RISK MANAGEMENT PLAN

#607

Former Signal Bulk Plan
2001 Versailles Avenue
Alameda, California

Oct 3, 97

Prepared for:
Chevron Products Company
San Ramon, California

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October 3, 1997

CONTENTS

1.0 INTRODUCTION

A corrective action evaluation was done for the site of the Former Signal Bulk Plant located at 2001 Versailles Avenue, Alameda, California. The evaluation was completed on behalf of Chevron U.S.A. Products Company by Touchstone Developments, and presented in a document titled "*Corrective Action Evaluation RBCA Tier 1*". The document was reviewed by the Alameda County Environmental Health Services (ACEHS), and in a letter dated July 3, 1997, they agreed with the conclusions of the evaluation stating, "the site poses little threat to human health or the environment".

To further clarify the status of the site, a meeting took pace between the ACEHS and Chevron on August 21, 1997. The ACEHS summarized the proceedings of the meeting in a letter dated August 21, 1997, and noted that site closure would be initiated. They also requested a risk management plan (RMP) be prepared because residual soil impact would be left in-place. Finally, the ACEHS requested that an example health and safety plan, focused on subsurface construction, be included in the RMP.

This document provides the RMP for the site as well as an example health and safety plan. In Section 2, the compounds of concern, risk, and sources of risk are summarized. In Section 3, risk management measures are developed. The corrective action evaluation that serves as a basis for this work is given in Appendix A, and figures showing the site location and relevant site features are provided in Appendix B. Appendix C contains the example health and safety plan.

2.0 RISK SUMMARY

2.1 Data

Data considered in preparing this RMP were summarized by Touchstone Developments in their document titled *Corrective Action Evaluation RBCA Tier 1* (Appendix A). The summarized data were generated by Harding Lawson Associates, Kleinfelder, and Touchstone Developments. Only soil data is examined here, since the focus of this RMP is the risk associated with hydrocarbon-affected soil left in-place at the site. Figures showing the hydrocarbon-affected areas are provided in Appendix B. Observations regarding the data are listed below.

- With one exception, data used to complete the Risk-Based Corrective Action (RBCA) Tier 1 evaluation is from the analyses of soil samples collected in 1990. The exception is data from 1995. It is likely that since 1990 biodegradation, as well as other natural attenuation mechanisms, have further reduced hydrocarbon concentrations in soil. Use of the historical data in the risk assessment assures a conservative outcome.

- The limited occurrence of hydrocarbons in soil, and low concentrations, infer that the mass of hydrocarbons in soil beneath the site is relatively small. Out of 31 soil samples analyzed for gasoline range total petroleum hydrocarbons (TPHg), only 14 samples contained hydrocarbons. Similarly, only 7 of 42 samples analyzed for benzene contained the compound. Considering only data for soil samples collected in 1995, the maximum TPHg concentration was 470 parts per million (ppm) and the maximum benzene concentration was 1.1 ppm. This observation considers only the most mobile constituents of the petroleum hydrocarbon range (TPHg and benzene) since they are the compounds of most concern in regard to public health and safety.

- It was noted in the Tier 1 evaluation that some soil samples were collected below the groundwater table. Because groundwater somewhat isolates the soil-bound hydrocarbons, the data were not considered in the Tier 1 evaluation. Variations in groundwater elevation, either seasonal or man-made, could uncover sources of vapor phase impact. For this reason, samples collected from beneath the groundwater table were considered in preparing the RMP.

Diesel range total petroleum hydrocarbons (TPHd), and total petroleum hydrocarbons with molecular weights greater than those in TPHd, were not examined in this RMP. These

compounds are less volatile, less water soluble, and less mobile than gasoline range compounds; consequently, they generally do not pose a significant health risk. Additionally, it is recommended that total petroleum hydrocarbons not be used in risk assessments because the general measure of total petroleum hydrocarbons provides insufficient information regarding individual chemicals of concern.

2.2 Risk Summary

Risks at the site, as characterized using American Society for Testing and Materials (ASTM) Standard E1739 for Risk-Based Corrective Action at Petroleum Release Sites, are summarized in Table 1. In addition to public health risk, safety concerns are also noted in Table 1. The following public health and safety concerns were noted.

- Inhalation of soil vapor, either in the atmosphere or in an enclosed space, that contains benzene at a level above the Risk-Based Screening Levels (RBSLs).
- Contact, ingestion, or inhalation of soil that contains benzene at a level above the RBSL.
- Ingestion of groundwater, or exposure to groundwater, that contains benzene at a concentration above the RBSL.
- Ignition of a soil vapor mixture that equals or exceeds the lower explosive limit.

Possible scenarios associated with the public health and safety concerns include:

- Construction workers engaged in subsurface piping at the site could be exposed to soil vapor and soil that contain benzene at levels above the respective RBSLs;
- Construction dewatering could take place at, or near the site. Untreated groundwater could be discharged to the street under a plan to discharge extracted groundwater to the storm drain;
- A groundwater extraction well could be installed for the purpose of providing an irrigation supply. Residents at the site could be exposed to untreated groundwater, or the irrigation well could act as a conduit to deeper groundwater supplies;
- Soil excavated from the site as a result of construction could be used as fill for landscaping. Workers and residents could be exposed to the soil and/or vapor from the soil;
- Atmospheric conditions, such as pressure and temperature, could create a situation where vapor phase hydrocarbons accumulate at the bottom of a trench or excavation. The mixture of air and vapor phase hydrocarbons could reach

the lower explosive limit, and an ignition source could cause a fire or explosion.

Several factors suggest that the scenarios listed above have a low probability of taking place; nevertheless, the least probable event must be considered in the effort to protect public health and safety. To show the conservative nature of the risk assessment, and thus this RMP, it is useful to review the factors that make the risk assessment and RMP conservative.

1. The RBSLs used to complete the RBCA Tier 1 evaluation were developed using conservative values for model parameters.
2. Historical data were used to complete the RBCA Tier 1 evaluation. It is likely that biodegradation and other attenuation mechanisms have reduced hydrocarbon concentrations in soil since the time samples were collected.
3. The frequency of hydrocarbon detection in soil, and the relatively low concentrations, infer that the mass of hydrocarbons in soil is minor.
4. Benzene RBSLs for all exposure pathways were exceeded by no more than 2.89 ppm (one case of inhalation in an enclosed space, 1E-6 residential risk).
5. RBSLs were developed considering an exposure duration of 30 years at a minimum of 250 days per year. For construction workers, the exposure period will be much shorter. For residents, hydrocarbon concentrations will continue to fall over the period they reside at the property.

3.0 RISK MANAGEMENT

In the previous section, data were reviewed, risks were summarized, and possible public health and safety scenarios were identified. Risk management concerns controlling the identified risks, to the extent that all possible risks were identified. Although petroleum hydrocarbon impact at the site is characterized according to specific source areas, there is a chance that records identifying the locations of source areas may be lost or misplaced. As such, risk management measures should apply to the entire site. Below, risk management measures are recommended along with justification for each measure.

1. The ACEHS shall be notified before any general construction takes place at the site where soil and/or groundwater might be handled. This measure will assure that aspects of any construction project for the site are reviewed in light of the fact that residual hydrocarbons have been left in-place at the site.

2. The ACEHS shall be consulted for approval regarding uses or disposal of soils from the site. This measure is meant to place controls on the use or disposal of soils from the site that may contain petroleum hydrocarbons.

3. The ACEHS shall be consulted for approval regarding construction dewatering at the site. The purpose of this measure is to assure extracted groundwater is handled properly given the potential that it may be impacted with petroleum hydrocarbons.

4. Groundwater from beneath the site shall not be used for any purpose unless approved by the ACHES. This measure will assure that any proposed uses are reviewed by the appropriate regulating authority.

5. Wells shall not be installed at the site unless approved by the ACHES. The purpose of this measure is to mitigate the possibility that vertical conduits to deeper groundwater sources are introduced at the site.

6. Before any development takes place at the site, development plans and a health and safety plan shall be submitted to the ACHES for review and approval. The purpose of this measure is to assure that workers and the general public are protected from the potential hazards associated with subsurface petroleum hydrocarbon impact. An example health and safety plan is presented in Appendix C.

7. If necessary, dust control measures shall be used during grading or excavation activities at the site. A contingency plan for such measures shall be included in site development plans reviewed by the ACHES.

8. The atmosphere in trenches and/or excavations at the site deeper than 2 feet below grade surface shall be monitored using a flame ionization or photo-ionization detector before manual work in the trenches and/or excavation begins. This activity shall happen each day work is to takes place in trenches and/or excavations. Monitoring shall occur once in the morning and once in the afternoon, and records shall be kept. Conditions under which work shall stop and mitigation measure take place shall be considered in the site health and safety plan (see Appendix C for example). This measure is meant to protect workers from inhalation risks.

9. The atmosphere in trenches and/or excavations at the site deeper than 2 feet below grade surface shall be monitored for an explosive atmosphere each day work is to take place in trenches and/or excavations. Monitoring shall occur in the morning prior to beginning work and records shall be kept. Mitigation measures shall take place (e.g.; ventilate trenches and/or excavation) if it is noted that the an explosive atmosphere exists. A contingency plan for such measures shall be included in site development plans reviewed by the ACHES. The purpose of this measure is to mitigate the potential for fire/explosion.

10. Records for the site, including investigative reports and the attached *Corrective Action Evaluation RBCA Tier 1*, shall be kept on file with the ACHES. Proper documentation can help all parties control potential risks associated with the site.

4.0 LIMITATIONS

Evaluations of the geological conditions at the site that serve as a basis for this RMP are inherently limited due to the limited number of observation points. There may be variations in subsurface conditions in areas away from the sample points. There are no representations, warranties, or guarantees that the points selected for sampling are representative of the entire site. The recommendations provided herein reflect the sample conditions at specific locations at a specific point in time. No other interpretations, representations, warranties, guarantees, express or implied, are included or intended in this RMP. Additional work, including further subsurface investigation, might reduce the inherent uncertainties associated with this RMP.

Table 1
Risk Summary

Former Signal Bulk Plant
2001 Versailles Avenue
Alameda, California

Source Area	Media	Constituents	Indicator	Public Health and Safety Concern
Source Area 1: Former Garage Area	soil	benzene	0.002 ppm benzene @ 4 feet bgs circa 1990	Inhalation of soil vapor that collects in an enclosed space; 1E-6 residential risk level at 0.002 ppm benzene in soil.
Source Area 2: Former UST Vault; Spill Containment Tank	soil groundwater	benzene TPHg	2.9 ppm benzene 670 ppm TPHg @ 7.5 feet bgs circa 1990	Inhalation of soil vapor that enters the atmoshpere or enclosed space; indicator exceeds residential and commercial risk for benzene, both 1E-4 and 1E-6.
			5.6 ppb benzene circa 1996	Soil contact, ingestion, or inhalation if soil becomes surficial; indicator exceeds 1E-6 residential risk and is equal to 1E-6 commercial risk.
				Accumulation of hydrocarbon vapors could generate a fire/explosion hazard under certain conditions; e.g., at low temperature, vapors denser than air accumulate in a trench to a point that the concentration nears the lower explosive limit.
				Leachate from soil could impact groundwater, dewatering at or near the site could expose the public; benzene in soil could result in exceeding the groundwater ingestion risk limit for residential and commercial receptors; but groundwater not a drinking water source.
Source Area 3: Former Drum Storage Area	soil	TPHg	190 ppm TPHg @ 7 feet bgs circa 1990	Accumulation of hydrocarbon vapors could generate a fire/explosion hazard under certain conditions; e.g., at low temperature, vapors denser than air accumulate in a trench to a point that the concentration nears the lower explosive limit.

Table 1
Risk Summary

Former Signal Bulk Plant
2001 Versailles Avenue
Alameda, California

Source Area	Media	Constituents	Indicator	Public Health and Safety Concern
Source Area 4: Former Warehouse Oil Receptacle	soil	benzene TPHg	0.63 ppm benzene 1,100 ppm TPHg @ 4.5 feet bgs circa 1990	Inhalation of soil vapor that enters the atmoshpere or enclosed space; indicator exceeds residential and commercial risk for benzene, both 1E-4 and 1E-6. Accumulation of hydrocarbon vapors could generate a fire/explosion hazard under certain conditions; e.g., at low temperature, vapors denser than air accumulate in a trench to a point that the concentration nears the lower explosive limit. Leachate from soil could impact groundwater, dewatering at or near the site could expose the public; benzene in soil could result in exceeding the groundwater ingestion risk limit for residential and commercial receptors; but groundwater not a drinking water source.
Source Area 5: Former Manifold Lines and Pump House Area	soil	benzene TPHg	1.1 ppm benzene 380 ppm TPHg @ 5.5 feet bgs circa 1995 8,200 ppm TPHg @ 7 feet bgs circa 1990	Inhalation of soil vapor that enters the atmoshpere or enclosed space; indicator exceeds residential and commercial risk for benzene, both 1E-4 and 1E-6. Accumulation of hydrocarbon vapors could generate a fire/explosion hazard under certain conditions; e.g., at low temperature, vapors denser than air accumulate in a trench to a point that the concentration nears the lower explosive limit. Leachate from soil could impact groundwater, dewatering at or near the site could expose the public; benzene in soil could result in exceeding the groundwater ingestion risk limit for residential and commercial receptors; but groundwater not a drinking water source.

Table 1
Risk Summary

Former Signal Bulk Plant
2001 Versailles Avenue
Alameda, California

Source Area	Media	Constituents	Indicator	Public Health and Safety Concern
Source Area 6: Former Above Ground Storage Tank Area	soil	benzene TPHg	0.49 ppm benzene 940 ppm TPHg @ 7.5 feet bgs circa 1990	Inhalation of soil vapor that enters the atmoshpere or enclosed space; indicator exceeds residential and commercial risk for benzene, both 1E-4 and 1E-6. Accumulation of hydrocarbon vapors could generate a fire/explosion hazard under certain conditions; e.g., at low temperature, vapors denser than air accumulate in a trench to a point that the concentration nears the lower explosive limit. Leachate from soil could impact groundwater, dewatering at or near the site could expose the public; benzene in soil could result in exceeding the groundwater ingestion risk limit for residential and commercial receptors; but groundwater not a drinking water source.

Notes

ppm = parts per million
ppb = parts per billion
bgs = below grade surface
1. Reference: *Corrective Action Evaluation RBCA Tier 1, Touchstone Developments, June 13, 1996*

APPENDIX A

CORRECTIVE ACTION EVALUATION RBCA TIER 1

Touchstone Developments
Environmental Management

CORRECTIVE ACTION EVALUATION
RBCA TIER 1

Former Alameda Bulk Plant
2001 Versailles Avenue
Alameda, California

prepared for

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6001 Bollinger Canyon Road
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prepared by

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June 13, 1996

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June 13, 1996

Mr. Phil Briggs
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RE: CORRECTIVE ACTION EVALUATION
RBCA TIER 1
Former Alameda Bulk Plant
2001 Versailles Road
Alameda, California

Dear Mr. Briggs:

This report presents the findings of a Tier 1 risk-based corrective action (RBCA) evaluation as requested by Alameda County Department of Environmental Health in a letter dated October 5, 1995. This evaluation was conducted by Touchstone Developments (Touchstone), at the request of Chevron Products Company (Chevron), and follows the ASTM: E 1739-95 *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* guidelines. The purpose of this evaluation is to assess if the proposed clean up goals presented in the Touchstone *Remediation Work Plan* dated October 10, 1995, are appropriate. This evaluation was performed and based on all available site data and past site activities.

EXECUTIVE SUMMARY

This document summarizes the findings using the Risk Base Corrective Action (RBCA) decision making guideline as requested by the Alameda County Department of Environmental Health (ACDEH), in their letter dated October 5, 1995. This RBCA Tier 1 evaluation was prepared by Touchstone Developments for Chevron USA Products Company.

This RBCA Tier 1 evaluation was conducted by applying two Cancer Risk factors (1 E-4 and 1 E-6), for the primary target (carcinagenic) chemicals present on-site. Touchstone also applied the RBSL look up table provided by ACDEH (revised January 24, 1996), to the site conditions.

Assessment and investigation activities have occurred at the site during the last twelve years and revealed that a mixture of gasoline, diesel and oil petroleum hydrocarbons have impacted the soils and groundwater at the site. These site investigations have revealed decreasing levels of petroleum hydrocarbons over the years (all wells ND for gasoline and

BTEX compounds), as a result of natural attenuation. Because of a groundwater sample from the hand dug irrigation well located adjacent to the site, and recent groundwater sampling data, groundwater was compared to Risk Based Screening Levels (RBSL's). It was determined that since the aquifer is considered non potable with no future plans to be used as a water supply, and no reoccurring chemicals of concern exceeded the established RBSL's for groundwater, that groundwater at the site was not an issue. The recent identified chemical of concern in MW-1 is an isolated occurrence.

The soil sampling data collected from the site was also compared to the RBSL's for dermal contact, inhalation, ingestion and leachability to the groundwater. In the evaluation, only benzene exceeded the RBSL's provided by ACDEH for soil leaching to groundwater. Utilizing the most conservative Cancer Risk factor, three samples were above the established RBSL's, while two samples exceeded the less conservative cancer risk factor of 1 E-4. Two soil samples (47699@7.5' and 47708@7.5'), were collected at a depth below the current water table at the site and therefore were not included in the evaluation. The highest benzene concentration detected in soils collected above the current water table is 1.1 parts per million (ppm). Petroleum impacted soils primarily exist in the smear zone at the site and can be monitored through routine groundwater sampling. Benzene has been non detect in the groundwater since October 1995, except recently in MW-1 (January 1996). The findings of this evaluation will supplement the Touchstone Work Plan , *Soil Remediation-Former Alameda Bulk Plant* dated October 10, 1995.

The primary source areas at the site have been removed. Additional leaching of petroleum hydrocarbons into the groundwater is a potential. However, based on the observed site data, soil leaching and natural attenuation of hydrocarbons in the groundwater beneath the site do not appear to pose a health hazardous. The site is planned to be developed with residential housing. Construction workers will likely be in contact with site soils. Based on this Tier 1 RBCA evaluation, surface soils at the site are below action levels and do not pose any health hazard for inhalation, ingestion and dermal contact expected during site construction and installation of service utilities. However, soils containing TPH compounds absent of BTEX constituents, might be encountered during the planned construction activities. These soils generated by construction activities will need to be sampled and possibly disposed of properly.

Total Petroleum Hydrocarbons (TPH), are present in the on-site soils and range up to 98 ppm (from 0 to 3 feet bgs), and up to 8,200 ppm (from 3 to 10 feet bgs). Benzene, although only detected in a few of the soil samples, was reported non detect (ND) in the 0 to 3 feet bgs range and up to 2.9 ppm in the 3 to 10 feet bgs range. This RBCA evaluation does not directly address the TPH, but the individual compounds that make up the TPH compound as required.

SITE DESCRIPTION

The subject property is located in the southeastern portion of Alameda, adjacent to the eastern shore of the Oakland-Alameda Estuary (Figure 1). In the vicinity of the site, the estuary has been dredged and channeled to accommodate shipping. The estuary is part of the San Francisco Bay and is tidally influenced. The former Alameda Bulk plant was located at 2001 Versailles Avenue, within the City and County of Alameda and the site is bordered by Versailles Avenue on the east, Tilden Way to the north and Fernside Boulevard on the south (Figure 2). Historic use of the site was for bulk storage and loading of gasoline, diesel, lubricate fluids and other petroleum products. The bulk plant consisted of both underground (8), and aboveground (6) storage tanks, repair garage space, warehouse space, offices, loading rack and pump house. The facility was demolished in the late 1980's and is currently a flat vacant lot. The subject site is located in an area of mixed residential, commercial and light industrial land uses. Immediately to the south and west of the site is residential development and to the northeast is commercial and light industrial development. East of the site is the tidal channel of the San Leandro Bay that encircles Alameda Island. Residential housing is proposed as the next use of this site.

A predecessor company of Chevron was one of many tenants of the site who used the facility for storage and loading of petroleum products. Recent litigation has designated Chevron to design and implement remediation at the site with cost sharing by others. Chevron will be the primary liaison between Barney M. Chan of the ACDEH and all other responsible parties.

The site is situated on Alameda island proper, with the closest open water being part of the San Leandro Bay channel waterway at approximately 400 feet to the east. The bay water is considered brackish.

SITE OWNERSHIP AND ACTIVITY

Previous property owners that operated the bulk plant include: Signal Oil (Standard Oil of California) from the mid 1930's to 1967, Humble Oil in 1967, Exxon from 1967 to 1982, King Petroleum, Inc. from 1982 to 1990. The property was purchased in 1990 by Mr. Clifford Mapes, for the development of multiple unit housing. The property has not been used for bulk storage of petroleum products since King Petroleum, Inc. tenancy.

All ASTs and USTs have been removed. The final tank removal occurred in 1983. All initial tanks at this facility were AST's, and were removed and replaced with UST's in 1974 and 1975. These USTs were later removed in 1983. The storage and distribution of petroleum products was ceased in 1982.

SUMMARY OF CURRENT AND COMPLETED SITE ACTIVITIES

Investigative activities began in 1984, with Kennedy Jenks Engineers (KJE), conducting an initial site investigation into soil and groundwater conditions. This investigation was initiated and performed behalf of a land developer, Mr. John Barni, as required for the Alameda Planing Board approval for zoning change. KJE advanced four soil borings, collected a number of soil samples and one groundwater grab sample. Petroleum odors were detected in all soil borings. Groundwater was encountered at 2 feet bgs. In addition, one hand dug well, located off-site to the west, was sampled and the laboratory analysis indicated that no EPA 601 compounds or petroleum hydrocarbons were detected in the sample collected from the off-site well (KJE report dated May 30, 1984).

