Applied GeoSystems, Inc.
A RESNA Company

RESNA
Working To Restore Nature

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ADDENDUM FIVE TO WORK PLAN
ADDITIONAL SUBSURFACE INVESTIGATION

at

ARCO Station 601
712 Lewwelling Boulevard
San Leandro, California

9/14/92

69034.10

Prepared for
ARCO Products Company
Post Office Box 5811
San Mateo, California 94402

by

RESNA Industries Inc.

September 14, 1992

Applied GeoSystems, Inc.
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TRANSMITTAL

TO: Mr. Scott Seery
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, California 94621

DATE: September 14, 1992
PROJECT NUMBER: 69034.10
SUBJECT: Final - Addendum Five to Work Plan, Additional Subsurface Investigation at ARCO Station 601, 712 Lewelling Blvd., San Leandro, California.

FROM: Erin McLucas
TITLE: Staff Geologist

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COPIES	DATED	DESCRIPTION
1	9/14/92	Final - Addendum to Work Plan at the above subject site.

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REMARKS: cc: Mr. H.C. Winsor, ARCO Products Company
Mr. Michael Whelan, ARCO Products Company
Mr. Guy Telham, San Leandro Fire Department
Mr. John Jang, CRWQCB, San Francisco Bay Region
Mr. Joel Coffman, RESNA Industries Inc.

Copies: 1 to RESNA project file no. 69034.10

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September 14, 1992
091492MWH
69034.10

Mr. Mike Whelan
ARCO Products Company
P.O. Box 5811
San Mateo, California 94402

Subject: Addendum Five to Work Plan for Initial Offsite and Additional Onsite Subsurface Investigations, ARCO Station 601, 712 Lewelling Boulevard, San Leandro, California.

Mr. Whelan:

As requested by ARCO, and as requested in the letter from the Alameda County Health Care Services Agency (ACHCSA) dated July 30, 1992, this letter has been prepared by RESNA Industries, Inc. (RESNA) to serve as Addendum Five to Work Plan (RESNA 69034-4W, March 21, 1991) to perform initial offsite and additional onsite subsurface investigations at the subject site. The location of the site is shown on the Site Vicinity Map, Plate 1. After receiving approval of this addendum to the Work Plan by the Regional Water Quality Control Board (RWQCB) and ACHCSA, project tasks recommended to perform initial offsite and additional onsite subsurface investigations include the following: submit well permit applications to the Alameda County Flood Control and Water Conservation District, Zone 7 (ACFCWCD); obtain encroachment permits from the City of San Leandro for the installation of one offsite groundwater monitoring well; drill borings and install one offsite groundwater monitoring well (MW-13) and two onsite groundwater wells (MW-11 & MW-12); submit soil samples for analysis; survey the wellheads to a local Geodetic Survey Datum; develop, perform subjective analysis, and sample the groundwater monitoring wells, including previously installed offsite groundwater monitoring well MW-14; and prepare a report of results.

The proposed offsite, upgradient boring/well B-18/MW-13, and the recently drilled offsite boring/well B-19/MW-14 (letter to ACHCSA dated July 29, 1992) are necessary to further evaluate the lateral and vertical extent of gasoline hydrocarbon impacted soil and groundwater in the vicinity of the subject site. These wells will help determine if gasoline

hydrocarbons exist upgradient of the subject site, and if possible offsite source(s) of hydrocarbons have impacted the soil and groundwater at the site. **Offsite boring/well B-18/MW-13 will be installed upon attaining permits from the City of San Leandro, and ACFCWCD.** Permission was previously obtained from the owner, Dr. Gary Sherrill, of the adjoining property located at 15301 Washington Avenue, San Leandro, California, and offsite boring/well B-19/MW-14 was drilled and installed on August 7, 1992. **Approval for installation of well MW-14 was obtained from Mr. Scott Seery of ACHCSA** (letter from ACHCSA dated July 30, 1992). The locations of the proposed borings/wells (B-16/MW-11 through B-18/MW-13) and the recently drilled and installed boring/well (B-19/MW-14), are shown on Plate 2, Proposed Boring/Monitoring Well Locations. Groundwater flow direction has generally been toward the southwest.

