11/02/98 Called & spoke to Doug Lee, Gettler Ryan. Requested that he include statements on whether utility line trench could be acting as a conduit prior to plume reaching new wells. – JMS

Gettler-Ryan Inc.
6747 Sierra Court, Suite J
Dublin, CA 94568-2611

FACSIMILE COVER SHEET

DATE: 10-30-98
(GR#

TO: JULIET SHIN FAX: 510 337-9335

COMPANY: ACHCSA - ENVIRONMENTAL HEALTH

RE: FORMER TOSCO NO. 1871, 96 MACARTHUR BLVD, OAKLAND

FROM: DOUG LEE

PHONE: (925) 551-7555
FAX: (925) 551-7888

COMMENTS: ATTACHED IS A DRAFT COPY OF OUR WORK PLAN FOR THE SUBJECT SITE. JOEL GREGER OF GR AND TINA BERRY OF TOSCO HAVE NOT COMPLETED THEIR REVIEW OF THIS DOCUMENT. THE FINAL REVISED COPY WILL BE DELIVERED TO YOUR AGENCY ON MONDAY, ~~OCTOBER~~ NOVEMBER 2, 1998.
IF YOU HAVE ANY QUESTIONS, PLEASE GIVE ME A CALL.

21 pages including cover

If there are any problems with this transmission, please call (925) 551-7555

______ Hardcopy to follow

GETTLER-RYAN INC.

TRANSMITTAL

TO: Ms. Tina Berry
Tosco Marketing Company
2000 Crow Canyon Place, Suite 400
San Ramon, California 94583

DATE: November 2, 1998
PROJ. #: 140165.04-1
SUBJECT: Work Plan
Former Tosco 76 Branded
Facility No. 1871
96 MacArthur Boulevard
Oakland, California

FROM:
Clyde J. Galantine
Project Geologist
Gettler-Ryan Inc.
6747 Sierra Court, Suite J
Dublin, California 94568

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	October 30, 1998	Work Plan For Limited Subsurface Investigation

THESE ARE TRANSMITTED as checked below:

[ ] For review and comment
[ ] Approved as submitted
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[X] As requested
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[ ] Return for corrections
[ ] Return __ corrected prints
[X] For Your Files

COMMENTS:
Enclosed is one copy of the above work plan. If you have any questions or comments, please call me at (925) 551-7555.

cc: Juliet Shin, Alameda County Health Care Services Agency

GETTLER-RYAN INC.

WORK PLAN FOR LIMITED SUBSURFACE INVESTIGATION

at

Former Tosco 76 Branded Facility No. 1871
96 MacArthur Boulevard
Oakland, California

Report No. 140165.04-1

Prepared for:

Ms. Tina Berry
Tosco Marketing Company
2000 Crow Canyon Place, Suite 400
San Ramon, California 94583

Prepared by:

Gettler-Ryan Inc.
6747 Sierra Court, Suite J
Dublin, California 94568

Clyde J. Galantine
Project Geologist

Joel G. Greger
Senior Engineering Geologist
C.E.G. EG 1633

REGISTERED GEOLOGIST
JOEL G. GREGER
No. EG 1633
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

October 30, 1998

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WORK PLAN FOR LIMITED SUBSURFACE INVESTIGATION

at

Former Tosco 76 Branded Facility No. 1871
96 MacArthur Boulevard
Oakland, California

Report No. 140165.04-1

INTRODUCTION

At the request of Tosco Marketing Company (Tosco), Gettler-Ryan Inc. (GR), has prepared this Work Plan for the advancement of four soil borings and seven Geoprobes (with the option of advancing two additional Geoprobes), and installation of three groundwater monitoring wells to evaluate soil and groundwater conditions in the vicinity of the subject site. The proposed work includes: writing a site safety plan; obtaining the required permits; installing three off-site groundwater monitoring wells, advancing two soil borings and seven to nine Geoprobes; collecting and submitting selected soil and groundwater samples for chemical analysis; surveying the wellhead elevations; arranging for Tosco's contractors to dispose of the waste materials; conducting a Risk Based Corrective Action (RBCA) analysis for the on-site area; and preparing a report presenting the observations associated with the above scope of work. This work is proposed to evaluate whether soil and groundwater downgradient of the subject site has been impacted by petroleum hydrocarbons and whether developing the site would constitute a risk to human health. This scope of work was developed during a meeting between Tosco, Alameda County Health Care Services Agency (ACHCSA), and GR representatives at the site on October 20, 1998.

The scope of work proposed 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 Tri-Regional Board Staff Recommendations for Preliminary Investigation and Evaluation of Underground Tank Sites*, and the ACHCSA guidelines. + Title 23

SITE DESCRIPTION

General

The site is located on the north corner of the intersection of MacArthur Boulevard and Harrison Street in Oakland, California. The site is currently a vacant lot. The underground and above ground facilities, including the station building, two dispenser islands, two gasoline underground storage tanks (USTs), one waste oil UST, and four groundwater monitoring wells, were demolished and removed from the site. One groundwater monitoring well (MW-1) remains at the site. Pertinent former and existing site features are shown on Figure 2.