The second phase of work involved Harding Lawson Associates (HLA), being contracted by Exxon Corporation (Exxon). HLA advanced a total of four soil borings (SB-1 through SB-4), and six groundwater monitoring wells (W-1, W-2, W-3,W-4, SW-1 and SW-2). Groundwater flow direction and gradient were calculated to be 0.008 ft/ft to the north (May 6, 1985). HLA, based on required analytical testing, determined that no detectable concentrations of volatile, acid extractable and base/neutral extractable organic chemicals were present in the groundwater (HLA report dated June 4, 1985) . The Regional Water Quality Control Board concurred with HLA's assessment and recommended site closure after the wells have been properly abandoned (RWQCB, letter dated July 2, 1985).

Earth Metrics Inc.(Entrix), was contracted by Mr. Clifford Mapes to perform a review of environmental documents and site inspection prior to purchasing the property. The Entrix report dated September 25, 1989, advised Mr. Mapes to continue approaching purchase and site development with due caution and prudence based on a review of historical environmental reports and current site conditions. The report notes the presence of two on-site buildings at the time of the report, one of which was used for automotive repair. Several drums were stored on-site in an unbermed, unpaved area (Source Area 1). These drums were the property of King Petroleum.

The property was sold to Mr. Clifford Mapes in January 1990. King Petroleum retained Kleinfelder to assess the soil and groundwater conditions at the site. Ten trenches were excavated at the site to a depth of approximately 10 feet bgs and soil samples were collected. Sample locations are shown on Figure 3, and the analytical data is included in Table A. Analytical results indicated that petroleum hydrocarbons were wide spread across the site, with TPH-Gasoline and benzene concentrations up to 8200 ppm and 2.9 ppm, respectively. The total volume of soil excavated was not documented in the Kleinfelder report. It was also not reported whether or not native soils were used to backfill the trenches. Kleinfelder submitted their *Preliminary Remedial Investigation Report* dated November 5, 1990.

Touchstone investigated the presence of a 1000-gallon UST reported by Kleinfelder, (1990), in the southeast corner of the property (Source Area 1). On behalf of Chevron, Touchstone coordinated with representatives from the ACDEH and performed excavating

activities looking for the reported unknown UST. However, only a small portion of a steel tank approximately 25-gallons in size, believed to be a scrap remnant of a old propane tank was found. The reported unknown UST was not found and the former UST located in this area appears to have been removed in 1983.

Touchstone on behalf of Chevron, prepared a Work Plan *Soil Remediation - Former Alameda Bulk Plant* dated October 10, 1995. The work plan described six source areas, and estimated the volume of impacted soil to be removed. This volume of soil was also derived from clean up goals from negotiations with the ACDEH and by using the Region IX Preliminary Remedial Goals (PRG's) guidance document (August 1994)

SITE HYDROGEOLOGIC CONDITIONS

The San Francisco Bay regional geomorphology has been greatly influenced by Quaternary tectonism and marine transgressions and regressions (changes in sea level). These sea-level fluctuations, in conjunction with large scale faulting associated uplift and subsidence, have controlled the type of depositional environments in the area, and therefore the types of sediments deposited in the vicinity of the site.

Bedrock in the East Bay is Franciscan Melange and in the vicinity of the site it is estimated to be several hundred feet below ground surface. In the western Oakland area , bedrock is unconformably overlain by a veneer of poorly indurated to unconsolidated Quaternary sedimentary soil formations. Soils in the Alameda-Oakland area near the site may be summarized into three groups. The oldest is a bay mud which is overlain by a eolian sand formally referred to as the Merritt Sand Formation. The greatest thickness reported for the Merritt Sands is 65 feet. The Merritt Sands are exposed in most of central Alameda and parts of western Oakland, although the aerial extent of the Merritt Sands is probably much greater. Marine and estuarine sediments of silt and clay have been deposited over the Merritt Sands forming a thin veneer. This younger bay mud typically slopes gently from the landward edge towards the center of the bay, and commonly forms tidal flats. In many instances, these areas have been covered with artificial fill dredged from the estuary, which may make it difficult to distinguish from native soils.

The Alameda Formation (the lowermost of the old bay mud unit described), is considered an aquifer which generally produces good quality water. The two overlying formations of the old bay mud unit, the San Antonio and Posey Formation are generally considered to be an effective aquitard between the Alameda Formation and the shallow water-being zones. The Merritt Sands are considered a source of potable water and may contain competent clay zones which serve as local aquitards. The younger bay mud commonly contains sandy zones which may produce groundwater. Groundwater within this unit is typically of poor quality and therefore is rarely used as a groundwater source. Groundwater may also occur locally in the artificial fill, and considered to be of very low quality.

Soils encountered during previous investigations have described a overlying clay cap, predominately a sandy clay, including what appears to be imported fill material consisting of base rock, silty sand and sand in the upper 2-feet. This "cap" extends from the ground surface to approximately 13 feet bgs. First encountered groundwater is from a shallow aquifer between approximately 13 and 27 feet bgs, and has been described as a Brown-Gray Sand (SP) (HLA 1985). This sand overlies a clay confining layer (aquitard) of at least 5-feet thick. The lateral extent of the encountered aquitard is unknown, and is limited to on-site data. It is not known if this water being zone is part of the Merritt Sands or the younger overlying bay mud unit.

First encountered groundwater at the site historically ranges from 3.5 to 8 feet bgs, and the aquifer appears to demonstrate unconfined to semi-confined conditions. Groundwater flow has been historically consistent, flowing to the east at a gradient of 0.008 foot per foot (ft/ft). Although a tidal influence study has not been performed, a review of the historical depth to water measurements and tide tables for the San Francisco Bay, indicate that the groundwater beneath the site appears to be tidally influenced and demonstrates seasonal fluctuations. An estimate of well yields from the site were documented by HLA (report dated December 3, 1984), as 10-gallons per minute and is based on their sampling field data. Initial Total Dissolved Solids testing indicated that the water from the aquifer ranged from 550 to 780 mg/l, considered a fresh water source, however, typical TDS limits for domestic and municipal supplies is approximately 500 mg/l. Therefore, it appears that the groundwater from this aquifer would not be an approved drinking water source.

RECEPTOR SURVEY

A 1/2-mile radius receptor survey was conducted by evaluating Alameda County Public Works Department well search data (Appendix A), interviewing County representatives and performing a site reconnaissance. A door-to-door survey was not performed. The survey identified twelve (12) wells, what were classified as follows: irrigation (10), and industrial (2) Figure 1. Two of the wells are located across the tidal channel in Oakland, three wells are located to the north of the site in an industrial area consisting of ship yards, autobody and automobile repair shops, light manufacturing and the remaining wells are all up-gradient of the site except one. This well is located adjacent to the site (cross-gradient), along the north property line and was reported to have been hand dug to 24 feet bgs. This well has been previously sampled with the results indicating that no petroleum hydrocarbons or associated compounds have impacted the well (Table B).

From the data reviewed, it appears that most of the private wells are between 24 and 60 feet in depth. These wells (most constructed without permits), were installed during the 1977 drought for lawn and garden irrigation. The activity of these wells is not known, however, it is speculated that the wells are not used currently. Alameda is serviced by imported water and does not have any municipal wells. The results of the survey are discussed below.

Drinking Water Wells

Groundwater encountered below the site is not used for public (municipal or subdivision), water supply. All municipal water in Alameda and the surrounding cities import their water from the East Bay Aqueduct, originating in the Sierra Nevada Mountains. This was confirmed by County of Alameda Public Works Agency representatives and review of well records. Private drinking water wells were evaluated by reviewing the water well data base compiled by County of Alameda Public Works Agency. The data base review did not reveal any domestic or private drinking water wells within the 1/2-mile radius.

Utilities

Utility trenches exist along Versailles Avenue and Fernside Boulevard that support water, gas, and sewer (sanitary and storm). All service utilities located on-site are believed to have been removed, with the trenches backfilled during facility demolition. No visual evidence of these utilities were observed during the site reconnaissance. Although groundwater is shallow at the site, it has also not been adversely impacted by petroleum hydrocarbon and, therefore, the utility trenches are not considered as a significant exposure pathway.

Basements and Other Structures

Private residences that are located near the site are built on pier foundations and do not have basements due to the shallow groundwater. Only the soil at the site has been impacted and is limited to the confines of the site. Groundwater has not been adversely impacted and therefore, off-site properties should not be impacted.

Surface Water Bodies

A section of the San Leandro Bay tidal channel is located approximately 300 feet east and down gradient of the site. This tidal channel extends around Alameda island and services many local ship yards, light industrial businesses and the Alameda Naval Ship Yard.

Environmental Receptors

All documented released hydrocarbons are confined to the soils on-site. As stated above, the nearest surface body of water is located approximately 300 feet down gradient. Groundwater beneath the site has not been adversely impacted and therefore, it is highly unlikely that residual petroleum hydrocarbons from the former bulk plant will reach and impact the surface waters.

Future Receptors

The area has been fully developed with only the subject site remaining as undeveloped. The current use of the area is expected to remain the same; residential, commercial and light industry.

CHEMICALS OF CONCERN

The following compounds have been identified as chemicals of concern at the site: benzene, toluene, ethyl-benzene, and total xylenes (BTEX). These chemicals are components of petroleum fuels and are restricted to the soil only. Groundwater does not warrant any remedial actions. The presence and extent of each of these chemicals are described in the following sections.

SOURCE AREAS

Previous on-site investigations have identified the source areas of petroleum hydrocarbons requiring remedial attention. The Touchstone Work Plan *Soil Remediation of the Former Alameda Bulk Plant,* dated October 10, 1995, describes six (6), primary areas. Figure 3 shows the locations of the six identified source areas described below, Figure 4 shows the sample locations and Table A presents a complete soil analytical summary.

Source Area 1: Former Garage Area

Previous investigations have reported that all subsurface structures were removed in the late 1980's. Kleinfelder (1990) reported that one UST of approximately 1000-gallon capacity may still be located on-site in the south east corner of the property. Touchstone performed an investigation in late 1995 and found that no UST existed in this area. Touchstone did uncover what is believed to have been portion of a propane tank.

Soil samples from this location were reported to contain primarily TPH-Diesel (2,600 ppm) and motor oil (2,400 ppm) at 4 feet bgs (Kleinfelder sample 47721). TPH-Gasoline was reported as ND for all samples, and benzene was only detected in one sample (47721), at a concentration of 0.002 ppm (below current detection limits of 0.005 ppm).

The source of the identified hydrocarbons is not known. General arrangement drawings and previous site maps from the site do not indicate any possible source. As noted in Figure 3, a former garage was located in the area and drums may have been stored nearby.

Source Area 2: Former UST Vault/ Concrete Slab/ 800-Gallon Spill Containment Tank

Three gasoline USTs were previously removed from this location. One soil sample, collected after removal, Kleinfelder 47708, indicates that TPH-Gasoline levels may be 670 parts per million (ppm) in the area with detectable concentrations of benzene (2.9 ppm). A sample collected at 9 feet bgs, was non-detectable (ND), for all constituents tested. Also, at this location was a former 800-gallon spill containment tank associated with the former USTs and loading rack. Groundwater monitoring well MW-1, located downgradient of the source area was measured in June 1994 by Entrix, and constituents detected were 600 parts per billion (ppb) TPH-Gasoline, 340 ppb TPH-Diesel and 43 ppb benzene. Recent groundwater sampling (1st quarter of 1996), reported non detect TPH-Gasoline, 920 ppb TPH-Diesel and 5.6 ppb benzene.

Source Area 3: Former Drum Storage Area

One soil sample from collected by Kleinfelder at 7.0 feet bgs, (47700), indicated TPH-Gasoline concentration levels are 190 ppm and ND for BTEX compounds. Also reported was TPH-Diesel at 280 ppm and Oil and Grease at 160 ppm. The drum storage area is located in the northwest portion of the property. Groundwater monitoring well MW-3 was reported to contain 360 ppb TPH-Gasoline, 190 ppb TPH-Diesel and 0.7 ppb benzene (Entrix, June 1994). Groundwater analytical results from the 1st quarter of 1996 reported non detect for TPH-Gasoline and BTEX compounds, and 530 ppb for an unidentified hydrocarbon.

Source Area 4: Warehouse Oil Receptacle

The source area beneath the warehouse has been identified in two locations. The first area is located on the south limits of the building. From this area, Kleinfelder sample 47715 (collected at 5 feet bgs), has been reported to contain 0.63 ppm benzene, 1100 ppm TPH-Gasoline and 20 ppm TPH-Diesel in soil samples. The second area is located along the north limits of the warehouse structure. Analytical results from this area were from Kleinfelder sample 47712 (at 4.5 feet bgs), and Touchstone sample SB-7 (at 5.0 feet bgs). Both samples were reported at non detect (ND) for benzene, however, contain up to 1100 ppm TPH-Gasoline, 490 ppm TPH-Diesel and 140 ppm oil and grease. One former UST was also located adjacent to the warehouse building and is addressed in this section. Groundwater monitoring well MW-2, located beneath the former warehouse was reported to contain 270 ppb TPH-Diesel, and was ND for TPH-Gasoline and BTEX compounds (Entrix, June 1994). The 4th quarter of 1995 sampling results reported MW-2 as non detect for benzene and TPH-Gasoline compounds and 110 ppb of an unidentifiable hydrocarbon.

Source Area 5: Manifold Lines and Pump House

Analytical results from soil samples in this area indicate that TPH-Gasoline ranges from ND (near the surface) to 8200 ppm at 7.0 feet bgs (Kleinfelder sample 47703). TPH-Diesel and motor oil were also identified at 570 ppm and 1200 ppm respectively. The highest concentrations appear to be between 5.0 and 7.0 feet bgs, and located directly below the pump house. Soil samples collected from the 2.5 feet bgs intervals ranged from ND to 27 ppm TPH-Gasoline and 53 to 94 ppm TPH-Diesel. Benzene was primarily reported as ND for most samples, and was only detected in two samples at concentrations of 0.35 ppm and 1.1 ppm.

Source Area 6: Former Above Ground Storage Tanks

The above ground storage tanks (ASTs) were located in the northeast portion of the property and consisted of six (6) tanks along with one UST. Soil samples collected from this area contained petroleum hydrocarbons and are concentrated in three areas. The first area is represented by Kleinfelder samples 47698 and 47699, and Touchstone soil boring SB-8 samples. This area is located adjacent to three of the western most former ASTs and one UST. Kleinfelder sample 47698, collected at 1.0 feet bgs, was ND for oil and grease. Sample 47699 (at 7.5 feet bgs) was reported to contain 0.49 ppm benzene, 940 ppm TPH-Gasoline and 880 ppm TPH-Diesel. Soil boring SB-8 (at 2.0 and 5.5 feet bgs) were ND for benzene, TPH-Gasoline, and TPH-Diesel at 5.5 feet bgs. TPH-Diesel was identified in the 2 feet bgs sample at 110 ppm.

The second area is located along the east property boundary, just south of the three former ASTs. Soil sampling results from soil boring SB-9 indicate TPH-Diesel concentrations of 1.2 ppm at 4.0 feet bgs and 580 ppm at 5.5 feet bgs. TPH-Gasoline and benzene were reported as ND for all samples. The third area in the AST portion of the property is located in the extreme northeast corner of the site, adjacent to the eastern most former ASTs. Benzene was not identified in any of the soil samples collected from this area except one. Sample 47699 reported a benzene concentration of 0.49 ppm and was collected below the current water table. Analytical results indicate a concentration of 600 ppm TPH-Gasoline in sample 47704, collected at 8.0 feet bgs, and 20 ppm oil and grease in sample 47707 collected at 2.5 feet bgs.

Three groundwater monitoring wells, MW-4, MW-5 and MW-6 are located with in this source area. Initial analytical results indicated TPH-Gasoline concentrations ranging from ND to 170 ppb, and TPH-Diesel from ND to 620 ppb. BTEX compounds were not identified (ND) from these wells. Currently, the three wells are ND for all analytes tested, except for an unidentified hydrocarbon which were reported up to 1000 ppm in the diesel range. A summary of groundwater chemical analytical results are presented in Table B.

Exposure Point Evaluation of Chemicals of Concern

The chemicals of concern have not been identified at any exposure points. There are no domestic or municipal drinking water wells with in the 1/2-mile radius of the site, and one hand dug irrigation well located adjacent to the north portion of the site was sampled and was reported free of all petroleum hydrocarbons. The down gradient tidal channel of the San Leandro Bay has not been sampled. Sampling of the bay waters would not be conclusive if detectable concentrations of hydrocarbons were detected. This is due to the tidal action that is present and the local light industry and Naval Ship Yard located along the tidal channel. No basements exist near the site and chemical vapors have not been reported within any subsurface structures (i.e. utilities).

There have been no observed impacts to vegetation, wildlife or sensitive habitats. Based on site data, no impact to the ecological conditions are expected. A detailed exposure pathway evaluation is presented in Table C.

SITE CLASSIFICATION

A site classification system has been incorporated in the risk assessment evaluation for petroleum hydrocarbon release sites. Site classification is based on the aquifer characteristics associated with the release. The criteria for being a potential potable water supply is a yield of >200 gallons per day and meets local water quality criteria of <10,000 mg/l total dissolved solids (TDS). Based on these guidelines and the site aquifers characteristics, this site has been classified as a 3. A classification of 3 is defined as *Long Term (>2 years) Threat To Human Health, Safety, or Sensitive Environmental Receptors.* Particular sub categories are: *3.1) Subsurface Soils (>3 fbg) are impacted and the depth between impacted soils and the first potable aquifer is less than 50 feet* and *3.6) Shallow contaminated surface soils are open to public access, and dwellings, parks, playgrounds, day care centers, schools, or similar use facilities are more than 500 feet of those soils.* The second sub category was selected because of the planned use for the site as multiple residential housing.

TIER 1 EVALUATION

Exposure Pathways

Several exposure pathways were considered for Tier 1 evaluation and a summary of the evaluation is presented in Table C. The exposure pathways considered are appropriate for the planned use of the site.

Off-site Resident

One hand dug irrigation well was identified on the residential property adjacent to the north prorate line of the site. Because of this well and one detected benzene concentration of 5.6 ppb identified on-site, groundwater ingestion was considered in the Tier 1 analysis. Because off-site soils are not impacted, inhalation, ingestion and dermal contact exposure pathways were not evaluated.

On-site Resident

No residents are on-site and therefore this exposure pathway was not evaluated.

Worker (site construction)

Site activities will expose workers to impacted soils. Construction activities are planned for the site. Excavation activities during the installation of site utilities, building foundations and site grading may expose workers to impacted soils.

Visitor

Currently, the site is secured by fencing and all visitors are required to follow health and safety guidelines to minimize the risk of exposure. Therefore, this exposure pathway was not evaluated.

Future Pathways

Based on the planned use of the site, exposure pathways were considered as if residential housing (planned use) currently existed. Because on-site soils are impacted and the historical depth to groundwater ranges from 3.5 to 8 feet bgs, inhalation and dermal contact exposure pathways were evaluated. Exposure to groundwater was not evaluated because the County of Alameda well seal requirements include a minimum of a surface seal to extend 20 feet or through first encountered groundwater (Zone 7 Water Resources Management). The surrounding residences are connected to a municipal water supply and therefore, installation of drinking water wells is not expected. Groundwater encountered at the site is considered non-potable based on depth, Total Dissolved Solids (TDS) and Alameda County required minimum depth of a well seal.

Risk Based Screening Levels (RBSLs)

For the Tier 1 evaluation of chemicals of concern levels were compared to ACDEH Risk Based Screening Levels (RBSLs). The Tier 1 evaluation assumes that the one irrigation well identified adjacent to the property is located on-site. Groundwater ingestion of

chemicals of concern was considered an exposure pathway because of the one irrigation well adjacent to the site and the detected benzene concentration identified in MW-1 in January 1996. Based on the planned use of the property and the presence of impacted soils, ingestion, inhalation and dermal contact exposures were also considered additional pathways of concern.

The RBSLs selected for the Tier 1 evaluation are derived from Table 4 of the RBCA Guidance Document (ASTM E-1739-95), and the ACDEH look up table with amended concentration levels (January 24, 1996). The maximum concentration of each chemical of concern was compared to the RBSLs for leaching into groundwater as shown in Table D. In addition, RBSL for soil ingestion, inhalation and dermal contact are also shown in Table D. Both Cancer Risk factors (1 E-6 and 1 E-4), are listed.

As shown in Table D, no chemical of concern exceeded the RBSLs in the one irrigation well identified. In addition, no chemical of concern exceeded the RBSL in any of the site monitoring wells, except for benzene in MW-1 located in Source Area 2, approximately in the middle of the site. Recent groundwater sampling conducted on January 26, 1996, indicated a benzene concentration of 5.6 ppb. First encountered groundwater beneath the site is considered non potable. Site sentry wells, located downgradient of MW-1 continue to indicate no presence of benzene compounds.

