ARCO Products Company
2000 Alameda de las Pulgas
Mailing Address: Box 5811
San Mateo, California 94402
Telephone 415 571 2400

91 SEP 13 AM 12:16

September 11, 1991

Ms. Susan Hugo
Hazardous Materials Specialist
Alameda County Health Care Services
Department of Environmental Health
80 Swan Way
Room 200
Oakland, California 94621

RE: ARCO Service Station #2112 -- 1260 Park Street, Alameda, California

Dear Ms. Hugo:

This letter is submitted in response to your letter of August 29, 1991 concerning remediation activities at this gasoline service station.

It is clear from the recent exchange of correspondence between ARCO and the Alameda County Health Care Services, Department of Environmental Health that there is some confusion and misunderstanding about what information has been provided to the County by ARCO concerning the removal of underground storage tanks and contaminated soil at this facility and the remediation of soil and groundwater. For ARCO's part, I apologize if we are responsible for any of this confusion.

Our review of the files on this facility, which are described in detail below, indicates that ARCO has attempted to provide all of the information requested by the County in a timely fashion and in accordance with all appropriate regulatory requirements. I trust that this letter and the attached information will end any confusion concerning ARCO's activities at this facility and that we will be able to move ahead quickly with the task of remediating any remaining contamination.

As a starting point, I would like to point out that as the recent exchange of correspondence demonstrates, ARCO had provided to the County by April 1991 all the information requested or needed to approve the proposed Workplan prepared by GeoStrategies, Inc., dated January 2, 1991 (see Attachment 1). The requested information was provided to Ms. Katherine Chesick orally

in April of this year and in written form in May. Our position, which has not changed, is that we were prepared in January 1991 to implement the Workplan but did not do so because the County had not yet reviewed the Workplan.

Listed below, with reference to the numbered sections of your August 29 letter, is ARCO's response to the specific issues which you have raised:

1. Chronology

In your August 29 letter, you state that the "Summary of communication" at page 1, paragraph 3, of my letter of August 26, 1991 is "accurate." By this, I take it to mean that you agree that Kyle Christie of ARCO informed Ms. Katherine Chesick of the County in early April 1991 that no changes to the proposed Workplan were anticipated and that ARCO was prepared to begin to implement the Workplan as soon as the County approved it.

Let me take this opportunity to summarize the chronology of the events that occurred thereafter. At Ms. Chesick's request, ARCO provided the County with the Trench Excavation/Soil Aeration Report prepared by GeoStrategies, Inc., dated May 3, 1991 (see Attachment 2) describing the soil samples taken from the piping excavation on the north side of the facility. As stated in my August 26 letter, Ms. Chesick contacted Keith Bullock of Gettler-Ryan, the contractor for site remediation work at the facility, on May 20, 1991 and informed him that the Workplan had not yet been reviewed. On June 17, 1991, Mr. Bullock spoke with Mr. Lowell Miller at the County and asked him who was responsible for approving the Workplan. Mr. Miller indicated that he was not certain of the individual to whom the project was assigned and said that he would call Mr. Bullock back to let him know. On August 5, 1991, Mr. Bullock spoke with you and asked if the Workplan had been approved. You informed him that you had recently sent out a letter on this site.

As of early April 1991, approximately five months ago, ARCO informed the County that no changes to the Workplan were anticipated and, as a result, was awaiting the County's approval to begin the Workplan's implementation. The additional information you have now requested in your letters of August 3 and 29, 1991 was not brought to ARCO's attention until those letters were received and ARCO was unaware that additional information would be so requested.

2. 1987 Removal of Waste Oil Tank and Associated Contaminated Soil

In your letter of August 29, you indicate that information on the method and location of disposal of any hazardous substances and any contaminated soils at the Station was not

provided to the County by ARCO until August 26, 1991. This statement is not accurate.

The method and location of disposal of any tanks, piping and contaminated soils excavated in 1990 and 1991 are described in the November 7, 1990 GeoStrategies, Inc., Report (see Attachment 3) and in the May 1991 Report. The 550 gallon waste oil tank removed in May 1987, as described in my letter of August 26, 1991, was properly disposed of as was the associated contaminated soil. I have provided you with the manifest forms for this disposal as well as the name of the scrap metal company which received the waste oil tank. The information on the removal of this tank and the associated soil was provided to the County at the time of removal and subsequently in 1989.

On June 8, 1987, Ellen Cianciaruli of ARCO wrote Ted Gerow at the County enclosing the soil sample test results from the excavation of the waste oil tank at the Station (see Attachment 4). In that letter, she stated:

> "All soil removed has been hauled to a Class I dump site and the excavation backfilled with clean sand."

Subsequently, on September 28, 1987, Mr. S. Hetznecker of Brown & Caldwell, ARCO's contractor for the facility at that time, spoke by telephone with Mr. Ted Gerow of the Department (see Attachment 5). His notes of that conversation are as follows:

> "According to information in the County file, specifically a letter dated June 16, 1987 from Ellen Cianiaruli of ARCO, says that the "dirty" soil was excavated and removed, an analysis shows the hole was excavated to cleanliness. Mr. Gerow says everything looks OK as far as the County goes. No further action at this point. His only question is: Will the site remain a service station?"

Clearly, the County had given its approval on the excavation and the information submitted. Subsequently, certain of these documents must have been misplaced by the County because on November 14, 1989, Greg Barclay, Project Branch Manager at Applied GeoStrategies, Inc. wrote to Mr. Ariu Levi at the County and provided the County with another set of the laboratory reports for the soil samples collected at the site in May 1987, another copy of the letter from Ms. Cianciaruli and a copy of the record of telephone conversation between Mr. Hetznecker and Mr. Gerow (see Attachment 6). Mr. Barclay asked Mr. Levi to call if he could be of any further assistance in this matter. No request for further information or documentation was made by the County. Since the waste oil tank was pulled more than four years ago, there has not

been any question as to whether the tank and associated contaminated soil were properly disposed of.

3. Piping and Aeration

You state in your August 29 letter that ARCO had not previously informed you, prior to my letter of August 26, 1991, that all piping at the facility had been removed. This is incorrect. The piping was removed in two stages. The first stage was described in the November 1990 Report. Plate 4 to that Report shows the location of the first stage of piping that was removed from the vicinity of the facility pump islands. Page 8 of that Report states:

> "After aerated soils have been removed from the site, the remaining product piping on the north side of the site will be removed."

The May 1991 Report which describes the removal of the remaining piping from the north side of the facility states at page 2:

> "Trenches were excavated to expose and remove existing fuel product lines."

These "existing fuel product lines" are shown in Plate 3 of the May 1991 Report. These reports, when read together, state that all the original piping was removed.

Your August 29 letter thanks ARCO for stating that no excavated soils were replaced in the ground. This point had been previously disclosed in the November 1990 and May 1991 Reports which state that excavated soil from the trenches was first stockpiled and sampled. Upon receipt of the chemical analyses, stockpiled soils were removed and transported to an appropriate disposal facility (November 1990 Report pp. 2-3; May 1991 Report pp. 3-4).

You next state that in your August 29 letter you have been "advised" that the BAAQMD was not notified twenty-four hours before the commencement of aeration of the excavated soil. To the contrary, Gettler-Ryan Inc., ARCO's consultant, provided notice to the District on August 9, 1990, twenty-four hours prior to the commencement of aeration pursuant to District Rule 8-40-403. Attachment 7 is a copy of Gettler's telephone log for August 9, 1990 indicating that such notice was made and a "Rapid Memo" to the Project File on the same subject. Further, the November 1990 Report, at page 3, states that the soils on site were aerated in compliance with District guidelines. No soils were aerated in connection with the removal of piping at the north side of the facility, as described in the May 1991 Report.

4. Hazardous Waste Manifests

ARCO has provided you with copies of the hazardous waste manifests for any tanks and associated contaminated soil removed from the facility. However, that Section 2652 of Title 23 of the California Code of Regulations does not require that hazardous waste manifests be submitted to the local agency. Section 2652(c)(4) merely requires an indication as to "whether a hazardous waste manifest[s] is utilized."

With regard to Condition No. 22 of the "closure permit," that ARCO supply the manifests within 60 days of receipt of sample results, I assume you are referring to the Underground Tank Closure/Modification Plan (see Attachment 8). You are correct that Section 22(c) of the Plan requests that ARCO forward to your office "TSD to Generator copies of wastes shipped and received." The manifests which were provided to you as an attachment to my August 26 letter confirmed that the hauler used to transport the contaminated soil from the facility was the hauler described in the Plan. I very much appreciate your courtesy in pointing out to me any additional information that ARCO needs to provide to the County. I mistakenly had thought that, based on your August 3 letter, you required these manifests to be submitted before you could review the Workplan.

5. Adequacy of Proposed Workplan

In your August 3 letter, you state that the Workplan submitted by ARCO is not "adequate" to fully define the extent of soil and groundwater contamination. In my letter to you of August 26, I explained that the Workplan proposes to include the installation of five onsite groundwater wells, three onsite vapor extraction wells and the performance of a vapor extraction test. Following the initial onsite groundwater monitoring, offsite wells may be installed if necessary to determine the extent of any dissolved contaminants. This assessment process is in keeping with the LUFT Manual (October 1989), as described in Section 7. below.

6. Purpose of Proposed Workplan

As the Workplan states, and as described in Section 5. above, its purpose is "to address the locations of known soil contamination" and "to provide groundwater-quality and potentiometric data for evaluating shallow ground-water flow direction and gradient." It is only after these data are generated that ARCO will be able to address many of the issues you have raised.

I now understand, based on your August 29 letter, that the proposed Workplan is approved subject to the conditions detailed on the last page of that letter, i.e., that the issues discussed on the bottom of page 2 and on pages 3 and 4 of your

August 3 letter be addressed in the development of a remediation plan.

As I mentioned above, I mistakenly believed that you required further information from ARCO in order to complete your review and approval of the Workplan. Now that we have confirmed that no further information was required, we will commence implementation of the Workplan.

7. Timing of Remediation

You describe as a "general rule" in your August 29 letter that site work in the form of assessment and remediation is to be implemented only after a workplan has been approved by the County. Your letter goes on to state, however, that if there is free product or dissolved product in the groundwater, ARCO "can and must" commence remedial action while it is in the process of obtaining approval from the County of its workplans.

I am uncertain as to the circumstances when this "exception" would apply. If you mean that ARCO must initiate remedial action prior to assessment or even approval of a workplan in all cases where there is any free product or dissolved product in the groundwater, then this exception is contrary to regulatory guidelines, practical limitations and good engineering practice.

To begin with, each site must be evaluated on a case-by-case basis. The LUFT Manual describes a "phased approach" to the investigation and cleanup of leaking underground fuel tank which is "tailored to the severity of each specific site" (LUFT Manual p. 9). The procedures set forth in the Manual "are intended to avoid unwarranted analysis while ensuring that adequate analysis is done to identify the extent of contamination problems" (LUFT Manual p. 2). An objective of the LUFT Manual is thus to prevent duplicative efforts that might result from proceeding with remediation without agency approval. Similarly, the Tri-Regional Recommendations anticipate that there will be a soil and groundwater investigation prior to remediation (p. 15 fig. 1).

The LUFT Manual goes on to state that the "cleanup of all contaminated soil and dissolved product in ground water is not always necessary to protect public health and the environment." (LUFT Manual p. 1). In some cases, free product or dissolved product will be left in place with a groundwater monitoring program to ensure the effectiveness of the remedial action (LUFT Manual p. 61). Surely, if the LUFT Manual contemplates that dissolved product or free product may be left in place, ARCO cannot be under an affirmative obligation to remove all free and dissolved product prior to approval of both its assessment and remediation plan.

There are additional reasons for obtaining local agency review before commencing remediation. Closure of an individual

site and that site's removal from the LUST computer file can only be granted by the State's Regional Water Quality Control Board (RWQCB). The RWQCB issues the closure decision based on the recommendations from the local agency. At "Category 3 sites" where there is known or suspected groundwater pollution or areas with shallow groundwater, as there is at this facility, the LUFT Manual requires consultation with the Regional Water Quality Control Board and responsible agencies "to determine required remedial action" (LUFT Manual p. 60). If the lead agency is not the Regional Board and the groundwater is threatened or affected, then the lead agency must consult with the appropriate Regional Board to ensure that the anticipated remedial action is consistent with the applicable water quality control plans and policies (LUFT Manual p. 60). It would be entirely inappropriate to proceed with remediation until receiving this consistency determination from the appropriate agency.

If the contamination presents an immediate threat to human health or safety, action should and will be taken by the operator. The LUFT Manual states that questions regarding "site health and safety hazards" should be asked and answered in the earliest stages of problem identification (LUFT Manual p. 12-13). If they exist, sources of possible hazardous vapor should be identified and eliminated. Similarly, the American Petroleum Institute Guide to the Assessment and Remediation of Underground Petroleum Releases, August 1989, also states that the "first step" in any site assessment of a petroleum release is to ascertain the immediate safety hazards (API Guide at p. 1). If there is a known release, the API Guide recommends that it be stopped and the hazards be mitigated (Figure 1 and Figure 17).

There are, of course, technical limitations to what can be accomplished at any given site in terms of immediate remediation where even a safety threat is present. As the API Guide points out, the "feasibility of liquid hydrocarbon removal is site specific and a function of the earth materials, hydrocarbon characteristics, and equipment limitations. In general, only part of the total original release volume is recoverable as a free liquid. Most skimming pumps require the accumulation of at least 1/8 inch of hydrocarbon in the well before they will operate" (API Guide pp. 41-43).

Remediation activities at a site are also technically complex and expensive. Engineering remedial systems without obtaining the proper amount of background information can lead to a wasted remedial approach and can actually make the problem worse by mixing distinct constituents, puncturing an aquifer or by altering the groundwater gradient. These examples are self evident and can only be avoided by sound engineering. Without aquifer testing, site hydrogeologic characteristics will not be easily understood and can waste our recovery efforts for both the dissolved constituents and floating product. Pumping rates,

aquifer transmissivity, area of influence need to be addressed so that the optimum recovery criteria can be reached. By over pumping an aquifer, additional geology can be affected which only increases the total impact to the site. Product only recovery systems (without groundwater extraction) can mask recovery efforts by capturing floating product very close to the individual recovery well. After the minor amount of floating product is captured, groundwater has a rebounding effect. By removing the weight of the floating product, groundwater equalizes (rebounds) with the release of the hydrostatic head and can push away the product surrounding the recovery well. Thus, product only recovery techniques can create the appearance of remediation without substantial results.

Many remediation activities, such as pumping groundwater or aeration, require the notification of other agencies, and in some cases the acquisition of waste discharge, air quality and other permits. These permits may not be available without agency approval of the contemplated remediation. In instances where there is a mixture of water and petroleum, there will almost certainly be delays associated with obtaining air quality and water discharge permits as well as practical problems associated with what to do with the water which is removed. Access to neighboring properties and city streets is often time-consuming. Remediation cannot be commenced without obtaining the appropriate governmental permits and access to private property.

Finally, it has been suggested that ARCO has been less than aggressive in pursuing the remediation of contamination at ARCO facilities. I do not think this characterization is accurate nor is it supported by the facts we have described in this or other situations. In January 1991, when the Workplan was submitted, we volunteered to proceed on parallel tracks with the implementation of the Workplan and the gathering of further information on the piping located on the north side of the facility. We were informed by the County that the Workplan would not be approved until the remaining piping had been removed. Even after the piping was removed and that information was transmitted to the County, review of the Workplan was delayed for a further four months. We are eager to proceed with the activities described in the Workplan and will keep you posted on our progress.

If you have any questions concerning this letter, please do not hesitate to contact me.

Sincerely,

Chuck Carmel
Environmental Engineer

Enclosures
cc: John Meck, ARCO Products Company
Chris Winsor, ARCO Products Company
Lester Feldman, San Francisco RWQCB
Howard Hatayama, State Department of Health Services
Keith Bullock, Gettler-Ryan, Inc.
Mark Thomson, Alameda County District Attorney's Office

# ATTACHMENT 1

gettler — ryan inc.

January 4, 1991

Alameda County Health Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

RECEIVED
JAN 14 1991
K.A. CHRISTIE

Attention: Ms. Katherine Chesick

Reference: ARCO Service Station No. 2112
1260 Park Street
Alameda, California

Ms. Chesick:

As requested by ARCO Products Company, we are forwarding a copy of the Work Plan prepared for the above referenced location.

If you should have any questions or comments, please call.

Sincerely,

Keith E. Bullock

KEB/me

enclosures

cc: K. Christie, ARCO Products Company
H. C. Winsor, ARCO Products Company
T. Callaghan, Regional Water Quality Control Board

2150 west winton avenue • hayward, california 94545-1210 • (415) 783-7500

GeoStrategies Inc.



# WORK PLAN

ARCO Service Station No. 2112
1260 Park Street
Alameda, California

792002-2

January 2, 1991

**GeoStrategies Inc.**
2140 WEST WINTON AVENUE
HAYWARD, CALIFORNIA 94545
(415) 352-4800

January 2, 1991

Gettler-Ryan Inc.
2150 West Winton Avenue
Hayward, California 94545

Attn: Mr. Keith Bullock

Re: WORK PLAN
ARCO Service Station No. 2112
1260 Park Street
Alameda, California

Gentlemen:

This Work Plan has been prepared for the ARCO Service Station at the above referenced location (Plate 1). GeoStrategies Inc. (GSI) proposes three vapor extraction wells will be installed to address the locations of known soil contamination. In addition, GSI proposes that five monitoring wells be installed to evaluate ground-water quality conditions, hydraulic gradient, and flow direction beneath the site. The proposed well locations are shown on Plate 2.

## BACKGROUND

In January, 1990 Applied Geosystems (AGS) drilled six exploratory soil borings (B-1 through B-6) to assess soil conditions in the area of the present and former underground storage tank (UGST) complexes. Five borings were drilled in the vicinity of the present UGST complex. Analytical results of soil samples from the present tank complex indicated detectable levels of benzene up to 210 parts per million (ppm) petroleum hydrocarbons. One boring was drilled in the area of the present UGST complex. Soil samples from the future tank complex were reported as none detected for petroleum hydrocarbons. First encountered groundwater was reported to be at approximately 12 feet below ground surface. Results of this investigation were presented in the AGS report dated February 20, 1990.

In July, 1990 Gettler-Ryan (G-R) removed the five existing steel UGST's and associated tank to dispenser underground piping (Plate 2). These included one 10,000 gallon, two 6,000 gallon, and two 4,000 gallon UGSTs that contained gasoline products. Approximately 2700 yards of soil were excavated from these activities at the site.

In August, 1990, G-R installed four double-walled fiberglass UGSTs and new product lines (Plate 2). The site is presently occupied by an operating ARCO Service Station.

## HYDROGEOLOGIC SETTING

The project site is situated on Alameda Island. Alameda is bordered by the San Francisco Bay to the southwest, San Leandro Bay to the southeast, and Oakland Inner Harbor to the east. The closest marine water is approximately 2/3 mile south of the site. Previous investigations (Hickerbottom and Muir 1988; Applied Geosystems, February 1990; GeoStrategies Inc., October 1990) depict the site as being within the East Bay Plain in the north central portion of the Berkeley Alluvial Plain. AGS boring logs indicate the site is underlain by poorly-graded sands with some clay content to approximately 5 feet below ground surface and clayey sand to the lower limit of the soil boreholes. First encountered groundwater was approximately 12 feet below ground surface. Potentiometric data has not been collected and so groundwater flow direction and hydraulic gradient have not been determined.

## TECHNICAL RATIONALE

Since concentrations of TPH-Gasoline, and benzene were detected in the previous soil investigation phase, potential soil and ground-water impacts need to be ascertained. GSI proposes the installation of three vapor extraction wells to address the locations of known soil contamination. We also propose the installation of five on-site ground-water monitoring wells, to provide groundwater-quality and potentiometric data for evaluating shallow ground-water flow direction and gradient. The proposed three vapor extraction wells and five monitoring wells are based on soil analytical data obtained during the UGST replacement effort. The locations are as follows:

- The three proposed vapor extraction wells will be installed outside the northern and southern extent of the former UGST excavations. The third vapor extraction well will be installed in the vicinity of the former vapor pots along Encinal Avenue. These wells will be used for in-situ remediation of known soil contamination.

- One monitoring well will be installed within the former UGST complex. This well will provide data to evaluate soil and ground-water contamination in and below the former UGST complex.

- One monitoring well will be installed adjacent to the former vapor pots along Encinal Avenue. This will provide data to evaluate soil and ground water contamination adjacent to a possible source area.

- One monitoring well will be installed adjacent to and in the inferred downgradient direction of the western-most service island near Park Street. This well will assist in evaluating soil and groundwater conditions adjacent to an area where hydrocarbons in the soil were detected during pipe removal.

- One monitoring well will be installed along the southern property boundary in the inferred downgradient direction of the former UGST complex. The purpose of this well is for further definition of hydrocarbons in the soil and groundwater near the site boundary.

- One monitoring well will be installed in the southeastern corner of the site in the inferred upgradient direction. This well will provide needed background soil and groundwater analytical data.

## SCOPE OF WORK

The following tasks are proposed:

TASK 1: Three vapor extraction wells will be installed in 12-inch borings. The borings will be drilled by conventional hollow-stem auger techniques to a total depth of approximately 10.5 feet. The vapor extraction wells will be constructed using 4-inch-diameter, precleaned Schedule 40 PVC well casing and continuously-wrapped well screens The well screens will be placed from 5.0 to 10.0 feet below ground surface. The annular sand pack will extend from the total depth to 1-foot above the well screen. A 1-foot bentonite seal, followed by a bentonite/cement grout to the ground surface, will be installed above the sandpack.

TASK 2. Five 8-inch-diameter exploratory borings will be drilled to an anticipated depth of approximately 30 feet below ground surface. Conventional hollow-stem auger techniques will be used to advance the borings. One boring will be continuously sampled to its total anticipated depth (approximately 30 feet). If a clay aquitard of five feet or more is encountered before a depth of 30 feet, the boring advancement will stop. Samples of the clay aquitard will then be collected for permeability testing. Five feet of aquitard material will be verified, then the borehole backfilled with bentonite to the upper surface of the clay stratum prior to construction of the well.

TASK 3. The monitoring wells will be constructed using 3-inch-diameter, precleaned Schedule 40 PVC well casing with 0.02-inch machine slotted well screen. The well installed in the tank excavation will be constructed using a 6-inch-diameter, precleaned Schedule 40 PVC well casing with 0.02-inch machine slotted well screen. This well will be used for subsequent aquifer tests. The monitoring wells will be constructed according to the appended procedures (Appendix A). The well screens will extend a minimum of 5 feet above the first encountered water-level. The annular sandpack will extend from total depth to a minimum of 1-foot above the well screen. A minimum 1-foot bentonite seal, followed by a cement grout seal to ground surface, will be placed above the sandpack. The well screens will be placed so that well designs are compatible with subsurface geologic conditions. No well screens will be installed that potentially may permit cross-contamination of adjacent aquifers.

TASK 4. Soil samples will be collected from the three proposed exploratory boreholes for analysis of specific chemical parameters discussed in Task 6 (described below). Collected soil samples will be field screened for visual evidence of contamination (i.e. product saturation, discoloration, etc.) and for organic vapors using an Organic Vapor Monitor (OVM) photoionization detector.

These field procedures are performed and recorded solely as reconnaissance data, and GSI does not consider field screening techniques as verification of contamination. Therefore, non-detectable field screened samples may also be selected for laboratory analysis as potential "false-negative" soil samples for quality control (QC) purposes. The selection of soil samples for chemical analysis will be based upon site-specific geologic conditions as they relate to potential contamination migration pathways and confining layers (aquitards).

TASK 5. The monitoring wells will be properly developed prior to collecting ground-water samples. A G-R Field Technician will perform the well development and evaluate completeness based on visual inspection of discharge water. Following well development, the wells will be sampled for parameters listed in Task 6.

TASK 6. Soil and ground-water samples will be analyzed for TPH-Gasoline using EPA Method 8015 (Modified); and Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) using EPA Method 8020/602.

TASK 7. A report of the well installation will be prepared documenting field procedures, description of the subsurface geology (boring logs), well construction details, chemical analytical results, and a brief discussion of results.

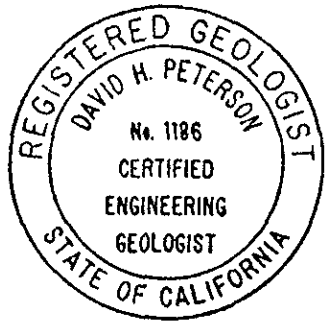
TASK 8. A vapor extraction pilot study will be conducted upon receipt of a permit from the Bay Area Air Quality Management District (BAAQMD) Data collected from this study will be used to design the vapor extraction system.

