benzene	358	2.0	0.8
	458	1.8	0.4
	555	0.7	4.5
	651	1.0	6.6
	724	0.7	6.0
	820	0.6	4.7

$a = \text{slope}(x, y) \quad a = -0.0032$
 $b = \text{intercept}(x, y) \quad b = 2.6922$
 $\text{corr}(x, y) = -0.8574$
 $\text{corr}(x, y)^2 = 0.7352$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 64.97 ft. There was no elevation data for the third date, so 0 was input.

SCVWD Site Number: 07S1W03G01F
 Site Address: 1795 Scott Blvd
 Site Name: Chevron #97116
 City: Santa Clara

Contaminant: TPH Gasoline

$i = 0..14$

$a = \text{slope}(x,y) \quad a = -0.0026$
 $b = \text{intercept}(x,y) \quad b = 5.649$
 $\text{corr}(x,y) = -0.8547$
 $\text{corr}(x,y)^2 = 0.7305$

Days	LogC	G.W. Elev
0	5.1	.2
89	5.0	.4
178	5.0	0
275	5.1	2.7
379	4.7	6.1
451	4.4	5.9
529	4.5	5.6
x = 606	y = 4.6	d = 6.0
695	4.5	7.1
795	4.2	7.1
877	4.2	6.0
975	3.7	9.7
1057	1.4	11.0
1175	2.5	10.6
1241	1.8	10.1

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 43.42 ft.

SCVWD Site Number: 07S1W03G01F	Days	LogC	G.W. Elev
Site Address: 1795 Scott Blvd	0	3.3	0.2
Site Name: Chevron #97116	89	3.2	0.4
City: Santa Clara	178	3.2	0
	275	3.0	2.7
Contaminant: Benzene	379	2.9	6.1
	451	2.7	5.9
i = 0..12	x = 529	y = 2.6	d = 5.6
	606	2.6	6.0
	695	2.4	7.1
	795	2.0	7.1
	877	1.6	6.0
	975	1.3	9.7
	1057	-0.6	11.0

a = slope(x,y) a = -0.0027

b = intercept(x,y) b = 3.7731

corr(x,y) = -0.867

corr(x,y)² = 0.7517

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 43.42 ft.

SCVWD Site Number: 06S1W35F01F
 Site Address: 2600 De La Cruz Blvd
 Site Name: Container Corp
 City: Santa Clara

Contaminant: TPH Gasoline

$i = 0..7$

Days	LogC	G.W. Elev
0	5.2	0
92	4.8	0
306	4.7	0.7
398	4.7	0
498	4.6	0.4
672	4.8	0.6
824	4.8	0.3
1006	4.8	2.5

$a = \text{slope}(x, y) \quad a = -2.0002 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 4.8949$

$\text{corr}(x, y) = -0.3931$

$\text{corr}(x, y)^2 = 0.1546$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 24.05 ft. There was no elevation data available for the first two dates, so 0 was input.

SCVWD Site Number: 06S1W35F01F
 Site Address: 2600 De La Cruz Blvd
 Site Name: Container Corp
 City: Santa Clara

Contaminant: Benzene

i = 0..10

Days	LogC	G.W. Elev
0	3.9	0
92	3.7	0
245	3.6	0
337	3.6	0
459	3.4	0.7
x = 549	y = 3.4	d = 0.7
641	3.4	0
733	3.3	0.4
976	3.2	0.6
1068	3.2	0.3
1250	3.1	2.5

a = slope(x,y) a = $-5.7832 \cdot 10^{-4}$

b = intercept(x,y) b = 3.7702

corr(x,y) = -0.9657

corr(x,y)² = 0.9325

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 24.05 ft. There was no elevation data available for the first four dates, so 0 was input.

SCVWD Site Number: 07S1W15F01F
 Site Address: 375 El Camino Real
 Site Name: Exxon #7-3850
 City: Santa Clara

Contaminant: TPH Gasoline	Days	LogC	G.W. Elev
	0	4.9	1.8
i = 0..3	83	4.8	6.0
	187	4.6	7.6
	284	4.4	7.2

$a = \text{slope}(x, y) \quad a = -0.0018$
 $b = \text{intercept}(x, y) \quad b = 4.9223$
 $\text{corr}(x, y) = -0.9948$
 $\text{corr}(x, y)^2 = 0.9896$

Note: Ground water elevations have been adjusted to fit the graph. 1.8 ft = 56.87 ft.

SCVWD Site Number: 07S1W15F01F
 Site Address: 375 El Camino Real
 Site Name: Exxon #7-3850
 City: Santa Clara

Contaminant: Benzene

$i = 0..5$

Days	LogC	G.W. Elev
0	3.5	0.6
111	3.4	0
189	3.1	1.8
272	3.1	6.0
376	2.9	7.6
474	2.8	7.2

$a = \text{slope}(x, y) \quad a = -0.0015$

$b = \text{intercept}(x, y) \quad b = 3.4965$

$\text{corr}(x, y) = -0.9748$

$\text{corr}(x, y)^2 = 0.9503$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 55.11 ft.

SCVWD Site Number: 07S1W03K01F
 Site Address: 1810 El Camino Real
 Site Name: Gangi Investments
 City: Santa Clara

	Days	LogC	G.W. Elev
	0	4.4	0
	91	3.9	0
Contaminant: TPH Gasoline - MW-5	197	3.3	0
	291	2.9	0
$i = 0..8$	$x = 368$	$y = 2.2$	$d = 0.6$
	463	2.2	0.4
	564	2.1	0.6
	635	2.7	4.5
	748	1.4	8.6

$a = \text{slope}(x,y) \quad a = -0.0034$

$b = \text{intercept}(x,y) \quad b = 4.0603$

$\text{corr}(x,y) = -0.9068$

$\text{corr}(x,y)^2 = 0.8223$

y_1	x_1	d_1
4.4	0	0
3.9	91	0
3.3	197	0
2.9	291	0
2.2	368	0.6
2.2	463	0.4
2.1	564	0.6
2.7	635	4.5
1.4	748	8.6

SCVWD Site Number: 07S1W03K01F
 Site Address: 1810 El Camino Real
 Site Name: Gangi Investments
 City: Santa Clara

Contaminant: Benzene - mw-5

$i = 0..8$

Days	LogC	G.W. Elev
0	3.2	0
91	2.3	0
197	2.4	0
291	0.8	0
$x = 368$	$y = 0.4$	$d = 0.6$
463	0.2	0.4
564	0.4	0.6
635	1.3	4.5
748	-0.8	8.6

$a = \text{slope}(x, y) \quad a = -0.0043$

$b = \text{intercept}(x, y) \quad b = 2.7396$

$\text{corr}(x, y) = -0.8512$

$\text{corr}(x, y)^2 = 0.7245$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 43.14 ft. Elevation data was not available for the first three dates, so 0 was input.

SCVWD Site Number: 07S1W03K01F

Site Address: 1810 El Camino Real

Site Name: Gangi Investments

City: Santa Clara

Contaminant: TPH Gasoline - MW-6

$i = 0..7$

Days	LogC	G.W. Elev
0	3.7	0
97	3.7	1.0
188	3.3	1.4
294	2.7	2.0
388	2.2	3.7
465	1.4	4.0
560	1.8	3.9
661	1.4	4.0

$a = \text{slope}(x,y) \quad a = -0.004$

$b = \text{intercept}(x,y) \quad b = 3.8632$

$\text{corr}(x,y) = -0.957$

$\text{corr}(x,y)^2 = 0.9159$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 35.84 ft/2.

SCVWD Site Number: 07S1W03K01F
 Site Address: 1810 El Camino Real
 Site Name: Gangi Investments
 City: Santa Clara

	Days	LogC	G.W. Elev
	0	1.7	1.0
	91	0.7	1.4
Contaminant: Benzene - MW-6	197	0.2	2.0
$i = 0..6$	$x = 291$	$y = -0.2$	$d = 3.7$
	368	-0.5	4.0
	463	-0.5	3.9
	564	-0.8	4.0

$a = \text{slope}(x,y) \quad a = -0.0041$
 $b = \text{intercept}(x,y) \quad b = 1.2358$
 $\text{corr}(x,y) = -0.9426$
 $\text{corr}(x,y)^2 = 0.8885$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 35.84 ft/2.

SCVWD Site Number: 06S1W27F01F
 Site Address: 2181 Laurelwood Road
 Site Name: Exxon #7-3624
 City: Santa Clara

Contaminant: TPHg

$i = 0..7$

Days	LogC	G.W. Elev
0	3.5	2.3
127	3.5	2.0
183	3.2	2.8
274	2.5	2.4
352	2.8	2.2
448	3.0	1.8
538	2.9	2.1
630	1.4	0

$a = \text{slope}(x, y) \quad a = -0.0024$

$b = \text{intercept}(x, y) \quad b = 3.63$

$\text{corr}(x, y) = -0.7727$

$\text{corr}(x, y)^2 = 0.5971$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 14.93 ft.