Soil sampling data was compared to the RBSLs in Table D. For inhalation, dermal contact and ingestion, that no concentration levels exceeded the RBSLs while using the Cancer Risk Factor of 1 E-4. Kleinfelder sample 47708 was just above the RBSL for benzene using the Cancer Risk factor of 1 E-6, however, was not listed because it was collected below current water table conditions. For soil leaching to groundwater, two samples were above the RBSL (Cancer Risk 1 E-4), for benzene, and a total of three samples using the more conservative Cancer Risk factor of 1 E-6. Forty-two soil samples were collected from the site. Seven samples were reported to contain benzene with only three of those samples identified at or above the RBSLs evaluated.

CONCLUSION

The site was evaluated with respect to the ASTM RBCA guidelines and ACDEH look up tables. It was determined that the site should be in Classification 3 because it poses a limited health risk to human health, safety and the environment. This is based on the planned use for the site, residential housing, shallow groundwater (soil leaching), and worker safety.

In accordance with the RBCA guidelines, TPH measurements are not used in preparing the risk assessment, but rather the individual compounds present. For this reason, this RBCA evaluated the chosen chemicals of concern; benzene, toluene, Ethyl benzene and xylenes.

an increase in the leaching potential of soils to groundwater by a increase of site watering practices (after the residential housing has been completed). Petroleum hydrocarbons will remain on-site in the soils as TPH compounds, although their volatile components will have been degraded. Non hazardous odors may be detected in the soils.

Recommendations

To address the groundwater quality and manage the risk, annually groundwater monitoring, during high water table conditions is recommended. Sentry wells are located in the downgradient direction, along the property boundary. Historical groundwater data suggests that natural attenuation is occurring. Additional groundwater sampling and review of the latest groundwater monitoring data, when available, could verify if the recent benzene identified in MW-1 is actually present. Soil sample 47708 which contains 2.9 ppm benzene is currently below the water table. Leaching of benzene into the groundwater can be expected, however, given its limited extent and low concentration, natural attenuation and bio-degradation will continue to occur. Groundwater monitoring should address the risk in the non potable aquifer. A groundwater pump and treat system would not be cost effective or technically effective means of remediation, given the site data. The introduction of an ORC material could be installed in the wells on-site to increase the oxygen content of the groundwater, therefore, increasing the natural bio-degradation and natural attenuation of petroleum hydrocarbons.

Excavation of impacted soil above the RBSL's to at least 1-foot below the maximum depth of the planned utilities is recommended in the three identified areas (Figure 3). This measure will preclude any potential soil leaching of benzene into the groundwater beneath the site. The excavations should extend to first encountered groundwater or approximately 6 to 7 feet bgs. Groundwater is anticipated between 4 and 6.5 feet bgs in these areas. Excavation of impacted soils is the most cost effective approach for this site.

If you have any questions or comments regarding the contents of this report, please call the undersigned at (707) 795-6097 or (707) 538-8818.

Sincerely,
Touchstone Developments by,

David J. Vossler
Project Manager

Marc Seeley, CEG #1014
Technical Review

Attachments:
Table A: Soil Analytical Summary
Table B: Groundwater Analytical Summary
Table C: RBSL Evaluation
Table D: Exposure Pathway Evaluation

Figure 1: Vicinity Map and Well Survey Locations
Figure 2: Site Plan
Figure 3: Source Areas and Areas of Concern
Figure 4: Boring and Sample Locations

Appendix A: ACPWD Well Data Base
Appendix B: RBCA Site Classification Table
Appendix C: ACDEH RBSL Look Up Table

TABLES

TABLE A
SOIL SAMPLE RESULTS
Former Alameda Bulk Plant

GASOLINE PETROLEUM HYDROCARBONS

Area	Boring Number	Depth (feet)	Consultant	Date	TPH - gasoline (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Xylene (ppm)
1	B-2	3	Kennedy/Jenks	3/84	NA*	NA	NA	NA	NA
1	SW-2	5-5.5	HLA	11/94	NA	ND	ND	ND	ND
1	47721	4	Kleinfelder	8/90	ND	0.002	0.006	ND	ND
1	SB-1	3	Touchstone	6/29/95	ND	ND	ND	ND	ND
1	SB-1	5	Touchstone	6/29/95	ND	ND	ND	ND	ND
2	B-1	surface	Kennedy/Jenks	3/84	NA*	NA	NA	NA	NA
2	SB-2	5-5.5	HLA	4/85	NA	ND	ND	ND	NA
2	SB-3	5-5.5	HLA	4/85	NA	ND	ND	ND	NA
2	47702	9.0	Kleinfelder	8/90	NA	ND	ND	ND	ND
2	47708	7.5	Kleinfelder	8/90	670	2.9	ND	7	11
2	47717	4.0	Kleinfelder	8/90	0.2	ND	ND	0.001	0.005
2	47720	6.0	Kleinfelder	8/90	9.2	0.003	0.004	0.043	0.028
2	SB-2	3.5	Touchstone	6/29/95	ND	ND	ND	ND	ND
2	SB-2	5	Touchstone	6/29/95	ND	ND	ND	ND	ND
2	SB-4	2.5	Touchstone	6/29/95	ND	ND	ND	ND	ND
2	SB-4	5.5	Touchstone	6/29/95	ND	ND	ND	ND	ND
3	B-4	4.0	Kennedy/Jenks	3/84	NA*	NA	NA	NA	NA
3	W-2	4-5.5	HLA	NA	ND	ND	ND	ND	ND
3	47700	7.0	Kleinfelder	8/90	190	ND	ND	ND	ND

* = samples visually inspected, but not analyzed, odor noted
TPH = Total petroleum hydrocarbons
ppm= parts per million

TABLE A (continued)
SOIL SAMPLE RESULTS
Former Alameda Bulk Plant

GASOLINE PETROLEUM HYDROCARBONS (continued)

Area	Boring Number	Depth (feet)	Consultant	Date	TPH - gasoline (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Xylene (ppm)
4	SB-4	surface	HLA	4/85	NA	ND	ND	0.006	NA
4	47701	1.5	Kleinfelder	8/90	NA	ND	ND	0.5	0.6
4	47712	4.5	Kleinfelder	8/90	1100	ND	ND	0.12	1.4
4	47715	5	Kleinfelder	8/90	1100	0.63	5.5	14	63
4	SB-3	3	Touchstone	6/29/95	ND	ND	ND	ND	ND
4	SB-3	5	Touchstone	6/29/95	ND	ND	ND	ND	ND
4	SB-7	2.5	Touchstone	6/29/95	98	ND	0.61	0.52	0.73
4	SB-7	5	Touchstone	6/29/95	470	ND	5.2	3.7	7.8
5	B-3	3.5	Kennedy/Jenks	3/84	NA	0.35	ND	0.64	NA
5	47703	7.0	Kleinfelder	8/90	8200	ND	ND	ND	2.0
5	SB-5	2.5	Touchstone	6/29/95	ND	ND	ND	ND	ND
5	SB-5	6	Touchstone	6/29/95	76	ND	ND	ND	0.97
5	SB-6	2.5	Touchstone	6/29/95	27	ND	ND	0.13	0.18
5	SB-6	5.5	Touchstone	6/29/95	380	1.1	1.2	2.4	1.6
5	SB-6	10	Touchstone	6/29/95	ND	ND	ND	ND	ND
6	W-1	0.5-1	HLA	11/94	NA	ND	ND	ND	ND
6	W-1	3.5-4.0	HLA	11/94	NA	ND	ND	ND	ND
6	SB-1	5-5.5	HLA	4/85	NA	ND	0.015	ND	NA
6	W-4	5-5.5	HLA	5/85	NA	ND	ND	ND	NA
6	47699	7.5	Kleinfelder	8/90	940	0.49	ND	2.3	1.7
6	47704	8.0	Kleinfelder	8/90	600	ND	ND	ND	ND
6	SB-8	2	Touchstone	6/29/95	ND	ND	0.010	ND	0.021
6	SB-8	5.5	Touchstone	6/29/95	ND	ND	ND	ND	ND
6	SB-9	4.0	Touchstone	6/29/95	ND	ND	ND	ND	ND
6	SB-9	5.5	Touchstone	6/29/95	ND	ND	ND	ND	ND
6	SB-9	10.0	Touchstone	6/29/95	ND	ND	ND	ND	ND

TABLE A (continued)
SOIL SAMPLE RESULTS
Former Alameda Bulk Plant

DIESEL, OIL AND GREASE and SOLVENTS

Area	Boring Number	Depth (feet)	Consultant	Date	TPH - diesel (ppm)	Oil and Grease (ppm)	8010, 601 or 624/625 chlorinated solvents (ppb) GAS COMPONENTS	8240 or 8270 semi-volatile solvents (ppb)
1	SW-2	5-5.5	Kennedy/Jenks	5/85	NA	NA	Trimethly chlorohexane = 750 Ethylmethylcyclohexane = 200 Tetramethyl hexane = 850 Decahydronethyl naphthalene =7000 Trimethyl octane = 11000 Dimethyl naphthalene = 13000 Heptadecane = 20000 Diocyctylester hexane diocacid = 86000	NA
1	47721	4	Kleinfelder	8/90	2600	260* 2400**	NA	NA
2	SB-2	5-5.5	HLA	4/85	NA	NA	Methylenechloride = 6 Di-n-butyl phthalate= 700 Bisethylhexyl pthalate= 100	NA
2	SB-3	5-5.5	HLA	4/85	NA	NA	Methylenechloride =8 Di-n-butyl phthalate=1100 Bisethylhexyl pthalate= 230	NA
2	44702	9.0	Kleinfelder	8/90	ND	ND	NA	NA
2	47708	7.5	Kleinfelder	8/90	320	20*	NA	8240 = only BTEX
2	47717	4.0	Kleinfelder	8/90	ND	ND**	NA	NA
2	47720	6.0	Kleinfelder	8/90	ND	ND**	NA	NA
2	SB-2	3.5	Touchstone	6/29/95	ND	ND***	ND	ND
2	SB-2	5	Touchstone	6/29/95	ND	ND***	ND	ND
3	47700	7.0	Kleinfelder	8/90	280	30* 160**	NA	8240 = ND for all

* Oil and grease determined by "purge and trap" method EPA 8015 - using GC
** Oil and grease determined by DHS method 503d&e - using IR
*** Oil and grease determined by Method 5520 e&f

TABLE A (continued)
SOIL SAMPLE RESULTS
Former Alameda Bulk Plant

DIESEL, OIL AND GREASE and SOLVENTS (continued)

Area	Boring Number	Depth (feet)	Consultant	Date	TPH - diesel (ppm)	Oil and Grease (ppm)	8010, 601 or 624/625 chlorinated solvents (ppb)	8240 or 8270 semi-volatile solvents (ppb)
4	SB-4	5-5.5	HLA	4/85	NA	NA	Methylenechloride =12 Di n-butyl phthalate=1800 Bisethylhexyl pthalate= 400	NA
4	47701	1.5	Kleinfelder	8/90	NA	3100**	NA	8240 = BTEX only
4	47712	4.5	Kleinfelder	8/90	✗ 6100	1200* ✗ 7200**	NA	8240 = BTEX only 8270 = ND for all
4	47715	5	Kleinfelder	8/90	20	ND* 50**	NA	8240 = BTEX only
4	SB-3	3	Touchstone	6/29/95	3.1	ND***	8010 = ND for all	8270 = ND for all
4	SB-3	5	Touchstone	6/29/95	ND	ND***	ND	8270 = ND for all
4	SB-7	2.5	Touchstone	6/29/95	25	ND***	NA	NA
4	SB-7	5	Touchstone	6/29/95	490	140***	NA	NA
5	B-3	3.5	Kennedy/Jenks	3/85	NA	NA	601 = ND for all	NA
5	47703	7.0	Kleinfelder	8/90	570	ND* 1200**	NA	8240 = BTEX only 8270 = ND for all
5	SB-5	2.5	Touchstone	6/29/95	53	NA	NA	NA
5	SB-5	6	Touchstone	6/29/95	23	NA	NA	NA
5	SB-6	2.5	Touchstone	6/29/95	94	ND***	8010 = ND for all	8270 = ND for all
5	SB-6	5.5	Touchstone	6/29/95	460	300***	NA	NA
5	SB-6	10	Touchstone	6/29/95	ND	ND***	8010 = ND for all	8270 = ND for all

* Oil and grease determined by "purge and trap" method EPA 8015 - using GC
** Oil and grease determined by DHS method 503d&e - using IR
*** Oil and grease determined by Method 5520e&f

TABLE A (continued)
SOIL SAMPLE RESULTS
Former Alameda Bulk Plant

DIESEL, OIL AND GREASE and SOLVENTS (continued)

Area	Boring Number	Depth (feet)	Consultant	Date	TPH - diesel (ppm)	Oil and Grease (ppm)	8010, 601 or 624/625 chlorinated solvents (ppb)	8240 or 8270 semi-volatile solvents (ppb)
6	SB-1	5-5.5	HLA	4/85	NA	NA	Methylenechloride =21 Di-n-butyl phthalate= 970 Bisethylhexyl pthalate= 67	NA
6	W-4	5-5.5	HLA	5/85	NA	NA	methylenechloride =5 Di-n-butyl phthalate= 1900 Bisethylhexyl pthalate= 80	NA
6	47698	1.0	Kleinfelder	8/90	NA	ND**	NA	NA
6	47699	7.5	Kleinfelder	8/90	880	ND*	NA	8240 = BTEX only
6	47704	8.0	Kleinfelder	8/90	110	30*	NA	8240 = ND for all Florene = 540 2-Methylnaphthalene = 740 Phenanthrene = 430
6	47707	2.5	Kleinfelder	8/90	NA	20**	NA	NA
6	SB-8	2	Touchstone	6/29/95	110	NA	NA	NA
6	SB-8	5.5	Touchstone	6/29/95	ND	NA	NA	NA
6	SB-9	4.0	Touchstone	6/29/95	1.2	NA	NA	NA
6	SB-9	5.5	Touchstone	6/29/95	580	NA	NA	NA
6	SB-9	10	Touchstone	6/29/95	ND	NA	NA	NA

* Oil and grease determined by "purge and trap" method EPA 8015 - using GC
** Oil and grease determined by DHS method 503d&e - using IR

TABLE A (continued)
SOIL SAMPLE RESULTS
Former Alameda Bulk Plant

METALS (as applicable)

Area	Boring Number	Depth (feet)	Consultant	Date	Cadmium (ppm)	Chromium (ppm)	Lead (ppm)	Nickel (ppm)	Organic Lead (ppm)	Zinc (ppm)
1	47721	4	Kleinfelder	8/90	ND	67	ND	59	NA	31
2	B-1	12.5	Kennedy /Jenks	3/84	0.29	53	ND	50	NA	93
2	SB-2	3.5	Touchstone	6/29/95	ND	27	5.3	8.0	ND	13
2	SB-2	5	Touchstone	6/29/95	ND	40	8.7	50	ND	25
3	47700	7.0	Kleinfelder	8/90	ND	35	ND	40	NA	20
4	47701	1.5	Kleinfelder	8/90	ND	25	8	9	NA	10
4	47712	4.5	Kleinfelder	8/90	ND	25	3	8	NA	21
4	SB-3	3	Touchstone	6/29/95	ND	26	15	10	ND	20
4	SB-3	5	Touchstone	6/29/95	ND	41	9	46	ND	31
4	SB-7	2.5	Touchstone	6/29/95	ND	38	8.4	55	ND	27
4	SB-7	5	Touchstone	6/29/95	ND	35	7.8	34	ND	26
5	47703	7.0	Kleinfelder	8/90	ND	33	ND	42	NA	24
6	47698	1.0	Kleinfelder	8/90	ND	22	3	11	NA	7
6	47707	2.5	Kleinfelder	8/90	ND	26	ND	15	NA	12

ND=Not detected at or above the laboratory detection limits
NA = Analysis not requested
ppm = parts per million (mg/kg)

TABLE A (continued)
SOIL SAMPLE RESULTS
Former Alameda Bulk Plant

METALS (continued)

Area	Boring Number	Depth (feet)	Consultant	Silver (ppm)	Arsenic (ppm)	Beryllium (ppm)	Copper (ppm)	Mercury (ppm)	Antimony (ppm)	Sellenium (ppm)	Thallium (ppm)
1	47721	4	Kleinfelder	ND	8	0.5	46	ND	ND	ND	31
2	B-1	12.5	Kennedy /Jenks	ND	ND	0.18	110	0.1	ND	ND	ND
3	47700	7.0	Kleinfelder	ND	5	0.3	15	ND	ND	ND	13
4	47701	1.5	Kleinfelder	ND	3	0.2	10	ND	ND	ND	9
4	47712	4.5	Kleinfelder	ND	ND	0.2	39	ND	ND	ND	8
5	47703	7.0	Kleinfelder	ND	6	0.4	21	ND	ND	ND	20
6	47698	1.0	Kleinfelder	ND	7	0.2	6	ND	ND	ND	5
6	47707	2.5	Kleinfelder	ND	5	0.3	6	ND	ND	ND	12

Note: B-1 (12.5 ft) and a composite of B-2 (3 ft) B-3 (3.5 ft) and B-4 (4 ft) were tested for polychlorinated biphenyls (PCBs). Results were "ND"
ND=Not detected at or above the laboratory detection limits
NA = Analysis not requested

TABLE B

WATER SAMPLE RESULTS

Former Alameda Bulk Plant
Alameda, California
all results in ug/L, parts per billion (ppb)

Boring No.	DTW (feet)	Consultant	Date	TPH-Gas	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-Diesel	TOG	MTBE	TDS (ppm)	SOLVENTS/other as listed by EPA method number
B-1	2.00	Kennedy/Jenks	Mar-84	NA	29	ND	ND	NA	NA	NA	NA	NA	601 = ND for all
offsite well	-	Kennedy/Jenks	Mar-84	NA	ND	ND	ND	NA	NA	NA	NA	NA	601 = ND for all
W-1	-	HLA	Nov-84	NA	ND	ND	ND	ND	NA	NA	NA	NA	624/625 = ND for all
W-2	-	HLA	Nov-84	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA
SW-1	-	HLA	Nov-84	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA
SW-2	-	HLA	Nov-84	NA	ND	ND	ND	ND	NA	NA	NA	NA	NA
SW-2	3.00	HLA	May-85	NA	ND	ND	ND	NA	NA	NA	NA	NA	624/625 = ND for all
W-3	-	HLA	May-85	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA
W-3	-	HLA	Nov-84	NA	ND	ND	ND	ND	NA	NA	NA	NA	624/625 = ND for all
W-4	5.00	HLA	May-85	NA	ND	ND	ND	NA	NA	NA	NA	NA	624/625 = ND for all
MW-1	-	Entrix	Jun-94	600	43	ND	8.9	3.5	340^	43	NA	740	NA
MW-1	7.03	Blaine	Aug-95	78	ND	ND	ND	ND	1200 ^^	NA	NA	NA	NA
MW-1	7.39	Blaine	Oct-95	ND	ND	ND	ND	ND	1100^^	NA	ND	NA	ND
MW-1	6.12	Blaine	Jan-96	ND	5.6	ND	ND	ND	920^^	NA	ND	NA	NA
MW-1	3.30	Blaine	Feb-96	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA
MW-2	-	Entrix	Jun-94	ND	ND	ND	ND	ND	270	ND	NA	NA	NA
MW-2	6.02	Blaine	Aug-95	ND	ND	ND	ND	ND	700^^	NA	NA	NA	NA
MW-2	6.47	Blaine	Oct-95	ND	ND	ND	ND	ND	710^^	NA	ND	NA	ND
MW-2	-	Blaine	Jan-96		Inaccessible								
MW-2	-	Blaine	Feb-96		Inaccessible								
MW-3	-	Entrix	Jun-94	360	0.70	ND	ND	0.50	190	0.70	NA	780	NA
MW-3	8.09	Blaine	Aug-95	56	ND	ND	ND	ND	860^^	NA	NA	NA	NA
MW-3	8.83	Blaine	Oct-95	ND	ND	ND	ND	ND	870^^	NA	ND	NA	
MW-3	5.73	Blaine	Jan-96	ND	ND	ND	ND	ND	530^^	NA	ND	NA	
MW-3	4.94	Blaine	Feb-96	NA	NA	NA	NA	NA	NA	ND	NA	NA	ND

TABLE B

WATER SAMPLE RESULTS

Former Alameda Bulk Plant
Alameda, California
all results in ug/L, parts per billion (ppb)

Boring No.	DTW (feet)	Consultant	Date	TPH-Gas	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-Diesel	TOG	MTBE	TDS (ppm)	SOLVENTS/other as listed by EPA method number
MW-4		Entrix	Jun-94	170	ND	ND	ND	ND	160^	NA	NA	NA	NA
MW-4	8.22	Blaine	Aug-95	ND	ND	ND	ND	ND	940^^	NA	NA	NA	NA
MW-4	8.65	Blaine	Oct-95	ND	ND	ND	ND	ND	570	NA	ND	NA	NA
MW-4	5.35	Blaine	Jan-96	ND	ND	ND	ND	ND	730^^	NA	ND	NA	NA
MW-4	4.34	Blaine	Feb-96	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA
MW-5	-	Entrix	Jun-94	140	ND	ND	ND	ND	620^	NA	NA	NA	NA
MW-5	7.26	Blaine	Aug-95	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
MW-5	7.78	Blaine	Oct-95	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
MW-5	4.33	Blaine	Jan-96	ND	ND	ND	ND	ND	1000^^	NA	ND	NA	NA
MW-5	3.30	Blaine	Feb-96	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA
MW-6	-	Entrix	Jun-94	ND	ND	ND	ND	ND	ND	NA	550	550	NA
MW-6	8.68	Blaine	Aug-95	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA
MW-6	9.12	Blaine	Oct-95	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
MW-6	5.90	Blaine	Jan-96	ND	ND	ND	ND	ND	78^^	NA	ND	NA	NA
MW-6	4.62	Blaine	Feb-96	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA

TPH-Gas = Total Petroleum Hydrocarbons calculated as Gasoline
TPH-Diesel = Total Petroleum Hydrocarbons calculated as Diesel
TOG = Total Oil & Grease
TDS = Total Dissolved Solids
DTW = Depth to Water
ND = Non Detected above the analytical method limits
NA = Not analyzed
deg. C = Degrees measured in Celsius
^ = unknown hydrocarbon found in diesel range qualified as diesel.
^^ = Chromatogram pattern indicates an unidentified hydrocarbon.
ppm = parts per million or mg/Kg

TABLE C

Exposure Pathway Evaluation

Corrective Action Evaluation
Former Alameda Bulk Plant
Alameda, California

Potential Exposure	Exposure Route, Medium and Exposure Point	Pathway Selected for Evaluation	Reason for Selection or Non-selection
Offsite Resident	Ingestion of Groundwater	yes	One irrigation well adjacent to site, not impacted.
	Direct Contact with Surface Soil	no	No near surface offsite soils impacted.
	Inhalation of Volatiles	no	Groundwater not used for domestic use. Imported municipal water source
Onsite Resident	Ingestion of Groundwater	no	No residents present onsite.
	Direct Contact with Surface Soil	no	No residents present onsite
	Inhalation of Volatiles	no	No residents present onsite
Onsite Construction Worker	Ingestion of Groundwater	no	Imported water supply
	Direct Contact with Surface Soil	yes	Planned development of property. Planned residential housing. Excavation activities.
	Inhalation of Volatiles	yes	Planned construction at site. Potential contact of impacted soils and emmissions.
Visitor	Ingestion of Groundwater	no	No contact with water
	Direct Contact with Surface Soil	yes	site is secured with fencing. No access to public.
	Inhalation of Volatiles	yes	No recorded emmissions eminating from the site or surface soils. Groundwater is not adversly impacted.
Planned Land Use/Onsite Resident	Ingestion of Groundwater	no	imported water supply
	Direct Contact with Surface Soil	yes	Potential contact with surface soils
	Inhalation of Volatiles	yes	Potential contact of impacted soils and emmissions

TABLE D
Tier 1 - RBSL Evaluation
Corrective Action Evaluation
Former Alameda Bulk Plant
Alameda, California

Chemical of Concern (soil)	Maximum Concentration (ppm)	RBSL (ppm)	Soil Samples above RBSL
Ingestion, Inhalation, Dermal			
Benzene	1.1	168.8*	none
		1.69**	none
Toluene	5.5	1,862	none
Ethylbenzene	14	548	none
Xylenes	63	2,030,000	none
Leachate to Groundwater			
Benzene	1.1	0.5**	47715, SB-6 @ 5.5' *
		0.005**	47715, SB-6@5.5', B-3 @ 3.5' **
Toluene	5.5	110^	none
Ethylbenzene	14	40^	none
Xylenes	63	RES^	none
Chemical of Concern (groundwater)	**Maximum Concentration (ppb)**	**RBSL (ppb)**	**Groundwater Samples above RBSL**
Ingestion			
Benzene	5.6	85 *	none
		0.9 **	MW-1
Toluene	ND	7300	none
Ethylbenzene	ND	3,650	none
Xylenes	ND	73,000	none

Notes:

RBSLs calculated using ASTM reference equations and standard default values (ASTM 1739-95).

Benzene RBSL and groundwater RBSLs provided by ACDEH look up table (HQ = 1).

RES = selective risk level is not exceeded for pure compound present at any concentration

ppm = parts per million

ppb = parts per billion

* = denotes cancer risk of 1.0E-04

* * = denotes cancer risk of 1.0E-06

^ = Calculated using site specific data: Mixing zone thickness = 2ft., depth to ground water = 6 ft., depth to subsurface soils = 3 ft. thickness of vadose zone = 6 ft., thickness of capillary fringe = 2 ft., lower depth of soil zone = 7 ft.

FIGURES

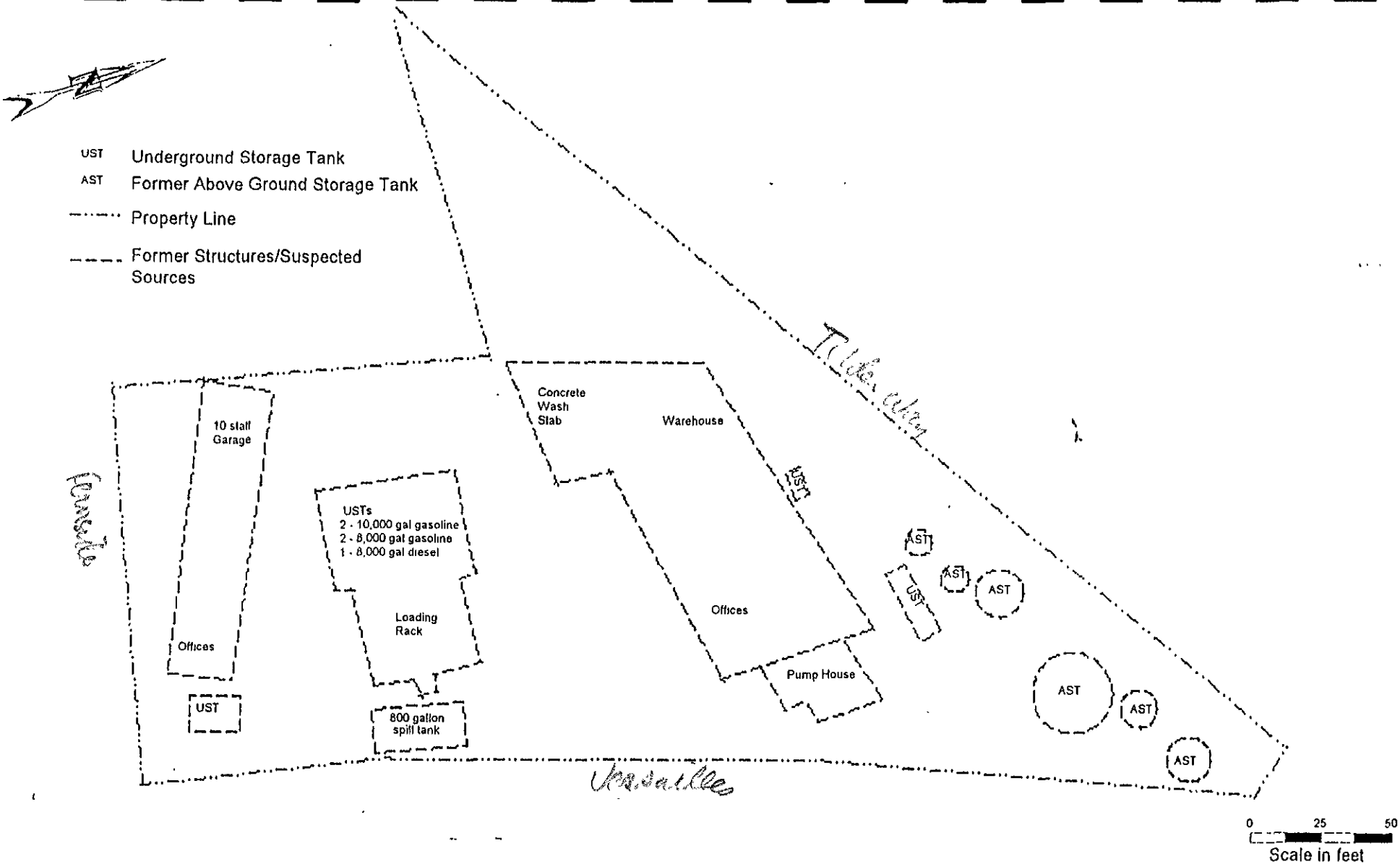
Touchstone Developments
Environmental Management

SITE VICINITY MAP and WELL SURVEY LOCATIONS

Former Chevron Bulk Plant
2001 Versailles Avenue
Alameda, California

FIGURE
1

PROJECT NO	DATE	DRAWN BY	BASE MAP
96-FABP-3	5/96	DJV	AAA ROAD MAP JANUARY 1995



Touchstone Developments
Environmental Management

SITE PLAN
FORMER ALAMEDA BULK PLANT
2001 VERSAILLES AVENUE
ALAMEDA, CALIFORNIA

FIGURE
2

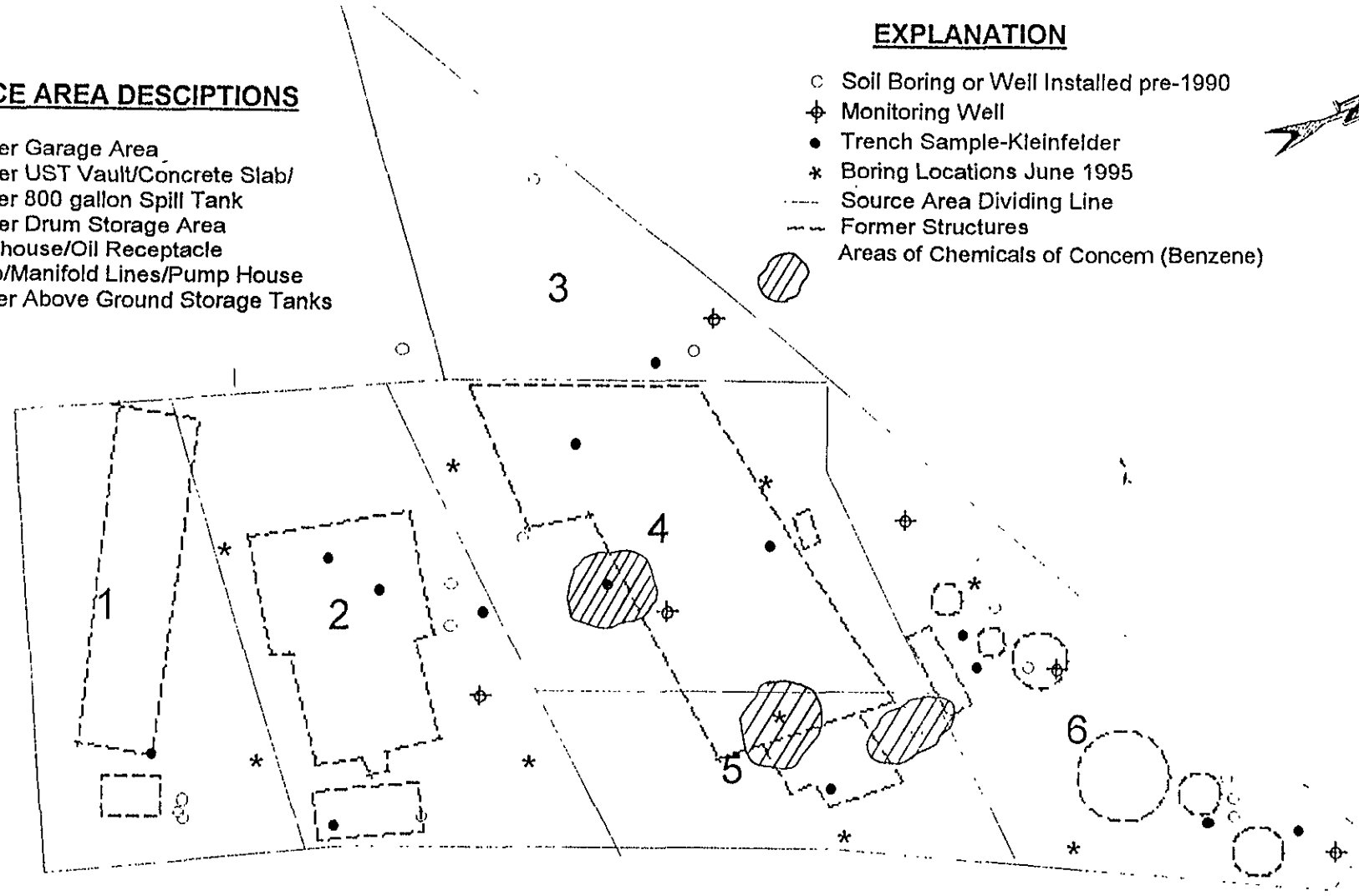
PROJECT NO.	DRAWN BY:	DATE	BASE MAP:
chev-1	AMD	1/95	KLEINFELDER

SOURCE AREA DESCIPTIONS

1) Former Garage Area
2) Former UST Vault/Concrete Slab/ Former 800 gallon Spill Tank
3) Former Drum Storage Area
4) Warehouse/Oil Receptacle
5) Sump/Manifold Lines/Pump House
6) Former Above Ground Storage Tanks

EXPLANATION

- Soil Boring or Well Installed pre-1990
- Monitoring Well
- Trench Sample-Kleinfelder
- Boring Locations June 1995
- Source Area Dividing Line
- Former Structures
- Areas of Chemicals of Concern (Benzene)



Areas Are Approximate

0 25 50
Scale in feet

Touchstone Developments
Environmental Management

POTENTIAL SOURCE AREAS and AREAS OF CONCERN

FORMER ALAMEDA BULK PLANT
2001 VERSAILLES AVENUE
ALAMEDA, CALIFORNIA

FIGURE
3

PROJECT NO.	DRAWN BY:	DATE	BASE MAP:
chev-1	AMD	7/95	KLEINFELDER

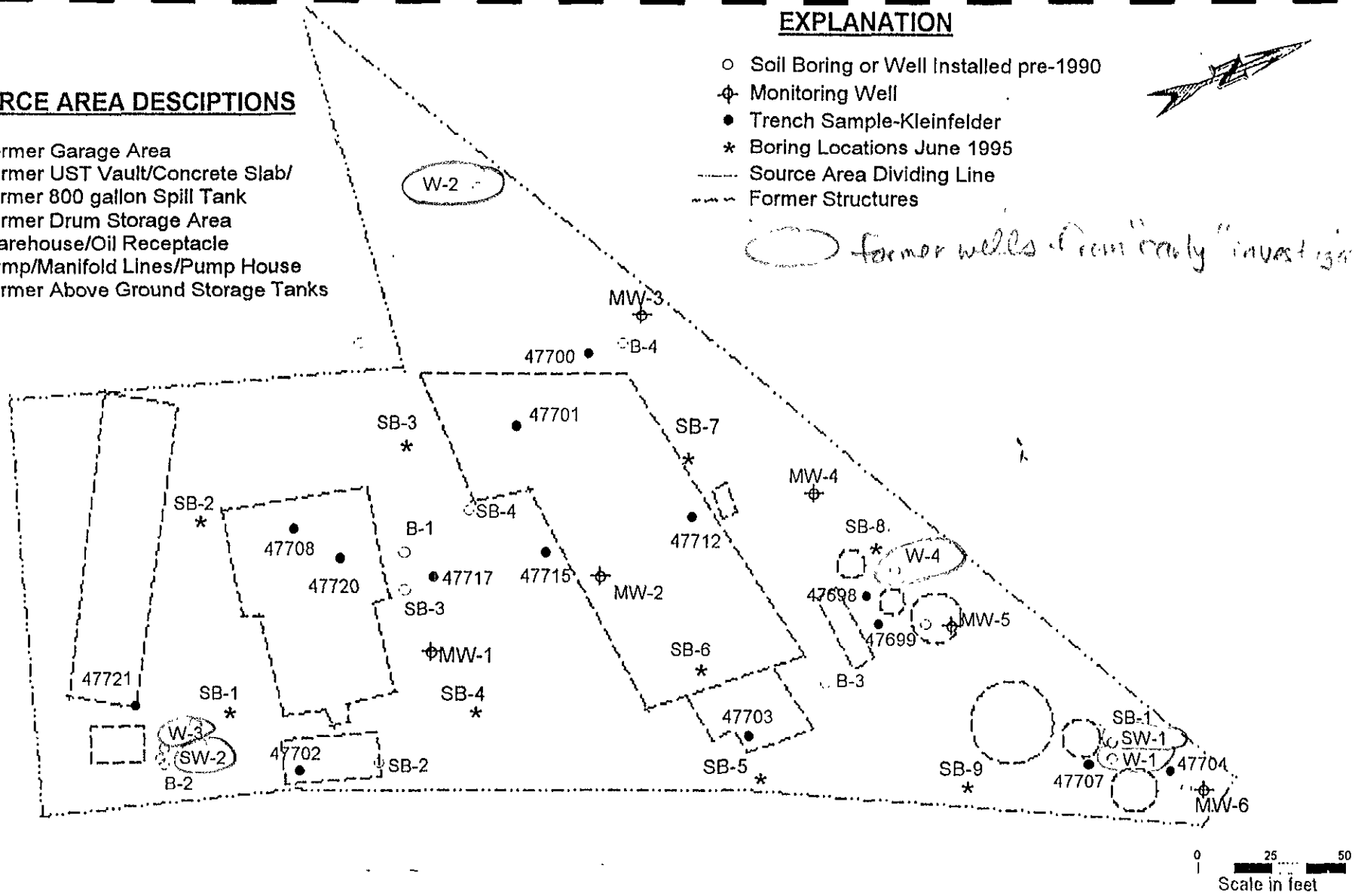
SOURCE AREA DESCIPTIONS

1) Former Garage Area
2) Former UST Vault/Concrete Slab/ Former 800 gallon Spill Tank
3) Former Drum Storage Area
4) Warehouse/Oil Receptacle
5) Sump/Manifold Lines/Pump House
6) Former Above Ground Storage Tanks

EXPLANATION

- ○ Soil Boring or Well Installed pre-1990
- ⊕ Monitoring Well
- ● Trench Sample-Kleinfelder
- * Boring Locations June 1995
- —— Source Area Dividing Line
- - - - Former Structures