Geology and Hydrogeology

The site is located on the western flank of the Oakland Hills and is underlain by Late Pleistocene age alluvium. These deposits are composed of weakly consolidated slightly weathered poorly sorted irregularly interbedded clay, silt, sand, and gravel. The northwest-southeast trending Hayward Fault is located approximately 2.3 miles northeast of the site (Helley, 1979). The nearest surface water is Glen Echo Creek, located approximately 1,000 feet northwest of the site.

The site is underlain by clay to approximately 5 to 7 feet below ground surface (bgs). The clay is underlain by silt, silty sand, and poorly graded, fine sand to 16 feet bgs. Clay was encountered beneath these sediments to a total explored depth of 25.5 feet bgs. Groundwater was measured at approximately 10 to 15 feet bgs during the July 1998 groundwater monitoring event (GR, 1998). This shallow groundwater at the site appears to be unconfined. The groundwater flow direction has ranged from southwest to south-southwest with an average gradient of 0.03 [Kaprealian Engineering Incorporated (KEI), 1996].

PREVIOUS ENVIRONMENTAL WORK

A dispenser and product piping modification project was performed at the site in May 1992. Four soil samples were collected from beneath the dispensers by representatives of Roux Associates (Roux) at depths ranging from 2 to 5 feet bgs. Petroleum hydrocarbon concentrations reported in the samples ranged from not detected to 58 parts per million (ppm) of Total Petroleum Hydrocarbons as Gasoline (TPHg), and not detected to 0.20 ppm of benzene. An additional sample was collected below the south end of the east island at 8 feet bgs. The sample contained 1,700 ppm of TPHg and 3.1 ppm of benzene (KEI, 1996).

Three 4-inch diameter groundwater monitoring wells designated MW-1, MW-2, and MW-3 were installed on-site by Roux in October 1992 (Figure 2). The wells were completed to total depths of 24 and 25 feet bgs. Groundwater was encountered at depths of 14 to 15 feet bgs. Soil samples collected from well borings MW-1 and MW-2 were reported as not detected for TPHg and benzene, toluene, ethylbenzene, and xylenes (BTEX). Soil samples collected from MW-3 at depths of 12-13.5 feet bgs and 13.5-15 feet bgs contained 4.2 ppm of TPHg and 0.079 ppm of benzene, and 10 ppm of TPHg and 0.040 ppm of benzene, respectively. Groundwater samples collected from the wells contained petroleum hydrocarbon concentrations ranging from 140 to 260,000 parts per billion (ppb) of TPHg and 2.2 to 2,300 ppb of benzene. Quarterly groundwater monitoring and sampling was initiated upon receipt of the initial groundwater sample results. In February 1996, ACHCSA approved Unocal's request to reduce the groundwater monitoring and sampling program from quarterly to semiannually (KEI, 1996).

A 280-gallon single-wall steel waste oil UST was replaced with a 550-gallon double-wall fiberglass UST in August 1994. One soil sample was collected from below the UST at a depth of 9 feet bgs by a representative from Kaprealian Engineering Incorporated (KEI). The excavation was deepened to 14 feet bgs and another soil sample was collected due to the obvious presence of petroleum hydrocarbons in the soil. Four sidewall soil samples were also collected at 9 feet bgs. The bottom sample collected at 9 feet bgs contained 46 ppm of TPHg, 0.12 ppm of benzene, 97 ppm of Total Petroleum Hydrocarbons as Diesel (TPHd), 1,400 ppm of Oil and Grease (O&G), and elevated concentrations of various semi-volatile organic (8270) compounds. One sidewall sample contained 960 ppm of TPHg, 2.2 ppm of benzene, 1,400 ppm of TPHg, 17,000 ppm of TOG, and elevated concentrations of 8270 compounds. The three other sidewall samples contained O&G concentrations ranging from 160 to 2,400 ppm. The soil sample collected at the bottom of the excavation at 14 feet bgs was reported as not detected for O&G and 8270 compounds (KEI, 1994).

In March 1996, KEI personnel witnessed the advancing of two soil borings (EB-1, EB-2) and installation of two additional monitoring wells (MW-4, MW-5) at the site (Figure 2). Soil borings EB-1 and EB-2 were advanced to depths of 13.5 and 14 feet bgs, respectively. Wells MW-4 and MW-5 were installed to a total depth of 20 feet bgs. Soil samples collected from boring EB-1 were reported as not detected for TPHg, BTEX, TPHd, O&G, 8270 compounds, and volatile organic (8010) compounds, except for 6.6 ppb of 1,1-dichloroethene (8010 compound) detected in the sample collected at 5 feet bgs. The soil sample collected at 5 feet bgs in boring EB-2 was reported as not detected for all analytes. The soil sample collected at 10 feet bgs in boring EB-2 contained 5.7 ppm of TPHg, 73 ppm of TPHd, 540 ppm of O&G, and elevated concentrations of 8270 compounds, and was reported as not detected for benzene and 8010 compounds. The soil sample collected at 5 feet bgs from well boring MW-4 was reported as not detected for TPHg, benzene, O&G, and 8270 compounds and contained 1.1 ppm of TPHd and elevated concentrations of 8010 compounds. The soil sample collected at 9.5 feet bgs from well boring MW-4 contained 24 ppm of TPHg, 350 ppm of TPHd, 1,000 ppm of O&G, and elevated concentrations of 8010 and 8270 compounds, and was reported as not detected for benzene. The soil samples collected from well boring MW-5 were reported as not detected for TPHg and BTEX, except for 0.023 ppm of benzene detected in the sample collected at 9 feet bgs (KEI, 1996).