SCVWD Site Number: 06S1W27F01F			
Site Address: 2181 Laurelwood Road			
Site Name: Exxon #7-3624			
City: Santa Clara			
	Days	LogC	G.W. Elev
	0	2.2	3.1
	91	1.8	1.4
	183	1.6	1.3
	356	1.6	2.9
Contaminant: Benzene	445	1.6	2.3
i = 0..11	x = 572	y = 1.6	d = 2.0
	628	1.0	2.8
	719	0.4	2.4
	797	0.6	2.2
	893	0.7	1.8
	983	0.7	2.1
	1075	-0.6	0

a = slope(x,y) a = -0.002

b = intercept(x,y) b = 2.2062

corr(x,y) = -0.8935

corr(x,y)² = 0.7984

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 14.93 ft.

SCVWD Site Number: 07S1W11G02F
 Site Address: 36 Washington Street
 Site Name: Exxon #7-0960
 City: Santa Clara

Contaminant: TPH Gasoline

$i = 0.7$

Days	LogC	G.W. Elev
0	3.2	0
95	2.6	3.8
183	2.0	4.9
274	2.1	5.4
357	2.7	10.0
449	2.9	9.8
546	1.8	9.3
637	1.4	9.1

$a = \text{slope}(x,y) \quad a = -0.0018$

$b = \text{intercept}(x,y) \quad b = 2.9022$

$\text{corr}(x,y) = -0.6463$

$\text{corr}(x,y)^2 = 0.4177$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 49.45 ft.

SCVWD Site Number: 07S1W11G02F
 Site Address: 36 Washington Street
 Site Name: Exxon #7-0960
 City: Santa Clara

	Days	LogC	G.W. Elev
	0	1.7	0
	95	0.8	3.8
	183	0.5	4.9
Contaminant: Benzene	274	1.0	5.4
	x = 357	y = 1.7	d = 10.0
	449	0.7	9.8
	546	0.5	9.3
	637	-0.1	9.1
	733	-0.6	13.5

i = 0..8

a = slope(x,y) a = -0.0023

b = intercept(x,y) b = 1.5114

corr(x,y) = -0.7505

corr(x,y)² = 0.5632

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 49.45 ft.

SCVWD Site Number: 06S1W26L01F
 Site Address: 565 Laurelwood Road
 Site Name: E.A. Hathaway & Co.
 City: Santa Clara

Contaminant: TPH Gasoline - MW-1

$i = 0..19$

$a = \text{slope}(x, y) \quad a = -8.4274 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 4.0904$

$\text{corr}(x, y) = -0.5169$

$\text{corr}(x, y)^2 = 0.2672$

Days	LogC	G.W. Elev
0	4.4	0.8
98	4.2	1.6
129	4.3	0.2
161	4.4	0.9
220	4.2	0.6
310	4.0	0
393	4.0	1.2
492	1.4	1.3
586	3.4	1.2
675	3.9	1.3
777	2.8	1.5
870	3.6	1.2
961	3.4	0.4
1040	2.6	0.9
1075	3.3	1.0
1137	3.3	2.0
1224	3.3	2.2
1318	2.2	1.7
1401	3.3	1.1
1501	3.7	2.1

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 14.43 ft.

SCVWD Site Number: 06S1W26L01F
 Site Address: 565 Laurelwood Road
 Site Name: E.A. Hathaway & Co.
 City: Santa Clara

Contaminant: Benzene - MW-1

i = 0.. 13

Days	LogC	G.W. Elev
0	2.3	0.8
98	1.9	1.6
129	1.9	0.2
161	2.0	0.9
220	1.8	0.6
310	2.0	0
393	1.8	1.2
492	-0.6	1.3
586	0.7	1.2
675	1.6	1.3
777	0.7	1.5
870	0.7	1.2
961	0.7	0.4
1040	-0.3	0.9

a = slope(x,y) a = -0.002

b = intercept(x,y) b = 2.1815

corr(x,y) = -0.7495

corr(x,y)² = 0.5618

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 14.43 ft.

SCVWD Site Number: 06S1W26L01F
 Site Address: 565 Laurelwood Road
 Site Name: E.A. Hathaway & Co.
 City: Santa Clara

Contaminant: TPH Gasoline - MW-2

$i = 0.18$

$a = \text{slope}(x,y) \quad a = -0.0012$

$b = \text{intercept}(x,y) \quad b = 3.3937$

$\text{corr}(x,y) = -0.6563$

$\text{corr}(x,y)^2 = 0.4307$

Days	LogC	G.W. Elev
0	4.4	0.5
30	4.0	0.3
63	3.5	0.8
122	3.2	0.5
215	3.1	0
297	3.3	1.3
396	1.9	1.3
488	1.4	1.1
577	2.8	1.1
679	2.7	1.2
772	2.4	0.4
863	2.7	1.8
942	2.3	0.9
977	2.2	1.9
1039	1.4	2.1
1126	2.3	1.5
1220	2.3	1.1
1303	2.1	0
1403	2.1	0

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 14.53 ft.

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = ____ ft.

SCVWD Site Number: 07S1W03K02F
 Site Address: 1702 El Camino Real
 Site Name: Jones Automotive
 City: Santa Clara

	Days	LogC	G.W. Elev
	0	2.5	0
Contaminant: Benzene MWS1-1	41	2.0	0
	x = 132	y = 1.9	d = 2.7
i = 0..4	217	1.8	2.5
	294	2.2	4.2

$$a = \text{slope}(x, y) \quad a = -8.8928 \cdot 10^{-4}$$

$$b = \text{intercept}(x, y) \quad b = 2.2017$$

$$\text{corr}(x, y) = -0.3894$$

$$\text{corr}(x, y)^2 = 0.1516$$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 53.61 ft. Elevation data was not available for the first date, so 0 was input.

SCVWD Site Number: 07S1W03K02F
 Site Address: 1702 El Camino Real
 Site Name: Jones Automotive
 City: Santa Clara

Contaminant: TPH Gasoline - MW-5	Days	LogC	G.W. Elev
	0	4.2	0.5
i = 0..3	x = 126	y = 4.0	d = 0.8
	241	3.5	0
	319	3.4	1.8

a = slope(x,y) a = -0.0027

b = intercept(x,y) b = 4.2403

corr(x,y) = -0.9773

corr(x,y)² = 0.9552

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 56.22 ft.

SCVWD Site Number: 07S1W03K02F
 Site Address: 1702 El Camino Real
 Site Name: Jones Automotive
 City: Santa Clara

Days

LogC

G.W.
Elev

Contaminant: Benzene - MW-5

$i = 0..3$

	0	126	241	319
x				
y	3.6	3.4	2.9	3.1
d	0.5	0.8	0	1.8

$a = \text{slope}(x, y) \quad a = -0.002$

$b = \text{intercept}(x, y) \quad b = 3.5846$

$\text{corr}(x, y) = -0.8731$

$\text{corr}(x, y)^2 = 0.7623$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 56.22 ft.

SCVWD Site Number: 07S1W15A02F
 Site Address: 230 N. Winchester Blvd.
 Site Name: Mobile
 City: Santa Clara

	Days	LogC	G.W. Elev
	0	3.6	2.2
	53	2.6	2.1
Contaminant: TPH Gasoline	228	2.3	2.0
	320	2.0	2.3
i = 0..8	x = 411	y = 2.8	d = 0
	501	2.9	2.4
	612	2.1	2.4
	683	2.7	2.3
	777	1.4	2.2

a = slope(x,y) a = -0.0013

b = intercept(x,y) b = 3.0253

corr(x,y) = -0.5829

corr(x,y)² = 0.3398

Note: Ground water elevations have been adjusted to fit the graph. 2.0 ft = 87.86 ft. No elevation data was available for the fifth date, so 0 was input.