former wells from early investigation



Touchstone Developments
Environmental Management

BORINGS AND SAMPLE LOCATIONS

FORMER ALAMEDA BULK PLANT
2001 VERSAILLES AVENUE
ALAMEDA, CALIFORNIA

FIGURE
4

PROJECT NO.	DRAWN BY:	DATE	BASE MAP:
chev-1	AMD	7/95	KLEINFELDER

APPENDIX A

ACPWD Well Data Base

WELL #		CITY	ADDRESS	OWNER		PHONE	USE	DR.DATE	DIAM	TOT.DEPTH	DTW	ST.ELEV	MA.ELEV	YIELD	LOG	WQ	ML	DATAORGN	MARGIN
2S/3W	5C	OAK	FRUITVALE AVE/DAVIS ST	PERALTA HACIENDA		0	DOR	10/85	4	20	10	0	0	0	G	0	0		L
2S/3W	7P 1	OAK	333 23RD AVE	CHEVRON/RHODES-JAMIESON		0	MON	9/85	4	24	9	0	0	0	G	0	0		L
2S/3W	7P 2	OAK	333 23RD AVE	CHEVRON/RHODES-JAMIESON		0	MON	9/85	4	24	9	0	0	0	G	0	0		L
2S/3W	7P 3	OAK	333 23RD	CHEVRON/RHODES-JAMIESON		0	MON	9/85	4	24	7	0	0	0	G	0	0		L
2S/3W	7P 4	OAK	333 23RD	CHEVRON/RHODES-JAMIESON		0	MON	9/85	4	24	11	0	0	0	G	0	0		L
2S/3W	7P 5	OAK	333 23RD AVE	CHEVRON/RHODES-JAMIESON		0	MON	9/85	4	24	11	0	0	0	G	0	0		L
2S/3W	7P 6	OAK	333 23RD AVE	CHEVRON/RHODES-JAMIESON		0	MON	9/85	3	24	0	0	0	0	G	0	0		L
2S/3W	7P 7	OAK	333 23RD AVE	CHEVRON/RHODES-JAMIESON		0	MON	10/85	4	24	12	19	0	0	G	0	0		L
2S/3W	7P 8	OAK	333 23RD AVE	CHEVRON/RHODES-JAMIESON		0	MON	10/85	4	24	9	20	0	0	G	0	0		L
2S/3W	7P 9	OAK	333 23RD AVE	CHEVRON/RHODES-JAMIESON		0	MON	10/85	4	24	9	19	10	0	G	0	0		L
2S/3W	7P10	OAK	333 23RD AVE	CHEVRON/RHODES-JAMIESON		0	MON	11/85	4	24	0	0	0	0	G	0	0		L
2S/3W	7P11	OAK	333 23rd AVE	CHEVRON/LONESTAR		0	MON	8/87	0	20	10	0	0	0	G				L
2S/3W	7P12	OAK	333 23rd AVE	CHEVRON/LONESTAR		0	MON	8/87	0	20	10	0	0	0	G				L
2S/3W	7P13	OAK	333 23rd AVE	CHEVRON/LONESTAR		0	MON	8/87	0	20	10	0	0	0	G				L
2S/3W	7P14	OAK	CRN OF KENNDY & 23RD AVE	CHEVRON/LONESTAR		0	REC	04/88	12	26	9	0	0	0	G	0	0		L
2S/3W	7G	OAK	E 7th St & 29th Ave	EBMUD		0	MON	8/90	4	35	23	34	11	0	G	0	0		D
2S/3W	7G 1	OAK	2900 GLASCOCK ST	DERR OLIVER INC.		0	IRR	/19	10	160	61	0	0	0	?	0	1		L
2S/3W	7H	OAK	880 Fruitvale Ave	State Shingle Company		0	MON	7/90	6	26	12	0	0	0	G	0	0		D
2S/3W	7H 1	OAK	880 Fruitvale Ave	State Shingle Company		0	MON	2/90	2	35	27	168	141	0	G	0	0		D
2S/3W	7H 2	OAK	880 Fruitvale Ave	State Shingle Company		0	MON	10/90	2	30	17	29	12	0	D	0	0		D
2S/3W	7H 3	OAK	880 Fruitvale Ave	State Shingle Company		0	MON	10/90	2	30	17	29	12	0	D	0	0		D
2S/3W	7J 1	OAK	3600 ALAMEDA AVE	OWENS-ILLINOIS		0	MON	09/86	2	30	11	0	0	0	G	0	0		L
2S/3W	7J 2	OAK	3600 ALAMEDA AVE	OWENS-ILLINOIS		0	MON	09/86	2	30	18	0	0	0	G	0	0		L
2S/3W	7J 3	OAK	3600 ALAMEDA AVE	OWENS-ILLINOIS		0	MON	09/86	2	31	14	0	0	0	G	0	0		L
2S/3W	7J 4	OAK	3600 ALAMEDA AVE	OWENS-ILLINOIS		0	MON	09/86	2	30	13	0	0	0	G	0	0		L
2S/3W	7J 5	OAK	3600 ALAMEDA AVE	OWENS-ILLINOIS		0	MON	09/86	2	30	18	0	0	0	G	0	0		L
2S/3W	7J 6	OAK	3600 ALAMEDA AVE	OWENS-ILLINOIS		0	MON	09/86	2	30	19	0	0	0	G	0	0		L
2S/3W	7J 7	OAK	3600 ALAMEDA AVE	OWENS-ILLINOIS		0	MON	09/86	2	25	18	0	0	0	G	0	0		L
2S/3W	7J 8	OAK	3600 ALAMEDA AVE	OWENS-ILLINOIS		0	MON	10/86	2	30	18	0	0	0	G	0	0		L
2S/3W	7J 9	OAK	3600 ALAMEDA AVE	OWENS-ILLINOIS		0	MON	10/86	2	25	15	0	0	0	G	0	0		L
2S/3W	7J18	OAK	3600 ALAMEDA AVE	OWENS ILLINOIS GLASS		0	MON	07/86	2	16	0	0	0	0	G	0	0		L
2S/3W	7J20	OAK	3600 ALAMEDA AVE	OWENS ILLINOIS GLASS		0	MON	11/86	2	32	17	0	0	0	G	0	0		L
2S/3W	7J21	OAK	3600 ALAMEDA AVE	OWENS ILLINOIS GLASS		0	MON	11/86	2	27	19	0	0	0	G	0	0		L
2S/3W	7J22	OAK	3600 ALAMEDA AVE	OWENS ILLINOIS GLASS		0	MON	12/86	2	27	14	0	0	0	G	0	0		L
2S/3W	7J23	OAK	3600 ALAMEDA AVE	OWENS ILLINOIS GLASS		0	MON	11/86	2	27	14	0	0	0	G	0	0		L
2S/3W	7J24	OAK	3600 ALAMEDA AVE	OWENS ILLINOIS GLASS		0	MON	12/86	2	30	13	0	0	0	G	0	0		L
2S/3W	7J25	OAK	3600 ALAMEDA AVE	OWENS ILLINOIS GLASS		0	MON	12/86	2	25	13	0	0	0	G	0	0		L
2S/3W	7J26	OAK	3600 ALAMEDA AVE	OWENS ILLINOIS GLASS		0	MON	12/86	2	25	12	0	0	0	G	0	0		L
2S/3W	7J27	OAK	3600 ALAMEDA AVE	OWENS ILLINOIS GLASS		0	MON	12/86	2	25	10	0	0	0	G	0	0		L
2S/3W	7J28	OAK	3675 Alameda Ave	Unocal Corp	VMW1	0	MON	12/91	2	10	0	0	0	0	G	0	0		D
2S/3W	7J29	OAK	3675 Alameda Ave	Unocal Corp	VMW2	0	MON	12/91	2	10	0	0	0	0	G	0	0		D
2S/3W	7J30	OAK	3675 Alameda Ave	Unocal Corp	VMW3	0	MON	12/91	2	10	0	0	0	0	G	0	0		D
2S/3W	7J31	OAK	3675 Alameda Ave	Unocal Corp	VMW4	0	MON	12/91	2	10	0	0	0	0	G	0	0		D
2S/3W	7J32	OAK	3675 Alameda Ave	Unocal Corp	VMW5	0	MON	12/91	2	9	0	0	0	0	G	0	0		D
2S/3W	7J33	OAK	3675 Alameda Ave	Unocal Corp	VMW7	0	MON	12/91	2	11	0	0	0	0	G	0	0		D
2S/3W	7J34	OAK	3675 Alameda Ave	Unocal Corp	VMW-8	0	MON	12/91	2	11	0	0	0	0	G	0	0		D
2S/3W	7J35	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J36	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J37	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J38	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J39	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J40	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J41	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J42	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J43	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J44	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J45	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J46	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J47	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J48	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J49	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D
2S/3W	7J50	OAK	3675 Alameda Ave	Lerner Props		0	DBS	6/91	0	0	0	0	0	0					D

WELL #	CITY	ADDRESS	OWNER		PHONE	USE	DR.DATE	DIAM	TOT.DEPTH	DTW	ST.ELEV	WA.ELEV	YIELD	LOG	NO	ML	DATAORGN	MARGIN
2S/3W 7J51	OAK	3675 Alameda Ave	Lerner Props		0	DES	6/91	0	0	0	0	0	0				D	
2S/3W 7K	ALA	FRUITVALE AVE R.R. BRIDGE	US ARMY CORPS OF ENGRS.		0	BOR	11/87	0	75	14	0	0	0	U	0	0	L	
2S/3W 7K	ALA	2691 BLANDING AVENUE	AMERICAN STORES PROP INC		0	BOR	04/88	0	15	6	0	0	0	U	0	0	L	
2S/3W 7K 1	ALA	2691 BLANDING AVENUE	AMERICAN STORES PROP INC		0	MON	04/88	2	24	5	0	0	0	G	0	0	L	
2S/3W 7K 2	ALA	2691 BLANDING AVENUE	AMERICAN STORES PROP INC		0	MON	04/88	2	25	9	0	0	0	G	0	0	L	
2S/3W 7K 3	ALA	2691 BLANDING AVENUE	AMERICAN STORES PROP INC		0	MON	04/88	2	25	6	0	0	0	G	0	0	L	
2S/3W 7K 4	OAK	2915 Ford St.	Gilro Machine & Stamping		0	MON	11/90	4	14	7	0	0	0	D	0	0	D	
2S/3W 7K 5	OAK	2915 Ford St.	Gilro Machine & Stamping		0	MON	11/90	2	16	13	7	-6	0	G	0	0	D	
2S/3W 7K 6	OAK	2915 Ford St.	Gilro Machine & Stamping		0	MON	11/90	2	16	12	9	-3	0	G	0	0	D	
2S/3W 7L 1	ALA	1915 EVERETT ST	R.S. SCHMIT		0	ABN	?	0	90	36	0	0	0	?	0	2	L	
2S/3W 7L 2	ALA	1819 EVERETT ST	A.T. GHILLIER		0	IRR	/06	4	0	5	0	0	0	?	0	2	L	
2S/3W 7L 3	ALA	1801 PARE ST & EAGLE	CHEVRON SERVICE STATION		0	MON	2/85	8	20	7	0	0	0	G	0	0	L	
2S/3W 7L 4	ALA	1801 PARE ST & EAGLE	CHEVRON SERVICE STATION		0	MON	2/85	8	18	7	0	0	0	G	0	0	L	
2S/3W 7L 5	ALA	1801 PARE ST & EAGLE	CHEVRON SERVICE STATION		0	MON	2/85	8	17	7	0	0	0	G	0	0	L	
2S/3W 7L 6	ALA	1801 PARE ST & EAGLE	CHEVRON SERVICE STATION		0	MON	2/85	8	17	7	0	0	0	G	0	0	L	
2S/3W 7L 7	ALA	1801 PARE ST & EAGLE	CHEVRON SERVICE STATION		0	MON	2/85	8	17	7	0	0	0	G	0	0	L	
2S/3W 7L 8	ALA	1725 PARE ST	EXXON RS 7-0104		0	MON	06/88	4	16	7	0	0	0	D	0	0	L	
2S/3W 7L 9	ALA	1725 PARK ST	EXXON RS 7-0104		0	MON	06/88	4	15	7	0	0	0	D	0	0	L	
2S/3W 7L10	ALA	1725 PARK ST	EXXON RS 7-0104		0	MON	06/88	4	22	7	0	0	0	D	0	0	L	
2S/3W 7L11	ALA	1725 PARK ST.	EXXON		0	MON	02/89	4	20	0	0	0	0	G	0	0	L	
2S/3W 7L12	ALA	1725 PARK ST.	EXXON		0	MON	02/89	4	20	0	0	0	0	G	0	0	L	
2S/3W 7L13	ALA	1725 PARK ST.	EXXON		0	MON	02/89	4	20	0	0	0	0	G	0	0	L	
2S/3W 7L14	ALA	1725 Park Street	Exxon Corporation		0	MON	1/90	4	20	9	0	0	0	G	0	0	L	
2S/3W 7L15	ALA	1725 Park Street	Exxon USA	MW-1	0	EXT	12/91	4	40	7	0	0	0	D	0	0	D	
2S/3W 7L16	ALA	1725 Park Street	Exxon USA	MW-2	0	EXT	12/91	4	40	7	0	0	0	D	0	0	D	
2S/3W 7L17	ALA	1725 Park Street	Exxon USA	MW-3	0	EXT	12/91	4	41	7	0	0	0	D	0	0	D	
2S/3W 7L18	ALA	1725 Park Street	Exxon USA	MW-4	0	EXT	12/91	4	41	7	0	0	0	D	0	0	D	
2S/3W 7L19	ALA	1725 Park Street	Exxon USA	MW-5	0	EXT	12/91	4	40	7	0	0	0	D	0	0	D	
2S/3W 7L20	ALA	1911 Park St.	Alameda Collision Rep.	MW1	0	MON	12/92	4	20	10	0	0	0	D	1	1	D	
2S/3W 7L21	ALA	1725 PARK ST	EXXON RS 7-0104	SW-1	0	MON	11/93	2	20	11	0	0	0	G	0	0	D	
2S/3W 7L22	ALA	1725 PARK ST	EXXON RS 7-0104	VW-1	0	MON	11/93	2	7	0	0	0	0	G	0	0	D	
2S/3W 7L23	ALA	1725 PARK ST	EXXON RS 7-0104	SM-1	0	MON	11/93	2	20	9	0	0	0	G	0	0	D	
2S/3W 7L24	ALA	1725 PARK ST	EXXON RS 7-0104	SM-1	0	MON	11/93	2	8	0	0	0	0	G	0	0	D	
2S/3W 7M 1	OAK	2307 CLEMENT AVE	BOB TENNANT		5237532	IND	4/77	6	72	0	0	0	7	D	0	0	L	Yes
2S/3W 7M 2	OAK	2307 CLEMENT AVE	BOB TENNANT		0	IND	4/77	6	82	6	0	0	0	D	0	0	L	Yes
2S/3W 7M 6	ALA	1825 Park St.	Goode Toyota	MW-4	0	MON	4/93	2	15	6	0	0	0	G	1	1	D	
2S/3W 7N 1	OAK	2235 LINCOLN AVE	ALAMEDA STEAM LAUNDRY		0	IRR	/16	0	206	0	0	0	0	?	0	3	L	Yes
2S/3W 7N14	ALA	1700 Park Street	Mr.Dave Cavanaugh		0	MON	05/90	4	15	0	0	0	0	G	0	0	D	
2S/3W 7N15	ALA	1700 Park Street	Mr.Dave Cavanaugh		0	MON	05/90	4	15	0	0	0	0	G	0	0	D	
2S/3W 7N16	ALA	1700 Park Street	Mr.Dave Cavanaugh		0	MON	05/90	4	15	0	0	0	0	G	0	0	D	
2S/3W 7N17	ALA	1700 Park Street	Mr.Dave Cavanaugh		0	MON	05/90	4	15	0	0	0	0	G	0	0	D	
2S/3W 7N23	ALA	1726 Park St	John B. Henry Estate		0	MON	5/92	2	20	7	0	0	0	D	0	0	D	
2S/3W 7N24	ALA	1700 Park St	Cavanaugh Motors	MW5	0	MON	6/91	2	21	8	0	0	0	D	0	0	D	
2S/3W 7N25	ALA	1700 Park St	Cavanaugh Motors	MW6	0	MON	6/91	2	21	8	0	0	0	D	0	0	D	
2S/3W 7P 1	ALA	2623 EAGLE AVE.	PG&E		0	CAT	6/76	0	120	0	0	0	0	D	0	0	L	
2S/3W 7Q 1	OAK	1819 VERSAILLES AV	LESTER CABRAL		0	IRR	9/77	4	24	5	0	0	12	D	0	0	L	
2S/3W 7Q 2	ALA	2001A VERSAILLES AV	KING PETROLEUM		8650767	MON	10/84	7	28	5	11	6	0	G	0	0	L	
2S/3W 7Q 3	ALA	2001A VERSAILLES AV	KING PETROLEUM		8650767	MON	10/84	7	30	5	12	7	0	G	0	0	L	
2S/3W 7Q 4	ALA	2001A VERSAILLES AV	KING PETROLEUM		8650767	MON	10/84	7	35	4	12	8	0	G	0	0	L	
2S/3W 7Q 5	ALA	2001A VERSAILLES AV	KING PETROLEUM		8650767	MON	10/84	7	10	5	11	6	0	G	0	0	L	
2S/3W 7Q 6	ALA	2001A VERSAILLES AV	KING PETROLEUM		8650767	MON	10/84	7	10	4	12	8	0	G	0	0	L	
2S/3W 7Q 7	ALA	2100A VERSAILLES AVE	KING PETROLEUM		0	MON	04/85	8	35	5	0	0	0	G	0	N	L	
2S/3W 7Q 8	ALA	1708 VERSAILLES AVE	MARK RATTO		0	IRR	07/88	5	60	10	0	0	0	?	0	0	L	
2S/3W 8E 1	OAK	W. 37TH AVE	PG&E		0	CAT	12/73	0	120	0	0	0	0	D	0	0	L	Yes
2S/3W 8M	OAK	3801 East 8th Street	American National Can Co.		0	BOR*	8/89	12	0	0	0	0	0	G	0	0	D	
2S/3W 8M	OAK	3801 East 8th Street	American National Can Co.		0	BOR*	3/91	8	7	5	0	0	0	G	0	0	D	
2S/3W 8M	OAK	3801 E. 8th St.	American Nat'l Can Co.	TB	0	GEO	12/94	0	24	0	0	0	0	G	0	0	D	
2S/3W 8M	OAK	3801 EAST 8TH AVE	AMERICAN CAN CO		0	BOR	01/86	2	30	13	0	0	0	G	0	0	L	Yes
2S/3W 8M 2	OAK	3801 East 8th Street	American National Can Co.		0	MON	8/89	4	24	0	15	0	0	G	0	0	D	
2S/3W 8M 3	OAK	3801 East 8th Street	American National Can Co.		0	OW	8/89	4	25	0	13	0	0	G	0	0	D	
2S/3W 8M 4	OAK	3801 East 8th Street	American National Can Co.		0	MON	8/89	4	20	0	12	0	0	G	0	0	D	
2S/3W 8M 5	OAK	3801 East 8th Street	American National Can Co.		0	MON	8/89	4	22	0	12	0	0	G	0	0	D	

WELL #		CITY	ADDRESS	OWNER	PHONE	USE	DR DATE	DIAM	TOT.DEPTH	DTW	ST. ELEV	WA. ELEV	YIELD	LOG	NO	WL	DATAQUAL	MARGIN
2S/3W	8M 6	OAK	3801 East 8th Street	American National Can Co.	0	MON	8/89	4	18	0	18	0	0	G	0	0		D
2S/3W	8M 7	OAK	3801 East 8th Street	American National Can Co.	0	IRR	4/91	7	180	41	0	0	0	U				U
2S/3W	8M 8	OAK	3801 East 8th Street	American National Can Co.	0	MON	3/91	0	25	11	0	0	0	G				U
2S/3W	8M 9	OAK	3801 East 8th Street	American National Can Co.	0	MON	4/91	4	20	12	16	4	0	G				D
2S/3W	8M10	OAK	3801 East 8th Street	American National Can Co.	0	MON	3/91	4	20	12	15	4	0	G				D
2S/3W	8M11	OAK	3801 East 8th Street	American National Can Co.	0	MON	3/91	4	19	9	15	6	0	G				D
2S/3W	8M12	OAK	3801 East 8th Street	American National Can Co.	0	MON	3/91	4	19	13	16	3	0	G				D
2S/3W	8M13	OAK	3801 East 8th Street	American National Can Co.	0	MON	3/91	4	19	12	15	3	0	G				D
2S/3W	8M14	OAK	3801 East 8th Street	American National Can Co.	0	MON	3/91	4	22	10	13	3	0	G				D
2S/3W	8M15	OAK	3801 East 8th Street	American National Can Co.	0	MON	3/91	4	18	13	16	3	0	G				D
2S/3W	8M16	OAK	3801 East 8th Street	American National Can Co.	0	MON	3/91	4	18	10	13	3	0	G				D
2S/3W	8M17	OAK	3801 East 8th Street	American National Can Co.	0	MON	3/91	4	23	10	12	2	0	G				D
2S/3W	8M18	OAK	3801 East 8th Street	American National Can Co.	0	MON	3/91	4	18	10	13	3	0	G				D
2S/3W	8M19	OAK	3801 East 8th Street	American National Can Co.	0	MON	3/91	4	19	11	15	4	0	G				D
2S/3W	8M20	OAK	3801 E 8th ST	American National CanMW17	0	MON	1/92	2	15	4	10	6	0	G	0	0		D
2S/3W	8M21	OAK	3801 E 8th ST	American National CanMW18	0	MON	1/92	2	19	4	23	9	0	G	0	0		D
2S/3W	8M22	OAK	3801 E 8th ST	American National CanMW19	0	MON	1/92	2	20	4	23	9	0	G	0	0		D
2S/3W	8M23	OAK	3801 E 8th ST	American National CanMW20	0	MON	1/92	2	19	4	14	10	0	G	0	0		D
2S/3W	8M24	OAK	3801 E 8th ST	American National CanMW21	0	MON	1/92	2	19	4	13	9	0	G	0	0		D
2S/3W	8M25	OAK	3801 East 8th St	American National Can TW1	0	TES	10/91	6	23	5	18	13	0	G	0	0		D
2S/3W	8M26	OAK	3801 East 8th St	American Natl Can MW14	0	MON	10/91	4	19	2	12	10	0	G	0	0		D
2S/3W	8M27	OAK	3801 East 8th St	American Natl Can MW15	0	MON	10/91	4	21	5	18	13	0	G	0	0		D
2S/3W	8M28	OAK	3801 East 8th St	American Natl Can MW16	0	MON	10/91	4	19	2	13	11	0	G	0	0		D
2S/3W	8N	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	25	15	8	-7	0	G	0	0		D
2S/3W	8N	OAK	410 High Street	Unocal Corporation	0	BOR*	8/89	4	0	8	8	0	0	G	0	0		D
2S/3W	8N	OAK	301 - 411 High Street	Arco Products Co	0	BOR	1/91	2	6	2	5	3	0	G	1	L		D
2S/3W	8N	OAK	401 HIGH STREET	UNOCAL CHEMICAL	0	BOR	8/88	6	18	0	0	0	0	G	0	0		L
2S/3W	8N15	OAK	410 High Street	Unocal Corporation	0	MON	9/90	4	98	19	0	0	0	D	0	0		U
2S/3W	8N16	OAK	410 High Street	Unocal Corporation	0	BOR*	9/89	4	0	10	11	1	0	G	0	0		D
2S/3W	8N17	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	25	15	9	-6	0	G	0	0		D
2S/3W	8N18	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	25	15	8	7	0	G	0	0		D
2S/3W	8N19	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	27	15	9	-6	0	G	0	0		D
2S/3W	8N20	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	30	15	8	7	0	G	0	0		D
2S/3W	8N21	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	26	15	8	-7	0	G	0	0		D
2S/3W	8N22	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	23	15	8	-7	0	G	0	0		D
2S/3W	8N23	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	26	15	8	-7	0	G	0	0		D
2S/3W	8N24	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	26	15	7	-8	0	G	0	0		D
2S/3W	8N25	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	24	15	8	-7	0	G	0	0		D
2S/3W	8N26	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	26	15	8	-7	0	G	0	0		D
2S/3W	8N27	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	25	15	8	-7	0	G	0	0		D
2S/3W	8N28	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	22	15	8	-7	0	G	0	0		D
2S/3W	8N29	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	24	15	8	-7	0	G	0	0		D
2S/3W	8N30	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	22	15	7	-8	0	G	0	0		D
2S/3W	8N31	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	24	15	9	-6	0	G	0	0		D
2S/3W	8N32	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	29	15	7	-8	0	G	0	0		D
2S/3W	8N33	OAK	410 High Street	Unocal Corporation	0	MON	9/89	2	27	15	7	-8	0	G	0	0		D
2S/3W	8N34	OAK	301 - 411 High Street	Arco Products Co	0	MON	10/90	1	14	0	0	0	0	G	0	0		D
2S/3W	8N35	OAK	301 - 411 High Street	Arco Products Co	0	BOR*	11/89	6	0	8	0	0	0	G	0	0		D
2S/3W	8N36	OAK	301 - 411 High Street	Arco Products Co MW1B	0	MON	1/91	2	23	10	8	-2	0	G	1	1		D
2S/3W	8N37	OAK	301 - 411 High Street	Arco Products Co MW2B	0	MON	1/91	2	23	10	7	-3	0	G	1	1		D
2S/3W	8N38	OAK	301 - 411 High Street	Arco Products Co MW3B	0	MON	1/91	2	23	10	9	-1	0	G	1	1		D
2S/3W	8N39	OAK	301 - 411 High Street	Arco Products Co MW4B	0	MON	1/91	2	23	10	8	-2	0	G	1	1		D
2S/3W	8N40	OAK	301 - 411 High Street	Arco Products Co MW5B	0	MON	1/91	2	23	10	6	4	0	G	1	1		D
2S/3W	8N41	OAK	301 - 411 High Street	Arco Products Co MW6B	0	MON	1/91	2	25	9	7	-2	0	G	1	1		D
2S/3W	8N42	OAK	301 - 411 High Street	Arco Products Co MW1A	0	MON	1/91	2	8	4	8	4	0	G	1	1		D
2S/3W	8N43	OAK	301 - 411 High Street	Arco Products Co MW2A	0	MON	1/91	2	8	4	7	3	0	G	1	1		D
2S/3W	8N44	OAK	301 - 411 High Street	Arco Products Co MW3A	0	MON	1/91	2	8	0	9	0	0	G	1	1		D
2S/3W	8N45	OAK	301 - 411 High Street	Arco Products Co MW4A	0	MON	1/91	2	7	4	8	4	0	G	1	1		D
2S/3W	8N46	OAK	411 High Street	Unocal Chemicals Division	0	MON	4/91	2	15	5	11	6	0	G				D
2S/3W	8N47	OAK	411 High Street	Unocal Chemicals Division	0	BOR*	3/91	8	16	15	180	165	0	G				D
2S/3W	8N48	OAK	411 High Street	Unocal Chemicals Division	0	MON	4/91	2	8	4	9	5	0	G				D
2S/3W	8N49	OAK	411 High Street	Unocal Chemicals Division	0	MON	4/91	2	29	10	9	-1	0	G				D