If you have any questions, please call.

GeoStrategies Inc. by,

Robert A. Lauritzen
Geologist

David H. Peterson
Senior Geologist
C.E.G. 1186




RAL/DHP/mlg

Plate 1. Vicinity Map
Plate 2. Site Plan

Appendix A: Field Methods and Procedures

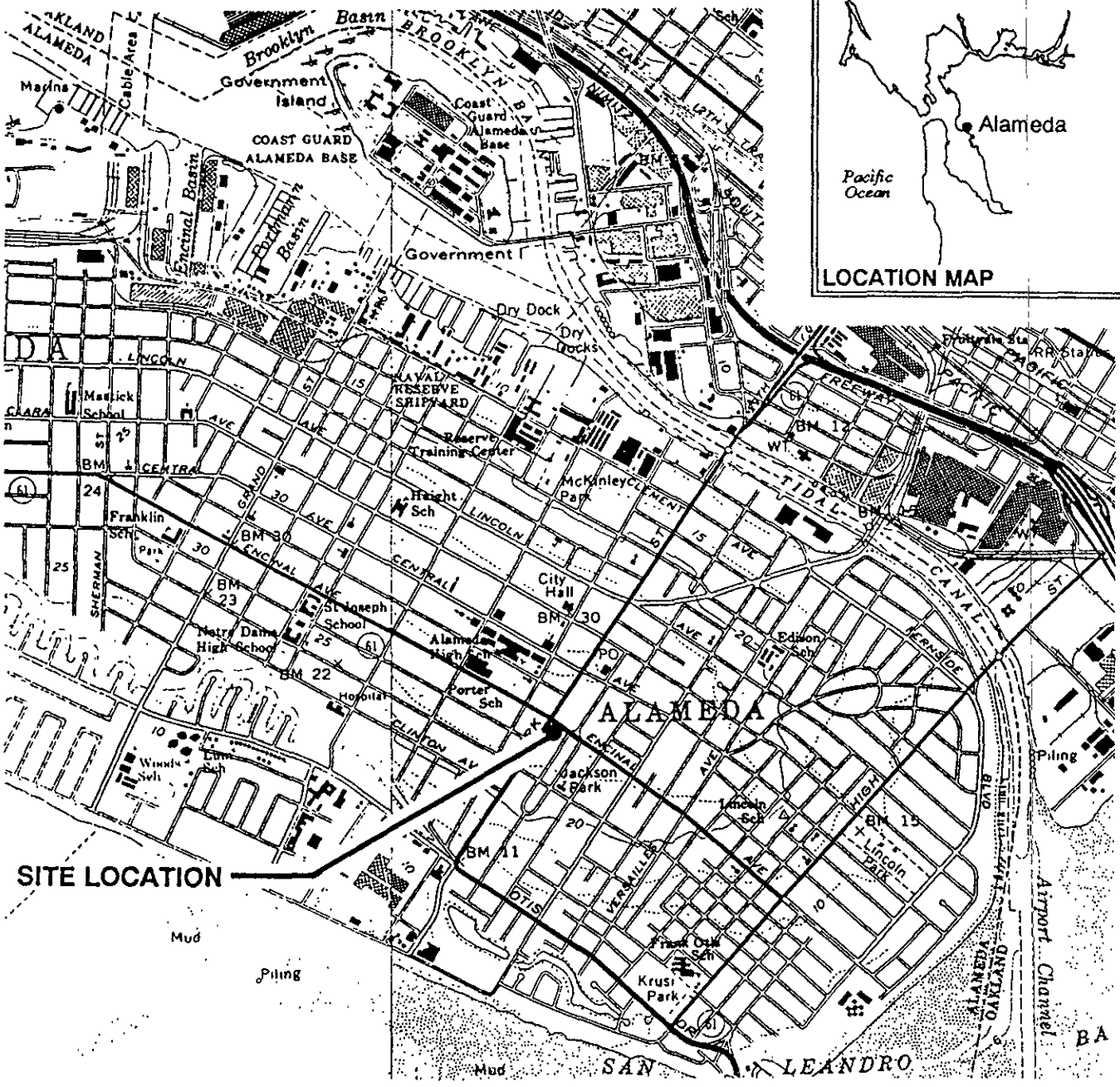
## References Cited

Applied Geosystems, 1990, Soil Boring Report, AGS Job 69048-1, dated February, 1990.

GeoStrategies Inc., 1990, Soil Boring Report, Report No. 7667-1, dated July 5, 1990.

Hickenbottom, K. and Muir, K., 1988, Geohydrology and Ground-water-quality overview of the East Bay Plain Area, Alameda County, California, Alameda County 205 (j) Report.

# ILLUSTRATIONS




Base Map: USGS Topographic Map

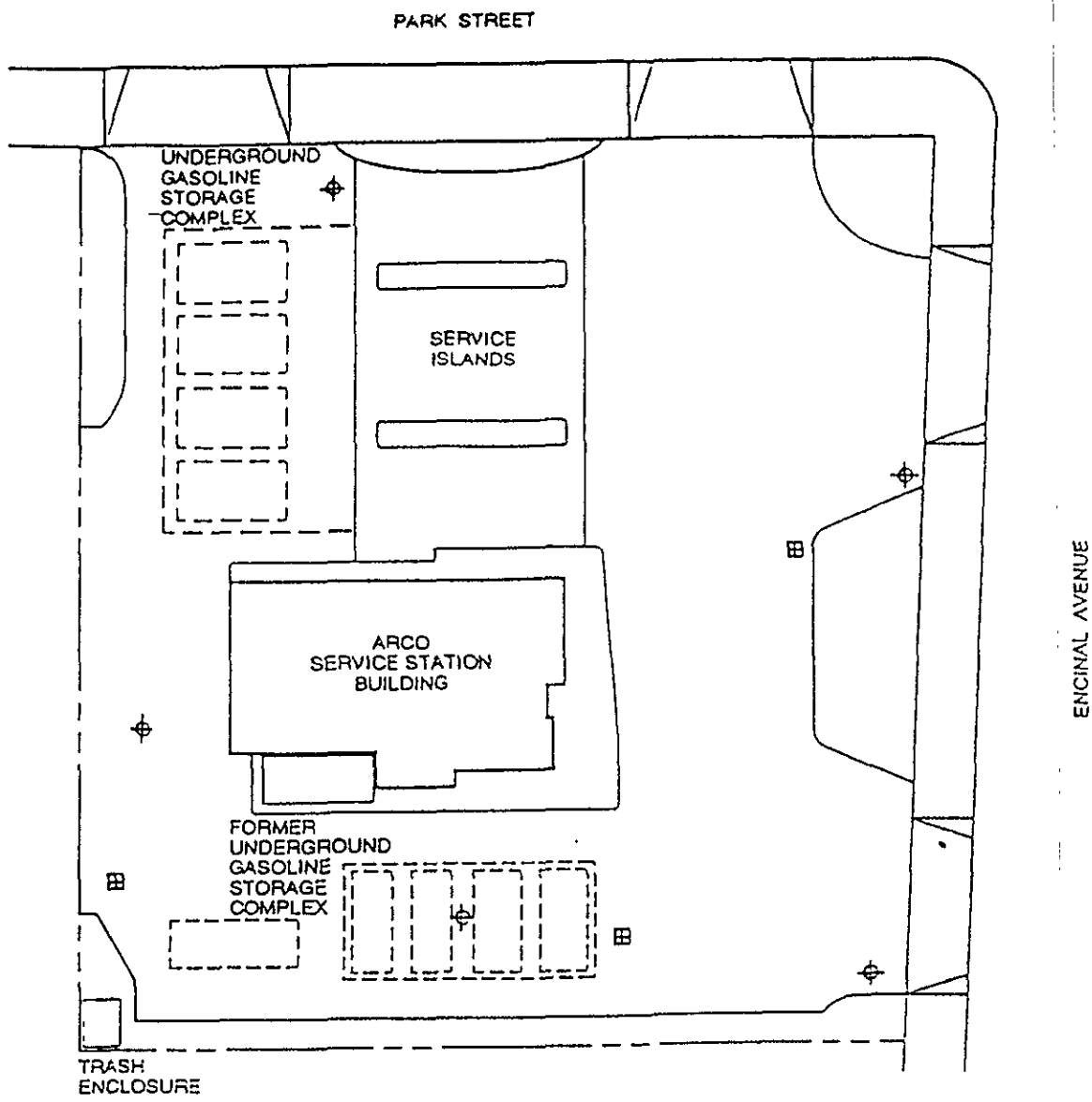
Approximate Scale : 1" = 2000'

GeoStrategies Inc.

**Vicinity Map**
ARCO Service Station #2112
1260 Park Street
Alameda, California

PLATE **1**

| JOB NUMBER | REVIEWED BY RG/CEG | DATE | REVISED DATE | REVISED DATE |
|---|---|---|---|---|
| 7920 | | 3/90 | | |




EXPLANATION

⊕ Proposed ground-water monitoring well location

⊞ Proposed vapor extraction well location

0 30 60

Scale in Feet

GSI GeoStrategies Inc.

Site Plan
ARCO Service Station #2112
1260 Park Street
Alameda, California

PLATE 2

| JOB NUMBER | REVIEWED BY RG/CEG | DATE | REVISED DATE | REVISED DATE |
|---|---|---|---|---|
| 7920 | | 12/90 | | |

# APPENDIX A
# FIELD METHODS AND PROCEDURES

# FIELD METHODS AND PROCEDURES

## EXPLORATION DRILLING

### Mobilization

Prior to any drilling activities, GeoStrategies Inc. (GSI) will verify that necessary drilling permits have been secured.

Utility locations will be located and drilling will be conducted so as not to disrupt activities at a project site. GSI will obtain and review available public data on subsurface geology and if warranted, the location of wells within a half-mile of the project site will be identified. Drillers will be notified in advance so that drilling equipment can be inspected prior to performing work.

### Drilling

The subsurface investigations are typically performed to assess the lateral and vertical extent of petroleum hydrocarbons present in soils and groundwater. Drilling methods will be selected to optimize field data requirements as well as be compatible with known or suspected subsurface geologic conditions.

Monitoring wells are installed using a truck-mounted hollow-stem auger drill rig or mud-rotary drill rig. Typically, the hollow-stem rig is used for wells up to 100 feet, if subsurface conditions are favorable. Wells greater than 100-feet deep are typically drilled using mud-rotary techniques. When mud rotary drilling is used, an electric log will be performed for additional lithological information. Also during mud rotary drilling, precautions will be taken to prevent mud from circulating contaminants by using a conductor casing to seal off contaminated zones. Samples will be collected for lithologic logging by continuous chip, and where needed by drive sample or core as specified by the supervising geologist.

Soil Sampling

Shallow soil borings will be drilled using a truck-mounted hollow-stem auger drilling rig, unless site conditions favor a different drilling method. Drilling and sampling methods will be consistent with ASTM Method D-1452-80. The auger size will be a minimum 6-inch nominal outside-diameter (O.D). No drilling fluids will be used during this drilling method. The augers and other tools used in the bore hole will be steam cleaned before use and between borings to minimize the possibilities of cross-contamination between borings.

Soil samples are typically collected at 5-foot intervals as a minimum from ground surface to total depth of boring. Additional soil samples will be collected based on significant lithologic changes and/or potential chemical content. Soil samples from each sampling interval will be lithologically described by a GSI geologist (Figure 1). Soil colors will be described using the Munsell Color Chart. Rock units will be logged using appropriate lithologic terms, and colors described by the G.S.A. Rock Color Chart.

Head-space analyses will be performed to check for the evidence of volatile organic compounds. Head-space analyses will be performed using an organic vapor analyzer; either an OVA, HNU, or OVM. Organic vapor concentrations will be recorded on the GSI field log of boring (Figure 1). The selection of soil samples for chemical analysis are typically based on the following criteria:

1) Soil discoloration
2) Soil odors
3) Visual confirmation of chemical in soil
4) Depth with respect to underground tanks (or existing grade)
5) Depth with respect to ground water
6) OVA reading

Soil samples (full brass liners) selected for chemical analysis are immediately covered with aluminum foil and the liner ends are capped to prevent volatilization. The samples are labeled and entered onto a Chain-of-Custody form, and placed in a cooler on blue ice for transport to a State-certified analytical laboratory.

Soil cuttings are stockpiled on-site. Soils are sampled and analyzed for site-specific chemical parameters. Disposition of soils is dependent of chemical analytical results of the samples.

Soil Sampling - cont.

Soil borings not converted to monitoring wells will be backfilled (sealed) to ground surface using either a neat cement or cement-bentonite grout mixture. Backfilling will be tremied by continuously pumping grout from the bottom to the top of the boring where depth exceeds 20' or as required by local permit requirements.

All field and office work, including exploratory boring logs, are prepared under the direction of a registered geologist.

Monitoring Well Installation

Monitoring well casing and screen will be constructed of Schedule 40, flush-joint threaded polyvinylchloride (PVC). The well screen will be factory mill-slotted unless additional open area is required (eg. conversion to an extraction well in a low-yield aquifer). The screen length will be placed adjacent to the aquifer material to a minimum of 2-feet above encountered water. No screen shall be placed in a borehole that potentially creates hydraulic interconnection of two or more aquifer units. Screen slot size and well sand pack will be compatible with encountered aquifer materials, as confirmed by sieve analysis.

Monitoring wells will be completed below grade (Figure 2) unless special conditions exist that require above-grade completion design. In the event a monitoring well is required in an aquifer unit beneath an existing aquifer, the upper aquifer will be sealed off by installing a steel conductor casing with an annular neat cement or cement-bentonite grout seal. This seal will be continuously tremie pumped from the bottom of the annulus to ground surface.

The monitoring well sand pack will be placed adjacent to the entire screened interval and will extend a recommended minimum distance of 2-feet above the top of the screen. No sand pack will be placed that interconnects two or more aquifer units. A minimum 2-foot bentonite pellet or bentonite slurry seal will be placed above the sand pack. Sand pack, bentonite, and cement seal levels will be confirmed by sounding the annulus with a calibrated weighted tape. The remaining annular space above the bentonite seal will be grouted with a bentonite-cement mixture and will be tremie-pumped from the bottom of the annular space to the ground surface. The bentonite content of the grout will not exceed 5 percent by weight. A field log of boring and a field well completion form will be prepared by GSI for each well installed.

Decontamination of drilling equipment before drilling and between wells will consist of steam cleaning, and/or Alconox wash.

Well Development

All newly installed wells will be properly developed within 48 hours of completion. No well will be developed until the well seal has set a minimum of 12 hours. Development procedures will include one or more of the methods described below:

Bailing

Bailing will be used to remove suspended sediments and drilling fluids from the well, where applicable. The bailer will be raised and lowered through the column of water in the well so as to create a gentle surging action in the screened interval. This technique may be used in conjunction with other techniques, such as pumping, and may be used alone if the well is of low yield.

Pumping

Pumping will be used in conjunction with bailing or surging. The pump will be operated in such a manner as to gently surge the entire screened interval of the well. This may involve operating the pump with a packer type mechanism attached and slowly raising and lowering the pump, or by cycling the pump off and on to allow water to move in and out of the screened interval. Care will be used not to overpump a well.

Surging

Surging will be performed on wells that are screened in known or suspected high yield formations and/or on larger diameter (recovery) wells. A surge block will be raised and lowered through the entire screened interval, forcing water in and out of the well screen and sand pack. Pumping or air lifting will be used in conjunction with this method of development to remove any sediment brought into the well during surging.

Air Lifting

Air lifting will be used to remove sediment from wells as an alternative to pumping under certain conditions. When appropriate, a surge block designed for use with air lifting will be used to agitate the entire screened interval and water will be lifted out of the well using forced air. When air lifting is performed, the air source will be either nitrogen or filtered air and the procedure will be performed gently to prevent any damage to the well screen or casing and to insure that discharged water is contained.

Well Development - cont.

All well developing equipment will be thoroughly decontaminated prior to development using a steam cleaner and/or Alconox detergent wash and clean water rinse. During development procedures, field parameters (temperature, specific conductance and pH) will be monitored and recorded on well development forms (Figure 3). Equilibration requirements consist of a minimum of three readings with the following accuracy standards:

| | |
|---|---|
| pH | ± 0.1 pH units |
| Specific Conductance | ± 10% of full scale reading |
| Temperature | ± 0.5 degrees Celsius |

The wells will be developed until water is visibly clear and free of sediment, and well purging parameters stabilized. A minimum of 8 to 10 well volumes will be purged from each well, if feasible. If well purging parameters have not stabilized before 10 casing volumes have been removed, well development will continue until purging parameters have stabilized and formation water is being drawn into the well. The adequacy of well development will be judged by the field technician performing the well development and based on known formation conditions.

Well Surveying

Monitoring wells will be surveyed to obtain top of box elevations to the nearest ±0.01 foot. Water level measurements will be recorded to the nearest ±0.01 foot and referenced to Mean Sea Level (MSL). If additional wells are required, then existing and newly installed wells are surveyed relative to MSL.

## GROUND-WATER SAMPLING AND ANALYSIS

### Quality Assurance/Quality Control Objectives

The sampling and analysis procedures employed by Gettler-Ryan Inc. (G-R) for ground-water sampling and monitoring follow specific Quality Assurance/Quality Control (QA/QC) guidelines. Quality Assurance objectives have been established by G-R to develop and implement procedures for obtaining and evaluating water quality and field data in an accurate, precise, and complete manner so that sampling procedures and field measurements provide information that is comparable and representative of actual field conditions. Quality Control (QC) is maintained by G-R by using specific field protocols and requiring the analytical laboratory to perform internal and external QC checks. It is the goal of G-R to provide data that are accurate, precise, complete, comparable, and representative. The definitions for accuracy, precision, completeness, comparability, and representativeness are as follows:

- Accuracy - the degree of agreement of a measurement with an accepted referenced or true value.

- Precision - a measure of agreement among individual measurements under similar conditions. Usually expressed in terms of the standard deviation.

- Completeness - the amount of valid data obtained from a measurement system compared to the amount that was expected to meet the project data goals.

- Comparability - expresses the confidence with which one data set can be compared to another.

- Representativeness - a sample or group of samples that reflects the characteristics of the media at the sampling point. It also includes how well the sampling point represents the actual parameter variations which are under study.

As part of the G-R QA/QC program, applicable federal, state, and local reference guidance documents are followed. The procedures outlined in these regulations, manuals, handbooks, guidance documents, and journals are incorporated into the G-R sampling procedures to assure that; (1) ground-water samples are properly collected, (2) ground-water samples are identified, preserved, and transported in a manner such that they are representative of field conditions, and (3) chemical analysis of samples are accurate and reproducible.

## Guidance and Reference Documents Used to Collect Groundwater Samples

These documents are used to verify G-R sampling procedures and are consistent with current regulatory guidance. If site specific work and sampling plans are required, those plans will be developed from these documents, and newly received applicable documents.

| | |
|---|---|
| U.S.E.P.A. - 330/9-51-002 | NEIC Manual for Groundwater/Subsurface Investigation at Hazardous Waste Sites |
| U.S.E.P.A. - 530/SW611 | Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities (August, 1977) |
| U.S.E.P.A. - 600/4-79-020 | Methods for Chemical Analysis of Water and Wastes (1983) |
| U.S.E.P.A. - 600/4-82-029 | Handbook for Sampling and Sample Preservation of Water and Wastewater (1982) |
| U.S.E.P.A. - 600/4-82-057 | Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater (July, 1982) |
| U.S.E.P.A. - SW-846#, 3rd Edition | Test Methods for Evaluating Solid Waste - Physical/Chemical Methods (November, 1986) |
| 40 CFR 136.3e,Table II (Code of Federal Regulations) | Required Containers, Preservation Techniques, and Holding Times |
| Resources Conservation and Recover Act (OSWER 9950.1) | Groundwater Monitoring Technical Enforcement Guidance Document (September, 1986) |
| California Regional Water Quality Control Board (Central Valley Region) | A Compilation of Water Quality Goals (September, 1988); Updates (October, 1988) |
| California Regional Water Quality Control Board (North Coast, San Francisco Bay, and Central Valley) | Regional Board Staff Recommendations for Initial Evaluations and Investigation of Underground Tanks: Tri-Regional Recommendations (June, 1988) |

Guidance and Reference Documents Used to Collect Groundwater Samples (cont.)

| | |
|---|---|
| Regional Water Quality Control Board (Central Valley Region) | Memorandum: Disposal, Treatment, and Refuse of Soils Contaminated with Petroleum Fractions (August, 1986) |
| State of California Department of Health Services | Hazardous Waste Testing Laboratory Certification List (March, 1987) |
| State of California Water Resources Control Board | Leaking Underground Fuel Tank (LUFT) Field Manual (May, 1988), and LUFT Field Manual Revision (April, 1989) |
| State of California Water Resources Control Board | Title 23, (Register #85.#33-8-17-85), Subchapter 16: Underground Tank Regulations; Article 3, Sections 2632 and 2634; Article 4, Sections 2645, 2646, 2647, and 2648; Article 7, Sections 2670, 2671, and 2672 (October, 1986: including 1988 Amendments) |
| Alameda County Water District | Groundwater Protection Program: Guidelines for Groundwater and Soil Investigations at Leaking Underground Fuel Tank Sites (November, 1988) |
| American Public Health Association | Standard Methods for the Examination of Water and Wastewaters, 16th Edition |
| Analytical Chemistry (journal) | Principles of Environmental Analysis, Volume 55, Pages 2212-2218 (December, 1983) |
| Napa County | Napa County Underground Storage Tank Program: Guidelines for Site Investigations; February 1989. |
| Santa Clara Valley Water District | Guidelines for Preparing or Reviewing Sampling Plans for Soil and Groundwater Investigation of Fuel Contamination Sites (January, 1989) |

Guidance and Reference Documents Used to Collect Groundwater Samples (cont.)

| | |
|---|---|
| Santa Clara Valley Water District | Investigation and Remediation at Fuel Leak sites: Guidelines for Investigation and Technical Report Preparation (March 1989) |
| Santa Clara Valley Water District | Revised Well Standards for Santa Clara County (July 18, 1989) |
| American Petroleum Institute | Groundwater Monitoring & Sample Bias; API Publication 4367, Environmental Affairs Department, June 1983 |
| American Petroleum Institute | A Guide to the Assessment and Remediation of Underground Petroleum Releases; API Publication 1628, February 1989 |
| American Petroleum Institute | Literature Summary: Hydrocarbon Solubilities and Attenuations Mechanisms, API Publication 4414, August 1985 |
| Site Specific (as needed) | General and specific regulatory documents as required. |

Because ground-water samples collected by G-R are analyzed to the parts per billion (ppb) range for many compounds, extreme care is exercised to prevent contamination of samples. When volatile or semi-volatile organic compounds are included for analysis, G-R sampling crew members will adhere to the following precautions in the field:

1. A clean pair of new, disposable gloves are worn for each well being sampled.

2. When possible, samples are collected from known or suspected wells that are least contaminated (i.e. background) followed by wells in increasing order of contamination.

3. Ambient conditions are continually monitored to maintain sample integrity.

When known or potential organic compounds are being sampled for, the following additional precautions are taken:

1. All sample bottles and equipment are kept away from fuels and solvents. When possible, gasoline (used in generators) is stored away from bailers, sample bottles, purging pumps, etc.

2. Bailers are made of Teflon or Stainless Steel. Other materials such as plastic may contaminate samples with phthalate esters which interfere with many Gas Chromatography (GC) analyses.

3. Volatile organic ground-water samples are collected so that air passage through the sample does not occur or is minimal (to prevent volatiles from being stripped from the samples): sample bottles are filled by slowly running the sample down the side of the bottle until there is a positive convex meniscus over the neck of the bottle; the Teflon side of the septum (in cap) is positioned against the meniscus, and the cap screwed on tightly; the sample is inverted and the bottle lightly tapped. The absence of an air bubble indicates a successful seal; if a bubble is evident, the cap is removed, more sample is added, and the bottle is resealed.

4. Extra Teflon seals are brought into the field in case seals are difficult to handle and/or are dropped. Dropped seals are considered contaminated and are not used. When replacing seals or if seals become flipped, care is taken to assure that the Teflon seal faces down.

Sample analysis methods, containers, preservatives and holding times are shown on Table 1.

Laboratory and field handling procedures of samples are monitored by including QC samples for analysis with every submitted sample lot from a project site. QC samples may include any combination of the following:

A. Trip Blank: Used for purgeable organic compounds only; QC samples are collected in 40 milliliter (ml) sample vials filled in the analytical laboratory with organic-free water. Trip blanks are sent to the project site, and travel with project site samples. Trip blanks are not opened, and are returned from a project site with the project site samples for analysis.

B. Field Blank: Prepared in the field using organic-free water. These QC samples accompany project site samples to the laboratory and are analyzed for specific chemical parameters unique to the project site where they were prepared.