SCVWD Site Number: 07S1W15A02F
 Site Address: 230 N. Winchester Blvd.
 Site Name: Mobile
 City: Santa Clara

Contaminant: Benzene

$i = 0..8$

Days	LogC	G.W. Elev
0	1.9	2.2
53	1.2	2.1
228	1.3	2.0
320	0.5	2.3
$x = 411$	$y = 0.9$	$d = 0$
501	0.8	2.4
612	0.04	2.4
683	0.7	2.3
777	-0.6	2.2

$a = \text{slope}(x, y) \quad a = -0.0023$

$b = \text{intercept}(x, y) \quad b = 1.6596$

$\text{corr}(x, y) = -0.8552$

$\text{corr}(x, y)^2 = 0.7314$

Note: Ground water elevations have been adjusted to fit the graph. 2.0 ft = 87.86 ft. No elevation data was available for the fifth date, so 0 was input

SCVWD Site Number: 06S1W34K03F
 Site Address: 1810 Richard Avenue
 Site Name: Roman Sausage Co.
 City: Santa Clara

	Days	LogC	G.W. Elev
	0	2.9	2.0
Contaminant: TPH Gasoline - MW-1	211	2.9	0
	291	2.5	0.2
$i = 0..6$	$x = 396$	$y = 1.7$	$d = 3.7$
	481	1.7	1.7
	584	1.8	0.9
	662	1.4	1.4

$a = \text{slope}(x,y) \quad a = -0.0025$

$b = \text{intercept}(x,y) \quad b = 3.0642$

$\text{corr}(x,y) = -0.9126$

$\text{corr}(x,y)^2 = 0.8328$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 88.51 ft.

SCVWD Site Number: 06S1W34K03F
 Site Address: 1810 Richard Avenue
 Site Name: Roman Sausage Co.
 City: Santa Clara

	Days	LogC	G.W. Elev
	0	4.7	3.3
Contaminant: TPH Gasoline - MW-3	211	4.6	1.9
	291	4.4	0
$i = 0..7$	396	4.3	3.5
	481	4.2	1.6
	584	4.4	0.7
	662	4.0	1.3
	757	4.1	3.1

$$a = \text{slope}(x,y) \quad a = -8.5031 \cdot 10^{-4}$$

$$b = \text{intercept}(x,y) \quad b = 4.697$$

$$\text{corr}(x,y) = -0.8932$$

$$\text{corr}(x,y)^2 = 0.7978$$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 88.45 ft.

SCVWD Site Number: 06S1W32G01

Site Address: 2455 Lawrence Epwy

Site Name: Shell

City: Santa Clara

	Days	LogC	G.W. Elev
	0	3.7	0.8
Contaminant: TPH Gasoline - MW-2	92	3.3	0.7
	176	3.3	0
$i = 0..6$	$x = 262$	$y = 3.4$	$d = 0.4$
	360	3.3	1.1
	647	1.9	3.9
	729	1.4	3.8

$a = \text{slope}(x,y) \quad a = -0.003$

$b = \text{intercept}(x,y) \quad b = 3.8681$

$\text{corr}(x,y) = -0.9377$

$\text{corr}(x,y)^2 = 0.8792$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 39.71 ft.

SCVWD Site Number: 06S1W32G01
 Site Address: 2455 Lawrence Epwy
 Site Name: Shell
 City: Santa Clara

Contaminant: Benzene

$i = 0..10$

Days	LogC	G.W. Elev
0	3.0	0.8
92	2.1	0.7
176	2.8	0
262	2.4	0.4
360	2.3	1.1
647	1	3.9
729	-0.6	3.8
834	-0.2	3.4
907	0.4	3.1
1034	1.3	7.5
1133	-0.6	7.8

$a = \text{slope}(x,y) \quad a = -0.0029$

$b = \text{intercept}(x,y) \quad b = 2.88$

$\text{corr}(x,y) = -0.8487$

$\text{corr}(x,y)^2 = 0.7203$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 39.71 ft.

SCVWD Site Number: 06S1W32G01
 Site Address: 2455 Lawrence Epwy
 Site Name: Shell
 City: Santa Clara

	Days	LogC	G.W. Elev
Contaminant: TPH Gasoline - MW-4	0	3.0	0.4
	94	3.0	0
	196	1.9	2.4
	279	1.8	2.8
	362	2.0	4.6
	458	1.4	3.9

$$i = 0..5$$

$$x =$$

$$y =$$

$$d =$$

$$a = \text{slope}(x, y) \quad a = -0.0035$$

$$b = \text{intercept}(x, y) \quad b = 3.0026$$

$$\text{corr}(x, y) = -0.9048$$

$$\text{corr}(x, y)^2 = 0.8187$$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 47.33 ft.

SCVWD Site Number: 06S1W32G01
 Site Address: 2455 Lawrence Epwy
 Site Name: Shell
 City: Santa Clara

	Days	LogC	G.W. Elev
	0	2.5	0.4
	94	2.2	0
Contaminant: Benzene - MW-4	196	0.5	2.4
	x = 279	y = 1.0	d = 2.8
i = 0..6	362	1.2	4.6
	458	0	3.9
	539	-0.6	5.0

a = slope(x,y) a = -0.0052

b = intercept(x,y) b = 2.4111

corr(x,y) = -0.9041

corr(x,y)² = 0.8173

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 47.33 ft.

SCVWD Site Number: 07S1W04J01	Days	LogC	G.W. Elev
Site Address: 2540 El Camino Real	0	3.3	0.1
Site Name: Shell	89	2.9	0
City: Santa Clara	186	2.4	1.1
Contaminant: TPH Gasoline - MW-2	273	2.6	1.0
	327	2.9	2.7
	510	y = 1.4	d = 2.2
	599	1.8	2.7
	693	1.0	2.4
	758	1.4	2.3
	872	2.1	4.0
	986	1.4	4.7

i = 0..10

a = slope(x,y) a = -0.0019

b = intercept(x,y) b = 3.0164

corr(x,y) = -0.8129

corr(x,y)² = 0.6608

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 68.04 ft/3.

SCVWD Site Number: 07S1W04J01
 Site Address: 2540 El Camino Real
 Site Name: Shell
 City: Santa Clara

Contaminant: Benzene - MW-2

$i = 0..10$

Days	LogC	G.W. Elev
0	2.1	0.1
89	1.8	0
186	1.7	1.1
273	1.6	1.0
327	1.5	2.7
$x = 510$	$y = 1.3$	$d = 2.2$
599	0.2	2.7
693	0.4	2.4
758	-0.6	2.3
872	0.6	4.0
986	-0.6	4.7

$a = \text{slope}(x, y) \quad a = -0.0027$

$b = \text{intercept}(x, y) \quad b = 2.1844$

$\text{corr}(x, y) = -0.9081$

$\text{corr}(x, y)^2 = 0.8246$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 68.04 ft/3.

SCVWD Site Number: 07S1W04J01			G.W.
Site Address: 2540 El Camino Real	Days	LogC	Elev
Site Name: Shell			
City: Santa Clara	0	4.0	0.2
	87	3.9	0.2
Contaminant: TPH Gasoline - MW-1	141	3.8	0
	332	3.7	1.3
i = 0..21	422	3.3	1.9
	517	3.2	1.5
	582	3.2	1.4
	692	3.2	3.1
	806	3.2	3.8
	867	3.1	3.5
	965	2.9	3.4
	1044	2.8	3.6
	1133	2.7	4.0
a = slope(x,y) a = $-9.9646 \cdot 10^{-4}$	1228	3.3	3.7
b = intercept(x,y) b = 3.9389	1317	2.5	3.5
corr(x,y) = -0.9277	1422	2.7	4.7
corr(x,y) ² = 0.8606	1501	2.9	4.9
	1591	2.5	4.9
	1684	2.5	4.7
	1769	2.0	5.0
	1867	2.0	5.3
	1966	1.4	5.2

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 70.7 ft/3.

SCVWD Site Number: 07S1W04J01
 Site Address: 2540 El Camino Real
 Site Name: Shell
 City: Santa Clara

	Days	LogC	G.W. Elev
	0	3.5	0.2
Contaminant: Benzene - MW-1	87	3.1	0.2
	141	3.2	0
i = 0..21	332	2.9	1.3
	422	2.3	1.9
	517	2.3	1.5
	582	2.2	1.4
	692	2.2	3.1
	806	2.4	3.8
	867	2.2	3.5
	965	1.9	3.4
x =	1044	y = 2.0	d = 3.6
	1133	1.8	4.0
	1228	2.5	3.7
	1317	1.6	3.5
a = slope(x,y) a = -0.001	1422	1.8	4.7
b = intercept(x,y) b = 3.1438	1501	2.1	4.9
corr(x,y) = -0.8168	1591	1.8	4.9
corr(x,y) ² = 0.6671	1684	1.5	4.7
	1769	0.9	5.0
	1867	2.2	5.3
	1966	-0.1	5.2

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 70.3 ft/3.