The proposed onsite borings/wells B-17/MW-12 and B-16/MW-11 (RESNA, March 6, 1992) are necessary to further evaluate the lateral and vertical extent of groundwater impacted by petroleum hydrocarbons at the site. These wells are to be placed along the eastern margin of the site, upgradient, and in the vicinity of the former underground storage tanks, and the eastern service islands at the request of Mr. Scott Seery of ACHCSA (letter dated July 30, 1992). **Boring/well B-16/MW-11, also included in Addendum Three to Work Plan** (RESNA, March 6, 1992), **is being included in this addendum, with a new location to accommodate Mr. Seery's suggestion in the July 30, letter referenced above.** The locations of the proposed borings/wells are shown on Plate 2.

PREVIOUS WORK

A summary of previous work performed at this site by RESNA (formerly Applied GeoSystems [AGS]) and others is included in the Work Plan for Subsurface Investigations and Remediation referenced above (AGS, March 1991). Addendum One to this Work Plan, detailing the proposed subsurface investigation and a vapor extraction test (VET) to be performed, was also submitted for review and approval to ARCO, RWQCB, and ACHCSA (AGS, March 1991). RESNA completed all proposed phases of work outlined in Addendum One by September 1991. Results of the work completed are summarized in the "Subsurface Environmental Assessment and Vapor Extraction Test Report" (RESNA, October 1991). The work outlined in Addendum Two to this Work Plan (RESNA, May 1991), installation of a floating product recovery system, was completed on December 24, 1992 with the installation of a Horner EZY Floating Product Skimmer in well MW-3. Skimmers were not installed in wells MW-1 or MW-5 due to low groundwater levels in the wells. The proposed work in Addendum Three to this Work Plan (RESNA, March 1992), installation of one onsite and two offsite groundwater monitoring wells, has not been performed as access has been denied for the installation of the offsite groundwater monitoring wells. The tasks outlined in Addendum Four to this Work Plan, Interim Groundwater Remediation, are in

the permitting and design stages, and the work is ongoing. The interim groundwater remediation system at the site will also address the problem of hydrocarbon impacted soils as the impact to soils is mostly limited to the capillary fringe zone above the first-encountered groundwater-bearing zone at the site. Plate 2, Proposed Boring/Monitoring Well Locations, shows the locations of the existing onsite and offsite wells.

Briefly summarized, based on results of previous investigations conducted by RESNA and others, RESNA concludes the following:

- The majority of gasoline and waste-oil hydrocarbons at concentrations above 100 parts per million (ppm) in the soil at the site, outside the immediate areas of the former gasoline-storage and waste-oil-storage tanks, appear to be located above the first-encountered groundwater-bearing zone within the capillary fringe layer of interbedded clayey sand to silty clay at depths between five and eleven feet below grade. Impact to these soils appears to be related to seasonal fluctuations of groundwater levels. The lateral extent of TPHg in this capillary zone has not been delineated below 100 ppm in the western (B-8/MW-3 and B-9/MW-4) and northern (B10/MW-5) areas of the site. Based on the results of the Vapor Extraction Test (VET) performed at the subject site, and the results from the slug test performed at the former Shell Station (GeoStrategies, June 29, 1990) located north across Lewelling Boulevard from the subject site, the lateral movement of gasoline and waste-oil hydrocarbons in these low permeability soils beneath the site is unlikely. The interim groundwater remediation system, described in addendum four to work plan, will assist in the control of migration of hydrocarbons in this capillary fringe zone and provide a means of interim remediation of these soils by draining and treating the impacted groundwater at the site.

