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A RESNA Company

RESNA
Working To Restore Nature

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ADDENDUM THREE TO WORK PLAN SUBSURFACE INVESTIGATION AND REMEDIATION

at

ARCO Station 2035
1001 San Pablo Avenue
Albany, California

5/28/92

69036.05

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

by

RESNA Industries

May 28, 1992

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May 29, 1992
69036.05

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

Subject: Addendum Three to Work Plan to Perform an Additional Subsurface Environmental Investigation and Vapor Extraction Test at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California.

Mr. Whelan:

As requested by ARCO Products Company (ARCO), RESNA Industries (RESNA) has prepared this letter to serve as Addendum Three to the Work Plan for Subsurface Investigation and Remediation (RESNA, April 29, 1991) for the subject site. This addendum is in response to the results of previous subsurface investigations at this site. The location of the subject site is shown on the Site Vicinity Map, Plate 1.

RESNA proposes the following project steps to perform this phase of subsurface investigation at this site: obtain offsite access and required permits for the construction of wells, drill and collect soil samples from six onsite (B-12 through B-17) and three offsite (B-18 through B-20) soil borings, install four 4-inch-diameter vapor extraction wells (VW-1 through VW-4) in soil borings B-14 through B-17, and three 2-inch-diameter groundwater monitoring wells (MW-4 through MW-6) in borings B-18 through B-20, respectively. The proposed locations of these wells and borings are shown on Plate 2, Proposed Boring/Vapor and Offsite Monitoring Well Locations. Develop groundwater monitoring wells MW-4 through MW-6, perform subjective analyses, and collect groundwater samples from the newly installed monitoring wells in conjunction with ongoing quarterly monitoring of wells MW-1 through MW-3 and RW-1, survey wells MW-4 through MW-6 and vapor extraction wells VW-1 through VW-4 to a local Geodetic Survey Datum by a licensed surveyor, perform laboratory analyses of soil and groundwater samples, perform a vapor extraction test, and prepare a report of the work performed including the findings, interpretations, and conclusions.

The purpose of this work is to: 1) evaluate the lateral extent of gasoline hydrocarbon impacted soil and groundwater in the downgradient (northwest) direction from the locations of the former underground gasoline-storage tanks (USTs); 2) evaluate the extent of waste-oil hydrocarbons in the soil in the vicinity of the former waste-oil tank; 3) confirm the groundwater gradient of the first water-bearing zone beneath the site; and 4) collect data necessary for the evaluation of the feasibility and design of a future soil remediation system. The locations of the proposed borings/wells and other pertinent features at the site are shown on Plate 2.

PREVIOUS WORK

Previous work is summarized in the Work Plan (Applied GeoSystems [AGS] 69036-2, April 29, 1991) and the Report of Subsurface Environmental Investigation and Pump Test (RESNA, March 6, 1992). The following is a brief summary of previous work performed at the site since that work plan was approved.

Underground Storage Tank Removal

Addendum One to the Work Plan, and the Site Safety Plan were prepared by RESNA in June 1991, outlining work to be performed for a limited subsurface investigation at the subject site.

On June 25, 1991, RESNA personnel supervised the drilling of two soil borings, (B-6 and B-7) to depths of 18 and 19-½ feet below ground surface in the immediate vicinity of the new tank pit location as shown on Plate 2. Groundwater was first encountered at 17-½ feet in B-6 and 19-½ feet in B-7. Selected soil samples collected from borings B-6 and B-7 were submitted for laboratory analyses for total petroleum hydrocarbons as gasoline (TPHg) and gasoline constituents benzene, toluene, ethylbenzene and total xylenes (BTEX) by Environmental Protection Agency (EPA) Methods 8015/8020. TPHg and BTEX concentrations were not detected from any soil sample submitted. The soil in the vicinity of the new tank pit indicated nondetectable concentrations of TPHg and BTEX down to a depth of 18-½ feet.