SCVWD Site Number: 07S1W05G01
 Site Address: 3499 El Camino Real
 Site Name: Unocal #4425
 City: Santa Clara

Contaminant: TPH Gasoline

$i = 0..10$

Days	LogC
0	4.7
92	4.7
183	4.0
275	4.2
365	4.0
$x = 457$	$y = 4.3$
548	3.8
822	3.2
913	2.9
1005	3.8
1095	2.1

$a = \text{slope}(x,y) \quad a = -0.0018$

$b = \text{intercept}(x,y) \quad b = 4.7155$

$\text{corr}(x,y) = -0.8619$

$\text{corr}(x,y)^2 = 0.7429$

Note: No ground water elevations were available

SCVWD Site Number: 06S1W22L01
 Site Address: 2017 Agnew Road
 Site Name: Wolco Oil Co.
 City: Sunnyvale

Days	LogC
0	5.4
127	4.8
254	4.8
334	4.4
428	4.2
578	3.6
697	4.4
806	3.6
892	4.1
1069	3.4
1166	3.0
1257	3.7
1347	4.3
1460	3.4
1529	2.9
1621	3.2
1712	2.2
1801	2.0

Contaminant: TPH Gasoline

i = 0..18

Note: No ground water elevation data was available.

x = 985 y = 3.8

a = slope(x,y) a = -0.0014

b = intercept(x,y) b = 5.0383

corr(x,y) = -0.8672

corr(x,y)² = 0.7521

SCVWD Site Number: 06S1W22L01
 Site Address: 2017 Agnew Road
 Site Name: Wolco Oil Co.
 City: Sunnyvale

Contaminant: Benzene

$i = 0..15$

$a = \text{slope}(x, y) \quad a = -0.0017$

$b = \text{intercept}(x, y) \quad b = 3.4617$

$\text{corr}(x, y) = -0.7934$

$\text{corr}(x, y)^2 = 0.6295$

Days	LogC
0	4.0
127	2.8
254	3.0
334	2.5
428	3.0
578	2.4
697	2.1
806	2.2
892	2.2
985	1.6
1069	1.4
1166	0.8
1257	2.5
1347	1.9
1460	1.7
1529	-0.6

Note: No ground water elevation data was available.

SCVWD Site Number: 06S2W36F01
 Site Address: 707 S. Mathilda
 Site Name: Arco #5334
 City: Sunnyvale

Contaminant: TPH Gasoline. A-2

$i = 0..18$

$a = \text{slope}(x, y) \quad a = -2.8699 \cdot 10^{-5}$

$b = \text{intercept}(x, y) \quad b = 4.4979$

$\text{corr}(x, y) = -0.0875$

$\text{corr}(x, y)^2 = 0.0077$

Days	LogC	G.W. Elev
0	4.7	0
88	4.5	0
172	4.6	0
283	4.5	0
346	4.5	0
463	4.5	0.2
553	4.5	0.5
649	4.2	0.4
720	4.6	0.4
$x = 839$	$y = 4.6$	0.8
909	4.1	$d = 1.4$
1055	4.1	1.6
1127	4.3	0
1237	4.5	2.2
1325	4.5	2.4
1426	4.5	2.4
1514	4.7	2.9
1600	4.6	3.6
1696	4.5	4.0
		4.3

Note: Ground water elevations have been adjusted to fit the graph. 0 feet = 39.9 feet/5. No elevation data was available for the 12th date, so 0 was input.

SCVWD Site Number: 06S2W36F01
 Site Address: 707 S. Mathilda
 Site Name: Arco #5334
 City: Sunnyvale

Contaminant: Benzene, A-2

$i = 0..19$

$a = \text{slope}(x, y) \quad a = -9.1298 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 3.2893$

$\text{corr}(x, y) = -0.8941$

$\text{corr}(x, y)^2 = 0.7995$

Note: Ground water elevations have been adjusted to fit the graph. 0 feet = 39.9 feet/5. No elevation data was available for the 10th date, so 0 was input.

Days	LogC	G.W. Elev
0	3.4	0
111	3.0	0
174	3.1	0.2
291	3.1	0.5
381	3.0	0.4
477	2.7	0.4
548	2.7	0.8
667	3.2	1.4
737	2.8	1.6
883	2.0	0
955	2.2	2.2
1065	2.4	2.4
1153	2.1	2.1
1254	2.5	2.9
1342	2.2	3.6
1428	1.8	4.0
1524	2.1	4.3
1597	1.3	4.6
1694	1.9	5.2
1777	1.8	5.4

SCVWD Site Number: 06S2W36F01
 Site Address: 707 S. Mathilda
 Site Name: Arco #5334
 City: Sunnyvale

Contaminant: TPH Gasoline. A-3

$i = 0..7$

Days	LogC	G.W. Elev
0	3.7	0
116	3.3	1.3
207	3.3	1.4
303	3.0	1.1
375	3.7	3.9
494	2.6	6.0
564	2.2	7.1
710	1.4	0

$a = \text{slope}(x, y) \quad a = -0.0029$

$b = \text{intercept}(x, y) \quad b = 3.9025$

$\text{corr}(x, y) = -0.8655$

$\text{corr}(x, y)^2 = 0.7492$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 40.7 ft. No elevation data was available for the last date, so 0 was input.

SCVWD Site Number: 06S2W36F01

Site Address: 707 S. Mathilda

Site Name: Arco #5334

City: Sunnyvale

Contaminant: Benzene. A-3

$i = 0..7$

Days	LogC	G.W. Elev
0	2.4	0
116	1.6	1.3
207	1.7	1.4
303	1.8	1.1
375	1.7	3.9
494	1.0	6.0
564	0.9	7.1
710	-0.6	0

$a = \text{slope}(x, y) \quad a = -0.0034$

$b = \text{intercept}(x, y) \quad b = 2.4806$

$\text{corr}(x, y) = -0.8879$

$\text{corr}(x, y)^2 = 0.7884$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 40.7 ft. No elevation data was available for the last date, so 0 was input.

SCVWD Site Number: 06S1W31C01

Site Address: 848 E. Evelyn Ave

Site Name: Beacon #543

City: Sunnyvale

Contaminant: TPH Gasoline

$i = 0..8$

Days	LogC	G.W. Elev
0	3.7	0.5
92	3.6	0
190	3.4	1.2
273	3.5	2.8
$x = 357$	$y = 3.0$	$d = 5.9$
473	2.9	4.9
552	2.9	4.3
590	2.8	6.5
679	2.7	7.1

$a = \text{slope}(x,y) \quad a = -0.0016$

$b = \text{intercept}(x,y) \quad b = 3.7233$

$\text{corr}(x,y) = -0.9647$

$\text{corr}(x,y)^2 = 0.9307$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 52.87 ft.

SCVWD Site Number: 06S1W31C01
 Site Address: 848 E. Evelyn Ave
 Site Name: Beacon #543
 City: Sunnyvale

Contaminant: Benzene

$i = 0.8$

Days	LogC	G.W. Elev
0	2.6	0.5
92	2.7	0
190	2.6	1.2
273	2.6	2.8
$x = 357$	$y = 2.0$	$d = 5.9$
473	1.9	4.9
552	2.0	4.3
590	1.4	6.5
679	0.7	7.1

$a = \text{slope}(x, y) \quad a = -0.0025$

$b = \text{intercept}(x, y) \quad b = 2.958$

$\text{corr}(x, y) = -0.8875$

$\text{corr}(x, y)^2 = 0.7876$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 52.87 ft.

SCVWD Site Number: 06S2W35B01F
 Site Address: 1005 W. El Camino Real
 Site Name: Exxon #7-3326
 City: Sunnyvale

Contaminant: TPH Gasoline

$i = 0..14$

Days	LogC	G.W. Elev
0	5.8	0
91	4.9	0
184	4.7	0.2
273	5.1	1.3
344	5.0	1.8
470	4.7	2.1
560	4.9	2.6
$x = 644$	$y = 4.6$	$d = 2.9$
738	4.5	3.1
834	4.4	3.1
931	4.2	3.4
1016	4.2	4.6
1115	4.3	5.2
1197	4.1	5.4
1283	3.6	5.8

$a = \text{slope}(x, y) \quad a = -0.0011$

$b = \text{intercept}(x, y) \quad b = 5.3265$

$\text{corr}(x, y) = -0.8992$

$\text{corr}(x, y)^2 = 0.8086$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 40.9/4 ft.

SCVWD Site Number: 06S2W35B01F	Days	LogC	G.W. Elev
Site Address: 1005 W. El Camino Real	0	4.4	0
Site Name: Exxon #7-3326	88	4.2	0
City: Sunnyvale	179	4.3	0
	272	4.0	0.2
Contaminant: Benzene	361	4.3	1.3
$i = 0..15$	432	3.9	1.8
	558	3.7	2.1
	648	3.6	2.6
	732	3.0	2.9
	826	2.7	3.1
	922	2.5	3.1
	1019	2.3	3.4
$a = \text{slope}(x,y) \quad a = -0.0023$	1104	1.5	4.6
$b = \text{intercept}(x,y) \quad b = 4.7149$	1203	1.6	5.2
$\text{corr}(x,y) = -0.9628$	1285	2.0	5.4
$\text{corr}(x,y)^2 = 0.9269$	1371	1.6	5.8

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 40.9/2 ft.