- The lateral extent of hydrocarbons in the soil associated with the former **waste-oil-storage tank** has been delineated to total oil and grease (TOG) levels of less than 30 ppm, south (B-12/MW-7) and downgradient (to the southwest) (B-13/MW-8) of the former waste-oil tank excavation. ~ 60' + 90' away from the waste oil tank, respectively

- The vertical extent of TPHg in the soil beneath the site in the clayey "aquitard" below the first-encountered groundwater-bearing zone has been delineated to less than 10 ppm at depths of eleven and a half to sixteen and a half feet below ground surface **with the exception of the eastern vicinity of the former gasoline tanks and near the former waste-oil tank.**

- The extent of petroleum hydrocarbons in the groundwater have not been delineated at the site with exception of waste-oil related hydrocarbons which have been

delineated to less than 5 ppm southwest and downgradient (in MW-8) of the former waste-oil tank pit excavation.

- Tank leaks were reported at the former Shell station and Greenhouse Plaza sites located across Lewelling Boulevard, relatively upgradient to ARCO Station 601. Several other facilities with identified tank leaks are located within approximately 1/6-mile radius of the site.

PROPOSED WORK

RESNA recommends the following work at the site based on previous investigations:

Step 1 Upon gaining regulatory approval of this addendum to work plan, obtain permits from the City of San Leandro to drill one boring and install one well (B18/MW-13) across Washington Avenue. Submit well permit applications to ACFCWCD Zone 7, for offsite (MW-13) and onsite (MW-11 & MW-12) wells.

Step 2 After permit approval, drill and obtain soil samples for soil classification and laboratory analysis from one offsite boring (B-18), and two onsite borings (B-16, and B-17) as shown on Plate 2, Proposed Boring/Monitoring Well Locations. Drill borings B-16 through B-18 down to 5 feet into a possible perching or confining layer beneath the first encountered groundwater (total depths of approximately 20 feet below ground surface). Install two groundwater monitoring wells (MW-11 and MW-12) with 4-inch-diameter well casing in the onsite borings (B-16 and B-17), and one groundwater monitoring well (MW-13) with 2-inch-diameter well casing in the offsite boring (B-18). The purpose of borings, B-16 through B-18, and monitoring wells, MW-11 through MW-13, is to delineate the lateral extent of gasoline hydrocarbons in soil and groundwater upgradient, and on the eastern portion of the site.

Step 3 Submit selected soil samples from borings B-16 through B-18 to an ARCO approved, State-certified laboratory for analysis for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by Environmental Protection Agency (EPA) Method 5030/8015/8020. Chain-of-custody protocol will be observed for all samples submitted for analysis.

Step 4 Survey wellhead elevations to a U.S. Coast and Geodetic Survey Datum, by a State-licensed surveyor.

Step 5 Develop groundwater monitoring wells MW-11 through MW-13.

Step 6 Measure depths-to-water, purge, and collect groundwater samples from monitoring wells MW-11 through MW-14 in conjunction with sampling the existing wells. Submit groundwater samples from MW-11 through MW-14 in conjunction with samples from monitoring wells MW-1 through MW-8, to a state-certified laboratory for analysis for TPHg and BTEX by EPA Method 5030/8015/602. **Submit groundwater samples from monitoring wells MW-7 and MW-8, located downgradient from the former waste-oil tank, for analysis to a State-certified laboratory for all analyses stated above and for analysis for total and oil and grease (TOG) by method 418.1, for total petroleum hydrocarbons as diesel (TPHd) by method 3510, for volatile organic compounds (VOC) by method 601, for cadmium, chromium, zinc and nickel by ICAP method 6010, lead by method 7421 and PCB, PCP, PNA and CREOSOTE by method 8270.** Chain-of-custody protocol will be observed.

Step 7 Prepare a draft report summarizing field and laboratory procedures, findings, interpretations, and conclusions and submit to ARCO for review.

Step 8 ARCO to review draft report.

Step 9 Incorporate any revisions (if necessary) and issue final report.

