RESNA
Working To Restore Nature

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ADDITIONAL ONSITE AND INITIAL OFFSITE SUBSURFACE INVESTIGATION

at

ARCO Station 2035
1001 San Pablo Avenue
Albany, California

69036.07

Report prepared for

ARCO Products Company
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by

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For ARCO Products Company

INTRODUCTION

At the request of ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) performed an additional onsite and initial offsite subsurface investigation at ARCO Station 2035 located at 1001 San Pablo Avenue in Albany, California. This investigation was initiated in response to the results of previous investigations conducted at the site. The purpose of this investigation was to further evaluate the lateral extent of hydrocarbon impacted soil and groundwater in the southern portion of the site and in the downgradient (western) vicinity of the site; and to evaluate the groundwater gradient and flow direction of the first water-bearing zone beneath the site.

The work performed for this investigation was performed in accordance with the Work Plan (RESNA/AGS, April 29, 1991) and Addendum Three to Work Plan (RESNA, May 28, 1992), which were approved by the Alameda County Health Care Services Agency (ACHCSA) prior to commencement of this investigation. Installation of two additional groundwater monitoring wells (MW-4 and MW-5) in the southern portion of the site, not included in the Addendum Three to Work Plan, was approved by Mr. Barney Chan of ACHCSA during a meeting held at ACHCSA on September 30, 1992. All proposed borings except two offsite groundwater monitoring wells MW-7 and MW-8 were installed during this investigation. Proposed well MW-7 was to be located on the northwestern corner of the

intersection of San Pablo and Marin Avenues (crossgradient of ARCO site). This well was not installed because planned reconstruction of the intersection by CalTrans in the near future could damage or destroy the well. Proposed well MW-8 was to be located across Marin Avenue to the northeast (generally upgradient of ARCO site). This well was not installed because our inspection of the site prior to drilling indicated that three groundwater monitoring wells already exist in the vicinity of proposed MW-8. A search of ACHCSA records indicated that these three wells belong to a Shell Station located across Marin Avenue and north of the subject site, at 999 San Pablo Avenue. The Shell Station site is listed by the State Water Resources Control Board (SWRCB) in the Report on Releases of Hazardous Substances from Underground Storage Tanks (SWRCB, January 1992, Report 92-2WP, Page 2 of Table 4). The data collected during the record search was used to evaluate the extent of hydrocarbon impacted soil and groundwater north (generally crossgradient) of the subject site.

The work performed for this investigation included drilling three soil borings (B-20 through B-22); collecting and describing soil samples from the borings; constructing two onsite groundwater monitoring wells (MW-4 and MW-5) and one offsite groundwater monitoring well (MW-6) in soil borings B-20 through B-22, respectively; developing and sampling groundwater monitoring wells; surveying wellhead elevations; submitting selected soil and groundwater samples for laboratory analyses; obtaining and reviewing aerial photographs to identify potential offsite sources; performing a record search of environmental data for a Shell Station located at 999 San Pablo Avenue on file at the ACHCSA to evaluate the extent of impacted soil and groundwater in the northern vicinity of the subject site; and preparing this report presenting field procedures, results and conclusions.

SITE DESCRIPTION AND BACKGROUND

General

ARCO Station 2035 is an operating service station located at the southeast corner of the intersection of Marin and San Pablo Avenues at 1001 San Pablo Avenue in Albany, California. The location of the site is shown on Plate 1, Site Vicinity Map. The site is a relatively flat, asphalt-and concrete-covered lot. The site is bounded by Marin Avenue and

an operating Shell Station to the north, by San Pablo Avenue and the Agricultural Research Station of the University of Berkeley to the west, an auto repair shop to the south, and residential homes to the east. The site vicinity is shown on Plate 2, Site and Vicinity Plan. Four underground gasoline-storage tanks (USTs) were excavated and removed from the northeastern portion of the site in July and August 1991, including one 6,000-gallon UST (T1), two 4,000-gallon USTs (T2 and T3), and one 10,000-gallon UST (T4). A 550-gallon waste-oil tank was removed from the east-central portion of the site in 1977 during ARCO's conversion of the station to a mini-market. Four new 10,000 gallon USTs were placed in a new pit situated in the southeastern portion of the site. The approximate locations of the former and existing USTs, former waste-oil tank, and other pertinent features at the site are shown on Plate 3, Generalized Site Plan.

Geology and Hydrogeology

ARCO Station 2035 is located within the East Bay Plain in the north-central portion of the Berkeley Alluvial Plain (Hickenbottom and Muir, 1988). The active Hayward Fault is situated approximately 2 miles east of the site. Helley et al. (1979) mapped the earth materials underlying the site area as older Quaternary alluvial deposits composed of a heterogeneous mixture of poorly consolidated to unconsolidated clay, silt, sand and gravel. The site is less than 1,200 feet north of Codornices Creek and approximately 1 mile east of Fleming Point on the eastern shoreline of the San Francisco Bay. The direction of groundwater flow in the vicinity of the site is inferred to be to the west-southwest, based on regional and local topography and drainage patterns.

PREVIOUS WORK

Results of previous subsurface environmental investigations performed at the site are summarized in Appendix A. Locations of borings and monitoring wells are shown on Plate 3. Results of groundwater monitoring and laboratory analyses of soil and groundwater from this and previous investigations at the site are included in Tables 1 through 3.

RECORD SEARCH

Aerial photographs of the subject site and surrounding area taken in 1957, 1969, 1979 and 1988 were obtained from Pacific Aerial Surveys of Oakland, California (Pacific, 1957, 1969, 1979 and 1988). Based on RESNA's review of these photographs it appears that the property located north, across Marin Avenue (at 999 San Pablo Avenue) and crossgradient to the subject site has been a gasoline station since at least 1947. Recently this property has been an operating Shell Service Station.

A record search of subsurface environmental data for the Shell Station located at 999 San Pablo Avenue on file at the ACHCSA, was conducted to attempt to evaluate the extent of gasoline hydrocarbons in soil and groundwater in the northern vicinity of ARCO site. The record search indicated that several subsurface investigations were performed at the Shell Station by GeoStrategies Inc. of Hayward, California (GSI) and other consultants after a fuel leak was detected in 1989 in the vicinity of USTs located in the northern portion of the property. Seven groundwater monitoring wells were installed for the Shell site by GSI, including well S-5 situated in Marin Avenue directly north of ARCO site; and wells S-4 and S-6 situated in Marin Avenue directly southeast and south, respectively, of the Shell site. As mentioned previously, because groundwater monitoring well S-6 is located where a well designated as MW-8 was proposed, it was decided that subsurface data from the environmental investigations performed for the Shell Station could be used to evaluate the presence and extent of gasoline hydrocarbons in the north and crossgradient of the ARCO site.

Results of the subsurface investigations for the Shell Station indicated that significant concentrations of gasoline hydrocarbons are present in soil (up to 1,900 parts per million [ppm]) and groundwater (up to 20,000 parts per billion [ppb]) beneath the Shell site and to the south. Based on this information and a local west-southwest flow direction, it appears the Shell site is a likely source of hydrocarbons detected beneath the northern portion of Marin Avenue and might be a secondary source of hydrocarbons detected beneath the southern portion of Marin Avenue and the northwestern portion of the ARCO site. The northwestern corner of the intersection of Marin and San Pablo Avenues, where proposed well MW-7 was to be located is situated directly downgradient of the Shell site. Therefore,

it appears that Shell has the responsibility of evaluating the presence of gasoline hydrocarbons at this location. The data collected during the record search including soil analyses data, groundwater monitoring data, GSI's cross sections and gradient map are included in Appendix B.

FIELD WORK

Drilling

Field work at the site was conducted in accordance with RESNA field protocol and Site Safety Plan (RESNA, November 20, 1992). A description of the field methods and Site Safety Plan is included in Appendix C. A well construction permit was acquired from the Alameda County Flood Control and Water Conservation District, Zone 7 (ACFCWCD) prior to drilling at the site. A copy of the permit is included in Appendix D. On November 24 and 25, 1992, two onsite (B-20 and B-21) and one offsite (B-22) soil borings were drilled, and two onsite (MW-4 and MW-5) and one offsite (MW-6) groundwater monitoring wells were constructed in borings B-20 through B-22, respectively. The locations of these borings/wells are shown on Plate 3. Drilling was performed by Bayland Drilling, Inc. of Menlo Park, California, using a mobil rig CME 75 and 8-inch-diameter (B-22) and 10-inch-diameter (B-20 and B-21) hollow-stem augers.

Soil borings B-20 and B-21 were drilled in the southern portion of the subject site. Soil boring B-22 was drilled on the western side of San Pablo Avenue, downgradient of the former USTs at the site. Groundwater monitoring wells MW-4 through MW-6 were installed in borings B-20 through B-22, respectively, to investigate the presence and extent of gasoline hydrocarbons in the soil and groundwater in the southern portion of the site and in the downgradient vicinity of the site, and to further evaluate the gradient and flow direction of the first water-bearing zone beneath the site.

Soil boring B-20 was drilled to a depth of approximately 29 feet, and soil borings B-21 and B-22 were drilled to a depth of approximately 26½ feet.

Soil Sampling and Description

Nineteen soil samples were collected from soil borings B-20 through B-22. The Unified Soil Classification System, as summarized on Plate 4, was used to identify the soil encountered during drilling. The description of soil encountered in the borings is presented on the Logs of Borings, Plates 5 through 10. Soil samples from the borings were collected at intervals of 5 feet or less from the ground surface to the total depth in the borings. Sampling procedures are described in Appendix C. Field monitoring of organic vapor concentrations in soil samples was performed during drilling using an organic vapor meter (OVM), which provides order of magnitude field measurements only.

Soil cuttings generated from the borings were placed on and covered with plastic sheeting onsite along the southern property line pending proper disposal. After drilling was completed on November 25, 1992, four soil samples were collected from the stockpile and submitted for compositing and laboratory analyses. Stockpile sampling methods are described in Appendix C.

Well Construction and Development

Two onsite (MW-4 and MW-5) and one offsite (MW-6) groundwater monitoring wells were constructed in borings B-20 through B-22, respectively. The onsite groundwater monitoring wells were completed with 4-inch-diameter, Schedule 40, polyvinyl chloride (PVC) casing. Well casings were set in well MW-4 to 25½ feet and in well MW-5 to 25 feet. The screened casings for the onsite wells consisted of 4-inch-diameter, 0.02 inch-wide machine-slotted PVC that was set from the total depths of the wells to approximately 8½ feet below the ground surface. Offsite groundwater monitoring well MW-6 was completed with 2-inch-diameter, Schedule 40, polyvinyl chloride (PVC) casing. Well casing was set in this well to 25 feet. The screened casing for well MW-6 consisted of 2-inch-diameter, 0.02 inch-wide machine-slotted PVC that was set from the total depth of the well to approximately 8 feet below the ground surface.

Groundwater monitoring wells MW-4 through MW-6 were developed on December 1, 1992, to remove fine-grained sediments and to allow better communication between the water-

bearing zone and the well. Development was performed using a combination of a surge block and bailing techniques. Details regarding well construction are described in Appendix C.

Groundwater Level Measuring and Sampling

Wells MW-1 through MW-3 and RW-1 were monitored on December 16, 1992, and newly installed groundwater monitoring wells MW-4 through MW-6 were monitored in conjunction with monthly monitoring of wells MW-1 through MW-3 and RW-1 on January 13 and February 22, 1993, by EMCON Associates of San Jose, California. Depth-to-water levels (DTW) were measured in the site wells and water samples were collected and visually inspected for floating product. Groundwater monitoring wells MW-1 through MW-6 were purged and sampled on January 13, 1993. Recovery well RW-1 was not sampled because floating product was present in the product skimmer, which was previously installed in the well.

Wellhead Survey

The wellheads for groundwater monitoring wells MW-4 through MW-6 were surveyed to a local National Geodetic Vertical Datum benchmark on January 16, 1993, by John E. Koch, a California licensed land surveyor. The results of this wellhead survey are included in Appendix E, Wellhead Survey.

LABORATORY METHODS

Soil Samples

Nine soil samples collected from borings B-20 through B-22 were analyzed in accordance with ACHCSA requirements for the gasoline constituents benzene, toluene, ethylbenzene, total xylenes (BTEX) and total petroleum hydrocarbons as gasoline (TPHg) using Environmental Protection Agency (EPA) Methods 5030/8015/8020. The analyses were performed by Sequoia Analytical in Redwood City, California (Hazardous Waste Testing

Laboratory Certification # 1210). Soil samples from the borings were selected for laboratory analyses based on:

- Location above first-encountered groundwater;
- Location in a potential confining or perching layer below first-encountered groundwater; and
- Areas where the presence of gasoline hydrocarbons was suspected;

Soil samples collected from the soil stockpile were composited by the laboratory and analyzed for TPHg and BTEX using EPA Method 5030/8015/8020.

Groundwater Samples

Water samples collected from monitoring wells MW-1 through MW-6 were analyzed under the direction of EMCON for BTEX and TPHg using EPA Methods 5030/8020/California DHS LUFT Method. In addition, the groundwater sample collected from MW-3, located next to the former waste-oil tank pit, was analyzed for total oil and grease (TOG) using EPA Standard Methods 5520 C and F. The analyses were performed by Columbia Analytical Services, Inc. of San Jose, California (Hazardous Waste Testing Laboratory Certification No. 1426).

FIELD WORK RESULTS

Drilling Observation

The earth materials encountered at the site during this investigation generally consisted of a fine-grained sandy silt to clay unit overlying a coarser-grained clayey gravel and clayey to gravelly sand unit.

The fine-grained unit of sandy silt to clay was encountered immediately below the ground surface in borings B-20 through B-22 and extended to depths of approximately 6 to 8 feet.

The coarser-grained unit of clayey gravel interbedded with clayey to gravelly sand was encountered beneath the fine-grained unit. Groundwater was encountered in the coarser-grained unit at depths between approximately 13 and 14 feet in these borings. Groundwater stabilized during drilling at a depth of 11½ feet in borings B-20 and B-21, and at a depth of approximately 13½ feet in boring B-22. A stratum of moist to damp clayey silt, which may be a perching or confining layer, was encountered at approximate depths between 25 and 25½ feet in borings B-20 through B-22 and extended to the total depths of borings B-21 and B-22 and to 27 feet in boring B-20. A layer of damp gravelly sand was encountered beneath clayey silt in boring B-20 and extended to a total depth of this boring. Drilling observations are summarized in the logs of borings, shown on Plates 5 through 10. Graphic interpretations of soil stratigraphy beneath the site based on this and previous investigations are shown on geologic Cross Sections A-A', B-B', C-C' and D-D' (Plates 11 through 14). The locations of the surface areas depicted on the cross sections are shown on Plate 3.

OVM measurements of all soil samples from borings B-20 through B-22 were nondetectable. OVM readings are shown on the borings logs (Plates 5 through 10) in the column labeled PID (photoionization detector). OVM readings are considered to be order of magnitude field measurements only.

Subjective Groundwater Analyses

According to EMCON's Field Reports and Water Sample Field Data Sheets (see Appendix F), water samples collected for subjective analyses from wells MW-1 through MW-3 on December 16, 1992, and from wells MW-1 through MW-6 on January 13 and February 22, 1993, showed no evidence of floating hydrocarbon product. Recovery well RW-1 contained 0.51 feet and 0.01 feet of floating product on December 16, 1992, and February 22, 1993, respectively. On January 13, 1993, no evidence of floating product was noted in groundwater from RW-1, but floating product was present in the product skimmer. DTW measurements and subjective analyses results for floating product in groundwater are included in Table 1, Cumulative Groundwater Monitoring Data. The results of EMCON's field work on the site, including DTW measurements, well purge data sheets, and subjective analyses for the presence of floating product in the groundwater in the onsite wells are

presented on EMCON's Field Reports and Water Sample Field Data Sheets and EMCON's Summary of Groundwater Monitoring Data. These data are included in Appendix F.

Groundwater Gradient and Flow Direction

EMCON's DTW measurements were used to calculate groundwater elevations, which were used to evaluate groundwater gradient and flow direction. Groundwater elevations for the wells that did not contain floating product were calculated by subtracting the DTW from the top of casing (TOC) elevation. Groundwater elevation for the recovery well RW-1, which contained floating product, was calculated by multiplying the product thickness in feet by 0.8 and subtracting the corrected elevation from the original DTW measurement, and then subtracting the corrected DTW from the TOC elevation. The DTW measurements, TOC elevations, calculated groundwater elevations, and evidence of product are presented in Table 1.

Based on the December 16, 1992, January 13, 1993, and February 22, 1993, DTW levels the average groundwater gradient for the first-encountered groundwater beneath the subject site was approximately 0.02. The groundwater flow direction was toward the west-southwest during December and January and toward the west during February. This gradient and flow direction is generally consistent with those previously interpreted for the site and the regional flow direction. Plates 15 through 17, Groundwater Gradient Maps, are graphic interpretations of the groundwater gradients and flow directions on December 16, 1992, and January 13 and February 22, 1993.

LABORATORY ANALYSES RESULTS

Soil Samples

Laboratory analytical results of soil samples from borings B-20 through B-22 indicated nondetectable TPHg (less than 1 part per million [ppm]), and nondetectable BTEX (less than 0.0050 ppm).

Laboratory analytical results of composite soil sample S-1125/SPA-D collected from the soil stockpile indicated nondetectable TPHg and BTEX. On December 8, 1992, the soil stockpile was removed from the site and transported to BFI Landfill in Livermore by ARCO's contractor, Dillard Trucking Inc. of Byron, California.

The results of soil samples analyses are summarized in Table 2, Cumulative Results of Laboratory Analyses of Soil Samples. Graphic interpretations of TPHg concentrations in soil beneath the subject site and the Shell site, at depths ranging from 4½ to 6 feet, 9 to 12 feet, and 13 to 16 feet are shown on Plates 18 through 20, respectively. The highest concentrations of TPHg in soil are present between depths of 9 and 12 feet below ground surface (Plate 19). Concentrations of TPHg, TPHd, and TOG in soil beneath the subject site are also shown graphically on the geologic cross sections, Plates 11 through 14. Chain of Custody Records and copies of laboratory reports for soil samples collected during this investigation are included in Appendix G. The analytical results for soil samples collected by GSI for the Shell site are included in Appendix B.

Groundwater Samples

Laboratory analytical results for water samples collected in January 1993 indicated TPHg was detected at a concentration of 430 parts per billion (ppb) in the sample from well MW-1, but was nondetectable (less than 50 ppb) in the samples from wells MW-2 through MW-6. Benzene was detected at concentrations of 130 ppb and 1.1 ppb in samples from wells MW-1 and MW-3, respectively, but was nondetectable (less than 0.5 ppb) in samples from wells MW-2 and MW-4 through MW-6. Toluene, ethylbenzene and total xylenes (TEX) concentrations were either nondetectable (less than 0.5 ppb) or relatively minor (less than 9 ppb) in wells MW-1 through MW-6. The laboratory analytical results for water samples collected from groundwater monitoring well MW-3, located next to the former waste-oil tank pit indicated TOG was detected at concentrations of 780 ppb (SM 5520C) and 1,100 ppb (SM 5520F). These results are summarized in Table 3, Cumulative Results of Laboratory Analyses of Water Samples - TPHg and BTEX; and Table 4, Cumulative Results of Laboratory Analyses of Water Samples - TPHd, TOG, VOC, SVOC, PCB and Metals. Chain of Custody records and laboratory analyses reports for groundwater samples are included in Appendix F. Graphic interpretations of the extent of TPHg and benzene in the

groundwater are shown on Plate 21, TPHg/Benzene Concentrations in Groundwater. The highest TPHg concentrations are present in MW-1 in the northeastern corner of the site, northeast of the former USTs.

SUMMARY AND CONCLUSIONS

RESNA concludes the following, based on the results of this investigation:

- The presence of gasoline impacted soil appears to be limited to the northern and eastern portions of the site and northern (upgradient) vicinity of the site. The highest concentrations of gasoline hydrocarbons in soil appear to be at depths between 9 and 12 feet, within silty to gravelly clay interbedded with discontinuous layers of clayey to sandy gravel and clayey sand. Gasoline hydrocarbons appear to have migrated laterally in the capillary fringe zone above the first encountered groundwater.

- The lateral extent of gasoline hydrocarbons in the soil appears to have been delineated to nondetectable or less than 10 ppm TPHg, with the exception of the northern and eastern vicinity of the site. The vertical extent of gasoline hydrocarbons in the soil at the site appears to have been delineated based on soil samples collected from unsaturated confining or perching layers beneath the local water-bearing zone.

- Groundwater in the first encountered water bearing zone is impacted by gasoline hydrocarbons as indicated by the presence of floating product in recovery well RW-1, and 430 ppb TPHg detected in the water sample from groundwater monitoring well MW-1. The groundwater at the site appears to have been impacted by waste-oil related hydrocarbons based on the presence of TOG (1,100 ppb) in monitoring well MW-3, located next to the former waste-oil tank pit.

- The lateral extent of gasoline hydrocarbons in the groundwater appears to have been delineated to the west (wells MW-2 and MW-6), southwest (well MW-4) and southeast (well MW-5) of the site.

- Information obtained from aerial photographs dated from 1947 to 1988 indicate that the property located to the north, across Marin Avenue at 999 San Pablo Avenue, and crossgradient of the subject site has been an active gasoline station (presently owned by Shell) since at least before 1947. The Shell Station site is listed by the SWRCB in the Report on Releases of Hazardous Substances from Underground Storage Tanks (SWRCB, January 1992, Report 92-2WP, Page 2 of Table 4). Information on file with the ACHCSA indicates that a gasoline leak was detected at the Shell site in 1989, and high concentrations of gasoline hydrocarbons had been detected in the soil (up to 1,900 ppm TPHg) and groundwater (up to 20,000 ppb TPHg) beneath this site. Based on this information and a local west-southwest flow direction, it appears the Shell site is a likely source of hydrocarbons detected beneath the northern portion of Marin Avenue and might be a secondary source of hydrocarbons detected beneath the southern portion of Marin Avenue and the northwestern portion of the ARCO site.

- The northwestern corner of the intersection of Marin and San Pablo Avenues, where proposed well MW-7 was to be located, is situated directly downgradient of the Shell site. Therefore, it appears that Shell has the responsibility of evaluating the presence of gasoline hydrocarbons at this location.

LIMITATIONS

This report was prepared in accordance with generally accepted standards of environmental geological practice in California at the time this investigation was performed. This assessment was conducted solely for the purpose of evaluating environmental conditions of the soil and groundwater with respect to gasoline and waste-oil related hydrocarbons at the site. Groundwater monitoring field procedures and acquisition of groundwater data were performed under the direction of EMCON. With respect to groundwater monitoring, RESNA's scope of work was limited to interpretation of EMCON's field and laboratory data. No soil engineering or geotechnical references are implied or should be inferred. Evaluation of the geologic conditions at the site for the purpose of this assessment is made from a limited number of observation points. Subsurface conditions may vary away from the data points available.

DISTRIBUTION

It is recommended that copies of this report be sent to the following regulatory agencies:

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Mr. Barney Chan
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Oakland, California 94621

REFERENCES

AGS January 24, 1990. Limited Environmental Site Assessment at ARCO Station 2035. AGS 96036-1.

Helley, E.S., K.R. Lajoie, W.E. Spangle, and M.L. Blair. 1979. Flatland Deposits of the San Francisco Bay Region, California. U.S. Geological Survey Professional Paper 943.

Hickenbottom, K. and K. Muir. 1988. Geohydrology and Groundwater-Quality Overview, East Bay Plain Area, Alameda County, California. Alameda County Flood Control and Water Conservation District 205(J) Report.

RESNA/AGS April 29, 1991. Work Plan for Subsurface Investigations and Remediation at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California. AGS 69036.02.

RESNA/AGS April 29, 1991. Addendum One to Work Plan at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California. AGS 69036.02

RESNA/AGS September 11, 1991. Underground Gasoline-Storage Tank Removal and Replacement. AGS 69036.03.

RESNA/AGS September 24, 1991. Addendum Two to Work Plan at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California. AGS 69036.02

RESNA March 6, 1992. Subsurface Environmental Investigations and Pump Test at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California. 69036.02.

RESNA May 4, 1992. Letter Report, Quarterly Groundwater Monitoring First Quarter 1992 at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California. 69036.04

RESNA May 29, 1992. Addendum Three to Work Plan at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California. AGS 69036.05

RESNA September 28, 1992. Letter Report, Quarterly Groundwater Monitoring Second Quarter 1992 at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California. 69036.04

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RESNA November 20, 1992. Site Safety Plan for the ARCO Service Station 2035, 1001 San Pablo Avenue, Albany, California. AGS 69036.07S.