SCVWD Site Number: 06S1W32E01F
 Site Address: 1045 Reed Lane
 Site Name: Exxon #7-0286
 City: Sunnyvale

Contaminant: TPH Gasoline

$i = 0..13$

Days	LogC	G.W. Elev
0	4.3	0
154	3.9	0
205	3.3	1.0
280	3.2	0.2
336	3.2	0
456	2.6	2.5
556	3.4	1.6
643	3.5	1.3
745	2.0	2.1
854	3.4	5.1
943	2.0	4.6
1045	1.4	1.0
1138	3.2	4.9
1227	1.4	6.9

$a = \text{slope}(x,y) \quad a = -0.0017$

$b = \text{intercept}(x,y) \quad b = 3.9396$

$\text{corr}(x,y) = -0.7302$

$\text{corr}(x,y)^2 = 0.5332$

Note: Ground water elevations have been adjusted to fit the graph.
 0 ft = 43.62 ft. No elevation data was available for first two dates.
 so 0 was input.

SCVWD Site Number: 06S1W32E01F
 Site Address: 1045 Reed Lane
 Site Name: Exxon #7-0286
 City: Sunnyvale

Contaminant: Benzene

$i = 0..7$

Days	LogC	G.W. Elev
0	2.3	1.6
87	2.0	1.3
189	0.6	2.1
298	2.3	5.1
387	1.1	4.6
489	-0.6	1.0
582	0.7	4.9
671	-0.6	6.9

$a = \text{slope}(x, y) \quad a = -0.0038$

$b = \text{intercept}(x, y) \quad b = 2.2744$

$\text{corr}(x, y) = -0.7755$

$\text{corr}(x, y)^2 = 0.6014$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 43.52 ft.

SCVWD Site Number: 06S1W20G01F
 Site Address: 1101 N. Lawrence Expwy
 Site Name: Shell
 City: Sunnyvale

Contaminant: TPH Gasoline, OP-4

$i = 0..9$

Days	LogC	G.W. Elev
0	3.8	2.1
91	3.6	1.0
182	3.0	0
285	2.6	3.3
362	2.9	2.4
463	3.0	1.2
546	3.1	0.7
636	3.2	2.9
727	3.2	2.6
819	1.4	0.4

$a = \text{slope}(x, y) \quad a = -0.0015$

$b = \text{intercept}(x, y) \quad b = 3.5826$

$\text{corr}(x, y) = -0.6187$

$\text{corr}(x, y)^2 = 0.3828$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 3.92 ft.

SCVWD Site Number: 06S1W20G01F
 Site Address: 1101 N. Lawrence Expwy
 Site Name: Shell
 City: Sunnyvale

Contaminant: Benzene, OP-4

$i = 0.12$

$a = \text{slope}(x, y) \quad a = -0.0031$

$b = \text{intercept}(x, y) \quad b = 3.0614$

$\text{corr}(x, y) = -0.8467$

$\text{corr}(x, y)^2 = 0.7169$

Days	LogC	G.W. Elev
0	3.1	2.1
91	2.7	1.0
182	2.0	0
285	1.1	3.3
362	2.4	2.4
463	2.0	1.2
$x = 546$	$y = 2.1$	$d = 0.7$
636	1.5	2.9
727	2.3	2.6
819	0.04	0.4
914	-0.6	0.9
1011	-0.2	3.2
1102	-0.6	2.6

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 3.92 ft.

SCVWD Site Number: 06S1W20G01F
 Site Address: 1101 N. Lawrence Expwy
 Site Name: Shell
 City: Sunnyvale

Contaminant: TPH Gasoline, mw-16

$i = 0..13$

$a = \text{slope}(x,y) \quad a = -0.0014$

$b = \text{intercept}(x,y) \quad b = 3.4492$

$\text{corr}(x,y) = -0.7654$

$\text{corr}(x,y)^2 = 0.5858$

Days	LogC	G.W. Elev
0	3.8	3.8
79	2.8	3.5
170	3.0	2.2
261	3.1	1.4
364	2.8	3.1
441	3.2	2.2
542	3.1	1.6
625	2.9	4.4
715	2.3	4.1
806	2.9	3.4
898	1.4	0
993	2.0	1.7
1090	1.4	4.4
1181	2.4	3.6

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 2.76 ft.

SCVWD Site Number: 06S1W20G01F
 Site Address: 1101 N. Lawrence Expwy
 Site Name: Shell
 City: Sunnyvale

Contaminant: Benzene, MW-16

$i = 0..13$

Days	LogC	G.W. Elev
0	1.7	3.8
79	0.9	3.5
170	1.0	2.2
261	0.6	1.4
364	1.0	3.1
441	1.4	2.2
542	1.3	1.6
625	1.0	4.4
715	0.4	4.1
806	0.8	3.4
898	-0.6	0
993	0.7	1.7
1090	-0.05	4.4
1181	0.3	3.6

$a = \text{slope}(x,y) \quad a = -0.0011$

$b = \text{intercept}(x,y) \quad b = 1.3636$

$\text{corr}(x,y) = -0.6743$

$\text{corr}(x,y)^2 = 0.4547$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 2.67 ft.

SCVWD Site Number: 06S2W24Q03F
 Site Address: 505 N. Mathilda
 Site Name: Shell
 City: Sunnyvale

Contaminant: TPH Gasoline

$i = 0..18$

$a = \text{slope}(x, y) \quad a = -3.0127 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 3.248$

$\text{corr}(x, y) = -0.2773$

$\text{corr}(x, y)^2 = 0.0769$

Days	LogC	G.W. Elev
0	5.0	1.6
78	3.3	2.8
174	2.6	2.4
239	3.0	2.4
349	3.0	3.7
456	3.2	4.7
547	2.5	0.3
640	2.1	0
731	3.1	0.8
$x = 826$	$y = 2.6$	$d = 1.2$
918	2.6	1.2
1009	3.1	1.3
1114	2.8	2.0
1197	3.2	2.8
1290	3.0	2.4
1381	3.0	2.6
1471	3.0	3.4
1565	3.1	3.6
1655	2.8	4.4

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 34.62 ft.

	Days	LogC	G.W. Elev
SCVWD Site Number: 06S2W24Q03F	0	3.6	1.6
Site Address: 505 N. Mathilda	78	2.3	2.8
Site Name: Shell	174	0.5	2.4
City: Sunnyvale	239	1.6	2.4
	349	1.6	3.7
Contaminant: Benzene	456	3.3	4.7
	547	1.4	0.3
	640	0.9	0
	731	1.8	0.8
	826	1.3	1.2
	918	1.4	1.2
	1009	2.1	1.3
	1114	1.8	2.0
	1197	2.4	2.8
	1290	1.6	2.4
	1381	1.3	2.6
	1471	1.2	3.4
	1565	1.0	3.6
	1655	2.2	4.4

$i = 0.18$
 $a = \text{slope}(x,y) \quad a = -3.7611 \cdot 10^{-4}$
 $b = \text{intercept}(x,y) \quad b = 2.0622$
 $\text{corr}(x,y) = -0.2548$
 $\text{corr}(x,y)^2 = 0.0649$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = ____ ft.

SCVWD Site Number: 06S2W24Q02F
 Site Address: 499 N. Mathilda Ave
 Site Name: Unocal #4315
 City: Sunnyvale

Contaminant: TPH Gasoline, MW-5

i = 0..26

Days	LogC
0	5.1
84	5.0
174	5.0
263	5.0
363	4.9
456	4.6
540	5.0
642	4.9
740	4.7
823	4.7
921	4.9
1009	4.6
1104	4.9
x = 1179	y = 4.7
1270	4.8
1350	4.7
1455	4.8
1550	4.7
1642	4.8
1733	4.4
1839	4.7
1923	3.7
2014	4.7
2105	4.4
2195	4.7
2289	4.6
2380	4.6

a = slope(x,y) a = $-2.2938 \cdot 10^{-4}$

b = intercept(x,y) b = 4.9981

corr(x,y) = -0.6155

corr(x,y)² = 0.3788

SCVWD Site Number: 06S2W24Q02F
 Site Address: 499 N. Mathilda Ave
 Site Name: Unocal #4315
 City: Sunnyvale

Contaminant: Benzene

$i = 0.26$

Days LogC

0	3.0
84	4.0
174	3.7
263	3.8
363	3.9
456	3.6
540	3.8
642	3.9
740	3.7
823	3.7
921	3.7
1009	3.6
1104	3.7
x = 1179	y = 3.7
1270	3.6
1350	3.3
1455	3.4
1550	3.1
1642	3.3
1733	3.3
1839	3.6
1923	3.6
2014	3.6
2105	1.5
2195	3.3
2289	3.4
2380	3.3

$a = \text{slope}(x, y) \quad a = -2.9534 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 3.8357$

$\text{corr}(x, y) = -0.46$

$\text{corr}(x, y)^2 = 0.2116$

y Log benzene(pphd) (G.W. elev (ft))

SCVWD Site Number: 06S2W24Q02F
 Site Address: 499 N. Mathilda Ave
 Site Name: Unocal #4315
 City: Sunnyvale

Contaminant: TPH Gasoline, MW-2

i = 0..27

Days	LogC
0	4.9
105	4.8
189	4.7
279	4.8
368	4.5
468	4.5
561	4.5
645	4.8
747	4.7
845	4.5
928	4.5
1026	4.7
1114	4.5
1209	4.2
1284	3.8
1375	4.1
1455	4.4
1560	4.3
1655	4.7
1474	3.7
1838	4.2
1944	4.4
2028	4.4
2119	4.0
2210	3.6
2300	3.2
2394	3.2
2485	3.6

a = slope(x,y) a = $-4.9982 \cdot 10^{-4}$

b = intercept(x,y) b = 4.9106

corr(x,y) = -0.7833

corr(x,y)² = 0.6135

Note: No ground water elevation data available except for last four sample dates.