C. Duplicates: Duplicated samples are collected "second samples" from a selected well and project site. They are collected as either split samples or second-run samples collected from the same well.

D. Equipment Blank: Periodic QC sample collected from field equipment rinsate to verify decontamination procedures.

The number and types of QC samples are determined as follows:

A. Up to 2 wells - Trip Blank Only

B. 2 to 5 Wells - 1 Field Blank and 1 Trip Blank

C. 5 to 10 Wells - 1 Field blank, 1 Trip Blank, and 1 Duplicate

D. More than 10 Wells - 1 Field Blank, 1 Trip Blank, and 1 Duplicate per each 12 wells

E. If sampling extends beyond one day, quality control samples will be collected for each day.

Additional QC is performed through ongoing and random reviews of duplicate samples to evaluate the precision of the field sampling procedures and analytical laboratory. Precision of QC data is accomplished by calculating the Relative Percent Difference (RPD). The RPD is evaluated to assess whether values are within an acceptable range (typically $\pm$ 20% of duplicate sample).

## SAMPLE COLLECTION

This section describes the routine procedures followed by G-R while collecting ground-water samples for chemical analysis. These procedures include decontamination, water-level measurements, well purging, physical parameter measurements, sample collection, sample preservation, sample handling, and sample documentation. Critical sampling objectives for G-R are to:

1. Collect ground-water samples that are representative of the sampled matrix and,

2. Maintain sample integrity from the time of sample collection to receipt by the analytical laboratory.

Sample analyses methods, containers, preservation, and holding times are presented in Table 1.

### Decontamination Procedures

All physical parameter measuring and sampling equipment are decontaminated prior to sample collection using Alconox or equivalent detergent followed by steam cleaning with deionized water. Any sampling equipment surfaces or parts that might absorb specific contaminants, such as plastic pump valves, impellers, etc., are cleaned in the same manner.

Sample bottles, bottle caps, and septa used for sampling volatile organics are thoroughly cleaned and prepared in the laboratory. Sample bottles, bottle caps, and septa are protected from all potential chemical contact before actual usage at a sample location.

During field sampling, equipment placed in a well are decontaminated before purging or sampling the next well. The equipment are decontaminated by cleaning with Alconox or equivalent detergent followed by steam cleaning with deionized water.

### Water-Level Measurements

Prior to purging and sampling a well, the static-water levels are measured in all wells at a project site using an electric sounder and/or calibrated portable oil-water interface probe (Figure 4). Both static water-level and separate-phase product thickness are measured to the nearest ±0.01 foot. The presence of separate-phase product is confirmed using a clean, acrylic or polyvinylchloride (PVC) bailer, measured to the nearest ±0.01 foot with a decimal scale tape.

Water-Level Measurements (continued)

The monofilament line used to lower the bailer is replaced between wells with new line to preclude the possibility of cross-contamination. Field observations (e.g. well integrity, product color, turbidity, water color, odors, etc.) are noted on the G-R Well Sampling Field Data Sheet shown in Figure 4. Before and after each use, the electric sounder, interface probe and bailer are decontaminated by washing with Alconox or equivalent detergent followed by rinsing with deionized water to prevent cross-contamination.

As mentioned previously, water-levels are measured in wells with known or suspected lowest dissolved chemical concentrations to the highest dissolved concentrations.

Well Purging

Before sampling occurs, well casing storage water and interstitial water in the artificial sand pack will be purged using (1) a positive displacement bladder pump constructed of inert, non-wetting, Teflon and stainless steel, (2) a pneumatic-airlift pumping system, (3) a centrifigal pumping system, or (4) a Teflon or Stainless steel bailer (Figure 5). Methods of purging will be assessed based on well size, location, accessibility, and known chemical conditions. Individual well purge volumes are calculated from borehole volumes which take into account the sand packed interval in the well annular space. As a general rule, a minimum of 3 and a maximum of 10 borehole volumes will be purged. Wells which dewater or demonstrate slow recharge periods (i.e. low-yield wells) during purging activities may be sampled after fewer purging cycles. If a low-yield (low recovery) well is to be sampled, sampling will not take place until at least 80 percent of the previously measured water column has been replaced by recharge, or as per local requirements. Physical parameter measurements (temperature, pH, and specific conductance) are closely monitored throughout the well purging process and are used by the G-R sampling crew as indicators for assessing sufficient purging. Purging is continued until all three physical parameters have stabilized. Specific conductance (conductivity) meters are read to the nearest $\pm 10$ umhos/cm, and are calibrated daily. pH meters are read to the nearest $\pm 0.1$ pH units and are calibrated daily. Temperature is read to the nearest 0.1 degree F. Calibration of physical parameter meters will follow manufacturers specifications. Monitoring wells will be purged according to the protocol presented in Figure 5. Collected field data during purging activities will be entered on the G-R Well Sampling Field Data Sheet shown in Figure 4. Copies of the G-R Field Data Sheets will be reviewed by the G-R Sampling Manager for accuracy and completeness.

## DOCUMENTATION

### Sample Container Labels

Each sample container will be labeled by an adhesive label, noted in permanent ink immediately after the sample is collected. Label information will include:

Sample point designation (i.e. well number or code)

Sampler's identification

Project number

Date and time of collection

Type of preservation used

### Well Sampling Data Forms

In the field, the G-R sampling crew will record the following information on the Well Sampling Data Sheet for each sample collected:

Project number

Client

Location

Source (i.e. well number)

Time and date

Well accessibility and integrity

Pertinent well data (e.g. depth, product thickness, static water-level, pH, specific conductance, temperature)

Calculated and actual purge volumes

Chain-of-Custody

A Chain-of-Custody record (Figure 6) shall be completed and accompany every sample and every shipment of samples to the analytical laboratory in order to establish the documentation necessary to trace sample possession from time of collections. The record will contain the following information:

- Sample or station number or sample identification (ID)
- Signature of collector, sampler, or recorder
- Date and time of collection
- Place of collection
- Sample type
- Signatures of persons involved in chain of possession
- Inclusive dates of possession

Samples shall always be accompanied by a Chain-of-Custody record. When transferring the samples, the individual relinquishing and receiving the samples will sign, date, and note the time on the Chain-of-Custody record. G-R will be responsible for notifying the laboratory coordinator when and how many samples will be sent to the laboratory for analysis, and what types of analyses shall be performed.

TABLE 1

SAMPLE ANALYSIS METHODS, CONTAINERS, PRESERVATIONS, AND HOLDING TIMES

| Parameter | Analytical Method | Reporting Units | Container | Preservation | Maximum Holding Time |
|---|---|---|---|---|---|
| Total Petroleum Hydrocarbons (Gasoline) | EPA 8015 (modified) | mg/l<br>ug/l | 40 ml. vial glass, Teflon | cool, 4 C<br>HCl to pH<2 | 14 days (maximum) |
| Benzene<br>Toluene<br>Ethylbenzene<br>Xylenes (BTEX | EPA 8020 | mg/l<br>ug/l | 50 ml. vial glass, Teflon lined septum | cool, 4 C<br>HCl to pH<2 | 7 days (w/o preservative)<br>14 days (w preservative) |
| Oil & Grease | SM 503E | mg/l<br>ug/l | 1 l glass, Teflon lined septum | H2SO4 or HCl to pH<2 | 28 days (maximum) |
| Total Petroleum Hydrocarbons (Diesel) | EPA 8015 (modified) | mg/l<br>ug/l | 40 ml. vial glass, Teflon lined septum | cool, 4 C | 14 days (maximum) |
| Halogented Volatile Organics (chlorinated solvents) | 8010 | mg/l<br>ug/l | 40 ml. vial glass, Teflon lined septum | cool, 4 C | 14 days (maximum) |
| Non chlorinated solvents | 8020 | mg/l<br>ug/l | 40 ml. vial glass, Teflon lined septum | cool, 4 C<br>HCl to pH<2 | 14 days (maximum) |
| Volatile Organics | 8240 | mg/l<br>ug/l | 40 ml. vial glass, Teflon lined septum | cool, 4 C<br>HCl to pH<2 | 14 days (maximum) |
| Semi-Volatile Organics | 8270 | mg/l<br>ug/l | 1 l amber glass, Teflon lined septum | cool, 4 C | 7 days extract<br>40 days (maximum to analyze) |
| Specific Conductance (Field test) | | umhos/cm | | | |
| pH (Field test) | | pH units | | | |
| Temperature (Field test) | | Deg F | | | |

GeoStrategies Inc.

# FIELD EXPLORATORY BORING LOG

**FIGURE 1**

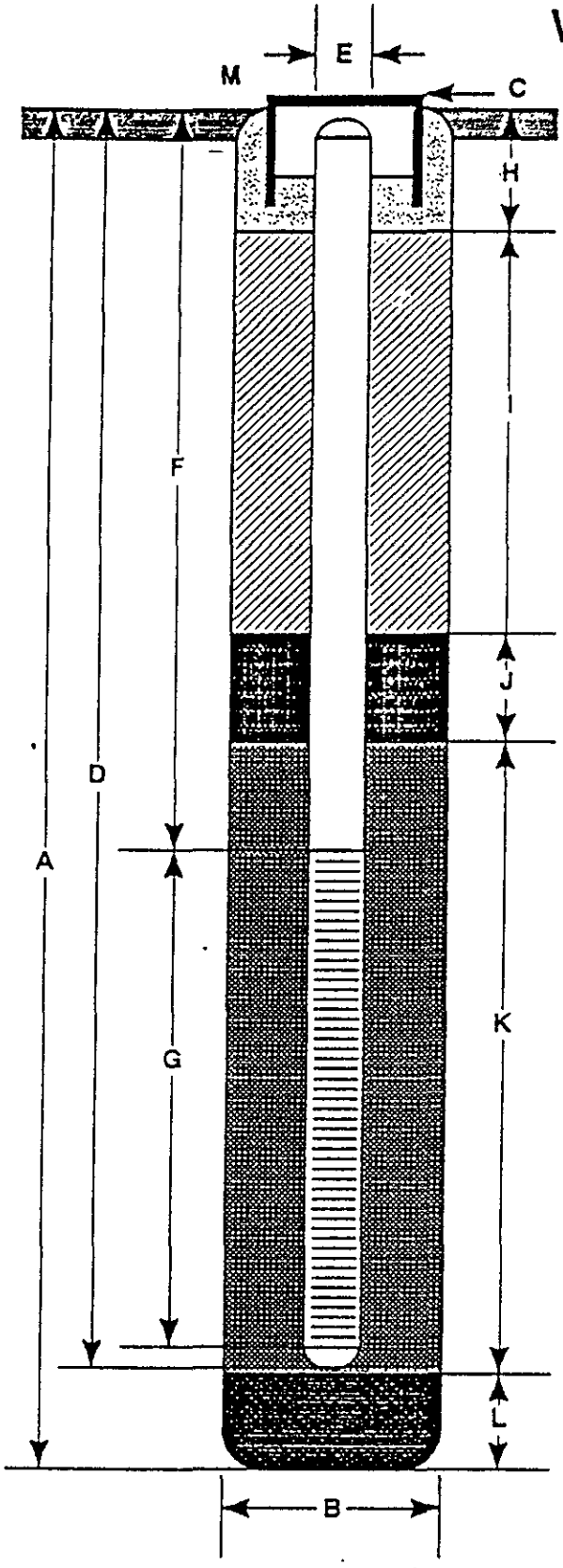
| | | | |
|---|---|---|---|
| Field location of boring: | Project No.: | Date: | Boring No: |
| | Client: | | |
| | Location: | | |
| | City: | | Sheet of |
| | Logged by: | Driller: | |
| Drilling method: | Casing installation data: | | |
| Hole diameter: | Top of Box Elevation: | Datum: | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Water Level | |
| | | | | | | | Time | |
| | | | | | | | Date | |
| PID (ppm) | Blows/ft. or Pressure (psi) | Type of Sample | Sample Number | Depth (ft.) | Sample | Well Detail | Soil Group Symbol (USCS) | Description |
| | | | | | | | | |

Remarks:

# WELL CONSTRUCTION DETAIL

FIGURE 2




A Total Depth of Boring _____ ft.

B Diameter of Boring _____ in.
Drilling Method _____

C Top of Box Elevation _____ ft.
☐ Referenced to Mean Sea Level
☐ Referenced to Project Datum

D Casing Length _____ ft.
Material _____

E Casing Diameter _____ in.

F Depth to Top Perforations _____ ft.

G Perforated Length _____ ft.
Perforated Interval from _____ to _____ ft.
Perforation Type _____
Perforation Size _____ in.

H Surface Seal from _____ to _____ ft.
Seal Material _____

I Backfill from _____ to _____ ft.
Backfill Material _____

J Seal from _____ to _____ ft.
Seal Material _____

K Gravel Pack from _____ to _____ ft.
Pack Material _____

L Bottom Seal _____ ft.
Seal Material _____

M _____

Note: Depths measured from initial ground surface

GSI GeoStrategies Inc.

Well Construction Detail

WELL NO

| JOB NUMBER | REVIEWED BY RG/CEG | DATE | REVISED DATE | REVISED DATE |
|---|---|---|---|---|

## WELL DEVELOPMENT FORM

FIGURE 3

Page_____ of_____

(to be filled out in office)

Client_____ SS#_____ Job#_____

Name_____ Location_____

Well#_____ Screened Interval_____ Depth_____

Aquifer Material_____ Installation Date _____

Drilling Method_____ Borehole Diameter_____

Comments regarding well installation:_____

(to be filled out in the field) Name_____

Date_____ Development Method_____

Total Depth_____ - Depth to liquid_____ = WaterColumn_____

Product thickness_____

_____ x _____ x _____ x 0.0408 = _____gals
Water Column Diameter (in.) #Vol

Purge Start_____ Stop_____ Rate_____ gpm

| Gallons | Time | Clarity | Temp. | pH | Conductivity |
|---|---|---|---|---|---|
| 0 | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Total gallons removed_____ Development stop time_____

Depth to liquid _____at_____(time)

Color of water_____ Water discharged to_____

Comments_____

# GETTLER-RYAN INC.

General and Environmental Contractors

## WELL SAMPLING FIELD DATA SHEET

FIGURE 4

COMPANY _____ JOB # _____

LOCATION _____ DATE _____

CITY _____ TIME _____

Well ID. _____ Well Condition _____

Well Diameter _____ in. Hydrocarbon Thickness _____ ft.

Total Depth _____ ft.

| Volume Factor (VF) | | | |
|---|---|---|---|
| | 2" = 0.17 | 6" = 1.50 | 12" = 5.80 |
| | 3" = 0.38 | 8" = 2.60 | |
| | 4" = 0.66 | 10" = 4.10 | |

Depth to Liquid- _____ ft.

(# of casing volumes) _____ x _____ x(VF) _____ = (Estimated Purge Volume) _____ gal.

Purging Equipment _____

Sampling Equipment _____

Starting Time _____ Purging Flow Rate _____ gpm.

(Estimated Purge Volume) _____ gal. / (Purging Flow Rate) _____ gpm. = (Anticipated Purging Time) _____ min.

| Time | pH | Conductivity | Temperature | Volume |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Did well dewater? _____ If yes, time _____ Volume _____

Sampling Time _____ Weather Conditions _____

Analysis _____ Bottles Used _____

Chain of Custody Number _____

COMMENTS _____

FIGURE 5

## Monitoring Well Sampling Protocol Schematic

Sampling Crew Reviews Project Sampling Requirements/Schedule

↓

Field Decontamination and Instrumentation Calibration

↓

Check Integrity of Well (Inspect for Well Damage)

↓

Measure and Record Depth to Water and Total Well Depth (Electric Well Sounder)

↓

Check for Floating Product (Oil/Water Interface Probe)

### Floating Product Present

↓

Confirm Product Thickness (Acrylic or PVC Bailer)

↓

Collect Free-Product Sample

↓

Dissolved Product Sample Not Required

↓

Record Data on Field Data Form

### Floating Product Not Present

↓

Purge Volume Calculation

$V = \pi (r/12)^2 h(\_\% \text{ vol})(7.48) = \_\_\_ / \text{gallons}$

V = Purge volume (gallons)
$\pi$ = 3.14159
h = Height of Water Column (feet)
r = Borehole radius (inches)

↓

Evacuate water from well equal to the calculated purge volume while monitoring groundwater stabilization indicator parameters (pH, conductivity, temperature) at intervals of one casing volume.

### ell Dewaters after One Purge Volume (Low yield well)

↓

ell Recharges to 80% of Initial easured Water Column Height in eet within 24 hrs. of Evacuation.

↓

easure Groundwater Stability Indicator arameters (pH, Temperature, Conductivity)

↓

llect Sample and Complete ain-of-Custody

↓

serve Sample According to Required emical Analysis

↓

nsport to Analytical Laboratory

### Well Readily Recovers

↓

Record Groundwater Stability Indicator Parameters from each Additional Purge Volume

Stability indicated when the following Criteria are met:

| | |
|---|---|
| pH : | ± 0.1 pH units |
| Conductivity: | ± 10% |
| Temperature: | 1.0 degrees F |

#### Groundwater Stability Achieved

↓

Collect Sample and Complete Chain-of-Custody

↓

Preserve Sample According to Required Chemical Analysis

↓

Transport to Analytical Laboratory

#### Groundwater Stability Not Achieved

↓

Continue Purging Until Stability is Achieved

↓

Collect Sample and complete Chain-of-Custody

↓

Preserve Sample According to Required Chemical Analysis

↓

Transport to Analytical Laboratory

Getter - Ryan Inc. ENVIRONMENTAL DIVISION

Chain of Custoc
FIGURE

COMPANY _____ JOB NO. _____

LOCATION _____

CITY _____ PHONE NO. _____

AUTHORIZED _____ DATE _____ P.O. NO. _____

| SAMPLE ID | NO. OF CONTAINERS | SAMPLE MATRIX | DATE/TIME SAMPLED | ANALYSIS REQUIRED | SAMPLE CONDITION LAB ID |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

QUINQUISHED BY: RECEIVED BY:

QUINQUISHED BY: RECEIVED BY:

QUNQUISHED BY: RECEIVED BY LAB:

SIGNATED LABORATORY: _____ DHS #: _____

MARKS: _____

TE COMPLETED _____ FOREMAN _____

# ATTACHMENT 2

gettler — ryan inc.

May 3, 1991

Alameda County Health Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Attention: Ms. Katherine Chesick

RECD MAY 7 1991

Reference: ARCO Service Station No. 2112
1260 Park Street
Alameda, California

Ms. Chesick:

As requested by ARCO Products Company, we are forwarding a copy of the Trench Excavation/Soil Sampling Report prepared for the above referenced location.

If you should have any questions or comments, please call.

Sincerely,

Keith E. Bullock

KEB/me

Enclosures

cc: C. Carmel, ARCO Products Company
H. C. Winsor, ARCO Products Company
T. Callaghan, Regional Water Quality Control Board

2150 west winton avenue • hayward, california 94545-1210 • (415) 783-7500

GeoStrategies Inc.

# TRENCH EXCAVATION/SOIL AERATION REPORT

ARCO Service Station No. 2112
1260 Park Street
Alameda, California

792001-3

May 3, 1991

**GeoStrategies Inc.**
2140 WEST WINTON AVENUE
HAYWARD, CALIFORNIA 94545
(415) 352-4800

May 3, 1991

Gettler-Ryan Inc.
2150 West Winton Avenue
Hayward, California 94545

Attn: Keith Bullock

Re: TRENCH EXCAVATION/SOIL AERATION REPORT
ARCO Service Station No. 2112
1260 Park Street
Alameda, California

Gentlemen:

## INTRODUCTION

This report by GeoStrategies Inc. (GSI) summarizes the field activities conducted during product line removal and associated excavation for the above referenced location (Plate 1). Also included in this report are the results of the soil aeration sampling associated with the previous tank removal, conducted between September 30 and November 28, 1990. On-site construction activities were performed by Gettler-Ryan Inc. (G-R). A GSI geologist observed excavation activities and obtained soil samples from product line trenches and stockpiles. The scope of work presented in this document was performed at the request of ARCO Products Company. Field work and laboratory analysis methods were performed to comply with current State of California Water Resources Control Board (SWRCB) guidelines.

## SITE BACKGROUND

In January 1990, Applied Geosystems (AGS) drilled six exploratory borings (B-1 through B-6). Analytical results of soil samples from borings around the former underground storage tank complex (UGST) indicated the presence of petroleum hydrocarbons. Groundwater was first encountered in these borings at approximately 12 feet below grade. The old underground tanks were replaced by G-R in July-August 1990, and documented in the GSI Tank Replacement Observation Report dated November 7, 1990.

## FIELD PROCEDURES

Trenches were excavated to expose and remove existing fuel product lines. A representative from Alameda County Health Care Services (ACHCS) was on-site to witness the removal of the subsurface product lines and direct the location of trench samples (Plate 3). Excavated soils from the trenches were first stockpiled on-site and then sampled.

Soils from the tank excavation stockpile that contained concentrations of Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline) greater than 100 parts per million (ppm) were aerated on-site in compliance with Bay Area Air Quality Management District (BAAQMD) guidelines. Upon receipt of chemical analysis, stockpiled soils were removed and transported to an appropriate disposal facility.

## SOIL SAMPLING

Soil samples were collected from the stockpiles and product line trenches. These samples were collected in clean brass or stainless steel tubes, then covered at both ends with aluminum foil and sealed with plastic end caps. The soil samples were labeled, entered on a Chain-of-Custody Form, placed in a cooler with blue ice and transported to a State-certified environmental laboratory. Soil samples were analyzed either by Superior Analytical Laboratories, Inc. (Superior) located in Martinez, California, or by Sequoia Analytical (Sequoia) located in Redwood City, California.

Trench Excavation Sampling

One sample was collected for every 20 lineal feet of trench. Soil samples were collected from the bottom of the trench at depths of 3 to 4 feet within a backhoe bucket or with a hand driven sampling device. Trench soil samples were designated AT-36 and UT-37 through UT-41. Soil samples AT-34 and AT-35 were collected from beneath an abandoned dispenser island at an approximate depth of 3 feet below grade. Sample locations are shown on Plate 3.

Stockpile Sampling

One composite sample, consisting of four separate soil samples was collected for approximately every 50 cubic yards of excavated soil. These four soil samples were composited in the laboratory and analyzed as one sample. Soil samples were collected by removing the first 6 to 12 inches of soil, then pushing a brass tube into the soil. The sample was then removed, sealed, and handled according to the procedures previously described.

Approximately 1,950 cubic yards of soil was excavated from the former and present tank complexes and subsurface piping trenches. Approximately 500 cubic yards of this soil remained on-site for aeration. Ten composite soil samples were collected from this aerated soil, and were designated AS-49 through AS-55 and AS-49* through AS-51*. The composite soil sample for the trench stockpile was designated AS-56 and consisted of approximately 50 cubic yards.

## CHEMICAL ANALYTICAL RESULTS

The samples were analyzed for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline) according to EPA Method 8015 (Modified), and Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) according to EPA method 8020. Chemical analytical reports and Chain-of-Custody Forms are presented in Appendix A.

Trench Sampling Results

TPH-Gasoline was detected in sample AT-36 at a concentration of 15000 parts per million (ppm). Benzene (71 ppm), Toluene (710 ppm), Ethylbenzene (200 ppm), and Xylenes (1300 ppm) were also detected in sample AT-36. All other samples collected from the trench were reported as none detected (ND) for TPH-Gasoline and BTEX. Trench sampling results are presented in Table 1.

Stockpile Sampling Results

Stockpile sampling results of the 500 cubic yards of aerated soil and the 50 cubic yards of trench stockpiled soil have been tabulated and are presented in Table 2. Laboratory analytical reports and Chain-of-Custody Forms are presented in Appendix A. Upon receipt of laboratory analytical reports, stockpiled soil was transported to Laidlaw's Lorkern Road disposal facility and/or to Redwood Landfill located in Novato, California.

If you have any questions, please call.