SCHEDULE

A Preliminary Time Schedule (Plate 3) to perform Steps 1 through 9 has been attached to this addendum. One boring/monitoring well (B-19/MW-14) was drilled and installed on the adjoining property at 15301 Washington Avenue, and information related to drilling and installing this well will be included in the report of the above proposed work.

Field work proposed in this Addendum Five to Work Plan will be performed according to the Field Methods included in Appendix A of the Work Plan for Subsurface Investigations and Remediation for the subject site, dated March 21, 1991. Subsequent addenda to the Work Plan will be prepared and submitted to regulatory agencies as necessary to describe future work proposed at the site.

DISTRIBUTION

It is recommended that copies of this Addendum be forwarded to:

Mr. Guy Telham
San Leandro Fire Department
835 East 14th Street
San Leandro, California 94577

Mr. Scott Seery
Alameda County Health Care Services Agency
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, California 94621

Mr. John Jang
Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94621

If you should have any questions or comments about this Addendum to Work Plan, please call us at (408) 264-7723.

Sincerely,
RESNA Industries Inc.

Erin McLucas
Staff Geologist

Joel Coffman
Project Geologist

Enclosures: References Cited
Plate 1, Site Vicinity Map
Plate 2, Proposed Boring/Monitoring Well Locations
Plate 3, Preliminary Time Schedule

cc: H.C. Winsor, Arco Products Company

REFERENCES CITED

Alameda County Health Care Services Agency, July 30, 1992, "ARCO Service Station 601, Lewelling Boulevard, San Leandro".

GeoStrategies Inc., June 29, 1990, Pumping Test Report from 15275 Washington Avenue, San Leandro, California. Report No. 7615-8.

RESNA, March 21, 1991, Work Plan for Subsurface Investigation and Remediation at ARCO Station 601, RESNA/AGS Report 69034-4W.

RESNA, March 21, 1991, Addendum One to Work Plan at ARCO Station 601, RESNA Report 69034.04.

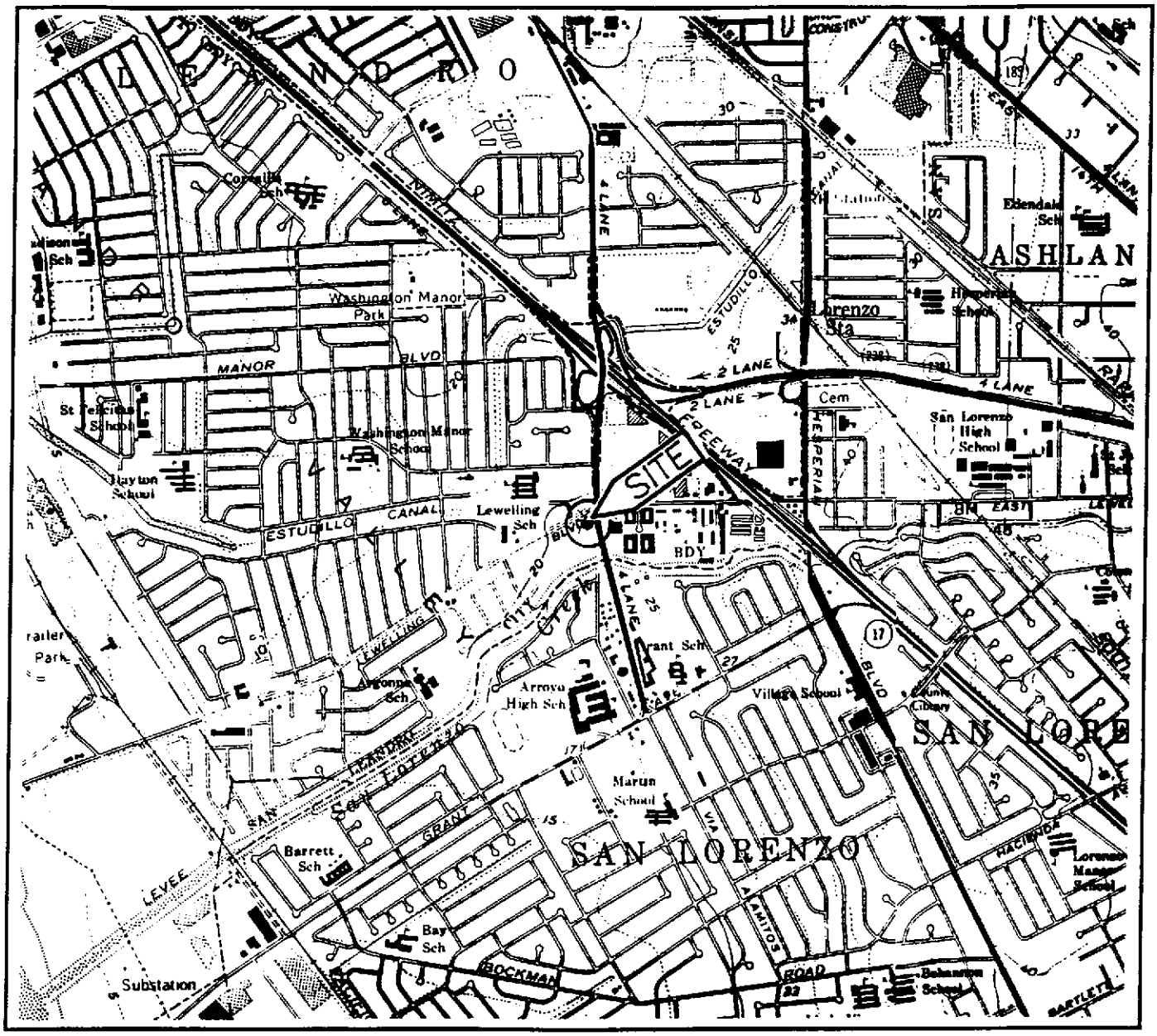
RESNA, May 15, 1991, Addendum Two to Work Plan for Interim Product Recovery at ARCO Station 601, RESNA/AGS Report 69034.04.