WELL #		CITY	ADDRESS	OWNER		PHONE	USE	DR.DATE	DIAM	TOT.DEPTH	DEM	ST.ELEV	WA.ELEV	YIELD	LOG	WQ	WL	DATAORGN	MARGIN
2S/3W	8N50	OAK	411 High Street	Unocal Chemicals Division		0	MON	4/91	2	9	4	9	5	0	G				D
2S/3W	8N51	OAK	411 High Street	Unocal Chemicals Division		0	MON	4/91	2	29	10	9	-1	0	G				D
2S/3W	8N52	OAK	500 High St	Uecker and Associates		0	MON	3/91	4	18	5	7	2	0	G				D
2S/3W	8N53	OAK	500 High St	Uecker and Associates		0	DOM	3/91	5	127	70	0	0	0	D				D
2S/3W	8N54	OAK	500 High St	Uecker and Associates		0	MON	3/91	4	24	5	0	0	0	D				D
2S/3W	8N55	OAK	500 High St	Uecker and Associates		0	MON	3/91	4	25	4	0	0	0	D				D
2S/3W	8N56	OAK	401 High St	Unocal Chem	MW3C	0	MON	9/91	2	50	12	0	0	0	D	0	0		D
2S/3W	8N57	OAK	401 High St	Unocal Chem	MW1C	0	MON	9/91	2	50	11	0	0	0	D	0	0		D
2S/3W	8N58	OAK	401 High St	Unocal Chem	MW3C	0	MON	9/91	2	50	13	0	0	0	D	0	0		D
2S/3W	8N59	OAK	411 High St	Former Arco Prod.	11B	0	MON	7/91	2	24	9	7	-2	0	G	0	0		D
2S/3W	8N60	OAK	411 High St	Former Arco Prod.	10B	0	MON	7/91	2	27	9	7	-2	0	G	0	0		D
2S/3W	8N61	OAK	411 High St	Former Arco Prod.	9B	0	MON	7/91	2	24	7	5	-2	0	G	0	0		D
2S/3W	8N62	OAK	411 High St	Former Arco Prod.	7B	0	MON	7/91	2	24	11	10	-1	0	G	0	0		D
2S/3W	8N63	OAK	411 High St	Former Arco Prod.	1B	0	MON	7/91	4	32	9	6	-3	0	G	0	0		D
2S/3W	8N65	OAK	401 High St	Unocal Chem	MW4C	0	MON	3/92	2	47	8	0	0	0	G	0	0		D
2S/3W	8N66	OAK	401 High St	Unocal Chem	MW5C	0	MON	3/92	2	45	8	0	0	0	G	0	0		D
2S/3W	8N69	OAK	301 - 411 High St	ARCO Products Co	MW5A	0	MON	1/91	2	5	0	5	0	0					D
2S/3W	8N70	OAK	301 - 411 High St	ARCO Products Co	MW6A	0	MON	1/91	2	8	0	7	0	0					D
2S/3W	8N71	OAK	301 - 411 High St	ARCO Products Co	MW12B	0	MON	7/91	2	24	0	6	0	0	G	0	0		D
2S/3W	8N72	OAK	301 - 411 High St.	ARCO Products Co	ARW1B	0	OTH	7/91	4	32	9	6	-3	0	G	0	0		D
2S/3W	8N73	OAK	401 High St.	Unocal Chem.	RW2	0	EXT	3/93	5	31	0	8	8	0	G	0	0		D
2S/3W	8N74	OAK	401 High St.	Unocal Chem.	RW3	0	EXT	3/93	5	29	0	8	8	0	G	0	0		D
2S/3W	8N75	OAK	401 High St.	Unocal Chem.	RW4	0	EXT	3/93	5	31	0	8	8	0	G	0	0		D
2S/3W	8N76	OAK	401 High St.	Unocal Chem.	RW5	0	EXT	3/93	5	29	0	9	9	0	G	0	0		D
2S/3W	8N77	OAK	401 High St.	Unocal Chem.	RW6	0	EXT	3/93	5	29	0	9	9	0	G	0	0		D
2S/3W	8N78	OAK	401 High St.	Unocal Chem.	RW7	0	EXT	3/93	5	31	0	8	8	0	G	0	0		D
2S/3W	8N79	OAK	401 High St.	Unocal Chem.	RW8	0	EXT	3/93	5	30	0	9	9	0	G	0	0		D
2S/3W	8N80	OAK	401 High St.	Unocal Chem.	RW9	0	EXT	3/93	5	33	0	8	8	0	G	0	0		D
2S/3W	8N81	OAK	401 High St.	Unocal Chem.	RW10	0	EXT	3/93	5	31	0	9	9	0	G	0	0		D
2S/3W	17D 9	OAK	344 High St	Gallagher Bank	MW-1	0	MON	7/91	0	29	18	0	0	0	D	0	0		D
2S/3W	18A 1	ALA	3126 PERNSIDE BL/GIBBON D	CHEVRON SERVICE STA		0	MON	08/86	3	23	3	7	4	0	G	0	0		L
2S/3W	18A 2	ALA	3126 PERNSIDE BL/GIBBON D	CHEVRON SERVICE STA		0	MON	08/86	3	22	3	7	4	0	G	0	0		L
2S/3W	18A 3	ALA	3126 PERNSIDE BL/GIBBON D	CHEVRON SERVICE STA		0	MON	08/86	3	22	3	7	4	0	G	0	0		L
2S/3W	18A 4	ALA	3126 PERNSIDE BLVD	CHEVRON USA		0	MON	9/90	6	30	13	0	0	0	D	0	0		D
2S/3W	18A 5	ALA	3126 Pernside Blvd.	Chevron USA Inc.	MW-4	0	MON	5/92	2	17	4	0	0	0	G	0	0		D
2S/3W	18A 6	ALA	3126 Pernside Blvd.	Chevron USA Inc.	MW-5	0	MON	5/92	2	17	3	0	0	0	G	0	0		D
2S/3W	18A 7	ALA	3126 Pernside Blvd.	Chevron USA Inc.	MW-6	0	MON	5/92	2	17	4	0	0	0	G	0	0		D
2S/3W	18B 1	ALA	2978 NORTHWOOD DR	DAVID SOUZA		0	IRR	5/77	4	55	10	0	0	0	D	0	0		L
2S/3W	18B 3	ALA	2936 GIBBONS DR	R.B. LYONS		0	IRR	8/77	4	40	10	0	0	0	D	0	0		L
2S/3W	18B 4	ALA	3001 GIBBONS DRIVE	ROBERT DOMITT		5233464	?	/77	4	49	49	0	0	0	?	0	0		L
2S/3W	30D 2	ALA	1506 VERSAILLES AVE	SOARES		0	IRR	?	0	180	0	0	0	0	?	+	0		L

WELL INVENTORY FILE

Definitions and abbreviations for items listed in the well inventory file are as follows:

[**WELLNO**] Well number - Wells are numbered according to their location in the rectangular system of the Public Land Survey. The part of the number preceding the slash indicates the township; the part following the slash indicates the range and section number; the letter following the section number indicates the 40-acre subdivision; and the final digit is a serial number for wells in each 40-acre subdivision.

[**DAT**] Date - The month and year when drilling or boring was completed.

[**ELEV**] Surface elevation - The surface elevation of the well, if known, in feet above mean sea level. A zero designates an unknown elevation.

[**TD**] Total depth - The depth of the well. This usually designates the completed well depth. If the well has a well log available on file, then the total drilled depth of the well is given. The inventory does not show total depth data for geotechnical borings. This is because only one state well number is assigned to one boring at a site, and there are usually several borings of different depth.

[**DTW**] Depth to water - This category usually indicates the standing groundwater level in the well on the date of completion. The "depth to first water encountered" is recorded in the inventory when it is the only water level data reported on the well driller's report.

[**USE**] Use - The well use (or in the case of cathodic protection wells and geotechnical borings, the reason for the excavation) as indicated in the well driller's report or data sheets. A plus sign (+) after the well use indicates a well in the current ACFC & WCD monitoring network.

[**ABN**] Abandoned well - A well whose use has been permanently discontinued or which is in such a state of disrepair that no water can be produced. In the inventory, this may include wells which are covered or capped but not properly destroyed.

[**CAT**] Cathodic protection well - Any artificial excavation constructed by any method for the purpose of installing equipment or facilities for the protection from corrosion by electrochemical methods of metallic equipment (usually piping) in contact with the ground; commonly referred to as cathodic protection.

[**DES**] Destroyed well - A well that has been properly filled so that it cannot produce water nor act as a vertical conduit for the movement of groundwater.

[**DOM**] Domestic well - A water well which is used to supply water for the domestic needs of an individual residence or systems of four or less service connections or "hookups".

[**EXT**] Extraction well - generally used in site remediation to extract contaminated water for treatment.

[**GEO**] Geotechnical boring - A temporary boring made to determine certain engineering properties of soils. An asterisk (*) indicates that the state well number assigned to the boring represents more than one boring at a particular site.

[**INA**] Inactive well - A well not routinely operating but capable of being made operable with a minimum of effort. Also called a "standby well".

[**IND**] Industrial well - A well used to supply water for industrial use

[**INJ**] Injection well - reintroduces water into the aquifer for recharge

[**IRR**] Irrigation well - A water well used to supply water only for irrigation or other agricultural purposes. In the inventory, this category includes large capacity wells as well as small capacity wells for lawn irrigation.

[**MON**] Monitoring or observation well - Wells constructed for the purpose of observing or monitoring groundwater conditions. (see piezometer).

[**MUN**] Municipal well - A water well used to supply water for domestic purposes in systems subject to Chapter 7, Part 1,
Division 5 of the California Health and Safety Code. Included are wells supplying public water systems classified by the Department of Health Services. (Also referred to as community water supply wells).

[**PIE**] Piezometer - A piezometer is a well specifically designated to measure the hydraulic head within a zone small enough to be considered a point as contrasted with a well that reflects the average head of the aquifer for the screened interval.

[**REC**] Recovery well - same as extraction well

[**STO**] Stock - A water well used primarily for livestock.

[**TES**] Test well and test hole - A test well is constructed for the purpose of obtaining the information needed to design a well prior to its construction. Such wells are not to be confused with "test holes" which are temporary in nature (i.e., uncased excavations whose purpose is the immediate determination of existing geologic and hydrologic conditions). Test wells are cased and can be converted to observation or monitoring wells, and under certain circumstances, to production wells. In the inventory, "TES" includes both test wells and test holes.

[**?**] Unidentified use - This indicates water wells whose use could not be ascertained from the available well data.

[LOG] Log - This category indicates whether a geologic record, or log, for the well or boring is available in the Agency's files. Abbreviations are as follows:

D - well driller's log
G - geotechnical boring log
E - electric (resistivity) log or other subsurface geophysical logs.

[WQ] Water quality data available - This category indicates which wells have water quality data available in ACFC & WCD files. The numbers 1 through 9 signify the number of sets of water quality measurements available for that well. A plus sign (+) indicates that 10 or more sets of data are available. A "0" indicates that no data is available.

[WL] Water level data available - This category indicates which wells have water level data other than the data reported on the well driller's logs. The numbers 1 through 9 signify the number of water level measurements available. A plus sign (+) indicates that 10 or more measurements are available for that well.
A "0" indicates that no data is available.

[YLD] Yield - The maximum pumping rate in gallons per minute that can be supplied by a well without lowering the water level in the well below the pump intake. This data is taken from pump test data recorded in the driller's records. Some of the yield data reflects current production rates and does not reflect maximum yield values determined in a capacity test.

[DIA] Diameter - The diameter in inches of the main casing in a well. May also indicate the diameter of a hand-dug well. Diameter data is not recorded for geotechnical borings.

APPENDIX B

RBCA Site Classification Table

TABLE 3 Site Classification Scenarios and Potential Initial Response Actions[A]

NOTE—For the purpose of this site classification process, an aquifer is considered to be a potential potable water supply if it has the potential to yield > 200 gal/day (756 L/day), and meets local water quality criteria (that is total dissolved solids (TDS) < 10 000 mg/L).

Classification	Criteria and Prescribed Scenarios	Possible Initial Response Actions[B]
1	*Immediate Threat to Human Health, Safety, or Sensitive Environmental Receptors:*	*Notify Appropriate Authorities, Property Owners, and Potentially Affected Parties, and Evaluate the Need to:*
1.1	Explosive levels, or concentrations of vapors that could cause acute health effects, are present in a residence or other building	Evacuate occupants, begin abatement measures such as subsurface ventilation, or building pressurization.
1.2	Explosive levels of vapors are present in subsurface utility system(s), but no building or residences are impacted.	Evacuate immediate vicinity, begin abatement measures such as ventilation
1.3	Free-product is present in significant quantities at ground surface, on surface water bodies, in utilities other than water supply lines, or in surface water runoff.	Prevent further free-product migration by appropriate containment measures, institute free-product recovery, restrict area access.
1.4	An active public water supply well, public water supply line, or public surface water intake is impacted or immediately threatened.	Notify user(s), provide alternate water supply, hydraulically control contaminated water, and treat water at point-of-use.
1.5	Ambient vapor/particulate concentrations exceed concentrations of concern from an acute exposure, or safety viewpoint.	Install vapor barrier (capping, foams, etc.), remove source, or restrict access to affected area.
1.6	A sensitive habitat or sensitive resources (sport fish, economically important species, threatened and endangered species, etc.) are impacted and affected.	Minimize extent of impact by containment measures and implement habitat management to minimize exposure.
2	*Short-Term (0 to 2 years) Threat to Human Health, Safety, or Sensitive Environmental Receptors:*	*Notify Appropriate Authorities, Property Owners, and Potentially Affected Parties, and Evaluate the Need to:*
2.1	There is potential for explosive levels, or concentrations of vapors that could cause acute effects, to accumulate in a residence or other building.	Assess the potential for vapor migration (through monitoring/modeling) and remove source (if necessary), or install vapor migration barrier.
2.2	Shallow contaminated surface soils are open to public access, and dwellings, parks, playgrounds, day-care centers, schools, or similar use facilities are within 500 ft (152.4 m) of those soils.	Remove soils, cover soils, or restrict access.
2.3	A non-potable water supply well is impacted or immediately threatened.	Notify owner/user, evaluate the need to install point-of-use water treatment, hydraulic control, or alternate water supply.
2.4	Ground water is impacted and a public or domestic water supply well producing from the impacted aquifer is located within two years projected ground water travel distance downgradient of the known extent of contamination.	Institute monitoring, then evaluate if natural attenuation is sufficient, or if hydraulic control is required.
2.5	Ground water is impacted and a public or domestic water supply well producing from a different interval is located within the known extent of contamination.	Monitor ground water well quality and evaluate if control is necessary to prevent vertical migration to the supply well.
2.6	Impacted surface water, storm water, or ground water discharges within 500 ft (152.4 m) of a sensitive habitat, or surface water body used for human drinking water or contact recreation.	Institute containment measures, restrict access to areas near discharge, and evaluate the magnitude and impact of the discharge.
3	*Long-Term (>2 Years) Threat to Human Health, Safety, or Sensitive Environmental Receptors:*	*Notify Appropriate Authorities, Property Owners, and Potentially Affected Parties, and Evaluate the Need to:*
3.1	Subsurface soils (>3 ft (0.9 m) BGS) are impacted and depth between impacted soils and the first potable aquifer is less than 50 ft (15.2 m).	Monitor ground water and determine the potential for future contaminant migration to the aquifer.
3.2	Ground water is impacted and potable water supply wells producing from the impacted interval are located >2 years ground water travel time from the dissolved plume.	Monitor the dissolved plume and evaluate the potential for natural attenuation and the need for hydraulic control.
3.3	Ground water is impacted and non-potable water supply wells producing from the impacted interval are located >2 years ground water travel time from the dissolved plume.	Identify water usage of well, assess the effect of potential impact, monitor the dissolved plume, and evaluate whether natural attenuation or hydraulic control are appropriate control measures.
3.4	Ground water is impacted and non-potable water supply wells that do not produce from the impacted interval are located within the known extent of contamination.	Monitor the dissolved plume, determine the potential for vertical migration, notify the user, and determine if any impact is likely.
3.5	Impacted surface water, storm water, or ground water discharges within 1500 ft (457.2 m) of a sensitive habitat, or surface water body used for human drinking water or contact recreation.	Investigate current impact on sensitive habitat or surface water body, restrict access to area of discharge (if necessary), and evaluate the need for containment/control measures.
3.6	Shallow contaminated surface soils are open to public access, and dwellings, parks, playgrounds, day-care centers, schools, or similar use facilities are more than 500 ft (152.4 m) of those soils.	Restrict access to impact soils.
4	*No Demonstrable Long-Term Threat to Human Health, Safety, or Sensitive Environmental Receptors:* Priority 4 scenarios encompass all other conditions not described in Priorities 1, 2, and 3, and that are consistent with the priority description previously given. Some examples are:	*Notify Appropriate Authorities, Property Owners, and Potentially Affected Parties, and Evaluate the Need to:*
4.1	Non-potable aquifer with no existing local use impacted.	Monitor ground water and evaluate effect of natural attenuation on dissolved plume migration.
4.2	Impacted soils located more than 3 ft (0.9 m) BGS and greater than 50 ft (15.2 m) above nearest aquifer.	Monitor ground water and evaluate effect of natural attenuation on leachate migration.
4.3	Ground water is impacted and non-potable wells are located down-gradient outside the known extent of contamination, and they produce from a nonimpacted zone.	Monitor ground water and evaluate effect of natural attenuation on dissolved plume migration.

[A] Johnson, D. C., DeVaull, G. E., Ettinger, R. A., MacDonald, R. L. M., Stanley, C. C., Westby, T. S., and Conner, J., "Risk-Based Corrective Action: Tier 1 Guidance Manual," Shell Oil Co., July 1993.

[B] Note that these are potential initial response actions that may not be appropriate for all sites. The user is encouraged to select options that best address the short-term health and safety concerns of the site, while the RBCA process progresses.

APPENDIX C

ACDEH RBSL Look-up Table

NOTE—This table is presented here only as an example set of Tier 1 RBSLs. It is not a list of proposed standards. The user should review all assumptions prior to using any of the values. Appendix X2 describes the basis of these values.