GeoStrategies Inc. by,

Thomas D. Leavitt
Geologist

David H. Peterson
Senior Geologist
C.E.G. 1186

REGISTERED GEOLOGIST
DAVID H. PETERSON
No. 1186
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

TDL/DHP/mlg

Plate 1. Vicinity Map
Plate 2. Site Plan
Plate 3. Soil Sampling Map

Appendix A: Soil Chemical Analytical Reports



QC Review: gap

TABLE 1

SOIL ANALYTICAL DATA
(Trench Samples)

| SAMPLE NO | DEPTH (FT) | SAMPLE DATE | ANALYSIS DATE | TPH-G (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENES (PPM) |
|---|---|---|---|---|---|---|---|---|
| AT-34 | 3.0 | 25-Oct-90 | 25-Oct-90 | <1.0 | <0.003 | <0.003 | <0.003 | <0.003 |
| AT-35 | 3.0 | 25-Oct-90 | 25-Oct-90 | <1.0 | <0.003 | <0.003 | <0.003 | <0.003 |
| AT-36 | 3.0 | 25-Oct-90 | 25-Oct-90 | 15000 | 71 | 710 | 200 | 1300 |
| UT-37 | 4.0 | 05-Mar-91 | 08-Mar-91 | <1.0 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| UT-38 | 4.0 | 05-Mar-91 | 08-Mar-91 | <1.0 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| UT-39 | 4.0 | 05-Mar-91 | 08-Mar-91 | <1.0 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| UT-40 | 3.5 | 05-Mar-91 | 08-Mar-91 | <1.0 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| UT-41 | 3.5 | 05-Mar-91 | 08-Mar-91 | <1.0 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
PPM = Parts Per Million

Notes: 1. BTEX for samples AT-34 through AT-36 were reported in parts per billion (ppb).
2. All data shown as <x are reported as ND (none detected).

TABLE 2

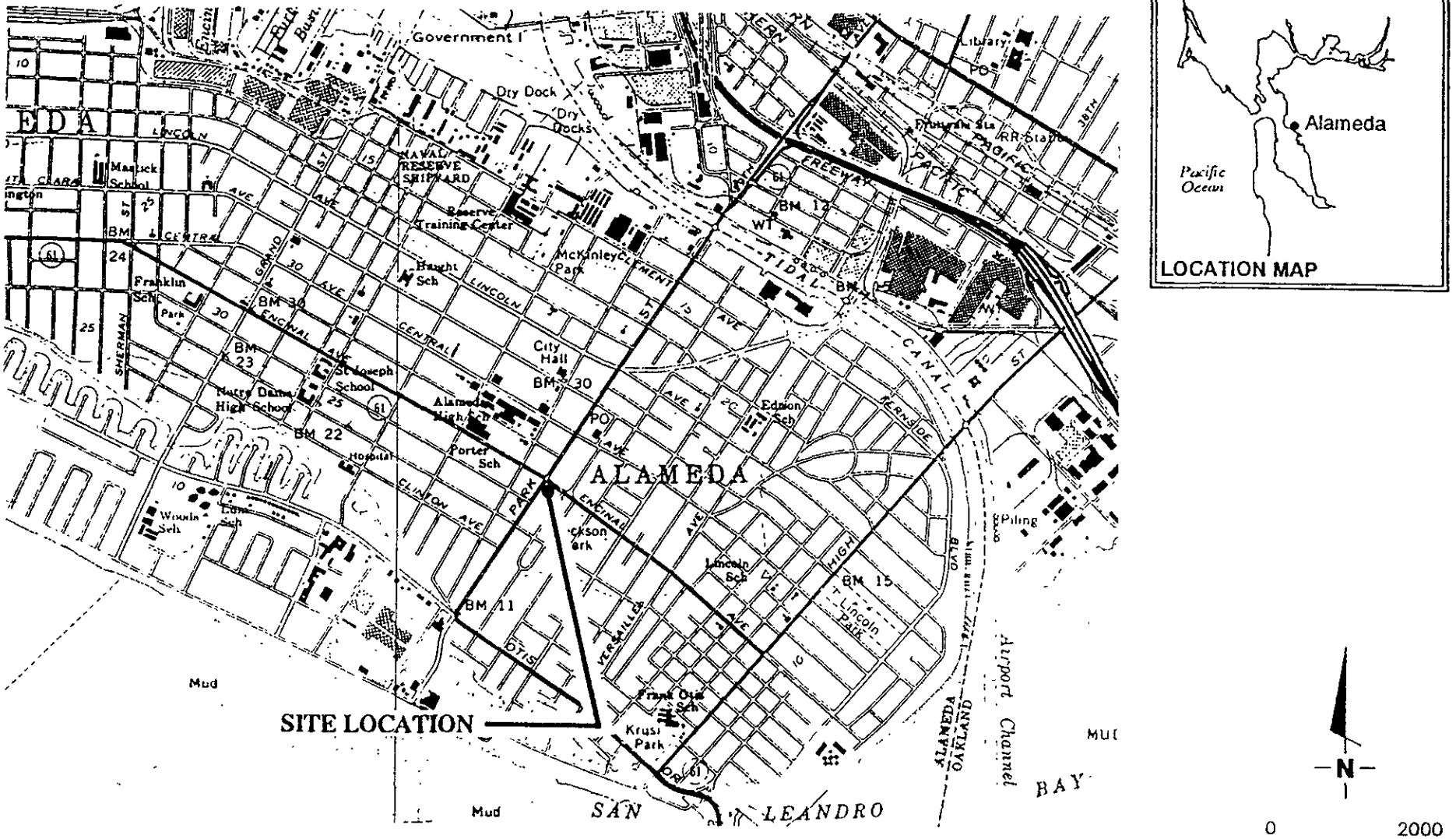
SOIL ANALYTICAL DATA
(Stockpile Samples)

| SAMPLE NO | SAMPLE DATE | ANALYSIS DATE | TPH-G (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENES (PPM) |
|---|---|---|---|---|---|---|---|
| AS-49 A-D | 03-Oct-90 | 03-Oct-90 | 2 | <0.003 | <0.003 | <0.003 | <0.003 |
| AS-50 A-D | 03-Oct-90 | 03-Oct-90 | 1 | <0.003 | <0.003 | <0.003 | 0.009 |
| AS-51 A-D | 12-Oct-90 | 15-Oct-90 | <1 | <0.003 | <0.003 | <0.003 | 0.009 |
| AS-52 A-D | 12-Oct-90 | 15-Oct-90 | 2 | <0.003 | <0.003 | 0.006 | .017 |
| AS-49 A-D* | 02-Nov-90 | 06-Oct-90 | 20 | <0.015 | 0.051 | 0.038 | 0.24 |
| AS-50 A-D* | 02-Nov-90 | 06-Oct-90 | 10 | <0.003 | 0.023 | 0.045 | 0.16 |
| AS-51 A-D* | 02-Nov-90 | 06-Oct-90 | 20 | <0.003 | 0.027 | 0.024 | 0.16 |
| AS-53 A-D | 28-Nov-90 | 29-Nov-90 | 2 | <0.003 | <0.003 | <.003 | 0.005 |
| AS-54 A-D | 28-Nov-90 | 29-Nov-90 | <1 | <0.003 | <0.003 | <.003 | <0.003 |
| AS-55 A-D | 28-Nov-90 | 29-Nov-90 | 40 | <0.015 | 0.009 | 0.038 | 0.44 |
| AS-56 A-D | 05-Mar-90 | 06-Mar-90 | 50 | 0.014 | 0.049 | 0.078 | 3.3 |

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
PPM = Parts Per Million

Notes: 1. * Sample numbers were duplicated. These samples represent separate and discrete sampling.
2. BTEX for samples AS-49 thorugh AS-55 were reported in Parts Per Billion (ppb).
3. All data shown as <x are reported as ND (none detected).

# ILLUSTRATIONS



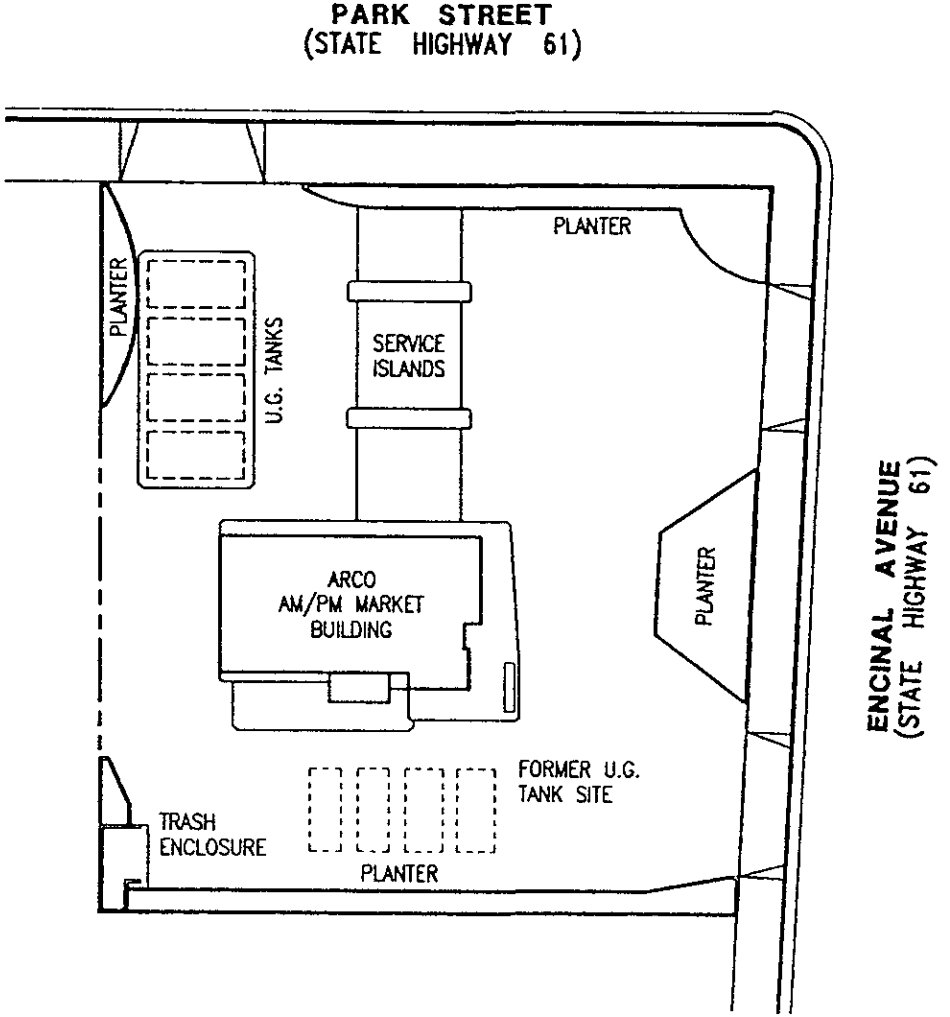

Base Map: USGS Topographic Map

GeoStrategies Inc.

VICINITY MAP
ARCO Service Station #2112
1260 Park Street
Alameda, California

PLATE 1

| JOB NUMBER | REVIEWED BY | DATE | REVISED DATE |
|---|---|---|---|
| 7920 | | 3/91 | |




Base Map. ARCO Site Plans dated 3-19-86 and 2-21-90

N

0 40

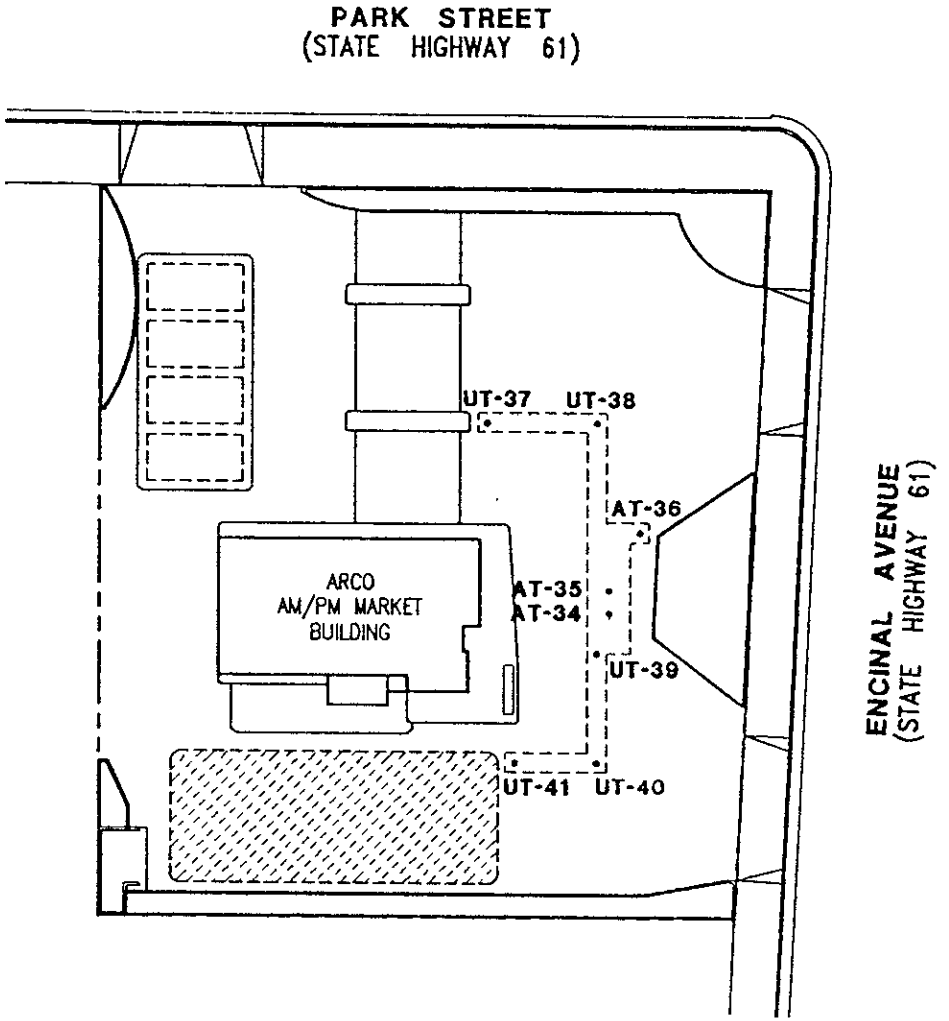
Scale in Feet

GeoStrategies Inc.

SITE PLAN
ARCO Service Station #2112
1260 Park Street
Alameda, California

PLATE 2

| JOB NUMBER | REVIEWED BY | DATE | REVISED DATE |
|---|---|---|---|
| 792001-3 | DHP | 3/91 | |




EXPLANATION

- Trench Samples
- Approximate location of trench
- Soil Stockpile

Base Map: ARCO Site Plans dated 3-19-86 and 2-21-90

N

0 40

Scale in Feet

GeoStrategies Inc.

SOIL SAMPLING MAP
ARCO Service Station #2112
1260 Park Street
Alameda, California

PLATE 3

| JOB NUMBER | REVIEWED BY | DATE | REVISED DATE |
|---|---|---|---|
| 792001-3 | DHP | 3/91 | |

# APPENDIX A

# SOIL CHEMICAL ANALYTICAL REPORTS

**SUPERIOR ANALYTICAL LABORATORIES, INC.**
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

# CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81776
CLIENT: Gettler Ryan Co.
CLIENT JOB NO.: X7920

DATE RECEIVED: 10/25/90
DATE REPORTED: 10/25/90
DATE SAMPLED: 10/25/90
DATE ANALYZED: 10/25/90

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

| LAB # | Sample Identification | Concentration(ug/Kg) Benzene | Toluene | Ethyl Benzene | Xylenes |
|---|---|---|---|---|---|
| 1 | AT-34 | ND<3 | ND<3 | ND<3 | ND<3 |
| 2 | AT-35 | ND<3 | ND<3 | ND<3 | ND<3 |
| 3 | AT-36 | 71,000 | 710,000 | 200,000 | 1300,000 |

ug/Kg - parts per billion (ppb)

Method Detection Limit in Soil: 3 ug/Kg

QA/QC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 103 %: Duplicate RPD = 2

Richard Srna, Ph.D.

Dorena Srna for
Laboratory Manager

**SUPERIOR ANALYTICAL LABORATORIES, INC.**
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

# CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81776
CLIENT: Gettler Ryan Co.
CLIENT JOB NO.: X7920

DATE RECEIVED: 10/25/90
DATE REPORTED: 10/25/90
DATE SAMPLED: 10/25/90
DATE ANALYZED: 10/25/90

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

| LAB # | Sample Identification | Concentration (mg/Kg) Gasoline Range |
|---|---|---|
| 1 | AT-34 | ND<1 |
| 2 | AT-35 | ND<1 |
| 3 | AT-36 | 15000 |

mg/kg - parts per million (ppm)

Method Detection Limit for Gasoline in Soil: 1 mg/Kg

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = 1
MS/MSD Average Recovery = 98%: Duplicate RPD = 6

Richard Srna, Ph.D.

Dorena Srna for
Laboratory Manager

Gettler - Ryan Inc. — ENVIRONMENTAL DIVISION — Chain of Custod

COMPANY ARCO JOB NO. 7920

JOB LOCATION PARK / ENCINAL

CITY ALAMEDA PHONE NO.

AUTHORIZED JOHN WARFEL DATE 10/25/90 P.O. NO.

| SAMPLE ID | NO. OF CONTAINERS | SAMPLE MATRIX | DATE/TIME SAMPLED | ANALYSIS REQUIRED | SAMPLE CONDITION LAB ID |
|---|---|---|---|---|---|
| At-34 | ONE | Soil | 10/25/90 | TPH-Gas / BTEX | |
| At-35 | | | | | |
| At-36 | | | | | |
| ~~At-37~~ | | | | | |

RELINQUISHED BY: Thomas Leavitt 16:08 10/25/90

RECEIVED BY: Ernest B Hom 1608 10/25/90

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY LAB:

DESIGNATED LABORATORY: DHS #:

REMARKS: 24 hour Rush

DATE COMPLETED 10/25/90 FOREMAN T. LEAVITT

# SEQUOIA ANALYTICAL
680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233


| | | | | |
|---|---|---|---|---|
| Gettler Ryan | Client Project ID: | #7920, Arco, Alameda | Sampled: | Mar 5, 1991 |
| 2150 W. Winton Avenue | Matrix Descript: | Soil | Received: | Mar 6, 1991 |
| Hayward, CA 94545 | Analysis Method: | EPA 5030/8015/8020 | Analyzed: | Mar 8, 1991 |
| Attention: Keith Bullock | First Sample #: | 103-0499 | Reported: | Mar 18, 1991 |

## TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

| Sample Number | Sample Description | Low/Medium B.P. Hydrocarbons mg/kg (ppm) | Benzene mg/kg (ppm) | Toluene mg/kg (ppm) | Ethyl Benzene mg/kg (ppm) | Xylenes mg/kg (ppm) |
|---|---|---|---|---|---|---|
| 103-0499 | UT-37 | N.D. | N.D. | N.D. | N.D. | N.D. |
| 103-0500 | UT-38 | N.D. | N.D. | N.D. | N.D. | N.D. |
| 103-0501 | UT-39 | N.D. | N.D. | N.D. | N.D. | N.D. |
| 103-0502 | UT-40 | N.D. | N.D. | N.D. | N.D. | N.D. |
| 103-0503 | UT-41 | N.D. | N.D. | N.D. | N.D. | N.D. |
| **Detection Limits:** | | **1.0** | **0.0050** | **0.0050** | **0.0050** | **0.0050** |

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

# SEQUOIA ANALYTICAL
680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233


Gettler Ryan
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Keith Bullock

Client Project ID: #7920, Arco, Alameda

Q C Sample Group: 1030499-503

Reported: Mar 18, 1991

## QUALITY CONTROL DATA REPORT

| ANALYTE | Benzene | Toluene | Ethyl benzene | Xylenes |
|---|---|---|---|---|
| Method: | EPA 8020 | EPA 8020 | EPA 8020 | EPA 8020 |
| Analyst: | L. Gonzales | L. Gonzales | L. Gonzales | L. Gonzales |
| Reporting Units: | ng | ng | ng | ng |
| Date Analyzed: | Mar 8, 1991 | Mar 8, 1991 | Mar 8, 1991 | Mar 8, 1991 |
| QC Sample #: | GBLK030891 | GBLK030891 | GBLK030891 | GBLK030891 |
| **Sample Conc.:** | 4.0 | N.D. | N.D. | N.D. |
| **Spike Conc. Added:** | 100 | 100 | 100 | 300 |
| **Conc. Matrix Spike:** | 72 | 100 | 90 | 260 |
| **Matrix Spike % Recovery:** | 68 | 100 | 90 | 87 |
| **Conc. Matrix Spike Dup.:** | 65 | 110 | 92 | 270 |
| **Matrix Spike Duplicate % Recovery:** | 61 | 110 | 92 | 90 |
| **Relative % Difference:** | 10 | 9.5 | 2.2 | 3.8 |

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

| | | |
|---|---|---|
| % Recovery: | Conc. of M.S. - Conc of Sample / Spike Conc. Added | x 100 |
| Relative % Difference: | Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2 | x 100 |

**Ryan Inc.** ENVIRONMENTAL DIVISION

**Chain of Custody**

ANY ARCO

JOB LOCATION 1260 PARK St JOB NO. 7920

TY. ALAMEDA

THORIZED Keith Bullock DATE 3/5/91 PHONE NO. P.O. NO.

| SAMPLE ID | NO. OF CONTAINERS | SAMPLE MATRIX | DATE/TIME SAMPLED | ANALYSIS REQUIRED | SAMPLE CONDITION LAB ID |
|---|---|---|---|---|---|
| t-37 | ONE | Soil | 3/5/91 | TPH-GAS/BTEX | 103041C9 |
| t-38 | ↓ | ↓ | ↓ | ↓ | 10305C0 |
| t-39 | | | | | 10305C1 |
| -40 | | | | | 10305C2 |
| t-41 | | | | | 10305C3 |

NQUISHED BY: Robert Lum Jr. 3/6/91 12:06

NQUISHED BY:

QUISHED BY:

RECEIVED BY:

RECEIVED BY:

RECEIVED BY LAB: KWM 3/6 1206

NATED LABORATORY: Sequoia

RKS: NORMAL 2-Week TAT DHS #:

OMPLETED

FOREMAN

**SUPERIOR ANALYTICAL LABORATORIES, INC.**
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

# CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81634
CLIENT: Gettler Ryan Co.
CLIENT JOB NO.: 7000

DATE RECEIVED: 10/03/90
DATE REPORTED: 10/03/90

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

| LAB # | Sample Identification | Concentration(ug/Kg) Benzene | Toluene | Ethyl Benzene | Xylenes |
|---|---|---|---|---|---|
| 1 | AS-49A,B,C,D | ND<3 | ND<3 | ND<3 | ND<3 |
| 2 | AS-50A,B,C,D | ND<3 | ND<3 | ND<3 | 9 |

ug/Kg - parts per billion (ppb)

Method Detection Limit in Soil: 3 ug/Kg

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 99% : Duplicate RPD = <2%

Richard Srna, Ph.D.

Darena Srna for
Laboratory Manager

**SUPERIOR ANALYTICAL LABORATORIES, INC.**
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

# CERTIFICATE OF ANALYSIS

LABORATORY NO.: 91634
CLIENT: Gettler Ryan Co.
CLIENT JOB NO.: 7220

DATE RECEIVED: 10/03/90
DATE REPORTED: 10/03/90

## ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
## by Modified EPA SW-846 Method 5030 and 8015

| LAB # | Sample Identification | Concentration (mg/Kg) Gasoline Range |
|---|---|---|
| 1. | AS-49A,B,C,D | 2 |
| 2 | AS-50A,B,C,D | 1 |

mg/kg - parts per million (ppm)

Method Detection Limit for Gasoline in Soil: 1 mg/Kg

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = 0%
MS/MSD Average Recovery = 100%: Duplicate RPD = 0%

Richard Srna, Ph.D.

Doreen Srna for

Laboratory Manager

**Gettler - Ryan Inc.** — ENVIRONMENTAL DIVISION

8/1034

Chain of Custod

COMPANY ARCO JOB NO. 7920

JOB LOCATION 1260 PARK ST. / ENCINAL

CITY ALAMEDA PHONE NO.

AUTHORIZED JOHN WERFAL DATE 10/2/90 P.O. NO.

| SAMPLE ID | NO. OF CONTAINERS | SAMPLE MATRIX | DATE/TIME SAMPLED | ANALYSIS REQUIRED | SAMPLE CONDITION LAB ID |
|---|---|---|---|---|---|
| AS-49A | 1 | SOIL | 10/2/90 14:45 | | |
| AS-49B | 1 | | 14:46 | | |
| AS-49C | 1 | | 14:48 | | |
| AS-49D | 1 | | 14:49 | | |
| AS-49(comp) | | | | TPH-GAS, BTEX | |
| AS-50A | 1 | SOIL | 10/2/90 14:35 | | |
| AS-50B | 1 | | 14:37 | | |
| AS-50C | 1 | | 14:41 | | |
| AS-50D | 1 | | 14:42 | | |
| AS-50(comp) | | | | TPH-GAS, BTEX | |

RELINQUISHED BY: Robert C. Mallory 10/2/90 16:05

RECEIVED BY: John L. Jespersen 10/2/90 1605

RELINQUISHED BY: John L. Jespersen 10/2/90 1845

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY LAB: 10/2/90 18:45

DESIGNATED LABORATORY: SUPERIOR (MARTINEZ) DHS #: #319 #320

REMARKS: COMPOSITE AS-49 A-D AND AS-50 A-D.
24 HR. T.A.T.