Grab groundwater samples were collected from both soil borings. Groundwater sample EB-1 was reported as not detected for all analytes except for 1.3 ppb xylenes and 0.54 ppb 1,1-dichloroethane (8010 compound). Groundwater EB-2 was reported as not detected for O&G and 8010 compounds and contained 1,400 ppb of TPHg, 690 ppb of benzene, 410 ppb of TPHd, and elevated concentrations of 8270 compounds. A groundwater sample collected from well MW-4 was reported as not detected for TPHg and contained 630 ppb of benzene, 110 ppb of TPHd and 18,000 ppb of methyl tertiary butyl ether (MTBE). A groundwater sample collected from MW-5 contained 31,000 ppb of TPHg, 5,500 ppb of benzene, and 66,000 ppb MTBE (KEI, 1996).

In May 1998, all underground and aboveground equipment and facilities were removed by John's Excavating of Santa Rosa, California, including two 12,000-gallon double-wall steel gasoline USTs, one 550-gallon double-wall steel waste oil UST, two hydraulic lifts, two dispenser islands and related single-wall product piping, and one service station building. GR personnel performed soil and groundwater sampling activities in conjunction with the station demolition.

Soil samples were collected beneath or near the USTs, hydraulic lifts, and dispenser islands/product piping. Four soil samples were collected from the sidewalls of the gasoline UST excavation at a depth of 11.5 feet bgs. Petroleum hydrocarbon concentrations in the samples ranged between not detected to 2,000 ppm of TPHg, not detected to 9.7 ppm of benzene, and 1.9 to 16 ppm of MTBE. The areas south and west of the excavation were overexcavated to groundwater and two confirmation samples were collected. The two confirmation samples, collected at 11 feet bgs, contained petroleum hydrocarbon concentrations ranging from not detected and 5.0 ppm of TPHg, 0.049 and 0.080 ppm of benzene, and 6.6 and 12 ppm of MTBE.

One soil sample was collected beneath each of the dispenser islands at a depth of 4 feet bgs. The sample collected beneath the north dispenser island was reported as not detected for TPHg and BTEX and contained 0.74 ppm of MTBE. The sample collected from beneath the south dispenser island was reported as not detected for benzene and MTBE and contained 15 ppm of TPHg. One soil sample was collected from the bottom of the waste oil UST excavation at a depth of 11 feet bgs The sample was reported as not detected for all analytes except for 140 ppm of O&G. One soil sample was collected beneath each of the hydraulic lifts at a depth of 8 feet bgs. Both of these samples were reported as not detected for Total Petroleum Hydrocarbons as hydraulic fluid (TPHhf).

Grab groundwater samples were collected from the gasoline and waste oil UST excavations. The sample collected from the gasoline UST excavation was reported as not detected for benzene and MTBE and contained 620,000 ppb of TPHg. The groundwater sample collected from the waste oil UST excavation was reported as not detected for BTEX, MTBE, O&G and 8270 compounds, and contained 90 ppb of TPHg, 890 ppb of TPHd, and elevated concentrations of 8010 compounds.

A total of 1,252.78 tons of soil was removed from the site during demolition activities and transported to Forward Landfill for disposal (GR, 1998A).

Groundwater monitoring and sampling has been performed at the site since January 1993. Depth to groundwater has ranged from 7.70 to 15.50 feet from top of casing. Groundwater flow direction has ranged from southwest to south-southwest with an average hydraulic gradient of 0.03. Petroleum hydrocarbon concentrations have ranged from not detected to 260,000 ppb of TPHg, not detected to 8,700 ppb of benzene, and 270 to 120,000 ppb of MTBE (GR, 1998).

The top of casings on monitoring wells MW-2 through MW-5 were damaged during site demolition activities. On September 14, 1998, these wells were drilled out and the borehole backfilled with neat cement to grade. In addition, one soil boring (EB-3) was advanced on-site to a total depth of 16.5 feet bgs (Figure 2). Groundwater was encountered at approximately 10.5 feet bgs. Soil and groundwater samples were collected for use in a RBCA analysis for the site. Documentation of the methods and results of the well destruction, soil boring advancement, and RBCA analysis will be included in the report referred to in **Task 9** of this Work Plan.

