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TO: MS. SUSAN HUGO
ACHCSA-DEPARTMENT OF
ENVIRONMENTAL HEALTH
80 SWAN WAY, ROOM 200
OAKLAND, CALIFORNIA 94621

DATE: MARCH 9, 1992
PROJECT NUMBER: 60000.09
SUBJECT: ARCO STATION 771, [REDACTED]
[REDACTED]

FROM: JOEL COFFMAN
TITLE: PROJECT GEOLOGIST

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ADDENDUM THREE TO WORK PLAN
SUBSURFACE INVESTIGATION
AND REMEDIATION

at

ARCO Station 771
899 Rincon Avenue
Livermore, California

60000.09

Prepared for
ARCO Products Company
P.O. Box 5811
San Mateo, California 94402

by

RESNA INDUSTRIES INC.



March 9, 1992

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
Fax: (408) 264-2435

March 9, 1992
60000.09

Mr. Chuck Carmel
ARCO Products Company
P.O. Box 5811
San Mateo, California 94402

Subject: Addendum Three to Work Plan to Perform Subsurface Investigation and Remediation at ARCO Station 771, 899 Rincon Avenue, Livermore, California.

Mr. Carmel:

As requested by ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) has prepared this letter to serve as an Addendum Three to the Work Plan for Subsurface Investigation and Remediation (RESNA/Applied GeoSystems [AGS], May 15, 1991) for the subject site. This addendum is in response to the results of previous subsurface investigation at this site. The location of the subject site is shown on the Site Vicinity Map, Plate 1.

RESNA recommends the following project tasks to further evaluate the lateral and vertical extent of gasoline hydrocarbons in the soil and groundwater at the site: **obtain offsite access and a permit for the construction of the wells; drill and collect soil samples from four offsite (B-12 through B-15) and two onsite (B-16 and B-17) soil borings; install four 4-inch-diameter groundwater monitoring wells (MW-8 through MW-11) in borings B-12 through B-15, respectively, one 4-inch-diameter vapor extraction well (VW-1) in soil boring B-16, and one 6-inch-diameter recovery well (RW-1) in soil boring B-17; develop, perform subjective analyses, and collect groundwater samples from the newly installed monitoring wells and recovery well in conjunction with ongoing quarterly monitoring of wells MW-1 through MW-7; survey wells MW-8 through MW-11, VW-1, and RW-1 to a local Geodetic Survey Datum by a licensed surveyor; perform laboratory analyses of soil and groundwater samples; perform an aquifer pump and recovery test; and prepare a report of the work performed including the findings, interpretations, and conclusions.**

The purpose of this work is to further delineate the lateral and vertical extent of gasoline hydrocarbons at the site and to investigate the presence and extent of gasoline hydrocarbons in the vicinity of the site, to confirm the groundwater gradient of the first water-bearing zone

beneath the site, to evaluate aquifer characteristics, to provide the future extraction point for groundwater recovery, and to determine the optimum flow rate for engineering design of a possible future groundwater extraction, collection, and treatment system.

PREVIOUS WORK

Previous work is summarized in the Work Plan (AGS 60000.06, May 15, 1991). The following is a brief summary of previous work performed at the site since that work plan was approved:

In June and July 1991, RESNA drilled five soil borings (B-7 through B-11) and constructed four groundwater monitoring wells (MW-4 through MW-7) in borings B-7 through B-10. Results of this subsurface investigation indicated that the majority of total petroleum hydrocarbons as gasoline (TPHg) at concentrations above 100 parts per million (ppm) in soils at the site appear to be located in the southern half of the site at depths between 32 and 43 feet, and greater, below grade. Refer to Plate 3 for soil TPHg concentration contours.

The extent of soil TPHg has not been delineated at the site with the exception of the northern portion of the property where soils from borings B-6, B-9, and B-11 contained trace to nondetectable levels of TPHg and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Samples from boring B-11 located in the former waste oil tank pit reported nondetectable levels of waste-oil related hydrocarbons, as summarized in Table 1, Cumulative Results of Laboratory Analyses of Soil.