	Exposure Pathway	Receptor Scenario	Target Level	Benzene	Ethylbenzene	Toluene	Xylenes (mixed)	Naphthalene	Benzo(a)pyrene
AIR	Indoor Air Screening Levels for Inhalation Exposure (µg/m^3)	Residential	Cancer Risk = 1E-06	0.11					1.26E-03
			Cancer Risk = 1E-04	11.37					1.26E-01
			Chronic HQ = 1		1.39E+03	5.56E+02	9.73E+03	1.95E+01	
		Commercial/ Industrial	Cancer Risk = 1E-06	0.14					2.35E-03
			Cancer Risk = 1E-04	14.3					2.35E-01
			Chronic HQ = 1		1.46E+03	5.84E+02	1.02E+04	2.04E+01	
	Outdoor Air Screening Levels for Inhalation Exposure (µg/m^3)	Residential	Cancer Risk = 1E-06	0.09					1.40E-03
			Cancer Risk = 1E-04	8.53					1.40E-01
			Chronic HQ = 1		1.04E+03	4.17E+02	7.30E+03	1.46E+01	
		Commercial/ Industrial	Cancer Risk = 1E-06	0.14					2.35E-03
			Cancer Risk = 1E-04	14.3					2.35E-01
			Chronic HQ = 1		1.46E+03	5.84E+02	1.02E+04	2.04E+01	
	OSHA TWA PEL (µg/m^3)			3.20E+03	4.35E+05	7.53E+05	4.35E+06	5.00E+04	2.00E+02 [1]
	Mean Odor Detection Threshold (µg/m^3) [2]			1.95E+05		6.00E+03	8.70E+04	2.00E+02	
	National Indoor Background Concentration Range (µg/m^3) [3]			3.25E+00 - 2.15E+01	2.20E+00 - 9.70E+00	9.60E-01 - 2.91E+01	4.85E+00 - 4.76E+01		
SOIL	Soil - Volatilization to Outdoor Air (mg/kg)	Residential	Cancer Risk = 1E-06	0.08					RES
			Cancer Risk = 1E-04	7.89					RES
			Chronic HQ = 1		RES	RES	RES	RES	
		Commercial/ Industrial	Cancer Risk = 1E-06	0.13					RES
			Cancer Risk = 1E-04	13.25					RES
			Chronic HQ = 1		RES	RES	RES	RES	
	Soil - Vapor Intrusion from Soil to Buildings (mg/kg)	Residential	Cancer Risk = 1E-06	0.002					RES
			Cancer Risk = 1E-04	0.16					RES
			Chronic HQ = 1		4.27E+02	2.06E+01	RES	4.07E+01	
		Commercial/ Industrial	Cancer Risk = 1E-06	0.005					RES
			Cancer Risk = 1E-04	0.49					RES
			Chronic HQ = 1		1.10E+03	5.45E+01	RES	1.07E+02	
	Surficial Soil (0-3 ft.) Ingestion/ Dermal/ Inhalation (mg/kg)	Residential	Cancer Risk = 1E-06	1.69					1.30E-01
			Cancer Risk = 1E-04	168.8					1.30E+01
			Chronic HQ = 1		7.83E+03	1.33E+04	1.45E+06	9.77E+02	
		Commercial/ Industrial	Cancer Risk = 1E-06	2.9					3.04E-01
			Cancer Risk = 1E-04	290					3.04E+01
			Chronic HQ = 1		1.15E+04	1.87E+04	2.08E+05	1.90E+03	
	Soil - Leachate to Protect Groundwater Ingestion Target Level (mg/kg)	MCL's		2.93E-02	1.10E+02	1.77E+01	3.05E+02	N/A	9.42E+00
		Residential	Cancer Risk = 1E-06	0.005					5.90E-01
			Cancer Risk = 1E-04	0.5					RES
			Chronic HQ = 1		5.75E+02	1.29E+02	RES	2.29E+01	
		Commercial/ Industrial	Cancer Risk = 1E-06	0.017					1.85E+00
			Cancer Risk = 1E-04	1.68					RES
			Chronic HQ = 1		1.61E+03	3.61E+02	RES	6.42E+01	
GROUND WATER	Groundwater - Volatilization to Outdoor Air (mg/L)	Residential	Cancer Risk = 1E-06	3.19					> S
			Cancer Risk = 1E-04	319					> S
			Chronic HQ = 1		> S	> S	> S	> S	
		Commercial/ Industrial	Cancer Risk = 1E-06	5.34					> S
			Cancer Risk = 1E-04	> S					> S
			Chronic HQ = 1		> S	> S	> S	> S	
	Groundwater Ingestion (mg/L)	MCL's		5.00E-03	7.00E-01	1.00E+00	1.00E+01	N/A	2.00E-04
		Residential	Cancer Risk = 1E-06	0.0009					1.17E-05
			Cancer Risk = 1E-04	0.085					1.17E-03
			Chronic HQ = 1		3.65E+00	7.30E+00	7.30E+01	1.46E-01	
		Commercial/ Industrial	Cancer Risk = 1E-06	0.003					3.92E-05
			Cancer Risk = 1E-04	0.29					> S
			Chronic HQ = 1		1.02E+01	2.04E+01	> S	4.09E-01	
	Groundwater - Vapor Intrusion from Groundwater to Buildings (mg/L)	Residential	Cancer Risk = 1E-06	0.007					> S
			Cancer Risk = 1E-04	0.69					> S
			Chronic HQ = 1		7.75E+01	3.28E+01	> S	4.74E+00	
		Commercial/ Industrial	Cancer Risk = 1E-06	0.021					> S
			Cancer Risk = 1E-04	2.14					> S
			Chronic HQ = 1		> S	8.50E+01	> S	1.23E+01	

[A] As benzene soluble coal tar pitch volatiles.

[B] American Industrial Hygiene Association, *Odor Thresholds for Chemicals with Established Occupational Health Standards*, 1989.

[C] From: Shah and Singh, *Environmental Science Technology* Vol 22, No. 12; ATSDR, 1988, Toxilogical Profiles, U.S. Public Health Services, 1988, and Wallace, L. A., *Journal of Occupational Medicine*, Vol 28, No. 5, 1986.

[D] "RES"—selected risk level is not exceeded for pure compound present at any concentration.

[E] ">S"—selected risk level is not exceeded for all possible dissolved levels (≤ pure component solubility).

Correct

REVISED 1/24/96

APPENDIX B
FIGURES

● WELL LOCATION

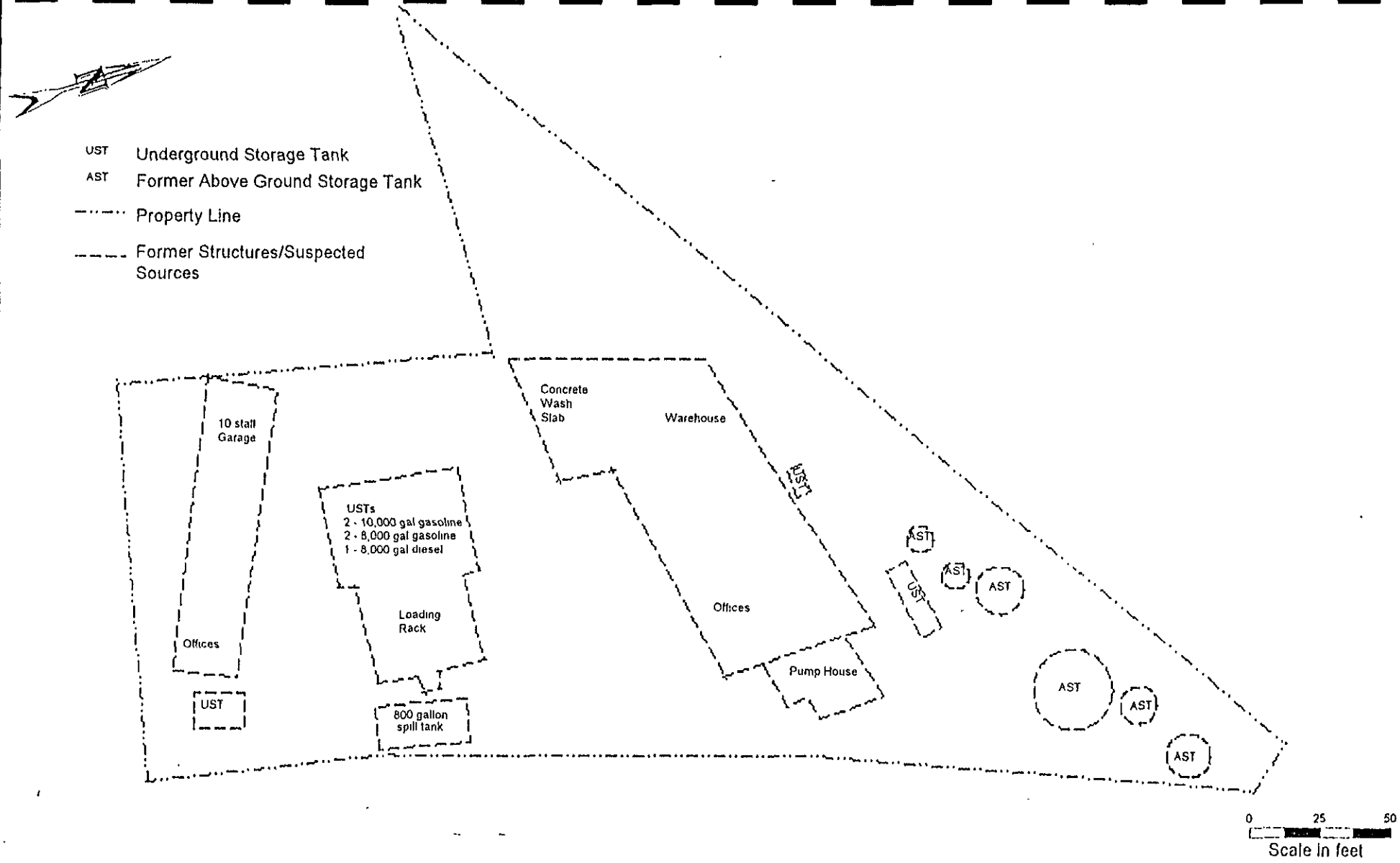
Touchstone Developments
Environmental Management

SITE VICINITY MAP and WELL SURVEY LOCATIONS

Former Chevron Bulk Plant
2001 Versailles Avenue
Alameda, California

FIGURE
1

PROJECT NO	DATE	DRAWN BY	BASE MAP
96-FABP-3	5/98	DJV	AAA ROAD MAP JANUARY 1996



Touchstone Developments
Environmental Management

SITE PLAN
FORMER ALAMEDA BULK PLANT
2001 VERSAILLES AVENUE
ALAMEDA, CALIFORNIA

FIGURE
2

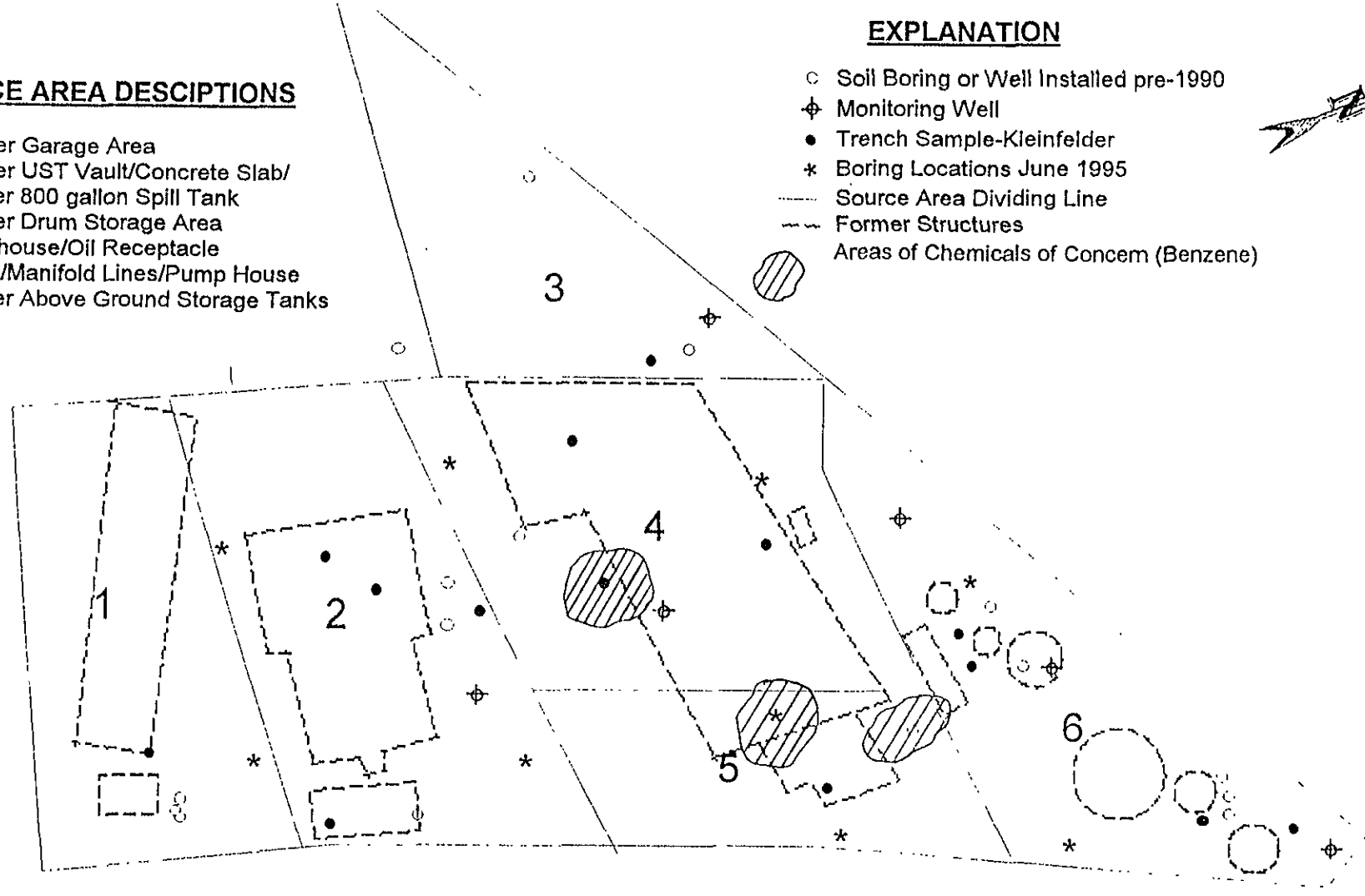
PROJECT NO.	DRAWN BY:	DATE	BASE MAP:
chev-1	AMD	1/95	KLEINFELDER

SOURCE AREA DESCIPTIONS

1) Former Garage Area
2) Former UST Vault/Concrete Slab/ Former 800 gallon Spill Tank
3) Former Drum Storage Area
4) Warehouse/Oil Receptacle
5) Sump/Manifold Lines/Pump House
6) Former Above Ground Storage Tanks

EXPLANATION

- ○ Soil Boring or Well Installed pre-1990
- ⊕ Monitoring Well
- ● Trench Sample-Kleinfelder
- ✱ Boring Locations June 1995
- Source Area Dividing Line
- Former Structures
- Areas of Chemicals of Concern (Benzene)



Areas Are Approximate

0 25 50
Scale in feet

Touchstone Developments
Environmental Management

POTENTIAL SOURCE AREAS and AREAS OF CONCERN
FORMER ALAMEDA BULK PLANT
2001 VERSAILLES AVENUE
ALAMEDA, CALIFORNIA

FIGURE
3

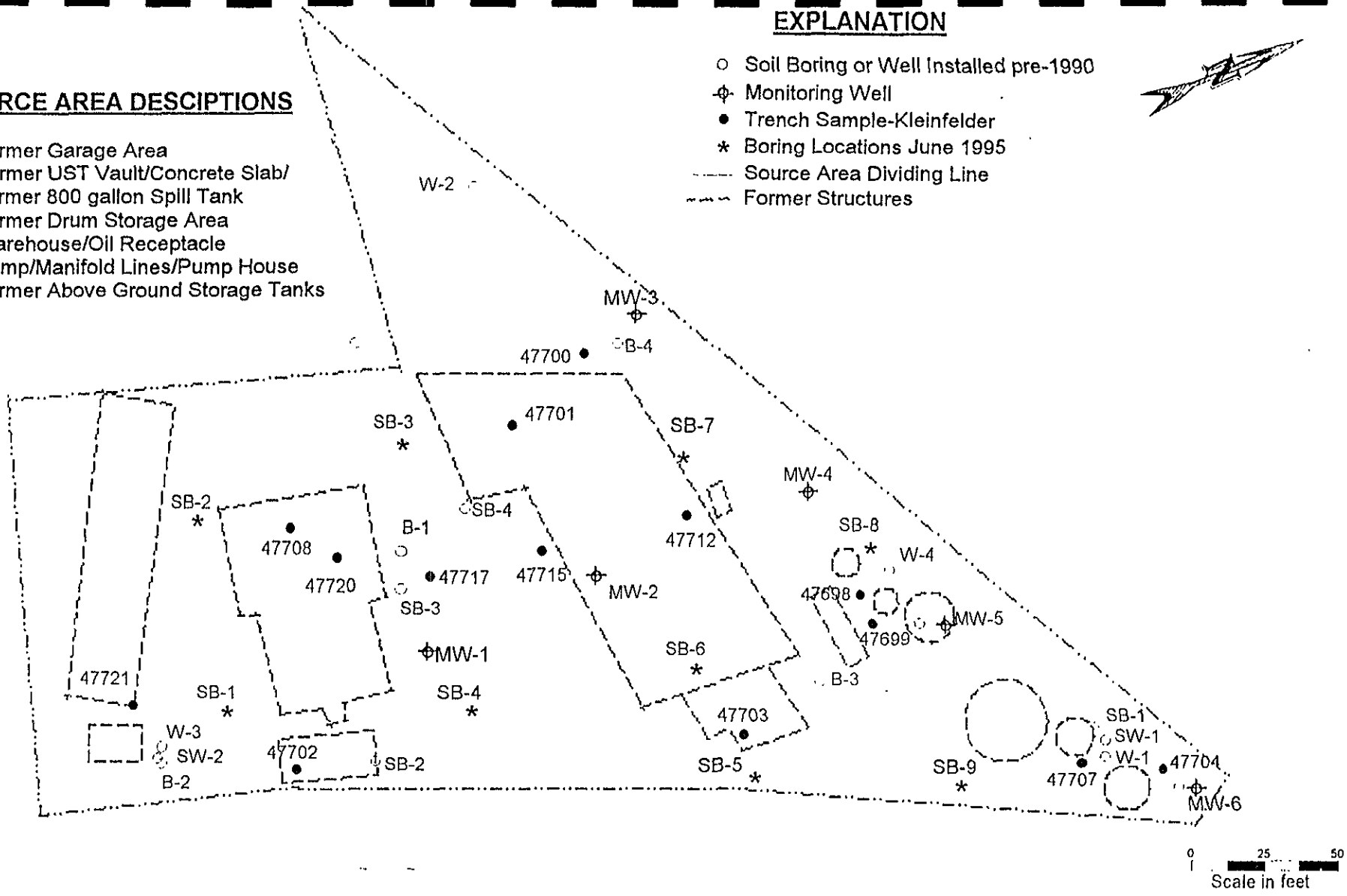
PROJECT NO.	DRAWN BY:	DATE	BASE MAP:
chev-1	AMD	7/95	KLEINFELDER

SOURCE AREA DESCIPTIONS

1) Former Garage Area
2) Former UST Vault/Concrete Slab/ Former 800 gallon Spill Tank
3) Former Drum Storage Area
4) Warehouse/Oil Receptacle
5) Sump/Manifold Lines/Pump House
6) Former Above Ground Storage Tanks

EXPLANATION

- ○ Soil Boring or Well Installed pre-1990
- ⊕ Monitoring Well
- ● Trench Sample-Kleinfelder
- * Boring Locations June 1995
- —— Source Area Dividing Line
- – – – Former Structures



Touchstone Developments
Environmental Management

BORINGS AND SAMPLE LOCATIONS

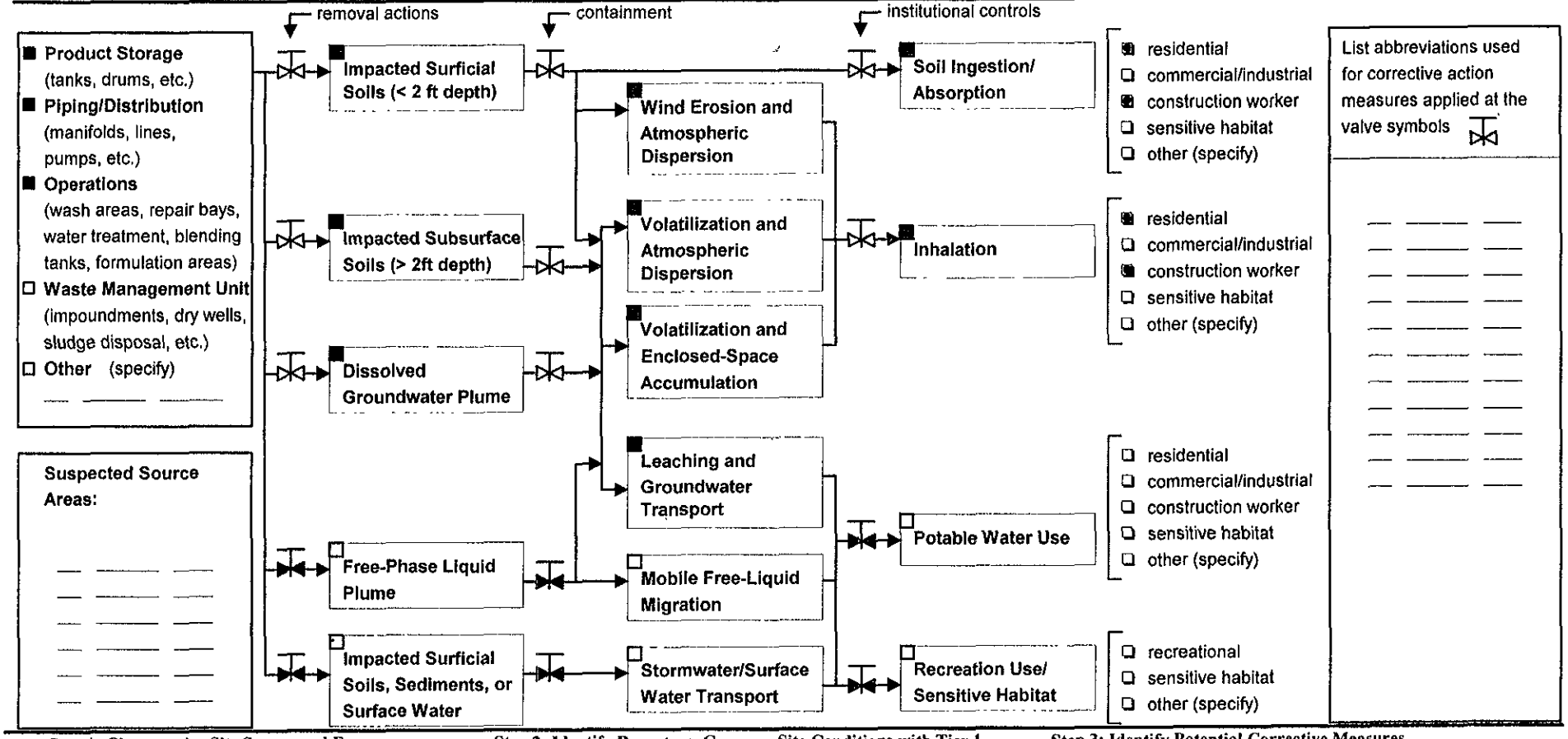
FORMER ALAMEDA BULK PLANT
2001 VERSAILLES AVENUE
ALAMEDA, CALIFORNIA

FIGURE
4

PROJECT NO.	DRAWN BY:	DATE	BASE MAP:
chev-1	AMD	7/95	KLEINFELDER

RBCA SITE ASSESSMENT — Worksheet

Site Name: Former Signal Bulk Plant
Site Location: 2001 Versailles Avenue, Alameda, California



Step 1: Characterize Site Source and Exposure Pathways
- complete Tier 1 worksheets
- fill applicable boxes for sources, release mechanisms, and actual or imminent exposure pathways (☐ or ■)

Step 2: Identify Receptors, Compare Site Conditions with Tier 1 Levels
- identify receptors
- fill applicable boxes for potential receptors and RBSL value(s) exceeded (☐ or ■)

Step 3: Identify Potential Corrective Measures
- complete Tier 1 summary report
- fill in exposure pathway shut-off valves (⋈ or ⋈)
- record the abbreviation for the corrective measure above the valve, and record the abbrev. on the right-hand side of the table.