SCOPE OF WORK

GR proposes to advance five soil borings and seven Geoprobes (with the option for two additional Geoprobes), and install three groundwater monitoring wells at the locations shown on Figure 2. The groundwater monitoring wells are being installed to replace the recently destroyed on-site monitoring wells. Soil and groundwater samples will be collected from the borings advanced for monitoring well installation, the Geoprobes, and off-site soil borings to characterize the vertical and horizontal extent of hydrocarbon-impacted soil and groundwater in the vicinity and downgradient of the site.

To perform this scope of work, GR proposes the following specific tasks:

Task 1. Pre-field Activities

Write a site-specific safety plan and obtain the necessary permits from Alameda County Public Works Agency (wells), City of Oakland (encroachment), and Caltrans (encroachment). Notify Underground Service Alert (USA) least 48 hours prior to initiating work. A subsurface utility locator will inspect each proposed location for buried utilities.

Task 2. Soil Boring Advancement

Five soil borings will be advanced at the locations shown on Figure 2. Drilling will be performed by a California licensed driller. A GR geologist will monitor the drilling activities, collect soil and groundwater samples for chemical analyses, describe the encountered soil, and prepare a log of each boring. The well borings will be drilled with eight-inch-diameter hollow-stem augers. The three soil borings along MacArthur Boulevard will be converted to groundwater monitoring wells and advanced to approximately 25 feet bgs. The two remaining proposed borings will be advanced to approximately 10 feet below first encountered groundwater. One of the soil borings may be advanced further to explore for the presence of a clay aquitard or bedrock.

Soil samples for description and possible chemical analysis will be obtained from each boring at five-foot intervals, as a minimum. The three soil borings advanced for monitoring well installation will be continuously sampled. Soil samples will be collected with a split-spoon sampler fitted with clean brass or stainless steel sample rings. Sample handling procedures are described in Appendix A. Although the actual number of samples submitted for chemical analysis will depend on site conditions and field screening data, we anticipate a minimum of one sample from each boring will be submitted for chemical analysis as described in Task 7.

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. Field screening procedures are described in Appendix A. Screening data will be recorded on the boring log.

A hydropunch will be utilized to collect depth-discrete groundwater samples from each soil boring. Hydropunch groundwater samples will be collected at the first encountered groundwater and 10 feet below the first encountered groundwater. If groundwater does not enter the hydropunch in sufficient quantity to allow sampling, a soil sample will be collected in lieu of a groundwater sample. These samples will be submitted to the laboratory and analyzed as described in Task 7.

Drill cuttings will be stored at the site pending receipt of chemical analytical data and disposal. Stockpiled cuttings will be placed on and covered with plastic sheeting. Four soil samples of the drill cuttings will be collected for disposal characterization as described in Appendix A. These samples will be submitted to the laboratory for compositing into one sample, and then analyzed as described in Task 7. Drill cuttings will be transported to Forward Landfill, located in Manteca, California for disposal. Steam cleaning rinsate waste water will be stored at the site in properly labeled drums pending disposal. Soil borings not converted into wells will be backfilled to grade with neat cement.

Task 3. Geoprobe Advancement

Seven Geoprobes will be advanced at the locations shown on Figure 2. Two contingency Geoprobe locations are proposed to be advanced if field screening or observations indicated the presence of hydrocarbons in the up-gradient Geoprobe locations (Figure 2). Drilling will be performed by a licensed California driller. A GR geologist will monitor the drilling activities, collect soil and groundwater samples for chemical analyses, describe the encountered soil, and prepare a log of each Geoprobe. Each Geoprobe will be advanced to approximately 2 feet below first encountered groundwater.

Soil samples for description and possible chemical analysis will be obtained continuously from each Geoprobe. Sample handling procedures are described in

Appendix A. Although the actual number of samples submitted for chemical analysis will depend on actual site conditions and field screening data, we anticipate a minimum of one sample from each boring will be submitted for chemical analysis as described in Task 7.

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. Field screening procedures are described in Appendix A. Screening data will be recorded on the boring log.

Grab groundwater samples will be collected from each Geoprobe. These samples will be submitted to the laboratory and analyzed as described in Task 7. Upon completion of each Geoprobe, the holes will be backfilled with neat cement.

Task 4. Well Installation

Install three on-site groundwater monitoring wells at the locations shown on Figure 2. Groundwater monitoring wells will be constructed of 2-inch diameter Schedule 40 polyvinyl chloride (PVC) well casing and 0.02-inch machine-slotted well screen, as shown on the Proposed Well Construction Detail (Figure 3). Groundwater is anticipated at approximately 10 feet bgs, and the proposed wells will be constructed with approximately fifteen feet of screen within the saturated zone and five feet of screen extending above first encountered groundwater.

Task 5. Wellhead Survey.

The elevations of the vault boxes and the top of the PVC casings of the newly installed wells and existing well MW-1 will be surveyed to mean sea level by a California licensed surveyor. The surveyor will also obtain the horizontal coordinates of the newly installed wells, soil borings, and Geoprobes.

Task 6. Well Development and Sampling.