In July and August 1991, four gasoline-storage tanks (one 6,000-gallon tank [T1], two 4,000-gallon tanks [T2 and T3], and one 10,000-gallon tank [T4]) and associated product delivery lines were excavated and removed from the site. Soil samples were collected from the side walls and bottom of the excavation, and beneath the product lines and submitted for laboratory analyses for TPHg and BTEX by EPA Method 8015/8020. The tank removal and subsequent environmental subsurface investigation concluded that gasoline hydrocarbons over 100 parts per million (ppm) did not appear to have impacted the shallow soils (ground

surface to 13 feet below grade) in the former underground steel gasoline-storage tank pit excavation; 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 190,000 parts per billion (ppb) TPHg.

Subsurface Environmental Investigation

In October and November 1991, RESNA performed a subsurface environmental investigation and pump test at the site (RESNA, March 6, 1992). This phase of the investigation included: performing a 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 for description and possible laboratory analysis; 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 to evaluate aquifer characteristics. RESNA concluded the following, based on the results of this investigation:

- The majority of gasoline hydrocarbons in the soil at the site appears to be at the depth between approximately 10 to 15 feet below ground surface, within the layer of sandy clays and gravely silts.

- The lateral extent of gasoline hydrocarbons in the soil has been delineated below 100 ppm only in the northwestern (B-10) and northeastern (B-9) portions of the site, and to nondetectable levels (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 has been delineated to nondetectable level (less than 1.0 ppm) at a depth of approximately 16 to 20-½ 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 has not been delineated.

- The lateral and vertical extent of hydrocarbons in the groundwater have not been delineated at the site with the exception of the northwestern part of the

site where TPHg concentrations were below laboratory detection limits (<60 ppb) for TPHg in MW-2.

- Nondetectable concentrations of total oil and grease (TOG), total petroleum hydrocarbons as diesel (TPHd), volatile organic compounds (VOC's), and the metals cadmium, chromium, lead, and nickel in groundwater samples collected from monitoring well MW-3 suggests that the hydrocarbons associated with the former waste-oil tank have not impacted groundwater beneath the site.

- Results of the pump test estimated a long term pumping rate from the recovery well RW-1 around 1.5 to 1.7 gallons per minute (gpm). The predicted zone of capture is sufficient to capture a large portion of the impacted groundwater and floating product at the site. The first-encountered water bearing zone was determined to be an 8-foot thick confined zone, with relatively high transmissivity.

Monitoring, Sampling and Floating Product Removal

In November 1991, monthly groundwater monitoring, monthly floating product removal, and quarterly sampling was initiated. Approximately 3.26 feet of floating product was measured in well RW-1 during first quarter 1992, but evidence of product or sheen was not detected in the other monitoring wells. In April 1992, a Horner EZY Floating Product Skimmer was installed in well RW-1 for interim remediation of groundwater at the site. The interpreted groundwater gradients averaged approximately 0.01 toward the southwest. Concentrations of TPHg and benzene increased in wells MW-1 and MW-3, and were generally consistent in MW-2 with results of initial monitoring data from October 1991.

PROPOSED WORK

RESNA proposes the following project steps 1 through 8 listed below as a method to: 1) further evaluate the lateral and vertical extents of gasoline hydrocarbons in the soil and groundwater onsite and offsite, and 2) evaluate the extent of waste-oil related hydrocarbons in the soil near the former waste-oil tank. 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 (RESNA, April 29, 1991) and in accordance with an updated Site Safety Plan.

Step 1: Upon gaining regulatory approval of this addendum to work plan, acquire proper permits, and attempt to gain offsite access for monitoring well installation from the appropriate property owners.

Step 2: Drill and obtain soil samples for soil classification and laboratory analyses from six onsite (B-12 to B-17) and three offsite (B-18 through B-20 [if access is granted]) soil borings as shown on Plate 2. Drill soil borings B-12 and B-13 to the first encountered water-bearing zone beneath the site (approximately 25 feet below ground surface). Borings B-12 and B-13 will be drilled and sampled to evaluate the lateral extent of waste-oil related hydrocarbons in soil in the vicinity of the former waste-oil tank.

Drill soil borings B-14 through B-17 to a depth of approximately two feet above the first-encountered water-bearing zone at the site (total depths of approximately 23 feet below ground surface), and install 4-inch-diameter vapor extraction wells (VW-1 through VW-4) in the borings. Borings/wells B-14/VW-1 through B-17/VW-4 will be drilled and installed to provide vapor extraction points to conduct a vapor extraction test.