DATE COMPLETED FOREMAN

**SUPERIOR ANALYTICAL LABORATORIES, INC.**
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512

DOHS #319
DOHS #220

# CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81832
CLIENT: Gettler Ryan Co.
CLIENT JOB NO.: 7920

DATE RECEIVED: 11/02/90
DATE REPORTED: 11/06/90

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

| LAB # | Sample Identification | Concentration (mg/Kg) Gasoline Range |
|---|---|---|
| 1 | COMP AS-49A,B,C,D | 20 |
| 2 | COMP AS-50A,B,C,D | 10 |
| 3 | COMP AS-51A,B,C,D | 20 |

mg/kg - parts per million (ppm)

Method Detection Limit for Gasoline in Soil: 1 mg/Kg

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = 2
MS/MSD Average Recovery = 103%: Duplicate RPD = 7

Richard Srna, Ph.D.

Robert Watson for
Laboratory Manager

**SUPERIOR ANALYTICAL LABORATORIES, INC.**
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

CLIENT ANALYSIS

LABORATORY NO.: 81832
CLIENT: Gettler Ryan Co.
CLIENT JOB NO.: 7920

DATE RECEIVED: 11/02/90
DATE REPORTED: 11/06/90

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

| LAB # | Sample Identification | Concentration(ug/Kg) Benzene | Toluene | Ethyl Benzene | Xylenes |
|---|---|---|---|---|---|
| 1 | COMP AS-49A,B,C,D | ND<15 | 51 | 38 | 240 |
| 2 | COMP AS-50A,B,C,D | ND<3 | 23 | 45 | 160 |
| 3 | COMP AS-51A,B,C,D | ND<3 | 27 | 24 | 160 |

ug/Kg - parts per billion (ppb)

Method Detection Limit in Soil: 3 ug/Kg

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 98 %: Duplicate RPD = <7

Richard Srna, Ph.D.

Peter Watson for
Laboratory Manager

**Gettler - Ryan Inc.** — ENVIRONMENTAL DIVISION — **Chain of Custody**

COMPANY ARCO JOB NO. 7920

JOB LOCATION 1260 PARK / ENCINAL

CITY ALAMEDA PHONE NO.

AUTHORIZED JOHN WARFEL DATE 11/2/90 P.O. NO.

| SAMPLE ID | NO. OF CONTAINERS | SAMPLE MATRIX | DATE/TIME SAMPLED | ANALYSIS REQUIRED | SAMPLE CONDITION LAB ID |
|---|---|---|---|---|---|
| AS-49A | ONE | Soil | 11/2/90 | Composite TPH-GAS BTEX | |
| AS-49B | | | | | |
| AS-49C | | | | | |
| AS-49B | | | | | |
| AS-50A | ONE | Soil | 11/2/90 | Composite TPH-GAS BTEX | |
| AS-50B | | | | | |
| AS-50C | | | | | |
| AS-50D | | | | | |
| AS-51A | ONE | Soil | 11/2/90 | Composite TPH-GAS BTEX | |
| AS-51B | | | | | |
| AS-51C | | | | | |
| AS-51D | | | | | |

RELINQUISHED BY: 16:18 RECEIVED BY:

Thomas Leavitt 11/2/90

RELINQUISHED BY: RECEIVED BY: Mickey XS 16 Express Of.

16:18 11-2-90

RELINQUISHED BY: RECEIVED BY LAB:

DESIGNATED LABORATORY: DHS #:

REMARKS: 48 hour TAT

DATE COMPLETED 11/2/90 FOREMAN T LEAVITT

SUPERIOR ANALYTICAL LABORATORIES, INC.
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

# CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81682
CLIENT: Gettler Ryan Co.
CLIENT JOB NO.: 7920

DATE RECEIVED: 10/12/90
DATE REPORTED: 10/15/90

## ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

| LAB # | Sample Identification | Concentration(ug/Kg) Benzene | Toluene | Ethyl Benzene | Xylenes |
|---|---|---|---|---|---|
| 1 | AS-51A,B,C,D | ND<3 | ND<3 | ND<3 | ND<3 |
| 2 | AS-52A,B,C,D | ND<3 | ND<3 | 6 | 17 |

ug/Kg - parts per billion (ppb)

Method Detection Limit in Soil: 3 ug/Kg

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 104 %: Duplicate RPD = <9

Richard Srna, Ph.D.

Laboratory Manager

**SUPERIOR ANALYTICAL LABORATORIES, INC.**

825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512

DOHS #319
DOHS #220

C E R T I F I C A T E  O F  A N A L Y S I S

LABORATORY NO.: 81682
CLIENT: Gettler Ryan Co.
CLIENT JOB NO.: 7920

DATE RECEIVED: 10/12/90
DATE REPORTED: 10/15/90

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

| LAB # | Sample Identification | Concentration (mg/Kg) Gasoline Range |
|---|---|---|
| 1 | AS-51A,B,C,D | ND<1 |
| 2 | AS-52A,B,C,D | 2 |

mg/kg - parts per million (ppm)

Method Detection Limit for Gasoline in Soil: 1 mg/Kg

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = 8
MS/MSD Average Recovery = 100%: Duplicate RPD = 3

Richard Srna, Ph.D.

Dorena Srna for
Laboratory Manager

Gettler - Ryan Inc. ENVIRONMENTAL DIVISION 0655 Chain of Custody

COMPANY ARCO JOB NO. 7920

JOB LOCATION 1260 PARK STREET / ENCINAL

CITY ALAMEDA PHONE NO.

AUTHORIZED JOHN WERFAL DATE 10/12/90 P.O. NO.

| SAMPLE ID | NO. OF CONTAINERS | SAMPLE MATRIX | DATE/TIME SAMPLED | ANALYSIS REQUIRED | SAMPLE CONDITION LAB ID |
|---|---|---|---|---|---|
| AS-S1A | 1 | SOIL | 10/12/90 10:44 | | |
| AS-S1B | 1 | | 10:45 | | |
| AS-S1C | 1 | | 10:48 | | |
| AS-S1D | 1 | | 10:49 | | |
| AS-S1-COMP ~~AS-COMP~~ | | | | TPH-GAS, BTEX | |
| AS-S2A | 1 | SOIL | 10/12/90 10:52 | | |
| AS-S2B | 1 | | 10:53 | | |
| AS-S2C | 1 | | 10:56 | | |
| AS-S2D | 1 | | 10:58 | | |
| AS-S2-COMP | | | | TPH-GAS, BTEX | |

RELINQUISHED BY: 13:59 10/12/90

RECEIVED BY: 13:59 10-12-90

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY LAB:

DESIGNATED LABORATORY: SUPERIOR (MARTINEZ) DHS #: #319, #220

REMARKS: 24 HR. TAT COMPOSITE AS-S1A - D AND AS-S2A - D.

DATE COMPLETED FOREMAN

**SUPERIOR ANALYTICAL LABORATORIES, INC.**
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

# CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81998
CLIENT: Gettler Ryan Co.
CLIENT JOB NO.: 7920

DATE RECEIVED: 11/28/90
DATE REPORTED: 11/29/90

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

| LAB # | Sample Identification | Concentration(ug/Kg) Benzene | Toluene | Ethyl Benzene | Xylenes |
|---|---|---|---|---|---|
| 1 | AS-53A,B,C,D | ND<3 | ND<3 | ND<3 | 5 |
| 2 | AS-54A,B,C,D | ND<3 | ND<3 | ND<3 | ND<3 |
| 3 | AS-55A,B,C,D | ND<15 | 9 | 38 | 440 |

ug/Kg - parts per billion (ppb)

Method Detection Limit in Soil: 3 ug/Kg

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 96%: Duplicate RPD = <5

Richard Srna, Ph.D.

Robert Watson for
Laboratory Manager

*OUTSTANDING QUALITY AND SERVICE*

**SUPERIOR ANALYTICAL LABORATORIES, INC.**
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

# CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81998
CLIENT: Gettler Ryan Co.
CLIENT JOB NO.: 7920

DATE RECEIVED: 11/28/90
DATE REPORTED: 11/29/90

## ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

| LAB # | Sample Identification | Concentration (mg/Kg) Gasoline Range |
|---|---|---|
| 1 | AS-53A,B,C,D | 2 |
| 2 | AS-54A,B,C,D | ND<1 |
| 3 | AS-55A,B,C,D | 40 |

mg/kg - parts per million (ppm)

Method Detection Limit for Gasoline in Soil: 1 mg/Kg

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = 14
MS/MSD Average Recovery = 90%: Duplicate RPD = 3

Richard Srna, Ph.D.

Robert Morton for
Laboratory Manager

**Getter - Ryan Inc.** ENVIRONMENTAL DIVISION — **Chain of Custody**

COMPANY ARCO JOB NO. 7920

JOB LOCATION 1260 PARK ST.

CITY ALAMEDA PHONE NO.

AUTHORIZED John Wetzel DATE 11/7/90 P.O. NO.

| SAMPLE ID | NO. OF CONTAINERS | SAMPLE MATRIX | DATE/TIME SAMPLED | ANALYSIS REQUIRED | SAMPLE CONDITION LAB ID |
|---|---|---|---|---|---|
| AS-53A | ONE | Soil | | Composite TPH-(Gas) BTEX | |
| AS-53B | " | " | | | |
| AS-53C | " | " | | | |
| AS-53D | " | " | | | |
| AS-54A | ONE | Soil | | Composite TPH-(Gas) BTEX | |
| AS-54B | " | " | | | |
| AS-54C | " | " | | | |
| AS-54D | " | " | | | |
| AS-55A | ONE | Soil | | Composite TPH-(Gas) | |
| AS-55B | " | " | | | |
| AS-55C | " | " | | | |
| AS-55D | " | " | | | |

RELINQUISHED BY: [signature] 11/8/90 15:29 RECEIVED BY: [signature]

RELINQUISHED BY: RECEIVED BY:

RELINQUISHED BY: RECEIVED BY LAB:

DESIGNATED LABORATORY: DHS #:

REMARKS:

DATE COMPLETED 11/7/90 FOREMAN T. LEWITT

**SEQUOIA ANALYTICAL**
680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

| | | | | |
|---|---|---|---|---|
| Gettler Ryan | Client Project ID: | #7920, Arco, Alameda | Sampled: | Mar 5, 1991 |
| 2150 W. Winton Avenue | Sample Descript.: | Soil, AS-56A, 56B, 56C, 56D, Composite | Received: | Mar 6, 1991 |
| Hayward, CA 94545 | Analysis Method: | EPA 5030/8015/8020 | Analyzed: | Mar 6, 1991 |
| Attention: Keith Bullock | Lab Number: | 103-0498 A-D | Reported: | Mar 7, 1991 |

## TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

| Analyte | Detection Limit mg/kg (ppm) | Sample Results mg/kg (ppm) |
|---|---|---|
| Low to Medium Boiling Point Hydrocarbons | 1.0 | 50 |
| Benzene | 0.0050 | 0.014 |
| Toluene | 0.0050 | 0.049 |
| Ethyl Benzene | 0.0050 | 0.078 |
| Xylenes | 0.0050 | 3.3 |

FILE COPY

RECEIVED

MAR 12 1991

GETTLER-RYAN INC.
GENERAL CONTRACTORS

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233


Gettler Ryan
2150 W. Winton Avenue
Hayward, CA 94545
Attention: Keith Bullock

Client Project ID: #7920, Arco, Alameda

QC Sample Group: 103-0498

Reported: Mar 7, 1991

## QUALITY CONTROL DATA REPORT

| ANALYTE | Benzene | Toluene | Ethyl benzene | Xylenes |
|---|---|---|---|---|
| Method: | EPA 8020 | EPA 8020 | EPA 8020 | EPA 8020 |
| Analyst: | J. Dinsay | J. Dinsay | J. Dinsay | J. Dinsay |
| Reporting Units: | ng | ng | ng | ng |
| Date Analyzed: | Mar 6, 1991 | Mar 6, 1991 | Mar 6, 1991 | Mar 6, 1991 |
| QC Sample #: | GBLK030691 | GBLK030691 | GBLK030691 | GBLK030691 |
| **Sample Conc.:** | 5.0 | N.D. | N.D. | N.D. |
| **Spike Conc. Added:** | 100 | 100 | 100 | 300 |
| **Conc. Matrix Spike:** | 87 | 89 | 92 | 270 |
| **Matrix Spike % Recovery:** | 82 | 89 | 92 | 90 |
| **Conc. Matrix Spike Dup.:** | 88 | 90 | 93 | 280 |
| **Matrix Spike Duplicate % Recovery:** | 83 | 90 | 93 | 93 |
| **Relative % Difference:** | 1.1 | 1.1 | 1.1 | 3.6 |

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

| | | |
|---|---|---|
| % Recovery: | Conc. of M.S. - Conc. of Sample / Spike Conc. Added | x 100 |
| Relative % Difference: | Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2 | x 100 |

Ryan Inc. ENVIRONMENTAL DIVISION 1308 Chain of Custody

ARCO JOB NO. 7920

LOCATION 1260 PARK St

CITY Alameda PHONE NO.

AUTHORIZED Keith Bullock DATE 3/5/91 P.O. NO.

| SAMPLE ID | NO. OF CONTAINERS | SAMPLE MATRIX | DATE/TIME SAMPLED | ANALYSIS REQUIRED | SAMPLE CONDITION/ LAB ID |
|---|---|---|---|---|---|
| AS-56A | ONE | Soil | 3/5/91 | TPH-Gas/BTEX | |
| AS-56B | " | " | " | Composite | |
| AS-56C | " | " | " | [redacted] D.L. | |
| AS-56D | " | " | " | | |

RELINQUISHED BY: Robert Lauf 3/6/91 12:06

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY LAB: 3/6 1206

DESIGNATED LABORATORY: Sequoia DHS #:

REMARKS: 24 hour TAT

Composite Samples AS-56A — AS-56D

DATE COMPLETED FOREMAN

# ATTACHMENT 3

**GeoStrategies Inc.**
2140 WEST WINTON AVENUE
HAYWARD, CALIFORNIA 94545
(415) 352-4800

November 7, 1990

Gettler-Ryan Inc.
2150 West Winton Avenue
Hayward, California 94545

Attn: Mr. John Werfal

Re: TANK REPLACEMENT OBSERVATION REPORT
ARCO Service Station #2112
1260 Park Street
Alameda, California

Gentlemen:

## INTRODUCTION

This report summarizes the field activities conducted at the above referenced site (Plate 1) during the recent underground storage tank (UGST) replacement. Field work presented in this report was performed between July 27 and September 30, 1990, in compliance with State and local guidelines. A GeoStrategies Inc. (GSI) geologist was present onsite to observe the UGST removal, assist in directing soil excavation and to obtain soil samples from the tank excavation, piping trenches, and soil stockpiles. This report also presents the results of the soil aeration completed through September 30, 1990. Results of work completed after September 30, 1990 will be presented in a future report. A summary of field procedures and sampling results are presented below.

## SITE BACKGROUND

In January 1990, Applied Geosystems (AGS) drilled six exploratory borings (B-1 through B-6) to assess soil conditions in the area of the former and present tank complexes. Five borings were drilled in the vicinity of the former UGST complex and one boring was drilled in the area of the present UGST complex. Analytical results of soil samples from the former tank complex indicated the presence of petroleum hydrocarbons. Soil samples from the present tank complex were reported as none detected for petroleum hydrocarbons. Groundwater was first encountered in Borings B-1 and B-6 at approximately 12 feet. Results of this investigation are presented in the AGS report dated February 20, 1990.

The site is presently occupied by an operating ARCO Service Station. Four newly installed 10,000 gallon tanks containing leaded and unleaded gasoline products, two fueling islands, and a mini-mart building are located onsite (Plate 2).

## FIELD PROCEDURES

Five UGSTs were excavated and removed from the site on July 26, 1990. These included one 10,000 gallon, two 4,000 gallon, and two 6,000 gallon UGSTs that contained gasoline products. Removal of the subsurface tanks was witnessed by representatives from the Alameda Fire Department (AFD) and the Alameda County Health Care Services Agency (ACHCS). The former tank complex was located on the south-east corner of the site behind the service station building (Plate 2). The maximum extent of the former tank excavation was approximately 77 by 27 feet, with a maximum depth of approximately 12 feet. The present UGST complex was excavated just south of the service islands (Plate 2). The maximum extent of the relocated tank excavation was approximately 57 feet long by 24 feet wide and 13 feet deep. Soil samples normally taken from beneath the tanks were waived by the ACHCS official as a result of findings in the pre-excavation investigation by AGS dated February 20, 1990. The ACHCS official directed other soil sample locations from the sidewalls and bottoms of each excavation (Plate 3).

In order to remove the subsurface product lines and install new product lines, trenches were dug along each side of the fueling islands. The location of the piping trenches are shown on Plate 4. Excavated soils were first stockpiled onsite and then sampled (Plates 5 and 6). Upon receipt of chemical analyses, selected stockpiled soils were removed from the site and transported to an appropriate disposal facility. Soils that contained high levels of petroleum hydrocarbons were aerated onsite in compliance with Bay Area Air Quality Management District (BAAQMD) guidelines.

## SOIL SAMPLING

Soil samples were collected from the sidewalls and bottoms of each tank complex excavation, the product line trenches, and the soil stockpiles. These samples were collected in clean brass tubes, then covered at both ends with aluminum foil and sealed with plastic end caps. The soil samples were labeled, entered on a Chain-of-Custody, placed in a cooler on blue ice and transported to a State-certified environmental laboratory. Soil samples were analyzed by either International Technology Analytical Services (IT) located in San Jose, California, Superior Analytical Laboratories, Inc. (Superior) located in Martinez, California, or by a National Environmental Testing, Inc. (NET) mobile laboratory located at the site.

### Tank Excavation Sampling

Soil samples were collected from the former UGST excavation from the sidewalls and bottoms of the sidewalls adjacent to the tanks. Samples from the present UGST complex excavation were collected at depths between approximately 6 and 12 feet below existing grade. Soil samples were designated as AX1-1 through AX1-11 for the former UGST excavation and AX2-1 through AX2-7 for the relocated UGST excavation. A backhoe bucket was used to collect soil from each excavation. The samples were collected by first removing the top few inches of soil, then pushing a brass sample tube into the soil until the tube was completely filled. The soil samples were then sealed, labeled, and handled according to the procedures described above. Soil sample locations and the extent of the excavations are presented on Plate 3. The former tank complex was excavated to approximately 13 feet, just above groundwater. Groundwater was not encountered in the present tank complex excavation.

Trench Sampling

Trenches were excavated on the east side of the fueling islands to expose and remove underground product piping. After the piping was removed, one sample for every 20 lineal feet of trench was collected. Additional trenches were excavated on the west side of the fueling islands to install new product piping. Trench depth was approximately 3 feet. Soil was excavated to an approximate depth of 9.5 feet in areas of observed contamination. Soil samples from the trenches were designated AT-1 through AT-33. Selected soil samples were omitted as a result of additional soil excavated from these locations. Trench soil samples were collected using a hand-driven sampler fitted with a brass tube or by driving a brass tube into soil collected with a backhoe bucket after the top few inches of soil were removed. The brass tubes were then removed, sealed, and handled according to the procedures described previously. The location of collected trench soil samplings are shown on Plate 4.

Stockpile Sampling

One composite soil sample consisting of four soil samples were collected for approximately every 50 cubic yards of excavated soil. These four soil samples were laboratory composited and analyzed as one sample. Soil samples were collected by removing the first 6 to 12 inches of soil, a brass tube was then pushed into the soil, removed, sealed, and handled according to the procedures described previously. Soil from the former and present tank complex excavations were stored in separate stockpiles. Excavated soils from the piping trenches were stockpiled with soil from the former tank excavation stockpile. Composite soil sample designations for the former tank excavation and trenching stockpiles are AS-1 through AS-6 and AS-22 through AS-39. The amount of soil in these stockpiles was estimated to be approximately 1200 cubic yards. The present tank excavation stockpiles have composite soil sample designations of AS-7 through AS-21. Soil from the present tank excavation stockpiles was estimated to be approximately 750 cubic yards. Composite soil sample and stockpile locations are presented on Plates 5 and 6.

## CHEMICAL ANALYTICAL RESULTS

Soil samples were analyzed by either IT in San Jose, California; Superior in Martinez, California; or the NET mobile laboratory located at the site. The samples were analyzed for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline) according to EPA Method 8015 (Modified), and Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) according to EPA Method 8020. NET analyzed for TPH-Gasoline according to DHS procedure GC FID/5030. Copies of the IT, Superior, and NET chemical analytical reports are presented in Appendix A.

### Former Tank Excavation Results

Chemical analytical results of soil samples from the former tank excavation identified TPH-Gasoline concentrations ranging from none detected (ND) to 23,000 parts per million (ppm). Benzene was identified in these same soil samples at concentrations ranging from ND to 150 ppm. The highest TPH-Gasoline concentrations were initially reported from a depth of 10 to 12 feet at sample locations AX1-3, AX1-6, AX1-8, and AX1-10. After the excavation was enlarged to the final extent, soil samples collected from locations AX1-2* and AX1-7* at a depth of 10 feet also reported high concentrations of TPH-Gasoline. Soil samples collected from a depth of 6 feet reported TPH-Gasoline at levels of 50 ppm or less, except at sample location AX1-2 where a TPH-Gasoline concentration of 1700 ppm was detected. Additional soil removal from the south, east, and west sides of the excavation was not performed due to property boundaries and the close proximity of the station building. Groundwater from the excavation was not sampled due to the presence of a film of free product on the water surface. Chemical analytical results for soil samples from this excavation are presented in Table 1.

* Asterisks identify soil sample designations that have been repeated and specified as separate and discreet sample locations. These samples were collected in August. Samples that had repeated designations were collected in July.

Present Tank Excavation Results

Chemical analytical results for soil samples from the present tank excavation reported TPH-Gasoline in samples AX2-1-12 and AX2-2-11 at a concentration of 2.0 ppm. Benzene was identified in samples AX2-1-12, AX2-2-11, and AX2-6-11 at concentrations ranging from 0.013 to 0.470 ppm. The remaining samples were reported as ND for both TPH-Gasoline and BTEX analytes. Chemical analytical results for soil samples from this excavation are presented in Table 1.

Trench Sampling Results

TPH-Gasoline was detected in trench soil samples AT-1, AT-2, AT-4, AT-7, AT-8, AT-14, AT-17, AT-26, and AT-28 at concentrations ranging from 1.9 to 5,800 ppm. Benzene was detected in soil samples AT-2, AT-4, AT-7, AT-8, AT-14, and AT-17 at concentrations ranging from 0.008 to 51 ppm. These samples were collected at depths ranging from 2.5 to 9.5 feet below grade. The remaining soil samples were reported as ND for TPH-Gasoline and BTEX. Additional soil excavation from areas of high TPH-Gasoline levels, (sample locations AT-17, AT-26, and AT-28), was not attempted due to the proximity of the overhead canopy foundation. Table 2 summarizes chemical analytical results of soil samples from the trenches.

Stockpile Sampling Results

Chemical analyses for soil sample composites from the former tank excavation and trenching stockpiles identified TPH-Gasoline concentrations ranging from 230 to 5,600 ppm. Benzene was reported in these same composites at concentrations ranging from ND to 3.9 ppm. Highest concentrations of TPH-Gasoline were reported from composite samples AS-22 and AS-23 at levels of 5,500 and 5,600 ppm, respectively. Chemical analytical results for these composites are presented in Table 3.

TPH-Gasoline was identified in soil sample composites from the present tank excavation stockpile at concentrations ranging from ND to 301 ppm. Benzene was reported as ND for each composite sample from this stockpile. Soil sample composite chemical analytical results for the present tank excavation are summarized in Table 4.

## SOIL AERATION

Upon receipt of chemical analytical results for stockpiled soils, an allowable volume of stockpiled soil was aerated onsite in compliance with BAAQMD guidelines for uncontrolled soil aeration. Soil was spread out onsite to a thickness of 1 to 2 feet and turned over with a backhoe on a daily basis to assist in the aeration process. Soil samples were collected from the aerating soils using the procedures described previously for the initial stockpile soil sampling. Approximately 350 cubic yards of aerating soil was resampled and analyzed. Composite samples for these soils were designated AS-1*, AS-2*, and AS-40 through AS-48. TPH-Gasoline concentrations for these samples ranged from ND to 490 ppm. Benzene was reported as ND for each composite. Chemical analytical results for these composites are presented in Table 5.

## SOIL REMOVAL

Approximately 1950 cubic yards of soil was excavated from the former and present tank complexes and subsurface piping trenches. Soil stockpiles for the former tank excavation and trenches were estimated to contain approximately 1200 cubic yards of soil. Approximately 340 cubic yards of soil from these stockpiles contained TPH-Gasoline at concentrations of greater than 1000 ppm and were transported to GSXs Lokern Road disposal facility, located in Buttonwillow, California. The remaining 860 cubic yards of soil remained onsite for aeration.