The groundwater monitoring wells will be developed after well 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, water discharge will be terminated. After allowing the water level to recover in the well, a groundwater sample will be collected. Well MW-1 will also be monitored and sampled during this scope of work. The groundwater samples will be analyzed as described in Task 5. Development and groundwater sampling procedures are described in Appendix A. Groundwater removed from the wells during development and sampling will be stored at the site in properly labeled drums pending disposal.

Task 7. Laboratory Analyses.

Soil and groundwater samples will be submitted for chemical analysis by a California state-certified Hazardous Material Testing Laboratory. Drill cutting samples, selected soil samples, and the groundwater samples from the site wells will be analyzed for TPHg by Environmental Protection Agency (EPA) Method 8015 (Modified), and for gasoline constituents benzene, toluene, ethylbenzene, and total xylenes (BTEX) and MtBE by EPA Method 8020. In addition, the soil stockpile sample will be analyzed for total lead by EPA Method 6010.

Task 8. RBCA Analysis

A RBCA Analysis will be performed to determine if petroleum hydrocarbons present beneath the site constitute a risk to human health during construction and future use of the site. Site specific parameters collected from previous investigations will be used, as well as the current plans for future land use.

Task 9. Report Preparation.

Following receipt and analysis of all data, a report will be prepared which summarizes the procedures and findings associated with this investigation. The report will include the geologic cross-section A-A' shown on Figure 2. The report will be submitted to Tosco for their use and distribution.

PROJECT STAFF

Mr. Joel G. Greger, a Certified Engineering Geologist in the State of California (C.E.G. No. 1633) will provide technical oversight and review of the work. Mr. David Vossler, Project Manager, will supervise implementation of the 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.

REFERENCES

Gettler-Ryan Inc., 1998, Semi-Annual 1998 Groundwater Monitoring & Sampling Report for Tosco (Unocal) Service Station No. 1871, 96 Mac Arthur Boulevard, Oakland, California: Job #180068 dated August 31, 1998.

Gettler-Ryan Inc., 1998A, Soil Sampling During Underground Storage Tank and Piping Removal at Former Tosco 76 Branded Facility No. 1871, 96 Mac Arthur Boulevard, Oakland, California: Report No. 140165.02 dated October 19, 1998.

Helley, E. J. and K. R. Lajoie, 1979, Flatland Deposits of the San Francisco Bay Region, California - Their Geology and Engineering Properties, and Their Importance to Comprehensive Planning: U.S. Geological Survey Professional Paper 943.

Kaprealian Engineering Incorporated, 1996, Continuing Soil and Groundwater Investigation at Unocal Service Station No. 1871, 96 Mac Arthur Boulevard, Oakland, California: Report KEI-P94-0601.R4 dated May 17, 1996.

GETTLER-RYAN INC.

FIELD METHODS AND PROCEDURES

Site Safety Plan

Field work performed by Gettler-Ryan Inc. (GR) is conducted in accordance with GR's Health and Safety Plan (revised January 16, 1995) and the Site Safety Plan. GR personnel and subcontractors who perform work at the site are briefed on the contents of these plans prior to initiating site work. The GR geologist or engineer at the site when the work is performed acts as the Site Safety Officer. GR 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 GR 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 on:

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

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 soil from the tip of the sampling device or sample liner into a clean ziplock bag and sealing the bag. After approximately twenty minutes, the bag is opened and the atmosphere within the bag tested using a PID. Head-space screening results are recorded on the boring log. Head-space screening procedures are performed and results recorded as reconnaissance data. GR 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 adjacent to the entire screened interval. A bentonite 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. After the wells have been developed, groundwater samples are collected. Well development and sampling is performed by GR.