SCVWD Site Number: 06S2W24Q02F
 Site Address: 499 N. Mathilda Ave
 Site Name: Unocal #4315
 City: Sunnyvale

Contaminant: Benzene, MW-2

i = 0..27

a = slope(x,y) a = $-4.6889 \cdot 10^{-4}$
 b = intercept(x,y) b = 2.8795
 corr(x,y) = -0.722
 corr(x,y)² = 0.5212

Days	LogC
0	3.2
105	2.7
189	2.9
279	2.9
368	2.7
468	2.9
561	2.7
645	2.6
747	2.9
845	2.4
928	2.4
1026	2.3
1114	2.6
1209	2.0
1284	1.3
1375	1.7
1455	2.0
1560	1.8
1655	2.0
1474	2.6
1838	2.1
1944	2.0
2028	2.0
2119	1.6
2210	1.8
2300	1.7
2394	2.0
2485	2.6

Note: No ground water elevation data available except for last four sample dates.

SCVWD Site Number: 06S2W24Q02F
 Site Address: 499 N. Mathilda Ave
 Site Name: Unocal #4315
 City: Sunnyvale

Contaminant: TPH Gasoline. MW-6

$i = 0..10$

Days	LogC
0	3.5
95	3.4
136	3.0
278	2.7
383	2.5
x = 461	y = 2.5
553	2.1
643	2.4
734	2.2
828	2.4
919	1.4

$a = \text{slope}(x,y) \quad a = -0.0017$

$b = \text{intercept}(x,y) \quad b = 3.3541$

$\text{corr}(x,y) = -0.9058$

$\text{corr}(x,y)^2 = 0.8205$

Note: No ground water elevation data was available.

SCVWD Site Number: 06S1W32B01F
 Site Address: 1202 Kifer Road
 Site Name: Texaco
 City: Sunnyvale

	Days	LogC	G.W. Elev
	0	4.1	5.1
	82	3.8	6.5
	166	2.8	6.3
Contaminant: TPH Gasoline	264	2.9	6.2
	344	3.1	6.0
	433	3.3	6.2
	526	2.6	6.4
	612	2.5	6.2
	714	3.0	0
	795	1.8	8.4
	900	2.2	8.3

$i = 0..10$

$x =$

$y =$

$d =$

$a = \text{slope}(x,y) \quad a = -0.0018$

$b = \text{intercept}(x,y) \quad b = 3.7235$

$\text{corr}(x,y) = -0.8209$

$\text{corr}(x,y)^2 = 0.6738$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 33.1 ft.

SCVWD Site Number: 06S1W32B01F

Site Address: 1202 Kifer Road

Site Name: Texaco

City: Sunnyvale

Contaminant: Benzene

$i = 0..6$

Days

LogC

G.W.
Elev

0

1.7

5.1

82

-0.6

6.5

166

0.3

6.3

$x = 264$

$y = 0.4$

$d = 6.2$

344

0.7

6.0

433

1.1

6.2

526

-0.6

6.4

$a = \text{slope}(x,y) \quad a = -0.0013$

$b = \text{intercept}(x,y) \quad b = 0.7531$

$\text{corr}(x,y) = -0.2812$

$\text{corr}(x,y)^2 = 0.0791$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 33.1 ft.

SCVWD Site Number: 07S1W04K01F
 Site Address: 2798 El Camino Real
 Site Name: Chevron #9-9631
 City: Santa Clara

Contaminant: TPH Gasoline

$i = 0..11$

Days	LogC	G.W. Elev
0	4.4	1.6
215	4.3	7.7
308	4.3	7.6
392	4.3	7.6
482	4.4	8.2
587	4.2	8.1
665	4.3	8.4
771	4.3	9.1
842	4.0	9.8
934	3.7	12.5
1025	4.2	12.
1112	4.0	12.3

$a = \text{slope}(x, y) \quad a = -4.0618 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 4.4482$

$\text{corr}(x, y) = -0.6817$

$\text{corr}(x, y)^2 = 0.4647$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 49.51 ft.

SCVWD Site Number: 07S1W04K01F
 Site Address: 2798 El Camino Real
 Site Name: Chevron #9-9631
 City: Santa Clara

Contaminant: Benzene

$i = 0.21$

$a = \text{slope}(x, y) \quad a = -3.8726 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 3.5174$

$\text{corr}(x, y) = -0.7094$

$\text{corr}(x, y)^2 = 0.5033$

Days	LogC	G.W. Elev
0	3.6	0.2
102	3.4	0.6
188	3.3	0
265	3.2	0.2
356	3.4	0.3
448	3.3	0.5
535	3.2	0.9
627	3.1	1.0
729	3.3	1.7
799	3.1	1.9
877	3.1	1.6
1092	3.4	7.7
1185	3.4	7.6
1269	3.4	7.6
1359	3.4	8.2
1464	3.1	8.1
1542	3.1	8.4
1648	3.1	9.1
1719	2.8	9.8
1811	2.3	12.5
1902	2.5	12.6
1989	2.4	12.3

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 49.51 ft.

SCVWD Site Number: 06S1W32E02F
 Site Address: 1037 Reed Ave
 Site Name: Chevron #9-6338
 City6 Sunnyvale:

Contaminant: TPH Gasoline

i = 0..17

a = slope(x,y) a = -0.0011

b = intercept(x,y) b = 5.0284

corr(x,y) = -0.8292

corr(x,y)² = 0.6875

Days	LogC	G.W. Elev
0	5.2	0
80	4.8	0
189	4.8	0
279	4.4	0
380	5.1	0
455	4.8	1.7
560	4.8	10.7
632	4.1	5.7
720	3.7	5.0
812	3.7	5.5
908	4.0	6.8
996	3.6	6.9
1085	4.0	6.7
1175	4.0	7.0
1269	3.1	12.1
1369	4.0	12.9
1458	3.9	11.4
1540	2.9	13.0

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 43.57 ft. No elevation data was available for the first four dates, so 0 was input.

1W32E02G.MCD

1/25/97

3:14 PM

SCVWD Site Number: 06S1W32E02F

Site Address: 1037 Reed Ave

Site Name: Chevron #9-6338

City6 Sunnyvale:

Contaminant: Benzene

$i = 0..11$

$a = \text{slope}(x, y) \quad a = -5.7217 \cdot 10^{-4}$

$b = \text{intercept}(x, y) \quad b = 3.1684$

$\text{corr}(x, y) = -0.3248$

$\text{corr}(x, y)^2 = 0.1055$

Days

LogC

G.W.
Elev

0	4.0	10.7
72	2.8	5.7
160	2.6	5.0
252	2.6	5.5
348	3.2	6.8
436	2.6	6.9
525	3.3	6.7
615	2.8	7.0
709	2.2	12.1
809	3.4	12.9
898	3.3	11.4
980	1.9	13.0

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 43.57 ft.

SCVWD Site Number: 06S2W16J01F
 Site Address: 808 N. Shoreline
 Site Name: Chevron #9-6377
 City: Mountain View

Contaminant: TPH Gasoline

$i = 0..10$

Days	LogC	G.W. Elev
0	4.3	0.5
70	4.3	0.3
168	3.7	0
251	4.0	0.5
378	3.9	1.4
$x = 469$	$y = 3.2$	$d = 0.9$
580	2.9	0.6
642	2.4	2.6
749	1.9	2.7
847	1.7	3.1
917	2.2	2.7

$a = \text{slope}(x,y) \quad a = -0.003$

$b = \text{intercept}(x,y) \quad b = 4.488$

$\text{corr}(x,y) = -0.95$

$\text{corr}(x,y)^2 = 0.902$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 24.36 ft.