Monitoring well MW-1 continues to collect floating product, well MW-5 contains sheen, and well MW-2 contained floating product and sheen until it was reported to be dry on November 13, 1991. Floating product has been removed from MW-1 and MW-2 on a monthly basis since January 1991 and from MW-5 since August 1991, as shown on Table 2, Approximate Cumulative Product Removed. The groundwater samples from monitoring wells MW-3, MW-4, MW-6, and MW-7 contain elevated concentrations of TPHg and BTEX, as summarized in Table 3, Cumulative Laboratory Results of Groundwater Samples. The extent of gasoline hydrocarbons in groundwater at the site has not been delineated and appears to have migrated offsite.

A vapor extraction performance test (VET) was performed at the site on December 12, 1991 to evaluate the use of vapor extraction as a remediation alternative at the site. Results of the VET were summarized in a letter report (RESNA, January 3, 1992).

The underground gasoline storage tanks (UST) and product delivery lines at the site were replaced beginning December 28, 1991. This work was supervised by Roux Associates of Concord, California, and performed by Golden West Builders of Walnut Creek, California. During the course of the UST replacement, piping was installed to connect the existing monitoring wells at the site together for future use in a vapor extraction and/or groundwater recovery system(s) at the site.

On January 8, 1992, three Horner EZY Floating Product Skimmers were installed in monitoring wells MW-1, MW-2, and MW-5 as described in Addendum II to Work Plan (RESNA, January 1992).

PROPOSED WORK

RESNA proposes the following project steps 1 through 9 listed below to be implemented upon regulatory approval of this Addendum to Work Plan and upon ARCO's authorization to proceed. This proposed work is designed to further delineate the vertical and horizontal extent of gasoline hydrocarbons and to evaluate aquifer characteristics for a possible future groundwater remediation system. Field work involved with the following project steps will be performed in accordance with the RESNA Field Protocol in Appendix A of the Work Plan, dated May 15, 1991. All work will be conducted in accordance with an updated Site Safety Plan.

- Step 1: Submit Addendum Three to Work Plan to the Regional Water Quality Control Board (RWQCB) and Alameda County Health Care Services Agency (ACHCSA) for review, comment, and approval.
- Step 2: Obtain offsite access and a permit for the construction of the wells. The request for access was mailed to the property owners on January 7, 1992. It is not known at this time if access will be allowed. If not, another location will be selected for offsite wells, and another addendum prepared for regulatory approval.
- Step 3: Drill and obtain soil samples for soil classification and laboratory analyses from four offsite (B-12 through B-15) and two onsite (B-16 and B-17) soil borings as shown on Plate 2, Proposed Boring/ Well Locations. Drill soil borings B-12 through B-15 and B-17 to a depth of 5 feet into a possible perching or confining layer beneath the first-encountered groundwater or no more than 20 feet into a water-bearing zone (total depths of approximately 45 feet) and install four 4-inch-diameter groundwater monitoring wells (MW-8 through MW-11) in borings B-12 through B-15, respectively, and a 6-inch-

diameter recovery well (RW-1) in soil boring B-17. Drill soil boring B-16 to the first encountered groundwater (total depth of approximately 35 feet) and install a 4-inch-diameter vapor extraction well (VW-1) in the boring.

- Step 4: Submit selected soil samples from soil borings B-12 through B-17 to an ARCO-contracted, State-certified laboratory for analyses of TPHg and BTEX by Environmental Protection Agency (EPA) Method 5030/8015/8020. Chain-of-custody protocol will be observed for all samples submitted for analyses.
- Step 5: Survey groundwater monitoring wells MW-8 through MW-11, recovery well RW-1, and vapor extraction well VW-1 to a National Geodetic Survey Datum for elevation relative to mean sea level (msl).
- Step 6: Develop monitoring wells MW-8 through MW-11 and recovery well RW-1.
- Step 7: Perform subjective analyses of groundwater in the monitoring wells and the recovery well, purge, and obtain groundwater samples for laboratory analyses from groundwater monitoring wells MW-1 through MW-11 and recovery well RW-1. Submit groundwater samples from the groundwater monitoring wells to an ARCO-contracted, State-certified laboratory for analyses of TPHg and BTEX by EPA Method 5030/8015/8020. Chain-of-custody protocol will be observed for all samples submitted for analyses.
- Step 8: Perform a 24-hour pump and recovery test to evaluate aquifer characteristics and optimum flow rate for design of a future groundwater extraction, collection, and treatment system.
- Step 9: Prepare a report including results of the assessment, conclusions, and recommendations for future work at the subject site.