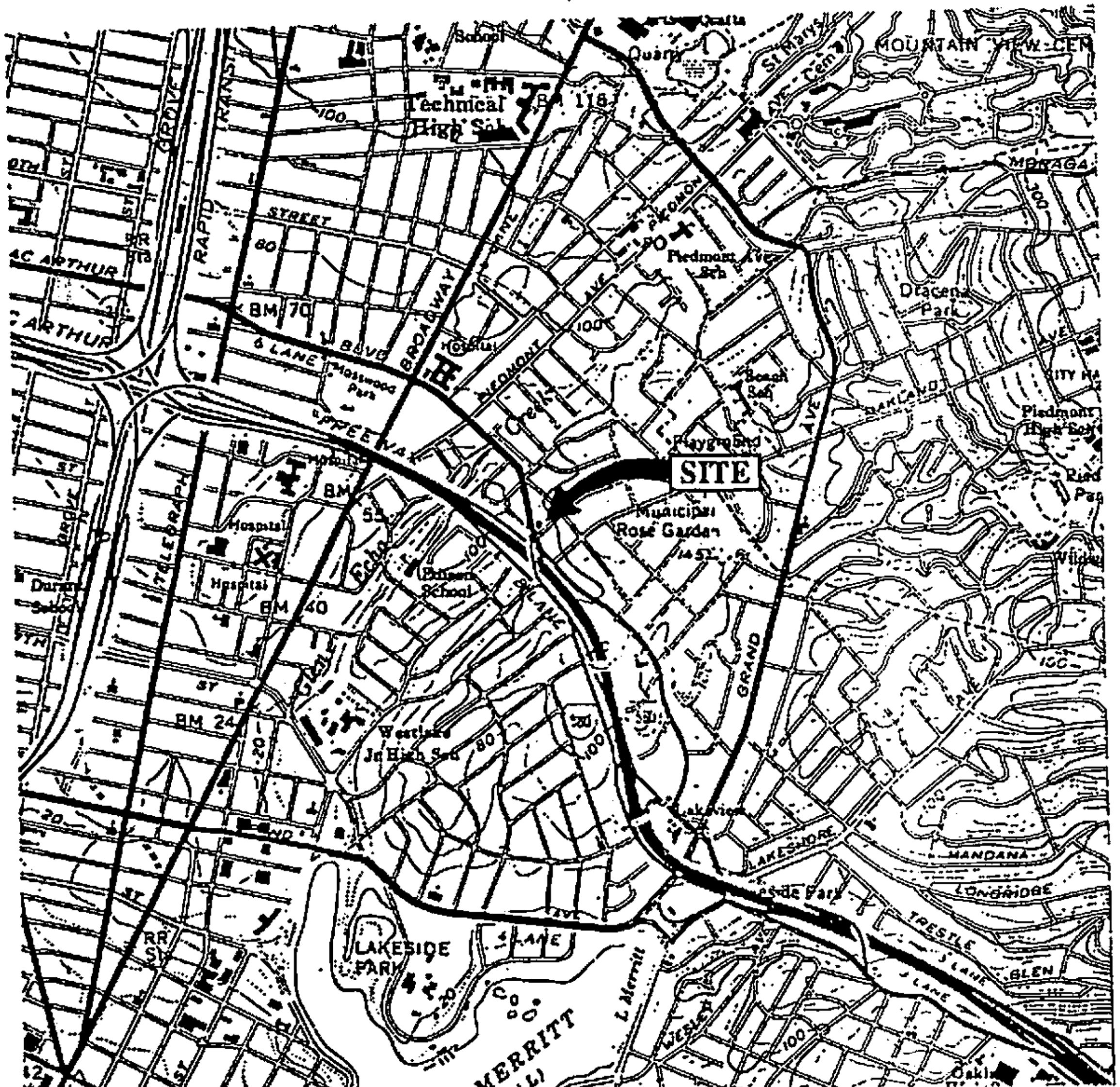
Storing and Sampling of Drill Cuttings

Drill cuttings are stockpiled on plastic sheeting or stored in drums depending on site conditions and regulatory requirements. Stockpile samples are collected and analyzed 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.

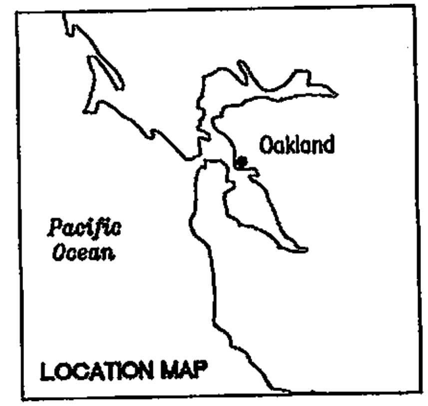
Each discrete stockpile sample is collected by removing the upper 3 to 6 inches of soil, and them driving the stainless steel or brass sample tube into the stockpiled material with a hand, mallet, or drive sampler. The sample tubes are then covered on both ends with Teflon sheeting or aluminum foil, 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.