SCVWD Site Number: 06S2W16J01F

Site Address: 808 N. Shoreline

Site Name: Chevron #9-6377

City: Mountain View

Contaminant: Benzene

$i = 0..6$

Days	LogC	G.W. Elev
0	2.4	0.5
70	2.3	0.3
168	1.6	0
$x = 251$	$y = 1.6$	$d = 0.5$
378	1.2	1.4
469	0.9	0.9
580	0	0.6

$a = \text{slope}(x,y) \quad a = -0.0038$

$b = \text{intercept}(x,y) \quad b = 2.4692$

$\text{corr}(x,y) = -0.9732$

$\text{corr}(x,y)^2 = 0.9472$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 24.36 ft.

SCVWD Site Number: 07S1W09G01F
 Site Address: 2790 Homestead Rd.
 Site Name: Chevron
 City: Santa Clara

Contaminant: TPH Gasoline

i = 0..9

Days	LogC	G.W. Elev
0	4.8	0.6
124	4.5	0.4
215	4.7	0
343	4.0	2.1
440	3.8	4.1
530	4.5	3.7
628	3.9	3.1
739	3.0	5.2
814	3.7	5.4
906	3.5	4.7

a = slope(x,y) a = -0.0016

b = intercept(x,y) b = 4.78

corr(x,y) = -0.8218

corr(x,y)² = 0.6753

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 65.71/3 ft.

SCVWD Site Number: 07S1W09GO1F
 Site Address: 2790 Homestead Rd.
 Site Name: Chevron
 City: Santa Clara

Contaminant: Benzene

$i = 0..12$

Days	LogC	G.W. Elev
0	4.0	0
193	3.6	0
308	3.2	0
478	3.8	0.6
602	3.7	0.4
693	3.7	0
$x = 821$	$y = 1.9$	$d = 2.1$
918	1.6	4.1
1008	2.6	3.7
1106	2.5	3.1
1217	1.6	5.2
1292	2.0	5.4
1384	1.4	4.7

$a = \text{slope}(x, y) \quad a = -0.0019$

$b = \text{intercept}(x, y) \quad b = 4.1674$

$\text{corr}(x, y) = -0.8394$

$\text{corr}(x, y)^2 = 0.7045$

Note: Ground water elevations have been adjusted to fit the graph. 0 ft = 65.71/3 ft. No elevation data was available for the first three dates so 0 was input.

APPENDIX C. TABLE C-1

Table C-1. Summary of calculated degradation rate constants, correlations, and site conditions

Unconfined		Remed- ation*	Aquifer Type	Range (ft)	Distance (ft)	Mean Depth (ft)	Depth/ Concent. Relation	TPH gas Rate (1/d)	TPH gas Correl.	Depth/ Concent. Relation	Benzene Rate (1/d)	Benzene Correl.
Site No	Well No.											
07S1W27E01	MW-12	pt, sve	SC	2.5	0	58.3	Y	-0.0031	0.36	N		
07S1W33R01	MW-4	none	GM/GC	7	48	13.5	N	-0.0018	0.57	N	-0.0018	0.57
07S1W27F01	MW-1	sve	SM	14.2	2.5	na	N	-0.016	0.82	N	-0.006	0.94
	MW-3	sve	SM	11	15	NA	N	-0.0027	0.72	Y	-0.0028	0.54
	site average	sve	SM	12.6				-0.0094	0.77		-0.002	0.74
08S1W03F01	MW-2	none	SM	0.4	7	NA	N	-0.0061	0.99	N	-0.0066	0.86
07S1W35P01	MW-1	none	SW	4.5	5	NA	N	-0.0023	0.7	N	-0.00057	0.05
07S1W35B02	E-11	ex, sve	SM	20.7	0	NA	N	-0.003	0.76	N	-0.004	0.81
06S2W30R01	U-8	none	SM	19.9	75	NA	N	-0.0058	0.98	N	-0.0056	0.65
06S2W19A01	A-1	pt, sve	SC/SM	7.7	35	40.8	N	-0.0045	0.86			
	A-2	pt, sve	SC/SM	7.9	25	38.3	N	-0.0031	0.67			
	A-3	pt, sve	SC/SM	11.2	100	42.3	N	-0.0044	0.75			
	site average	pt, sve	SC/SM	8.9333333				-0.004	0.76			
08S1W15M03	MW-1	none	SM	8.9	30	50.2						
08S1W21D01	MW-C	bio	SC/SM	6.8	25	14	Y	-0.00013	0.015	N	-0.00059	0.45
	MW-F	bio	SC/SM	2.2	75	14.8	Y	-0.00051	0.14	Y	-0.00064	0.15
	site average	bio	SC/SM	4.5		14.4		-0.0003	0.0775		-0.0006	0.3
08S1W13J01	C-5	none	GC	2.9	5	18.2	Y	-0.0028	0.24			
08S1W16N04	MW-5	sve	SM/GC	2.2	25	17.2	Y	-0.0015	0.15	N	-0.0021	0.33
	MW-8	sve	SM/GC	4.4	125	14.9	Y	-0.000066	0.0024	Y	-0.00011	0.0022
	site average	sve	SM/GC	3.3		16.05		-0.0008	0.0762		-0.001	0.1661
08S1W21E02	MW-2	ex	SM	3.6	60	16.7						
08S1W16N03	S-3	bio, sve	GC	6.9	10	15.5	Y	-0.003	0.73	Y	-0.0034	0.57
06S2W26H02	MW-1	none	SM		15			-0.00093	0.7		-0.0012	0.71
06S3W02D05	S-2	sve	SC/SM	5.5	40	44.5	Y	-0.0036	0.49	Y	-0.0036	0.76
06S2W07C01	MW-6	ex, pt	SP	3.5	10	9.6	N	-0.0028	0.95			

Table C-1. Summary of calculated degradation rate constants, correlations, and site conditions
(continued)

Unclassified (continued)												
Site No.	Well No.	Remed- iation	Aquifer Type	Range (ft)	Distance (ft)	Mean Depth (ft)	Depth/ Concent. Relation	TPH gas Rate (1/d)	TPH gas Correl.	Depth/ Concent. Relation	Benzene Rate (1/d)	Benzene Correl.
06S2W08N01	S-3	pt, sve, bio	SC	1.5	5	7	Y	-0.0021	0.73			
	S-4	pt, sve, bio	SC	1.4	5	6.3	N	-0.00085	0.72	Y	-0.00099	0.14
	site average	pt, sve, bio	SC	1.4		6.65		-0.0015	0.725		-0.001	0.14
06S3W12E02	MW-7	pt	SC	3.5	90	25.3	N	-0.0015	0.85	N	-0.0023	0.88
	MW-11	pt	SC	3.2	225	28	N	-0.003	0.94	N	-0.0016	0.58
	site average	pt	SC	3.35		26.65		-0.0023	0.895		-0.002	0.73
06S2W17B02	A-3	pt	unknown	1.6	5	7.5	N	-0.002	0.76	N	-0.0044	0.98
	A-6	pt	unknown	3.2	76	8.1	Y	-0.0023	0.73	N	-0.0023	0.85
	site average	pt	unknown	2.4		7.8		-0.0022	0.745		-0.003	0.915
06S2W07C02	MW-4	pt	GC	3.4	5	11.3	Y	-0.0017	0.33	Y	-0.0017	0.45
	MW-5	pt	GC	2.3	90	9.9	Y	-0.0012	0.38	Y	-0.00062	0.05
	site average	pt	GC	2.85		10.6		-0.0015	0.355		-0.001	0.25
07S1W15A01	MW-5	ex	GP	0.4	5	24.6	N	-0.0013	0.34	N	-0.0023	0.73
06S2W36F01	A-2	pt, sve	SC	27	25	76	N	-0.00003	0.008	N	-0.0009	0.8
	A-3	pt, sve	SC	7.1	10	78	N	-0.003	0.75	N	-0.003	0.78
	site average	pt, sve	SC	17.05		77		-0.0015	0.379		-0.002	0.79

Table C-1. Summary of calculated degradation rate constants, correlations, and site conditions
(continued)