SCHEDULE

A preliminary time schedule to perform Steps 1 through 9 is shown on Plate 3. This time schedule is an estimate and is subject to change should circumstances dictate. Property owner approval is the main unknown impacting the proposed work and the preliminary schedule. The letter to the property owners has been sent. The schedule allows three weeks after regulatory approval of this addendum before property owner approval is received. However, property owner approval may take several more months, or may be declined completely by the owners. ARCO and the appropriate regulatory agencies will be informed should the estimated time for completion of the proposed work in this addendum

to work plan be delayed beyond the estimated time of completion depicted in Plate 3. Time is estimated in weeks after gaining regulatory approval of Addendum Three to Work Plan and any changes which must be incorporated into this Addendum to Work Plan due to regulatory request. Subsequent addenda to the Work Plan will be prepared and submitted to ARCO and proper regulatory agencies as necessary to describe future work proposed at the site. RESNA can initiate work at the site within one week after receiving authorization to proceed.

DISTRIBUTION

Copies of this Addendum Three should be forwarded to:

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

Mr. Eddy So
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

Ms. Danielle Stefani
Livermore Fire Department
4550 East Avenue
Livermore, California 94550

Addendum Three to Work Plan
ARCO Station 771, Livermore, California

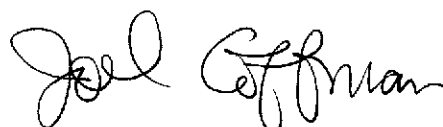
March 9, 1992
60000.09

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

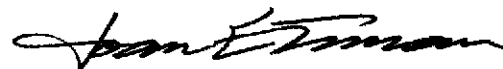
Sincerely,
RESNA



Barbara Sieminski
Assistant Project Geologist



Joel Coffman
Project Geologist



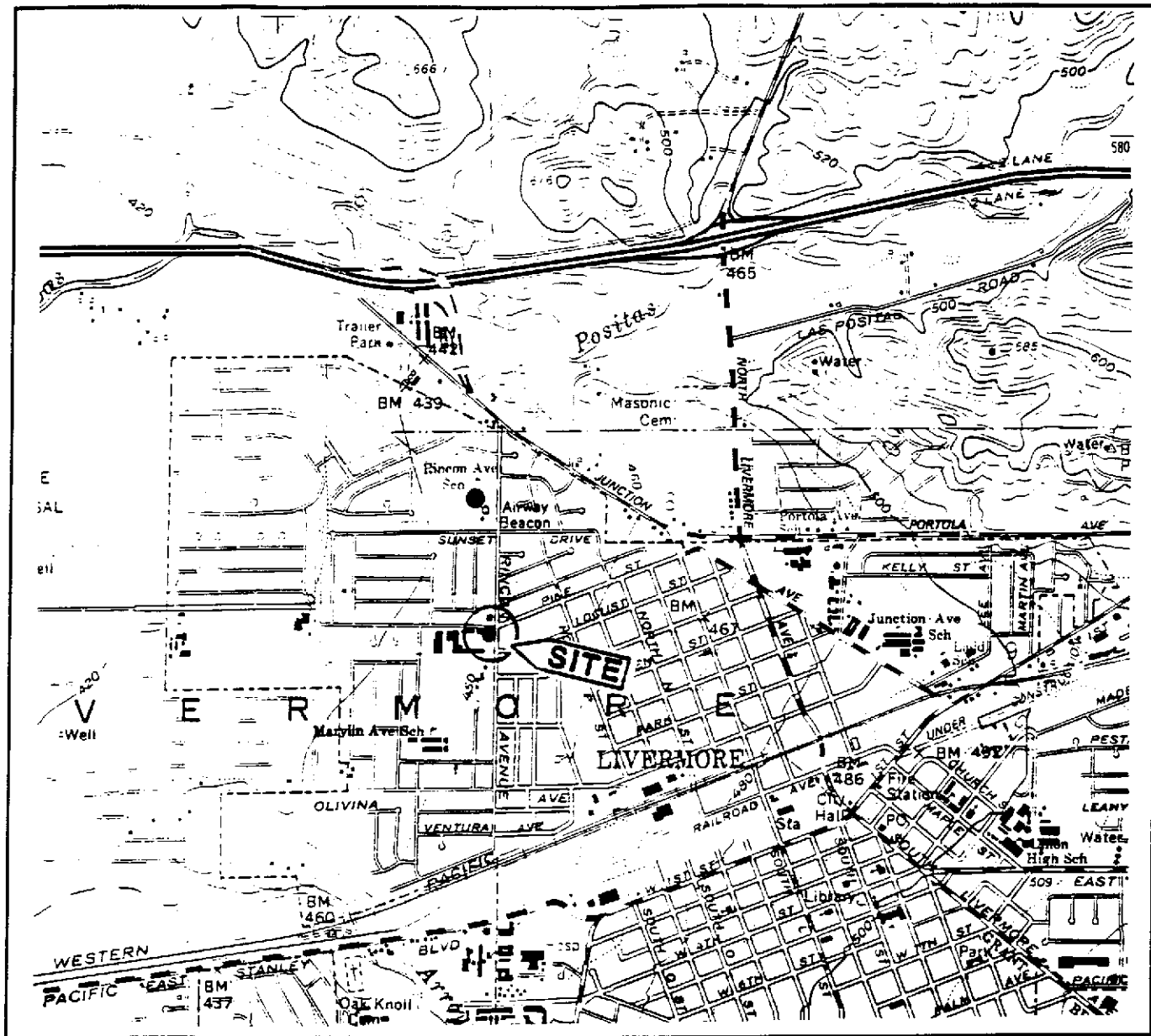
Joan E. Tiernan, Ph.D., P.E.
Engineering Manager