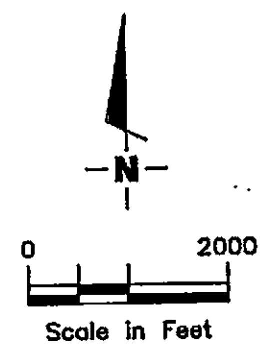
APPENDIX A

Gettler-Ryan Inc. Field Methods And Procedures



Base Map: USGS Topographic Map





FIGURE

1

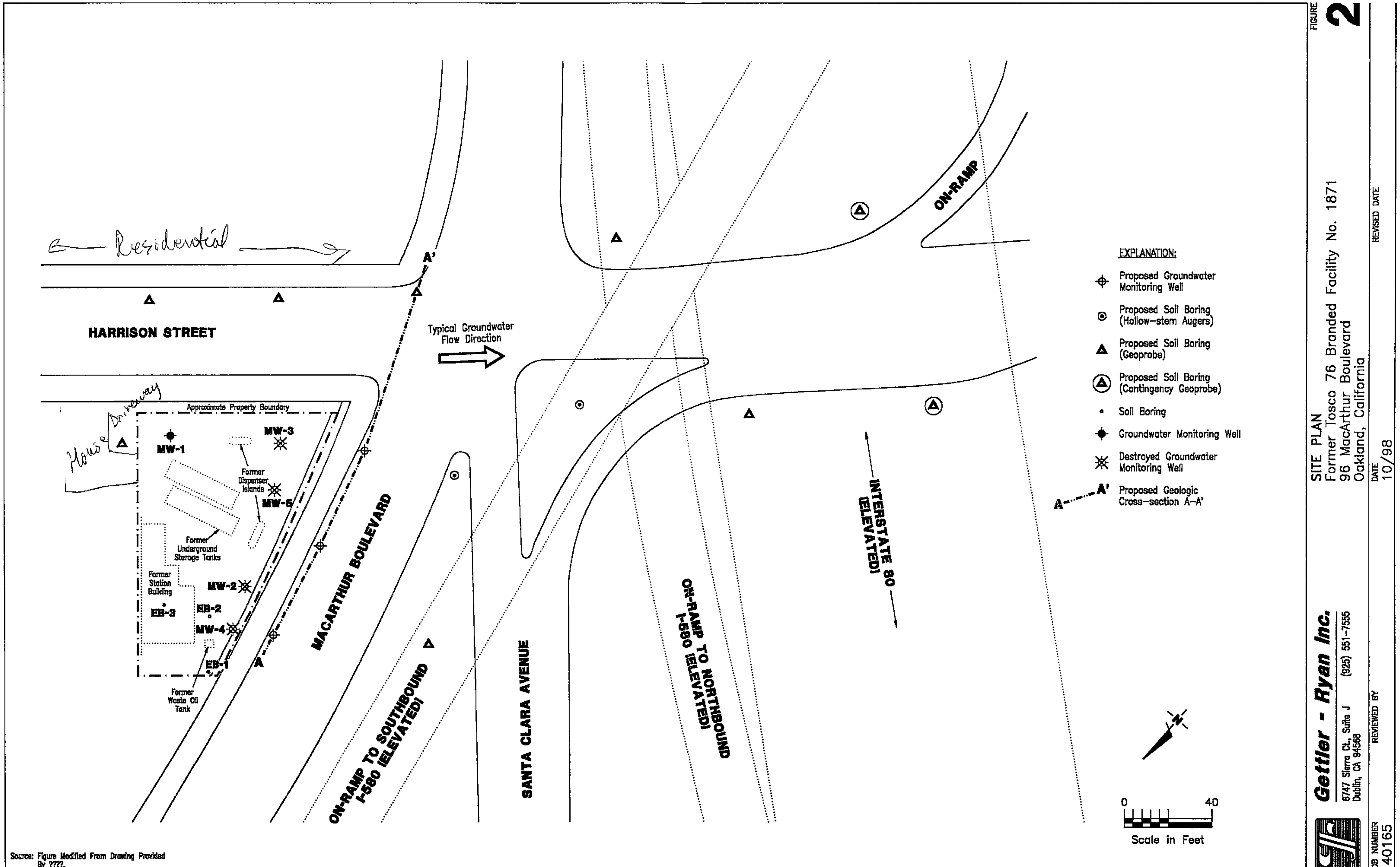
Gettler - Ryan Inc.

6747 Sierra Ct., Suite J
Dublin, CA 94568

(925) 551-7555

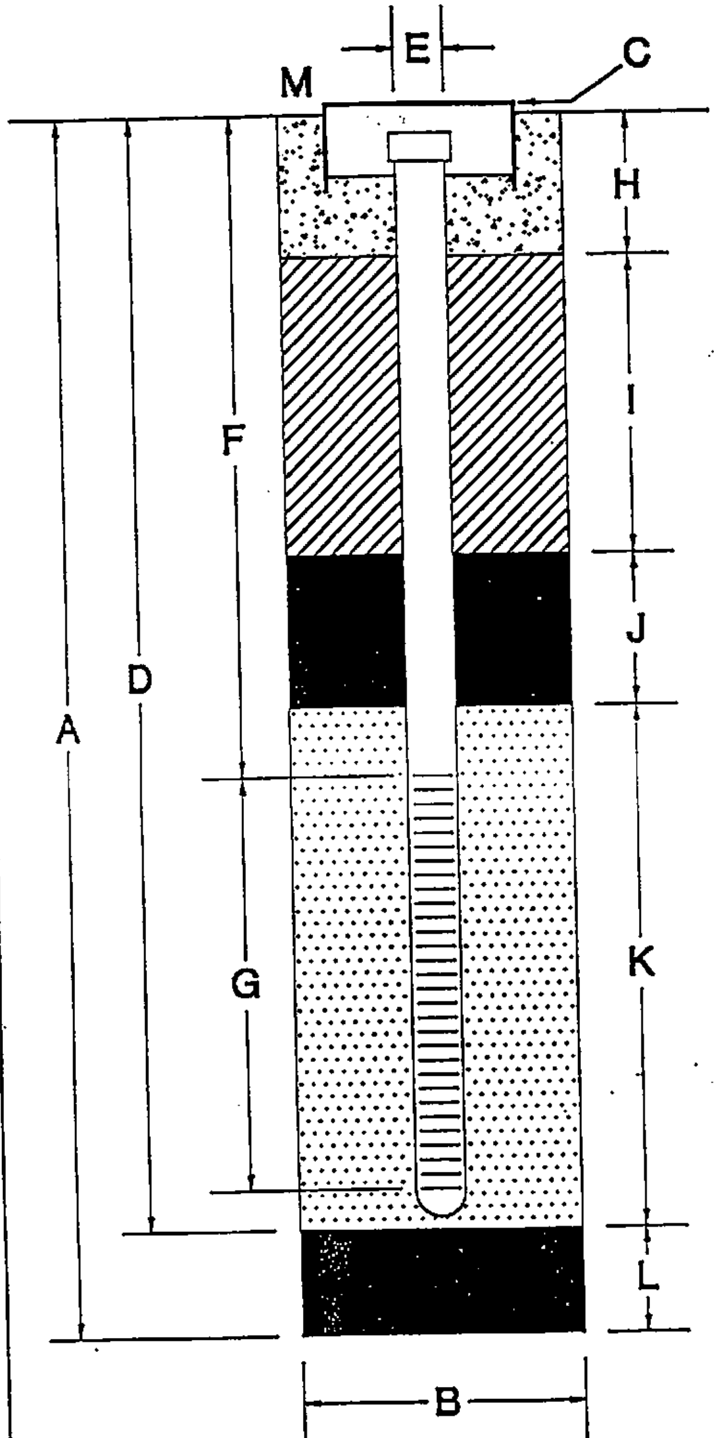
VICINITY MAP
Former Tosco 76 Branded Facility No. 1871
96 MacArthur Boulevard
Oakland, California

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
140165		July, 1998	



Residential
House Driveway
HARRISON STREET
Approximate Property Boundary
MW-1
MW-3
MW-5
MW-2
MW-4
EB-1
EB-2
EB-3
Former Dispenser Islands
Former Underground Storage Tanks
Former Station Building
Former Waste Oil Tank
A
A'
Typical Groundwater Flow Direction
MACARTHUR BOULEVARD
ON-RAMP TO SOUTHBOUND I-580 (ELEVATED)
SANTA CLARA AVENUE
ON-RAMP TO NORTHBOUND I-580 (ELEVATED)
INTERSTATE 80 (ELEVATED)
ON-RAMP
EXPLANATION:
Proposed Groundwater Monitoring Well
Proposed Soil Boring (Hollow-stem Augers)
Proposed Soil Boring (Geoprobe)
Proposed Soil Boring (Contingency Geoprobe)
Soil Boring
Groundwater Monitoring Well
Destroyed Groundwater Monitoring Well
Proposed Geologic Cross-section A-A'
N
0
40
Scale in Feet
Source: Figure Modified From Drawing Provided By ????.
FIGURE
2
SITE PLAN
Former Tosco 76 Branded Facility No. 1871
96 MacArthur Boulevard
Oakland, California
Gettler - Ryan Inc.
6747 Sierra Ct., Suite J
Dublin, CA 94568
(925) 551-7555
JOB NUMBER
140165
REVIEWED BY
DATE
10/98
REVISED DATE

WELL CONSTRUCTION DETAIL



A Total Depth Of Boring 25 ft.

B Diameter Of Boring 8 in.
Drilling Method HOLLOW STEM AUGER

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

D Casing Length 25 ft.
Material SCH. 40 PVC

E Casing Diameter 2 in.

F Depth To Top Perforations 5 ft.

G Perforated Length 20 ft.
Perforated Interval From 5 to 25 ft.
Perforation Type SLOTTED SCHD. 40 PVC
Perforation Size 0.02 in.

H Surface Seal From 0 to 1 ft.
Seal Material REDI-MIX CONCRETE

I Backfill From 1 to 3 ft.
Backfill Material NEAT CEMENT

J Seal From 3 to 4 ft.
Seal Material HYDRATED BENTONITE

K Gravel Pack From 4 to 25 ft.
Pack Material Lonestar #3 Sand

L Bottom Seal NONE ft.
Seal Material ____

M Traffic-rated well box, locking well cap, lock

Note: Depths Measured From Initial Ground Surface.

Gettler - Ryan Inc.
6747 Sierra Ct., Suite J
Dublin, CA 94568
(510) 551-7555

Proposed Well Construction Detail
Former Tosco 76 Branded Station No. 1871
96 MacArthur Boulevard
Oakland, California

JOB NUMBER	REVIEWED BY	DATE	REVISION DATE
140165	CJG	10/98	

APPENDIX A

Gettler-Ryan Inc. Field Methods And Procedures

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 soil from the tip of the sampling device or sample liner into a clean ziplock bag and sealing the bag. After approximately twenty minutes, the bag is opened and the atmosphere within the bag tested using a PID. Head-space screening results are recorded on the boring log. Head-space screening procedures are performed and results recorded as reconnaissance data. GR 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 adjacent to the entire screened interval. A bentonite 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. After the wells have been developed, groundwater samples are collected. Well development and sampling is performed by GR.

Storing and Sampling of Drill Cuttings

Drill cuttings are stockpiled on plastic sheeting or stored in drums depending on site conditions and regulatory requirements. Stockpile samples are collected and analyzed 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.