RESNA, October 17, 1991, Subsurface Environmental Assessment and Vapor Extraction Test at ARCO Service Station 601, RESNA Report 69034.04

RESNA, March 5, 1992, Addendum Three to Work Plan for Additional Subsurface Investigation, RESNA Report 69034.08.

RESNA, March 5, 1992, Addendum Four to Work Plan for Interim Groundwater Remediation, RESNA Report 69034.07.

RESNA, July 29, 1992, "Proposed location of offsite groundwater monitoring well adjacent to ARCO Station 601, 712 Lewelling Boulevard, San Leandro, California."



Base: U.S. Geological Survey
7.5–Minute Quadrangles
Hayward/San Leandro, California.
Photorevised 1984

N

LEGEND

⊙ = Site Location

Approximate Scale

2000 1000 0 2000 4000

feet

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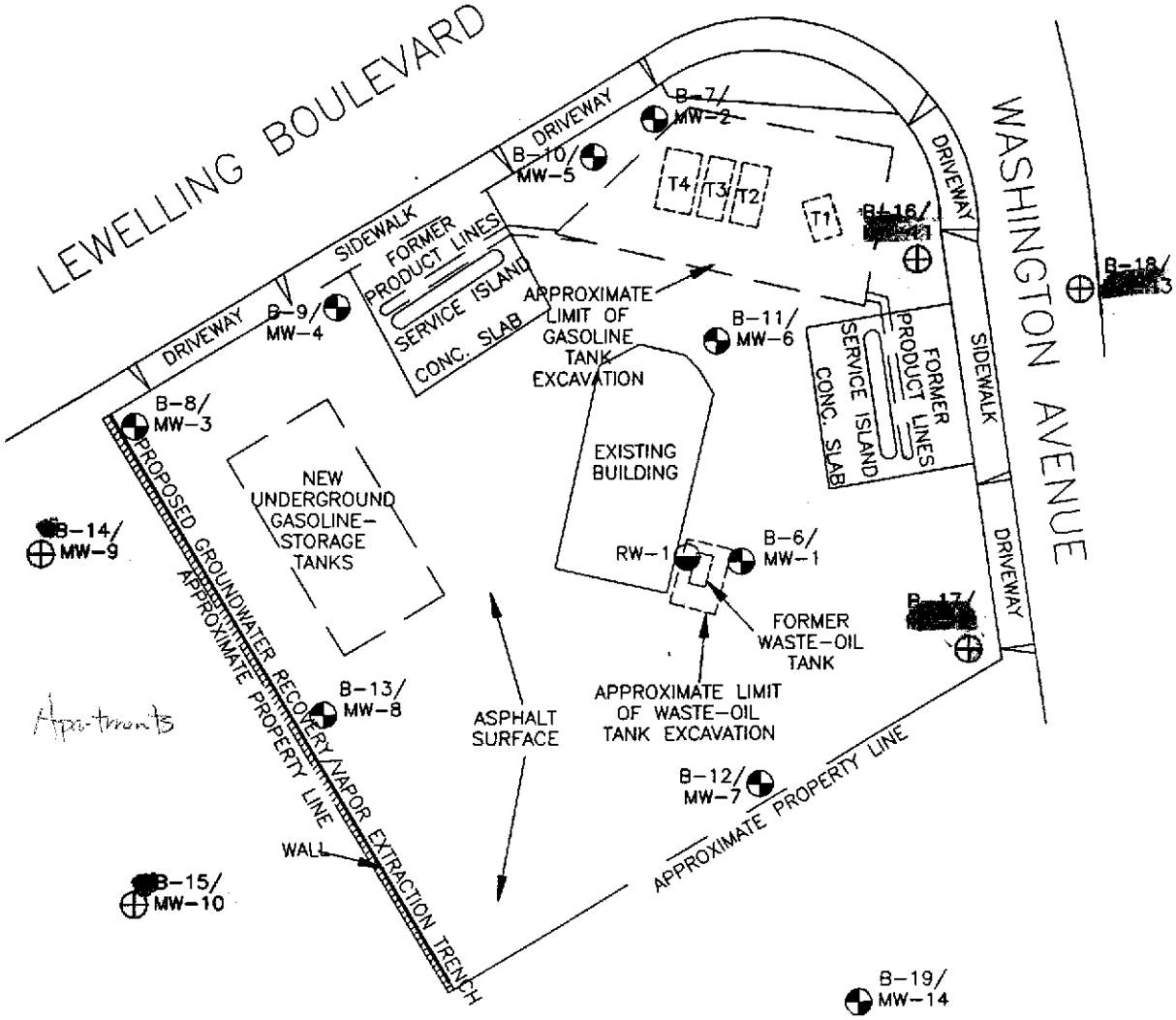
SITE VICINITY MAP
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

PLATE
1



EXPLANATION

B-18/ MW-13 = Proposed boring/monitoring well

B-19/ MW-14 = Groundwater monitoring well (RESNA, 1990, 1991 and 1992)

RW-1 = Product recovery well (GeoStrategies, January 1990)

T4 = Former underground gasoline storage tank

* = Wells not yet installed due to difficulty obtaining access

N

Approximate Scale

40 20 0 40 80

feet

Source: Surveyed by John Koch, Licensed Land Surveyor.

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PROPOSED BORING/ MONITORING WELL LOCATIONS
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

PLATE 2

STEP 1:
Obtain encroachment permits from the City of San Leandro and well installation permits from ACFCWCD Zone 7.

STEP 2:
Drill borings and install wells.

STEP 3:
Submit soil samples for laboratory analysis and receive results.

STEP 4:
Survey wells.