Soil stockpiles from the present tank complex contained approximately 750 cubic yards of soil. Approximately 650 cubic yards of soil from these stockpiles contained TPH-Gasoline concentrations of less than 100 ppm and were transported to Redwood Landfill located in Novato, California. The remaining 100 cubic yards of soil remained onsite for aeration.

Approximately 350 cubic yards of soil have been aerated, resampled, and analyzed. Upon receipt of the chemical analytical reports indicating that these soil samples contain less than 100 ppm TPH-Gasoline, the soils were transported to the Redwood Landfill in Novato, California.

## PLANNED SITE ACTIVITIES

- Soil stockpiled on-site will continue to be aerated and, upon receipt of chemical analytical results, will be transported to an appropriate disposal facility

- After aerated soils have been removed from the site, the remaining product piping on the north side of the site will be removed. Soil samples will be collected from beneath the product lines approximately every 20 lineal feet. The ACHCS will be notified prior to the start of these activities.

- A work plan will be issued to assess the extent of soil and ground-water contamination at the site.

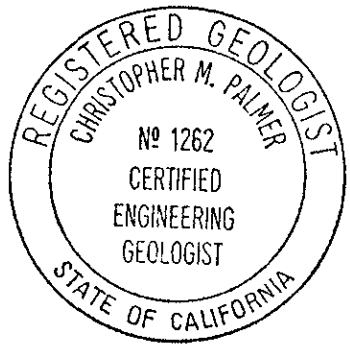
- Design of an appropriate remediation system to mitigate unexcavated soils beneath the site.

If you have any questions, please call.

GeoStrategies Inc. by,

Robert C. Mallory
Geologist

Jeffrey L. Peterson
Senior Hydrogeologist
R.E.A. 1021




Christopher M. Palmer
C.E.G. 1262, R.E.A. 285

RCM/CMP/kjj

Plate 1. Vicinity Map
Plate 2. Site Plan
Plate 3. Excavation Soil Sample Map
Plate 4. Trench Soil Sample Map
Plate 5. Soil Stockpile Map
Plate 6. Soil Stockpile Map

Appendix A: Soil Chemical Analytical Reports

QC Review: DHP

Report No. 7920-1

TABLE 1

SOIL ANALYTICAL DATA
(EXCAVATIONS)

| SAMPLE I.D. | SAMPLE DATE | ANALYZED DATE | TPH-G (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENES (PPM) |
|---|---|---|---|---|---|---|---|
| AX1-1-6 | 26-Jul-90 | 26-Jul-90 | 14 | <0.005 | <0.005 | <0.005 | 1 |
| AX1-1-10 | 10-Aug-90 | 21-Aug-90 | 27. | 0.12 | 1.1 | 0.7 | 4.4 |
| AX1-2-6 | 26-Jul-90 | 26-Jul-90 | 1700 | <0.005 | 16 | 4.8 | 76 |
| AX1-2*-10 | 10-Aug-90 | 19-Aug-90 | 7700. | 60. | 360. | 150. | 930. |
| AX1-3-6 | 26-Jul-90 | 26-Jul-90 | <1 | <0.005 | <0.005 | <0.005 | <0.005 |
| AX1-3-10 | 09-Aug-90 | 21-Aug-90 | 15000. | 130. | 850. | 330. | 1900. |
| AX1-3-12 | 26-Jul-90 | 26-Jul-90 | 23000 | 150 | 490 | 940 | 2700 |
| AX1-4-6 | 26-Jul-90 | 31-Jul-90 | <1 | <0.005 | <0.005 | <0.005 | <0.005 |
| AX1-4-12 | 26-Jul-90 | 26-Jul-90 | 1.2 | <0.005 | 0.011 | 0.018 | 0.062 |
| AX1-5-6 | 26-Jul-90 | 26-Jul-90 | <1 | 0.019 | <0.005 | <0.005 | 0.032 |
| AX1-6-6 | 26-Jul-90 | 26-Jul-90 | <1 | 0.067 | 0.011 | 0.042 | 0.055 |
| AX1-6-10 | 10-Aug-90 | 18-Aug-90 | 1000. | 2.0 | 24. | 18. | 110. |
| AX1-7-6 | 26-Jul-90 | 27-Jul-90 | 50 | <0.005 | <0.005 | <0.005 | <0.005 |
| AX1-7*-10 | 10-Aug-90 | 21-Aug-90 | 9400. | 96. | 570. | 200. | 1200. |

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
PPM = Parts Per Million

Notes: 1. All data shown as <x are reported as ND (NONE DETECTED).
2. BTEX data analyzed on July 26, 27 and 31, 1990 by NET are reported in micrograms per kilogram.
3. The last number of the Sample I.D. corresponds to the approximate depth below existing grade that the sample was collected.
4. For sample locations, see Plate 3.
5. TPH-G concentration for AX1-8-10' appear to be the more volatile constituents of diesel.

TABLE 1

SOIL ANALYTICAL DATA
(EXCAVATIONS)

| SAMPLE I.D. | SAMPLE DATE | ANALYZED DATE | TPH-G (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENES (PPM) |
|---|---|---|---|---|---|---|---|
| AX1-8-10 | 27-Jul-90 | 27-Jul-90 | 7,300 | 20 | 130 | 98 | 650 |
| AX1-8*-10 | 10-Aug-90 | 18-Aug-90 | 320. | <0.4 | <0.4 | 3.8 | 12. |
| AX1-9-10 | 27-Jul-90 | 27-Jul-90 | <1 | 0.014 | <0.005 | 0.020 | 0.017 |
| AX1-9*-10 | 10-Aug-90 | 18-Aug-90 | 1.6 | 0.037 | 0.057 | 0.01 | 0.051 |
| AX1-10-10 | 27-Jul-90 | 27-Jul-90 | 2,700 | 36 | 51 | 180 | 320 |
| AX1-10*-10 | 10-Aug-90 | 18-Aug-90 | 120. | 0.56 | 4.3 | 2.5 | 15. |
| AX1-11-10 | 27-Jul-90 | 27-Jul-90 | <1 | 12 | 6 | 14 | 35 |
| AX2-1-6 | 31-Jul-90 | 31-Jul-90 | <1 | <0.005 | <0.005 | 0.007 | 0.007 |
| AX2-1-12 | 31-Jul-90 | 31-Jul-90 | 2.0 | 0.024 | 0.073 | 0.048 | 0.110 |
| AX2-2-11 | 31-Jul-90 | 31-Jul-90 | 2.0 | 0.470 | 0.180 | 0.005 | 0.013 |
| AX2-3-6 | 31-Jul-90 | 31-Jul-90 | <1 | <0.005 | <0.005 | <0.005 | <0.005 |
| AX2-3-11.5 | 31-Jul-90 | 31-Jul-90 | <1 | <0.005 | <0.005 | <0.005 | <0.005 |
| AX2-4-6 | 31-Jul-90 | 31-Jul-90 | <1 | <0.005 | <0.005 | <0.005 | <0.005 |
| AX2-4-11 | 31-Jul-90 | 31-Jul-90 | <1 | <0.005 | <0.005 | <0.005 | <0.005 |
| AX2-5-6 | 31-Jul-90 | 31-Jul-90 | <1 | <0.005 | <0.005 | <0.005 | <0.005 |
| AX2-5-11 | 31-Jul-90 | 31-Jul-90 | <1 | <0.005 | <0.005 | <0.005 | <0.005 |
| AX2-6-11 | 31-Jul-90 | 31-Jul-90 | <1 | 0.013 | 0.011 | <0.005 | <0.005 |
| AX2-7-11 | 31-Jul-90 | 31-Jul-90 | <1 | <0.005 | <0.005 | <0.005 | <0.005 |

TABLE 2

SOIL ANALYTICAL DATA
(TRENCHING)

| SAMPLE I.D. | SAMPLE DATE | ANALYZED DATE | TPH-G (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENES (PPM) |
|---|---|---|---|---|---|---|---|
| AT-1 | 17-Aug-90 | 20-Aug-90 | 2000. | <0.8 | 23. | 28. | 210. |
| AT-2 | 17-Aug-90 | 20-Aug-90 | 6.7 | 0.023 | 0.088 | 0.11 | 0.84 |
| AT-3 | 17-Aug-90 | 20-Aug-90 | <1. | <0.005 | <0.005 | <0.005 | <0.005 |
| AT-4 | 17-Aug-90 | 20-Aug-90 | 5.8 | 0.034 | 0.12 | 0.057 | 0.52 |
| AT-7-2 | 08-Aug-90 | 16-Aug-90 | 2.0 | 0.008 | 0.017 | 0.008 | 0.061 |
| AT-8-2.5 | 08-Aug-90 | 16-Aug-90 | 14. | 0.11 | 0.15 | 0.28 | 1.6 |
| AT-9-9.5 | 20-Aug-90 | 29-Aug-90 | <1. | <0.01 | <0.01 | <0.01 | <0.01 |
| AT-10-2.5 | 15-Aug-90 | 17-Aug-90 | <1 | <0.003 | <0.003 | <0.003 | <0.003 |
| AT-10-9.5 | 20-Aug-90 | 28-Aug-90 | <1. | <0.005 | <0.005 | 0.008 | 0.014 |
| AT-11-2.5 | 15-Aug-90 | 17-Aug-90 | <1 | <0.003 | <0.003 | <0.003 | <0.003 |
| AT-12-2.5 | 15-Aug-90 | 17-Aug-90 | <1 | <0.003 | <0.003 | <0.003 | <0.003 |

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
PPM = Parts Per Million

Notes: 1. All data shown as <x are reported as ND (none detected).
2. BTEX data analyzed on August 17, 1990 by Superior are reported in micrograms per kilograms.
3. The last number of the Sample I.D. corresponds to the approximate depth below existing grade that the sample was collected. AT-1 and AT-3 were collected at 3.5 feet below existing grade. AT-2 and AT-4 were collected at 2.5 feet below existing grade.
4. For sample locations, see Plate 4.

TABLE 2

SOIL ANALYTICAL DATA
(TRENCHING)

| SAMPLE I.D. | SAMPLE DATE | ANALYZED DATE | TPH-G (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENES (PPM) |
|---|---|---|---|---|---|---|---|
| AT-13-2.5 | 15-Aug-90 | 17-Aug-90 | <1 | <0.003 | <0.003 | <0.003 | <0.003 |
| AT-14-2.5 | 15-Aug-90 | 17-Aug-90 | 250 | 0.019 | 0.032 | 0.110 | 3.0 |
| AT-14-7 | 23-Aug-90 | 24-Aug-90 | 1.9 | 0.025 | 0.034 | 0.026 | 0.25 |
| AT-17-8.5 | 20-Aug-90 | 28-Aug-90 | 5800. | 51. | 330. | 100. | 560. |
| AT-24-5 | 22-Aug-90 | 29-Aug-90 | <1. | <0.005 | <0.005 | <0.005 | <0.005 |
| AT-25-5 | 22-Aug-90 | 28-Aug-90 | <1. | <0.008 | <0.008 | <0.008 | <0.008 |
| AT-26-5 | 22-Aug-90 | 28-Aug-90 | 890. | <1. | 1.6 | 2.5 | 38. |
| AT-27-5 | 22-Aug-90 | 28-Aug-90 | <1. | <0.005 | <0.005 | <0.005 | 0.006 |
| AT-28-5 | 23-Aug-90 | 28-Aug-90 | 4600. | <2. | 46. | 56. | 460. |
| AT-29-5 | 23-Aug-90 | 27-Aug-90 | <1. | <0.005 | <0.005 | <0.005 | <0.005 |
| AT-30-5 | 23-Aug-90 | 24-Aug-90 | <1.0 | <0.005 | <0.005 | <0.005 | <0.005 |
| AT-31-5 | 23-Aug-90 | 29-Aug-90 | <1. | <0.005 | <0.005 | <0.005 | 0.007 |
| AT-32-5 | 24-Aug-90 | 28-Aug-90 | <1. | <0.005 | <0.005 | <0.005 | <0.005 |
| AT-33-5 | 24-Aug-90 | 28-Aug-90 | <1. | <0.005 | 0.008 | <0.005 | 0.009 |

TABLE 3

COMPOSITED SOIL ANALYTICAL DATA
(FORMER UGT COMPLEX AND TRENCH STOCKPILES)

| SAMPLE ID | SAMPLE DATE | ANALYSIS DATE | TPH-G (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENES (PPM) |
|---|---|---|---|---|---|---|---|
| AS-1 (A-D) (composite) | 26-Jul-90 | 26-Jul-90 | 940 | <0.005 | 5.3 | 1.9 | 24 |
| AS-2 (A-D) (composite) | 27-Jul-90 | 27-Jul-90 | 640 | <0.005 | 0.91 | <0.005 | 12 |
| AS-3 (A-D) (composite) | 27-Jul-90 | 27-Jul-90 | 1,100 | <0.005 | 14 | 3.6 | 52 |
| AS-4 (A-D) (composite) | 27-Jul-90 | 27-Jul-90 | 930 | <0.005 | <0.005 | <0.005 | 24 |
| AS-5 (A-D) (composite) | 27-Jul-90 | 27-Jul-90 | 2,300 | <0.005 | 20 | 15 | 130 |
| AS-6 (A-D) (composite) | 27-Jul-90 | 27-Jul-90 | 1,300 | 3.9 | 16 | 14 | 72 |

TPH-G = Total Petroleum Hydrocarbons as Gasoline
PPM = Parts Per Million

Note: 1. All data shown as <x are reported as ND (none detected).
2. BTEX data analyzed on July 26 and 27, 1990 by NET, and August 2 and 22, 1990 by Superior, are reported in micrograms per kilogram.
3. For sample locations, see Plates 5 and 6.

TABLE 3

COMPOSITED SOIL ANALYTICAL DATA
(FORMER UGT COMPLEX AND TRENCH STOCKPILES)

| SAMPLE ID | SAMPLE DATE | ANALYSIS DATE | TPH-G (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENES (PPM) |
|---|---|---|---|---|---|---|---|
| AS-22 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 5,500 | <0.3 | 62 | 48 | 480 |
| AS-23 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 5,600 | <0.3 | 75 | 55 | 560 |
| AS-24 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 2,300 | <0.3 | 1.5 | 1.1 | 170 |
| AS-25 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 2,000 | <0.3 | <0.3 | 0.39 | 83 |
| AS-26 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 870 | <0.3 | 0.39 | <0.3 | 42 |
| AS-27 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 1,800 | <0.3 | <0.3 | <0.3 | 59 |
| AS-28 (A-D) (composite) | 15-Aug-90 | 22-Aug-90 | 860 | <0.15 | 0.8 | 0.69 | 56 |
| AS-29 (A-D) (composite) | 15-Aug-90 | 22-Aug-90 | 900 | <0.15 | 1 | 0.72 | 66 |
| AS-30 (A-D) (composite) | 15-Aug-90 | 22-Aug-90 | 260 | <0.15 | <0.15 | 0.25 | 9.6 |
| AS-31 (A-D) (composite) | 15-Aug-90 | 22-Aug-90 | 550 | <0.15 | <0.25 | 0.41 | 24 |

TABLE 3

COMPOSITED SOIL ANALYTICAL DATA
(FORMER UGT COMPLEX AND TRENCH STOCKPILES)

| SAMPLE ID | SAMPLE DATE | ANALYSIS DATE | TPH-G (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENES (PPM) |
|---|---|---|---|---|---|---|---|
| AS-32 (A-D) (composite) | 15-Aug-90 | 22-Aug-90 | 460 | <0.15 | 0.59 | 0.62 | 29 |
| AS-33 (A-D) (composite) | 15-Aug-90 | 22-Aug-90 | 1,600 | 1.6 | 2.9 | 2.8 | 110 |
| AS-34 (A-D) (composite) | 15-Aug-90 | 22-Aug-90 | 620 | 0.37 | 0.85 | 0.44 | 48 |
| AS-35 (A-D) (composite) | 15-Aug-90 | 22-Aug-90 | 900 | 0.2 | 0.87 | 0.53 | 63 |
| AS-36 (A-D) (composite) | 15-Aug-90 | 22-Aug-90 | 680 | 0.54 | 5.4 | 2.6 | 50 |
| AS-37 (A-D) (composite) | 15-Aug-90 | 22-Aug-90 | 590 | <0.15 | 2.4 | 0.89 | 43 |
| AS-38 (A-D) (composite) | 15-Aug-90 | 22-Aug-90 | 280 | <0.15 | 0.33 | 0.2 | 19 |
| AS-39 (A-D) (composite) | 15-Aug-90 | 22-Aug-90 | 230 | <0.15 | <0.15 | 0.21 | 14 |

TABLE 4

COMPOSITED SOIL ANALYTICAL DATA
(PRESENT UGT COMPLEX STOCKPILE)

| SAMPLE ID | SAMPLE DATE | ANALYZED DATE | TPH-G (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENES (PPM) |
|---|---|---|---|---|---|---|---|
| AS-7 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 3 | <0.003 | 0.014 | 0.013 | 0.120 |
| AS-8 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 5 | <0.003 | 0.035 | 0.033 | 0.280 |
| AS-9 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 2 | <0.003 | 0.008 | 0.007 | 0.075 |
| AS-10 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 1 | <0.003 | 0.005 | 0.006 | 0.064 |
| AS-11 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 4 | <0.003 | 0.013 | 0.015 | 0.130 |
| AS-12 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 3 | <0.003 | <0.003 | <0.003 | 0.016 |
| AS-13 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 1 | <0.003 | <0.003 | <0.003 | 0.005 |

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
PPM = Parts Per Million

Note: 1. All data shown as <x are reported as ND (none detected).
2. BTEX data are reported in micrograms per kilogram.
3. For sample locations, see Plate 5.

TABLE 4

COMPOSITED SOIL ANALYTICAL DATA
(PRESENT UGT COMPLEX STOCKPILE)

| SAMPLE ID | SAMPLE DATE | ANALYZED DATE | TPH-G (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENES (PPM) |
|---|---|---|---|---|---|---|---|
| AS-14 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 13 | <0.003 | 0.042 | 0.036 | 0.280 |
| AS-15 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 273 | <0.150 | 0.270 | 0.730 | 5.100 |
| AS-16 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 301 | <0.150 | 0.980 | 1.600 | 9.900 |
| AS-17 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 4 | <0.003 | 0.018 | 0.013 | 0.084 |
| AS-18 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 2 | <0.003 | 0.004 | 0.005 | 0.036 |
| AS-19 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | <1 | <0.003 | <0.003 | <0.003 | <0.003 |
| AS-20 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | 3 | <0.003 | <0.003 | <0.003 | 0.010 |
| AS-21 (A-D) (composite) | 31-Jul-90 | 02-Aug-90 | <1 | <0.003 | <0.003 | <0.003 | 0.007 |

TABLE 5

COMPOSITED SOIL ANALYTICAL DATA
(AERATED SOIL)

| SAMPLE I.D. | SAMPLE DATE | ANALYSIS DATE | TPH-G (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENE (PPM) | SOIL REMOVED |
|---|---|---|---|---|---|---|---|---|
| AS-1* (A-D) (composite) | 17-Aug-90 | 21-Aug-90 | 19. | <0.005 | 0.009 | 0.026 | 0.16 | Approximately 50 cubic yards to Redwood Landfill |
| AS-2* (A-D) (composite) | 17-Aug-90 | 20-Aug-90 | 6.4 | <0.005 | 0.008 | 0.006 | 0.038 | Approximately 50 cubic yards to Redwood Landfill |
| AS-40 (A-D) (composite) | 22-Aug-90 | 28-Aug-90 | 12. | <0.17 | <0.017 | <0.017 | 0.099 | Approximately 50 cubic yards to Redwood Landfill |
| AS-41 (A-D) (composite) | 30-Aug-90 | 06-Sep-90 | <1 | <0.003 | <0.003 | <0.003 | <0.003 | |
| AS-42 (A-D) (composite) | 30-Aug-90 | 06-Sep-90 | 14 | <0.003 | <0.003 | <0.003 | 0.008 | |
| AS-43 (A-D) (composite) | 10-Sep-90 | 10-Sep-90 | 490. | <0.2 | 0.2 | <0.2 | 21. | |
| AS-44 (A-D) (composite) | 10-Sep-90 | 10-Sep-90 | 240. | <0.2 | <0.2 | <0.2 | 0.4 | |
| AS-45 (A-D) (composite) | 17-Sep-90 | 24-Sep-90 | <1 | <0.003 | <0.003 | <0.003 | 0.005 | Approximately 50 cubic yards to Redwood Landfill |

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
PPM = Parts Per Million

Note: 1. All data shown as <x are reported as ND (none detected)
2. BTEX data analyzed by Superior on September 6 and 24, 1990, are reported in micrograms per kilogram

TABLE 5

COMPOSITED SOIL ANALYTICAL DATA
(AERATED SOIL)

| SAMPLE I.D. | SAMPLE DATE | ANALYSIS DATE | TPH-G (PPM) | BENZENE (PPM) | TOLUENE (PPM) | ETHYLBENZENE (PPM) | XYLENE (PPM) | SOIL REMOVED |
|---|---|---|---|---|---|---|---|---|
| AS-46 (A-D) (composite) | 17-Sep-90 | 24-Sep-90 | 3 | <0.003 | <0.003 | 0.006 | 0.017 | Approximately 50 cubic yards to Redwood Landfill |
| AS-47 (A-D) (composite) | 21-Sep-90 | 24-Sep-90 | <1 | <0.003 | <0.003 | <0.003 | <0.003 | Approximately 50 cubic yards to Redwood Landfill |
| AS-48 (A-D) (composite) | 21-Sep-90 | 24-Sep-90 | <1 | <0.003 | <0.003 | <0.003 | 0.004 | Approximately 50 cubic yards to Redwood Landfill |

# ILLUSTRATIONS


Base Map: USGS Topographic Map

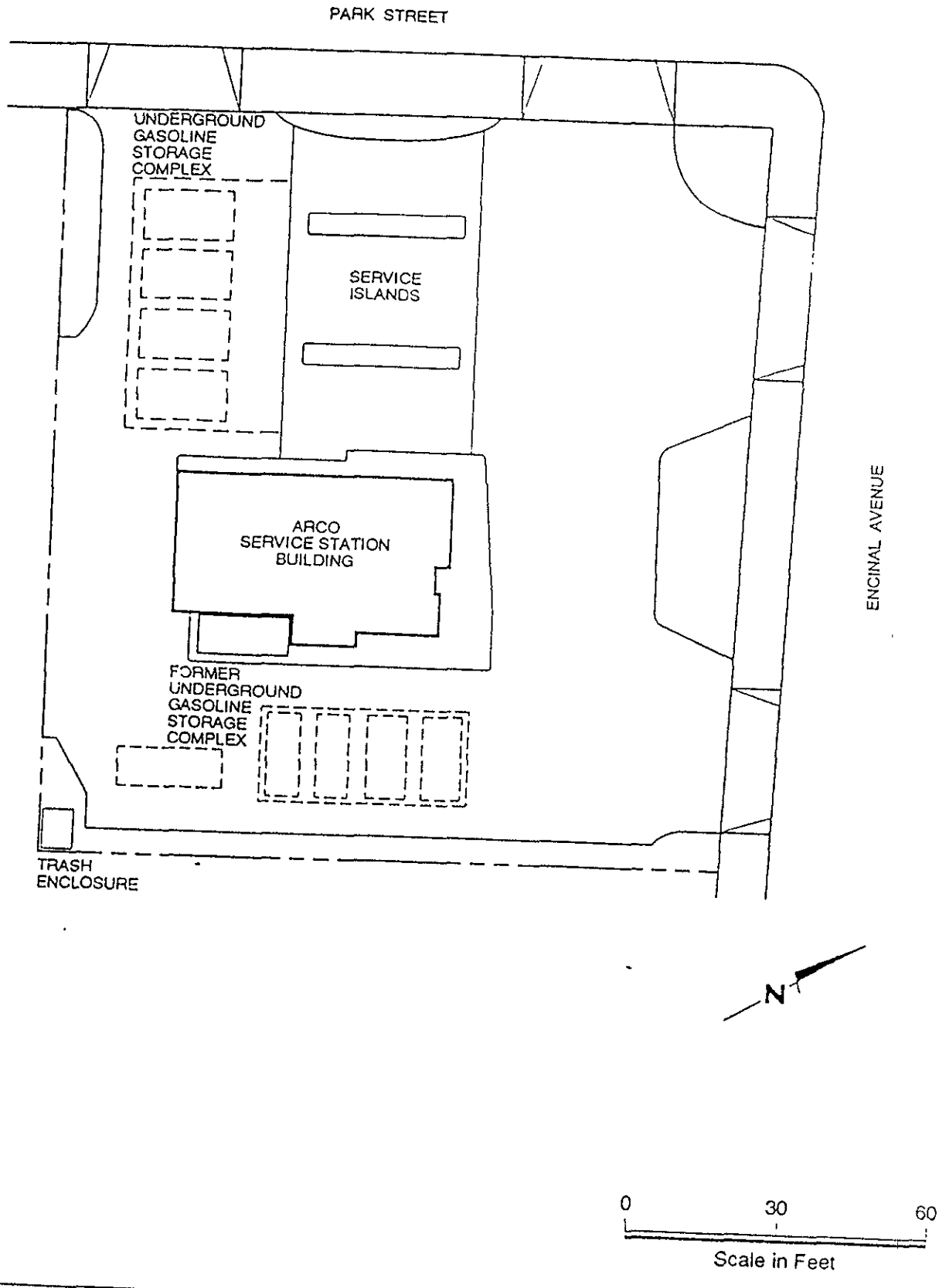
Approximate Scale : 1" = 2000'

GeoStrategies Inc.