Confined							Depth/ Concent.	TPH gas Rate (1/d)	TPH gas Correl.	Depth/ Concent.	Benzene Rate (1/d)	Benzene Correl.
Site No.	Well No	Remed- iation	Type	Range (ft)	Distance (ft)	Mean Depth (ft)	Relation					
06S2W17N02	MW-4	pt, sve, pr	SC	6.9	28	15.2	N	-0.00089	0.79	N	-0.00069	0.42
06S2W09N01	MW-2	ex	SM	1.7	40	7		-0.003	0.76			
06S2W15E02	MW-2	ex	SC	1	10	8.6	Y	-0.001	0.46			
06S2W15M01	MW-1	ex	SP	5.4	3	10.9	N	-0.00023	0.31	N	-0.0018	0.48
06S2W15L01	MW-6	ex, pt	SM	3	10	25.9						
06S2W27C03	C-3	ex	SC	8.6	5	79.4	N	-0.004	0.86	N	-0.004	0.88
06S2W22C02	EX-1	none	SW	12.7	5	19.5	N	-0.0013	0.61	N	-0.0013	0.49
06S3W11A02	MW-4	sve, pr	SM	4.2	10	29	N	-0.0011	0.65	N	-0.0012	0.41
06S3W11A01	S-5	sve, pt, pr	GC	5.2	10	31.4	Y	-0.0011	0.45	N	-0.0038	0.84
	S-8	sve, pt, pr	GC	3.9	55	30.2	N	-0.0022	0.74	N	-0.0048	0.86
	site average	sve, pt, pr	GC	4.45		30.8		-0.0017	0.595		-0.004	0.85
06S3W12E01	MW-6	pt, bio, sve	SC	4.1	15	23.4	N	-0.0061	0.62	N	-0.0031	0.76
	MW-8	pt, bio, sve	SC	3.3	40	23.9	Y	-0.0039	0.85	Y	-0.0039	0.79
	MW-11	pt, bio, sve	SC	6.9	150	25	Y	-0.00081	0.67	N	-0.00074	0.86
	site average	pt, bio, sve	SC	4.76666667		24.1		-0.0036	0.71333333		-0.0026	0.8033333
06S2W08K05	A-2	none	SC	2.4	20	7.3	Y	-0.00061	0.65	N	-0.00086	0.76
	A-3	none	SC	0.8	115	7.1	N	-0.0011	0.31	N	-0.00096	0.51
	A-5	none	SC	2.3	110	7.1	Y	-0.00054	0.05	Y	-0.00021	0.006
	site average	none	SC	1.83333333		7.16666667		-0.0008	0.33666667		-0.0007	0.4253333
06S2W07P01	MW-1	sve	SM	6.7	70	11.3	N	-0.0015	0.75	N	-0.0027	0.75
	VE-2	sve	SM	7.5	35	11.6	N	-0.0017	0.73	N	-0.0052	0.96
	site average	sve	SM	7.1		11.45		-0.0016	0.74		-0.004	0.855
06S2W08Q01	MW-1	none	SC	1.3	6	7.4	N	-0.0023	0.63	N	-0.0025	0.58
06S2W18C01	EC-3	ex	SM	7.4	10	18.6	N	-0.0015	0.35	N	-0.0019	0.24
06S2W18D01	C-2	none	SC	9.2	2	20.5	N	-0.00019	0.18	N	-0.00055	0.55
07S1W03M01	A-4	none	SM	6.3	60	14.8	N	-0.0029	0.94	N	-0.0023	0.91
07S1W09G02	MW-1	sve	SM	12	10	70.5	N	-0.0012	0.45	N	-0.0052	0.73

Table C-1. Summary of calculated degradation rate constants, correlations, and site conditions
(continued)

Confined (continued)												
Site No.	Well No.	Remed- iation	Type	Range (ft)	Distance (ft)	Mean Depth (ft)	Depth/ Concent. Relation	TPH gas Rate (1/d)	TPH gas Correl.	Depth/ Concent. Relation	Benzene Rate (1/d)	Benzene Correl.
07S1W03G01	EA-4	ex	SP	11	5	17.5	N	-0.0026	0.73	N	-0.0027	0.75
06S1W35F01	MW-1	pt	SM	2.5	10	10.3	N	-0.0002	0.15	N	-0.00059	0.93
07S1W15F01	MW-5	pt, sve	SM	7.6	180	36.4	N	-0.0018	0.99	N	-0.0095	0.95
07S1W03K01	MW-5	ex	GW	8.6	2.5	30.9	N	-0.0034	0.82	N	-0.0043	0.72
	MW-6	ex	GW	8	50	35.3	N	-0.004	0.92	N	-0.0041	0.89
	site average	ex	GW	8.3		33.1		-0.0037	0.87		-0.004	0.805
07S1W11G02	EA-6	sve	SC	10	20	41.8	N	-0.0018	0.42	N	-0.0023	0.56
06S1W26L01	MW-1	ex, pt	SW	2.2	0	12.5	N	-0.00084	0.27	N	-0.002	0.56
	MW-2	ex, pt	SW	2.1	2.5	12.6	N	-0.0012	0.43	N	-0.0036	0.79
	site average	ex, pt	SW	2.15		12.55		-0.001	0.35		-0.003	0.675
07S1W03K02	MW51-1	ex	SM	4.2	15	19	N	-0.0011	0.35	N	-0.00088	0.15
	MW-5	ex	SM	1.8	30	18	N	-0.0027	0.96	N	-0.002	0.76
	site average	ex	SM	3		18.5		-0.0019	0.655		-0.001	0.455
06S1W34K03	MW-1	ex	SC	3.7	2	10.4	N	-0.0025	0.83			
	MW-3	ex	SC	3.5	15	10.1	N	-0.00083	0.8			
	site average	ex	SC	3.6		10.25		-0.0017	0.815			
06S1W32G01	MW-2	pt, sve	SP	7.8	22	20.4	N	-0.003	0.88	N	-0.003	0.72
	MW-4	pt, sve	SP	5	15	12.7	N	-0.004	0.82	N	-0.005	0.82
	site average	pt, sve	SP	6.4		16.55		-0.0035	0.85		-0.004	0.77
07S1W04J01	MW-1	none	SP	19.7	2	15.5	N	-0.001	0.86	N	-0.001	0.67
	MW-2	none	SP	29.1	30	14	N	-0.002	0.66	N	-0.003	0.83
	site average	none	SP	24.4		14.75		-0.0015	0.76		-0.002	0.75
07S1W05G01	MW-9	pt, bio	ML				N	-0.002	0.74			
06S1W22L01	MW-1	sve, pt, ex	SC		20		N	-0.001	0.75	N	-0.002	0.63
06S1W31C01	MW-1	none	CL	7.1	5	21.7	N	-0.002	0.93	N	-0.003	0.79
06S2W35B01	MW-5	sve, pt	SW	23	5	80	N	-0.001	0.81	N	-0.002	0.93
06S1W32E01	MW-1	none	SC	6.9	8	27	Y	-0.002	0.53	Y	-0.004	0.6
06S1W20G01	OP-4	sve, pt, pt, bio	SP	2.2	2	12	N	-0.0015	0.38	N	-0.0031	0.72

Table A-1. Summary of Calculated Degradation Rates, Correlations, and Site Conditions (continued)

Confined (continued)												
Site No.	Well No.	Remed- iation	Type	Range (ft)	Distance (ft)	Mean Depth (ft)	Depth/ Concent.	TPH gas Rate (1/d)	TPH gas Correl.	Depth Concent.	Benzene Rate (1/d)	Benzene Correl.
	S-16	sve, pt, pr, bio	SP	3.8	130	10	N	-0.0014	0.59	N	-0.0011	0.45
	Site Average	sve, pt, pr, bio	SP	3.5		11		-0.0014	0.49		-0.002	0.59
06S2W24Q03	MW-1	none	SM	4.7	0	12	Y	-0.0003	0.08	Y	-0.0004	0.07
06S2W24Q02	MW-2	ex	SM		10			-0.0005	0.61		-0.0005	0.52
	MW-5	ex	SM		20			-0.0002	0.38		-0.0005	0.21
	MW-6	ex	SM		25			-0.002	0.82			
	Site Average	ex	SM					-0.0009	0.6		-0.0004	0.37
06S1W32B01	MW-1	none	SC	8.4	10	14	N	-0.0018	0.67	N	-0.0013	0.08
07S1W04K01	C-1	none	SM	12.3	50	55	N	-0.0004	0.47	N	-0.0004	0.5
06S1W32E02	MW-3	none	SM	12.9	80	19	N	-0.0011	0.69	N	-0.0006	0.11
06S2W16J01	MW-5	none	SW	3.1	20	25.5	N	-0.005	0.9	N	-0.0038	0.95
06S1W09G01	MW-2	sve	SM	16.1	20	27	N	-0.0016	0.68	N	-0.0019	0.71
07S1W03G04	A-1	ex	SC	5	5	13.9	N	-0.0041	0.79	N	-0.0041	0.63
	A-2	ex	SC	10.1	10	17.3	N	-0.0014	0.72	N	-0.0026	0.72
	Site Average	ex	SC	7.5		15.6		-0.003	0.76		-0.003	0.68

* pt = pump and treat; sve = soil vapor extraction; bio = bioenhancement; ex = excavation; pr = product removal
 Range = maximum minus minimum ground water elevation
 Distance = approximate distance from source to monitoring well
 Mean Depth = average depth to ground water