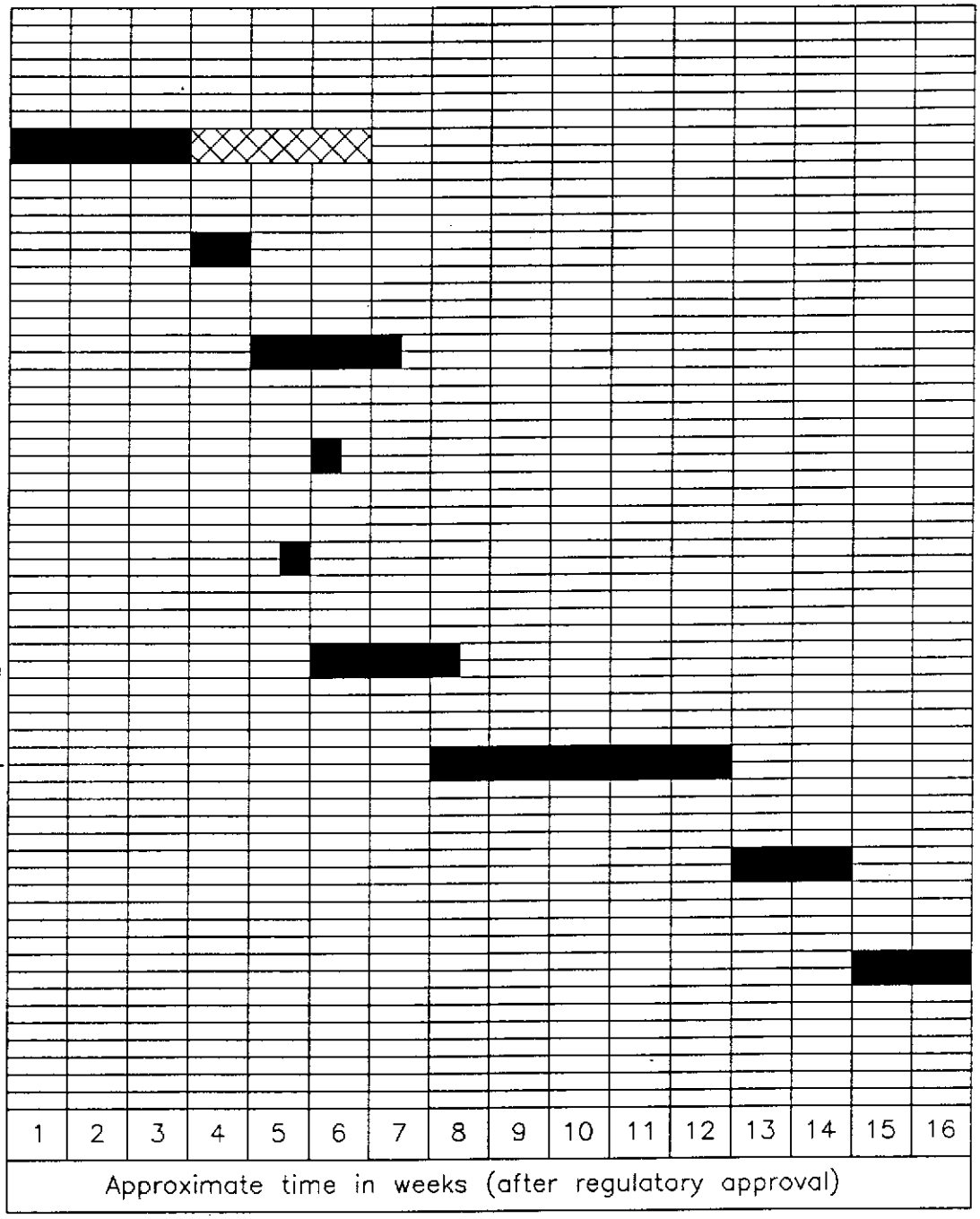
STEP 5:
Develop wells.

STEP 6:
Sample wells, submit samples for laboratory analysis; receive results.

STEP 7:
Prepare draft report and submit to ARCO.

STEP 8:
ARCO review of draft report.

STEP 9:
Finalize report.



Schedule is dependent upon City of San Leandro granting encroachment permits for well installation.

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PRELIMINARY TIME SCHEDULE
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

PLATE
3