**Vicinity Map**
ARCO Service Station #2112
1260 Park Street
Alameda, California

PLATE **1**

| JOB NUMBER | REVIEWED BY RG/CEG | DATE | REVISED DATE | REVISED DATE |
|---|---|---|---|---|
| 7920 | | 3/90 | | |

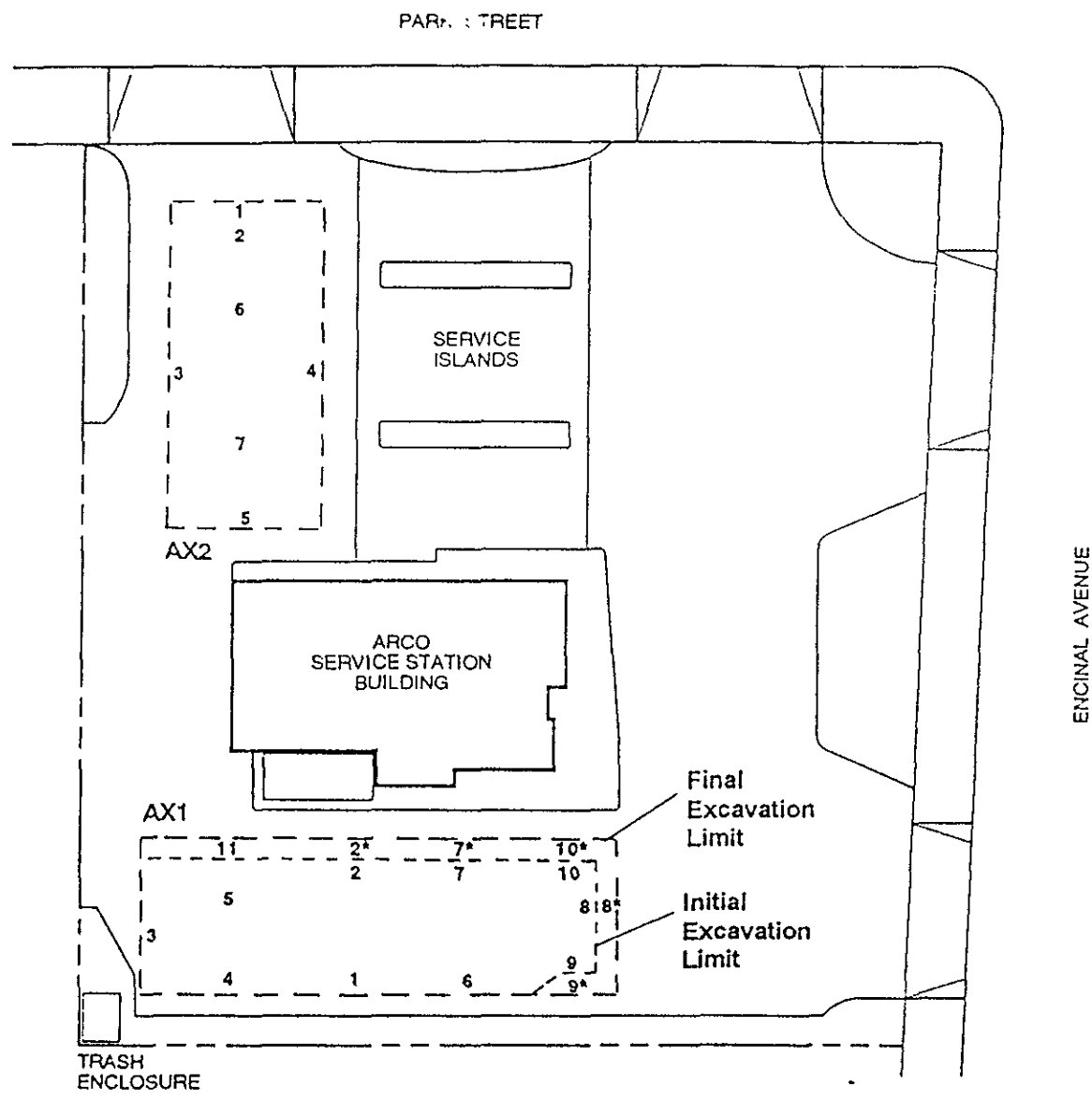



GeoStrategies Inc.

Site Plan
ARCO Service Station #2112
1260 Park Street
Alameda, California

PLATE 2

| JOB NUMBER | REVIEWED BY RG/CEG | DATE | REVISED DATE | REVISED DATE |
|---|---|---|---|---|
| 7920 | RG CEG 12/92 | 10/90 | | |

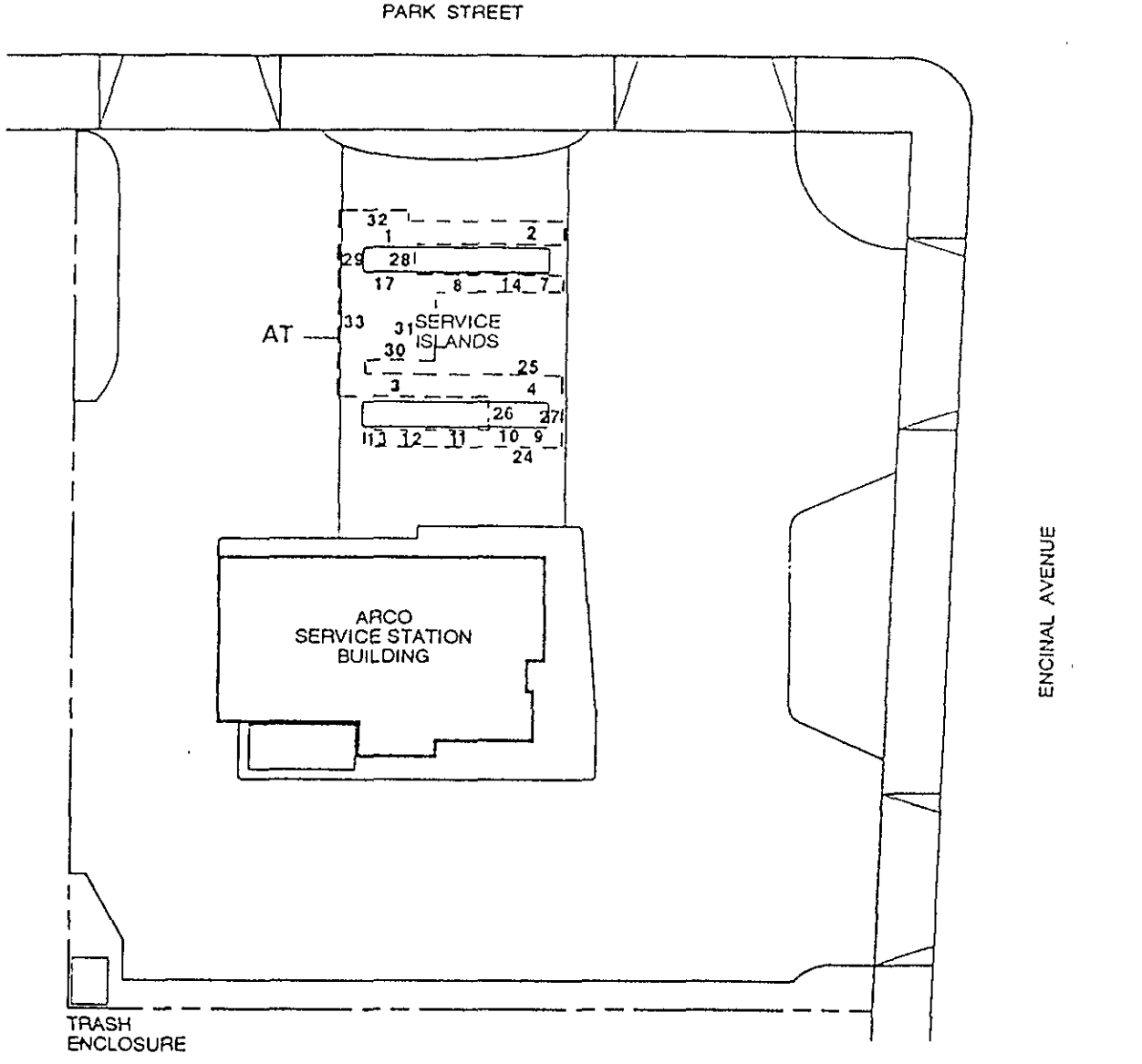



GeoStrategies Inc.

**Excavation Soil Sample Map**
ARCO Service Station #2112
1260 Park Street
Alameda, California

PLATE **3**

| JOB NUMBER | REVIEWED BY RG/CEG | DATE | REVISED DATE | REVISED DATE |
|---|---|---|---|---|
| 7920 | RG/CEG 12/62 | 10/90 | | |




EXPLANATION

AT — Trench excavation and designation

1 — Sample location and designation

N

0 30 60

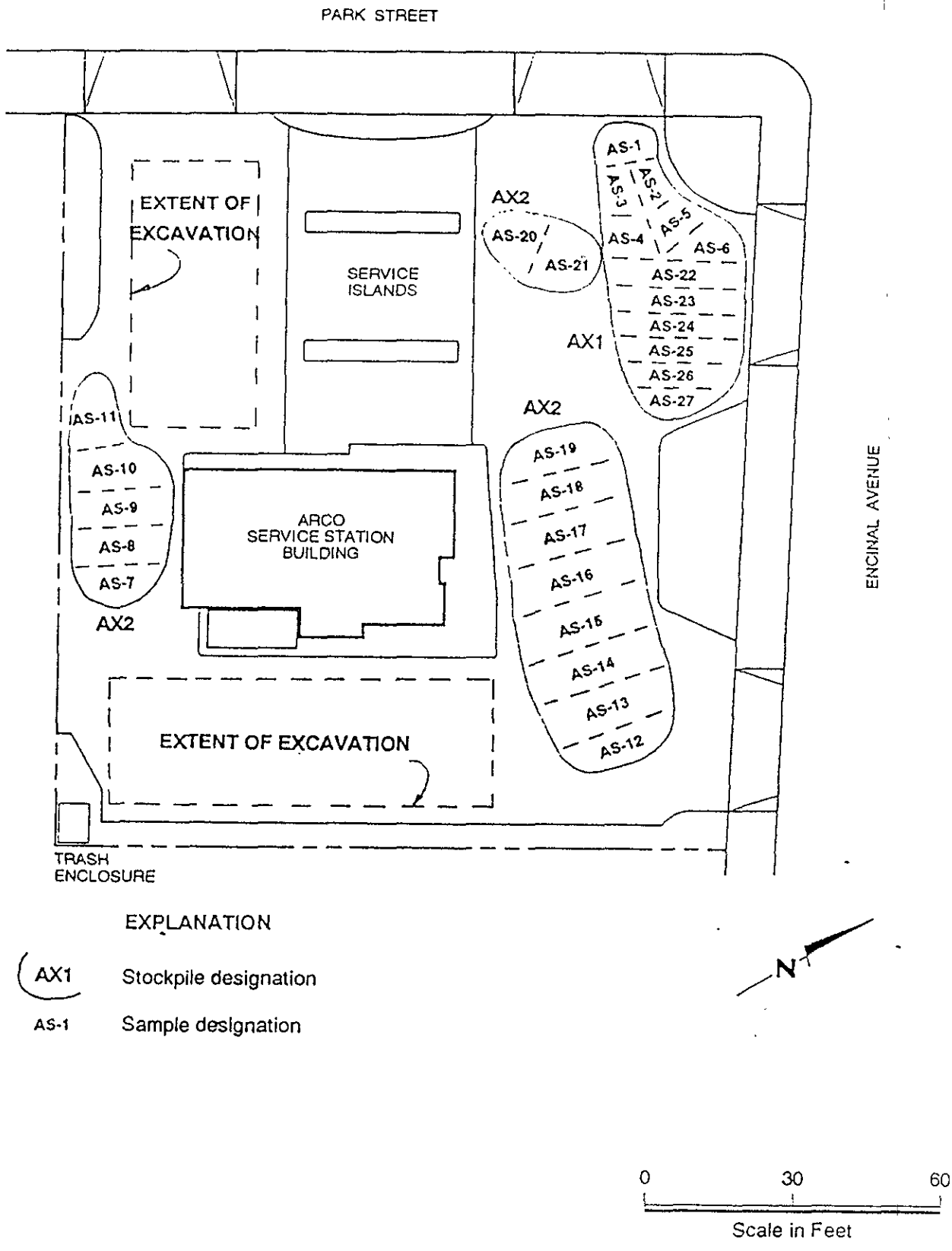
Scale in Feet

GeoStrategies Inc.

**Trench Soil Sample Map**
ARCO Service Station #2112
1260 Park Street
Alameda, California

PLATE 4

| JOB NUMBER | REVIEWED BY RG/CEG | DATE | REVISED DATE | REVISED DATE |
|---|---|---|---|---|
| 7920 | RMP CEG 1262 | 10/90 | | |

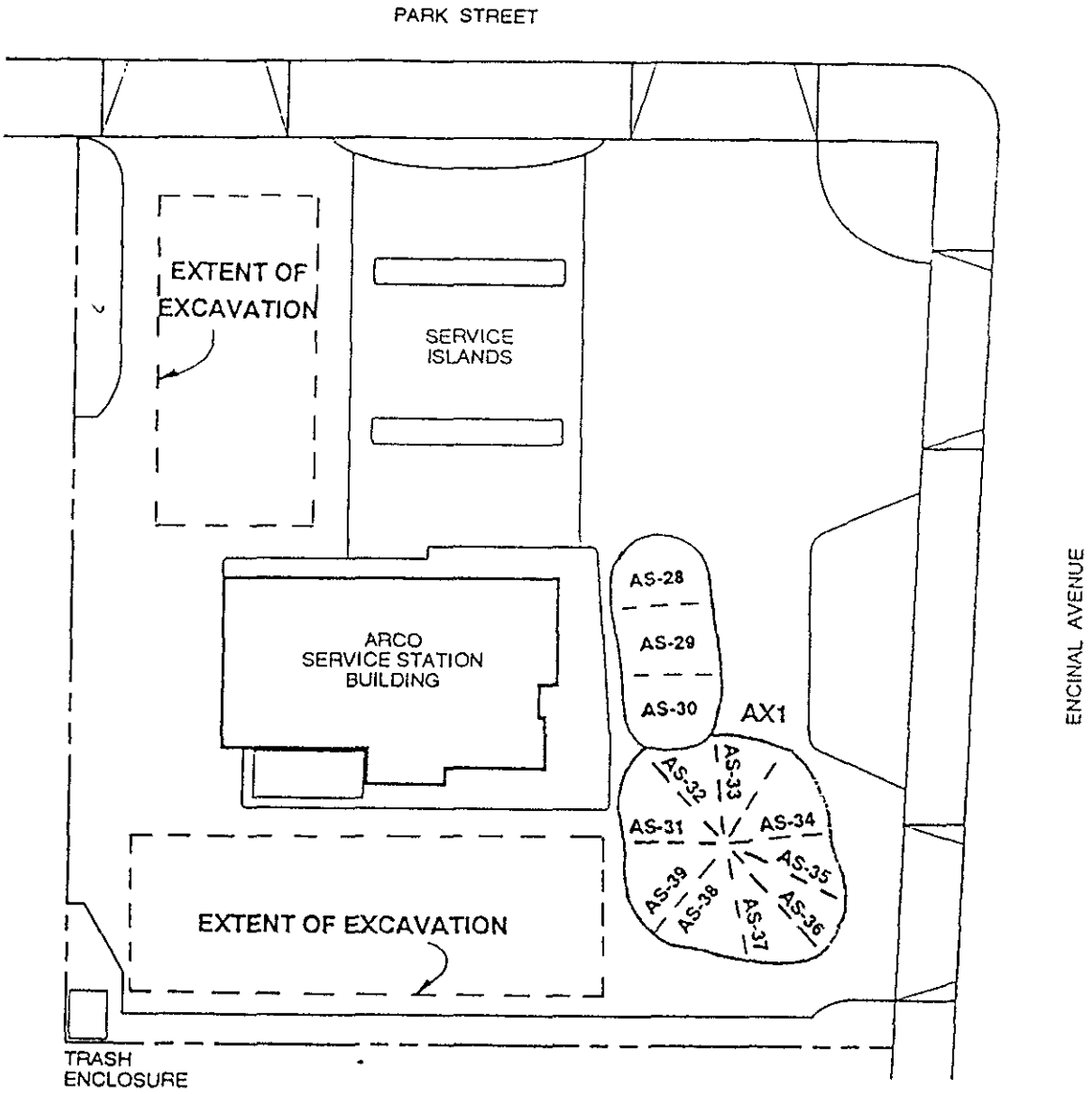



GeoStrategies Inc.

**Soil Stockpile Map**
ARCO Service Station #2112
1260 Park Street
Alameda, California

PLATE 5

| JOB NUMBER | REVIEWED BY RG/CEG | DATE | REVISED DATE | REVISED DATE |
|---|---|---|---|---|
| 7920 | CWP CEG 12/92 | 10/90 | | |




GeoStrategies Inc.

**Soil Stockpile Map**
ARCO Service Station #2112
1260 Park Street
Alameda, California

PLATE
**6**

| JOB NUMBER | REVIEWED BY RG/CEG | DATE | REVISED DATE | REVISED DATE |
|---|---|---|---|---|
| 7920 | | 10/90 | | |

# ATTACHMENT 4

Mailing Address: Box 5811
San Mateo, California 94402
Telephone 415 571 2400

Alameda County Health Department
470 27th Street
Oakland, California 94612
Attn: Ted Gerow

June 8,1987

Re: SS#2112, 1260 Park Blvd., Alameda,Ca.

Dear Mr. Gerow,

Enclosed are soil sample test results from the above-mentioned site. After removal of a waste oil tank, we obtained samples at the bottom of the excavation. All soil removed has been hauled to a Class I dump site and the excavation backfilled with clean sand.

If you have any questions, please call.

Sincerely,

Ellen Cianciaruli

cc:K.Schultheis

INC.

435 Tesconi Circle • Santa Rosa, California 95401 • 707-526-7200

Rec'd. 1987

Dan Heath
Crosby & Overton
8430 Amelia Street
Oakland, CA 94621

May 19, 1987
ANATEC Log No. 9310 (1-2)
Series No: 356/007
Client Ref: Job 694

Subject: Analysis of Two Soil Samples Referenced "ARCO, 1260 Park St., Alameda" Received May 15 on an ASAP Priority Basis

Dear Mr. Heath:

Analysis of the samples referenced above has been completed. This report is written to confirm results transmitted verbally on May 18, 1987.

Samples were prepared for motor oil and diesel fuel analysis by thorough mixing and subsequent extraction with methylene chloride; extraction, aided by sonication, was performed three successive times for each sample. Extracts were then combined, dried over sodium sulfate and concentrated in Kuderna-Danish apparatus. Extracts were then analyzed by capillary-column gas chromatography with flame ionization detection. Preparation and analysis of samples was accompanied by similar treatment of a method blank and a fortified sample. Response of the chromatographic system to calibration standards prepared with commercial motor oil and diesel fuel were compared with system response to samples for purposes of qualitative and quantitative interpretation.

Details of the analytical methodology are consistent with requirements specified in "Guidelines for Addressing Fuel Leaks," revised February, 1986, Regional Water Quality Control Board, San Francisco Bay Region; the preparation procedures used are described in detail in, "Sonication Extraction," Method 3550, in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA SW-846, 2nd edition, revised 1985.

Results of analyses are summarized below in Table 1. Please feel welcome to contact us should you have questions regarding procedures or results.

Submitted by:

Susan Joy Griffin
Project Chemist

Approved by:

Greg Anderson, Director
Analytical Laboratories

Encl: Custody Record

TABLE 1. SUMMARIZED ANALYTICAL TESTING RESULTS

| Parameter | Bottom of Tank 5-14-87 D. Liles (9310-1) | West Side of Tank 5-15-87 D. Liles (9310-2) |
|---|---|---|
| Extractable hydrocarbons as diesel fuel (mg/Kg)[a] | 430 ppm | <10 |
| Extractable hydrocarbons as motor oil (mg/Kg)[b] | 2,400 ppm | <10 |

[a]Data are expressed in units of milligrams diesel fuel per liter sample, as-received basis.
[b]Data are expressed in units of milligrams motor oil per liter sample, as-received basis.

9310

# CHAIN OF CUSTODY RECORD

LOCATION OF SAMPLING: ____ PRODUCER ✓ HAULER ____ DISPOSAL SITE

____ OTHER: Waste oil SAMPLE

SHIPPER NAME: ARCO

ADDRESS: 1260 NUMBER Park St. STREET Alameda CITY CA STATE 94501 ZIP

COLLECTOR'S NAME Wayne SIGNATURE TELEPHONE: (415) 633-0336

DATE SAMPLED 5-14-87 TIME SAMPLES 1400 HOURS 1/2

TYPE OF PROCESS PRODUCING WASTE Tank Removal

FIELD INFORMATION 2 soil samples waste oil below tank

SAMPLE RECEIVER:

1. Anatec, 435 Tesconi Circle, Santa Rosa, CA 954 -NAME AND ADDRESS OF ORGANIZATION RECEIVING SAMPLE-

2. ____

3. ____

CHAIN OF POSSESSION:

1. [signature] SIGNATURE Response Tech TITLE 5-15-87 INCLUSIVE DATES

2. [signature] SIGNATURE National Courier Systems Courier 686 TITLE 5-15-87 INCLUSIVE DATES

3. [signature] SIGNATURE [illegible] TITLE 5-15-87 INCLUSIVE DATES

FIGURE 2.0-3 COLLECTOR'S SAMPLE

EXAMPLE OF CHAIN OF CUSTODY RECORD

ANATEC LABORATORIES INC.

435 Tesconi Circle • Santa Rosa, California 95401 • 707-526-720(

MAY 29 1987
Ans'd.....

Dan Heath
Crosby & Overton
3430 Amelia Street
Oakland, CA 94621

May 27, 1987
ANATEC Log No. 9347 (-1)
Series No: 356/008
Client Ref: Job # 694

Subject: ASAP Analysis of One Soil Sample Identified as "ARCO Station, 1260 Park, Alameda, CA" Received May 22, 1987.

S# 2112

Dear Mr. Heath:

Analysis of the sample referenced above has been completed. This report is written to confirm results transmitted verbally on May 26, 1987.

Sample delivery to the laboratory was conducted under chain-of-custody. On receipt, sample custody was transferred to ANATEC sample control personnel who subsequently documented receipt and condition of the sample and placed it in secured storage at 4 °C until analysis commenced.

The sample was prepared for extractable hydrocarbons measurement by thorough mixing and subsequent extraction with methylene chloride; extraction, aided by sonication, was performed three successive times. Extracts were then combined, dried over sodium sulfate and concentrated in Kuderna-Danish apparatus. Extracts were then analyzed by capillary-column gas chromatography with flame ionization detection. Preparation and analysis of the sample was accompanied by similar treatment of a method blank and a motor oil-fortified sample. Response of the chromatographic system to calibration standards prepared with commercial motor oil were compared with system response to the sample for purposes of qualitative and quantitative interpretation.

Details of the analytical methodology are consistent with requirements specified in "Guidelines for Addressing Fuel Leaks," revised February, 1986, Regional Water Quality Control Board, San Francisco Bay Region; the preparation procedures used are described in detail in, "Sonication Extraction," Method 3550 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA SW-846, 2nd edition, revised 1984.

Results of analysis are summarized in Table 1. Attached is the custody document. Please feel welcome to contact us should you have questions regarding procedures or results.