Drill borings B-18 through B-20 up to 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 (approximately 35 feet below ground surface) and install three 2-inch-diameter groundwater monitoring wells (MW-4 through MW-6) in borings B-18 through B-20, respectively. Borings/wells B-18/MW-4 through B-20/MW-6 will be located to evaluate the lateral extent of gasoline hydrocarbon impacted soils and groundwater downgradient (northwest) of the subject site.

Step 3: Submit selected soil samples from soil borings B-12 through B-20 to a State-certified laboratory to be analyzed for TPHg and BTEX by EPA Methods 5030/8015/8020. Selected soil samples collected from soil borings B-12 and B-13, located in the vicinity of the former waste-oil tank pit will be submitted for analyses TPHd and TOG by EPA Methods 3550/8015/8020 and 5520 D and F, respectively. Selected soil samples from borings B-12 and B-13 will also be analyzed for the metals cadmium, chromium, lead, zinc, and nickel by the methods outlined in the August 1990 RWQCB Tri-Regional Board Staff Recommendations document. Chain-of-custody protocol will be observed for all samples submitted for analyses.

Step 4: Survey newly installed groundwater monitoring wells MW-4 through MW-6 and vapor extraction wells VW-1 through VW-4 to a National Geodetic Survey Datum for elevation relative to mean sea level (msl). Gaining offsite access from CalTrans and private owners may delay the installation and subsequent surveying.

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Step 5: Develop newly installed monitoring wells MW-4 through MW-6.

Step 6: Perform subjective analyses of groundwater from the monitoring wells, purge, and obtain groundwater samples for laboratory analyses from groundwater monitoring wells MW-1 through MW-6 and RW-1. Submit groundwater samples from the groundwater monitoring wells to a State-certified laboratory to be analyzed for TPHg and BTEX by EPA Methods 5030/8015/8020. Chain-of-custody protocol will be observed for all samples submitted for analyses.

Step 7: Perform a vapor extraction test (VET) using vapor extraction wells VW-1 through VW-4 to collect data necessary for the evaluation of the feasibility and design of future remediation system. Recovery well RW-1 and onsite monitoring wells MW-1 through MW-3 will also be monitored during the VET to evaluate vacuum flow rates across the site.

Step 8: 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 8 is shown on Plate 3. This time schedule is an estimate and is subject to change should circumstances dictate. Onsite wells can be permitted and installed within a few weeks after regulatory agencies' approval of this work plan. However, offsite wells are in a CalTrans right of way, and encroachment permits are expected to take 3-6 months for CalTrans approval. ARCO and the appropriate regulatory agencies will be informed should the estimated time for completion of the work proposed in this Addendum Three to the Work Plan be delayed beyond the estimated time of completion depicted on 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 the 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. Larry Seto
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

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

Sincerely,
RESNA Industries

Robert D. Campbell
Staff Geologist

Joel Coffman
Project Geologist

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

cc: H.C. Winsor, ARCO Products Company

REFERENCES

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

California Regional Water Quality Control Board, San Francisco Bay Region. August 10, 1990. Tri-Regional Board Staff Recommendations for Preliminary Evaluations and Investigation of Underground Tank Sites.

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

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

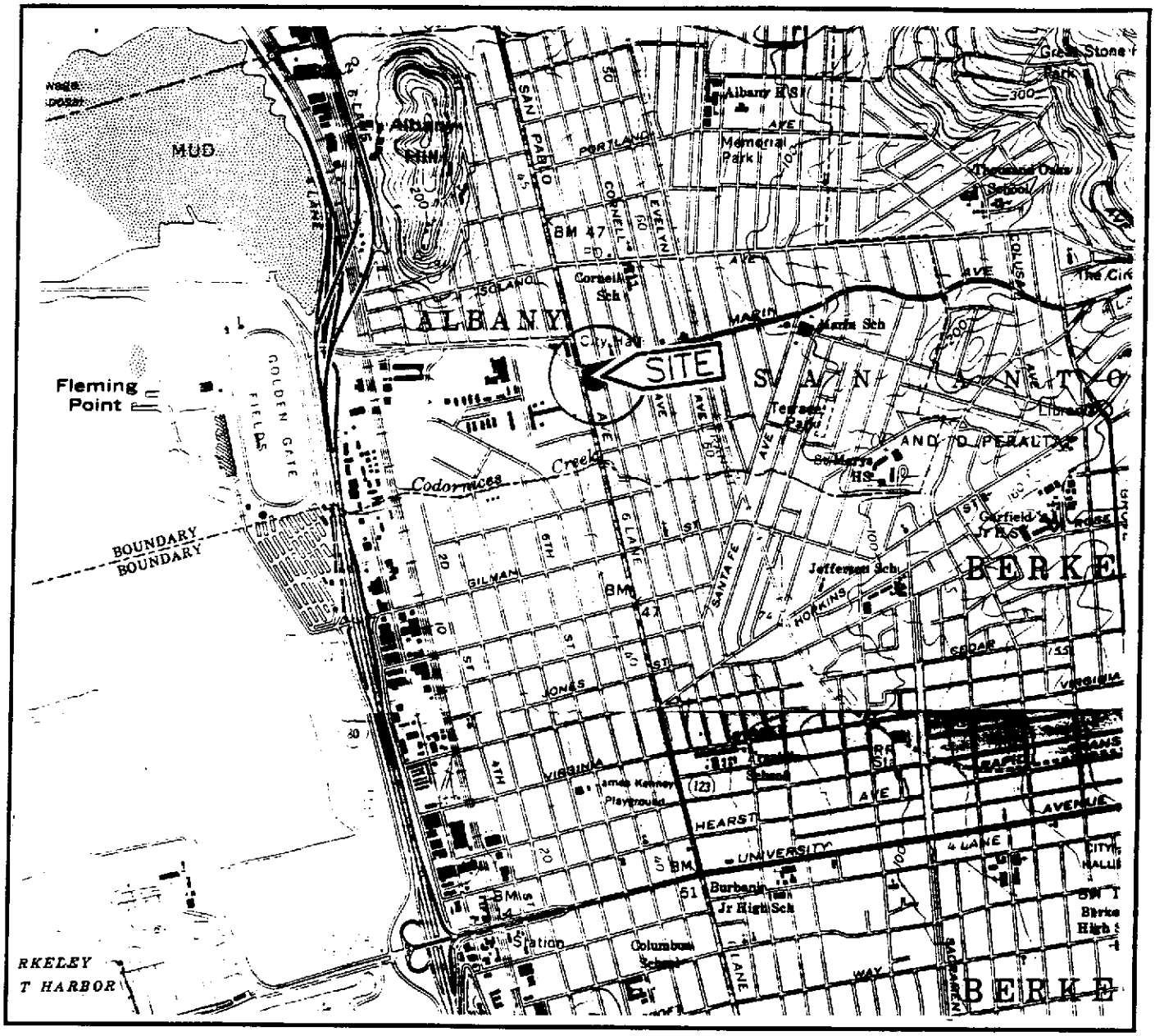
RESNA/Applied GeoSystems. June 24, 1991. Site Safety Plan for the ARCO Service Station No.2035, 1001 San Pablo Avenue, Albany, California. AGS 69036.03S.

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

RESNA. September 24, 1991. Addendum Two to Work Plan for Subsurface Investigation and Remediation at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California. 69036-2

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

RESNA. May 1, 1992. First Quarter 1992 Groundwater Monitoring Report at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California. RESNA 69036.04.



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

N

LEGEND

⊙ = Site Location

Approximate Scale

2000 1000 0 2000 4000

feet

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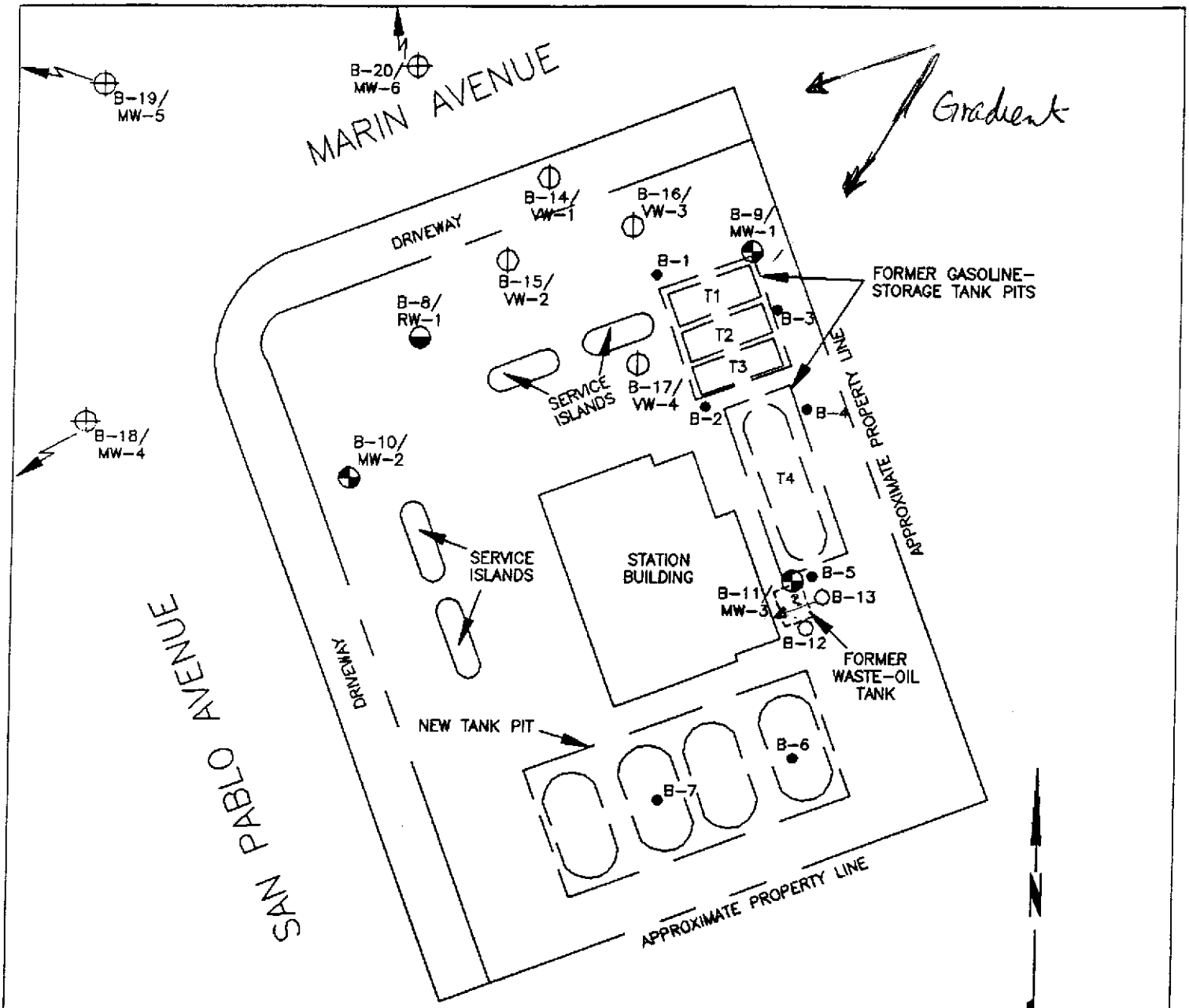
PROJECT 69036.05

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

PLATE 1



EXPLANATION

B-17/VW-4 = Proposed vapor extraction well

B-20/MW-6 = Proposed offsite monitoring well

B-13 = Proposed boring

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

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

B-5 = Soil boring (RESNA, August 1989 and June 1991)

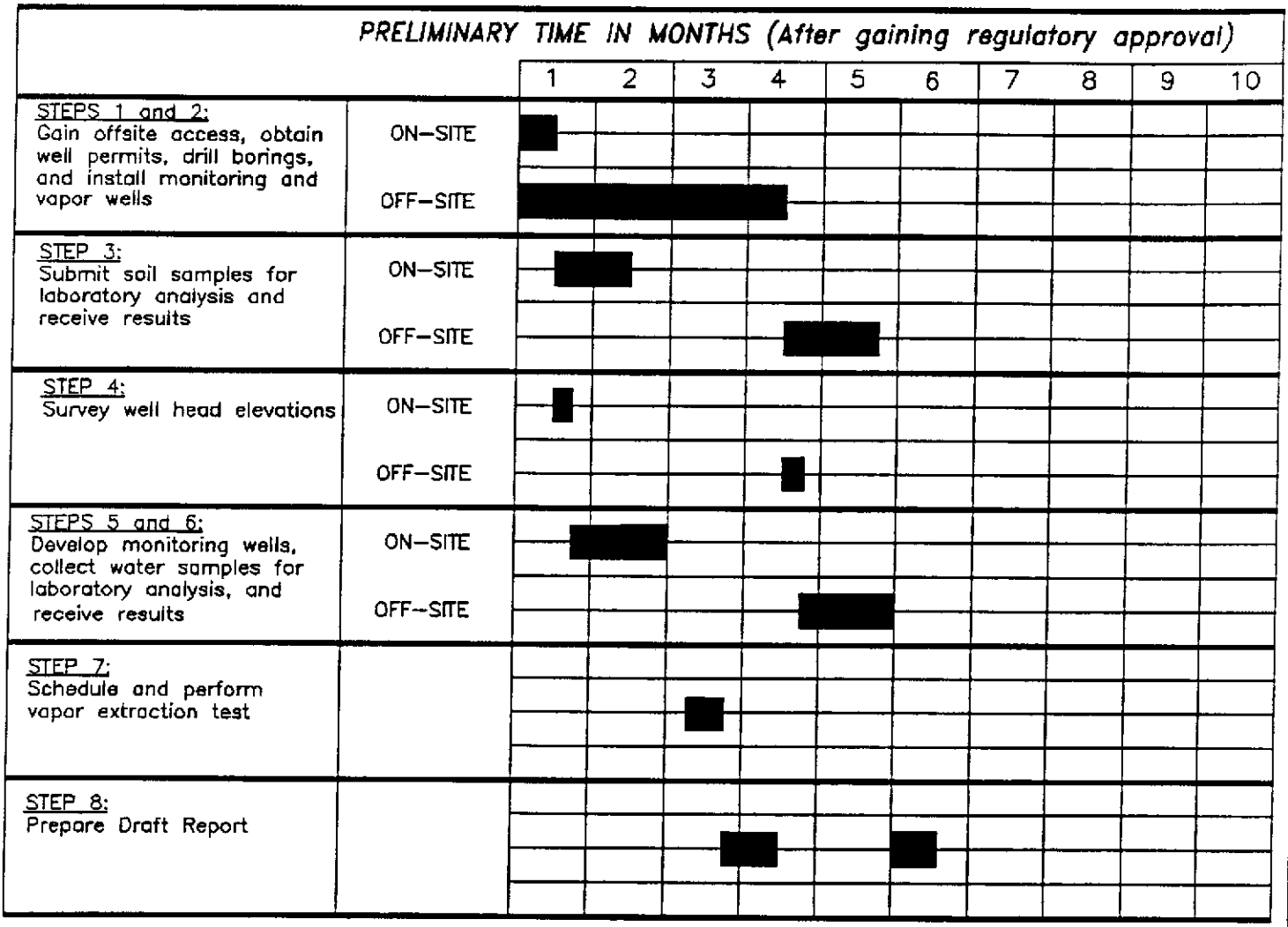
Approximate Scale

30 15 0 30 60

feet

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

RESNA	**PROPOSED BORING/VAPOR AND OFFSITE MONITORING WELL LOCATIONS** **ARCO Station 2035** **1001 San Pablo Avenue** **Albany, California**	**PLATE** **2**
PROJECT 69036.05		



NOTE:
Onsite work will proceed upon gaining regulatory approval and well permits. Installation of offsite wells may be delayed pending offsite access and proper encroachment permits from CalTrans.

RESNA	**PRELIMINARY TIME SCHEDULE** **ARCO Station 2035** **1001 San Pablo Avenue** **Albany, California**	**PLATE** **3**
PROJECT 69036.05		