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

cc: H.C. Winsor, ARCO Products Company

REFERENCES

- Applied GeoSystems. June 22, 1990. Limited Subsurface Environmental Assessment at ARCO Station 771, 899 Rincon Avenue, Livermore, California. AGS 60000-1.
- Applied GeoSystems. September 20, 1990. Work Plan for Supplemental Subsurface Investigation at ARCO Station 771, 899 Rincon Avenue, Livermore, California: AGS 60000-3.
- Brown and Caldwell. September 16, 1987. Soil Sample Results for Waste Oil Tank Removal, ARCO Station 771: Report No. 17/3456-02/3.
- California Department of Water Resources. 1974. Evaluation of Ground-Water Resources Engineering Livermore and Sunol Valleys: Bulletin No. 118-2, Appendix A.
- RESNA/Applied GeoSystems. April 12, 1991. Supplemental Subsurface Investigation at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.04.
- RESNA. May 15, 1991. Work Plan for Subsurface Investigations and Remediation at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.06
- RESNA/Applied GeoSystems. May 15, 1991. Addendum One to Work Plan for Supplemental Subsurface Investigation at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.06
- RESNA/Applied GeoSystems. June 27, 1991. Site Safety Plan for the ARCO Service Station No. 771, 899 Rincon Avenue, Livermore, California. RESNA 60000.06S.
- RESNA. October 21, 1991. Additional Environmental Investigation at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.06
- RESNA. January 13, 1992. Addendum Two to Work Plan for Interim Product Recovery at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.08



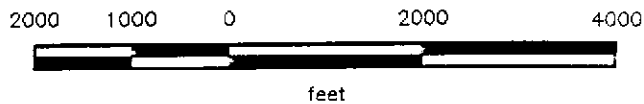
Base: U.S. Geological Survey
 7.5-Minute Quadrangle
 Livermore, California
 Photorevised 1980

LEGEND

● = Site Location



Approximate Scale



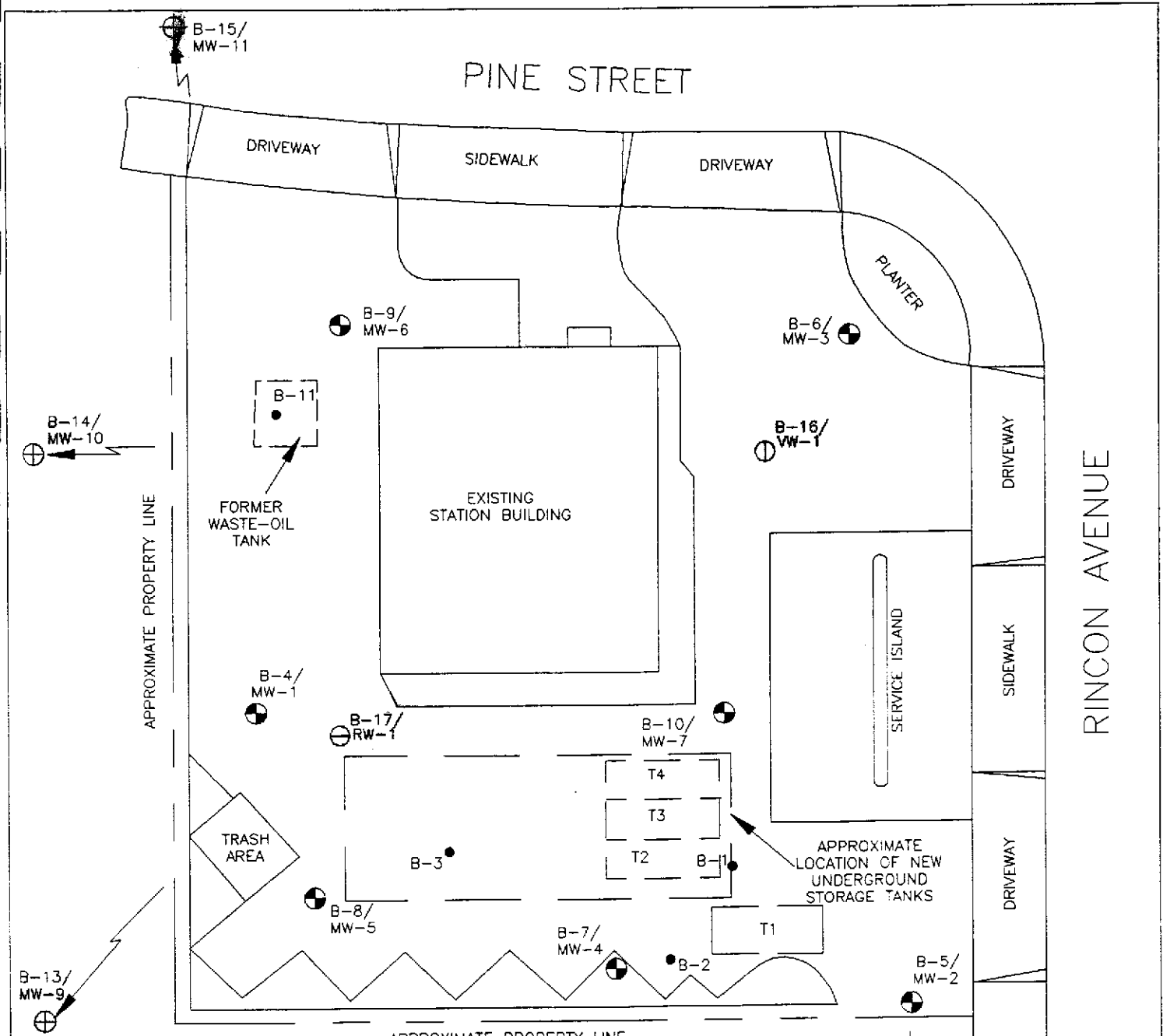
RESNA

**SITE VICINITY MAP
 ARCO Station 771
 899 Rincon Avenue
 Livermore, California**

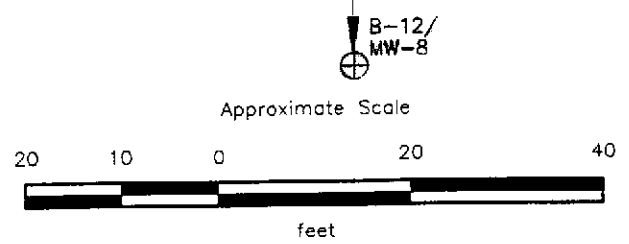
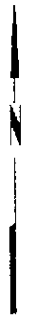
PLATE

1

PROJECT 60000.09



- EXPLANATION**
- B-16/
MW-1 ⊕ = Proposed vapor extraction well
 - B-17/
RW-1 ⊖ = Proposed recovery well
 - B-15/
MW-11 ⊕ = Proposed boring/monitoring well
 - B-10/
MW-7 ⊕ = Monitoring well
(RESNA, December 1990, June and July 1991)
 - B-11 ● = Soil boring
(RESNA, February 1990, July 1991)
 - T4 □ = Former underground gasoline-storage tanks



Source: Surveyed by John Koch, Licensed Land Surveyor.

	PROPOSED BORING/ WELL LOCATIONS ARCO Station 771 899 Rincon Avenue Livermore, California	PLATE 2
	PROJECT 60000.09	

TASKS 1 and 2:
 Submit Addendum Three to
 Work Plan to ACHCSA, obtain
 offsite access and permits for
 well construction

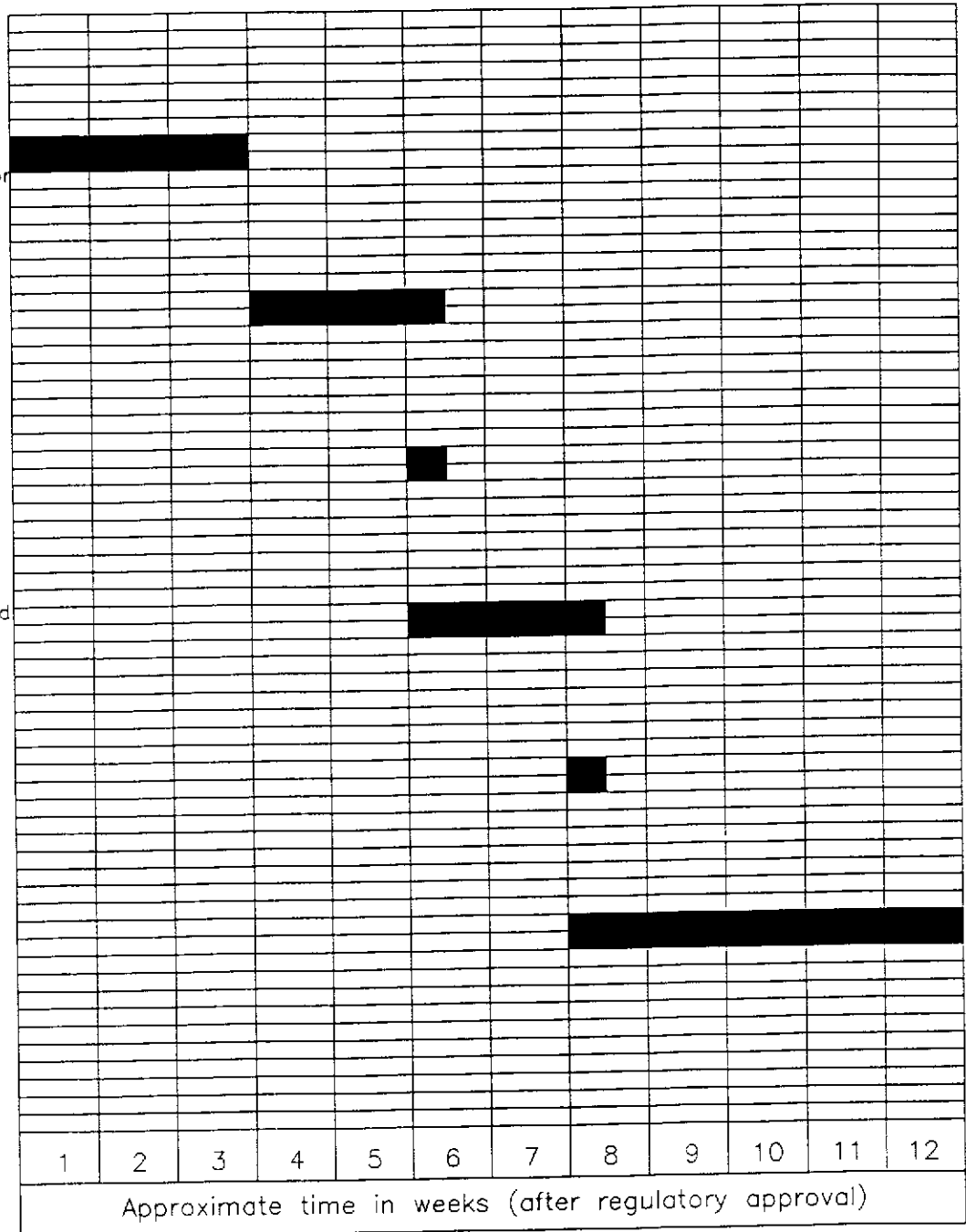
TASKS 3 and 4:
 Drill borings and install wells
 and receive analytical results
 of soil samples

TASK 5:
 Survey wells

TASKS 6 and 7:
 Develop and sample wells and
 receive analytical results of
 water samples

TASK 8:
 Perform pump and recovery
 test

TASK 9:
 Prepare report



If offsite access is not granted, time schedule for completion of work will change.



PROJECT 60000.09

PRELIMINARY TIME SCHEDULE
ARCO Station 771
899 Rincon Avenue
Livermore, California

PLATE
3



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 53 FEDEX BOX
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