RESNA November 30, 1992. Additional Subsurface Environmental Investigation and Vapor Extraction Test at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California. 69036.05

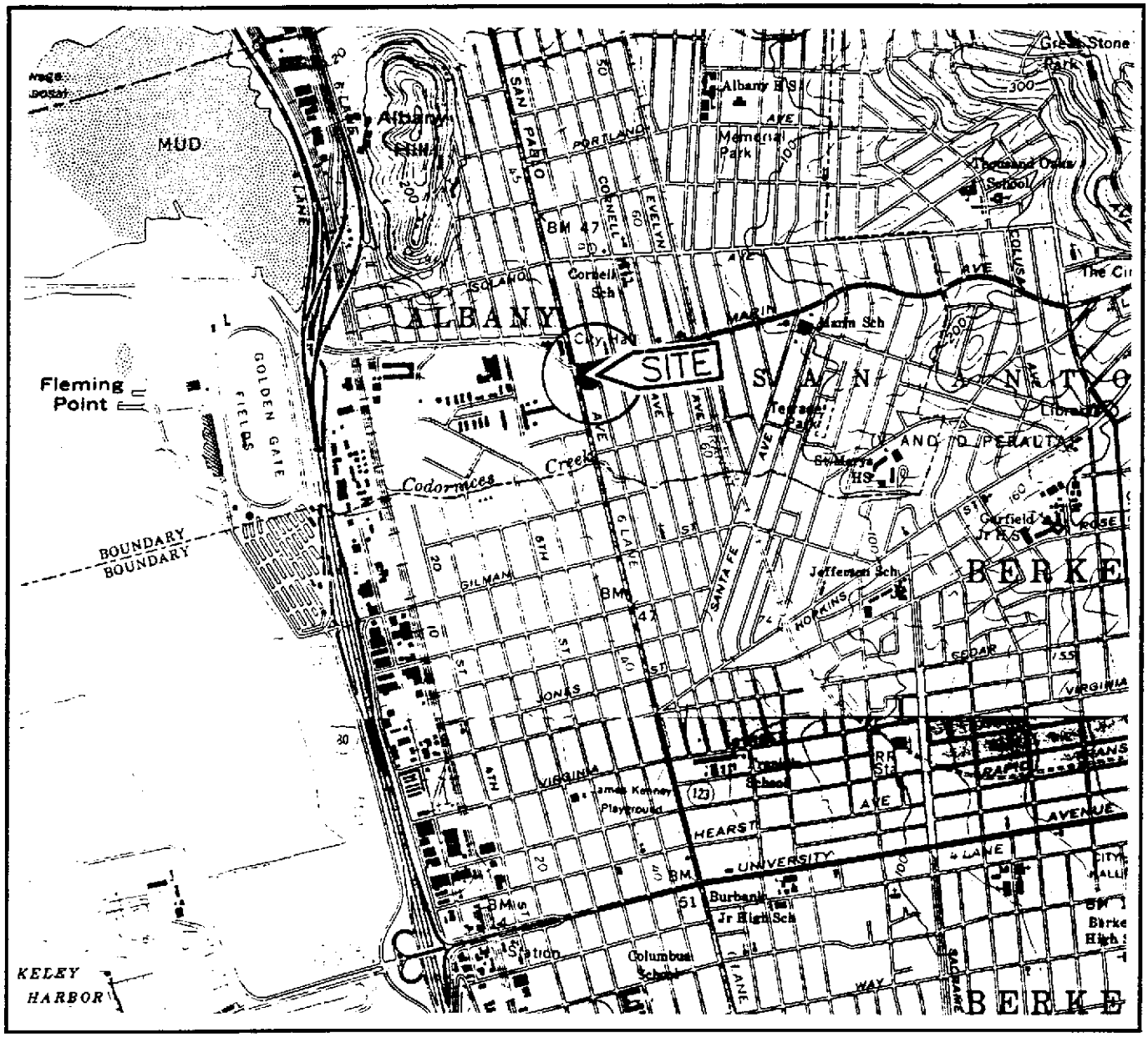
RESNA November 30, 1992. Letter Report, Quarterly Groundwater Monitoring Third Quarter 1992 at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California. 69036.04

RESNA March 16, 1993. Letter Report, Quarterly Groundwater Monitoring Fourth Quarter 1992 at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California. 69036.04

State Water Resources Control Board, January 1992. Report on Releases of Hazardous Substances from Underground Storage Tanks. 92-2WP

AERIAL PHOTOGRAPHS

Date	Agency	Type	No.	Scale
03-24-47	Pacific Aerial Surveys	Black and White	AV-11-4-8	1:20,000
09-06-49	Pacific Aerial Surveys	Black and White	AV-28-11-27	1:7,200
05-03-57	Pacific Aerial Surveys	Black and White	AV-253-7-15	1:12,000
05-02-69	Pacific Aerial Surveys	Black and White	AV-902-7-12	1:12,000
05-02-69	Pacific Aerial Surveys	Black and White	AV-902-7-12	1:12,000
09-06-79	Pacific Aerial Surveys	Black and White	AV-1750-7-1	1:12,000
08-03-88	Pacific Aerial Surveys	Black and White	AV-3368-6-16	1:12,000



Base: U.S. Geological Survey
7.5–Minute Quadrangles
Richmond/Oakland West, California.
Photorevised 1980

LEGEND

◉ = Site Location

Approximate Scale

2000 1000 0 2000 4000

feet

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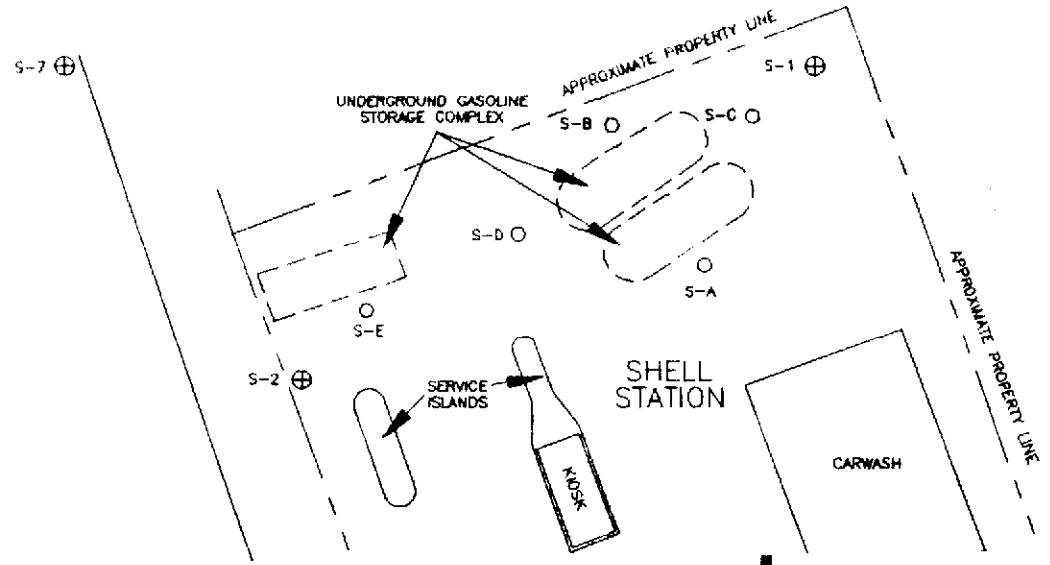
SITE VICINITY MAP
ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE
1



B-22/MW-6 = Monitoring well (RESNA, October 1991 and November 1992)

B-13 = Soil boring (RESNA, Aug. 1989, June 1991, and Aug. 1992)

S-C = Soil boring at Shell site

S-7 = Monitoring well at Shell site

N

Approximate Scale

40 20 0 40 80

feet

Source: Revised GeoStrategies Inc. map for job 7666.
Arco site surveyed by John E. Koch, Land Surveyor.

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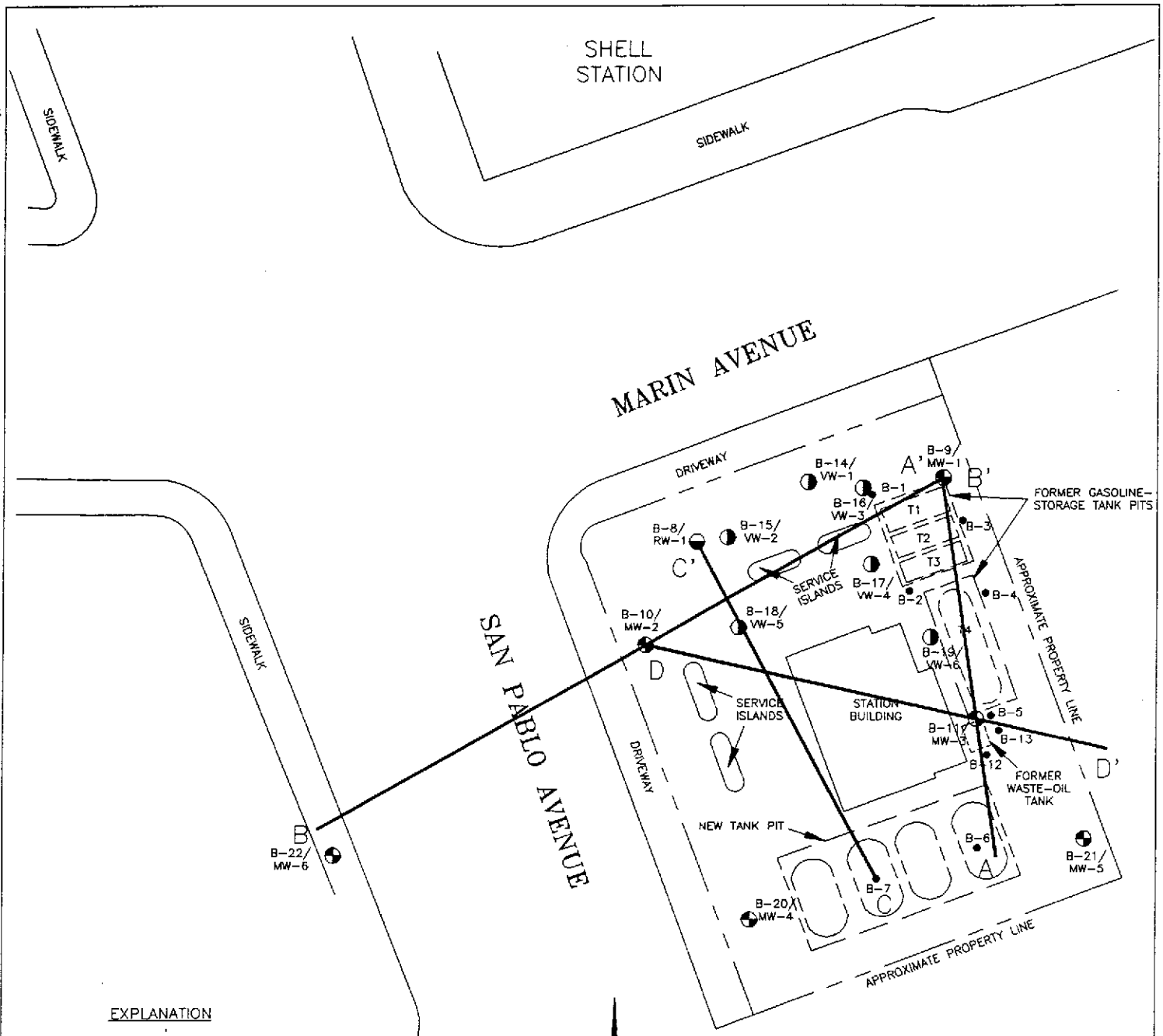
AREAL SITE MAP
ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE
2



EXPLANATION

B-19/VW-6 = Vapor extraction well (RESNA, Aug. 1992)

B-8/RW-1 = Recovery well (RESNA, October 1991)

B-22/MW-6 = Monitoring well (RESNA, October 1991 and November 1992)

B-13 = Soil boring (RESNA, Aug. 1989, June 1991, and Aug. 1992)

D D' = Geologic cross section

N

Approximate Scale

40 20 0 40 80

feet

Source: Surveyed by John E. Koch, Land Surveyor.

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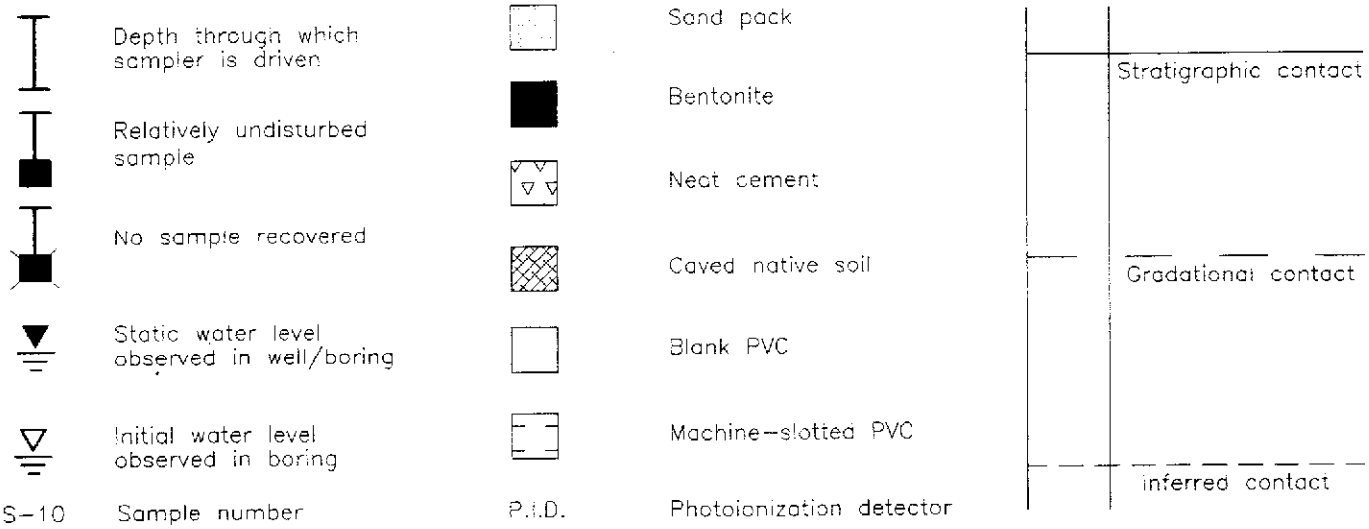
PROJECT 69036.07 Drawn: 3/5/J 690367SP

GENERALIZED SITE PLAN
ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE 3

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISION		LTR	DESCRIPTION	MAJOR DIVISION		LTR	DESCRIPTION
COARSE-GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded Gravels or Gravel-Sand mixtures, little or no fines.	FINE-GRAINED SOILS	SILTS AND CLAYS LL<50	ML	Inorganic Silts and very fine sands, rock flour, Silty or Clayey fine Sands, or Clayey Silts with slight plasticity.
		GP	Poorly-graded Gravels or Gravel-Sand mixtures, little or no fines.			CL	Inorganic Clays of low to medium plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays.
		GM	Silty Gravels, Gravel-Sand-Silt mixtures.			OL	Organic Silts and Organic Silt-Clays of low plasticity.
		GC	Clayey Gravel, Gravel-Sand-Clay mixtures.		SILTS AND CLAYS LL>50	MH	Inorganic Silts, micaceous or diatomaceous fine Sandy or Silty Soils. Elastic Silts.
	SAND AND SANDY SOILS	SW	Well-graded Sand or Gravelly Sands, little or no fines.			CH	Inorganic Clays of high plasticity, fat Clays.
		SP	Poorly-graded Sands or Gravelly Sands, little or no fines.			OH	Organic Clays of medium to high plasticity, organic Silts.
		SM	Silty Sands, Sand-Silt mixtures.				
		SC	Clayey Sands, Sand-Clay mixtures.	HIGHLY ORGANIC SOILS		PT	Peat and other highly Organic Soils.



BLOWS REPRESENT THE NUMBER OF BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES TO DRIVE THE SAMPLER THROUGH EACH 6 INCHES OF AN 18-INCH PENETRATION.

DASHED LINES SEPARATING UNITS ON THE LOG REPRESENT APPROXIMATE BOUNDARIES ONLY. ACTUAL BOUNDARIES MAY BE GRADUAL LOGS REPRESENT SUBSURFACE CONDITIONS AT THE BORING LOCATION AT THE TIME OF DRILLING ONLY.

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UNIFIED SOIL CLASSIFICATION SYSTEM AND SYMBOL KEY
ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE
4

Depth of boring: 29 feet Diameter of boring: 10 inches Date drilled: 11/24/92

Well depth: 25-1/2 feet Material type: Sch 40 PVC Casing diameter: 4 inches

Screen interval: 8-1/2 to 25-1/2 feet Filter pack: #3 Sand Slot size: 0.020-inch

Drilling Company: Bayland Drilling Driller: John and Tom

Method Used: Hollow-Stem Auger Field Geologist: Barbara Sieminski

Signature of Registered Professional:

Registration No.: CEG 1463 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Asphalt-covered surface.	
0				GC	Asphalt (4 inches).	
				GC	Clayey gravel, brown, damp, dense: baserock.	
2				ML	Sandy silt with clay, dark brown, damp, low plasticity, stiff.	
4				CL	Sandy clay, brown, damp, medium plasticity, very stiff.	
6	S-5.5	5 8 11	0	SC	Clayey sand, fine- to medium-grained, trace fine gravel, brown, damp, medium dense.	
8						
10	S-9.5	11 12 14	0		Increasing gravel.	
	S-11	3 8 8	0	GC	Clayey gravel with sand, brown mottled orange and black, moist, medium dense.	
12					▽	
14				SP=SC	Gravelly sand with clay, medium- to coarse-grained sand, brown, very moist to wet, medium dense.	
16	S-15.5	5 8 10	0			
18	S-18.5	6 9 10	0	SM/ML	Silty sand, fine-grained, light gray mottled orange, wet, medium dense; interbedded with sandy silt and clay, light gray mottled orange, moist to wet, low plasticity, very stiff.	
20						

(Section continues downward)

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LOG OF BORING B-20/MW-4

ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE 5

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
22				SM/ML	Silty sand, fine-grained, light gray mottled orange, wet, medium dense; interbedded with sandy silt and clay, light gray mottled orange, moist to wet, low plasticity, very stiff.	
24	S-24.5	10 11 12	0		Increasing silt, moist.	
26	S-26.5	8 15 25	0	ML	Clayey silt, light gray mottled orange, damp, low plasticity, very stiff.	
28	S-28	10 25 50/6"	0	SP	Gravelly sand, fine- to medium-grained sand, orange-brown, damp, dense.	
					Total depth = 29 feet.	
30						
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						

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PROJECT 69036.07

LOG OF BORING B-20/MW-4

ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE 6

Depth of boring: 26-1/2 feet Diameter of boring: 10 inches Date drilled: 11/24/92

Well depth: 25 feet Material type: Sch 40 PVC Casing diameter: 4 inches

Screen interval: 8-1/2 to 25 feet Filter pack: #3 Sand Slot size: 0.020-inch

Drilling Company: Bayland Drilling Driller: John and Tom

Method Used: Hollow-Stem Auger Field Geologist: Barbara Sieminski

Signature of Registered Professional:

Registration No.: CEG 1463 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Asphalt-covered surface.	
0				GP	Asphalt (4 inches).	
					Sandy gravel, gray, damp, dense: baserock.	
2				CL	Sandy clay, dark brown, damp, medium plasticity, stiff.	
					Color change to brown.	
4						
6	S-5.5	4 6 9	0			
				GC	Clayey gravel with sand, brown with black and orange mottling, damp, medium dense.	
8						
10	S-10.5	9 10 14	0			
12						
				SP=SC	Gravelly sand with clay, fine- to medium-grained sand, orange-brown, very moist to wet, medium dense.	
14						
16	S-15.5	6 9 11	0			
18						
20	S-20.5	15 25 30	0			

(Section continues downward)

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PROJECT 69036.07

LOG OF BORING B-21/MW-5

ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE 7

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
22				SP–SC	Gravelly sand with clay, fine– to medium–grained sand, orange–brown, very moist to wet, medium dense.	
24		8		SM/ML	Silty sand, fine–grained, light gray mottled orange, moist, medium dense; interbedded with sandy silt and clay, light gray mottled orange, damp, low plasticity, very stiff.	
26	S–26	11 12	0	ML	Clayey silt, light gray mottled orange, damp, low plasticity, very stiff.	
28					Total depth = 26–1/2 feet.	
30						
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						

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PROJECT 69036.07

LOG OF BORING B–21/MW–5
ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE
8

Depth of boring: 26-1/2 feet Diameter of boring: 8 inches Date drilled: 11/25/92

Well depth: 25 feet Material type: Sch 40 PVC Casing diameter: 2 inches

Screen interval: 8 to 25 feet Filter pack: #3 Sand Slot size: 0.020-inch

Drilling Company: Bayland Drilling Driller: John and Tom

Method Used: Hollow-Stem Auger Field Geologist: Barbara Sieminski

Signature of Registered Professional:

Registration No.: CEG 1463 State: CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
					Concrete surface.	
0				GP	Concrete (2 inches).	
				ML	Sandy gravel, grayish-brown, damp, dense: baserock.	
2				CL	Sandy silt, dark brown, damp, low plasticity, stiff; with roots.	
					Sandy clay, brown, damp, medium plasticity, very stiff; with roots.	
4						
6	S-5.5	8 10 15	0			
8				SP-SC	Gravelly sand with clay, fine- to medium-grained sand, brown, damp, medium dense.	
10	S-9.5	8 15 11	0			
		10		SC	Clayey sand, fine-grained, light brown, damp, medium dense.	
12	S-11.5	15 14	0	GC	Clayey gravel with sand, brown mottled orange, moist, medium dense.	
14				SP	Gravelly sand, medium-grained sand, brown, wet, medium dense.	
	S-15.5	6 7 9	0			
16				SM/ML	Silty sand, fine-grained, light gray mottled orange, wet, medium dense; interbedded with sandy silt and clay, light gray mottled orange, moist to wet, low plasticity, stiff.	
18						
20	S-20.5	8 10 14	0			

(Section continues downward)

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PROJECT 69036.07

LOG OF BORING B-22/MW-6

ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE 9

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
22				SM/ML	Silty sand, fine-grained, light gray mottled orange, wet, medium dense; interbedded with sandy silt sand clay, light gray mottled orange, moist to wet, low plasticity, stiff. With gravel.	
24						
26	S-26	5 6 7	0	ML	Clayey silt, light gray mottled orange, damp to moist, low plasticity, stiff.	
					Total depth = 26-1/2 feet.	
28						
30						
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						

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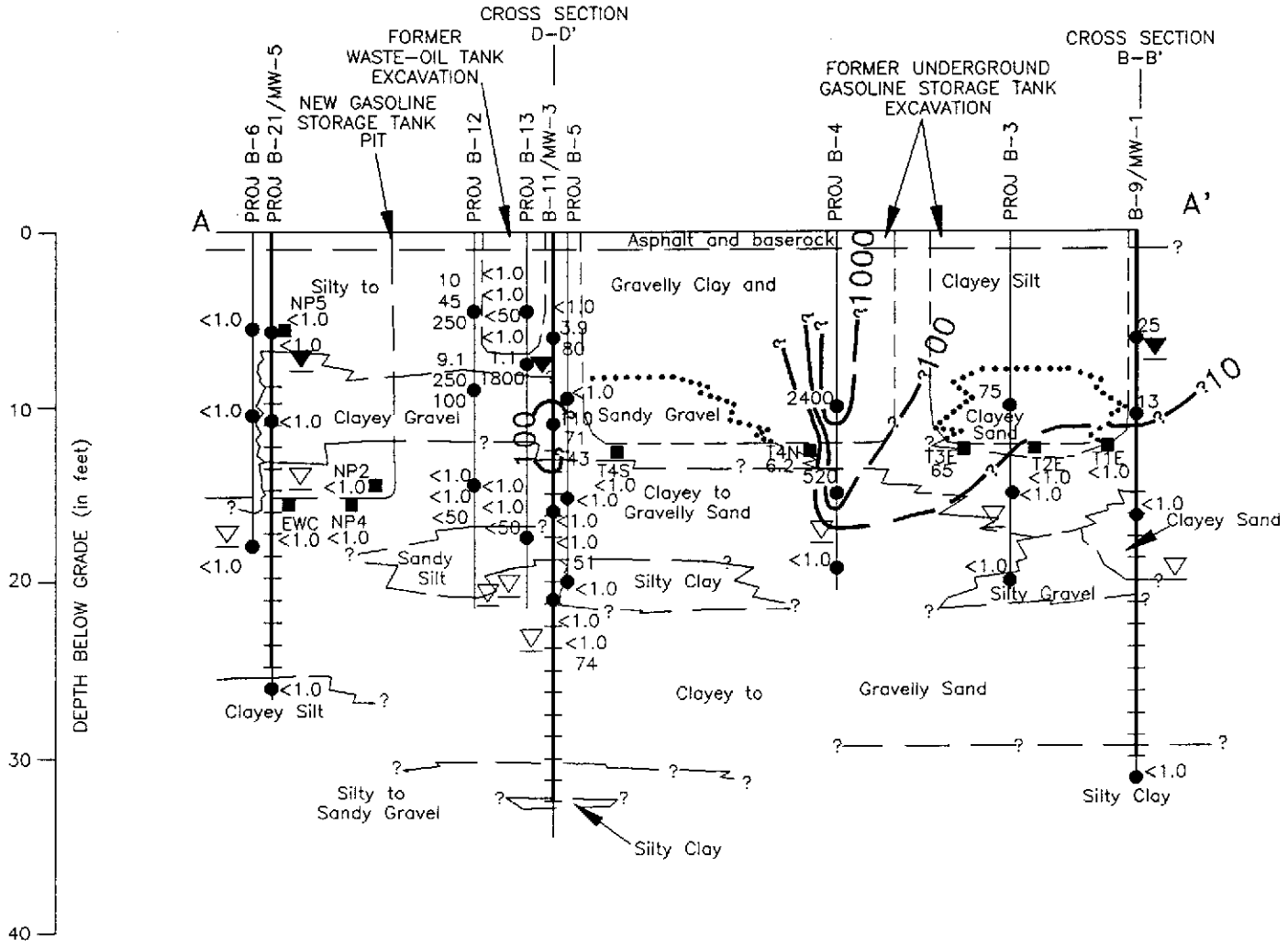
LOG OF BORING B-22/MW-6

ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE

10



EXPLANATION

1000 = Line of equal concentration of TPHg in soil in parts per million (ppm)

2400 / 250 / 1800 = Laboratory analyzed soil sample showing concentration of TPHg (red), TPHd (green), and TOG (blue) in ppm

= Well casing

= Well screen

= Boring

= Initial water level in boring

= Static water level in well (02/22/93)

T3E 65 = Projected tank pit soil sample showing concentration of TPHg in ppm

Approximate Horizontal Scale

20 10 0 20 40

feet

Approximate Vertical Scale

10 5 0 10 20

feet

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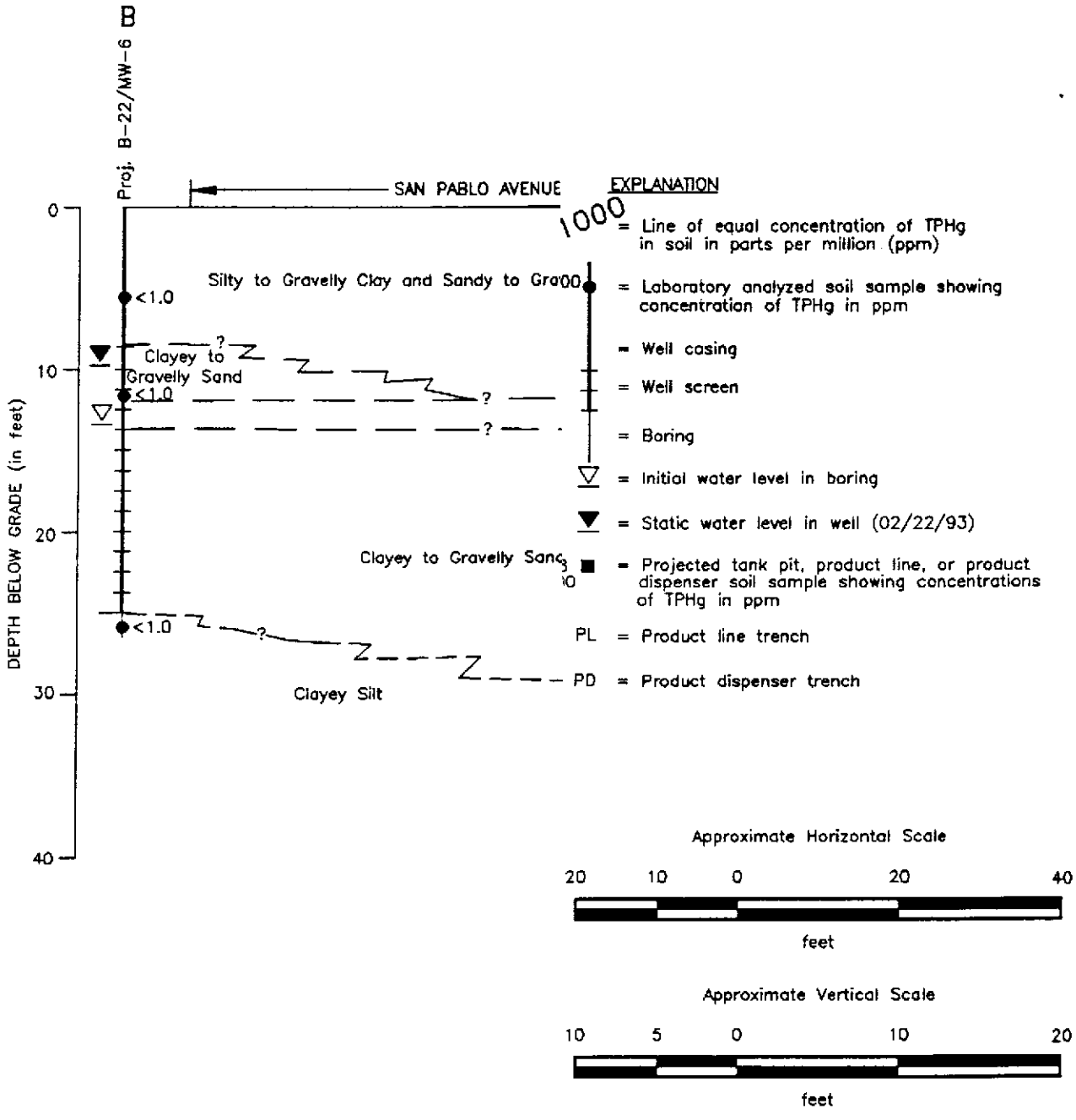
PROJECT 69036.07

GEOLOGIC CROSS SECTION A-A'
ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE 11



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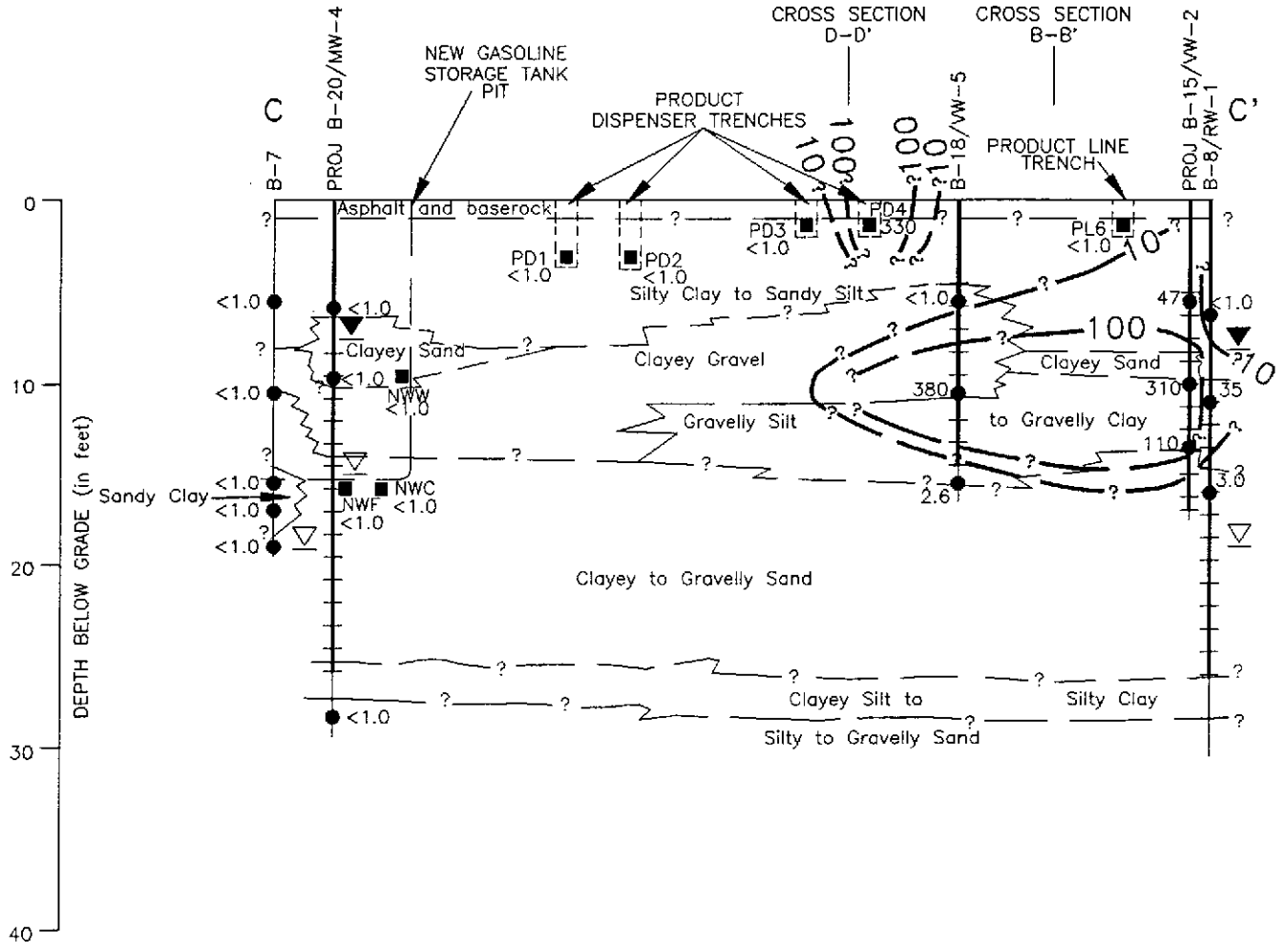
PROJECT 69036.07

PLATE 12



EXPLANATION

100 = Line of equal concentration of TPHg in soil in parts per million (ppm)

380 = Laboratory analyzed soil sample showing concentration of TPHg in ppm

= Well casing

= Well screen

= Boring

= Initial water level in boring

= Static water level in well (02/22/92)

NWF <1.0 = Projected tankpit, product dispencer or product line soil sample showing concentration of TPHg in ppm

Approximate Horizontal Scale

20 10 0 20 40

feet

Approximate Vertical Scale

10 5 0 10 20

feet

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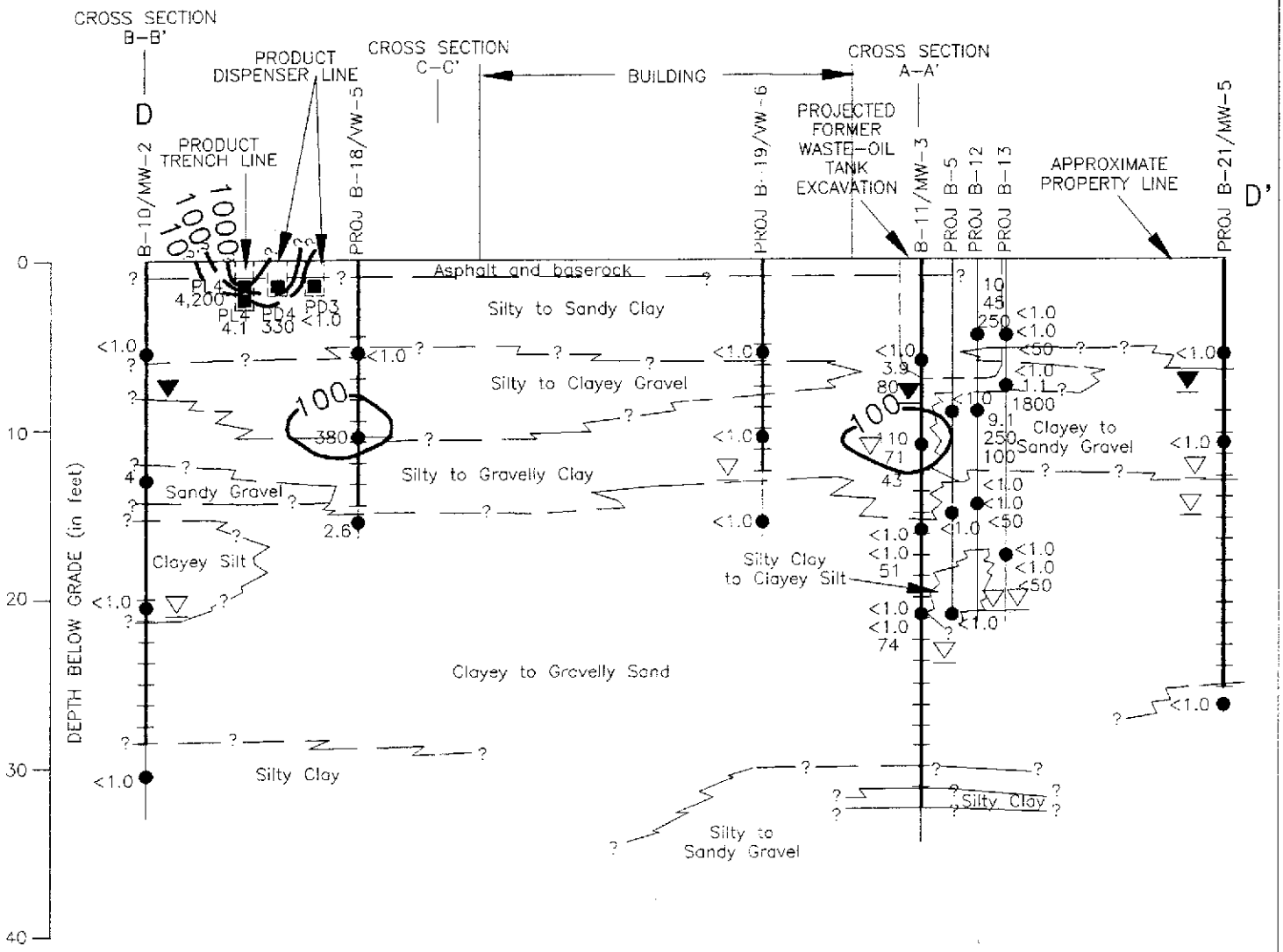
PROJECT 69036.07

GEOLOGIC CROSS SECTION C-C'
ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE 13



EXPLANATION

1,000 = Line of equal concentration of TPHg in soil in parts per million (ppm)

380 / 250 / 1800 = Laboratory analyzed soil sample showing concentration of TPHg (red), TPHd (green), and TOG (blue) in ppm

= Well casing

= Well screen

= Boring

= Initial water level in boring

= Static water level in well (02/22/93)

PL4 4,200 = Projected product line or product dispenser soil sample showing concentration of TPHg in ppm

Approximate Horizontal Scale

20 10 0 20 40

feet

Approximate Vertical Scale

10 5 0 10 20

feet

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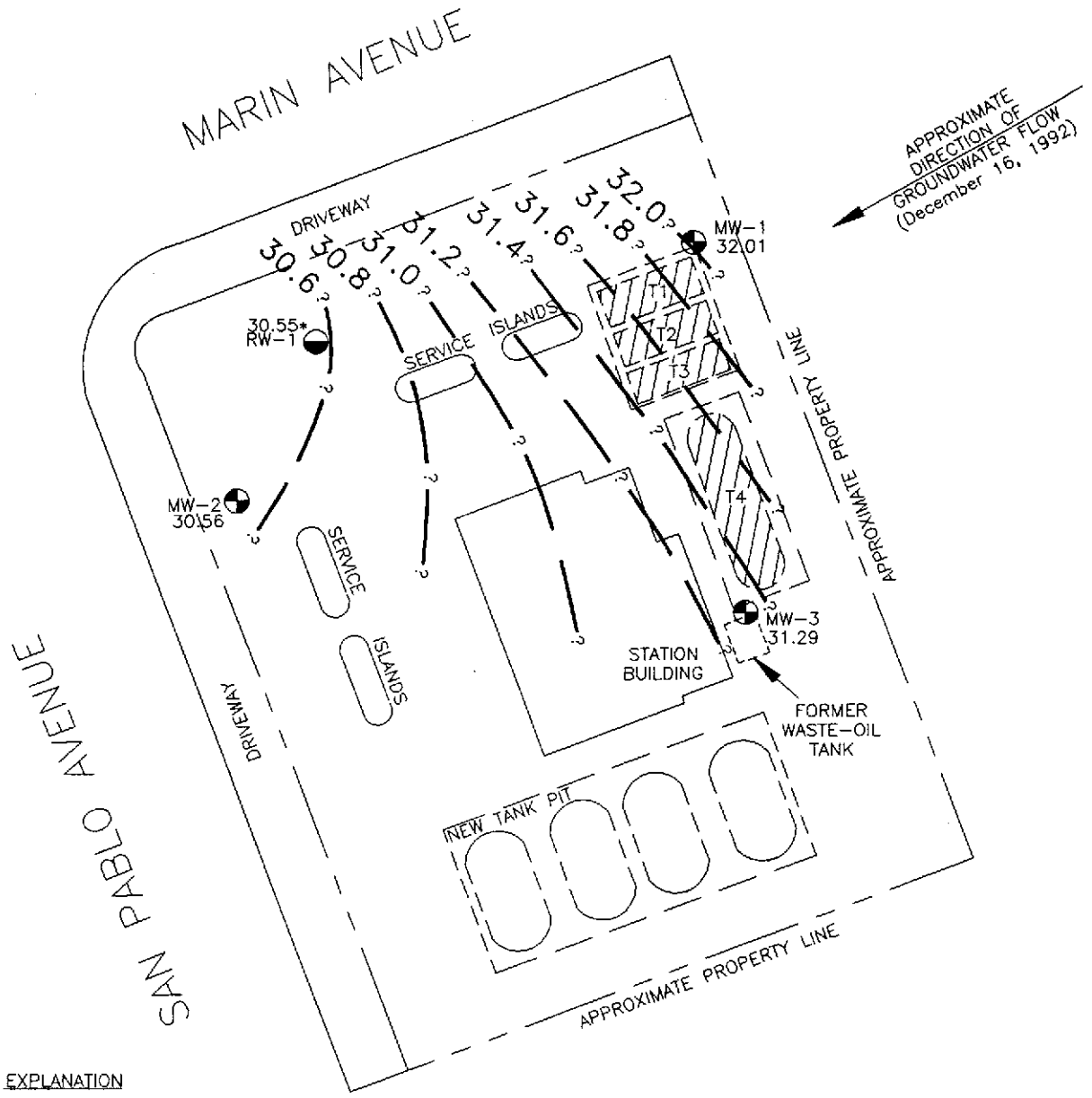
GEOLOGIC CROSS SECTION D-D'
ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE
14



EXPLANATION

RW-1 = Recovery well (Exceltech, October 1991)

MW-3 = Monitoring well (Exceltech, October 1991)

= Former underground gasoline tank pits

32.0 = Line of equal elevation of groundwater in feet above mean sea level (MSL)

32.01 = Elevation of groundwater in feet above MSL, December 16, 1992

* = Elevation adjusted for presence of floating product

Approximate Scale

30 15 0 30 60

feet

Source: Surveyed by John E. Koch, Land Surveyor. Dated October 29, 1991.

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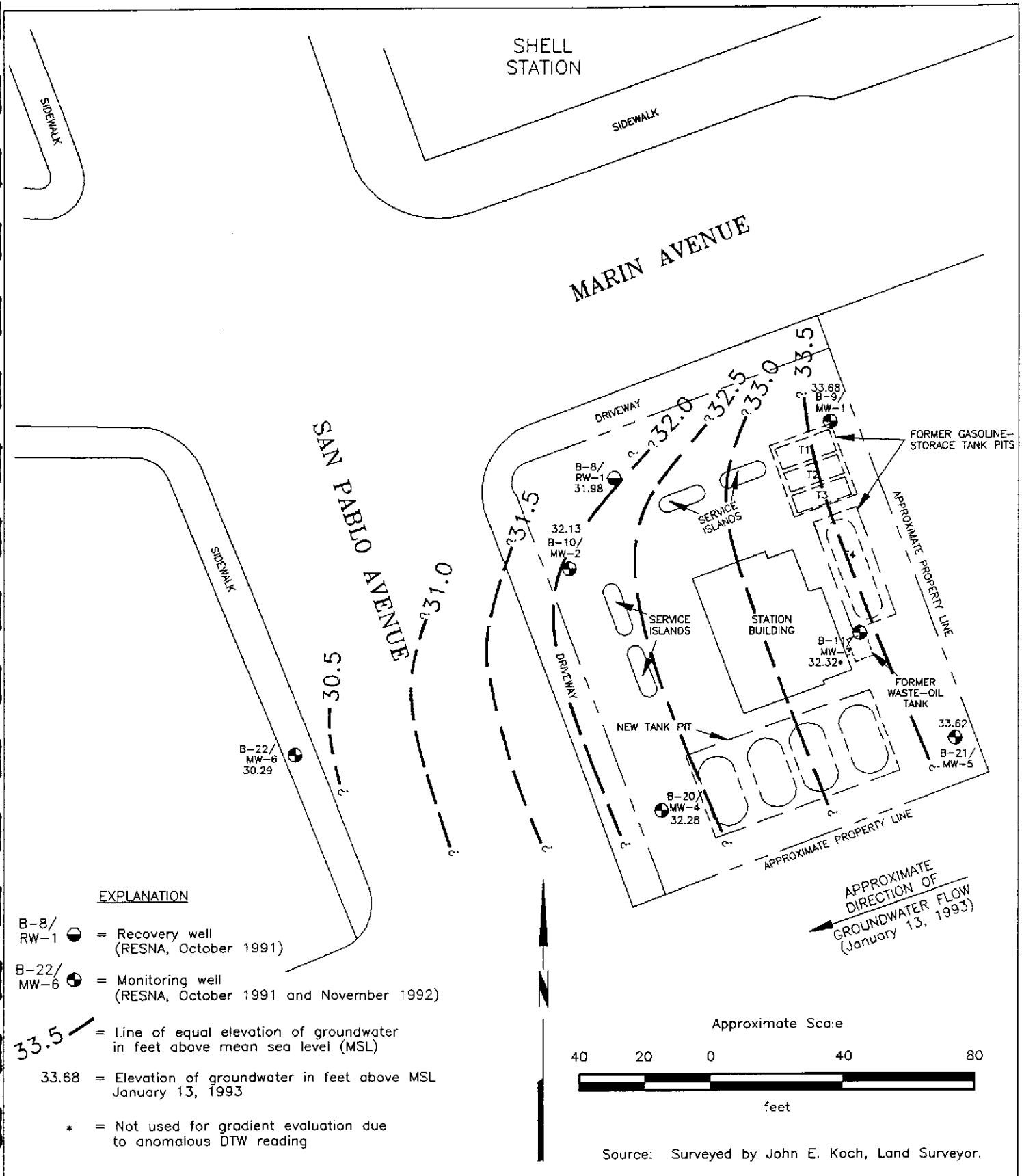
GROUNDWATER GRADIENT MAP
ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE
15



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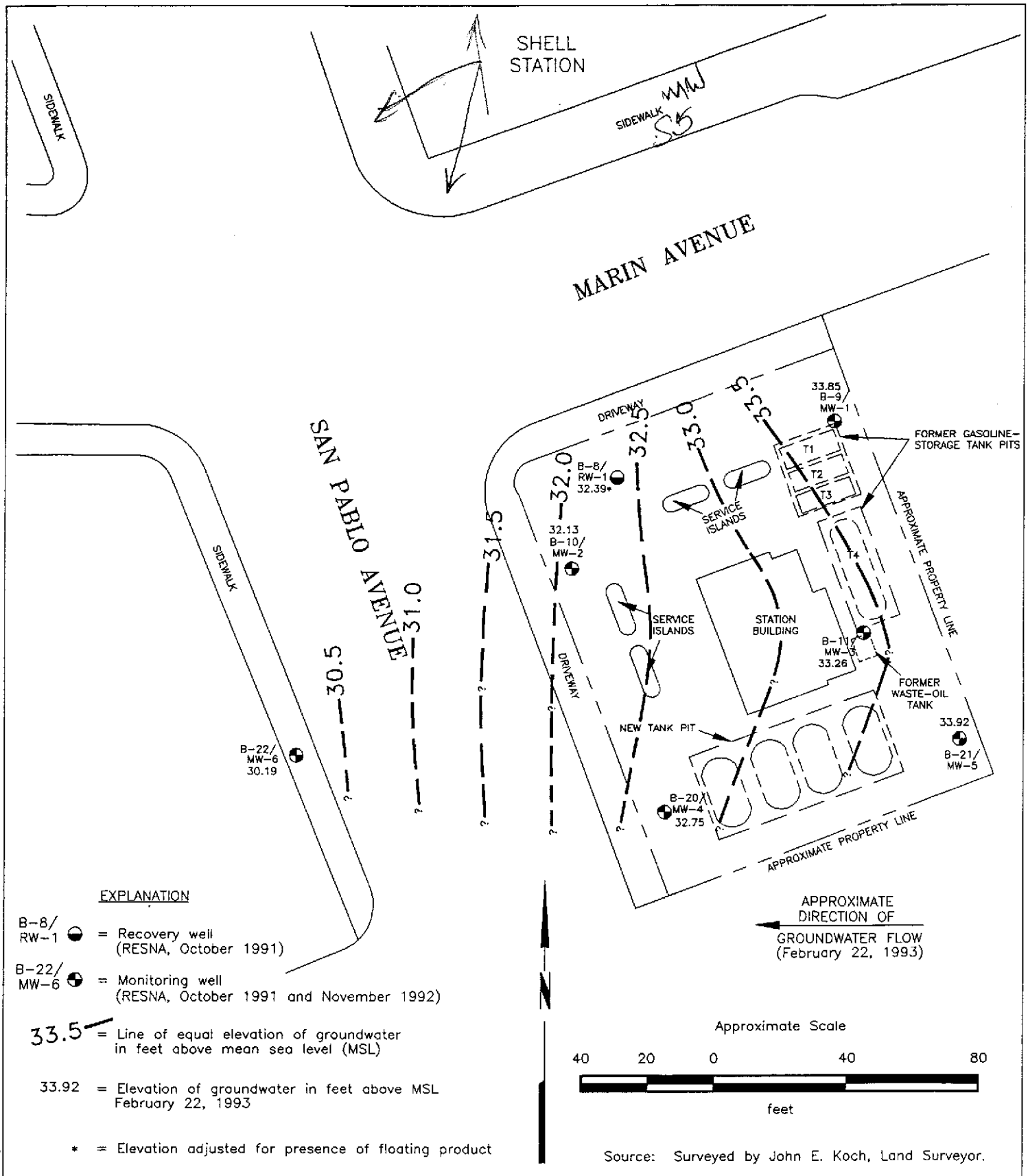
PROJECT 69036.07 Drawn: 3/5/J 690367GW

GROUNDWATER GRADIENT MAP

ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE
16



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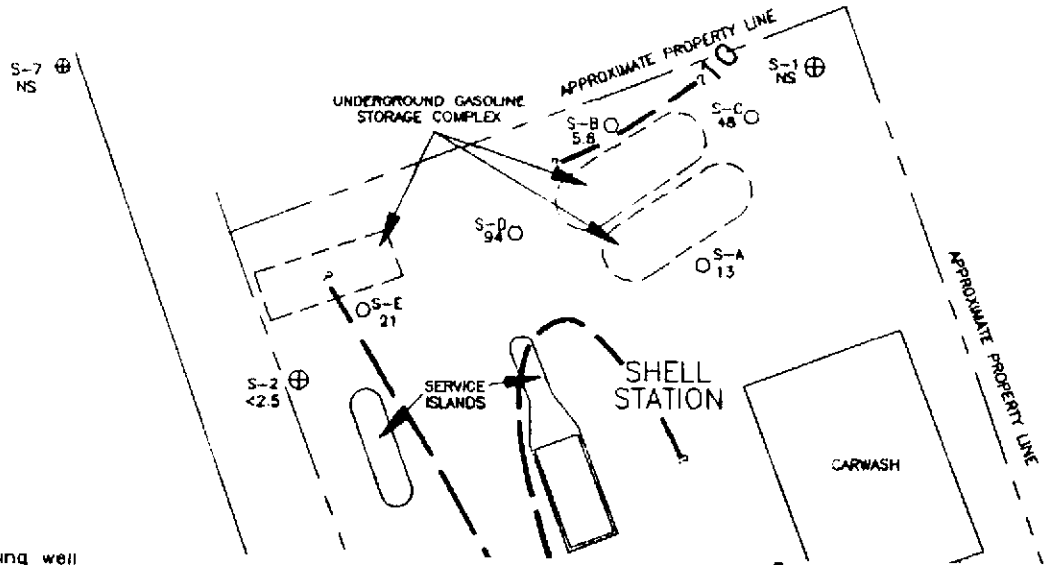
PROJECT **69036.07** Drawn: 3/5/J 690367GW

GROUNDWATER GRADIENT MAP

ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE

17



MW-6 = Monitoring well (RESNA, October 1991 and November 1992)

B-13 = Soil boring (RESNA, Aug. 1989, June 1991, and Aug. 1992)

S-G = Soil boring for Shell site

S-7 = Monitoring well for Shell site

100 = Line of equal concentration of TPHg in soil in parts per million (ppm)

430 = Concentration of TPHg in soil at depths between 4.5 and 6 feet.

NS = Not sampled

Approximate Scale

40 20 0 40 80

feet

Source: Revised GeoStrategies Inc. map for job 7666, Arco site surveyed by John E. Koch, Land Surveyor.

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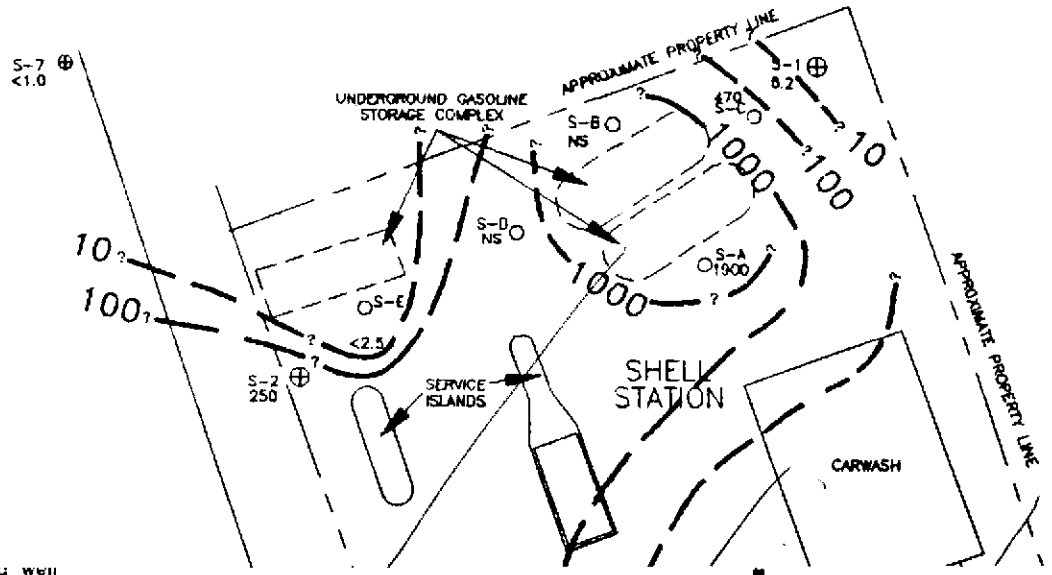
PROJECT 69036.07

CONCENTRATIONS OF TPHg IN SOIL AT DEPTHS BETWEEN 4.5 AND 6 FEET
ARCO Station 2035 and Vicinity
1001 San Pablo Avenue
Albany, California

PLATE 18



MW-6 = Monitoring well (RESNA, October 1991 and November 1992)

B-13 = Soil boring (RESNA, Aug. 1989, June 1991, and Aug. 1992)

S-G O = Soil boring for Shell site

S-7 ⊕ = Monitoring well for Shell site

1,000 = Line of equal concentration of TPHg in soil in parts per million (ppm)

4300 = Concentration of TPHg in soil at depths between 9 and 12 feet.

NS = Not sampled

N

Approximate Scale

40 20 0 40 80

feet

Source: Revised GeoStrategies Inc. map for job 7666, Arco site surveyed by John E. Koch, Land Surveyor.

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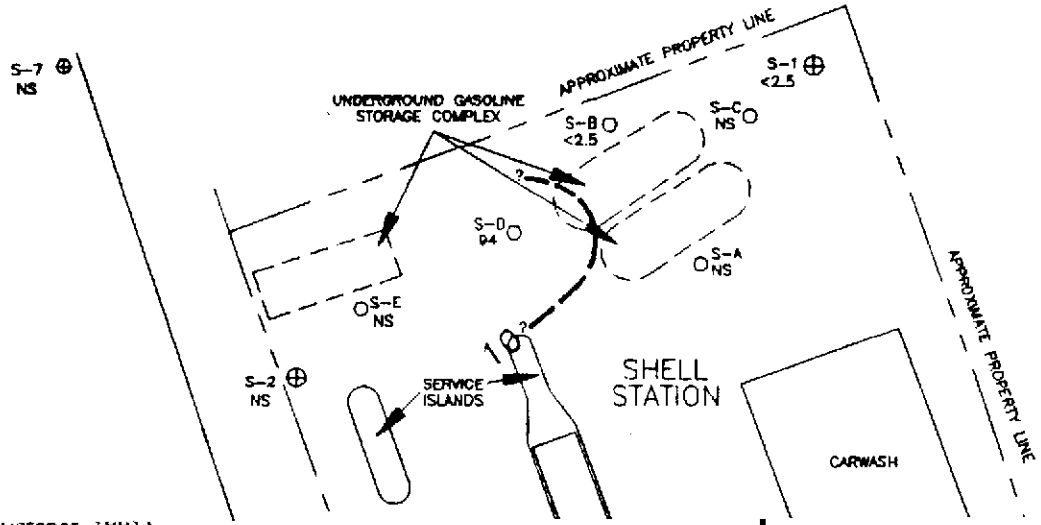
PROJECT 69036.07

CONCENTRATIONS OF TPHg IN SOIL AT DEPTHS BETWEEN 9 AND 12 FEET
ARCO Station 2035 and Vicinity
1001 San Pablo Avenue
Albany, California

PLATE 19



(RESNA, October 1991)

B-22/MW-6 = Monitoring well (RESNA, October 1991 and November 1992)

B-13 = Soil boring (RESNA, Aug. 1989, June 1991, and Aug. 1992)

S-G = Soil boring for Shell site

S-7 = Monitoring well for Shell site

100 = Line of equal concentration of TPHg in soil in parts per million (ppm)

130 = Concentration of TPHg in soil at depths between 13 and 16 feet.

NS = Not sampled

Approximate Scale

40 20 0 40 80

feet

Source: Revised GeoStrategies Inc. map for job 7666, Arco site surveyed by John E. Koch, Land Surveyor.

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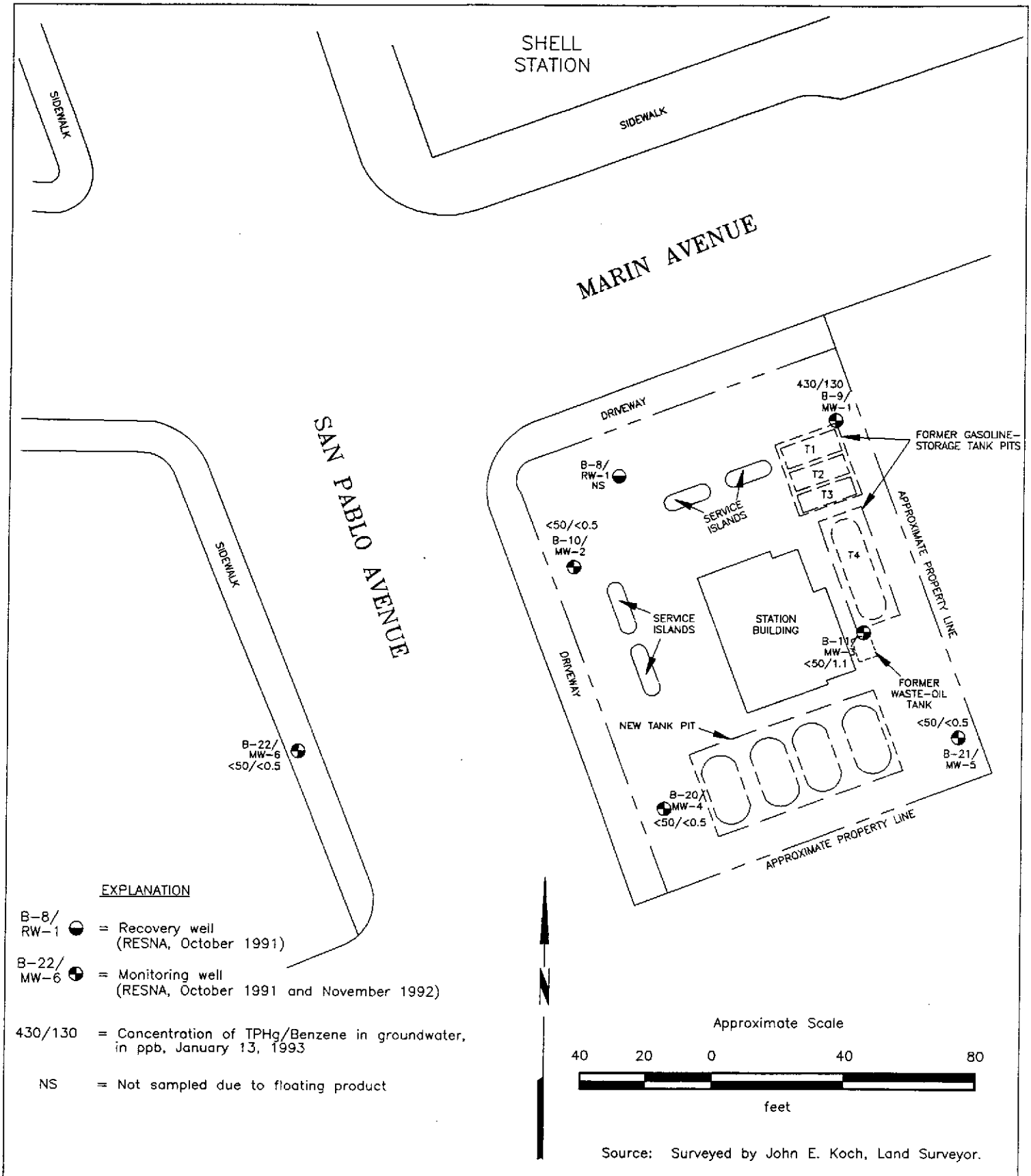
PROJECT 69036.07

CONCENTRATIONS OF TPHg IN SOIL AT DEPTHS BETWEEN 13 AND 16 FEET
ARCO Station 2035 and Vicinity
1001 San Pablo Avenue
Albany, California

PLATE 20



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PROJECT **69036.07** Drawn: 3/5/J 690367GW

TPHg/BENZENE CONCENTRATIONS IN GROUNDWATER
ARCO Station 2035
1001 San Pablo Avenue
Albany, California

PLATE

21

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2035
Albany, California
(Page 1 of 3)

Well Date	Elevation of Wellhead (TOC)	Depth to Water	Elevation of Groundwater	Evidence of Product
MW-1				
10/29/91	41.41	11.86	29.55	None
11/07/91		10.94	30.47	None
11/14/91		10.97	30.44	None
01/19/92		10.06	31.35	None
02/19/92		8.65	32.76	None
03/19/92		8.33	33.08	None
04/21/92		9.32	32.09	None
05/12/92		9.82	31.59	None
06/12/92		10.50	30.91	None
07/15/92		10.69	30.72	None
08/07/92		10.53	30.88	None
09/08/92		11.04	30.37	None
10/26/92		11.24	30.17	None
11/23/92		10.90	30.51	None
12/16/92		9.40	32.01	None
01/13/93		7.73	33.68	None
02/22/93		7.56	33.85	None
MW-2				
10/29/91	40.38	11.10	29.28	None
11/07/91		11.20	29.18	None
11/14/91		11.21	29.17	None
01/19/92		10.44	29.94	None
02/19/92		8.70	31.68	None
03/19/92		8.84	31.54	None
04/21/92		9.80	30.58	None
05/12/92		10.29	30.09	None
06/12/92		10.95	29.43	None
07/15/92		11.15	29.23	None
08/07/92		11.01	29.37	None
09/08/92		11.41	28.97	None
10/26/92		11.60	28.78	None
11/23/92		7.31	33.07	None
12/16/92		9.82	30.56	None
01/13/93		8.25	32.13	None
02/22/93		8.25	32.13	None
MW-3				
10/29/91	41.44	11.62	29.82	None
11/07/91		11.52	29.92	None
11/14/91		11.50	29.94	None
01/19/92		10.56	30.88	None

See notes on Page 3 of 3.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2035
Albany, California
(Page 2 of 3)

Well Date	Elevation of Wellhead (TOC)	Depth to Water	Elevation of Groundwater	Evidence of Product
MW-3cont.				
02/19/92	41.44	9.52	31.92	None
03/19/92		9.01	32.43	None
04/21/92		9.70	31.74	None
05/12/92		10.29	31.15	None
06/12/92		11.26	30.18	None
07/15/92		11.28	30.16	None
08/07/92		11.15	30.29	None
09/08/92		11.70	29.74	None
10/26/92		12.15	29.29	None
11/23/92		12.55	28.89	None
12/16/92		10.15	31.29	None
01/13/93		9.12	32.32	None
02/22/93		8.18	33.26	None
MW-4				
01/13/93	40.33	8.05	32.28	None
02/22/93		7.58	32.75	None
MW-5				
01/13/93	41.84	8.22	33.62	None
02/22/93		7.92	33.92	None
MW-6				
01/13/93	40.13	9.84	30.29	None
02/22/93		9.94	30.19	None
RW-1				
10/29/91	40.33	10.85	29.48	Sheen
11/07/91		11.97	28.36	0.01
11/14/91		11.03	29.30	0.01
01/19/92		10.22*	30.11*	3.26
02/19/92		8.49*	31.84*	2.14
03/19/92		8.50*	31.83*	0.50
04/21/92		9.68*	30.65	0.03
05/12/92		10.47	29.86	Product not measured
06/12/92		11.41	28.92	Product not measured
07/15/92		11.35	28.98	None
08/07/92		10.80*	29.53*	0.02
09/08/92		10.80*	29.53*	0.62
10/26/92		11.42*	28.91*	0.04
11/23/92		10.94	29.39	Sheen

See notes on Page 3 of 3.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2035
Albany, California
(Page 3 of 3)

Well Date	Elevation of Wellhead (TOC)	Depth to Water	Elevation of Groundwater	Evidence of Product
RW-1cont.				
12/16/92	40.33	9.78*	30.55*	0.51
01/13/93		8.35	31.98	Product in skimmer
02/22/93		7.94*	32.39*	0.01

Wellhead Elevation based on benchmark (B1198): A standard Bronze Disk in the sidewalk 0.8' behind the face of curb on the northerly side of Marin Avenue 6' +/- westerly of the curb return at the northeast corner of Marin Avenue and San Pablo Avenue at an elevation of 40.426 feet above mean sea level, City of Albany, California.

(TOC) = Top-of-casing elevation

Depth-to-water measurements in feet below the top of the well casing.

*Adjusted water level due to product. The recorded thickness of the floating product was multiplied by 0.80 to obtain an approximate value for the displacement of water by the floating product. This approximate displacement value was then subtracted from the measured depth to water to obtain a calculated depth to water. These calculated groundwater depths were subtracted from surveyed wellhead elevations to obtain the adjusted groundwater elevations.

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES
ARCO Station 2035
Albany, California
(Page 1 of 3)

Date / Sample ID	TPHg	B	T	E	X	TPHd	VOC,PCB, TOG and SVOC	Cd	Cr	Pb	Ni	Zn
August 1989												
S-10-B1	1,900	<4	15	8	53	NA	NA	NA	NA	NA	NA	NA
S-15-B1	<1.0	<0.005	0.006	0.006	<0.005	NA	NA	NA	NA	NA	NA	NA
S-19½-B1	<1.0	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA
S-10-B2	51	1.9	0.35	0.81	4.0	NA	NA	NA	NA	NA	NA	NA
S-14½-B2	<1.0	0.063	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA
S-20-B2	<1.0	0.039	0.044	0.007	0.041	NA	NA	NA	NA	NA	NA	NA
S-10-B3	75	3.1	8.2	1.8	11.0	NA	NA	NA	NA	NA	NA	NA
S-14½-B3	<1.0	0.21	<0.025	<0.025	0.039	NA	NA	NA	NA	NA	NA	NA
S-20-B3	<1.0	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA
S-10-B4	2,400	33	140	40	220	NA	NA	NA	NA	NA	NA	NA
S-15-B4	520	<1.0	6.9	6.2	6.3	NA	NA	NA	NA	NA	NA	NA
S-19-B4	<1.0	<0.005	0.007	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA
S-9½-B5	<1.0	0.007	0.006	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA
S-15-B5	<1.0	<0.005	0.006	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA
S-20-B5	<1.0	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA
June 1991												
S-5½-B6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
S-10½-B6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
S-15½-B6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
S-17-B6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
S-5½-B7	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
S-10½-B7	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
S-15½-B7	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
S-17-B7	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
S-18½-B7	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
October 1991												
S-6-B8	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
S-11-B8	35	1.2	1.7	0.42	2.0	NA	NA	NA	NA	NA	NA	NA
S-16-B8	3.0	0.45	0.13	0.11	0.47	NA	NA	NA	NA	NA	NA	NA
*S-30-B8	240	3.6	5.0	4.1	16	NA	NA	NA	NA	NA	NA	NA
S-6-B9	25	0.60	0.58	0.44	1.8	NA	NA	NA	NA	NA	NA	NA
S-10½-B9	13	0.74	0.72	0.18	0.95	NA	NA	NA	NA	NA	NA	NA
S-16-B9	<1.0	0.015	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
S-31-B9	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA

See notes on Page 3 of 3

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES
ARCO Station 2035
Albany, California
(Page 2 of 3)

Date / Sample ID	TPHg	B	T	E	X	TPHd	TOG	VOC,PCB, and SVOC	Cd	Cr	Pb	Ni	Zn
October 1991cont.													
S-5½-B10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-13-B10	4.0	0.13	0.15	0.041	0.16	NA	NA	NA	NA	NA	NA	NA	NA
S-20½-B10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-30½-B10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-6-B11	<1.0	0.010	<0.0050	<0.0050	<0.0050	3.9	80	ND[b]	<0.50	49	7.7	97	41
S-11-B11	110	<0.0050	<0.0050	<0.0050	0.27	71	43	ND[b]	<0.50	80	5.8	77	69
S-16-B11	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	57	ND[b]	<0.50	33	7.5	25	45
S-21-B11	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	74	ND[b]	<0.50	39	7.2	32	56
August 1992													
S-4½-B12	10	<0.0050	<0.0050	0.0070	0.050	45[e]	250	ND	<0.50	59	<5.0	58	40
S-9-B12	9.1	<0.0050	<0.0050	0.0060	0.082	250[e]	100	ND	<0.50	42	<5.0	46	37
S-14½-B12	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	<50	ND	<0.50	49	7.4	49	69
S-4½-B13	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	<50	ND	<0.50	68	<5.0	65	43
S-7½-B13	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	1.1[e]	1,800	ND[d]	<0.50	51	<5.0	81	46
S-17½-B13	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	<50	ND	<0.50	43	5.6	51	69
S-5½-B14	430	4.0	16	7.3	42	NA	NA	NA	NA	NA	NA	NA	NA
S-10½-B14	1,300	20	82	31	170	NA	NA	NA	NA	NA	NA	NA	NA
S-15½-B14	<1.0	0.012	0.034	0.011	0.055	NA	NA	NA	NA	NA	NA	NA	NA
S-5½-B15	47	0.22	0.56	0.76	4.3	NA	NA	NA	NA	NA	NA	NA	NA
S-10-B15	310	3.8	15	7.1	37	NA	NA	NA	NA	NA	NA	NA	NA
S-13½-B15	110	1.5	4.3	2.1	12	NA	NA	NA	NA	NA	NA	NA	NA
S-4½-B16	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-10-B16	4,300	21	110	51	580	NA	NA	NA	NA	NA	NA	NA	NA
S-14½-B16	<1.0	0.010	0.032	0.018	0.18	NA	NA	NA	NA	NA	NA	NA	NA
S-5½-B17	1.4	0.045	0.0080	<0.0050	0.028	NA	NA	NA	NA	NA	NA	NA	NA
S-10½-B17	1,100	16	71	27	140	NA	NA	NA	NA	NA	NA	NA	NA
S-15½-B17	27	2.1	0.40	0.75	1.3	NA	NA	NA	NA	NA	NA	NA	NA
S-5½-B18	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-10½-B18	380	4.8	21	8.7	46	NA	NA	NA	NA	NA	NA	NA	NA
S-15½-B18	2.6	0.78	0.48	0.059	0.29	NA	NA	NA	NA	NA	NA	NA	NA
S-5½-B19	<1.0	0.017	0.0090	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-10½-B19	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-15½-B19	<1.0	0.15	0.012	0.029	0.032	NA	NA	NA	NA	NA	NA	NA	NA

See notes on Page 3 of 3

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES
ARCO Station 2035
Albany, California
(Page 3 of 3)

Date Sample ID	TPHg	B	T	E	X	TPHd	TOG	VOC,PCB, and SVOC	Cd	Cr	Pb	Ni	Zn
August 1992cont.													
S-0821-SPAD	550	2.6	9.5	5.4	47	NA	NA	NA	NA	NA	NA	NA	NA
November 1992													
S-5½-B20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-9½-B20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-28-B20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-5½-B21	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-10½-B21	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-26-B21	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-5½-B22	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-11½-B22	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-26-B22	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA
S-1125/SPA-D	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA

Results for TPHg, BTEX, TPHd, TOG and metals in parts per million (ppm); and for VOC, PCB and SVOC in parts per billion (ppb).
TPHg: Total petroleum hydrocarbons as gasoline by EPA method 5030/8015/8020.
B: benzene, T: toluene, E: ethylbenzene, X: total xylenes isomers; BTEX analyzed by EPA method 5030/8015/8020.
TPHd: Total Petroleum Hydrocarbons as diesel by EPA method 3550/8015.
TOG: Total oil and grease by Standard method 5520 E&F.
VOC: Volatile organic compounds by EPA method 8240.
PCB: Polychlorinated biphenyls by EPA method 8080.
SVOC: Semi-volatile organic compounds by EPA method 8270.
Cd: Cadmium by EPA method 6010.
Cr: Chromium by EPA method 6010.
Ni: Nickel by EPA method 6010.
Zn: Zinc by EPA method 6010.
Pb: Lead by EPA method 6010.
NA: Not analyzed.
<: Results reported below the laboratory detection limit.
ND: All compounds tested were nondetectable. Detection limits varied for different compounds.
[a]: Sample collected from the saturated zone, analyzed for site characterization purposes only.
[b]: Only VOCs tested.
[c]: Identified as a non-diesel mixture. The mixture in B-12 contained C9-C14 plus >C16 and >C17. The mixture in B-13 was >C17.
[d]: All compounds tested were nondetectable except ethylbenzene.

Sample Identification:

S-26-B22
- S: Soil Sample
- 26: Depth in feet
- B22: Boring number

S-1125-SP2AD
- S: Soil Sample
- 1125: Date sampled
- SP: Soil pile
- 2AD: Composite sample

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES - TPHg and BTEX
ARCO Station 2035
Albany, California
Page 1 of 2

WELL DATE	TPHg	B	T	E	X
MW-1					
10/29/91	620	76	69	15	60
03/19/92	6,500	2,600	89	42	290
06/12/92	2,900	1,100	2.5	21	15
09/08/92	820	350	<5*	<5*	<5*
10/26/92	190	68	<0.5	0.6	<0.5
01/13/93	430	130	5.3	5.0	9.0
MW-2					
10/29/91	<60	2.4	4.6	0.48	2.3
03/19/92	<50	6.8	0.9	<0.5	1.1
06/12/92	<50	<0.5	<0.5	<0.5	<0.5
09/08/92	<50	<0.5	<0.5	<0.5	<0.5
10/26/92	<50	<0.5	<0.5	<0.5	<0.5
01/13/93	<50	<0.5	<0.5	<0.5	<0.5
MW-3					
10/29/91	32	2.1	2.8	0.35	1.8
03/19/92	2,100	780	8.8	16	58
06/12/92	720	210	<2.5*	23	4.0
09/08/92	<50	5.3	<0.5	<0.5	<0.5
10/26/92	<50	0.6	<0.5	<0.5	<0.5
01/13/93	<50	1.1	<0.5	<0.5	<0.5
MW-4					
01/13/93	<50	<0.5	1.3	<0.5	1.6
MW-5					
01/13/93	<50	<0.5	<0.5	<0.5	<0.5
MW-6					
01/13/93	<50	<0.5	<0.5	<0.5	<0.5
RW-1					
10/29/91	Not sampled--sheen				
03/19/92	Not sampled--floating product				
06/12/92	Not sampled--floating product				
09/08/92	Not sampled--floating product				
10/23/92	Not sampled--floating product				
01/13/93	Not sampled--floating product in skimmer				
MCL:	—	1	—	680	1,750
DWAL:	—	—	100	—	—

See notes on Page 2 of 2

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES - TPHg and BTEX
ARCO Station 2035
Albany, California
Page 2 of 2

Results in parts per billion (ppb).

TPHg:	Total petroleum hydrocarbons as gasoline by EPA Method 5030/8015/8020.
B: benzene, T: toluene, E: ethylbenzene, X: total xylenes isomers	
BTEX:	Analyzed by EPA Method 5030/8015/8020.
<:	Results reported below the laboratory detection limit.
*:	Laboratory Raised Methods Reporting Limit (MRL) due to high analyte concentration requiring sample dilution.
MCL:	State Maximum Contaminant Level (October 1990).
DWAL:	State Drinking Water Action Level (October 1990).

TABLE 4
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES
- TPHd, TOG, VOC, SVOC, PCB and Metals
ARCO Station 2035
Albany, California

WELL DATE	TPHd	TOG	VOC	SVOC	PCB	Cd	Cr	Pb	Ni	Zn
MW-3										
10/29/91	NA	<5,000	ND[a]	NA	NA	<10	<10	<5	<50	45
03/19/92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
06/12/92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
09/08/92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10/26/92	<50	(600)[600]	ND[b]	NA	NA	NA	NA	NA	NA	NA
12/01/92	NA	NA	NA	ND[c]	ND[d]	NA	NA	NA	NA	NA
01/13/93	NA	(780)[1,100]	NA	NA	NA	NA	NA	NA	NA	NA
MCL:	—	—	—	—	—	10	50	50	—	—

Results in parts per billion (ppb).

TPHd: Total petroleum hydrocarbons as diesel by EPA Method 3510/California DHS LUFT Method.
TOG: Total oil and grease by Standard Method 5520B&F or 5520C (780) and 5520F [1.100].
VOC: Volatile organic compounds by EPA Method 624.
SVOC: Semivolatile organic compounds by EPA Method 3510/8270.
PCB: Polychlorinated biphenyls by EPA Method 3510/8080.
Cd: Cadmium by EPA Method 200.7.
Cr: Chromium by EPA Method 200.7.
Ni: Nickel by EPA Method 200.7.
Zn: Zinc by EPA Method 200.7.
Pb: Lead by EPA Method 3010.
NA: Not analyzed.
<: Results reported below the laboratory detection limit.
ND: Not detected; detection limit varied according to analyte.
[a]: All 37 compounds were nondetectable except for toluene (3.0 ppb).
[b]: All 41 compounds analyzed were nondetectable.
[c]: All 34 compounds analyzed were nondetectable.
[d]: All 7 compounds analyzed were nondetectable.
MCL: State Maximum Contaminant Level (October 1990).

APPENDIX A

PREVIOUS WORK

PREVIOUS WORK

Limited Site Assessment

On August 9, 1989, Applied GeoSystems (AGS) performed a limited environmental site assessment to evaluate the possible presence of gasoline hydrocarbons in the vicinity of the four underground gasoline-storage tanks (AGS, January 24, 1990).

Five soil borings (B-1 through B-5) were drilled as shown on Plate 2 and 1A. Groundwater was encountered in the borings at depths between 17 and 18 feet below ground surface, except in boring B-5 where groundwater was not encountered to a total depth of 20½ feet below ground surface. A hydrocarbon sheen was noted on the surface of water samples obtained from borings B-1 through B-4.

Laboratory analytical results of selected soil samples from borings B-1 through B-5 indicated concentrations of TPHg ranging from nondetectable to 2,400 ppm (Table 2). AGS concluded that shallow soils (at 10 to 15 feet) near the four underground gasoline storage tanks (USTs) had been impacted by gasoline hydrocarbons, and shallow groundwater beneath the site appeared to have been impacted by gasoline hydrocarbons.

Underground Storage Tank Removal

A Work Plan (RESNA/AGS, April 29, 1991) and an Addendum One to the Work Plan (RESNA/AGS, April 29, 1991) were prepared by RESNA outlining work to be performed for a limited subsurface investigation at the subject site. Before work proposed in accordance with Addendum One to the Work Plan began, removal and replacement of USTs and product delivery lines commenced in July 1991 (RESNA/AGS, September 11, 1991).

On June 25, 1991, RESNA personnel supervised the drilling of two soil borings, (B-6 and B-7) to depths of 18 and 19½ feet below ground surface in the area of the proposed new tank pit location.

Groundwater was first encountered at depths of 17½ feet in B-6 and 19½ feet in B-7. Selected soil samples collected from borings B-6 and B-7 were submitted for laboratory analyses for TPHg and BTEX using EPA Methods 8015/8020. TPHg and BTEX concentrations were not detected from any soil sample submitted. The laboratory results of soil samples from borings are summarized in Table 2, and laboratory results of soil samples from new tank pit excavation are summarized in Table A-1, Laboratory Analyses

of New Tank Pit Soil Samples. Locations of soil samples collected from new tank pit and from former tank pits and product line trenches are shown on Plate A1, Soil Sample Location.

In July and August 1991, four gasoline USTs (T1 through T4) and associated product lines were excavated and removed. Soil samples were collected from the side walls, bottom of the excavation, and beneath the product lines. Selected soil samples were submitted for laboratory analyses for TPHg and BTEX using EPA Method 8015/8020. The analytical results are shown on Table A-2, Laboratory Analyses of Former Gasoline Tank Pit Soil Samples, and Table A-3, Laboratory Analyses of Product-Line and Product-Dispenser Soil Samples. Based on the tank removal and environmental subsurface investigation RESNA concluded that gasoline hydrocarbons over 100 ppm have not impacted the shallow soils (ground surface to 13 feet below grade) in the vicinity of the former underground steel gasoline-storage tanks; gasoline hydrocarbons over 1,000 ppm have impacted the shallow soils (one foot below grade) in the vicinity of the product dispensers adjacent to the former steel gasoline-storage tanks; and a water "grab" sample collected from the former tank pit and submitted for laboratory analyses showed a concentration of 190 ppb TPHg.

Subsurface Environmental Investigation and Pump Test

An Addendum Two to the Work Plan (RESNA/AGS, September 24, 1991) was prepared by RESNA outlining work to be performed in a subsurface environmental investigation at the subject site. This work included: performing a records research of Alameda County Flood Control and Water Conservation District (ACFCWCD) records for water supply and monitoring wells within a ½-mile radius of the subject site; performing a records research of the City of Albany Fire Department and ACFCWCD files for nearby and upgradient possible offsite sources of gasoline hydrocarbons; drilling four soil borings (B-8 through B-11); collecting soil samples from the borings; constructing a 6-inch-diameter groundwater recovery well RW-1 in boring B-8, and 4-inch-diameter groundwater monitoring wells MW-1 through MW-3 in borings B-9 through B-11, respectively; developing and sampling the wells; submitting soil and groundwater samples for laboratory analyses; surveying wellhead elevations; and performing an aquifer pump test (RESNA, March 6, 1992).

The work described above was performed by RESNA in October and November 1991. Based on the results of this investigation RESNA concluded that the majority of gasoline hydrocarbons in the soil at the site was at depths between approximately 10 to 15 feet below ground surface, within sandy clay and gravely silt layers. The lateral extent of gasoline hydrocarbons in the soil had been delineated to concentrations of TPHg less than 100 parts per million (ppm) only in the northwestern (B-10) and northeastern (B-9) portions of the

site, and to nondetectable level (less than 1 ppm) in the southern portion of the site (B-6 and B-7). The vertical extent of gasoline hydrocarbons in the soil at the site had been delineated to nondetectable TPHg (less than 1.0 ppm) at a depth of approximately 16 to 20½ feet below the ground surface with the exception of boring B-8, where 240 ppm of TPHg was detected at a depth of 30 feet below ground surface within the saturated zone. The lateral extent of waste-oil related hydrocarbons in the soil in the area of the former waste-oil tank at the site had not been delineated.

The lateral and vertical extent of gasoline hydrocarbons in the groundwater had not been delineated at the site with the exception of the northwestern part of the site where TPHg concentrations were below laboratory detection limit (<60 ppb) in MW-2. Based on the findings that concentrations of TOG, TPHd, VOCs, and the metals cadmium, chromium, lead, and nickel in groundwater samples collected from monitoring well MW-3 were nondetectable RESNA concluded that the hydrocarbons associated with the waste-oil tank have not impacted groundwater beneath the site.

Based on the results of the pump test RESNA estimated a long term pumping rate from the recovery well RW-1 to be around 1.5 to 1.7 gallons per minute (gpm), and concluded that the predicted zone of capture is sufficiently large to capture a portion of the impacted groundwater and floating product at the site (for a pumping rate of 385 ft^3/day, a transmissivity of 91 ft^2/day and hydraulic gradient of 0.012 the width of the zone of capture upgradient of the recovery well is 353 feet and the distance to the downgradient stagnation point is 56 feet). The first-encountered water bearing zone was estimated to be confined, approximately 8 feet thick, with relatively high transmissivity.

Additional Subsurface Environmental Investigation and Vapor Extraction Test

An Addendum Three to the Work Plan (RESNA, May 29, 1992) was prepared by RESNA outlining work to be performed in an additional subsurface environmental investigation and vapor extraction test at the subject site. The work for this investigation was performed by RESNA in August 1992. The work included drilling eight soil borings (B-12 through B-19); collecting and describing soil samples from the borings; constructing six vapor extraction wells (VW-1 through VW-6) in soil borings B-14 through B-19, respectively; submitting selected soil samples for laboratory analyses; and performing a vapor extraction test (RESNA, November 30, 1992).

Based on the results of this investigation RESNA concluded that the majority of gasoline impacted soil at concentrations above 100 ppm of TPHg appeared to be in the northern and eastern portions of the site (northern and southern vicinity of the northern service islands,

northeastern vicinity of former gasoline tank T4, and immediate vicinity of the former waste-oil tank) at depths between 5 to 15 feet below the ground surface, within silty to gravelly clay interbedded with discontinuous layers of clayey to sandy gravel and clayey sand. The presence of water in this relatively permeable zone appeared to have facilitated the movement of gasoline hydrocarbons laterally. The lateral extent of gasoline hydrocarbons in the soil at the subject site had been delineated to less than 100 ppm TPHg, with the exception of the northern and eastern vicinity of the site. The vertical extent of gasoline hydrocarbons in the soil at the site had been delineated based on soil samples collected from unsaturated aquitard materials beneath the site. The soil in the immediate vicinity of the former waste-oil tank pit appeared to be impacted by waste-oil related hydrocarbons up to 1,800 ppm of TOG and up to 250 ppm of a non-diesel mixture of hydrocarbons (C9 - C14, and >C17) calculated as TPHd were detected in the samples collected from borings B-12 and B-13 located next to the former waste-oil tank. VOCs, SVOCs, PCBs were not detected in the soil samples from borings B-12 and B-13, and concentrations of metals (Cd, Cr, Pb, Zn and Ni) were within the range of natural background levels. RESNA concluded that groundwater in the first encountered water-bearing zone was impacted by gasoline hydrocarbons as evidenced by the presence of floating product in recovery well RW-1, and 820 ppb of TPHg detected in the water sample from groundwater monitoring well MW-1. The groundwater at the site did not appear to be impacted by waste-oil related hydrocarbons based on the nondetectable concentrations of TOG, VOCs, Cd, Cr, Pb, Ni, and minor (0.045 ppb) concentration of Zn in monitoring well MW-3 located next to the former waste-oil tank pit. The lateral extent of gasoline hydrocarbons in the groundwater had not been delineated at the site with the exception of the northwestern portion of the site (MW-2), and the vicinity of the former waste-oil tank pit (MW-3) where TPHg concentrations were less than 50 ppb. Laboratory results of air samples and field organic vapor measurements collected from vapor extraction wells VW-2 and VW-5 during the VET suggested that petroleum hydrocarbons exist in the area of the northern service islands and its immediate vicinity. Based on VET results RESNA concluded that vapor extraction appeared to be a viable soil remediation alternative for the remediation of gasoline hydrocarbons from onsite soils. An effective radius of influence for vapor wells VW-1 through VW-6 had been estimated to range from approximately 15 to 40 feet, based upon wellhead flow rates of approximately 80 standard cubic feet per minute (SCFM) and applied vacuums of approximately 90 inches of water column (WC). The projected radius of influence appeared to vary with compass direction, depending on well location and proximity to backfill areas. Radius of influence appears to be limited (< 15 feet) for vapor wells installed near the former tank complex and product-line areas. RESNA believed that this reduced radius of influence might be the result of air short-circuiting through more permeable backfill areas.

Monthly Monitoring and Quarterly Sampling

Monthly monitoring and quarterly sampling of groundwater monitoring wells at the subject site began in October 1991. The highest concentrations of hydrocarbons in groundwater beneath the site were noted in March 1992 (up to 6,500 ppb TPHg and 2,600 ppb benzene in MW-1). Since March 1992 hydrocarbon concentrations have decreased significantly in MW-1 (to 430 ppb TPHg and 130 ppb BTEX) and MW-3 (to nondetectable TPHg and BTEX), and remained nondetectable (TPHg) or decreased to nondetectable levels (BTEX) in MW-2. Recovery well RW-1 continued to contain floating product. In January 1992 RESNA initiated removal of floating product from RW-1 by hand bailing. In April 1992 Horner EZY Floating Skimmer was installed in recovery well RW-1. In third quarter of 1992 RESNA changed floating product removal from monthly to bi-weekly. The results of previous groundwater monitoring and sampling are reported in Table 1, 3 and 4 in the main body of this report and summarized in the reports listed in the References section of this report.

TABLE A-1
LABORATORY ANALYSES OF NEW TANK PIT SOIL SAMPLES
ARCO Station 2035
Albany, California

Sample ID	B	T	E	X	TPHg
July 8, 1991					
S-15-EWC	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-15-SE	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-16-SW1	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-15-SW	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-15-NWC	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-15-WWC	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-15-NWF	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-9-NWW	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-8-NW	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-15-NW	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
July 9, 1991					
S-0709-NP1(10')	0.025	0.027	0.0060	0.024	<1.0
S-0709-NP2(14')	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-0709-NP3(10')	<0.0050	0.0050	<0.0050	0.018	<1.0
S-0709-NP4(15)	0.0050	0.0050	<0.0050	<0.0050	<1.0
S-0709-NP5(5')	0.012	0.013	<0.0050	0.0080	<1.0
S-0709-NP6(15')	0.017	0.021	0.014	0.056	<1.0
S-0709-NP7(3')	0.0060	0.0060	<0.0050	<0.0050	<1.0
S-0709-NP8(14')	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-0709-NP9(9')	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-0709-NP10(10')	0.0090	0.0060	<0.0050	<0.0050	<1.0
S-0709-NP11(8')	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-0709-NP12(14')	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-0709-NP13(2')	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
S-0709-NP14(6')	<0.0050	<0.0050	0.0050	0.0080	<1.0
S-0709-NP15(5')	<0.0060	<0.0050	<0.0050	0.0060	<1.0
S-0709-NP16(16')	<0.0050	<0.0050	0.0050	0.0080	<1.0
S-0709-NP17(10')	<0.0050	<0.0050	0.0050	0.0080	<1.0
S-0709-NP18(11')	<0.0050	<0.0050	0.0050	0.0080	<1.0

Results in parts per million (ppm).
B: benzene, T: toluene, E: ethylbenzene, X: total xylenes
TPHg: Total petroleum hydrocarbons as gasoline (TPHg with BTEX distinction measured by EPA Methods 5030/8015/8020)
<: Less than the indicated laboratory detection limit.
Sample Identification:

Excavation Samples: S-0709-NP1(10')

- New tank pit consecutive number (sample depth)
- Date of sample
- Soil sample

Sidewall and Floor Samples: S-15-EWC

- Location identifier
- Depth of sample
- Soil sample

TABLE A-2
LABORATORY ANALYSES OF FORMER GASOLINE TANK PIT SOIL SAMPLES
ARCO Station 2035
Albany, California

Sample ID	B	T	E	X	TPHg	TOG	VOC	Pb
July 3, 1991								
S-12-T1W	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	NA	NA	NA
S-12-T1E	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	NA	NA	NA
S-12-T2W	0.031	<0.0050	0.0080	<0.0050	<1.0	NA	NA	NA
S-12-T2E	0.019	<0.0050	<0.0050	<0.0050	<1.0	NA	NA	NA
S-12-T3W	1.2	2.4	1.0	3.8	48	NA	NA	<0.05
S-12-T3E	0.2	0.51	0.97	3.9	65	NA	NA	<0.05
S-13-T4N	0.45	0.039	0.18	0.33	6.2	NA	NA	NA
S-13-T4S	0.061 (0.160)	0.034	0.0080	0.15 (0.430)	<1.0	<30	ND	NA

Results in parts per million (ppm).
NA: Not analyzed.
<: Less than the indicated laboratory detection limit
ND: Less than laboratory limit for each compound, except benzene and total xylenes
( ): Indicates results measured by EPA Method 8240
B: benzene, T: toluene, E: ethylbenzene, X: total xylenes
TPHg: Total petroleum hydrocarbons as gasoline
(TPHg with BTEX distinction measured by EPA Methods 5030/8015/8020)
TOG: Total oil and grease (measured by Standard Method 5520 E and F)
VOC: Volatile organic compounds (measured by EPA Method 8240)
Pb: Organic lead (measured by California LUFT Manual Method, 12/87)

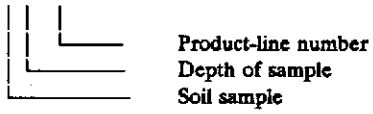
Sample Identification: S-12-T1W

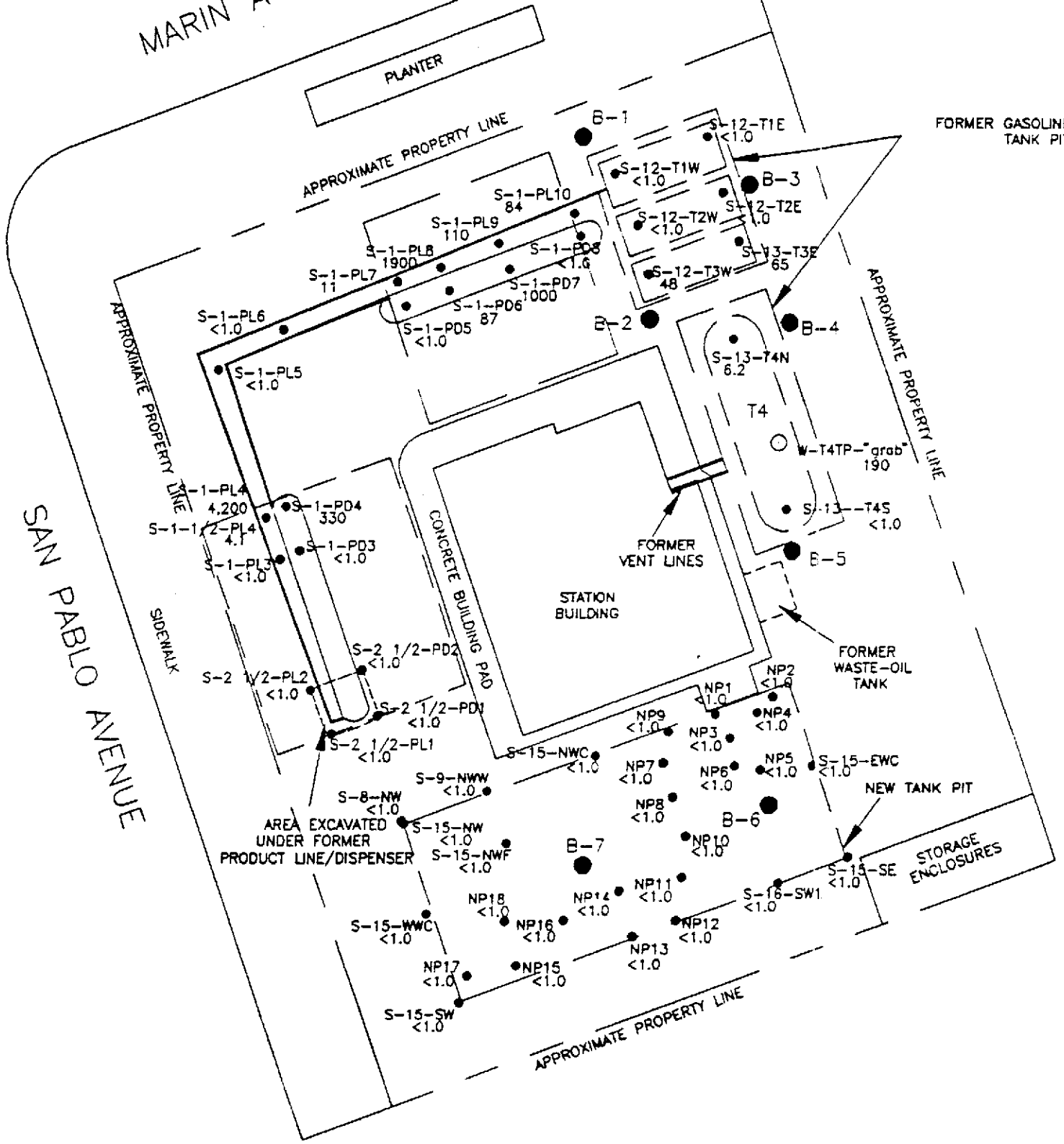
Tank number and locator
Depth of sample
Soil sample

TABLE A-3
LABORATORY ANALYSES OF PRODUCT-LINE
AND PRODUCT-DISPENSER SOIL SAMPLES
ARCO Station 2035
Albany, California

Sample ID	B	T	E	X	TPHg
July 19, 1991					
S-2½-PL1	<0.005	<0.005	<0.005	<0.005	<1.0
S-2½-PL2	<0.005	<0.005	<0.005	<0.005	<1.0
S-1-PL3	0.005	0.02	0.016	0.12	1.7
S-1-PL4	36	320	100	640	4,200
S-1-PL5	<0.005	<0.005	<0.005	<0.005	<1.0
S-1-PL6	<0.005	<0.005	<0.005	<0.005	<1.0
S-1-PL7	0.10	0.37	0.16	1.2	11
S-1-PL8	3.6	28	29	200	1,900
S-1-PL9	0.2	0.78	0.36	3.1	110
S-1-PL10	0.09	0.43	0.72	2.8	84
S-2½-PD1	<0.005	<0.005	<0.005	<0.005	<1.0
S-2½-PD2	<0.005	<0.005	<0.005	<0.005	<1.0
S-1-PD3	<0.005	<0.005	<0.005	<0.005	<1.0
S-1-PD4	<0.005	<0.005	<0.005	12	330
S-1-PD5	<0.005	<0.005	<0.005	<0.005	<1.0
S-1-PD6	0.13	0.28	0.48	3.8	87
S-1-PD7	0.35	2.1	1.1	47	1,000
S-1-PD8	<0.005	<0.005	<0.005	<0.005	<1.0
August 9, 1991					
S-1½-PL4	0.21	0.040	0.15	0.12	4.1

Results in parts per million (ppm).
<: Less than the laboratory detection limit.
B: benzene, T: toluene, E: ethylbenzene, X: total xylenes
BTEX: Measured by EPA Method.
TPHg: Total petroleum hydrocarbons as gasoline (measured by EPA Method).
Sample Identification: S-1½-PL1




MARIN
PLANTER
APPROXIMATE PROPERTY LINE
B-1
S-12-T1E
<1.0
FORMER GASOLINE-STORAGE
TANK PITS
S-12-T1W
<1.0
B-3
S-12-T2E
<1.0
S-12-T2W
<1.0
S-13-T3E
65
S-12-T3W
48
S-1-PL10
84
S-1-PL9
110
S-1-PL8
1900
S-1-PD8
<1.0
S-1-PL7
11
S-1-PD7
1000
S-1-PD6
87
S-1-PD5
<1.0
S-1-PL6
<1.0
B-2
B-4
S-13-T4N
6.2
T4
W-T4TP-"grab"
190
S-13-T4S
<1.0
S-1-PL5
<1.0
APPROXIMATE PROPERTY LINE
APPROXIMATE PROPERTY LINE
S-1-PL4
4,200
S-1-PD4
330
S-1-1/2-PL4
4.1
S-1-PD3
<1.0
S-1-PL3
<1.0
CONCRETE BUILDING PAD
FORMER
VENT LINES
B-5
STATION
BUILDING
SIDEWALK
SAN PABLO AVENUE
S-2 1/2-PD2
<1.0
S-2 1/2-PL2
<1.0
S-2 1/2-PD1
<1.0
S-2 1/2-PL1
<1.0
FORMER
WASTE-OIL
TANK
NP1
<1.0
NP2
<1.0
NP9
<1.0
NP3
<1.0
NP4
<1.0
S-15-NWC
<1.0
NP7
<1.0
NP6
<1.0
NP5
<1.0
S-15-EWC
<1.0
S-9-NWW
<1.0
S-8-NW
<1.0
NEW TANK PIT
NP8
<1.0
B-6
AREA EXCAVATED
UNDER FORMER
PRODUCT LINE/DISPENSER
S-15-NW
<1.0
S-15-NWF
<1.0
B-7
NP10
<1.0
S-15-SE
<1.0
STORAGE
ENCLOSURES
NP18
<1.0
NP14
<1.0
NP11
<1.0
S-16-SW1
<1.0
S-15-WWC
<1.0
NP16
<1.0
NP12
<1.0
NP13
<1.0
NP17
<1.0
NP15
<1.0
S-15-SW
<1.0
APPROXIMATE PROPERTY LINE

APPENDIX B

RECORD SEARCH DATA OF SHELL STATION AT 999 SAN PABLO AVENUE, ALBANY, CALIFORNIA

Table 2
Summary of Analytical Results
Third Quarter 1992
milligrams per liter (mg/l) or parts per million (ppm)

Shell Station: 999 San Pablo Avenue
Albany, California
WIC #: 204-0079-0109

Date: 08/28/92
Project Number: 087-19.01

Sample Designation	Water Sample Field Date	TPH-g (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Ethyl-benzene (mg/l)	Total Xylenes (mg/l)
S-1	08/23/91	2.9	0.027	<0.0025	0.075	0.018
S-1	11/07/91	2.9	0.0080	0.0025	0.046	0.026
S-1	01/28/92	2.0	0.011	<0.0025	0.060	0.020
S-1	05/06/92	1.2	0.0055	<0.0025	0.080	0.036
S-1	07/29/92	2.0	0.0094	<0.0025	0.13	<0.0025
S-2	08/23/91	23.	4.4	0.26	1.9	2.4
S-2	11/07/91	40.	4.0	0.16	1.02	3.4
S-2	01/28/92	22.	1.6	0.07	0.42	1.7
S-2	05/06/92	20.	2.6	0.11	0.86	1.9
S-2	07/29/92	42.	5.0	0.16	1.1	3.5
S-3	08/23/91	2.0	0.025	0.0040	0.0093	0.0045
S-3	11/07/91	4.0	0.020	0.0039	0.0050	0.0049
S-3	01/28/92	2.1	0.021	0.0076	0.0067	0.015
S-3	05/06/92	6.6	0.038	0.051	0.045	0.065
S-3	07/29/92	5.1	0.018	0.0059	0.027	0.060
SD-3	07/29/92	5.8	0.013	0.012	0.029	0.060
S-4	08/23/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
S-4	11/07/91	0.26	<0.0005	<0.0005	<0.0005	<0.0005
S-4	01/28/92	0.11*	<0.0005	<0.0005	<0.0005	<0.0005
S-4	05/06/92	0.054+	<0.0005	<0.0005	<0.0005	<0.0005
S-4	07/29/92	0.067	<0.0005	<0.0005	<0.0005	<0.0005

TPH-g = total petroleum hydrocarbons as gasoline
* = Compounds detected and calculated as gasoline are not characteristic of the standard gasoline chromatographic pattern
+ = The concentration reported as gasoline is primarily due to the presence of a discrete hydrocarbon peak not indicative of gasoline

Table 2
Summary of Analytical Results
Third Quarter 1992
milligrams per liter (mg/l) or parts per million (ppm)

Shell Station: 999 San Pablo Avenue
Albany, California
WIC #: 204-0078-0109

Date: 08/28/92
Project Number: 087-19.01

Sample Designation	Water Sample Field Date	TPH-g (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Ethyl-benzene (mg/l)	Total Xylenes (mg/l)
S-5	08/23/91	FP	FP	FP	FP	FP
S-5	11/07/91	FP	FP	FP	FP	FP
S-5	01/28/92	FP	FP	FP	FP	FP
S-5	05/06/92	FP	FP	FP	FP	FP
S-5	07/29/92	FP	FP	FP	FP	FP
S-6	08/23/91	9.8	0.48	0.08	0.12	0.15
S-6	11/07/91	8.2	0.24	0.023	0.025	0.027
S-6	01/28/92	5.8	0.25	0.015	0.041	0.036
S-6	05/06/92	7.1	0.33	0.029	0.11	0.21
S-6	07/29/92	13.	0.24	<0.05	0.058	0.078
S-7	08/23/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
S-7	11/07/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
S-7	01/28/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
S-7	05/06/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
S-7	07/29/92	0.16	<0.0005	<0.0005	<0.0005	<0.0005
FB	07/29/92	<0.05^	<0.0005^	<0.0005^	<0.0005^	<0.0005^
TB	01/28/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
TB	05/06/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
TB	07/29/92	<0.05^	<0.0005^	<0.0005^	<0.0005^	<0.0005^

TPH-g = total petroleum hydrocarbons as gasoline
FP = Floating product; well contained floating product and was not sampled
^ = Samples TB and FB from 07/29/92 are called TB-1 and FB-1 on the chain-of-custody form and certified analytical report

TABLE 3

HISTORICAL GROUND-WATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)
01-May-90	S-5	Floating Product 0.64 ft				
28-Aug-90	S-5	Floating Product 3.51 ft				
27-Nov-90	S-5	Floating Product 4.71 ft				
11-Feb-91	S-5	Floating Product 5.57 ft				
13-May-91	S-5	Floating Product 6.48 ft				
23-Aug-91	S-5	Floating Product 5.50 ft				
28-Aug-90	S-6	5.7	0.58	0.023	0.032	0.058
27-Nov-90	S-6	8.0	0.79	0.037	0.096	0.069
11-Feb-91	S-6	12.	0.54	0.077	0.17	0.19
13-May-91	S-6	13.	0.60	0.14	0.21	0.31
23-Aug-91	S-6	9.8	0.48	0.08	0.12	0.15
28-Aug-90	S-7	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
27-Nov-90	S-7	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
11-Feb-91	S-7	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
13-May-91	S-7	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
23-Aug-91	S-7	<0.05	<0.0005	<0.0005	<0.0005	<0.0005

Current Regional Water Quality Control Board Maximum Contaminant Levels
Benzene 0.001 ppm Xylenes 1.750 ppm Ethylbenzene 0.680 ppm

Current DHS Action Levels Toluene 0.1000 ppm

TPH-G - Total Petroleum Hydrocarbons calculated as Gasoline
PPM - Parts Per Million
NOTE: 1. DHS Action levels and MCL's are subject to change pending State of California review.
2. All data shown as <X are reported as ND (none detected).

TABLE 3

HISTORICAL GROUND-WATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)
05-Feb-90	S-1	3.1	0.056	0.037	0.11	0.097
01-May-90	S-1	4.2	0.023	<0.0025	0.116	0.32
28-Aug-90	S-1	0.80	0.0081	0.001	0.075	0.054
27-Nov-90	S-1	2.2	0.011	<0.0025	0.058	0.022
11-Feb-91	S-1	1.5	0.027	<0.0025	0.073	0.087
13-May-91	S-1	1.5	0.020	0.0026	0.086	0.074
23-Aug-91	S-1	2.9	0.027	<0.0025	0.075	0.018
05-Feb-90	S-2	8.7	1.6	0.058	0.16	1.0
01-May-90	S-2	11.	2.3	0.082	0.409	0.77
28-Aug-90	S-2	4.4	1.7	0.035	0.16	0.17
27-Nov-90	S-2	18.	4.3	0.20	1.5	1.7
11-Feb-91	S-2	6.8	1.1	0.047	0.17	0.62
13-May-91	S-2	23.	3.9	0.23	1.1	3.2
23-Aug-91	S-2	23.	4.4	0.26	1.9	2.4
05-Feb-90	S-3	5.7	0.045	0.004	0.12	0.50
01-May-90	S-3	2.0	0.018	<0.0025	0.024	0.008
28-Aug-90	S-3	0.66	0.0087	0.001	0.026	0.007
27-Nov-90	S-3	1.9	0.0073	0.0030	0.0093	0.0032
11-Feb-91	S-3	1.3	0.020	<0.0025	0.0095	0.0036
13-May-91	S-3	3.3	0.030	0.0036	0.026	0.013
23-Aug-91	S-3	2.0	0.025	0.0040	0.0093	0.0045
01-May-90	S-4	<0.05	<0.0005	<0.0005	<0.0005	<0.001
28-Aug-90	S-4	<0.05	<0.0005	0.0006	<0.0005	0.0010
27-Nov-90	S-4	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
11-Feb-91	S-4	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
13-May-91	S-4	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
23-Aug-91	S-4	<0.05	<0.0005	<0.0005	<0.0005	<0.0005

Table 1
Monitoring Well Field Measurement Data
Third Quarter 1992

ell Station: 999 San Pablo Avenue
Albany, California
WIC #: 204-0079-0109

Date: 08/26/92
Project Number: 087-18.01

ll sig-tion	Water Level Field Date	TOB Elevation (ft-MSL)	Depth to Water (feet)	Ground-water Elevation (ft-MSL)	Total Well Depth (feet)	Floating Product Thickness (feet)	Water Sample Field Date	pH (std. units)	Electrical Conductivity (micromhos/cm)	Temperature (degrees F)	Turbidity (NTU)
1	08/23/91	42.73	8.37	34.36	11.8	ND	08/23/91	6.63	814	68.1	NR
1	11/07/91	42.73	8.30	34.43	11.8	ND	11/07/91	7.04	544	68.3	NR
1	01/28/92	42.73	7.84	34.89	11.4	ND	01/28/92	6.87	707	63.9	>200
1	05/06/92	42.73	7.95	34.78	11.8	ND	05/06/92	6.58	692	67.3	833
1	08/06/92	42.73	8.24	34.49	11.8	ND	07/28/92	6.71	856	68.0	191
2	08/23/91	40.73	8.80	31.93	12.2	ND	08/23/91	6.56	940	69.4	NR
2	11/07/91	40.73	8.81	32.12	12.2	ND	11/07/91	6.66	855	69.8	NR
2	01/28/92	40.73	7.60	32.93	11.8	ND	01/28/92	6.84	1177	62.4	>200
2	05/06/92	40.73	8.10	32.63	12.1	ND	05/06/92	7.02	1154	63.5	21.8
2	08/06/92	40.73	8.37	32.36	12.2	ND	07/29/92	6.50	1401	68.0	>200
3	08/23/91	41.46	8.14	33.32	12.2	ND	08/23/91	6.46	698	70.3	NR
3	11/07/91	41.46	7.91	33.55	12.2	ND	11/07/91	6.93	814	70.8	NR
3	01/28/92	41.46	7.53	33.93	11.9	ND	01/28/92	6.76	777	61.2	>200
3	05/06/92	41.46	7.55	33.91	12.1	ND	05/06/92	6.54	704	65.2	>1000
3	08/06/92	41.46	7.53	33.93	12.2	ND	07/29/92	6.16	787	68.9	>200
4	08/23/91	41.10	8.32	32.78	14.1	ND	08/23/91	6.55	358	67.8	NR
4	11/07/91	41.10	8.32	32.78	14.1	ND	11/07/91	6.60	358	69.5	NR
4	01/28/92	41.10	7.40	33.70	13.8	ND	01/28/92	6.80	409	63.8	>200
4	05/06/92	41.10	7.21	33.89	14.1	ND	05/06/92	6.16	419	67.9	>1000
4	08/06/92	41.10	8.13	32.97	14.0	ND	07/29/92	5.20	490	65.5	>200

OB = top of well box
t-MSL = elevation in feet, relative to mean sea level
td. units = standard pH units
icromhos/cm = micromhos per centimeter
egrees F = degrees Fahrenheit
TU = nephelometric turbidity units
D = None detected
R = Not reported; data not available

Table 1
Monitoring Well Field Measurement Data
Third Quarter 1992

Shell Station: 999 San Pablo Avenue
Albany, California
WIC #: 204-0079-0109

Date: 08/28/92
Project Number: 087-18.01

Well Designation	Water Level Field Date	TOB Elevation (ft-MSL)	Depth to Water (feet)	Groundwater Elevation (ft-MSL)	Total Well Depth (feet)	Floating Product Thickness (feet)	Water Sample Field Date	pH (std. units)	Electrical Conductivity (micromhos/cm)	Temperature (degrees F)	Turbidity (NTU)
S-5	08/23/91	39.99	15.14	29.25**	NR	5.50	08/23/91	FP	FP	FP	FP
S-5	11/07/91	39.99	15.10	29.17**	NR	5.35	11/07/91	FP	FP	FP	FP
S-5	01/28/92	39.99	14.05	29.86**	15.7	4.90	01/28/92	FP	FP	FP	FP
S-5	05/06/92	39.99	14.31	30.21**	16.1	5.66	05/06/92	FP	FP	FP	FP
S-5	08/06/92	39.99	14.28	28.77**	16.1	3.80	07/29/92	FP	FP	FP	FP
S-6	08/23/91	40.12	9.58	30.54	15.3	ND	08/23/91	6.61	598	68.8	NR
S-6	11/07/91	40.12	10.86	29.26	15.3	ND	11/07/91	7.34	538	70.2	NR
S-6	01/28/92	40.12	8.97	31.15	14.8	ND	01/28/92	7.09	728	65.8	>200
S-6	05/06/92	40.12	8.27	31.85	15.2	ND	05/06/92	7.27	594	64.5	>1000
S-6	08/06/92	40.12	9.57	30.55	15.2	ND	07/29/92	5.88	912	67.5	>200
S-7	08/23/91	40.10	11.16	28.94	15.1	ND	08/23/91	6.61	600	68.4	NR
S-7	11/07/91	40.10	11.48	28.62	15.2	ND	11/07/91	6.39	606	69.8	NR
S-7	01/28/92	40.10	10.72	29.38	14.7	ND	01/28/92	6.79	800	62.7	>200
S-7	05/06/92	40.10	10.34	29.76	15.1	ND	05/06/92	6.84	826	67.2	>1000
S-7	08/06/92	40.10	11.13	28.97	15.1	ND	07/29/92	5.80	958	65.8	>200

TOB = top of well box
ft-MSL = elevation in feet, relative to mean sea level
std. units = standard pH units
micromhos/cm = micromhos per centimeter
degrees F = degrees Fahrenheit
NTU = nephelometric turbidity units
** = groundwater elevation corrected to include 80 percent of the floating product thickness measured in the well
NR = Not reported; data not available
FP = Floating product; well contained floating product and was not sampled
ND = None detected

TABLE 2

SOIL ANALYSIS DATA

BORING NO	SAMPLE DATE	ANALYSIS DATE	TPH (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)
S-A-5'	29-Jan-90	08-Feb-90	13.	0.26	<0.025	0.46	0.91
S-A-10'	29-Jan-90	09-Feb-90	1900.	9.8	10.	41.	250.
S-B-5'	29-Jan-90	09-Feb-90	5.6	<0.025	<0.025	0.028	0.09
S-B-15'	29-Jan-90	08-Feb-90	<2.5	<0.025	<0.025	<0.025	0.09
S-C-5'	29-Jan-90	08-Feb-90	48.	<0.2	<0.2	0.27	0.7
S-C-10'	29-Jan-90	08-Feb-90	470.	<1.	1.	8.	28.
C-D-15'	29-Jan-90	08-Feb-90	94.	0.63	0.31	2.5	1.4
S-E-5'	29-Jan-90	08-Feb-90	21.	0.38	0.036	0.40	0.44
S-E-10'	29-Jan-90	08-Feb-90	<2.5	<0.025	<0.025	0.026	0.06
S-F-5'	29-Jan-90	08-Feb-90	<2.5	<0.025	<0.025	<0.025	<0.05
S-F-10'	29-Jan-90	08-Feb-90	120.	0.44	0.10	<0.8	0.8
S-G-10'	29-Jan-90	08-Feb-90	6.5	0.032	<0.025	<0.025	0.07
S-G-15'	29-Jan-90	08-Feb-90	<2.5	<0.025	<0.025	<0.025	<0.05
S-3-10'	30-Jan-90	08-Feb-90	18.	<0.03	<0.025	<0.025	0.11
S-3-15'	30-Jan-90	08-Feb-90	<2.5	<0.025	<0.025	<0.025	<0.05
S-1-10'	30-Jan-90	09-Feb-90	6.2	<0.06	<0.025	0.096	0.32
S-1-14'	30-Jan-90	09-Feb-90	<2.5	<0.025	<0.025	<0.025	<0.05
S-2-5'	30-Jan-90	09-Feb-90	<2.5	<0.025	<0.025	<0.025	<0.05
S-2-10'	30-Jan-90	09-Feb-90	250.	2.5	0.8	6.5	8.6

Note: 1. All data shown as <x are reported as ND (none detected)

TABLE 2

SOIL ANALYSIS DATA

SAMPLE NO	SAMPLE DATE	ANALYSIS DATE	TPH (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)
S-4-5	16-Apr-90	26-Apr-90	<2.5	<0.025	<0.025	<0.025	<0.05
S-4-9	16-Apr-90	26-Apr-90	<2.5	<0.025	<0.025	<0.025	<0.05
S-5-5	16-Apr-90	26-Apr-90	<2.5	<0.025	<0.025	<0.025	<0.05
S-5-12	16-Apr-90	26-Apr-90	25	0.30	0.12	0.51	1.2
S-5-15	16-Apr-90	26-Apr-90	130	1.9	7.5	3.3	18

TPH = Total Petroleum Hydrocarbons as Gasoline

Note: 1. All data shown as <x are reported as ND (none detected).

TABLE 1

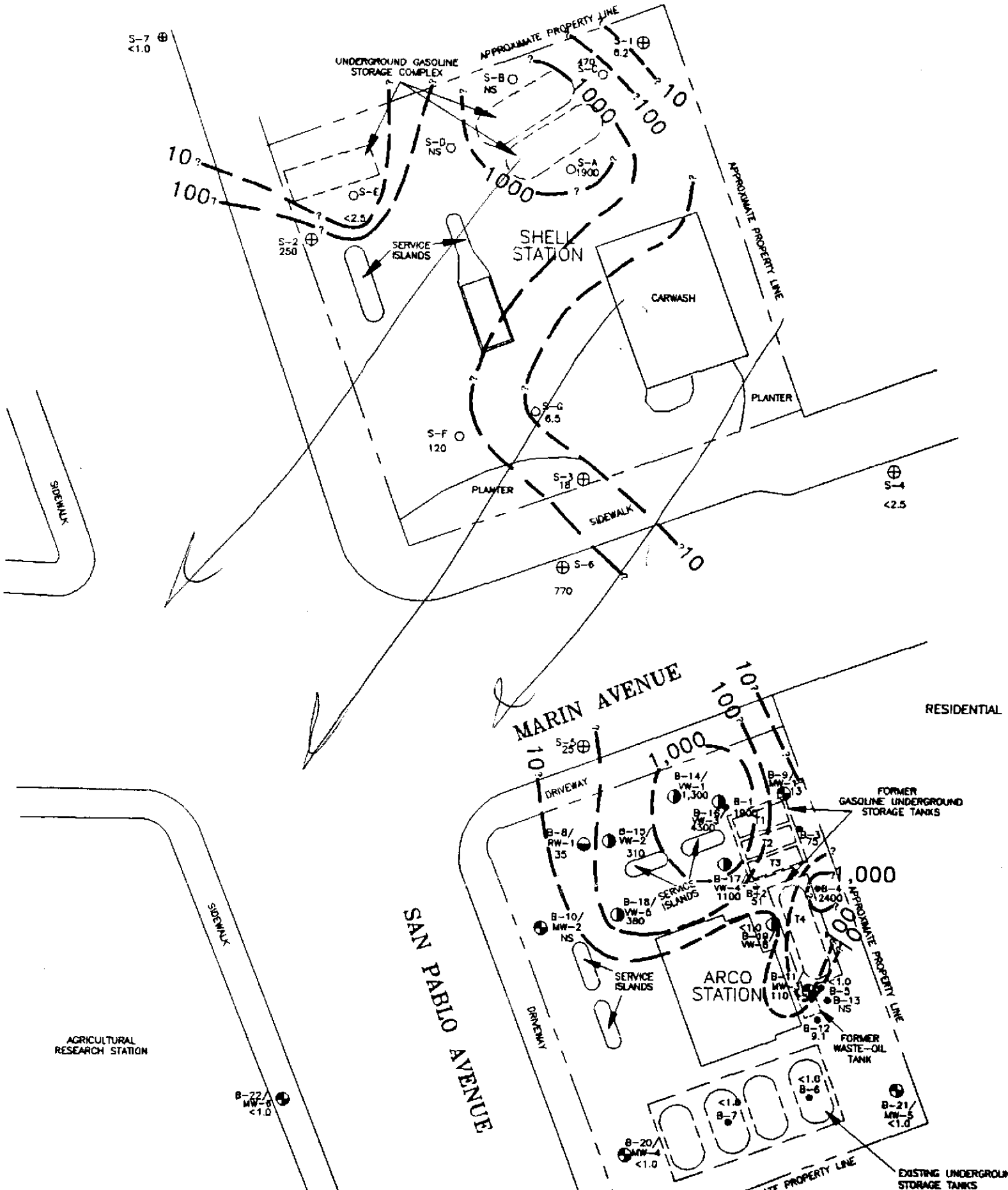
SOIL ANALYSIS DATA

SAMPLE NO	SAMPLE DATE	ANALYSIS DATE	TPH (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)
S-6-6	15-Aug-90	23-Aug-90	180.	0.2	0.4	0.5	1.5
S-6-9	15-Aug-90	23-Aug-90	770.	2.2	2.8	6.8	5.1
S-6-19.5	15-Aug-90	22-Aug-90	<1.	<0.005	<0.005	<0.005	<0.005
S-7-9	15-Aug-90	22-Aug-90	<1.	<0.005	<0.005	<0.005	<0.005
S-7-19.5	15-Aug-90	22-Aug-90	<1.	<0.005	<0.005	<0.005	<0.005

TPH = Total Petroleum Hydrocarbons calculated as Gasoline

Note: 1. All data shown as <x are reported as ND (none detected).

Report No. 7666-4


S-7 <1.0
UNDERGROUND GASOLINE STORAGE COMPLEX
APPROXIMATE PROPERTY LINE
S-1 6.2
S-B NS
S-C 470
S-D NS
S-A 1900
S-E <2.5
S-2 250
SERVICE ISLANDS
SHELL STATION
CARWASH
APPROXIMATE PROPERTY LINE
PLANTER
S-G 6.5
S-F 120
S-3 18
PLANTER
SIDEWALK
S-4 <2.5
S-6 770
SIDEWALK
MARIN AVENUE
RESIDENTIAL
S-5 25
DRIVEWAY
B-14/ VW-1 1,300
B-9/ MW-3 13
B-1 190
B-16/ VW-3 4300
FORMER GASOLINE UNDERGROUND STORAGE TANKS
B-8/ RW-1 35
B-15/ VW-2 310
B-3 75
T2
T3
B-17/ VW-4 1100
SERVICE ISLANDS
B-2 31
B-4 2400
APPROXIMATE PROPERTY LINE
B-18/ VW-6 380
T4
B-10/ MW-2 NS
SERVICE ISLANDS
ARCO STATION
B-11/ MW-1 110
B-5 <1.0
B-13 NS
B-12 9.1
FORMER WASTE-OIL TANK
DRIVEWAY
SAN PABLO AVENUE
SIDEWALK
AGRICULTURAL RESEARCH STATION
B-22/ MW-6 <1.0
<1.0 B-6
<1.0 B-7
B-21/ MW-5 <1.0
B-20/ MW-4 <1.0
EXISTING UNDERGROUND STORAGE TANKS
PROPERTY LINE

APPENDIX C

FIELD PROTOCOL

FIELD PROTOCOL

The following presents RESNA's protocol for a typical site investigation involving gasoline- and waste-oil- impacted soil and/or groundwater.

Site Safety Plan

The Site Safety Plan describes the safety requirements for the evaluation of gasoline hydrocarbons in soil, groundwater, and the vadose-zone at the site. The site Safety Plan is applicable to personnel of RESNA and its subcontractors. RESNA personnel and subcontractors of RESNA scheduled to perform the work at the site are to be briefed on the contents of the Site Safety Plan before work begins. A copy of the Site Safety Plan is available for reference by appropriate parties during the work. A site Safety Officer is assigned to the project.

Sampling of Stockpiled Soil

One composite soil sample is collected for each 50 cubic yards of stockpiled soil, and for each individual stockpile composed of less than 50 cubic yards. Composite soil samples are obtained by first evaluating relatively high, average, and low areas of hydrocarbon concentration by digging approximately one to two feet into the stockpile and placing the intake probe of a field calibrated OVM against the surface of the soil; and then collecting one sample from the "high" reading area, and three samples from the "average" areas. Samples are collected by removing the top one to two feet of soil, then driving laboratory-cleaned brass sleeves into the soil. The samples are sealed in the sleeves using aluminum foil, plastic caps, and aluminized duct tape; labeled; and promptly placed in iced storage for transport to the laboratory, where compositing will be performed.

Soil Borings

Prior to the drilling of borings and construction of monitoring wells, permits are acquired from the appropriate regulatory agency. In addition to the above-mentioned permits, encroachment permits from the City or State are acquired if drilling of borings offsite in the City or State streets is necessary. Copies of the permits are included in the appendix of the project report. Prior to drilling, Underground Services Alert is notified of our intent to drill, and known underground utility lines and structures are approximately marked.

The borings are drilled by a truck-mounted drill rig equipped with 8- or 12-inch-diameter, hollow-stem augers. The augers are steam-cleaned prior to drilling each boring to minimize the possibility of cross-contamination. After drilling the borings, monitoring wells are constructed in the borings, or neat-cement grout with bentonite is used to backfill the borings to the ground surface.

Borings for groundwater monitoring wells are drilled to a depth of no more than 20 feet below the depth at which a saturated zone is first encountered, or a short distance into a stratum beneath the saturated zone which is of sufficient moisture and consistency to be judged as a perching layer by the field geologist, whichever is shallower. Drilling into a deeper aquifer below the shallowest aquifer can begin only after a conductor casing is properly installed and allowed to set, to seal the shallow aquifer.

Drill Cuttings

Drill cuttings subjectively evaluated as having hydrocarbon contamination at levels greater than 100 parts per million (ppm) are separated from those subjectively evaluated as having hydrocarbon contamination levels less than 100 ppm. Evaluation is based either on subjective evidence of soil discoloration, or on measurements made using a field calibrated OVM. Readings are taken by placing a soil sample into a ziplock type plastic bag and allowing volatilization to occur. The intake probe of the OVM is then inserted into the headspace created in the plastic bag immediately after opening it. The drill cuttings from the borings are placed in labeled 55-gallon drums approved by the Department of Transportation; or on plastic at the site, and covered with plastic. The cuttings remain the responsibility of the client.

Soil Sampling in Borings

Soil samples are collected at no greater than 5-foot intervals from the ground surface to the total depth of the borings. The soil samples are collected by advancing the boring to a point immediately above the sampling depth, and then driving a California-modified, split-spoon sampler containing brass sleeves through the hollow center of the auger into the soil. The sampler and brass sleeves are laboratory-cleaned, steam-cleaned, or washed thoroughly with Alconox® and water, prior to each use. The sampler is driven with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows to drive the sampler each successive six inches are counted and recorded to evaluate the relative consistency of the soil.

The samples selected for laboratory analyses are removed from the sampler and quickly sealed in their brass sleeves with aluminum foil, plastic caps, and aluminized duct tape. The samples are then be labeled, promptly placed in iced storage, and delivered to a laboratory certified by the State of California to perform the analyses requested.

One of the samples in brass sleeves not selected for laboratory analyses at each sampling interval is tested in the field using an OVM that is field calibrated at the beginning of each day it is used. This testing is performed by inserting the intake probe of the OVM into the headspace created in the plastic bag containing the soil sample as described in the Drill Cuttings section above. The OVM readings are presented in Logs of Borings included in the project report.

Logging of Borings

A geologist is present to log the soil cuttings and samples using the Unified Soil Classification System. Samples not selected for chemical analyses, and the soil in the sampler shoe, are extruded in the field for inspection. Logs include texture, color, moisture, plasticity, consistency, blow counts, and any other characteristics noted. Logs also include subjective evidence for the presence of hydrocarbons, such as soil staining, noticeable or obvious product odor, and OVM readings.

Groundwater Monitoring Well Construction

Monitoring wells are constructed in selected borings using clean 2- or 4-inch-diameter, thread-jointed, Schedule 40 polyvinyl chloride (PVC) casing. No chemical cements, glues, or solvents are used in well construction. Each casing bottom is sealed with a threaded end-plug, and each casing top with a locking plug. The screened portions of the wells are constructed of machine-slotted PVC casing with 0.020-inch-wide (typical) slots for initial site wells. Slot size for subsequent wells may be based on sieve analyses and/or well development data. The screened sections in groundwater monitoring wells are placed to allow monitoring during seasonal fluctuations of groundwater levels.

The annular space of each well is backfilled with No. 2 by 12 sand, or similar sorted sand to approximately two feet above the top of the screened casing for initial site wells. The sand pack grain size for subsequent wells may be based on sieve analyses and/or well development data. A 1- to 2-foot-thick bentonite plug is placed above the sand as a seal against cement entering the filter pack. The remaining annulus is then backfilled with a slurry of water, neat cement, and bentonite to approximately one foot below the ground surface.

An aluminum utility box with a PVC apron is placed over each wellhead and set in concrete placed flush with the surrounding ground surface. Each wellhead cover has a seal to protect the monitoring well against surface-water infiltration and requires a special wrench to open. The design discourages vandalism and reduces the possibility of accidental disturbance of the well.

Groundwater Monitoring Well Development

The monitoring wells are developed by bailing or over-pumping and surge-block techniques. The wells are either bailed or pumped, allowed to recharge, and bailed or pumped again until the water removed from the wells is determined to be clear. Turbidity measurements (in NTUs) are recorded during well development and are used in evaluating well development. The development method used, initial turbidity measurement, volume of water removed, final turbidity measurement, and other pertinent field data and observations are included in reports. The wells are allowed to equilibrate for at least 48 hours after development prior to sampling. Water generated by well development will be stored in 17E Department of Transportation (DOT) 55-gallon drums on site and will remain the responsibility of the client.

Sample Labeling and Handling

Sample containers are labeled in the field with the job number, sample location and depth, and date, and promptly placed in iced storage for transport to the laboratory. A Chain of Custody Record is initiated by the field geologist and updated throughout handling of the samples, and accompanies the samples to a laboratory certified by the State of California for the analyses requested. Samples are transported to the laboratory promptly to help ensure that recommended sample holding times are not exceeded. Samples are properly disposed of after their useful life has expired.

APPENDIX D

WELL CONSTRUCTION PERMIT

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588 • (510) 484-2600

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT ARCO 2035
1001 San Pablo Avenue
Albany, California

CLIENT
Name ARCO
Address P.O. Box 5811 Phone (415) 571-2434
City San Mateo Zip 94402

APPLICANT
Name RESNA Industries Inc.
Address 3315 Almaden Expy. Suite 34 Phone (408) 266-7723
City San Jose Zip 95118

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	___
Monitoring	X	Well Destruction	___

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger Hollow-Stem
Cable ___ Other ___

DRILLER'S LICENSE NO. C-57 374152

WELL PROJECTS
Drill Hole Diameter 8 in. (12) Maximum
Casing Diameter 2 in. (4) Depth 35 ft.
Surface Seal Depth 10 ft. Number 2 (2)

GEOTECHNICAL PROJECTS
Number of Borings ___ Maximum
Hole Diameter ___ in. Depth ___ ft.

ESTIMATED STARTING DATE 11/24/92
ESTIMATED COMPLETION DATE 11/25/92

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Barbara Sieminski Date 11/16/92

FOR OFFICE USE

PERMIT NUMBER 92604
LOCATION NUMBER ___

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 19 Nov 92
Wyman Hong

51991

APPENDIX E

WELLHEAD SURVEY

JOHN E. KOCH
Land Surveyor
CA State Lic. No. LS4811
5427 Telegraph Ave., Suite A
Oakland, CA 94609
(510) 655-9956
FAX (510) 655-9745

TRANSMITTAL LETTER

TO:Barbara Sieminski/Joel Coffman FROM:John Koch

Job No.:93004

COMPANY:RESNA Re:RESNA Project #69036.05

FAX NO:(408) 264-2435

SUBJECT:Arco Station #2035
1001 San Pablo Avenue
@ Marin Ave.
Albany, CA

PER: _x_ Your request.

___ Our telephone conversation of:

___Other:

FIND ENCLOSED:

1. Report of monitor well data table.
2. Plot plan of site.

NO. OF PAGES (including transmittal): __3__

MESSAGE:

JOHN E. KOCH
Land Surveyor
CA. State Lic. No. LS4811
5427 Telegraph Ave., Suite A
Oakland, CA 94609
(510) 655-9956
FAX (510) 655-9745

01/19/93

RESNA
3315 Almaden Expressway, Suite 34
San Jose, CA 95118
(408) 264-7723
FAX (408) 264-2435

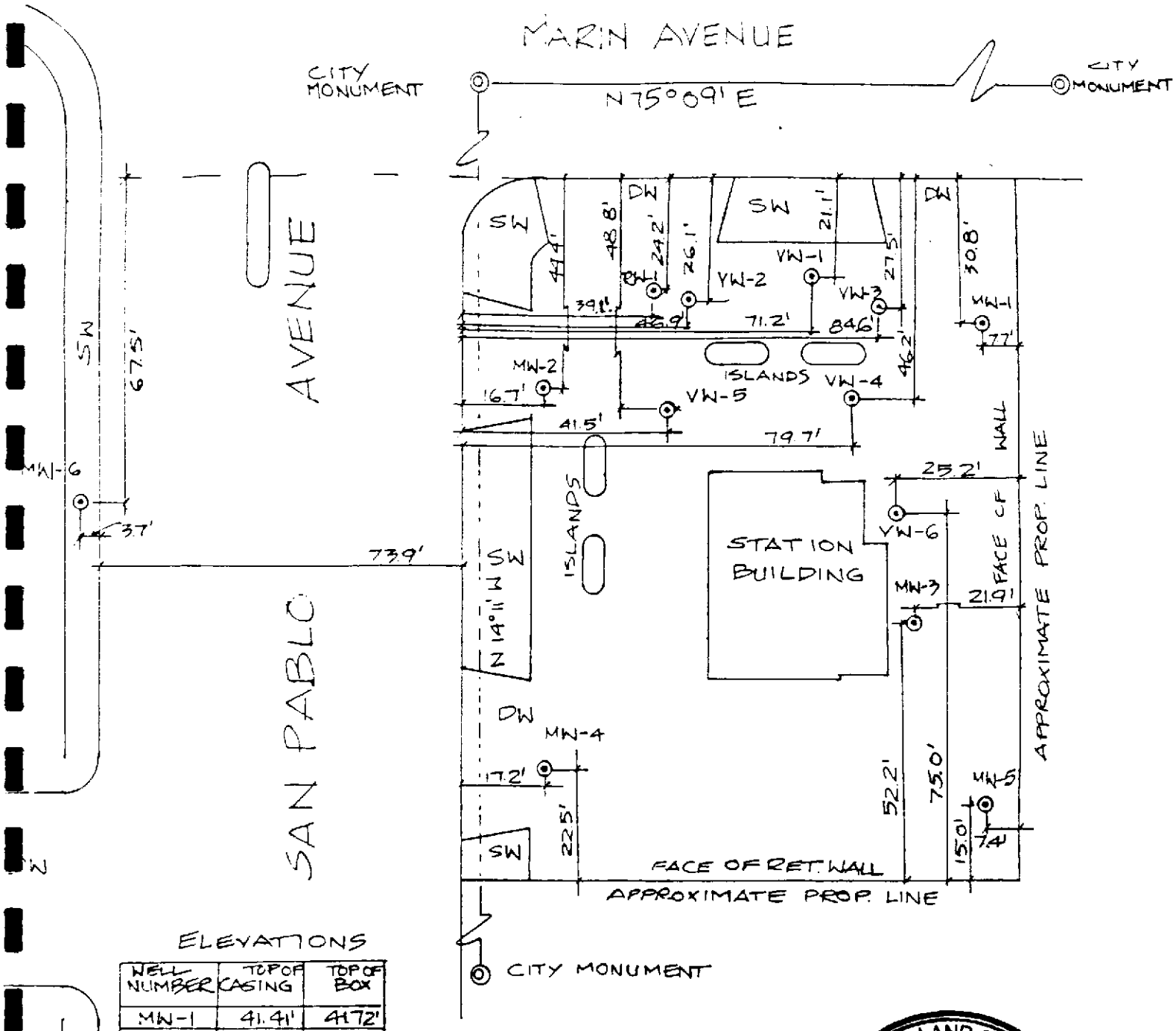
Tabulation of Elevations as of
01:00 p.m. 01/16/93

Job #93004
RESNA Project 69036.05
Project Geologist:Joel Coffman
Site: ARCO Station # 2035
1001 San Pablo Avenue
@ Marin Ave.
Albany, CA

BENCHMARK: (B1198) A standard Bronze Disk in the sidewalk 0.8' behind the face of curb on the northerly side of Marin Avenue 6' +/- westerly of the curb return at the northeast corner of Marin Ave. and San Pablo Ave. (El. = 40.426').

MONITOR WELL DATA TABLE

Well Designation	Elevation	Description
MW-1*	41.41	Top of PVC Casing
	41.72	Top of Box
MW-2*	40.38	Top of PVC Casing
	40.73	Top of Box
MW-3*	41.44	Top of PVC Casing
	41.88	Top of Box
MW-4	40.33	Top of PVC Casing
	41.01	Top of Box
MW-5	41.84	Top of PVC Casing
	42.48	Top of Box
MW-6	40.13	Top of PVC Casing
	40.60	Top of Box
RW-1*	40.33	Top of PVC Casing
	40.83	Top of Box



ELEVATIONS

WELL NUMBER	TOP OF CASING	TOP OF BOX
MW-1	41.41'	41.72'
MW-2	40.38'	40.75'
MW-3	41.44'	41.88'
MW-4	40.33'	41.01'
MW-5	41.84'	42.48
MW-6	40.13	40.60
RW-1	40.33	40.83

LEGEND
SW - SIDEWALK
DW - DRIVEWAY

LICENSED LAND SURVEYOR
JOHN E. KOCH
No. 4811
Exp. 09-30-98
STATE OF CALIFORNIA

SITE: ARCO STATION 2035
1061 SAN PABLO AVE.
ALBANY, CA.,
RESNA PROJECT: 6903605

CLIENT: RESNA
3315 ALMADEN EXPRESSWAY
SUITE 34
SAN JOSE, CA, 95118

7083 / 93004 DRAWN BY DATE:

JOHN E. KOCH
LAND SURVEYOR
CA STATE LIC. NO. LS48
5427 TELEGRAPH AVE.
OAKLAND, CA. 94609
PHONE (510) 6559956
FAX (510) 6559745

APPENDIX F

EMCON's SUMMARY OF GROUNDWATER MONITORING DATA, CHAIN OF CUSTODY FORMS AND ANALYTICAL REPORTS OF GROUNDWATER SAMPLES

EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

RECEIVED
JAN 1 1993
RESNA
SAN JOSE

Date December 31, 1992
Project 0G70-017.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Almaden Expressway, Suite 34
San Jose, California 95118

We are enclosing:

Copies	Description
1	Depth To Water/Floating Product Survey Results
	December 1992 monthly water level survey, ARCO
	station 2035, 1001 San Pablo Avenue, Albany, CA

For your: X Information Sent by: X Mail

Comments:

Monthly water level data for the above mentioned site are attached. Please call if you have any questions: (408) 453-2266.

Reviewed by:

Jim Butera JB

Robert Porter, Senior Project Engineer.

1938 Junction Avenue, San Jose, California 95131-2102, (408) 453-0719, Fax (408) 453-0452

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-017.01 STATION ADDRESS : 1001 San Pablo Ave. Albany, CA DATE : 12/16/92

ARCO STATION # : 2035 FIELD TECHNICIAN : Steve Horton DAY : Wednesday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-2	good	yes	na	3259	yes	9.82	9.82	ND	ND	28.7	under pressure allowed to stabilize
2	MW-3	good	yes	na	3259	yes	10.15	10.15	ND	ND	33.0	under pressure allowed to stabilize
3	MW-1	good	yes	na	3259	yes	9.40	9.41	ND	ND	29.7	water in box
4	RW-1	good	yes	na	3259	yes	10.19	10.20	9.69	.51	25.1	valve on skimmer was open skimmer not set at correct depth

SURVEY POINTS ARE TOP OF WELL CASINGS

EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

RECEIVED
FEB 5 1993

Date February 4, 1993
Project 0G70-017.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Almaden Expressway, Suite 34
San Jose, California 95118

We are enclosing:

Copies	Description
1	Depth To Water / Floating Product Survey Results
1	Summary of Groundwater Monitoring Data
1	Certified Analytical Reports with Chain-of-Custody
7	Water Sample Field Data Sheets

For your: X Information Sent by: X Mail

Comments:
Enclosed are the data from the first quarter 1993 monitoring event at ARCO service station 2035, 1001 San Pablo Avenue, Albany, California. Groundwater monitoring is conducted consistent with applicable regulatory guidelines. Please call if you have any questions: (408) 453-2266.

Jim Butera JB

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
ROBERT CURTIS PORTER
No: 4084
Exp. 4/30/96
INDUSTRIAL
STATE OF CALIFORNIA

Robert Porter, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-017.01 STATION ADDRESS : 1001 San Pablo Ave. Albany, CA DATE : 1-13-93

ARCO STATION # : 2035 FIELD TECHNICIAN : REICHELDERFER / GALLEGOS DAY : WEDNESDAY

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-4	OK	YES	OK	3259	OK	8.05	8.05	ND	NA	25.1	—
2	MW-5	OK	YES	OK	DOLPHIN	OK	8.22	8.22	ND	NA	24.3	—
3	MW-6	OK	YES	OK	DOLPHIN	OK	9.84	9.84	ND	NA	24.3	—
4	MW-2	OK	YES	OK	3259	OK	8.25	8.25	ND	NA	28.7	—
5	MW-3	OK	YES	OK	3259	OK	9.12	9.12	ND	NA	33.0	—
6	MW-1	OK	YES	OK	3259	BAD	7.73	7.73	ND	NA	29.6	REPLACED LWC
7	RW-1	OK	YES	OK	3259	BAD	8.35	8.35	*NA	*NA	NA	*SKIMMER CONTAINS PRODUCT • METAL L.W.C. DOES NOT SEAL CORRECTLY — NEEDS NEW L.W.C. • WATER IN BOX, @ CASING LEVEL

SURVEY POINTS ARE TOP OF WELL CASINGS

Columbia Analytical Services, Inc.

January 27, 1993

Service Request No. SJ93-0050

Jim Butera
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Re: **EMCON Project No. 0G70-017.01**
ARCO Facility No. 2035

Dear Mr. Butera:

Attached are the results of the water samples submitted to our lab on January 14, 1993. For your reference, these analyses have been assigned our service request number SJ93-0050.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Keoni A. Murphy
Laboratory Manager

Annelise J. Bazar
Regional QA Coordinator

KAM/kt

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-017.01
Arco Facility No. 2035

Date Received: 01/14/93
Service Request No.: SJ93-0050
Sample Matrix: Water

Inorganic Parameters[1]
mg/L (ppm)

Sample Name:		MW-3 (33)	Method Blank
Date Sampled:		01/13/93	
Analyte	**Method**	**MRL**	
Total Oil and Grease	SM 5520C	0.5	0.78	ND
Hydrocarbons, IR	SM 5520F	0.5	1.10	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
SM *Standard Methods for the Examination of Water and Wastewater*, 17th Ed., 1989
1 Unless otherwise noted, all analyses were performed within EPA recommended maximum holding times specified in *Test Methods for Evaluating Solid Waste*, (SW-846, 3rd Edition) and *Methods for Chemical Analysis of Water and Waste* (EPA-600/4-79-020, Revised March 1983).

Approved by: Kevin Murphy Date: January 27, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	Date Received:	01/14/93
Project:	EMCON Project No. 0G70-017.01	Service Request No.:	SJ93-0050
	ARCO Facility No. 2035	Sample Matrix:	Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
µg/L (ppb)

Sample Name:		MW-1 (29)	MW-2 (28)	MW-3 (33)
Date Analyzed:		01/21/93	01/20/93	01/20/93
Analyte	MRL			
Benzene	0.5	130.	ND	1.1
Toluene	0.5	5.3	ND	ND
Ethylbenzene	0.5	5.0	ND	ND
Total Xylenes	0.5	9.0	ND	ND
TPH as Gasoline	50	430.	ND	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by: Kevin Murphy Date: January 27, 1993

California 95131 • Telephone 408/437-2400 • Fax 408/437-9255

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	Date Received:	01/14/93
Project:	EMCON Project No. 0G70-017.01	Service Request No.:	SJ93-0050
	ARCO Facility No. 2035	Sample Matrix:	Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
µg/L (ppb)

Sample Name:		MW-4 (25)	MW-5 (24)	MW-6 (24)
Date Analyzed:		01/20/93	01/21/93	01/20/93
Analyte	MRL			
Benzene	0.5	ND	ND	ND
Toluene	0.5	1.3	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	1.6	ND	ND
TPH as Gasoline	50	ND	ND	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by: Kevin A Murphy Date: January 27, 1993

San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	Date Received:	01/14/93
Project:	EMCON Project No. 0G70-017.01	Service Request No.:	SJ93-0050
	ARCO Facility No. 2035	Sample Matrix:	Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
µg/L (ppb)

		Sample Name:	FB-1	Method Blank	Method Blank
		Date Analyzed:	01/20/93	01/20/93	01/21/93
Analyte	**MRL**				
Benzene	0.5		ND	ND	ND
Toluene	0.5		ND	ND	ND
Ethylbenzene	0.5		ND	ND	ND
Total Xylenes	0.5		ND	ND	ND
TPH as Gasoline	50		ND	ND	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by: [signature] Date: January 27, 1993

[illegible] • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

APPENDIX A

LABORATORY QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	Date Received:	01/14/93
Project:	EMCON Project No. 0G70-017.01	Service Request No.:	SJ93-0050
	ARCO Facility No. 2035	Sample Matrix:	Water

Continuing Calibration Summary
Inorganics
SM5520
mg/L

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Total Oil and Grease	4.0	3.42	78.	56-151

SM *Standard Methods for the Examination of Water and Wastewater,* 17th Ed., 1989

Approved by: Kenneth Murphy Date: January 27, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-017.01
ARCO Facility No. 2035

Date Received: 01/14/93
Service Request No.: SJ93-0050
Sample Matrix: Water

Matrix Spike Summary
Total Recoverable Petroleum Hydrocarbons
SM5520
mg/L (ppm)

Sample Name: MW-3 (33)

Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria
6.15	1.10	5.72	5.56	75.	73.	56-151

SM *Standard Methods for the Examination of Water and Wastewater,* 17th Ed., 1989

Approved by: Kevin A Murphy Date: January 27, 1993

Telephone 408/437-2400 • Fax 408/437-9256

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-017.01
ARCO Facility No. 2035

Date Received: 01/14/93
Service Request No.: SJ93-0050

Initial Calibration Verification
BTEX and TPH as Gasoline
EPA Methods 5030/8020/DHS LUFT Method
Nanograms

Date Analyzed: 01/20/93

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	250.	244.	98.	85-115
Toluene	250.	252.	101.	85-115
Ethylbenzene	250.	232.	93.	85-115
Total Xylenes	750.	684.	91.	85-115
TPH as Gasoline	2,500.	2,708.	108.	90-110

Date Analyzed: 01/21/93

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	250.	252.	101.	85-115
Toluene	250.	258.	103.	85-115
Ethylbenzene	250.	239.	96.	85-115
Total Xylenes	750.	687.	92.	85-115
TPH as Gasoline	2,500.	2,273.	91.	90-110

TPH Total Petroleum Hydrocarbons

Approved by: Kevin A Murphy Date: January 27, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-017.01
ARCO Facility No. 2035

Date Received: 01/14/93
Service Request No.: SJ93-0050
Sample Matrix: Water

Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Sample Name	Date Analyzed	Percent Recovery *a,a,a*-Trifluorotoluene
MW-1 (29)	01/21/93	105.
MW-2 (28)	01/20/93	109.
MW-3 (33)	01/20/93	109.
MW-4 (25)	01/20/93	110.
MW-5 (24)	01/21/93	104.
MW-6 (24)	01/20/93	107.
FB-1	01/20/93	109.
MW-2 (28) MS	01/20/93	113.
MW-2 (28) DMS	01/20/93	113.
Method Blank	01/20/93	102.
Method Blank	01/21/93	104.
CAS Acceptance Criteria		70-130

TPH Total Petroleum Hydrocarbons

Approved by: Kevin Murphy Date: January 27, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-017.01
ARCO Facility No. 2035

Date Received: 01/14/93
Service Request No.: SJ93-0050
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
BTE
EPA Methods 5030/8020
µg/L (ppb)

Sample Name: MW-2 (28)
Date Analyzed: 01/20/93

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria
Benzene	25.	ND	25.2	25.4	101.	102.	39-150
Toluene	25.	ND	25.1	25.3	100.	101.	46-148
Ethylbenzene	25.	ND	24.5	24.5	98.	98.	32-160

ND None Detected at or above the method reporting limit

Approved by: David Murphy Date: January 27, 1993

APPENDIX B

CHAIN OF CUSTODY

ARCO Products Company
Division of AtlanticRichfieldCompany

Chain of Custody

Task Order No. EMCGC-97-1

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) JILL BUTERA	Laboratory name CAS
ARCO engineer Kyle Christie	Telephone no. (ARCO) 415 571-2434	Telephone no. (Consultant) 453-0719	Fax no. (Consultant) 453-0862
Consultant name EMCON Associates	Address (Consultant) 1938 Junction Ave San Jose		Contract number 07077

Method of shipment: sampler will deliver

Sample I.D	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 8020/EPA 8020	BTEX/TPH EPA M602/8020/8015 GMS	TPH Modified 8015 Gas ☐ Diesel ☐	5520 C&F Oil and Grease ☐ 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
MW-1 (29')	1-2	2		X		X	HCl	1-13-93	1512		X									
MW-2 (28')	3-4	2		X		X	HCl		1355		X									
MW-3 (33')	5-6	4		X		X	HCl		1429		X		X							
MW-4 (25')	7-8	2		X		X	HCl		1225		X									
MW-5 (24')	9-10	2		X		X	HCl		1250		X									
MW-6 (24')	11-12	2		X		X	HCl		1320		X									
RW-1 ( )		2		X		X	HCl		—		X	no sample Product in well								
FD-1	BH	2		X		X	HCl		1340		X									

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 2-40 ml HCl VOA's; 4-Liter HCl GLASS OG70-01701 IR added for 17 J. Butera H.P. 1-14-93

Lab number: SJ93-0050

Turnaround time
- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒

Condition of sample: OK

Temperature received: Cool

	Date	Time	Received by
Relinquished by sampler: Manuel L. Gallegos	1-14-93	0958	
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: [signature] Date: 1-14-93 Time: 10:00

ARCO Environmental Engineering Pink copy — Consultant

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-017.01 SAMPLE ID: MW-1 (29)

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2035

SAMPLED BY: ↓ LOCATION: 1001 SAN PABLO AVE ALBANY, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 X 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	14.90
DEPTH TO WATER (feet):	7.56	CALCULATED PURGE (gal.):	43 20
DEPTH OF WELL (feet):	29.6	ACTUAL PURGE VOL. (gal.):	43.50

DATE PURGED: 1-13-93 Start (2400 Hr) 1453 End (2400 Hr) 1505

DATE SAMPLED: 1-13-93 Start (2400 Hr) 1512 End (2400 Hr) 1514

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1456	14.50	6.92	578	64.7	CLOUDY	LIGHT
1500	29.00	6.85	772	65.1	↓	↓
1505	43.50	6.94	779	66.1		

D. O. (ppm): NR ODOR: ~~NONE~~ SLIGHT COLOR: NR (COBALT 0 - 100) TURBIDITY: NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
X Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 0764

REMARKS: ___

Meter Calibration: Date: 1-13-93 Time: 1200 Meter Serial #: 9203 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-4

Signature: Kevin Reichelderfer Reviewed By: JG Page 1 of 1

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-017.01 SAMPLE ID: MW-2(28)

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2035

SAMPLED BY: ✓ LOCATION: 1001 SAN PABLO AVE ALBANY, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 X 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 13.46

DEPTH TO WATER (feet): 8.10 CALCULATED PURGE (gal.): 40.38

DEPTH OF WELL (feet): 28.7 ACTUAL PURGE VOL (gal.): 40.50

DATE PURGED: 1-13-93 Start (2400 Hr) 1340 End (2400 Hr) 1349

DATE SAMPLED: 1-13-93 Start (2400 Hr) 1355 End (2400 Hr) 1357

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1343	13.50	6.80	771	66.1	BROWN	MODERATE
1346	27.00	6.81	790	66.4	↓	↓
1349	40.50	6.73	798	67.0	↓	↓

D. O. (ppm): NR ODOR: ~~NONE~~ SLIGHT COLOR: NR (COBALT 0 - 100) TURBIDITY: NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): FB-1 (1340)

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
X Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 1-13-93 Time: 1200 Meter Serial #: 7203 Temperature °F: ___

(EC 1000 ___/___) (DI ___) (pH 7 ___/___) (pH 10 ___/___) (pH 4 ___/___)

Location of previous calibration: MW-4

Signature: Kevin Reichelderfer Reviewed By: JB Page 2 of 2

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-017.01 SAMPLE ID: MW-3(33)

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2035

SAMPLED BY: ↓ LOCATION: 1001 SAN PABLO AVE ALBANY, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 X 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	15.58
DEPTH TO WATER (feet):	9.15	CALCULATED PURGE (gal.):	46.75
DEPTH OF WELL (feet):	33.0	ACTUAL PURGE VOL. (gal.):	47.00

DATE PURGED: 1-13-93 Start (2400 Hr) 1408 End (2400 Hr) 1420

DATE SAMPLED: 1-13-93 Start (2400 Hr) 1429 End (2400 Hr) 1435

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1411	16.00	6.90	766	63.4	BROWN	MODERATE
1414	32.00	6.89	809	64.0	↓	↓
1420	47.00	6.88	739	64.9	↓	HEAVY

D. O. (ppm): NR ODOR: NONE COLOR: NR (COBALT 0 - 100) TURBIDITY: NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
X Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
X Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 1-13-93 Time: 1200 Meter Serial #: 9203 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-4

Signature: [signature] Reviewed By: JG

Rev. 2 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-017.01 SAMPLE ID: MW-4 (25)

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2035

SAMPLED BY: ↓ LOCATION: 1001 SAN PABLO AVE ALBANY, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 X 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	11.14
DEPTH TO WATER (feet):	8.05	CALCULATED PURGE (gal.):	33.42
DEPTH OF WELL (feet):	25.1	ACTUAL PURGE VOL. (gal.):	26.00

DATE PURGED: 1-13-93 Start (2400 Hr) 1200 End (2400 Hr) 1210

DATE SAMPLED: 1-13-93 Start (2400 Hr) 1225 End (2400 Hr) 1227

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1204	11.50	6.78	981	65.1	BROWN	HEAVY
1207	23.00	6.81	924	66.7	↓	↓
1210	WELL DRIED @ 26.00 GALLONS					
1228	RECHARGE	6.77	830	66.6	BROWN	HEAVY

D. O. (ppm): NR ODOR: NONE

COLOR (COBALT 0 - 100): NR

TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
X Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: • 1210 WELL DRIED @ 26.00 GALLONS
• 1220 DTW @ 14.19
• HEAVY EXHAUST EMISSIONS FROM NEARBY CAR WHILE SAMPLING

Meter Calibration: Date: 1-13-93 Time: 1200 Meter Serial #: 9203 Temperature °F: 59.5

(EC 1000 974 / 1,000) (DI 6.71) (pH 7 7.10 / 7.00) (pH 10 9.89 / 10.00) (pH 4 3.92 / ___)

Location of previous calibration: ___

Signature: Kevin Reichelderfer Reviewed By: JB Page 4 of 7

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-017.01 SAMPLE ID: MW-5 (24)

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2035

SAMPLED BY: ↓ LOCATION: 1001 SAN PABLO AVE ALBANY, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 X 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	10.49
DEPTH TO WATER (feet):	8.24	CALCULATED PURGE (gal.):	31.48
DEPTH OF WELL (feet):	24.3	ACTUAL PURGE VOL. (gal.):	31.50

DATE PURGED: 1-13-93 Start (2400 Hr) 1232 End (2400 Hr) 1244

DATE SAMPLED: 1-13-93 Start (2400 Hr) 1250 End (2400 Hr) 1257

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1234	10.50	6.96	844	64.3	BROWN	HEAVY
1237	21.00	7.02	849	65.3	↓	↓
1244	31.50	7.04	774	65.4	↓	↓

D. O. (ppm): NR ODOR: NONE

COLOR (COBALT 0 - 100): NR TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
X Centrifugal Pump	___ Bailer (PVC)	___ ODL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: [illegible] DOLPHIN

REMARKS: ___

Meter Calibration: Date: 1-13-93 Time: 1200 Meter Serial #: 9203 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-4

Signature: Kevin Reichelderfer Reviewed By: JB Page 5 of 7

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: OG70-017.01 SAMPLE ID: MW-6 (24)

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2035

SAMPLED BY: ↓ LOCATION: 1001 SAN PABLO AVE ALBANY, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 X 3 ___ 4 ___ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	2.36
DEPTH TO WATER (feet):	9.84	CALCULATED PURGE (gal.):	7.09
DEPTH OF WELL (feet):	24.3	ACTUAL PURGE VOL (gal.):	7.50

DATE PURGED: 1-13-93 Start (2400 Hr) 1310 End (2400 Hr) 1315

DATE SAMPLED: 1-13-93 Start (2400 Hr) 1320 End (2400 Hr) 1322

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1310	2.50	7.09	862	63.9	BROWN	HEAVY
1312	5.00	7.10	866	64.3	↓	↓
1315	7.50	7.09	864	64.4	↓	↓

D. O. (ppm): NR ODOR: NONE

COLOR (COBALT 0 - 100): NR

TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	X Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 3 DOLPHIN

REMARKS: ___

Meter Calibration: Date: 1-13-93 Time: 12:00 Meter Serial #: 9203 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-4

Signature: Kevin Reichelderfer Reviewed By: GB Page 6 of 7

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-017.01 SAMPLE ID: RW-1

PURGED BY: REICHELDERFER/GALLEGOS CLIENT NAME: ARCO 2035

SAMPLED BY: ↓ LOCATION: 1001 SAN PABLO AVE ALBANY, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ___ 4.5 ___ 6 X Other ___

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): NA

DEPTH TO WATER (feet): 8.35 CALCULATED PURGE (gal.): NA

DEPTH OF WELL (feet): NA ACTUAL PURGE VOL. (gal.): NA

DATE PURGED: 1-13-93 Start (2400 Hr) NA End (2400 Hr) NA

DATE SAMPLED: NA Start (2400 Hr) NA End (2400 Hr) NA

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
NO SAMPLE - PRODUCT IN WELL; SKIMMER CONTAINED PRODUCT						

D. O. (ppm): NR ODOR: NA

COLOR: NR (COBALT 0 - 100) TURBIDITY: NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	___ Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: NA		Other: NA	

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: METAL L.W.C. DOES NOT SEAL CORRECTLY; NEEDS NEW L.W.C.

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: JB Page 7 of 7

Summary of Groundwater Monitoring Data
First Quarter 1993
ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California
micrograms per liter (µg/l) or parts per billion (ppb)

Well ID and Sample Depth	Sampling Date	Depth To Water (feet)	Floating Product Thickness (feet)	TPH[1] as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	Hydro-carbons IR (ppm)*	Total Oil and Grease (ppm)*
MW-1(29)	01/13/93	7.73	ND.[2]	430.	130.	5.3	5.0	9.0	NR.[3]	NR.
MW-2(28)	01/13/93	8.25	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.	NR.
MW-3(33)	01/13/93	9.12	ND.	<50.	1.1	<0.5	<0.5	<0.5	1.10	0.78
MW-4(25)	01/13/93	8.05	ND.	<50.	<0.5	1.3	<0.5	1.6	NR.	NR.
MW-5(24)	01/13/93	8.22	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.	NR.
MW-6(24)	01/13/93	9.84	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.	NR.
RW-1	01/13/93	11.45	FP.[4]	FP.	FP.	FP.	FP.	FP.	NR.	NR.
FB-1[5]	01/13/93	NA.[6]	NA.	<50.	<0.5	<0.5	<0.5	<0.5	NR.	NR.

1. TPH. = Total petroleum hydrocarbons
2. ND. = Not detected
3. NR. = Not required, well was not analized for the above listed parameter
4. FP. = Floating product; well was not sampled due to detection of floating product
5. FB. = Field blank
6. NA. = Not applicable

* = Reported as parts-per-million

emcon Associates
1938 Junction Avenue • San Jose, California 95131-2102 • (408) 453-0719 • Fax (408) 453-0452

Date February 25, 1993
Project 0G70-017.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Almaden Expressway, Suite 34
San Jose, California 95118

We are enclosing:

Copies	Description
1	Depth To Water/Floating Product Survey Results
	February 1993 monthly water level survey, ARCO
	station 2035, 1001 San Pablo Avenue, Albany, CA

For your: X Information Sent by: X Mail

Comments:
Monthly water level data for the above mentioned site are attached. Please call if you have any questions: (408) 453-2266.

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER ROBERT CURTIS PORTER No: 4094 Exp 4/30/94 INDUSTRIAL STATE OF CALIFORNIA

Jim Butera JB

Robert Porter, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-017.01 STATION ADDRESS : 1001 San Pablo Ave. Albany, CA DATE : 2-22-93

ARCO STATION # : 2035 FIELD TECHNICIAN : L. RATH DAY : MONDAY

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-4	OK	YES	OK	2359	OK	7.58	7.58	ND	ND	25.1	—
2	MW-5	OK	YES	OK	Dolphin	OK	7.92	7.92	ND	ND	24.41	—
3	MW-6	OK	YES	OK	Dolphin	OK	9.94	4.94	ND	ND	24.3	—
4	MW-2	OK	YES	OK	2359	OK	8.25	8.25	ND	ND	28.7	—
5	MW-3	OK	YES	OK	2359	OK	8.18	8.18	ND	ND	33.0	—
6	MW-1	OK	YES	OK	2359	OK	7.56	7.56	ND	ND	~~29.6~~ 29.6	~~TD~~ 29.6
7	RW-1	OK	YES	OK	slip cap	slip cap	7.95	7.95	~~7.94~~	0.01	25.1	Skimmer in well; skimmer valve was found open. Fluid in skimmer drained out while I was pulling it up. Valve is now closed

SURVEY POINTS ARE TOP OF WELL CASINGS

APPENDIX G

LABORATORY ANALYSES REPORTS AND CHAIN OF CUSTODY RECORDS FOR SOIL SAMPLES

SEQUOIA ANALYTICAL

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

MAL

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Revised: 3/25/93

Project: ARCO 2035, Albany

Enclosed are the results from 9 soil samples received at Sequoia Analytical on November 25,1992. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
2114923	Soil, S-5.5-B20	11/25/92	EPA 5030/8015/8020
2114924	Soil, S-9.5-B20	11/25/92	EPA 5030/8015/8020
2114925	Soil, S-28-B20	11/25/92	EPA 5030/8015/8020
2114926	Soil, S-5.5-B21	11/25/92	EPA 5030/8015/8020
2114927	Soil, S-10.5-B21	11/25/92	EPA 5030/8015/8020
2114928	Soil, S-26-B21	11/25/92	EPA 5030/8015/8020
2114929	Soil, S-5.5-B22	11/25/92	EPA 5030/8015/8020
2114930	Soil, S-11.5-B22	11/25/92	EPA 5030/8015/8020
2114931	Soil, S-26-B22	11/25/92	EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

for Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: ARCO 2035, Albany
Sample Matrix: Soil
Analysis Method: EPA 5030/8015/8020
First Sample #: 211-4923

Sampled: Nov 25, 1992
Received: Nov 25, 1992
Revised: Mar 25, 1993

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 211-4923 S-5.5-B20	Sample I.D. 211-4924 S-9.5-B20	Sample I.D. 211-4925 S-28-B20	Sample I.D. 211-4926 S-5.5-B21	Sample I.D. 211-4927 S-10.5-B21	Sample I.D. 211-4928 S-26-B21
Purgeable Hydrocarbons	1.0	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Benzene	0.0050	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Toluene	0.0050	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Ethyl Benzene	0.0050	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Total Xylenes	0.0050	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Chromatogram Pattern:		--	--	--	--	--	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Analyzed:	12/2/92	12/2/92	12/2/92	12/2/92	12/2/92	12/2/92
Instrument Identification:	GCHP-6	GCHP-6	GCHP-6	GCHP-6	GCHP-6	GCHP-6
Surrogate Recovery, %: (QC Limits = 70-130%)	98	95	98	100	102	99

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

2114923.RES <1>.

SEQUOIA ANALYTICAL

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

RESNA	Client Project ID:	ARCO 2035, Albany	Sampled:	Nov 25, 1992
3315 Almaden Expwy., Suite 34	Sample Matrix:	Soil	Received:	Nov 25, 1992
San Jose, CA 95118	Analysis Method:	EPA 5030/8015/8020	Reported:	Dec 8, 1992
Attention: Joel Coffman	First Sample #:	211-4929		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 211-4929 S-5.5-B22	Sample I.D. 211-4930 S-11.5-B22	Sample I.D. 211-4931 S-26-B22
Purgeable Hydrocarbons	1.0	N.D.	N.D.	N.D.
Benzene	0.0050	N.D.	N.D.	N.D.
Toluene	0.0050	N.D.	N.D.	N.D.
Ethyl Benzene	0.0050	N.D.	N.D.	N.D.
Total Xylenes	0.0050	N.D.	N.D.	N.D.
Chromatogram Pattern:		--	--	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0
Date Analyzed:	12/2/92	12/2/92	12/2/92
Instrument Identification:	GCHP-6	GCHP-6	GCHP-6
Surrogate Recovery, %: (QC Limits = 70-130%)	104	93	93

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

SEQUOIA ANALYTICAL

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: ARCO 2035, Albany

QC Sample Group: 2114923-31

Reported: Dec 8, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	R. Geckler	R. Geckler	R. Geckler	R. Geckler
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Dec 2, 1992	Dec 2, 1992	Dec 2, 1992	Dec 2, 1992
QC Sample #:	GBLK120292 MS/MSD	GBLK120292 MS/MSD	GBLK120292 MS/MSD	GBLK120292 MS/MSD
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.20	0.20	0.20	0.60
Conc. Matrix Spike:	0.21	0.21	0.20	0.62
Matrix Spike % Recovery:	105	105	100	103
Conc. Matrix Spike Dup.:	0.23	0.24	0.23	0.69
Matrix Spike Duplicate % Recovery:	115	120	115	115
Relative % Difference:	9.1	13	14	11

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Maria Lee
Project Manager

$$\text{\% Recovery:} \quad \frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$$

$$\text{Relative \% Difference:} \quad \frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{(\text{Conc. of M.S. + Conc. of M.S.D.}) / 2} \times 100$$

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 11 11 9 7

Chain of Custody

ARCO Facility no: 2035 | City (Facility): Albany | Project manager (Consultant): Joel Coffman | Laboratory name: Sequoia

ARCO engineer: Michael Whelan | Telephone no (ARCO): (415) 571-2434 | Telephone no (Consultant): (408) 264-7723 | Fax no (Consultant): (408) 264-2435 | Contract number: 07-073

Consultant name: RESNA | Address (Consultant): 3315 Almaden Expy, Suite 34, San Jose, CA 95118 | Method of shipment: Sequoia Courier

Sample I.D	Lab no	Container no	Matrix: Soil	Water	Other	Preservation: Ice	Acid	Sampling date	Sampling time	BTEX 8020/EPA 8020	BTEX/TPH EPA M8020/8015	TPH Modified 8015 Gas / Diesel	Oil and Grease 413.1 / 413.2	TPH EPA 418.1/SM503E	EPA 8010/8010	EPA 8240/8240	EPA 8250/8270	TCLP Metals / VOA / Semi VOA	CAM Metals EPA 6010/7000 TTLC / STLC	Lead Org./DHS / Lead EPA 7420/7421		
S-5.5-B20		1	V			V		11/24/92			X										111	11.25
S-9.5-B20		1	V			V		11/24/92			X										111	11.24
S-11-B20		1	V			V		11/24/92														
S-15.5-B20		1	V			V		11/24/92														
S-18.5-B20		1	V			V		11/24/92														
S-24.5-B20		1	V			V		11/24/92														
S-26.5-B20		1	V			V		11/24/92														
S-28-B20		1	V			V		11/24/92			X										111	11.25
S-5.5-B21		1	V			V		11/24/92			X											16
S-10.5-B21		1	V			V		11/24/92			X											7
S-15.5-B21		1	V			V		11/24/92														
S-20.5-B21		1	V			V		11/24/92														
S-25.5-B21		1	V			V		11/24/92			X										111	11.25

Special detection Limit/reporting

Special QA/QC

Remarks: RESNA will call regarding samples to be analyzed

Lab number

Turnaround time
- Priority Rush 1 Business Day [ ]
- Rush 2 Business Days [ ]
- Expedited 5 Business Days [ ]
- Standard 10 Business Days [X]

Condition of sample:

Temperature received:

Relinquished by sampler: B. Nieminski — Date: 11/25/92 — Time: 1250

Received by: [signature]

Relinquished by: [signature] — Date: 11/25/92 — Time: 1510

Received by laboratory: [signature] — Date: 11-25-92 — Time: 1510

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 7-(-(- 07-7 [illegible]

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) Joel Coffman	Laboratory name Sequoia
ARCO engineer Michael Whelan	Telephone no (ARCO) (415) 571-2434 ~~264-7723~~	Telephone no (Consultant) (408) 264-7723	Fax no (Consultant) (408) 264-2435
Consultant name RESNA	Address (Consultant) 3315 Almaden Exp., Suite 34, San Jose, CA 95118		Contract number 07-073

Sample I.D.	Lab no	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH – G EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐		
S-5.5-	B22	1	✓			✓		11/25/92			X								211929			
S-9.5-	B22	1	✓			✓		11/25/92														
S-11.5-	B22	1	✓			✓		11/25/92			X								211930			
S-15.5-	B22	1	✓			✓		11/25/92														
S-20.5-	B22	1	✓			✓		11/25/92														
S-26-	B22	1	✓			✓		11/25/92			X								211931			

Method of shipment: Sequoia Courier

Special detection Limit/reporting:

Special QA/QC:

Remarks: RESNA will call regarding samples to be analyzed

Lab number:

Turnaround time:
- Priority Rush 1 Business Day [ ]
- Rush 2 Business Days [ ]
- Expedited 5 Business Days [ ]
- Standard 10 Business Days [✓]

Condition of sample:

Temperature received:

Relinquished by sampler: B. Sieminski	Date: 11/25/92	Time: 1:25 PM	Received by: [signature]			
Relinquished by	Date	Time	Received by			
Relinquished by: [signature]	Date: 11/25/92	Time: 1510	Received by laboratory: [signature]	Date: 11/25/92	Time: 15:10	

SEQUOIA ANALYTICAL

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

RECEIVED
DEC 2 - 1992
RESNA
SAN JOSE

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Project: ARCO 2035

Enclosed are the results from 1 soil sample received at Sequoia Analytical on November 25,1992. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
2114408	Soil, S-1125/SPA-D	11/25/92	EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Andrea J. Fulcher

for Maria Lee
Project Manager

2114408.RES <1>

69036-7

SEQUOIA ANALYTICAL

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: ARCO 2035
Sample Matrix: Soil
Analysis Method: EPA 5030/8015/8020
First Sample #: 211-4408

Sampled: Nov 25, 1992
Received: Nov 25, 1992
Reported: Dec 1, 1992

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 211-4408 S-1125/SPA-D
Purgeable Hydrocarbons	1.0	N.D.
Benzene	0.0050	N.D.
Toluene	0.0050	N.D.
Ethyl Benzene	0.0050	N.D.
Total Xylenes	0.0050	N.D.
Chromatogram Pattern:		--

Quality Control Data

Report Limit Multiplication Factor:	1.0
Date Analyzed:	11/25/92
Instrument Identification:	GCHP-1
Surrogate Recovery, %: (QC Limits = 70-130%)	98

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Andrea I Sileher

for Maria Lee
Project Manager

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: ARCO 2035

QC Sample Group: 211-4408

Reported: Dec 1, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	R. Geckler	R. Geckler	R. Geckler	R. Geckler
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Nov 25, 1992	Nov 25, 1992	Nov 25, 1992	Nov 25, 1992
QC Sample #:	GBLK112592 MS/MSD	GBLK112592 MS/MSD	GBLK112592 MS/MSD	GBLK112592 MS/MSD
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.20	0.20	0.20	0.60
Conc. Matrix Spike:	0.20	0.19	0.20	0.57
Matrix Spike % Recovery:	100	95	100	95
Conc. Matrix Spike Dup.:	0.22	0.21	0.21	0.62
Matrix Spike Duplicate % Recovery:	110	105	110	103
Relative % Difference:	9.5	10	4.9	10

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Andrea J. Fulcher

Maria Lee
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

Relative % Difference: $\frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{(\text{Conc. of M.S. + Conc. of M.S.D.}) / 2} \times 100$

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No.

Chain of Custody

ARCO Facility no. 2035 | City (Facility)

Project manager (Consultant) Joel Coffman

ARCO engineer Michael Whelan | Telephone no. (ARCO) (415) 571-2434

Telephone no. (Consultant) (408) 264-7723 | Fax no. (Consultant) (408) 264-2435

Consultant name RESNA | Address (Consultant) 3315 Almaden Exy, Suite 34, San Jose, CA 95118

Laboratory name: Sequoia

Contract number: 07-073

Method of shipment: Sequoia Courier

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH Gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAN Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
S-1125-SPA		1	✓			✓		11/25/92			X											
S-1125-SPB		1	✓			✓		11/25/92			X											
S-1125-SPC		1	✓			✓		11/25/92			X											
S-1125-SPD		1	✓			✓		11/25/92			X											

Special detection Limit/reporting

Special QA/QC

Remarks: Composite Sample Turnaround time 48 hr

Lab number: 2114408

Turnaround time
- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☑
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☐

Condition of sample:

Temperature received:

	Date	Time			
Relinquished by sampler: B. Sieminski	11/25/92	1:25 pm	Received by: [signature]		
Relinquished by			Received by		
Relinquished by: [signature]	11/25/92	1510	Received by laboratory: Sophia Patigo	Date 11-25-92	Time 1510