CAMBRIA

October 1, 2003

Ms. Karen Streich
ChevronTexaco
P. O. Box 6004
San Ramon, California 94583

Re: **Re-designation as RP**
Former Texaco Station 211285
15595 Washington Avenue
San Lorenzo, California

Dear Ms. Streich:

As requested, Cambria Environmental Technology, Inc. (Cambria) is submitting this analysis of site conditions with respect to case closure for the site referenced above. At issue is an earlier de-designation of Texaco (now ChevronTexaco) as a responsible party (RP) by the Alameda County Health Care Services Agency (ACHSA). The current property owner challenged the de-designation and the State Water Resources Control Board (SWRCB) remanded the case back to the ACHSA for justification. We understand that the ACHSA has changed case workers and the current case worker and ACHSA management are now unwilling to respond to the SWRCB directives. As a result, on July 7, 2003 the ACHSA re-designated ChevronTexaco and Agnes Calleri as secondary RPs. Our objective is to review the 1986 site data with respect to current Regional Water Quality Control Board – San Francisco Region (RWQCB) environmental screening levels and assess whether the site conditions at the end of Texaco's tenure meet current closure criteria. The site conditions at the time of Texaco's tenure and our analysis are presented below.

## Site Conditions

The site was operated as an active service station from approximately 1964 through 1983 and from 1986 through to the present. From 1974 to 1983, the site was owned by the Calleris family, who operated a service station. Texaco owned the site from 1983 through 1986, but did not operate the facility and neither stored nor dispensed gasoline during that period. The site location is presented in Figure 1.

Texaco conducted a baseline assessment in 1986 to determine site conditions and identify potential environmental liabilities prior to selling the property to Mr. Bertram Kubo. Texaco drilled six borings and installed wells MW-1, MW-2 and MW-3 in three of the borings. A figure with boring and well locations is presented in Attachment A.

**Cambria Environmental Technology, Inc.**

5900 Hollis Street
Suite A
Emeryville, CA 94608
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Because the investigation objectives were to screen the site for potential liabilities to support a property transaction and not for a regulated environmental investigation, 3-point composite soil samples were analyzed from each boring. No hydrocarbons were detected in soil at detection limits of 10 mg/kg total petroleum hydrocarbons as gasoline (TPHg), 0.5 mg/kg benzene and toluene, and 1.0 mg/kg xylene isomers in the six samples analyzed.

Groundwater samples were collected from the 3 borings and 3 wells to assess potential impacts to groundwater. No benzene, toluene or xylenes were detected in wells MW-2 and MW-3, or in borings SB-2 and SB-3 at detection limits of 0.05 ug/l. Well MW-1 contained 82 ug/l xylenes and boring SB-1 contained 220 ug/l benzene, 390 ug/l toluene and 680 ug/l xylenes. Analytical data for soil and groundwater from the 1986 investigation are presented in Attachment B.

There is a more recent oxygenated fuels release (MTBE release) that post-dates Texaco's ownership of the site. The ACHSA named ChevronTexaco as a secondary RP for the contamination that is present on the site due to the pre-1983 release.

## Sensitive Receptor Survey

Cambria reviewed the area surrounding the site for potential sensitive land use receptors that could be impacted by hydrocarbon releases at the site. The properties immediately adjacent to the site are primarily commercial and residential. Figure 2 presents surrounding land use.

Cambria also reviewed Department of Water Resources well logs for wells within a ½ mile radius of the site. Eleven total wells were identified within ½ mile of the site: 1 industrial well, 5 irrigation wells, 1 domestic well, 1 test well, and 3 wells of unknown or "other" use. No municipal or drinking water supply wells were identified. The nearest well is an irrigation well southwest (about 1/16-mile cross and down-gradient) of the site. This well is screened from 56 to 76 feet below grade (Texaco wells MW-1, MW-2 and MW-3 are screened from 5 to 15 feet below grade). The domestic well is over ¼ mile southeast (cross and up-gradient of the site). Because of the large distance to this well, it is not likely to be impacted by the hydrocarbons detected during Texaco's 1986 assessment. Well survey data are presented on Figure 3 and Table 1.

As indicated on Figure 2, San Lorenzo Creek is about 1/8 mile northwest of the site and flows west-southwestward. Due to the distance, it is unlikely that the low concentrations detected in the source area at the Texaco station in 1986 could impact the creek.

Based on the sensitive receptor survey data, no sensitive receptors were identified that would have been adversely impacted by hydrocarbons originating from the pre-1983 release.

## Environmental Screening Levels

The SWRCB indicated that ChevronTexaco could be removed as a responsible party (RP) if "...by a preponderance of the evidence that constituents from that party's release, when taken in conjunction with commingled constituents from another release(s) that have similar effects on beneficial use, do not contribute to the need for cleanup at the site." To assess whether the release detected by Texaco in 1986 would have contributed to the need for cleanup at the site, we compared site conditions in 1986 to environmental screening levels (ESLs) presented in *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater* (July 2003, updated September 4, 2003) produced by the RWQCB.

Groundwater is not used as a drinking water source in the site vicinity and no municipal water supply wells were identified within ½-mile of the site. In addition, no surface water bodies were identified near the site that are likely to be impacted by the low hydrocarbon concentrations detected in 1986. Because it is unlikely that groundwater beneath or in the vicinity of the site would be used as a drinking water source in the foreseeable future, or that it would impact surface water, the appropriate ESL is based on potential impacts to indoor air. Table A presents maximum hydrocarbon concentrations detected in groundwater in the 1986 investigation and corresponding ESLs.

**Table A – Hydrocarbon Concentrations and ESLs**

| Analyte | Maximum Detection | ESL | Comments |
|---|---|---|---|
| Benzene | 220 ug/l | 530 to 1,900 ug/l | Below ESL |
| Toluene | 390 ug/l | 500,000 to 530,000 ug/l | Below ESL |
| Xylenes | 680 ug/l | 150,000 to 160,000 ug/l | Below ESL |

ESL: *Groundwater Screening Levels for Evaluation of Potential Indoor-Air Impacts,* Table E-1a, residential land use scenario. Ranges based on high permeability soil (first number presented) and low/moderate permeability soil (second number presented).

As indicated in Table A, the maximum concentrations detected in groundwater during the 1986 investigation are below the ESLs for residential use (the most conservative land use scenario). Therefore, not only would groundwater remediation not be required at the site based on the concentrations detected in 1986, the site would qualify for closure using current closure criteria. RWQCB ESL Table E-1a is included in Attachment C.

No hydrocarbons were detected in soil so it is impossible to compare hydrocarbon concentrations in soil to ESLs. The fact that no hydrocarbons were detected in soil and only low concentrations were detected in groundwater indicates that there was no significant impact to soil from operations prior to cessation of initial operations in 1983.

## Justification for De-Designation of Texaco and Calleris Family

According to the SWRCB, Texaco and the Calleris family were named as RP's at the site because they owned the property and the underground storage tanks (USTs), and because there is evidence of an historic petroleum hydrocarbon release predating 1983. The SWRCB also stated that it is not appropriate for the local oversight program to remove an RP unless it finds, "...by a preponderance of the evidence that constituents from that party's release, when taken in conjunction with commingled constituents from another release(s) that have similar effects on beneficial use, do not contribute to the need for cleanup at the site."

The SWRCB also stated that if an RP has been issued a closure letter, it would ordinarily be inappropriate for that RP to be held liable for cleanup of other releases at the site for which that RP had no responsibility (e.g., the RP is not the current owner and did not control the USTs from which an additional release occurred).

Based on the data, it is apparent that the hydrocarbons detected in 1986 would not contribute to the need for cleanup of the site, whether in 1986 or now. The SWRCB stated that the ACHSA may de-designate Texaco and the Calleris family if "constituents from the first release do not contribute to the need for cleanup at the site." The SWRCB further stated that the ACHSA could de-designate Texaco and the Calleris family if: (1) the site would be closed but for the MTBE from the second release(s), and (2) the BTEX constituents remaining from the first release do not have similar effects as MTBE on beneficial uses."

The data presented above clearly indicate that, in the absence of the recent oxygenated fuels release(s), the site would not only pass ESLs, but would qualify for case closure because of the lack of sensitive receptors in the site vicinity. The low benzene, toluene and xylenes

concentrations detected in 1986 do not have a similar effect on beneficial use as the high concentrations of MTBE from the more recent release(s) and do not contribute to the need for cleanup at the site. The MTBE concentrations pose a greater risk to beneficial use because of its greater mobility and lower attenuation rates and any site remediation would be driven by MTBE. In addition, analysis of concentration trends previously prepared by Cambria (Attachment D) indicates that the benzene and toluene concentrations detected in 1986 would now be near or below maximum contaminant levels for drinking water (MCLs) and, therefore, warrant no remediation. Xylenes concentrations were already below MCLs in 1986.

We recommend that ChevronTexaco petition the SWRCB to review the ACHSA's recent decision re-designating ChevronTexaco and the Calleris as secondary RPs at the site. The secondary RP status assigned ChevronTexaco by the ACHSA could have significant current and future liability that is unwarranted given the low concentrations of hydrocarbons detected in the groundwater attributable to pre-1986 site use.

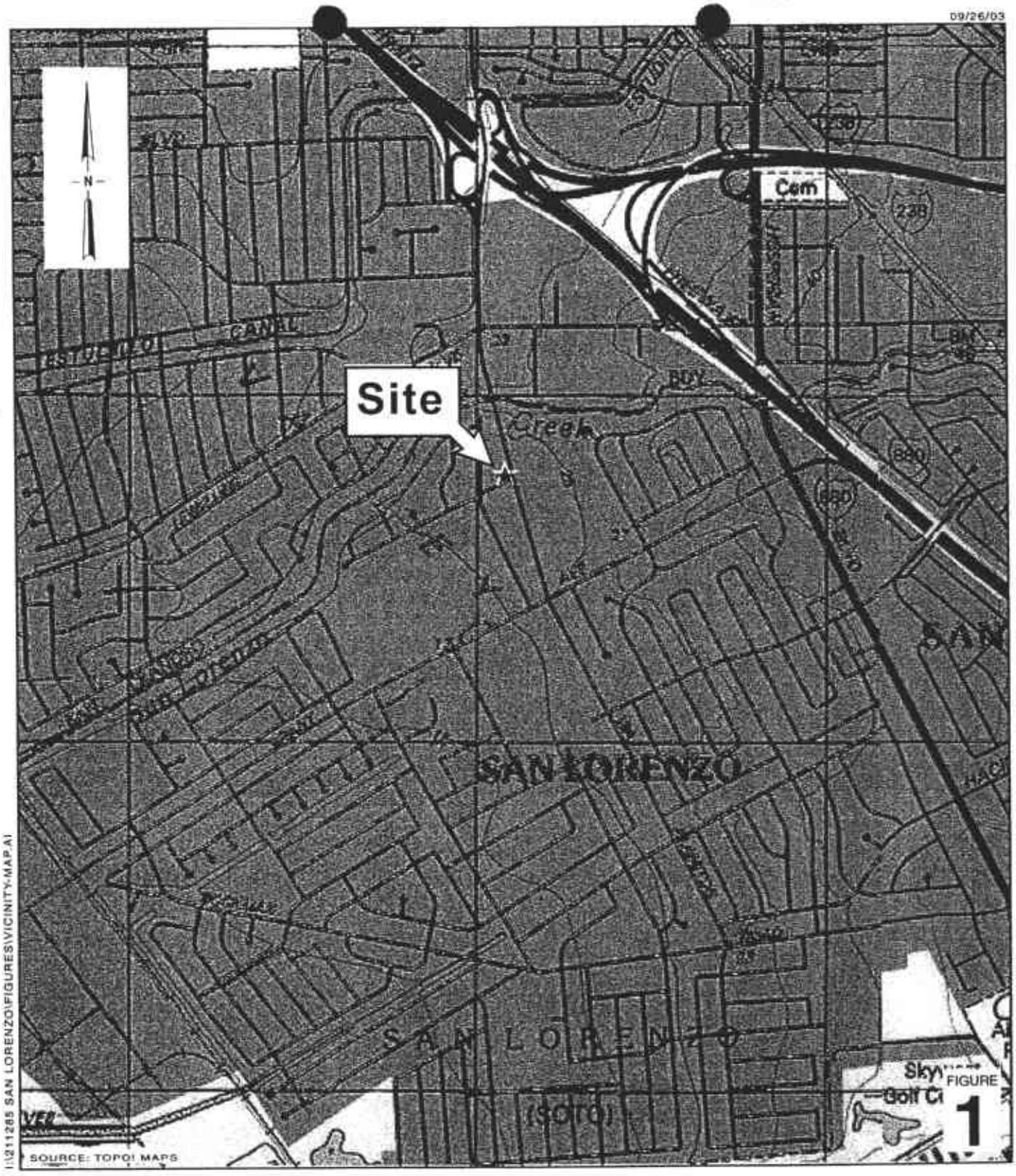
Please contact me at (510) 420-3301 if you have any questions or comments.

Sincerely,
**Cambria Environmental Technology, Inc.**

N. Scott MacLeod, RG
Principal Geologist

I:\211285 San Lorenzo\Letter Petitioning Re-Designation by ACHSA.doc

Attachments: A – Site Maps
B – Soil and Groundwater Analytical Data
C – ESL Table E-1a
D – Natural Attenuation Analysis




I:\211285 SAN LORENZO\FIGURES\VICINITY-MAP.AI

**Chevron Service Station 211285**

15595 Washington Avenue

San Lorenzo, California

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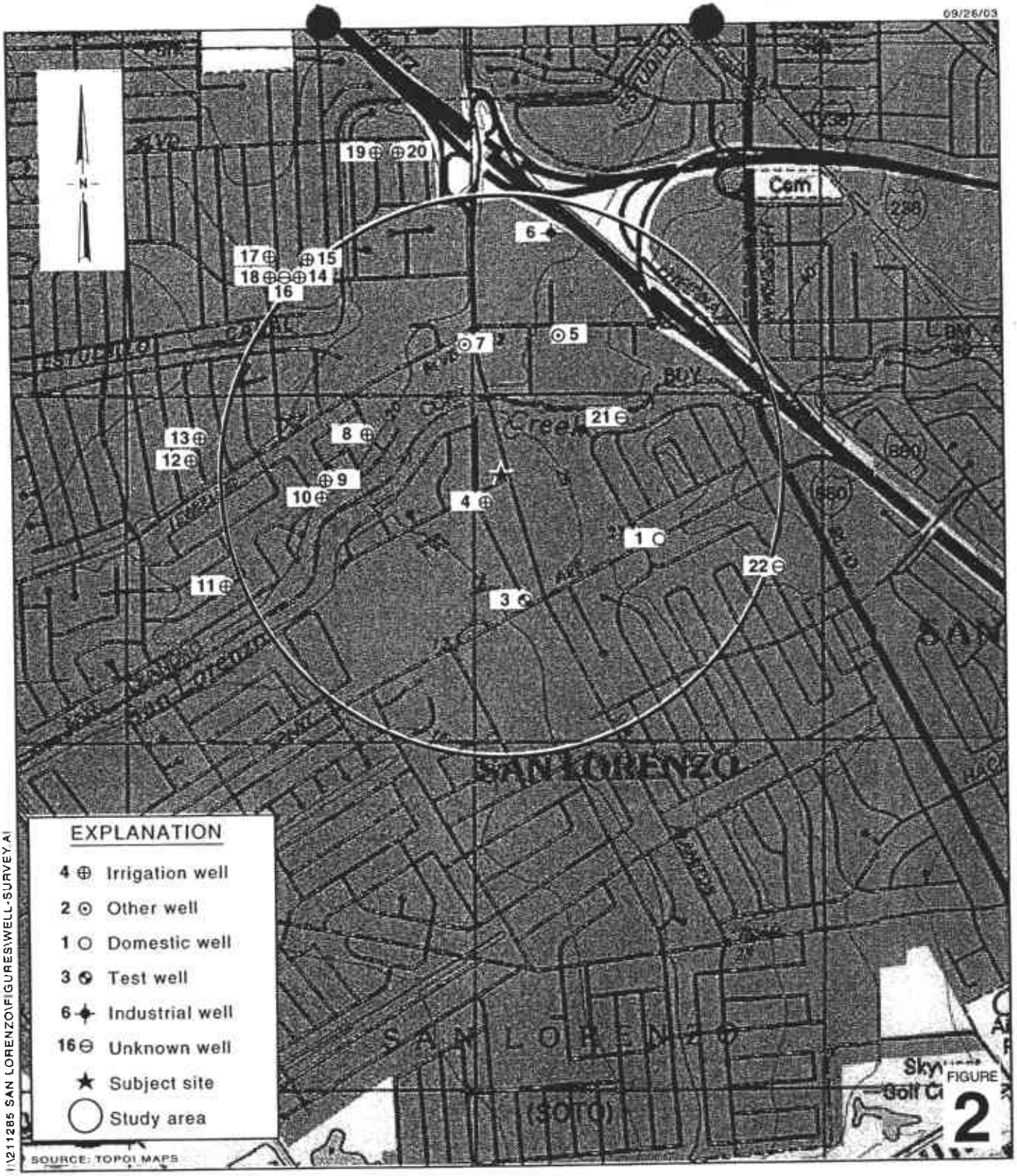
**Vicinity Map**




**Chevron Service Station 211285**

15595 Washington Avenue

San Lorenzo, California

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**Area Well Survey**

1/2 Mile Radius

I:\211285 SAN LORENZO\FIGURES\PARCEL MAP.AI

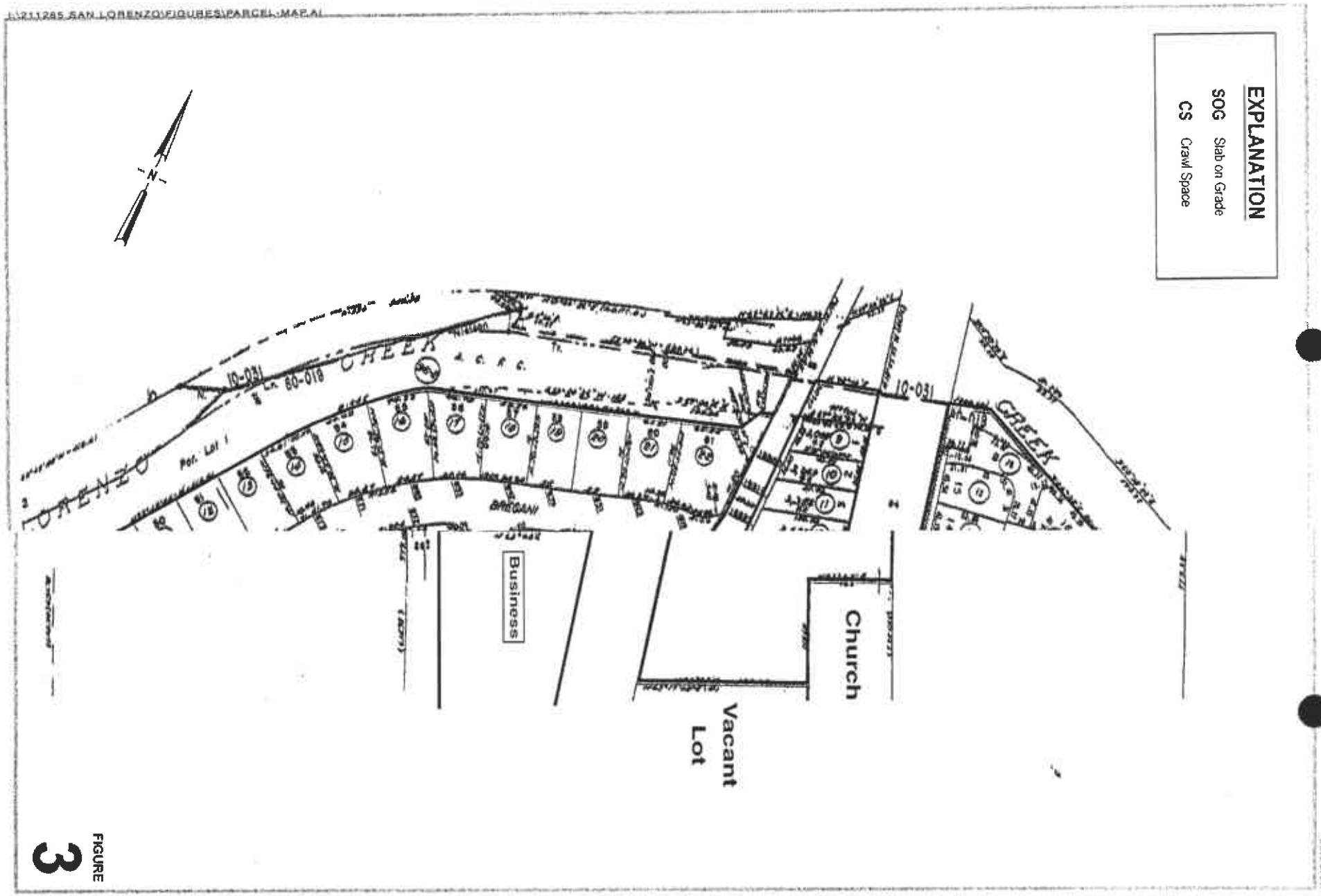


FIGURE 3

**Chevron Service Station**
15595 Washington Avenue
San Lorenzo, California

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**Surrounding Land Use Map**

**TABLE 1: 1/2 MILE RADIUS WELL SURVEY - Former Texaco 211285 - 15595 Washington Avenue, San Lorenzo, CA 95840**

| Table 1. Location ID# | Township | Range | Section | Well ID | Owner | Depth (fbg) | Screen Interval (fbg) | Address (based on information from DWR-188 forms) | Location | Installation Date | Well Use |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3S | 2W | 7 | 7725 | Paul R. Frink | 29' | 10.5' to 30' | 754 Grant Street, San Lorenzo, CA | As stated | Jun-77 | Dom |
| 2 | 3S | 3W | 12 | -- | Gus and Francis Paretti | 100' | 52' to 96' | 15785 Washington Avenue, San Lorenzo, CA | As stated | Oct-77 | O |
| 3 | 3S | 3W | 12 | -- | Arroyo High School | 600' | -- | 15701 Lorenzo Avenue, San Lorenzo, CA | Along Grant Avenue | 1955 | Test |
| 4 | 3S | 3W | 12 | -- | Frank Perry | 76' | 56' to 76' | 15600 Lorenzo Avenue, San Lorenzo | As stated | Aug-78 | Irr |
| 5 | 3S | 2W | 7 | -- | F. J. Goyette Machine Works | 71' | 32' to 35'; 52' to 60'; 61' to 71' | 624 Lewelling Boulevard, San Lorenzo, CA | As stated | Jul-37 | O |
| 6 | 3S | 3W | 12 | 1 | San Lorenzo Nursery | 524' | 341' to 354'; 490' to 511' | 10500 Washington Avenue, San Lorenzo, CA | As stated | Jun-57 | Ind |
| 7 | 3S | 3W | 12 | -- | San Lorenzo Nursery | 720' | -- | 10500 Washington Avenue, San Lorenzo, CA | On Washington Avenue | Oct-47 | O |
| 8 | 3S | 3W | 12 | -- | Dewey Roole | 30' | 15' to 30' | 15547 Sedgeman Street, San Lorenzo, CA | As stated | -- | Irr |
| 9 | 3S | 3W | 12 | -- | Robert Perino | 30' | 13' to 30' | 15596 Tilden Street, San Leandro, CA | As stated | Mar-77 | Irr |
| 10 | 3S | 3W | 12 | -- | Aubrey Elliot | 30' | 15' to 30' | 1018 Kramer Street, San Leandro, CA | As stated | Apr-77 | Irr |
| 11 | 3S | 3W | 12 | 577 | George and Loretta Bolla | 27' | 13' to 27' | 1335 Sayre Street, San Leandro, CA | As stated | Jun-77 | Irr |
| 12 | 3S | 3W | 12 | -- | Ronald Stanley | 30' | 10' to 30' | 15368 Churchill Street, San Leandro, CA | As stated | May-77 | Irr |
| 13 | 3S | 3W | 12 | -- | Donald Woolery | 22.5' | -- | 15340 Churchill Street, San Leandro, CA | As stated | Mar-77 | Irr |
| 14 | 3S | 3W | 12 | -- | Christ Presbyterian Church | 28' | 10' to 28' | 890 Fargo Avenue, San Leandro, CA | As stated | Jul-77 | Irr |
| 15 | 3S | 3W | 12 | 77377 | Jan Tisby | 20' | 10' to 20' | 15193 Endicott, San Leandro, CA | As stated | Aug-77 | Irr |
| 16 | 3S | 3W | 12 | -- | Richard D. Armstrong | 40' | 15' to 40' | 15177 Norton Street, San Leandro, CA | As stated | Aug-77 | -- |
| 17 | 3S | 3W | 12 | 77306 | Sal Campilongo | 30' | 10' to 30' | 15190 Norton Street, San Leandro, CA | As stated | May-76 | Irr |
| 18 | 3S | 3W | 12 | -- | Herman C. Albright | 46' | 21' to 46' | 15185 Norton Street, San Leandro, CA | As stated | Apr-77 | Irr |
| 19 | 3S | 3W | 12 | -- | Roy Swatman | 28' | 10' to 28' | 15054 Alexandria Street, San Leandro, CA | As stated | May-77 | Irr |
| 20 | 3S | 3W | 12 | -- | Lyle S. Bates | 28' | 22' to 28' | 15028 Grenda Street, San Leandro, CA | As stated | May-77 | Irr |
| 21 | 3S | 3W | 12 | -- | A. L. Christensen | 358' | 275' to 279'; 318' to 323'; 326' to 330'; 348' to 358' | -- | -- | Mar-40 | -- |
| 22 | 3S | 2W | 11 | -- | Ratti | 124' | 57' to 59'; 104' to 112'; 119' to 124' | -- | -- | Aug-45 | -- |

M = Municipal, Dom = Domestic, P = Public, Irr = Irrigation, Ind = Industrial, O = Other, Test = Test Well
-- = no data available
? = unknown
fbg = feet below grade

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# ATTACHMENT A

## Site Maps

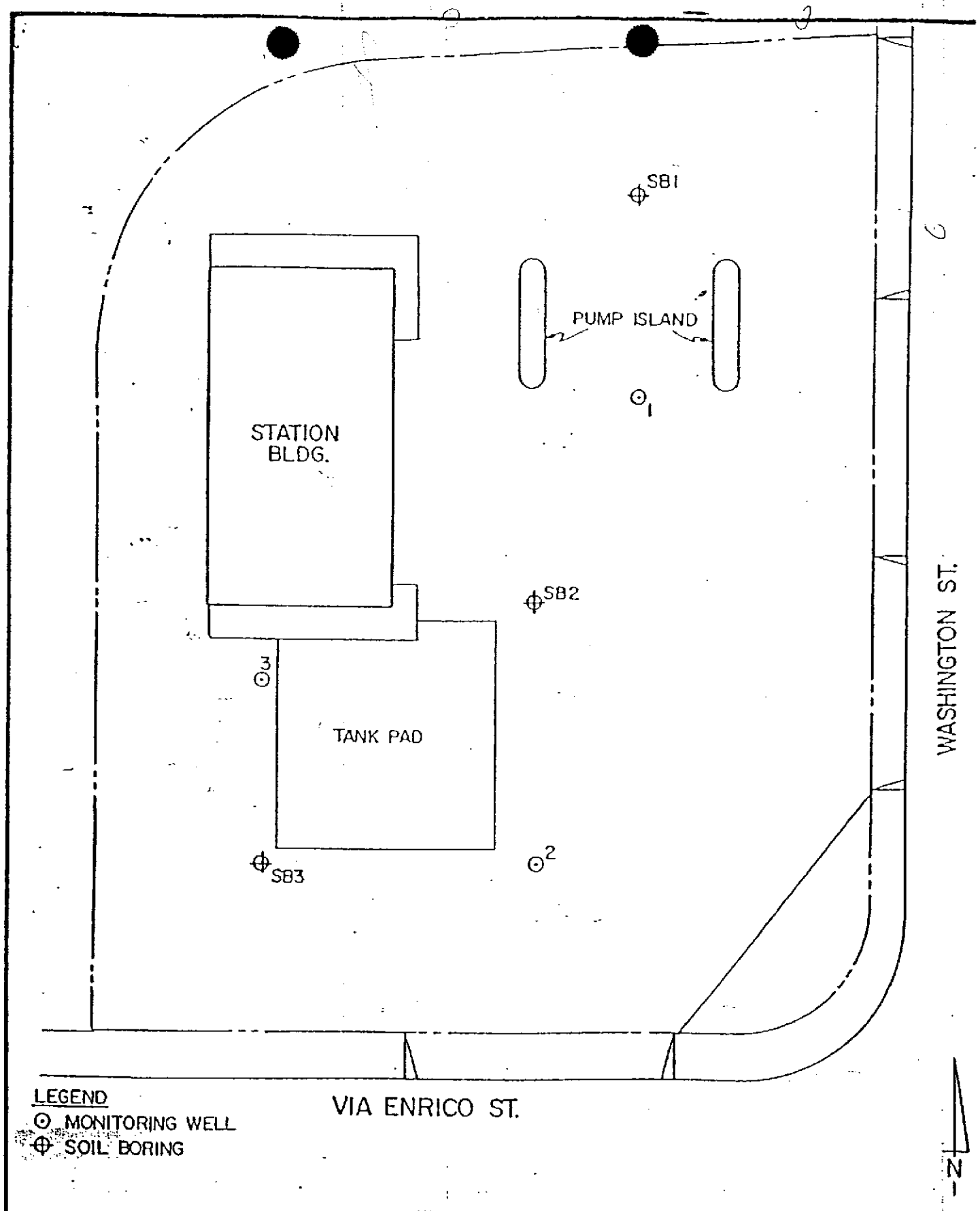


FIGURE 2
SITE PLAN

TEXACO USA
SAN LORENZO, CALIFORNIA

GROUNDWA
TECHNOLO

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# ATTACHMENT B

## Soil and Groundwater Analytical Data

BROWN AND CALDWELL

ANALYTICAL LABORATORIES

RECEIVED
AUG 28 1986
Anal.

LOG NO: E86-08-202

Received: 11 AUG 86
Reported: 28 AUG 86

Ms. Amy Sager
Groundwater Technology
4080 Pike Lane, Suite D
Concord, California 94520

Purchase Order: 464

REPORT OF ANALYTICAL RESULTS



| LOG NO | SAMPLE DESCRIPTION , SOIL SAMPLES | DATE SAMPLED |
|---|---|---|
| 08-202-1 | MW-1 Composite | 08 AUG 86 |
| 08-202-2 | MW-2 Composite | 08 AUG 86 |
| 08-202-3 | MW-3 Composite | 08 AUG 86 |
| 08-202-4 | SB-1 Composite | 08 AUG 86 |
| 08-202-5 | SB-2 Composite | 08 AUG 86 |

| PARAMETER | 08-202-1 | 08-202-2 | 08-202-3 | 08-202-4 | 08-202-5 |
|---|---|---|---|---|---|
| Lead, mg/kg | 12 | 12 | 18 | 14 | 20 |
| Nitric Acid Digestion, Date | 08.18.86 | 08.18.86 | 08.18.86 | 08.18.86 | 08.18.86 |
| Benzene,Toluene,Xylene Isomers | | | | | |
| Benzene, mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Toluene, mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Xylene Isomers, mg/kg | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Total Fuel Hydrocarbons, mg/kg | <10 | <10 | <10 | <10 | <10 |

BROWN AND CALDWELL

ANALYTICAL LABORATORIES

LOG NO: E86-08-202

Received: 11 AUG 86
Reported: 28 AUG 86

Ms. Amy Sager
Groundwater Technology
4080 Pike Lane, Suite D
Concord, California 94520

Purchase Order: 464

REPORT OF ANALYTICAL RESULTS



| LOG NO | SAMPLE DESCRIPTION , SOIL SAMPLES | DATE SAMPLED |
|---|---|---|
| 08-202-6 | SB-3 Composite | 08 AUG 86 |

| PARAMETER | 08-202-6 |
|---|---|
| Lead, mg/kg | 12 |
| Nitric Acid Digestion, Date | 08.18.86 |
| Benzene,Toluene,Xylene Isomers | |
| Benzene, mg/kg | <0.5 |
| Toluene, mg/kg | <0.5 |
| Total Xylene Isomers, mg/kg | <1.0 |
| Total Fuel Hydrocarbons, mg/kg | <10 |

BROWN AND CALDWELL
ANALYTICAL LABORATORIES

LOG NO: E86-08-202

Received: 11 AUG 86
Reported: 28 AUG 86

Ms. Amy Sager
Groundwater Technology
4080 Pike Lane, Suite D
Concord, California 94520

Purchase Order: 464

REPORT OF ANALYTICAL RESULTS



| LOG NO | SAMPLE DESCRIPTION , GROUND WATER SAMPLES | DATE SAMPLED |
|---|---|---|
| 08-202-7 | MW-1 | 08 AUG 86 |
| 08-202-8 | MW-2 | 08 AUG 86 |
| 08-202-9 | MW-3 | 08 AUG 86 |
| 08-202-10 | SB-1 | 08 AUG 86 |
| 08-202-11 | SB-2 | 08 AUG 86 |

| PARAMETER | 08-202-7 | 08-202-8 | 08-202-9 | 08-202-10 | 08-202-11 |
|---|---|---|---|---|---|
| Benzene,Toluene,Xylene Isomers | | | | | |
| Benzene, mg/L | <0.05 | <0.05 | <0.05 | 0.22 | <0.05 |
| Toluene, mg/L | <0.05 | <0.05 | <0.05 | 0.39 | <0.05 |
| Total Xylene Isomers, mg/L | 0.082 | <0.05 | <0.05 | 0.68 | <0.05 |

BROWN AND CALDWELL
ANALYTICAL LABORATORIES

LOG NO: E86-08-202

Received: 11 AUG 86
Reported: 28 AUG 86

Ms. Amy Sager
Groundwater Technology
4080 Pike Lane, Suite D
Concord, California 94520

Purchase Order: 464

REPORT OF ANALYTICAL RESULTS



| LOG NO | SAMPLE DESCRIPTION , GROUND WATER SAMPLES | DATE SAMPLED |
|---|---|---|
| 08-202-12 | SB-3 | 08 AUG 86 |

| PARAMETER | 08-202-12 |
|---|---|
| Benzene,Toluene,Xylene Isomers | |
| Benzene, mg/L | <0.05 |
| Toluene, mg/L | <0.05 |
| Total Xylene Isomers, mg/L | <0.05 |

Linda Brack Fok
D. A. McLean, Laboratory Director

CAMBRIA

# ATTACHMENT C

## ESL Table E-1a

# TABLE E-1a. GROUNDWATER SCREENING LEVELS FOR EVALUATION OF POTENTIAL INDOOR-AIR IMPACTS (volatile chemicals only)

| CHEMICAL PARAMETER | Physical State | | Residential Land Use | | Commercial/Industrial Land Use | |
|---|---|---|---|---|---|---|
| | | | Vadose-Zone Soil Type | | Vadose-Zone Soil Type | |
| | | | *High Permeability | *Low/Moderate Permeability | *High Permeability | *Low/Moderate Permeability |
| | | | (ug/L) | (ug/L) | (ug/L) | (ug/L) |
| #ACENAPHTHENE | V | S | 4.2E+03 | 4.2E+03 | 4.2E+03 | 4.2E+03 |
| ACENAPHTHYLENE | V | S | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) |
| #ACETONE | V | L | 6.0E+06 | 7.9E+06 | 1.6E+07 | 2.2E+07 |
| ALDRIN | NV | S | | | | |
| #ANTHRACENE | V | S | 4.3E+01 | 4.3E+01 | 4.3E+01 | 4.3E+01 |
| ANTIMONY | NV | S | | | | |
| ARSENIC | NV | S | | | | |
| BARIUM | NV | S | | | | |
| #BENZENE | V | L | 5.3E+02 | 1.9E+03 | 1.8E+03 | 6.4E+03 |
| BENZO(a)ANTHRACENE | NV | S | | | | |
| BENZO(b)FLUORANTHENE | NV | S | | | | |
| BENZO(k)FLUORANTHENE | NV | S | | | | |
| BENZO(g,h,i)PERYLENE | NV | S | | | | |
| BENZO(a)PYRENE | NV | S | | | | |
| BERYLLIUM | NV | S | | | | |
| BIPHENYL, 1,1- | V | S | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) |
| BIS(2-CHLOROETHYL)ETHER | V | L | 8.3E+01 | 8.3E+01 | 2.1E+02 | 2.8E+02 |
| BIS(2-CHLOROISOPROPYL)ETHER | V | L | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) |
| BIS(2-ETHYLHEXYL)PHTHALATE | NV | S | | | | |
| BORON | NV | S | | | | |
| BROMODICHLOROMETHANE | V | L | 1.6E+02 | 3.1E+02 | 5.4E+02 | 1.0E+03 |
| BROMOFORM | NV | S | | | | |
| BROMOMETHANE | V | G | 5.8E+02 | 2.0E+03 | 1.6E+03 | 5.7E+03 |
| CADMIUM | NV | S | | | | |
| CARBON TETRACHLORIDE | V | L | 9.5E+00 | 4.0E+01 | 3.2E+01 | 1.4E+02 |
| CHLORDANE | NV | S | | | | |
| CHLOROANILINE, p- | NV | S | | | | |
| CHLOROBENZENE | V | L | 1.3E+04 | 4.3E+04 | 3.8E+04 | 1.2E+05 |
| CHLOROETHANE | V | G | 8.2E+02 | 3.3E+03 | 2.7E+03 | 1.1E+04 |
| CHLOROFORM | V | L | 3.4E+02 | 1.2E+03 | 1.1E+03 | 3.9E+03 |
| CHLOROMETHANE | V | G | 1.7E+02 | 7.5E+02 | 5.8E+02 | 2.5E+03 |
| CHLOROPHENOL, 2- | V | L | 5.5E+03 | 1.6E+04 | 1.5E+04 | 4.6E+04 |
| CHROMIUM (Total) | NV | S | | | | |
| CHROMIUM III | NV | S | | | | |
| CHROMIUM VI | NV | S | | | | |
| CHRYSENE | NV | S | | | | |
| COBALT | NV | S | | | | |
| COPPER | NV | S | | | | |

## TABLE E-1a. GROUNDWATER SCREENING LEVELS FOR EVALUATION OF POTENTIAL INDOOR-AIR IMPACTS (volatile chemicals only)

| CHEMICAL PARAMETER | Physical State | | [2]Residential Land Use | | Commercial/Industrial Land Use | |
|---|---|---|---|---|---|---|
| | | | Vadose-Zone Soil Type | | Vadose-Zone Soil Type | |
| | | | [4]High Permeability | [4]Low/Moderate Permeability | [4]High Permeability | [4]Low/Moderate Permeability |
| | | | (ug/L) | (ug/L) | (ug/L) | (ug/L) |
| CYANIDE (Free) | NV | S | | | | |
| DIBENZO(a,h)ANTHTRACENE | NV | S | | | | |
| DIBROMOCHLOROMETHANE | V | S | 1.8E+02 | 4.2E+02 | 6.1E+02 | 1.4E+03 |
| 1,2-DIBROMO-3-CHLOROPROPANE | V | L | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) |
| DIBROMOETHANE, 1,2- | V | S | 1.6E+02 | 2.6E+02 | 5.6E+02 | 8.6E+02 |
| DICHLOROBENZENE, 1,2- | V | L | 7.8E+04 | 1.6E+05 | 1.6E+05 | 1.6E+05 |
| DICHLOROBENZENE, 1,3- | V | L | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) |
| DICHLOROBENZENE, 1,4- | V | S | 3.6E+02 | 1.0E+03 | 1.2E+03 | 3.4E+03 |
| DICHLOROBENZIDINE, 3,3- | NV | S | | | | |
| DICHLORODIPHENYLDICHLOROETHANE (DDD) | NV | S | | | | |
| DICHLORODIPHENYLDICHLOROETHYLENE (DDE) | NV | S | | | | |
| DICHLORODIPHENYLTRICHLOROETHANE (DDT) | NV | S | | | | |
| DICHLOROETHANE, 1,1- | V | L | 1.0E+03 | 3.6E+03 | 3.5E+03 | 1.2E+04 |
| DICHLOROETHANE, 1,2- | V | L | 2.0E+02 | 5.1E+02 | 6.9E+02 | 1.7E+03 |
| DICHLOROETHYLENE, 1,1- | V | L | 6.3E+03 | 2.7E+04 | 1.8E+04 | 7.5E+04 |
| DICHLOROETHYLENE, Cis 1,2- | V | L | 6.2E+03 | 2.0E+04 | 1.7E+04 | 5.5E+04 |
| DICHLOROETHYLENE, Trans 1,2- | V | L | 6.7E+03 | 2.5E+04 | 1.9E+04 | 6.9E+04 |
| DICHLOROPHENOL, 2,4- | NV | S | | | | |
| DICHLOROPROPANE, 1,2- | V | L | 2.9E+02 | 8.9E+02 | 9.6E+02 | 3.0E+03 |
| DICHLOROPROPENE, 1,3- | V | L | 4.9E+01 | 2.0E+02 | 1.7E+02 | 6.6E+02 |
| DIELDRIN | NV | S | | | | |
| DIETHYLPHTHALATE | NV | S | | | | |
| DIMETHYLPHTHALATE | NV | S | | | | |
| #DIMETHYLPHENOL, 2,4- | V | S | 2.8E+06 | 4.1E+06 | 8.0E+06 | 1.1E+07 |
| DINITROPHENOL, 2,4- | NV | S | | | | |
| DINITROTOLUENE, 2,4- | NV | S | | | | |
| 1,4 DIOXANE | NV | L | | | | |
| DIOXIN (2,3,7,8-TCDD) | NV | S | | | | |
| ENDOSULFAN | NV | S | | | | |
| ENDRIN | NV | S | | | | |
| #ETHYLBENZENE | V | L | 1.4E+04 | 5.2E+04 | 4.7E+04 | 1.6E+05 |
| FLUORANTHENE | NV | S | | | | |
| #FLUORENE | V | S | 1.9E+03 | 1.9E+03 | 1.9E+03 | 1.9E+03 |
| HEPTACHLOR | NV | S | | | | |
| HEPTACHLOR EPOXIDE | NV | S | | | | |
| HEXACHLOROBENZENE | NV | S | | | | |
| HEXACHLOROBUTADIENE | NV | S | | | | |
| HEXACHLOROCYCLOHEXANE (gamma) LINDANE | NV | S | | | | |

# TABLE E-1a. GROUNDWATER SCREENING LEVELS FOR EVALUATION OF POTENTIAL INDOOR-AIR IMPACTS (volatile chemicals only)

| CHEMICAL PARAMETER | Physical State | | Residential Land Use | | Commercial/Industrial Land Use | |
|---|---|---|---|---|---|---|
| | | | Vadose-Zone Soil Type | | Vadose-Zone Soil Type | |
| | | | [a]High Permeability | [a]Low/Moderate Permeability | [a]High Permeability | [a]Low/Moderate Permeability |
| | | | (ug/L) | (ug/L) | (ug/L) | (ug/L) |
| HEXACHLOROETHANE | NV | S | | | | |
| INDENO(1,2,3-cd)PYRENE | NV | S | | | | |
| LEAD | NV | S | | | | |
| MERCURY | NV | S | | | | |
| METHOXYCHLOR | NV | S | | | | |
| METHYLENE CHLORIDE | V | L | 2.4E+03 | 7.2E+03 | 8.1E+03 | 2.4E+04 |
| #METHYL ETHYL KETONE | V | L | 5.5E+07 | 1.2E+08 | 1.5E+08 | 3.3E+08 |
| #METHYL ISOBUTYL KETONE | V | L | 3.1E+06 | 4.3E+06 | 8.7E+06 | 1.2E+07 |
| METHYL MERCURY | NV | S | | | | |
| #METHYLNAPHTHALENE (total 1- & 2-) | V | S | 2.6E+04 | 2.6E+04 | 2.6E+04 | 2.6E+04 |
| METHYL TERT BUTYL ETHER | V | L | 2.4E+04 | 4.8E+04 | 8.0E+04 | 1.6E+05 |
| MOLYBDENUM | NV | S | | | | |
| #NAPHTHALENE | V | S | 2.6E+04 | 3.1E+04 | 3.1E+04 | 3.1E+04 |
| NICKEL | NV | S | | | | |
| PENTACHLOROPHENOL | NV | S | | | | |
| PERCHLORATE | NV | S | | | | |
| PHENANTHRENE | V | S | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) |
| PHENOL | NV | S | | | | |
| POLYCHLORINATED BIPHENYLS (PCBs) | NV | S | | | | |
| #PYRENE | V | S | 1.4E+02 | 1.4E+02 | 1.4E+02 | 1.4E+02 |
| SELENIUM | NV | S | | | | |
| SILVER | NV | S | | | | |
| #STYRENE | V | L | 3.1E+05 | 3.1E+05 | 3.1E+05 | 3.1E+05 |
| tert-BUTYL ALCOHOL | | | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) |
| TETRACHLOROETHANE, 1,1,1,2- | V | L | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) |
| TETRACHLOROETHANE, 1,1,2,2- | V | L | 1.9E+02 | 3.1E+02 | 6.3E+02 | 1.0E+03 |
| TETRACHLOROETHYLENE | V | L | 1.3E+02 | 5.2E+02 | 4.3E+02 | 1.7E+03 |
| THALLIUM | NV | S | | | | |
| #TOLUENE | V | L | 5.0E+05 | 5.3E+05 | 5.3E+05 | 5.3E+05 |
| TOXAPHENE | NV | S | | | | |
| TPH (gasolines) | V | L | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) |
| TPH (middle distillates) | V | L | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) | (NV: Use soil gas) |
| TPH (residual fuels) | NV | L/S | | | | |
| TRICHLOROBENZENE, 1,2,4- | V | L | 1.5E+05 | 2.6E+05 | 3.0E+05 | 3.0E+05 |
| TRICHLOROETHANE, 1,1,1- | V | L | 1.3E+05 | 5.2E+05 | 3.6E+05 | 1.3E+06 |
| TRICHLOROETHANE, 1,1,2- | V | L | 3.5E+02 | 8.0E+02 | 1.2E+03 | 2.7E+03 |
| TRICHLOROETHYLENE | V | L | 5.3E+02 | 2.1E+03 | 1.8E+03 | 6.9E+03 |
| TRICHLOROPHENOL, 2,4,5- | V | S | 8.2E+05 | 8.2E+05 | 1.2E+06 | 1.2E+06 |

# TABLE E-1a. GROUNDWATER SCREENING LEVELS FOR EVALUATION OF POTENTIAL INDOOR-AIR IMPACTS (volatile chemicals only)

| CHEMICAL PARAMETER | Physical State | | Residential Land Use | | Commercial/Industrial Land Use | |
|---|---|---|---|---|---|---|
| | | | Vadose-Zone Soil Type | | Vadose-Zone Soil Type | |
| | | | *High Permeability (ug/L) | *Low/Moderate Permeability (ug/L) | *High Permeability (ug/L) | *Low/Moderate Permeability (ug/L) |
| TRICHLOROPHENOL, 2,4,6- | NV | S | | | | |
| VANADIUM | NV | S | | | | |
| VINYL CHLORIDE | V | G | 4.0E+00 | 1.7E+01 | 1.3E+01 | 5.7E+01 |
| #XYLENES | V | L | 1.5E+05 | 1.6E+05 | 1.6E+05 | 1.6E+05 |
| ZINC | NV | S | | | | |

Notes:

1. "Residential" screening levels generally considered adequate for other sensitive uses (e.g., day-care centers, hospitals, etc.).
2. High permeability soil model: One meter dry sandy soil (92% sand, 5% silt, 3% clay) over one meter moist clayey loam (33% sand, 34% silt, 33% clay).
3. Low/Moderate permeability soil model: One meter dry loamy sand (83% sand, 11% silt, 6% clay) over one meter moist silt (7% sand, 87% silt, 6% clay)
4. For inclusion in Tier 1 screening levels, all groundwater assumed to potentially migrate under a residential area. Screening levels for protection of indoor air under a residential exposure scenario carried forward for use at both residential and commercial/industrial sites (see Table F series).

Screening levels calculated using spreadsheet provided with *User's Guide for the Johnson and Ettinger Indoor Air model (1991) for Subsurface Vapor* Intrusion Into Buildings (USEPA 2001). Assumed vadose-zone thickness/depth to groundwater three meters. See Appendix 1 text for model details.
Physical state of chemical at ambient conditions (V - volatile, NV - nonvolatile, S -id, L - liquid, G - gas).
Chemical considered to be "volatile" if Henry's number (atm m3/mole) >0.00001 and molecular weight <200.
Dibromochloromethane, dibromochloropropane and pyrene considered volatile for purposes of modeling (USEPA 2002).
Target cancer risk = 1E-06, Target Hazard Quotient = 0.2
"#": Nonchlorinated VOCs (except MTBE) adjusted upwards by factor of ten to account for assumed biodegradation in vadose-zone prior to emision at surface.
NV: No value. Use soil gas data to evaluate potential indoor-air impact concerns.

CAMBRIA

# ATTACHMENT D

## Natural Attenuation Analysis

**Concentration Data for Well MW-1, Former Texaco Site 211285, 15595 Washington Street, San Lorenzo, California**

Raw Data

| Date | GWE | TPH-G (ug/L) | MTBE (ug/L) |
|---|---|---|---|
| 12/12/1992 | | 720 | |
| 3/24/1994 | 14.22 | 1,300 | |
| 12/15/1995 | 14.44 | 350 | |
| 8/26/1998 | 13.66 | <500 | 340,000 |
| 1/26/1999 | 15.00 | <50000 | 269,000 |
| 4/6/1999 | 14.95 | 3,500 | 117,000 |
| 5/24/2000 | 14.81 | 33,000 | 74,000 |
| 8/24/2000 | 13.62 | 11,000 | 32,000 |
| 11/22/2000 | 13.77 | 24,000 | 35,000 |
| 2/22/2001 | 15.19 | 19,000 | 51,000 |
| 5/29/2001 | 14.09 | 30,000 | 110,000 |
| 8/24/2001 | 13.39 | 46,000 | 70,000 |
| 12/6/2001 | 14.69 | 25,000 | 37,000 |
| 3/25/2002 | 15.21 | 770 | 20,000 |

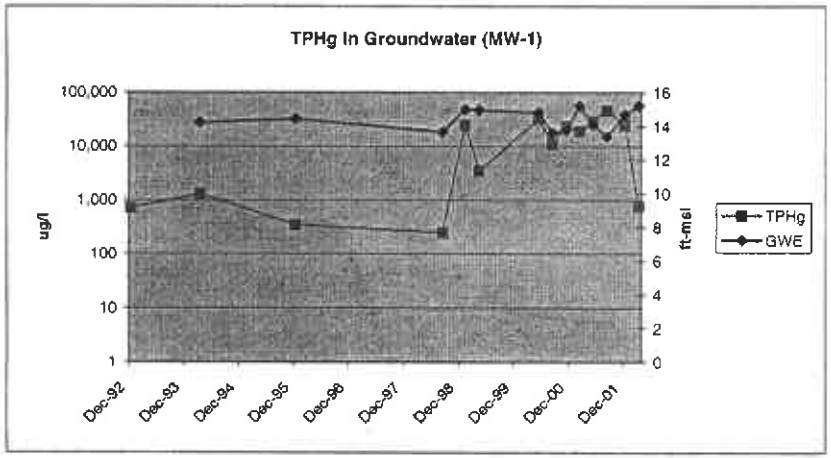
Edited Data

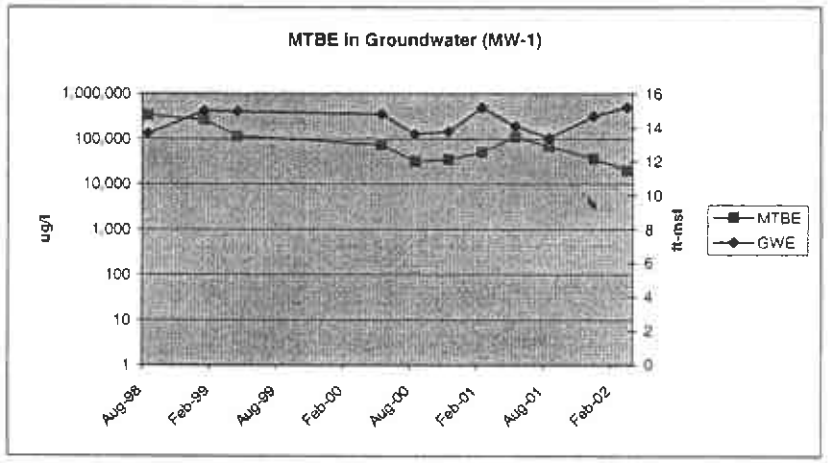
| Date | GWE | TPH-G (ug/L) | MTBE (ug/L) |
|---|---|---|---|
| 12/12/1992 | | 720 | |
| 3/24/1994 | 14.22 | 1,300 | |
| 12/15/1995 | 14.44 | 350 | |
| 8/26/1998 | 13.66 | 250 | 340,000 |
| 1/26/1999 | 15.00 | 25,000 | 269,000 |
| 4/6/1999 | 14.95 | 3,500 | 117,000 |
| 5/24/2000 | 14.81 | 33,000 | 74,000 |
| 8/24/2000 | 13.62 | 11,000 | 32,000 |
| 11/22/2000 | 13.77 | 24,000 | 35,000 |
| 2/22/2001 | 15.19 | 19,000 | 51,000 |
| 5/29/2001 | 14.09 | 30,000 | 110,000 |
| 8/24/2001 | 13.39 | 46,000 | 70,000 |
| 12/6/2001 | 14.69 | 25,000 | 37,000 |
| 3/25/2002 | 15.21 | 770 | 20,000 |

| Days Since 5/24/2000 | TPH-G (ug/L) |
|---|---|
| 0 | 33,000 |
| 92 | 11,000 |
| 182 | 24,000 |
| 274 | 19,000 |
| 370 | 30,000 |
| 457 | 46,000 |
| 561 | 25,000 |
| 670 | 770 |

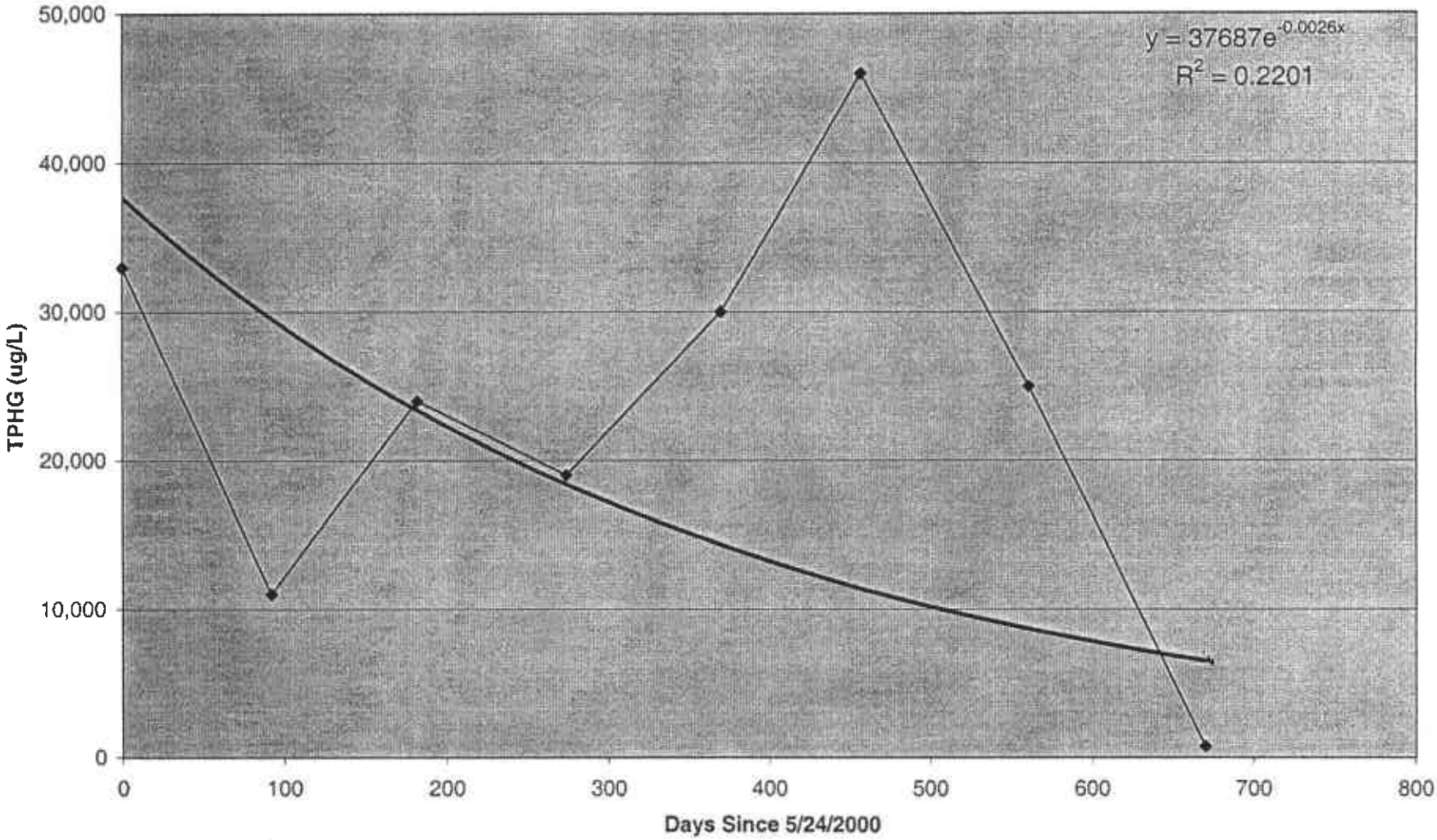
| Days Since 8/26/1998 | MTBE (ug/L) |
|---|---|
| 0 | 340,000 |
| 153 | 269,000 |
| 223 | 117,000 |
| 637 | 74,000 |
| 729 | 32,000 |
| 819 | 35,000 |
| 911 | 51,000 |
| 1,007 | 110,000 |
| 1,094 | 70,000 |
| 1,198 | 37,000 |
| 1,307 | 20,000 |

Assumed <x = x/2



**TPHg Concentrations in Groundwater (Well MW-1)**
**Former Texaco Station 211285, 15595 Washington Street, San Lorenzo, CA**



## Predicted Time to Cleanup of TPHg in Well MW-1, Former Texaco Site 211285, 15595 Washington Street, San Lorenzo, California

**Calculate "time to cleanup" given the first-order decay equation:**

$y = b e^{ax}$ ==> $x = \ln(y/b) / a$

| | |
|---|---|
| Site: | Former Texaco Site 211358 |
| Well: | MW-1 |
| Constituent: | TPHg |

$y = 37687\ e^{-0.0026x}$ ==> $x = \ln(y/37687) / -0.0026$

**Given**

| | | | |
|---|---|---|---|
| Water Quality Objective: | y | 50 | ug/L |
| Constant: | b | 37687 | |
| Constant: | a | -0.0026 | |
| Date of first sample: | | 5/24/2000 | |

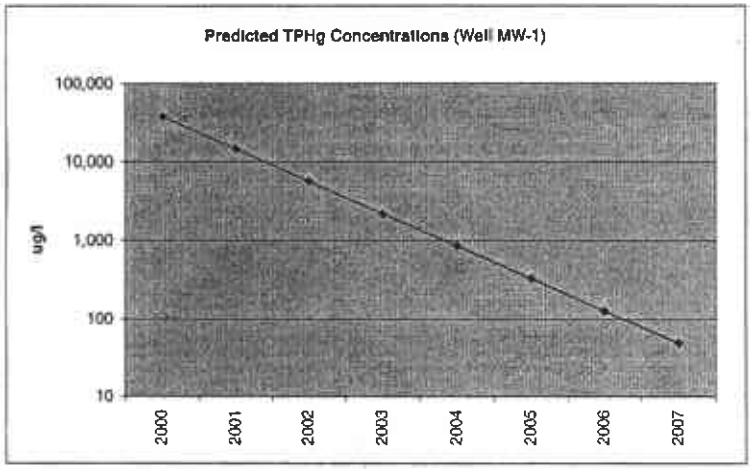
**Calculate**

| | | | |
|---|---|---|---|
| Days from first sample: | x | 2,548 | Days |
| Years from first sample: | | 7.0 | Years |
| Estimated date of cleanup: | | May-2007 | |

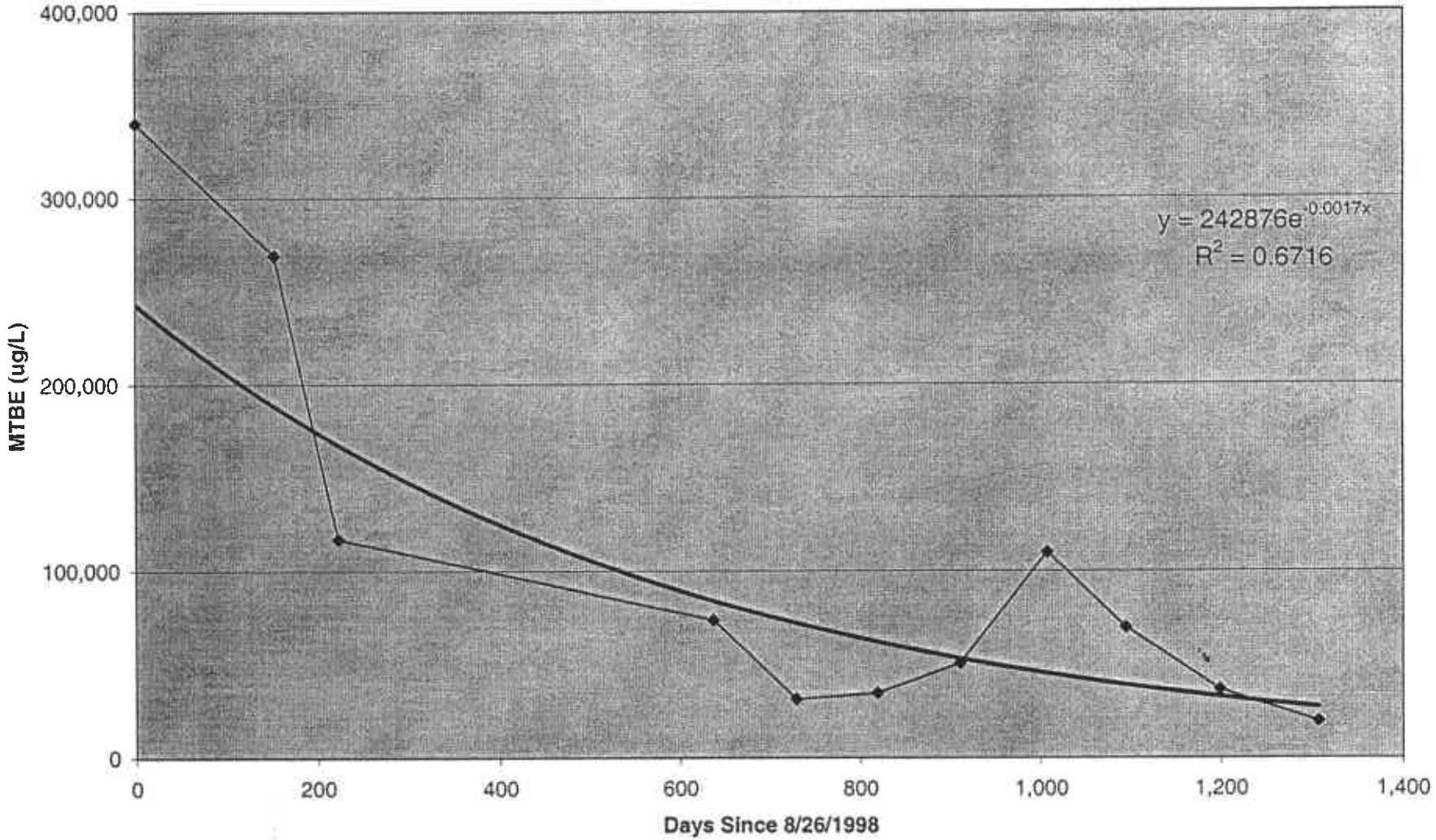
Calculated Half Life = -ln(2)/a = 267 Days

**Concentration Trend Prediction**

| Date | Days from First Sample | Predicted Concentration (ug/l) |
|---|---|---|
| 5/24/2000 | 0 | 37,687 |
| 5/24/2001 | 365 | 14,590 |
| 5/24/2002 | 730 | 5,648 |
| 5/24/2003 | 1,095 | 2,187 |
| 5/24/2004 | 1,461 | 844 |
| 5/24/2005 | 1,826 | 327 |
| 5/24/2006 | 2,191 | 127 |
| 5/24/2007 | 2,556 | 49 |



**MTBE Concentrations in Groundwater (Well MW-1)**
**Former Texaco Station 211285, 15595 Washington Street, San Lorenzo, CA**



## Predicted Time to Cleanup of MTBE in Well MW-1, Former Texaco Site 211285, 15595 Washington Street, San Lorenzo, California

Calculate "time to cleanup" given the first-order decay equation:

$y = b e^{ax}$ ==> $x = \ln(y/b) / a$

Site: Former Texaco Site 211258
Well: MW-1
Constituent: MTBE

$y = 242876\, e^{-0.0017x}$ ==> $x = \ln(y/242876) / -0.0017$

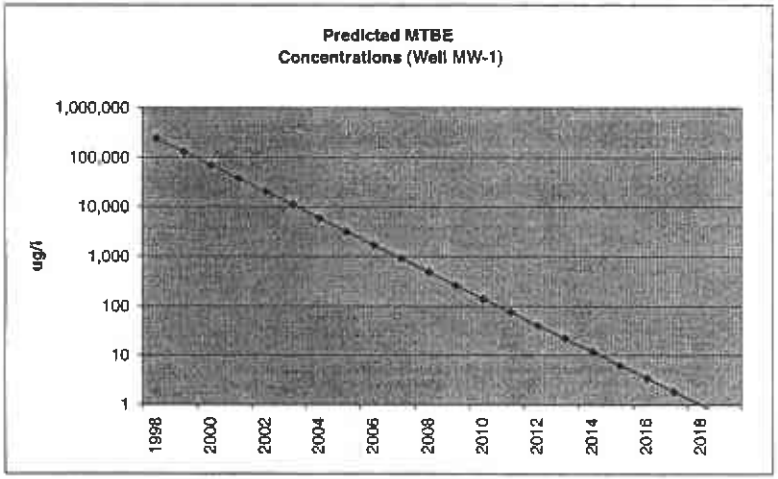
Given

| | | |
|---|---|---|
| Water Quality Objective: | y | 5 ug/L |
| Constant: | b | 242876 |
| Constant: | a | -0.0017 |
| Date of first sample: | | 8/26/1998 |

Calculate

| | | |
|---|---|---|
| Days from first sample: | x | 6,348 Days |
| Years from first sample: | | 17.4 Years |
| Estimated date of cleanup: | | Jan-2016 |

Calculated Half Life = -ln(2)/a
408 Days




**Concentration Trend Prediction**

| Date | Days from First Sample | Predicted Concentration (ug/l) |
|---|---|---|
| 8/26/1998 | 0 | 242,876 |
| 8/26/1999 | 365 | 130,588 |
| 8/26/2000 | 731 | 70,095 |
| 8/26/2001 | 1,096 | 37,688 |
| 8/26/2002 | 1,461 | 20,264 |
| 8/26/2003 | 1,826 | 10,896 |
| 8/26/2004 | 2,192 | 5,848 |
| 8/26/2005 | 2,557 | 3,144 |
| 8/26/2006 | 2,922 | 1,691 |
| 8/26/2007 | 3,287 | 909 |
| 8/26/2008 | 3,653 | 488 |
| 8/26/2009 | 4,018 | 262 |
| 8/26/2010 | 4,383 | 141 |
| 8/26/2011 | 4,748 | 76 |
| 8/26/2012 | 5,114 | 41 |
| 8/26/2013 | 5,479 | 22 |
| 8/26/2014 | 5,844 | 12 |
| 8/26/2015 | 6,209 | 6.3 |
| 8/26/2016 | 6,575 | 3.4 |
| 8/26/2017 | 6,940 | 1.8 |
| 8/26/2018 | 7,305 | 1.0 |
| 8/26/2019 | 7,670 | 0.5 |

**Concentration Data for Well MW-2, Former Texaco Site 211285, 15595 Washington Street, San Lorenzo, California**

Raw Data

| Date | GWE | TPH-G (ug/L) | MTBE (ug/L) |
|---|---|---|---|
| 11/12/1992 | | <10 | |
| 3/24/1994 | 14.22 | <50 | |
| 12/15/1995 | 17.47 | <50 | |
| 8/26/1998 | 13.67 | <50 | 210,000 |
| 1/26/1999 | 14.78 | <2000 | 9,450 |
| 4/6/1999 | 14.79 | <1000 | 209,000 |
| 5/24/2000 | 14.72 | 46,000 | 180,000 |
| 8/24/2000 | 13.55 | 21,000 | 70,000 |
| 11/22/2000 | 13.70 | 29,000 | 43,000 |
| 2/22/2001 | 15.42 | 20,000 | 61,000 |
| 5/29/2001 | 14.04 | 9,100 | 24,000 |
| 8/24/2001 | 13.32 | 8,700 | 12,000 |
| 12/6/2001 | 14.66 | 11,000 | 22,000 |
| 3/25/2002 | 15.08 | <50 | 25,000 |

Edited Data

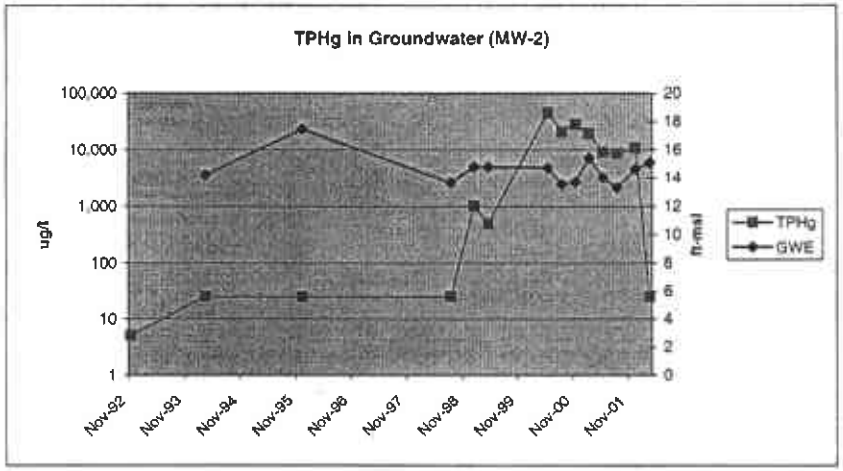
| Date | GWE | TPH-G (ug/L) | MTBE (ug/L) |
|---|---|---|---|
| 11/12/1992 | | 5 | |
| 3/24/1994 | 14.22 | 25 | |
| 12/15/1995 | 17.47 | 25 | |
| 8/26/1998 | 13.67 | 25 | 210,000 |
| 1/26/1999 | 14.78 | 1,000 | 9,450 |
| 4/6/1999 | 14.79 | 500 | 209,000 |
| 5/24/2000 | 14.72 | 46,000 | 180,000 |
| 8/24/2000 | 13.55 | 21,000 | 70,000 |
| 11/22/2000 | 13.70 | 29,000 | 43,000 |
| 2/22/2001 | 15.42 | 20,000 | 61,000 |
| 5/29/2001 | 14.04 | 9,100 | 24,000 |
| 8/24/2001 | 13.32 | 8,700 | 12,000 |
| 12/6/2001 | 14.66 | 11,000 | 22,000 |
| 3/25/2002 | 15.08 | 25 | 25,000 |

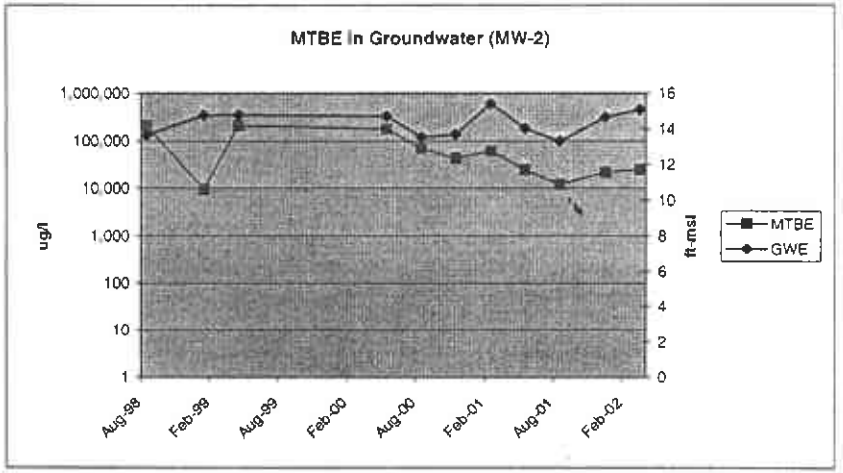
| Days Since 5/24/2000 | TPH-G (ug/L) |
|---|---|
| 0 | 46,000 |
| 92 | 21,000 |
| 182 | 29,000 |
| 274 | 20,000 |
| 370 | 9,100 |
| 457 | 8,700 |
| 561 | 11,000 |
| 670 | 25 |

| Days Since 4/6/1999 | MTBE (ug/L) |
|---|---|
| 0 | 209,000 |
| 414 | 200,000 |
| 506 | 170,000 |
| 596 | 160,000 |
| 688 | 130,000 |
| 784 | 78,000 |
| 871 | 98,000 |
| 975 | 94,000 |
| 1,084 | 62,000 |

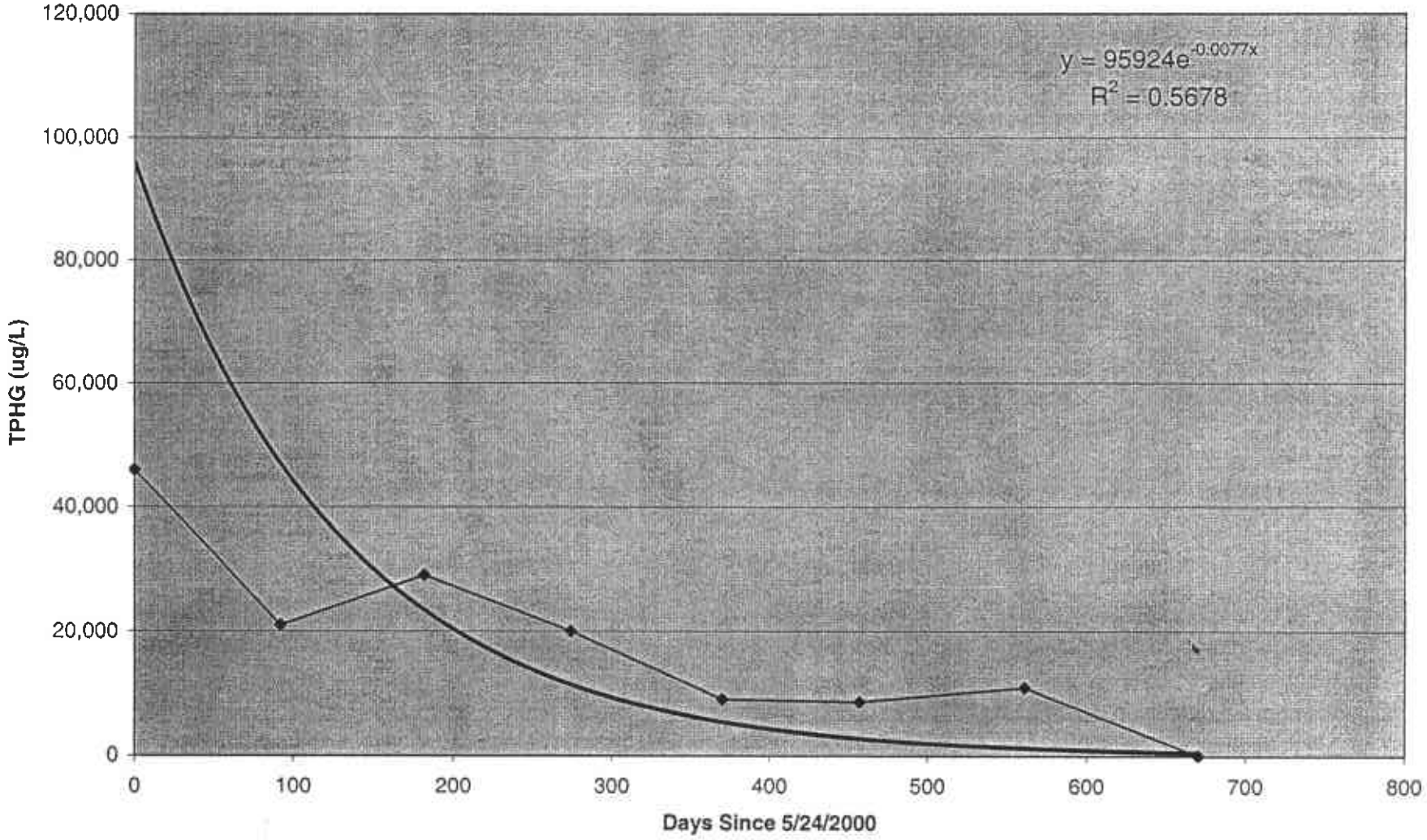
Assumed <x = x/2

Used this data set because the 1/26/1999 data appears anomalous and disrupts the curve substantially



**TPHg Concentrations in Groundwater (Well MW-2)**
**Former Texaco Station 211285, 15595 Washington Street, San Lorenzo, CA**



## Predicted Time to Cleanup of TPHg in Well MW-2, Former Texaco Site 211285, 15595 Washington Street, San Lorenzo, California

**Calculate "time to cleanup" given the first-order decay equation:**

$y = b e^{ax}$ ==> $x = \ln(y/b) / a$

Site: Former Texaco Site 211258
Well: MW-2
Constituent: TPHg

$y = 95924\ e^{-0.0077x}$ ==> $x = \ln(y/95924) / -0.0077$

Given

| | | | |
|---|---|---|---|
| Water Quality Objective: | y | 50 | ug/L |
| Constant: | b | 95924 | |
| Constant: | a | -0.0077 | |
| Date of first sample: | | 5/24/2000 | |

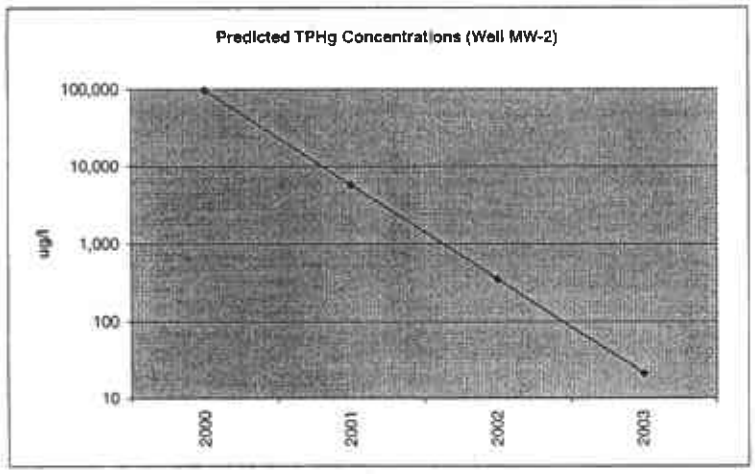
Calculate

| | | | |
|---|---|---|---|
| Days from first sample: | x | 982 | Days |
| Years from first sample: | | 2.7 | Years |
| Estimated date of cleanup: | | Jan-2003 | |

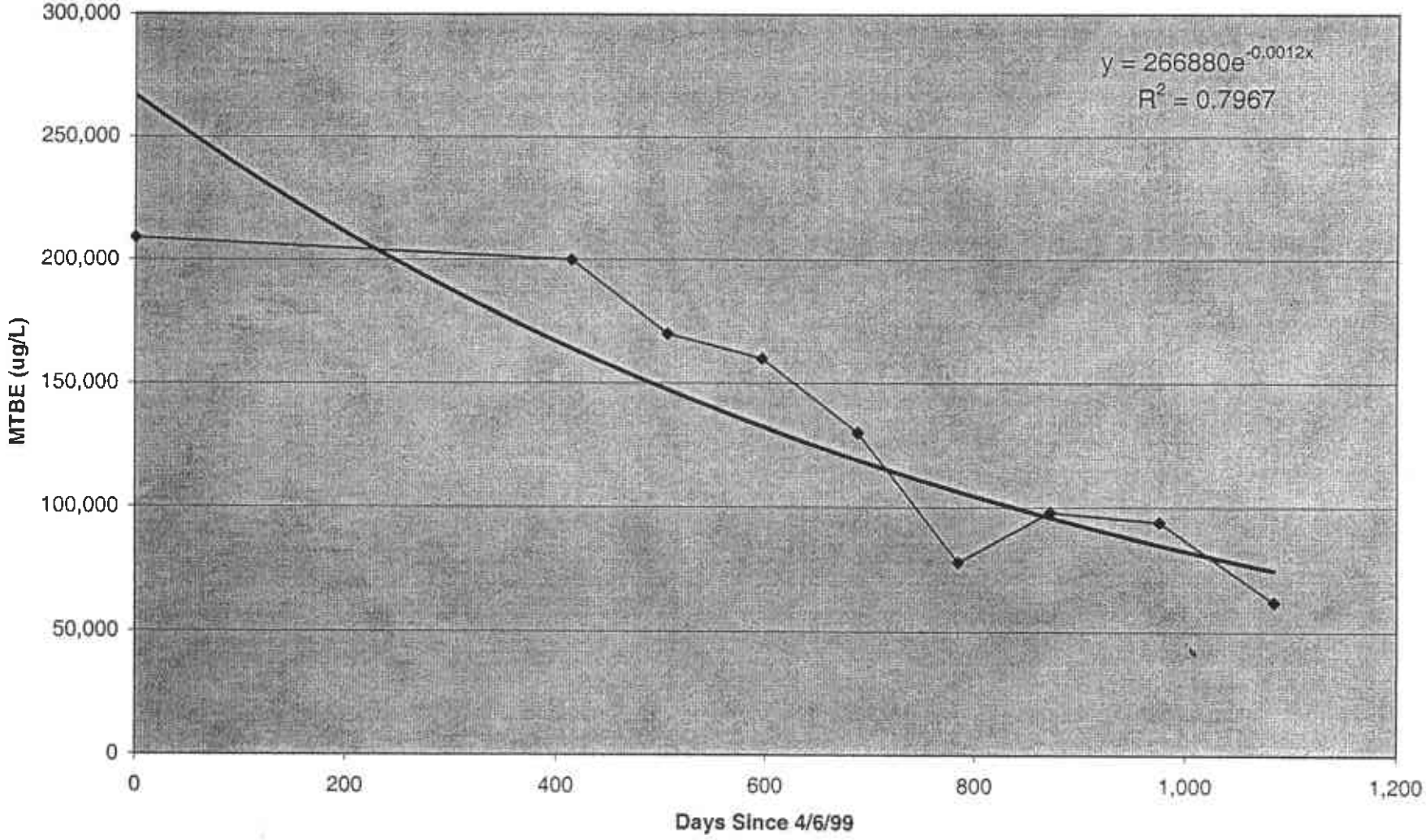
Calculated Half Life = -ln(2)/a
90 Days

**Concentration Trend Prediction**

| Date | Days from First Sample | Predicted Concentration (ug/l) |
|---|---|---|
| 5/24/2000 | 0 | 95,924 |
| 5/24/2001 | 365 | 5,772 |
| 5/24/2002 | 730 | 347 |
| 5/24/2003 | 1,095 | 21 |



**MTBE Concentrations in Groundwater (Well MW-2)**
**Former Texaco Station 211285, 15595 Washington Street, San Lorenzo, CA**



## Predicted Time to Cleanup of MTBE in Well MW-2, Former Texaco Site 211285, 15595 Washington Street, San Lorenzo, California

**Calculate "time to cleanup" given the first-order decay equation:**

$y = b\,e^{ax}$ ==> $x = \ln(y/b) / a$

Site: Former Texaco Site 211285
Well: MW-2
Constituent: MTBE

$y = 266880\ e^{-0.0012x}$ ==> $x = \ln(y/266880) / -0.0012$

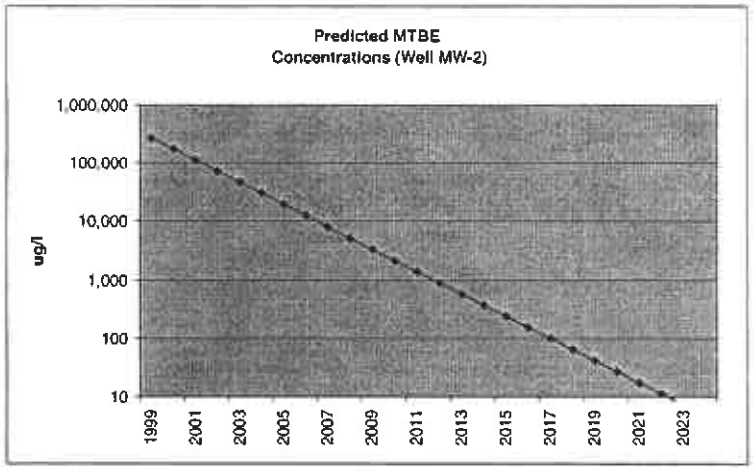
Given

| | | | |
|---|---|---|---|
| Water Quality Objective: | y | 5 | ug/L |
| Constant: | b | 266880 | |
| Constant: | a | -0.0012 | |
| Date of first sample: | | 4/6/1999 | |

Calculate

| | | | |
|---|---|---|---|
| Days from first sample: | x | 9,071 | Days |
| Years from first sample: | | 24.9 | Years |
| Estimated date of cleanup: | | Feb-2024 | |

Calculated Half Life = -ln(2)/a = 578 Days




**Concentration Trend Prediction**

| Date | Days from First Sample | Predicted Concentration (ug/l) |
|---|---|---|
| 4/6/1999 | 0 | 266,880 |
| 4/6/2000 | 366 | 172,018 |
| 4/6/2001 | 731 | 111,008 |
| 4/6/2002 | 1,096 | 71,636 |
| 4/6/2003 | 1,461 | 46,229 |
| 4/6/2004 | 1,827 | 29,797 |
| 4/6/2005 | 2,192 | 19,229 |
| 4/6/2006 | 2,557 | 12,409 |
| 4/6/2007 | 2,922 | 8,008 |
| 4/6/2008 | 3,288 | 5,161 |
| 4/6/2009 | 3,653 | 3,331 |
| 4/6/2010 | 4,018 | 2,149 |
| 4/6/2011 | 4,383 | 1,387 |
| 4/6/2012 | 4,749 | 894 |
| 4/6/2013 | 5,114 | 577 |
| 4/6/2014 | 5,479 | 372 |
| 4/6/2015 | 5,844 | 240 |
| 4/6/2016 | 6,210 | 154.9 |
| 4/6/2017 | 6,575 | 99.9 |
| 4/6/2018 | 6,940 | 64.5 |
| 4/6/2019 | 7,305 | 41.6 |
| 4/6/2020 | 7,671 | 26.8 |
| 4/6/2021 | 8,036 | 17.3 |
| 4/6/2022 | 8,401 | 11.2 |
| 4/6/2023 | 8,766 | 7.2 |
| 4/6/2024 | 9,132 | 4.6 |

**Concentration Data for Well MW-3, Former Texaco Site 211285, 15595 Washington Street, San Lorenzo, California**

Raw Data

| Date | GWE | TPH-G (ug/L) | MTBE (ug/L) |
|---|---|---|---|
| 11/12/1992 | | 69 | |
| 3/24/1994 | 14.04 | <50 | |
| 12/15/1995 | 14.42 | <50 | |
| 8/26/1998 | 13.45 | <500 | 99,000 |
| 1/26/1999 | 14.74 | <500 | 19,800 |
| 4/6/1999 | 14.74 | <1000 | 151,000 |
| 5/24/2000 | 14.48 | 48,000 | 200,000 |
| 8/24/2000 | 13.32 | 52,000 | 170,000 |
| 11/22/2000 | 13.48 | 69,000 | 160,000 |
| 2/22/2001 | 14.98 | 30,000 | 130,000 |
| 5/29/2001 | 13.80 | 29,000 | 78,000 |
| 8/24/2001 | 13.10 | 37,000 | 98,000 |
| 12/6/2001 | 14.50 | 33,000 | 94,000 |
| 3/25/2002 | 14.94 | <50 | 62,000 |

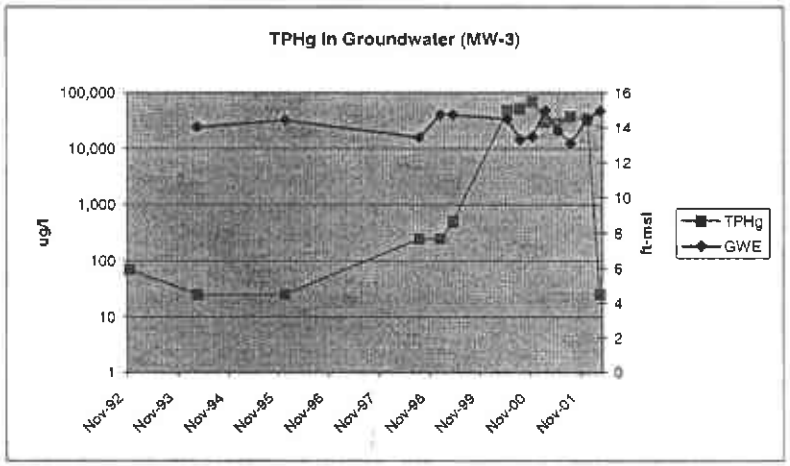
Edited Data

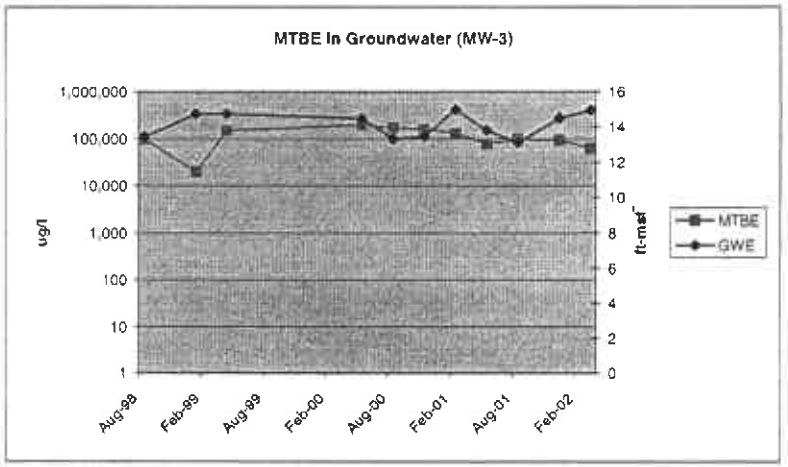
| Date | GWE | TPH-G (ug/L) | MTBE (ug/L) |
|---|---|---|---|
| 11/12/1992 | | 69 | |
| 3/24/1994 | 14.04 | 25 | |
| 12/15/1995 | 14.42 | 25 | |
| 8/26/1998 | 13.45 | 250 | 99,000 |
| 1/26/1999 | 14.74 | 250 | 19,800 |
| 4/6/1999 | 14.74 | 500 | 151,000 |
| 5/24/2000 | 14.48 | 48,000 | 200,000 |
| 8/24/2000 | 13.32 | 52,000 | 170,000 |
| 11/22/2000 | 13.48 | 69,000 | 160,000 |
| 2/22/2001 | 14.98 | 30,000 | 130,000 |
| 5/29/2001 | 13.80 | 29,000 | 78,000 |
| 8/24/2001 | 13.10 | 37,000 | 98,000 |
| 12/6/2001 | 14.50 | 33,000 | 94,000 |
| 3/25/2002 | 14.94 | 25 | 62,000 |

| Days Since 11/22/2000 | TPH-G (ug/L) |
|---|---|
| 0 | 69,000 |
| 92 | 30,000 |
| 188 | 29,000 |
| 275 | 37,000 |
| 379 | 33,000 |
| 488 | 25 |

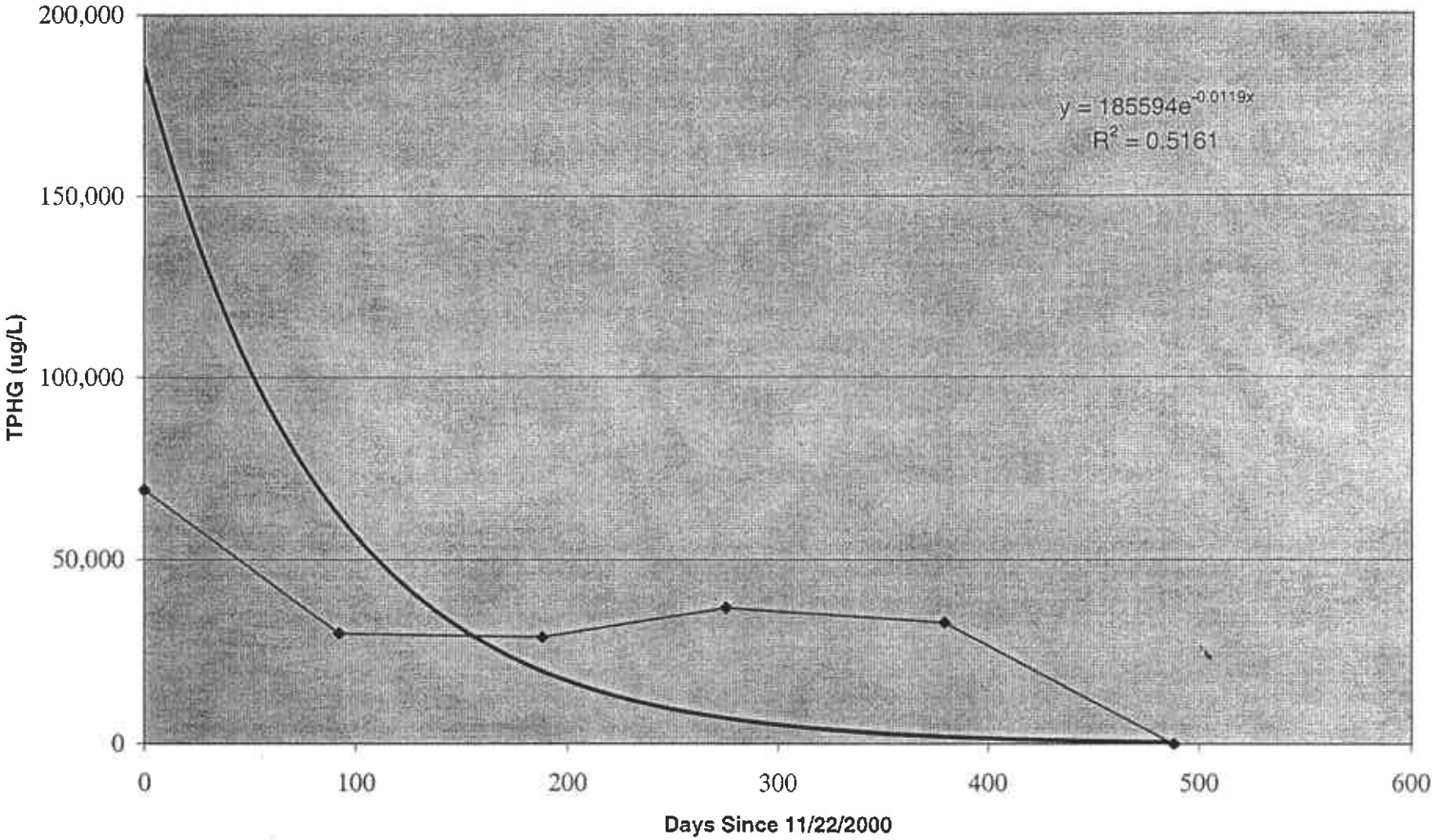
| Days Since 5/24/2000 | MTBE (ug/L) |
|---|---|
| 0 | 200,000 |
| 92 | 170,000 |
| 182 | 160,000 |
| 274 | 130,000 |
| 370 | 78,000 |
| 457 | 98,000 |
| 561 | 94,000 |
| 670 | 62,000 |

Assumed <x = x/2



**TPHg Concentrations in Groundwater (Well MW-3)**
**Former Texaco Station 211285, 15595 Washington Street, San Lorenzo, CA**



## Predicted Time to Cleanup of TPHg in Well MW-3, Former Texaco Site 211285, 15595 Washington Street, San Lorenzo, California

Calculate "time to cleanup" given the first-order decay equation:

$y = b e^{ax}$ ===> $x = \ln(y/b) / a$

Site: Former Texaco Site 211258
Well: MW-3
Constituent: TPHg

$y = 185594\, e^{-0.0119x}$ ===> $x = \ln(y/185594) / -0.0119$

Given

| | | |
|---|---|---|
| Water Quality Objective: | y | 50 ug/L |
| Constant: | b | 185594 |
| Constant: | a | -0.0119 |
| Date of first sample: | | 5/24/2000 |

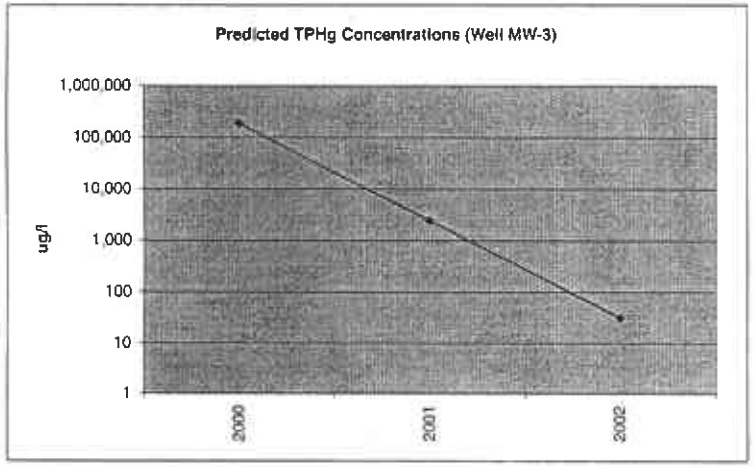
Calculate

| | | |
|---|---|---|
| Days from first sample: | x | 691 Days |
| Years from first sample: | | 1.9 Years |
| Estimated date of cleanup: | | Apr-2002 |

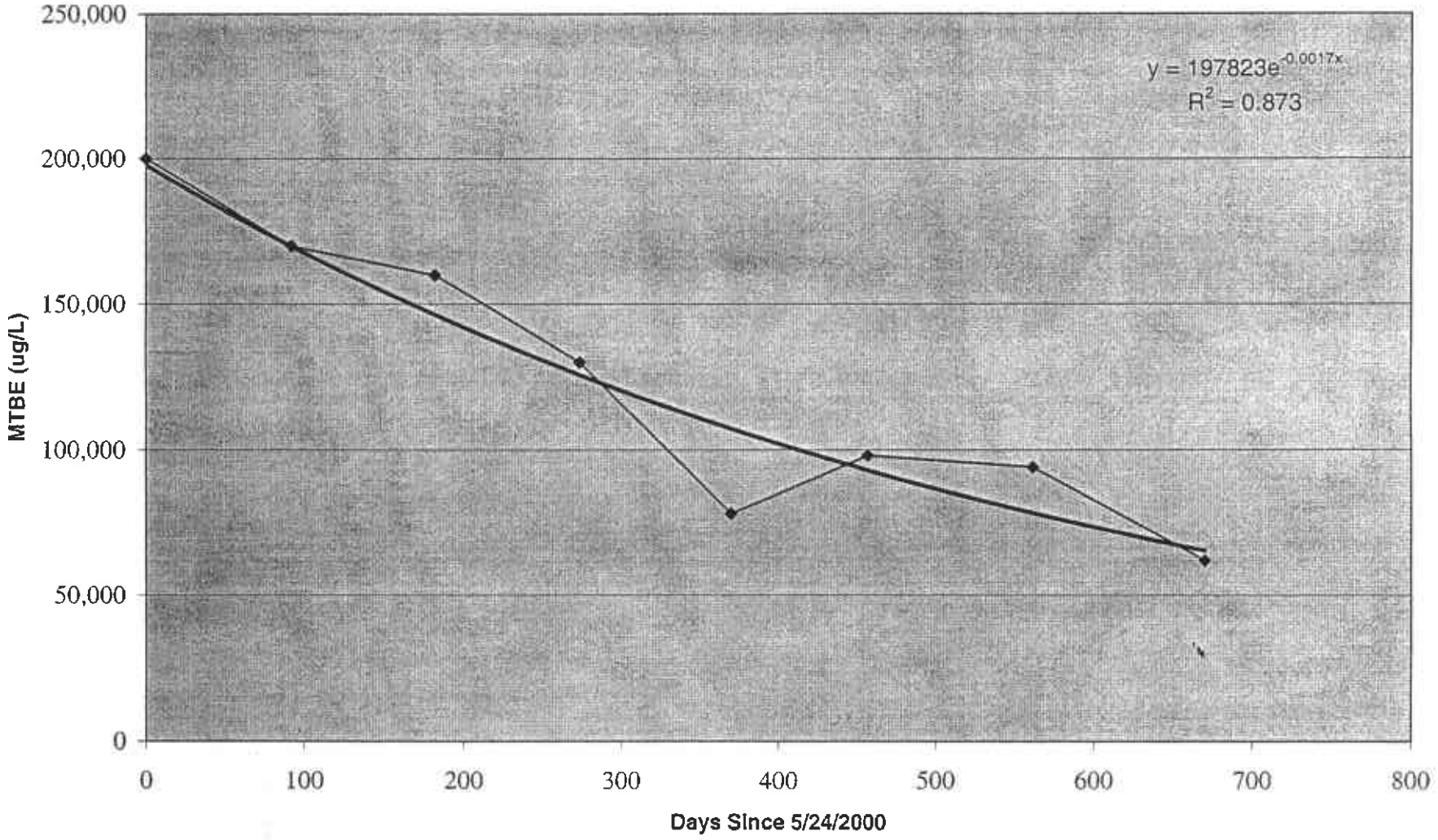
Calculated Half Life = -ln(2)/a
58 Days

**Concentration Trend Prediction**

| Date | Days from First Sample | Predicted Concentration (ug/l) |
|---|---|---|
| 5/24/2000 | 0 | 185.594 |
| 5/24/2001 | 365 | 2.411 |
| 5/24/2002 | 730 | 31 |



**MTBE Concentrations in Groundwater (Well MW-3)**
**Former Texaco Station 211285, 15595 Washington Street, San Lorenzo, CA**



## Predicted Time to Cleanup of MTBE in Well MW-3, Former Texaco Site 211285, 15595 Washington Street, San Lorenzo, California

**Calculate "time to cleanup" given the first-order decay equation:**

$y = b\,e^{ax}$ ==> $x = \ln(y/b) / a$

| | |
|---|---|
| Site: | Former Texaco Site 211258 |
| Well: | MW-3 |
| Constituent: | MTBE |

$y = 197823\ e^{-0.0017x}$ ==> $x = \ln(y/197823) / -0.0017$

**Given**

| | | | |
|---|---|---|---|
| Water Quality Objective: | y | 5 | ug/L |
| Constant: | b | 197823 | |
| Constant: | a | -0.0017 | |
| Date of first sample: | | 5/24/2000 | |

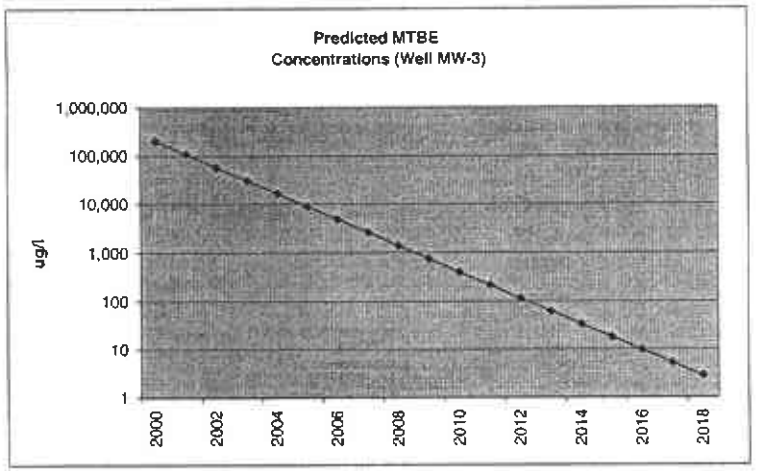
**Calculate**

| | | | |
|---|---|---|---|
| Days from first sample: | x | 6,227 | Days |
| Years from first sample: | | 17.1 | Years |
| Estimated date of cleanup: | | Jun-2017 | |

Calculated Half Life = $-\ln(2)/a$ = 408 Days

**Concentration Trend Prediction**

| Date | Days from First Sample | Predicted Concentration (ug/l) |
|---|---|---|
| 5/24/2000 | 0 | 197,823 |
| 5/24/2001 | 365 | 106,365 |
| 5/24/2002 | 730 | 57,190 |
| 5/24/2003 | 1,095 | 30,749 |
| 5/24/2004 | 1,461 | 16,505 |
| 5/24/2005 | 1,826 | 8,874 |
| 5/24/2006 | 2,191 | 4,772 |
| 5/24/2007 | 2,556 | 2,566 |
| 5/24/2008 | 2,922 | 1,377 |
| 5/24/2009 | 3,287 | 740 |
| 5/24/2010 | 3,652 | 398 |
| 5/24/2011 | 4,017 | 214 |
| 5/24/2012 | 4,383 | 115 |
| 5/24/2013 | 4,748 | 62 |
| 5/24/2014 | 5,113 | 33 |
| 5/24/2015 | 5,478 | 18 |
| 5/24/2016 | 5,844 | 10 |
| 5/24/2017 | 6,209 | 5.2 |
| 5/24/2018 | 6,574 | 2.8 |



**Predicted BTX Concentrations in SB-1, Former Texaco Site 211285, 15595 Washington Street, San Lorenzo, California**

Site: Former Texaco Site 211285
Well: SB-1
Constituent: Benzene, Toluene and Xylenes

| | MW-1 TPHg | MW-1 MTBE | MW-2 TPHg | MW-2 MTBE | MW-3 TPHg | MW-3 MTBE | |
|---|---|---|---|---|---|---|---|
| Predicted Half-Life: | 267 | 408 | 90 | 578 | 58 | 408 | (from spreadsheets) |

Average half-life: 302 days

Assumed Half Life: 302 Days

| | Predicted Concentration | | | |
|---|---|---|---|---|
| Date | Benzene | Toluene | Xylenes | |
| 8/8/1996 | 220 | 390 | 680 | (Initial Concentration) |
| 6/6/1997 | 110 | 195 | 340 | |
| 4/4/1998 | 55 | 97.5 | 170 | |
| 1/31/1999 | 28 | 49 | 85 | |
| 11/29/1999 | 14 | 24 | 43 | |
| 9/26/2000 | 6.9 | 12 | 21 | |
| 7/25/2001 | 3.4 | 6.1 | 11 | |
| 5/23/2002 | 1.7 | 3.0 | 5.3 | |
| 3/21/2003 | 0.9 | 1.5 | 2.7 | |
| 1/17/2004 | | 0.8 | 1.3 | |
| 11/14/2004 | | | 0.7 | |