APPENDIX C
EXAMPLE HEALTH AND SAFETY PLAN

SITE HEALTH AND SAFETY PLAN

Former Signal Bulk Plant
Alameda, California

Prepared for:

_____
_____
_____

Date:_____

TABLE OF CONTENTS

1.0 INTRODUCTION

A. Overview

The contractor is providing this site safety plan in order to address various health and safety issues regarding work at the site and to disseminate information about the contractor's health and safety goals, procedures, and policies.

B. Scope of Work

This Site Health and Safety Plan was created for field work being performed at the Former Alameda Bulk Plant, 2001 Versailles Road, Alameda, California. The scope of the investigation includes: (1) soil excavation, (2) soil, groundwater, and concrete disposal, and (3) excavation backfill and surfacing.

Subcontractors will be utilized on-site to perform the work associated soil excavation; soil, groundwater, and concrete disposal; and excavation backfilling. Entry into site excavations by site personnel will be expressly prohibited.

C. Site Description

The subject property is located on the northern side Versailles Avenue near the intersection of Versailles Avenue and Windsor Drive in Alameda, California. The site is currently a vacant lot.

2.0 PROJECT SAFETY AUTHORITY

A. On-Site Project Safety

Personnel responsible for the project safety are:

Mr. Foreman	Project Safety Officer (The Contractor)
Mr. Assistant	Company Safety Officer (The Contractor)

The Project Safety Officer and Company Safety Officer have the authority to upgrade or downgrade the provisions of this Site Safety Plan as site conditions change. In addition, the Project Safety Officer shall be responsible for the following:

- Safety Supplies & Equipment Inventory for the Project Site
- Accident/Incident Reporting
- Decontamination/Contamination Reduction Procedures.

B. Safety Officer

The Company Safety Officer is responsible for assuring on-site safety and loss prevention functions. These responsibilities include:

- Health surveillance of all Contractor employees.
- Assuring that safety procedures in effect are in compliance with all appropriate federal, state, and company regulations.
- Maintenance of personnel exposure monitoring records.
- Assuring appropriate personal protective equipment is adequate for actual hazards of on-site conditions.
- Assuring appropriate exclusion areas are identified and delineated.

3.0 JOB HAZARD ANALYSIS

A. Inhalation Hazards

Contaminants that have been documented to occur in soil and groundwater at the site include gasoline and diesel fuel. Site specific hazard identification with regards to the inhalation of these contaminants are discussed below.

Gasoline

Gasoline is a clear liquid with a characteristic odor. Inhalation or absorption of gasoline can cause irritation of the eyes, skin, and mucous membranes, dermatitis, headache, fatigue, slurred speech, confusion, and convulsions.

The California Occupational Safety and Health Administration (Cal-OSHA) Permissible Exposure Limit (PEL) (the maximum permitted 8-hour time-weighted average concentration of an airborne contaminant) for gasoline is 300 parts per million (ppm). The Short Term Exposure Limit (STEL) (the maximum permitted 15 minute time weighted exposure) for gasoline is 500 ppm.

Diesel Fuel

Diesel fuel is a clear liquid with an aromatic odor. Absorption of diesel fuel can cause irritation and dermatitis.

Due to its low vapor pressure, Cal-OSHA PELs and STELs have not been established for diesel fuel.

Benzene

Benzene is a colorless to light-yellow liquid with an aromatic odor. Inhalation or absorption of benzene can cause irritation of the eyes, skin, nose and respiratory system. Prolonged exposure can cause giddiness, headache, nausea, staggered gait, and fatigue.

The Cal-OSHA PEL for benzene is 1 ppm; the STEL for benzene is 5 ppm.

Toluene

Toluene is a colorless liquid with a sweet, pungent odor. Inhalation or absorption of toluene can cause irritation to the eyes and nose, fatigue, weakness, dizziness, headache, dermatitis, liver, and kidney damage.

The Cal-OSHA PEL for toluene is 100 ppm; the STEL for toluene is 150 ppm. The ceiling limit (the maximum concentration of an airborne contaminant to which an employee may be exposed at any time) for toluene is 500 ppm.

Ethylbenzene

Ethylbenzene is a colorless liquid with an aromatic odor. Inhalation or absorption of ethylbenzene can cause irritation to the eyes, skin, mucous membranes, headache, dermatitis, narcosis, and coma.

The Cal-OSHA PEL for ethylbenzene is 100 ppm; the STEL for ethylbenzene is 125 ppm.

Xylene Compounds

Xylene compounds (ortho-, meta-, and para-xylene) are colorless liquids with aromatic odors. Inhalation or absorption of xylene compounds can cause irritation to the eyes, skin nose, throat, dizziness, drowsiness, nausea, vomiting, and dermatitis.

The Cal-OSHA PEL for xylene compounds is 100 ppm; the STEL for xylene compounds is 300 ppm.

4.0 RISK ASSESSMENT SUMMARY

It is anticipated that there will be no significant or major potential source of exposures due to the scope of work to be performed on this project. An analyses of site specific hazards with respect to chemical and physical hazards are discussed below.

In general, the principal routes of exposure on any site include inhalation, absorption, dermal contact, and ingestion. With respect to the scope of work to be performed, the potential routes of exposure include inhalation, absorption, and dermal contact. General safe work practices should adequately address the potential for exposure via absorption or dermal contact.

The potential for exposure due to inhalation would probably originate from airborne vapors, gas, or dusts. Due to the nature of this project, it is necessary to perform excavation activities at the site. Dust suppression measures may be required if it is deemed that airborne materials pose a hazard. These measures will include slowing the pace of work to minimize agitation of possible airborne materials and water saturation to minimize airborne materials.

With respect to direct contact, personal protective equipment such as gloves, eye protection, and skin protection will provide protection from potential exposure. Further, the amount of direct contact with potential contaminants, other than airborne dusts, will be limited.

Should respiratory irritation occur, appropriate air-purifying respiratory protective devices will be worn, with organic vapor cartridges and dust pre-filters, or with high efficiency organic vapor/HEPA stack-type cartridge. Typically, the cartridge will require replacement daily. Should direct contact occur in excess of what is anticipated through sample preservation procedures, appropriate protective clothing will be worn.

Physical hazards on-site have been identified as hazards associated with soil and groundwater sampling, soil excavation, and soil disposal activities; fire and explosion due to the presence of petroleum hydrocarbons; and general safety hazards.

5.0 AIR MONITORING PLAN

A. General

An air quality monitoring program shall be implemented to provide baseline and on-going air quality data for site operations. This program shall include an on-going evaluation of on-site atmospheric contaminant concentrations during work site activities that involve significant surface disturbances using organic vapor detection instruments and detector tubes.

Additionally, the program will include a preliminary survey of existing air quality conditions, prior to any surface disturbances and, if possible, under anticipated "worst case" weather conditions, to be used to establish baseline levels for input into the respiratory protection selection process. The Project Safety Officer may also decide to perform perimeter monitoring of downwind air quality conditions during significant surface disturbances.

B. Action Levels

Photo-ionization detector (PID) readings will be taken and recorded once every hour (minimum) during the performance of these work activities. If it is determined, based on PID readings, that organic vapor concentrations in the work area reach 10 ppm in the breathing zone for 5 minutes, half mask respirators with organic vapor cartridges will be required.

If PID readings indicate total hydrocarbon levels reach 20 ppm in the breathing zone for 5 minutes, work activities will be suspended until the airborne hydrocarbon concentrations decrease to less than 10 ppm. If airborne levels remain at 20 ppm or more, all work activities will cease until the Company Safety Officer can be notified, and these levels can be ameliorated.

6.0 PERSONAL PROTECTIVE EQUIPMENT

A. Introduction

It is important that personal protective equipment and safety requirements be appropriate to protect against the potential hazards at the site. Protective equipment will be selected based on the contaminant type(s), concentration(s), and route of entry. In situations where the type of materials and possibilities of contact are unknown or the hazards are not clearly identifiable, a more subjective determination must be made of the personal protective equipment.

A minimum of modified Level D safety equipment and clothing will be required for all workers and visitors on the site. All personnel must be prepared to step up to higher levels of protective equipment as conditions warrant.

B. Levels of Protection

The basic required work uniform for the site is modified Level D protection which will include:

- hard hat
- steel toed boots
- safety glasses
- polyvinyl gloves for handling soil or liquid samples
- neoprene over gloves for handling augers or other contaminated items

If Level C protection is deemed necessary by the Site Safety Officer based on field conditions, the protective equipment will include:

- modified Level D equipment including gloves and polycoated Tyvek coveralls
- respiratory protection which may include half face respirator with organic vapor cartridges depending on respiratory action levels listed above

The necessity for Level A or Level B protection is not expected to be encountered on this site. If site conditions indicate that Level C protection is inadequate, all site activities are

to be ceased pending further review by the Company Safety Officer and the Contractor Senior Management.

7.0 WORK ZONES AND SECURITY MEASURES

A. General

A site must be controlled to reduce the possibility of exposure to any contaminants present and their transport by personnel or equipment from the site.

The possibility of exposure or translocation of contaminants can be reduced or eliminated in a number of ways, including:

- Setting up security or physical barriers to exclude unnecessary personnel from the general area
- Minimizing the number of personnel and equipment on-site consistent with effective operations
- Establishing work zones within the site
- Conducting operations in a manner to reduce the exposure of personnel and equipment
- Minimizing the airborne dispersion of contaminants
- Implementing the appropriate personnel and equipment decontamination procedures

B. Field Operations Work Area

Work areas (zones) will be established based on anticipated contamination. Within these zones prescribed operations will occur utilizing appropriate personal protective equipment. The planned zones are:

1. Exclusion Area (contaminated). The actual areas where work is being performed are considered to be the exclusion areas. Access to these areas will be strictly limited to the personnel needed to conduct the work being performed.

2. Contamination Reduction Area. An area near each active work zone will be designated as the contamination reduction area. Disposable protective gear will be removed and placed in garbage bags prior to leaving the reduction zone. Heavy equipment and non-disposable gear will be cleaned at a decontamination area within this zone.

3. Support Area (non-contaminated). Areas located away from active work areas and out of the zone of potential impact of hazards will be used for staging and support of the work being performed on site. Any materials, equipment, or clothing of personnel must be fully decontaminated prior to entering these areas.

8.0 DECONTAMINATION PROCEDURES

As part of the system to prevent or reduce the physical transfer of contaminants by people and/or equipment from on-site, procedures will be instituted for decontaminating anything leaving the Exclusion Area and Contamination Reduction Area. These procedures include the decontamination of personnel, protective equipment, monitoring equipment, clean-up equipment, etc. In cases where the Contamination Reduction Zone is not directly adjacent to the Exclusion Area, gross decontamination will occur in the Exclusion Area, followed by more detailed cleaning in the Contaminant Reduction Area. This gross decontamination will be performed to the extent necessary to keep contaminants from spreading to other "clean" areas of the site. In general, decontamination at the site consists of rinsing equipment, personnel, etc., with copious amounts of water and washing with detergent water solutions. The spent solution, brushes, sponges, containers, stands, etc., used in the decontamination process must be properly disposed.

9.0 GENERAL SAFE WORK PRACTICES

The project operations shall be conducted with the following minimum safety requirements employed:

1. Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of materials is prohibited in any area where the possibility of contamination exists.

2. Hands must be thoroughly washed upon leaving a contaminated or suspected contaminated area before eating, drinking, or any other activities transpire.

3. Legible and understandable precautionary labels shall be prominently affixed to containers of raw materials, intermediates, products, mixtures, scrap, waste, debris, and contaminated clothing.

4. Contaminated protective equipment shall not be removed from the regulated area until it has been cleaned or properly packaged and labeled.

5. Removal of materials from protective clothing or equipment by blowing, shaking, or any other means which may disperse materials into the air is prohibited.

6. Personnel on-site must use the "buddy" system when wearing any respiratory protective devices. Communications between members must be maintained at all times. Emergency communications shall be prearranged in case of encountering unexpected situations. Visual contact must be maintained between "pairs" on-site, and each team should remain in closed proximity to assist each other if necessary.

7. Personnel should be cautioned to inform each other of subjective symptoms of chemical exposure such as headache, dizziness, nausea, and irritation of the respiratory tract.

8. No excessive facial hair which interferes with a satisfactory fit of the facepiece-to-face seal, will be allowed on personnel required to wear respiratory protective equipment.

9. All respiratory protection selection, use, and maintenance shall meet the requirements of established procedures, recognized consensus standards (AIHA, ANSI, NIOSH), and shall comply with the requirements set forth in CCR, Title 8, Section 5144 et. seq.

10. Contact with surface and groundwater shall be minimized.

In addition, the following precautions shall be implemented for all personnel working on the project:

- Gross decontamination and removal of all personal protective equipment shall be performed prior to exiting the facility. Contaminated personal protective clothing of worn, will be removed and collected in a drum for disposal.
- Field operations personnel shall be cautioned to inform each other of non-visual effects of the presence of toxics, such as: headaches, dizziness, or nausea.
- On-site personnel shall be aware of symptoms related to heat and cold stress.

10.0 STANDARD OPERATING PROCEDURES

A. Respiratory Protection Program Guidelines

Respirators will be provided by the Contractor when such equipment is deemed necessary to protect the health of employees. The Contractor shall provide respirators which are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of this respiratory protection program. The Company Safety Officer will approve the selection, purchase, and inspection of the models and types of respiratory protective devices.

A medical evaluation is required prior to wearing any respirator, except where emergency escape respirators are provided. The contract physician shall determine if any health or physical conditions exist which would prohibit a worker from being assigned to an area requiring respiratory protection.

Respirators shall not be worn when conditions prevent a facepiece-to-face seal. Such conditions as facial hair, scars, wrinkles, facial diseases, dentures removal, or other disorders could prevent a proper facepiece-to-face seal. In these cases, corrective action will be taken to ensure a proper seal.

For the safe use of any respirator, it is essential that the user be properly instructed in its operation and maintenance. Both supervisors and employees shall be so instructed. Employees shall be instructed and trained in the proper selection and use of respirators and their limitations. The employee shall use the provided respirator in accordance with instructions and training received. All training shall be documented with records retained in the employee's training files.

11.0 EMERGENCY PROCEDURES

A. Site Emergency Warnings

Several warning systems may be utilized depending on the work site conditions or emergency involved:

1. Verbal Communications

2. Vehicle Horns

Verbal instructions between crew members are typically adequate to communicate steps that are required in emergency situations. In cases where parts of the crew are distant from the center of activity, vehicle horns may be necessary to indicate site emergencies. This type of communication needs to be followed by verbal instructions on necessary emergency actions.

In cases where a field worker is alone, verbal communication with the company safety officer should be established upon arrival to and exit from the site. The field worker should also present any other field personnel with the Contractor's telephone number and address. Location of the nearest telephone should be within reasonable distance of the field worker. The Contractor will provide the field worker with a field phone if the nearest telephone is not readily available.

B. Emergency Equipment

The following equipment comprises the basic elements for emergency preparedness. All or some of these items will be available at the work site:

1. Fire extinguishers - dry chemical

2. First aid kits

C. General Emergency Procedures

In case of an emergency or hazardous situation, the person that observes this condition shall immediately sound the alarm.

1. Upon hearing an alarm, all non-emergency communications will cease and the person giving the alarm will proceed to give the Project Safety Officer all pertinent information.

2. Power equipment will be shut down and operators will stand by for instruction.

3. Injured personnel will be transported outside of the Exclusion Zone (if possible).

4. The Contractor's office will be notified immediately.

5. In case of a fire, explosion, or hazard alarm, personnel will immediately proceed to assigned pre-arranged safe locations.

6. Upon arrival at the safe locations, a complete head count will taken by the Project Safety Officer and personnel will stay at the safe locations until the area is secured.

7. Directions to the nearest medical clinic or hospital as well as their telephone numbers will be made available to on-site personnel.

When a field worker is alone in an emergency or hazardous situation, outside contact should be made immediately. The field worker should then attempt to deactivate power equipment, and contact the Company Safety Officer.

D. Personal Injury

If an injury occurs due to an accident or exposure to a hazardous substance, the Contractor's office will be notified. The Company Safety Officer will be given all appropriate information concerning the nature and cause of the injury so that treatment preparations can be initiated. The injured person will be transported to the Contamination Reduction line where appropriate first aid and treatment can begin. The Project Manager will be informed and will investigate the cause of the injury and make any necessary changes in work procedures.

In the event of an accident resulting in physical injury, first aid will be administered, and the injured worker will be transported to for emergency treatment.

Hospital **Alameda Hospital**

2070 Clinton Avenue

Alameda, California

Directions From Site to Alameda Hospital:

Go South on Versailles Avenue

Turn Right (West) on Encinal Avenue

Turn Left (South) on Willow Street

Turn Right (West) on Clinton Ave.

Hospital is on the Left

EMERGENCY CONTACT LISTING

Nature of Emergency	**Phone Number**
Ambulance	911
Fire	911
Police	911
Poison Control Center	(800) 662-9886
Office of Emergency Services	(510) 646-5908
Chemical Spills	(800) 852-7550
Hospital	(510) 522-3700
The Contractor	( ) ___-____

12.0 TRAINING REQUIREMENTS

All personnel assigned to this project will be required to demonstrate that they have completed the Initial Training Requirements (40 hours). An annual 8 hour refresher course is also required in accordance with CCR Title 8, General Industry Safety Orders, Sections 5192.

Field personnel from the Contractor and their sub-contractors will attend a project briefing for safety issues and project work task review before beginning work. All Contractor site personnel shall have completed training relative to the project operations plans, and the materials to be encountered during the project.

13.0 MEDICAL SURVEILLANCE

The Contractor personnel and sub-contractors engaged in project operations shall be participants in the Medical Surveillance program, and must be cleared by the examining physician(s) to wear respiratory protection devices and protective clothing for working with hazardous materials. The applicable requirements under CCR, Title 8, General Industry Safety Orders, Sections 5192 and 29 CFR 1910 will be observed.

A. Examination Requirements

All Contractor personnel on-site shall have successfully completed a pre-placement or periodic medical examination in accordance with established Contractor policies and procedures, and consistent with the provisions of the OSHA standards. This examination shall include a complete medical and occupational history, physical examination, and selected biological sampling. Laboratory studies include a complete blood count (CBC), urinalysis, chemistry panel (SMAC), pulmonary function (FEV and FVC), chest X-ray, audiometry, and vision screening.

14.0 RECORDKEEPING

A. General

Recordkeeping shall be consistent with OSHA regulations in all respects. The following permanent records will be maintained in the company offices:

1. Safety Inspection Reports
2. Personnel Exposure Monitoring Records
3. OSHA 200 Form - Current to within 90 days
4. Accident reports consistent with established company procedures

B. Medical Records

Permanent medical records shall be maintained in confidential files by the contract physician/medical clinic. The physician will supply the comapny with a medical status document, certifying that the personnel assigned to the project are physically capable of performing their individual work tasks.

Former Alameda Bulk Plant