Submitted by:

Susan Joy Griffin
Project Chemist

Approved by:

Greg Anderson, Director
Analytical Laboratories

Encl: Custody Record

TABLE 1. SUMMARIZED RESULTS FOR "5/21/87 R CAMPBELL #2 FROM 6' DEPTH 1030" (ARCO STATION, 1260 PARK, ALAMEDA, CA) (ANATEC LAB NO. 9347-1)

| Parameter | Results (mg/Kg)[1] |
|---|---|
| (Extractable) Petroleum Hydrocarbons, as motor oil | <10 |

[1]Data are milligrams motor oil per kilogram sample, as-received basis.

1610 WEST 17th STREET LONG BEACH, CALIFORNIA 90813

# CHAIN OF CUSTODY RECORD

LOCATION OF SAMPLING: ____ PRODUCER ____ HAULER ____ DISPOSAL SITE
✓ OTHER: ARCO STATION 1260 Park, Alameda
SAMPLE

SHIPPER NAME: Crosby & Overton

ADDRESS: 8430 Amelia St. Oakland CA 94621
NUMBER STREET CITY STATE ZIP

COLLECTOR'S NAME Mr. Campbell TELEPHONE: (415) 633-0336
SIGNATURE

DATE SAMPLED 5/21/87 TIME SAMPLES 1030 HOURS

TYPE OF PROCESS PRODUCING WASTE WASTE OIL TANK REMOVAL

FIELD INFORMATION
Secondary sample from 6 feet excavation

HC
Waste
oil
per BC
5/22

SAMPLE RECEIVER: Bruce G. Cunningham

1. Bruce G. Cunningham ANATEC 5/21/87 3:30
-NAME AND ADDRESS OF ORGANIZATION RECEIVING SAMPLE-

2. ____

3. ____

CHAIN OF POSSESSION:

| | SIGNATURE | TITLE | INCLUSIVE DATES |
|---|---|---|---|
| 1. | Bruce G. Cunningham | | |
| 2. | Judy Ridley | | |
| 3. | | | |

9347

FIGURE 2.0-3 COLLECTOR'S SAMPLE NO.

EXAMPLE OF CHAIN OF CUSTODY RECORD

# ATTACHMENT 5

RECORD OF TELEPHONE CONVERSATION

DATE: 9-28-87 JOB:

| Individual | Organization | Telephone No. |
|---|---|---|
| FROM: S. Hetznecker | Brown & Caldwell | 937-9010 |
| TO: MR. Gerow | Alameda Co Dept. of Health Ser. | 874-643 |

SUBJECT: Arco Service Station 2112
1260 Park St, Alameda CA

NOTES:

According to information in the county file, specifically a letter dated June 16, 1987 from Ellen Cianiarula of Arco, says that the "dirty" soil was excavated and removed, and analysis shows the hole was excavate to cleanliness.
Mr. Gerow says everything looks ok as far as the county goes.
No further action at this point.
His only question is: will the site remain a service station?

(continued on ba

ACTIONS REQUIRED:

# ATTACHMENT 6

**Applied GeoSystems** 3315 Almaden Expressway, Suite 34, San Jose, CA 95118 (408) 264-7723

• FREMONT – • IRVINE • HOUSTON • BOSTON • SACRAMENTO • CULVER CITY • SAN JOSE

November 14, 1989
1114alev

Mr. Ariu Levi
Hazardous Materials Specialist
Alameda County Health Agency
80 Swan Way, Room 200
Oakland, California 94621

Subject: File Information on ARCO Station No. 2112, 1260 Park Street, Alameda, California.

Mr. Levi:

As you requested on November 11, 1989, and as authorized by Mr. Kyle Christie of ARCO Products Company (ARCO), enclosed are copies of records on file with ARCO regarding the subject site. This information includes:

- laboratory reports (Anatec Laboratories Inc., of Santa Rosa, California) and chain of custody records (Environmental Management, Inc. of Long Beach, California), for three soil samples collected at the site in May 1987,
- a letter, dated June 8, 1987, from Ms. Ellen Cianciaruli of ARCO to Mr. Ted Gerow of the Alameda County Health Agency, and
- a "record of telephone conversation", dated September 28, 1987, reporting a telephone conversation between S. Hetznecker of Brown and Caldwell, of Walnut Creek, California, and Mr. Gerow of the Alameda County Health Agency.

Please call if we can be of any further assistance in this matter.

Sincerely,
Applied GeoSystems

Greg Barclay
Project Branch Manager

cc: Mr. Kyle Christie, ARCO

INC.

435 Tesconi Circle • Santa Rosa, California 95401 • 707-526-7200

Ans'd. 21 1987

Dan Heath
Crosby & Overton
8430 Amelia Street
Oakland, CA 94621

May 19, 1987
ANATEC Log No. 9310 (1-2)
Series No: 356/007
Client Ref: Job 694

Subject: Analysis of Two Soil Samples Referenced "ARCO, 1260 Park St., Alameda" Received May 15 on an ASAP Priority Basis

Dear Mr. Heath:

Analysis of the samples referenced above has been completed. This report is written to confirm results transmitted verbally on May 18, 1987.

Samples were prepared for motor oil and diesel fuel analysis by thorough mixing and subsequent extraction with methylene chloride; extraction, aided by sonication, was performed three successive times for each sample. Extracts were then combined, dried over sodium sulfate and concentrated in Kuderna-Danish apparatus. Extracts were then analyzed by capillary-column gas chromatography with flame ionization detection. Preparation and analysis of samples was accompanied by similar treatment of a method blank and a fortified sample. Response of the chromatographic system to calibration standards prepared with commercial motor oil and diesel fuel were compared with system response to samples for purposes of qualitative and quantitative interpretation.

Details of the analytical methodology are consistent with requirements specified in "Guidelines for Addressing Fuel Leaks," revised February, 1986, Regional Water Quality Control Board, San Francisco Bay Region; the preparation procedures used are described in detail in, "Sonication Extraction," Method 3550, in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA SW-846, 2nd edition, revised 1985.

Results of analyses are summarized below in Table 1. Please feel welcome to contact us should you have questions regarding procedures or results.

Submitted by:

Susan Joy Griffin
Project Chemist

Approved by:

Greg Anderson, Director
Analytical Laboratories

Encl: Custody Record

TABLE 1. SUMMARIZED ANALYTICAL TESTING RESULTS

| Parameter | Bottom of Tank 5-14-87 D. Liles (9310-1) | West Side of Tank 5-15-87 D. Liles (9310-2) |
|---|---|---|
| Extractable hydrocarbons as diesel fuel (mg/Kg)[a] | 430 ppm | <10 |
| Extractable hydrocarbons as motor oil (mg/Kg)[b] | 2,400 ppm | <10 |

[a]Data are expressed in units of milligrams diesel fuel per liter sample, as-received basis.
[b]Data are expressed in units of milligrams motor oil per liter sample, as-received basis.

9310

# CHAIN OF CUSTODY RECORD

LOCATION OF SAMPLING: ____ PRODUCER ✓ HAULER ____ DISPOSAL SITE

____ OTHER: Waste Oil
SAMPLE

SHIPPER NAME: ARCO

ADDRESS: 1260 Park St. Alameda, CA 94501
NUMBER STREET CITY STATE ZIP

COLLECTOR'S NAME Lorayne Lee TELEPHONE: (415) 633-0336
SIGNATURE

DATE SAMPLED 5-14-87 TIME SAMPLES 1400 HOURS 1/2

TYPE OF PROCESS PRODUCING WASTE Tank Removal

FIELD INFORMATION 2 Soil Samples waste oil below tank

SAMPLE RECEIVER:

1. Anatec, 435 Tesconi Circle, Santa Rosa, CA 9540
-NAME AND ADDRESS OF ORGANIZATION RECEIVING SAMPLE-

2. ____

3. ____

CHAIN OF POSSESSION:

1. [signature] Response Tech 5-15-87
SIGNATURE TITLE INCLUSIVE DATES

2. [signature] National Courier Systems Courier 5-15-87
SIGNATURE TITLE INCLUSIVE DATES

3. [signature] Sample Receiving Assistant 5-15-87
SIGNATURE TITLE INCLUSIVE DATES

FIGURE 2.0-3 COLLECTOR'S SAMPLE

EXAMPLE OF CHAIN OF CUSTODY RECORD

LABORATORIES INC.

435 Tesconi Circle • Santa Rosa, California 95401 • 707-526-7200

Rec'd 29 1987

Dan Heath
Crosby & Overton
8430 Amelia Street
Oakland, CA 94621

May 27, 1987
ANATEC Log No. 9347 (-1)
Series No: 356/008
Client Ref: Job # 694

Subject: ASAP Analysis of One Soil Sample Identified as "ARCO Station, 1260 Park, Alameda, CA" Received May 22, 1987.

SS#2112

Dear Mr. Heath:

Analysis of the sample referenced above has been completed. This report is written to confirm results transmitted verbally on May 26, 1987.

Sample delivery to the laboratory was conducted under chain-of-custody. On receipt, sample custody was transferred to ANATEC sample control personnel who subsequently documented receipt and condition of the sample and placed it in secured storage at 4 °C until analysis commenced.

The sample was prepared for extractable hydrocarbons measurement by thorough mixing and subsequent extraction with methylene chloride; extraction, aided by sonication, was performed three successive times. Extracts were then combined, dried over sodium sulfate and concentrated in Kuderna-Danish apparatus. Extracts were then analyzed by capillary-column gas chromatography with flame ionization detection. Preparation and analysis of the sample was accompanied by similar treatment of a method blank and a motor oil-fortified sample. Response of the chromatographic system to calibration standards prepared with commercial motor oil were compared with system response to the sample for purposes of qualitative and quantitative interpretation.

Details of the analytical methodology are consistent with requirements specified in "Guidelines for Addressing Fuel Leaks," revised February, 1986, Regional Water Quality Control Board, San Francisco Bay Region; the preparation procedures used are described in detail in, "Sonication Extraction," Method 3550 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U.S. EPA SW-846, 2nd edition, revised 1984.

Results of analysis are summarized in Table 1. Attached is the custody document. Please feel welcome to contact us should you have questions regarding procedures or results.

Submitted by:

Susan Joy Griffin
Project Chemist

Approved by:

Greg Anderson, Director
Analytical Laboratories

Encl: Custody Record

TABLE 1. SUMMARIZED RESULTS FOR "5/21/87 R CAMPBELL #2 FROM 6' DEPTH 1030" (ARCO STATION, 1260 PARK, ALAMEDA, CA) (ANATEC LAB NO. 9347-1)

| Parameter | Results (mg/Kg)[1] |
|---|---|
| (Extractable) Petroleum Hydrocarbons, as motor oil | <10 |

[1]Data are milligrams motor oil per kilogram sample, as-received basis.

1610 WEST 17th STREET LONG BEACH, CALIFORNIA 90813

# CHAIN OF CUSTODY RECORD

LOCATION OF SAMPLING: ____ PRODUCER ____ HAULER ____ DISPOSAL SITE

✓ OTHER: ARCO Station 1260 Park, Alameda
SAMPLE

SHIPPER NAME: Crosby & Overton

ADDRESS: 8430 Amelia St. Oakland CA 94621
NUMBER STREET CITY STATE ZIP

COLLECTOR'S NAME Mr. Campbell TELEPHONE: (415) 633-0336
SIGNATURE

DATE SAMPLED 5/21/87 TIME SAMPLES 1030 HOURS

TYPE OF PROCESS PRODUCING WASTE WASTE OIL TANK REMOVAL

FIELD INFORMATION
Secondary sample from 6 feet excavation

SAMPLE RECEIVER: Bruce G. Cunningham

1. [signature] AXIATE 5/21/87 1330
-NAME AND ADDRESS OF ORGANIZATION RECEIVING SAMPLE

2. ____

3. ____

HC waste oil per BC 5/22

CHAIN OF POSSESSION:

1. [signature] ____ ____
SIGNATURE TITLE INCLUSIVE DATES

2. [signature] ____ ____
SIGNATURE TITLE INCLUSIVE DATES

3. ____ ____ ____
SIGNATURE TITLE INCLUSIVE DATES

9347

FIGURE 2.0-3 COLLECTOR'S SAMPLE NO.

EXAMPLE OF CHAIN OF CUSTODY RECORD

Mailing Address: Box 5811
San Mateo, California 94402
Telephone 415 571 2400

Alameda County Health Department
470 27th Street
Oakland, California 94612
Attn: Ted Gerow

June 8,1987

Re: SS#2112, 1260 Park Blvd., Alameda,Ca.

Dear Mr. Gerow,

Enclosed are soil sample test results from the above-mentioned site. After removal of a waste oil tank, we obtained samples at the bottom of the excavation. All soil removed has been hauled to a Class I dump site and the excavation backfilled with clean sand.

If you have any questions, please call.

Sincerely,

Ellen Cianciaruli

cc:K.Schultheis

RECORD OF TELEPHONE CONVERSATION

DATE: 9-28-87 JOB:

| Individual | Organization | Telephone No. |
|---|---|---|
| FROM: S. Hetzneckar | Brown & Caldwell | 937-9010 |
| TO: MR. Gerow | Alameda Co Dept. of Health Ser. | 874-6434 |

SUBJECT: Arco Service Station 2112
1260 Park St, Alameda CA

NOTES:

According to information in the county file, specifically a letter dated June 16, 1987 from Ellen Cianiarula of Arco, says that the "dirty" soil was excavated and removed, and analysis shows the hole was excavated to cleanliness.

Mr. Gerow says everything looks ok as far as the county goes.

No further action at this point.

His only question is: will the site remain a service station?

(continued on bac

ACTIONS REQUIRED:

# ATTACHMENT 7

## IMPORTANT — THIS WEEK

"Those who flee temptation generally leave a forwarding address."
— LANE OLINGHOUSE

**1990 HOLIDAYS THIS MONTH**

Victory Day (R.I.) — 13th
Admission Day (Hawaii) — 17th

## THURSDAY 9 AUGUST

9108 - Conv w/ ARCO personnel re: problems w/ dealer - pulled off site
* 9920 - Met. Board of operation review w/ Denny 2112
9902 - Rev. system modification w/ Phil
9920 - coordinate soil disposal
9907 - Rev. RAE based on new well data

## FRIDAY 10 AUGUST

9640 - Spoke w/ (illegible) re: Permit Requirements/Conditions, rev w/ Phil
5902
5904 } Rev. docs w/ ARCO (Paul S.)
5910 } Forward draft comments to ESI for report final.
5911
9902 - Contact Paradise re: tank rep. schedule
9815 - Forward sampling report

## SATURDAY 11 AUGUST

## SUNDAY 12 AUGUST

# BARD MEMO

TO: Project File

Notified BAAQMD (Enforcement Div) of intent to aerate soil at site per Reg 8, Rule 40

Advise Denny to begin aeration B-10 or B-13

VW

9920-P

TOPS FORM 4151

# ATTACHMENT 8

ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS DIVISION
80 SWAN WAY, ROOM 200
OAKLAND, CA 94621
PHONE NO. 415/271-4320

OK
JH

#2160

COPY

# UNDERGROUND TANK CLOSURE/MODIFICATION PLANS

1. Business Name ARCO FAC No. 2112

   Business Owner Atlantic Richfield Company

2. Site Address 1260 Park Street (at Encinal)

   City Alameda Zip 94501 Phone (415) 865-7335

3. Mailing Address c/o Mr. Steve Weiss, 2000 Alameda de las Pulgas

   City San Mateo Zip 94403 Phone (415) 571-2400

4. Land Owner Atlantic Richfield Company (ARCO)

   Address 2000 Alameda de las Pulgas City, State San Mateo, CA Zip 94403

5. EPA I.D. No. CAC 000243393 (Temporary-Permanent Available - 3/12/90)

6. Contractor Gettler Ryan

   Address 1992 National Avenue

   City Hayward Phone (415) 783-7500

   License Type 'B' with Service Station Specialty ID# 220793

7. Consultant Gettler Ryan

   Address 1992 National Avenue

   City Hayward Phone (415) 783-7500

8. Contact Person for Investigation

Name Mr. Kyle Chrisey Title Environmental Engineer

Phone (415) 571-2400

9. Total No. of Tanks at facility 1

10. Have permit applications for all tanks been submitted to this office? Yes [XX] No [ ]

11. State Registered Hazardous Waste Transporters/Facilities

a) Product/Waste Tranporter

Name H & H Ship Service EPA I.D. No. CAD 004771168

Address 220 China Basin Street

City San Francisco State CA Zip 94107

b) Rinsate Transporter

Name same as above EPA I.D. No. _____

Address _____

City _____ State _____ Zip _____

c) Tank Transporter

Name same as above EPA I.D. No. _____

Address _____

City _____ State _____ Zip _____

Hauler Registration 0334

d) Tank Disposal Site

Name same as above EPA I.D. No. _____

Address _____

City _____ State _____ Zip _____

e) Contaminated Soil Transporter

Name _____ EPA I.D. No. _____

Address _____

City _____ State _____ Zip _____

12. Sample Collector

Name Doug Byron

Company Gettler Ryan

Address 1992 National Avenue

City Hayward State CA Zip 94545 Phone (415) 783-7500

13. Sampling Information for each tank or area

During tank removal, the sides and bottom of all excavations will be sampled.

| Tank or Area | | Material sampled | Location & Depth |
|---|---|---|---|
| Capacity | Historic Contents (past 5 years) | | |
| | | | |

14. Have tanks or pipes leaked in the past? Yes [ ] No [x]

If yes, describe. However, overspillage has resulted in soil contamination in the vacinity of existing underground storage tanks.

15. NFPA methods used for rendering tank inert? Yes [xx] No [ ]

If yes, describe. Dry Ice

An explosion proof combustible gas meter shall be used to verify tank inertness.

16. Laboratories

Name IT Analytical Labs

Address 2055 Junction Avenue

City San Jose State CA Zip 95030

State Certification No. 137

17. Chemical Methods to be used for Analysing Samples

| Contaminant Sought | EPA, DHS, or Other Sample Preparation Method Number | EPA, DHS, or Other Analysis Number |
|---|---|---|
| Gasoline | Standard Methods | Modified 8015 |

18. Submit Site Safety Plan

19. Workman's Compensation: Yes [XX] No [ ]

Copy of Certificate enclosed? Yes [XX] No [ ]

Name of Insurer REPUBLIC INDEMNITY

20. Plot Plan submitted? Yes [X] No [ ]

21. Deposit enclosed? Yes [XX] No [ ]

Submitted 1/25/90

22. Please forward to this office the following information within 60 days after receipt of sample results.

a) Chain of Custody Sheets

b) Original Signed Laboratory Reports

c) TSD to Generator copies of wastes shipped and received

d) Attachment A summarizing laboratory results

I declare that to the best of my knowledge and belief the statements and information provided above are correct and true. I understand that information in addition to that provided above may be needed in order to obtain an approval from the Department of Environmental Health and that no work is to begin on this project until this plan is approved.

I understand that any changes in design, materials or equipment will void this plan if prior approval is not obtained.

I understand that all work performed during this project will be done in compliance with all applicable OSHA (Occupational Safety and Health Administration) requirements concerning personnel and safety.

I will notify the Department of Environmental Health at least two (2) working days (48 hours) after approval of this closure plan in advance to schedule any required inspections. I understand that site and worker safety are solely the responsibility of the property owner or his agent and that this responsibility is not shared nor assumed by the County of Alameda.

Signature of Contractor

Name (please type) DAVID A. BYRON

Signature _____

Date 3-5-90

Signature of Site Owner or Operator

Name (please type) Atlantic Richfield Company

Signature Stan W Hedrick Barghausen Consulting Engineers, In
Agent for ARCO

Date 2-22-90

NOTES:

1. Any changes in this document must be approved by this Department.

2. Any leaks discovered must be submitted to this office on an underground storage tank unauthorized leak/contamination site report form within 5 days of its discovery.

3. Three (3) copies of this plan must be submitted to this Department. One copy must be at the construction site at all times.

4. After approval of plan, notification of at least two (2) working days (48 hours) must be given to this Department prior to removal of tank(s).

5. A copy of your approved plan must be sent to the landowner.

6. Triple rinse means that:

   a) Final rinse must contain less than 100 ppm of Gasoline (EPA method 8020 for soil, or EPA method 602 for water) or Diesel (EPA method 418.1). Other methods for halogenated volatile organics (EPA method 8010 for soil, EPA method 601 for water) may be required. The composition of the final rinse must be demonstrated by an original or facsimile report from a laboratory certified for the above analyses.

   b) Tank interior is shown to be free from deposits or residues upon a visual examination of tank interior.

   c) Tank should be labelled as "tripled rinsed; laboratory certified analysis available upon request" with the name and address of the contractor.

If all the above requirements cannot be met, the tank must be transported as a hazardous waste.

7. Any cutting into tanks requires local fire department approval.

# UNDERGROUND TANK CLOSURE/MODIFICATION PLANS

## ATTACHMENT A

## SAMPLING RESULTS

| Tank or Area | Contaminant | Location & Depth | Results (specify units) |
|---|---|---|---|
| | | | |

## INSTRUCTIONS

2. SITE ADDRESS
Address at which closure or modification is taking place.

5. EPA I.D. NO.
This number may be obtained from the State Department of Health Services, 916/324-1781.

6. CONTRACTOR
Prime contractor for the project.

7. OTHER
List professional consultants here.

12. SAMPLE COLLECTOR
Persons who are collecting samples.

13. SAMPLING INFORMATION
Historic contents - the principal product(s) used in the last 5 years.

Material sampled - i.e., water, oil, sludge, soil, etc.

16. LABORATORIES
Laboratories used for chemical and geotechnical analyses.

17. CHEMICAL METHODS:
All sample collection methods and analyses should conform to EPA or DHS methods.

Contaminant - Specify the chemical to be analyzed.

Sample Preparation Method Number - The means used to prepare the sample prior to analyses - i.e., digestion techniques, solvent extraction, etc. Specify number of method and reference if not an EPA or DHS method.

Analysis Method Number - The means used to analyze the sample - i.e., GC, GC-MS, AA, etc. Specify number of method and reference if not a DHS or EPA method.

NOTE:
Method Numbers are available from certified laboratories.

18. SITE SAFETY PLAN
A plan outlining protective equipment and additional specialized personnel in the event that significant amount of hazardous materials are found. The plan should consider the availability of respirators, respirator cartridges, self-contained breathing apparatus (SCBA) and industrial hygienists.

19. ATTACH COPY OF WORKMAN'S COMPENSATION

20. PLOT PLAN

The plan should consists of a scaled view of the facility at which the tank(s) are located and should include the following information:

a) Scale

b) North Arrow

c) Property Line

d) Location of all Structures

e) Location of all relevant existing equipment including tanks and piping to be removed

f) Streets

g) Underground conduits, sewers, water lines, utilities

h) Existing wells (drinking, monitoring, etc.)

i) Depth to ground water

j) All existing tanks in addition to the ones being pulled

rev. 9/88
mam

# ACORD CERTIFICATE OF INSURANCE

04/02/90

COUPRIE & COOK INSURANCE SERVICES
P.O. BOX 1030
PLEASANTON, CA. 94566

GETTLER-RYAN, INC.
1992 NATIONAL AVENUE
HAYWARD, CA. 94545-1767

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

## COMPANIES AFFORDING COVERAGE

A — AMERICAN STATES INS.
B — DEANS & HOMER
C — AMERICAN INTERNATIONAL
D — DEANS & HOMER
E — NATIONAL INDEMNITY

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

| | TYPE OF INSURANCE | POLICY NUMBER | POLICY EFFECTIVE DATE | POLICY EXPIRATION DATE | ALL LIMITS IN THOUSANDS |
|---|---|---|---|---|---|
| C | GENERAL LIABILITY<br>X COMMERCIAL FORM<br>X OCCURRENCE | OLS407248 | 04/01/89 | 04/01/90 | $2,000<br>$1,000<br>$1,000<br>$1,000<br>$ 200<br>$ 5 |
| A | AUTOMOBILE LIABILITY<br>X ANY AUTO<br>X ALL OWNED AUTOS<br>X HIRED AUTOS<br>NON-OWNED AUTOS | OICC393297-10 | 04/01/89 | 04/01/90 | $ 2,000<br>$<br>$<br>$ |
| B | EXCESS LIABILITY<br>X UMBRELLA FORM | 47895466 | 04/01/89 | 04/01/90 | $ 1,000 $ 1,000 |
| E | WORKERS COMPENSATION AND EMPLOYERS LIABILITY<br>OTHER | PU994725 | 04/01/89 | 04/01/90 | $ 1,000<br>$ 1,000<br>$ 1,000 |

DESCRIPTIONS OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY IS NAMED AS AN ADDITIONAL INSURED AS RESPECTS WORK PERFORMED BY GETTLER-RYAN, INC.

ALAMEDA COUNTY HEALTH CARE
SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIAL DIVISION
80 SWAN WAY, ROOM 200
OAKLAND, CA. 94621

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE