GETTLER-RYAN INC.

WORK PLAN FOR MONITORING WELL INSTALLATION

at

Chevron Service Station #9-9708
5910 Mac Author Boulevard
Oakland, California

Report No. 346395.02

Prepared for:

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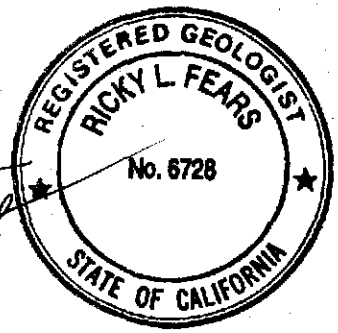

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August 25, 1998

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INTRODUCTION

This Work Plan has been prepared by Gettler-Ryan Inc. (GR) at the request of Chevron Products Company (Chevron) in response to Alameda County Public Works Agency (ACPWA) letter dated June 26, 1998. The ACPWA requested a further investigation in a downgradient direction of the site to assess the lateral extent of the dissolved methyl tert-butyl ether (MtBE) in the groundwater beneath the site. GR proposes to install one additional groundwater monitoring well to further delineate the dissolved MtBE plume in a downgradient direction from the site.

The scope of this proposed monitoring well installation includes: obtaining the necessary well installation permits from the ACPWA; preparing a site specific health and safety plan; obtaining the necessary encroachment permits for installation of one ground water monitoring well along Seminary Avenue; installing one groundwater monitoring well; collecting soil and groundwater samples from the pilot boring and monitoring well; submitting the soil and groundwater samples for chemical analysis; and preparing a report which presents soil and groundwater results from this limited investigation.

The scope of work described in this Work Plan is intended to comply with the State of California Water Resources Control Board's *Leaking Underground Fuel Tanks (LUFT) Manual* and *California Underground Storage Tank Regulations, 1994*, the California Regional Water Quality Control Board (CRWQCB) *Tri-Regional Board Staff Recommendations for Preliminary Investigation and Evaluation of Underground Tank Sites*, and ACPWA guidelines.

SITE DESCRIPTION

The site is an active service station located on the northeast corner of Mac Author Boulevard and Seminary Avenue in Oakland, California (Figure 1). The current facilities consist of a station building, four dispenser islands and three gasoline USTs that share a common excavation in the central portion of the site. Locations of pertinent site features are shown on Figure 2.

SCOPE OF WORK

To further define the dissolved MtBE downgradient (west) of well MW-2, GR proposes to drill one soil boring (completed as monitoring well MW-4) to groundwater west of monitoring well MW-2. Soil samples from this boring will be analyzed to evaluate if residual concentrations of MtBE in the soil around well MW-4 are acting as an ongoing source of MtBE into the groundwater at the site. GR Field Methods and Procedures are included in Appendix A.

To implement the proposed scope of work, GR proposes the following six tasks:

Task 1. Pre-field Activities

GR will update the site safety plan, and will obtain the necessary well installation permit from ACPWA. A City of Oakland encroachment permit will be obtained for drilling and installing a monitoring well on Seminary Avenue. Underground Service Alert (USA) will be notified at least 48 hours prior to initiating work at the site. A private utility locator will be contracted to clear the proposed monitoring well location.

Task 2. Well Installation

GR will install one groundwater monitoring well at the locations shown on Figure 1. Drilling and well construction will be performed by Bay Area Exploration, Inc. (C57 #522125). A GR geologist or engineer will monitor the drilling activities and prepare a log of the boring. The well boring will be drilled with 8-inch diameter hollow-stem augers to approximately 20 feet bgs. Soil samples for description and possible chemical analysis will be obtained from the boring at five-foot intervals. The actual number of samples submitted for chemical analysis will depend on site conditions and field screening data. We anticipate a minimum of one unsaturated soil sample from the well boring to be submitted for chemical analysis as described in Task 5.

Soil from each sampled interval will be screened in the field for the presence of volatile organic compounds using a photoionization detector (PID). These data will be collected for reconnaissance purposes only, and will not be used as verification of the presence or absence of petroleum hydrocarbons. Screening data will be recorded on the boring logs.

The groundwater monitoring well will be constructed with 2-inch diameter Schedule 40 polyvinyl chloride (PVC) well casing and 0.02-inch machine slotted well screen. The wells will be constructed with 10 feet of screen (10.0 to 20.0 feet bgs), as shown on Figure 3. The actual screen interval will depend on the groundwater depth and lithologic conditions encountered during drilling. A proposed well construction detail diagram is attached as Figure 3.

Drill cuttings will be stored at the site pending receipt of chemical analytical data for disposal. The drill cuttings will be stockpiled on and covered with plastic sheeting. Four discrete soil samples will be collected from the drill cuttings for disposal characterization. These samples will be submitted to the laboratory for compositing and analysis and will be collected as described in Task 5. Stockpiled soil will be transported for disposal at an appropriately licensed facility by Integrated Wastestream Management (IWM). Steam cleaning rinsate waste water will be transported by IWM to McKittrick Waste Management.

Task 3. Well Development and Sampling

The newly installed groundwater monitoring well will be developed after being allowed to stand a minimum of 72 hours following completion. During development, the clarity of the discharged well water and selected groundwater parameters (pH, temperature, conductivity) will be monitored. When the discharge water runs clear and the groundwater parameters have stabilized, a groundwater sample will be collected. Groundwater removed from the well during development and sampling will be transported by IWM to McKittrick Waste Management. The groundwater samples will be analyzed as described in Task 5. The newly installed well will be included in the quarterly monitoring program beginning with the quarter following installation.

Task 4. Wellhead Survey

Following installation, the elevation of the top of well casing will be surveyed to mean sea level by a California licensed surveyor. Horizontal coordinates of the well will also be obtained.

Task 5. Laboratory Analyses

Soil and groundwater samples will be submitted for chemical analysis at Sequoia Analytical, by a California state-certified Hazardous Material Testing Laboratory (ELAP #1210, #1271, and #1624). Selected soil samples will be analyzed for TPHg by Environmental Protection Agency (EPA) Method 8015 Modified, and for benzene, toluene, ethylbenzene and xylenes (BTEX) and MtBE by EPA Method 8020.

Groundwater samples will be analyzed for TPHg, BTEX, MtBE and for oxygenate compounds by EPA Method 8260. The sample of the stockpiled drill cuttings will be analyzed for TPHg and BTEX.

Task 6. Report Preparation

Following receipt and analysis of all data, a report will be prepared which summarizes the procedures and findings associated with this investigation. This report will be submitted to Chevron for their use and distribution.

PROJECT STAFF

Mr. Ricky L. Fears, a Registered Geologist in the State of California (R.G. No. 6728), will provide technical oversight and review of the work. Mr. Greg Gurss, Senior Project Manager, will supervise implementation of field and office operations. GR employs a staff of geologists, engineers, and technicians who will assist with the project.

SCHEDULE

Implementation of the proposed scope of work will commence upon receipt of regulatory approval.

FIGURES

Source: Street Atlas USA, Delorme (1995).

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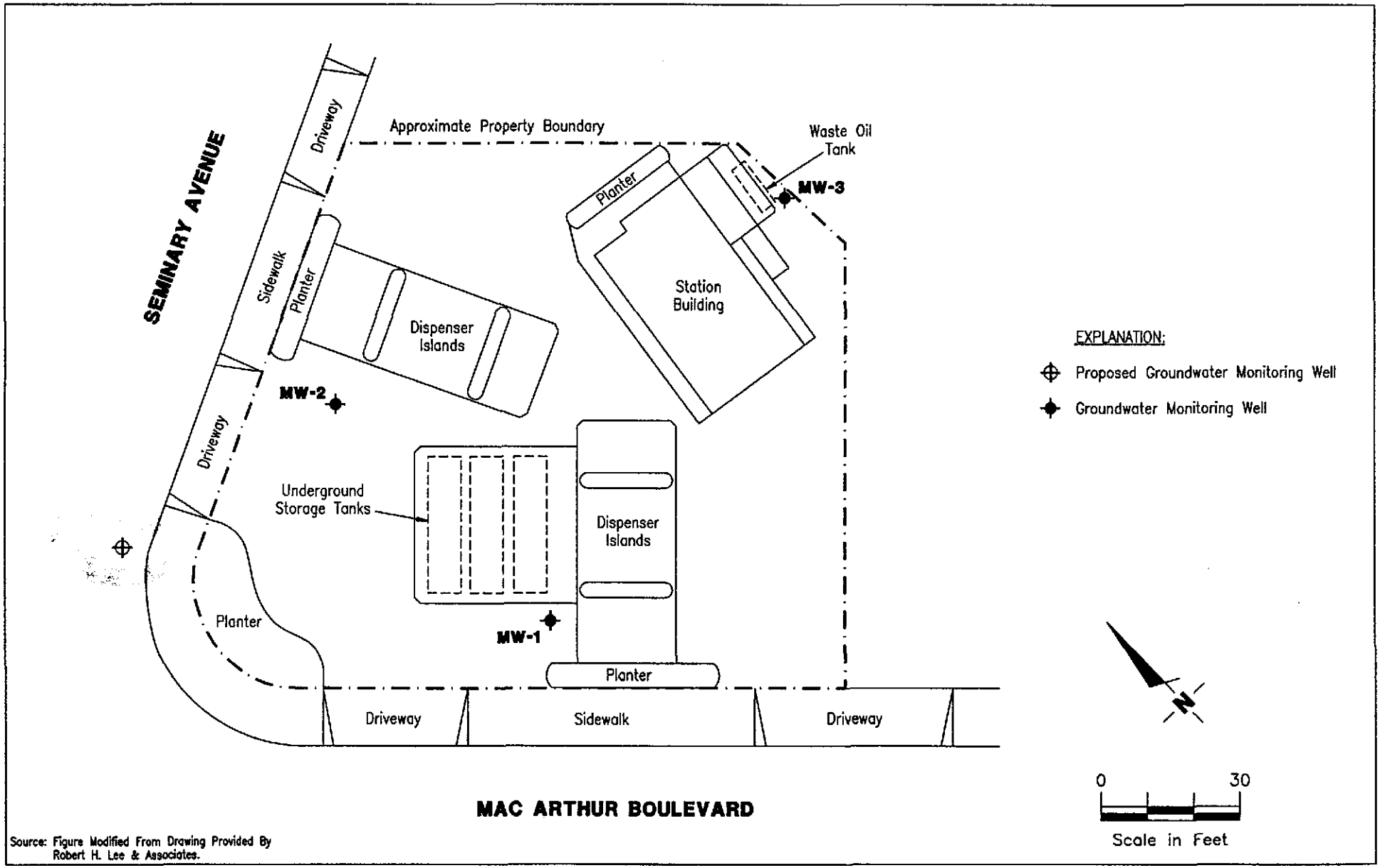
VICINITY MAP
Chevron Service Station No. 9-9708
5910 Mac Arthur Boulevard
Oakland, California

FIGURE
1

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
346395		08/98	



Source: Figure Modified From Drawing Provided By Robert H. Lee & Associates.

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SITE PLAN
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FIGURE
2

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
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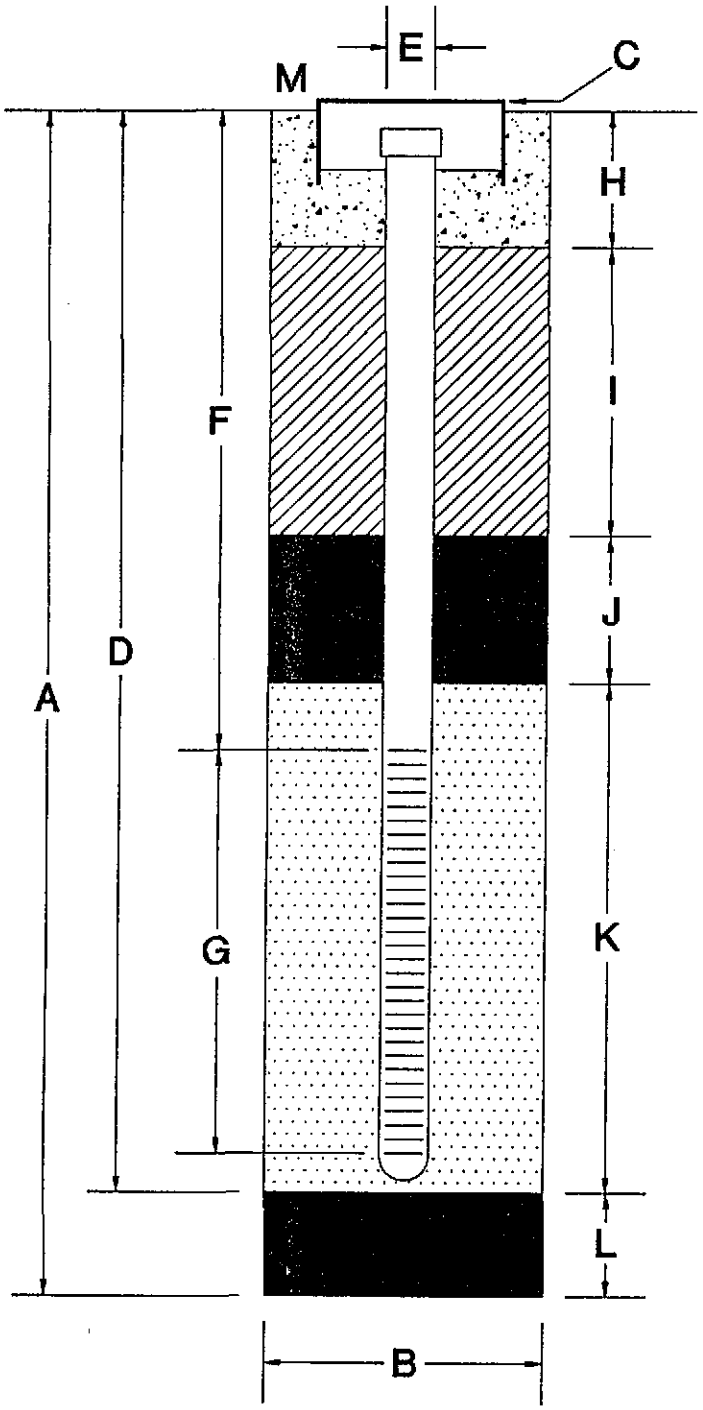
WELL CONSTRUCTION DETAIL



A Total Depth Of Boring 20.0 ft.

B Diameter Of Boring 8.0 in.
Drilling Method Hollow Stem Auger

C Top Of Box Elevation _____ ft.
☐ Referenced To Mean Sea Level
☐ Referenced To Project Datum

D Casing Length 10.0 ft.
Material Sched. 40 PVC

E Casing Diameter 2.0 in.

F Depth To Top Perforations 10.0 ft.

G Perforated Length 10.0 ft.
Perforated Interval From 10.0 to 20.0 ft.
Perforation Type Machine cut slotted
Perforation Size 0.020 in.

H Surface Seal From 0.0 to 0.5 ft.
Seal Material Concrete

I Backfill From 7.0 to 0.5 ft.
Backfill Material Neat Cement/5% Bentonite

J Seal From 9.0 to 7.0 ft.
Seal Material Bentonite

K Gravel Pack From 9.0 to 20.0 ft.
Pack Material #3 Monterey Sand

L Bottom Seal _____ ft.
Seal Material _____

M Traffic Rated Box

Note: Depths Measured From Initial Ground Surface.

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JOB NUMBER	REVIEWED BY	DATE	REVISION DATE
346395		8/98	Figure 3

GETTLER-RYAN INC.

FIELD METHODS AND PROCEDURES

Site Safety Plan

Field work performed by Gettler-Ryan Inc. (G-R) is conducted in accordance with G-R's Health and Safety Plan and the Site Safety Plan. G-R personnel and subcontractors who perform work at the site are briefed on the contents of these plans prior to initiating site work. The G-R geologist or engineer at the site when the work is performed acts as the Site Safety Officer. G-R utilizes a photoionization detector (PID) to monitor ambient conditions as part of the Health and Safety Plan.

Collection of Soil Samples

Soil borings are drilled by a California-licensed well driller. A G-R geologist is present to observe the drilling, collect soil samples for description, physical testing, and chemical analysis, and prepare a log of the exploratory soil boring. Soil samples are collected from the soil boring with a split-barrel sampling device fitted with 2-inch-diameter, clean brass tube or stainless steel liners. The sampling device is driven approximately 18 inches with a 140-pound hammer falling 30 inches. The number of blows required to advance the sampler each successive 6 inches is recorded on the boring log. The encountered soils are described using the Unified Soil Classification System (ASTM 2488-84) and the Munsell Soil Color Chart.

After removal from the sampling device, soil samples for chemical analysis are covered on both ends with teflon sheeting or aluminum foil, capped, labeled, and place in a cooler with blue ice for preservation. A chain-of-custody form is initiated in the field and accompanies the selected soil samples to the analytical laboratory. Samples are selected for chemical analysis based in part on:

a. depth relative to underground storage tanks and existing ground surface
b. depth relative to known or suspected groundwater
c. depth relative to areas of known hydrocarbon impact at the site
d. presence or absence of contaminant migration pathways
e. presence or absence of discoloration or staining
f. presence or absence of obvious gasoline hydrocarbon odors
g. presence or absence of organic vapors detected by headspace analysis

APPENDIX A

Field Screening of Soil Samples

A PID is used to perform head-space analysis in the field for the presence of organic vapors from the soil sample. This test procedure involves removing some soil from one of the sample tubes not retained for chemical analysis and immediately covering the end of the tube with a plastic cap. The PID probe is inserted into the headspace inside the tube through a hole in the plastic cap. Head-space screening results are recorded on the boring log. Head-space screening procedures are performed and results recorded as reconnaissance data. G-R does not consider field screening techniques to be verification of the presence or absence of hydrocarbons.

Construction of Monitoring Wells

Monitoring wells are constructed in the exploratory soil borings with Schedule 40 polyvinyl chloride (PVC) casing. All joints are thread-joined; no glues, cements, or solvents are used in well construction. The screened interval is constructed of machine-slotted PVC well screen which generally extends from the total well depth to a point above the groundwater. An appropriately-sized sorted sand is placed in the annular space adjacent to the entire screened interval. A bentonite transition seal is placed in the annular space above the sand, and the remaining annular space is sealed with neat cement or cement grout.

Wellheads are protected with water-resistant traffic-rated vault boxes placed flush with the ground surface. The top of the well casing is sealed with a locking waterproof cap. A lock is placed on the well cap to prevent vandalism and unintentional introduction of materials into the well.

Measurement of Water Levels

The top of the newly-installed well casing is surveyed by a California-licensed Land Surveyor to mean sea level (MSL). Depth-to-groundwater in the well is measured from the top of the well casing with an electronic water-level indicator. Depth-to-groundwater is measured to the nearest 0.01-foot, and referenced to MSL.

Well Development and Sampling

The purpose of well development is to improve hydraulic communication between the well and the surrounding aquifer. Prior to development, each well is monitored for the presence of floating product and the depth-to-water is recorded. Wells are then developed by

alternately surging the well with a vented surge block, then purging the well with a pump or bailer to remove accumulated sediments and draw groundwater into the well. Development continues until the groundwater parameters (temperature, pH, and conductivity) have stabilized.

Storing and Sampling of Drill Cuttings

Drill cuttings are stockpiled on and covered with plastic sheeting and samples are collected and analyzed for disposal classification on the basis of one composite sample per 100 cubic yards of soil. Stockpile samples are composed of four discrete soil samples, each collected from an arbitrary location on the stockpile. The four discrete samples are then composited in the laboratory prior to analysis.

Each discrete stockpile sample is collected by removing the upper 3 to 6 inches of soil, and them driving the stainless steel or brass sample tube into the stockpiled material with a hand, mallet, or drive sampler. The sample tubes are then covered on both ends with teflon sheeting or aluminum foil, capped, labeled, and placed in a cooler with blue ice for preservation. A chain-of-custody form is initiated in the field and accompanies the selected soil samples to the analytical laboratory. Stockpiled soils are covered with plastic sheeting after completion of sampling.