MAY 2 1 2002

GETTLER-RYAN INC.

1364 North McDowell Blvd. Suite B2
Petaluma, CA 94954-1116
Phone (707) 789-3255, Fax (707) 789-3218

TRANSMITTAL

TO: David B. De Witt
Phillips 66 Company
2000 Crow Canyon Place, Suite 400
San Ramon, California 94583

FROM: Clyde Galantine

DATE: May 20, 2002
PROJECT NO. 140165.10
SUBJECT: System Installation Report
F. Tosco SS No. 1871
96 MacArthur Boulevard
Oakland, California

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	May 20, 2002	Ozone Microsparge Well and System Installation Report

THESE ARE TRANSMITTED as checked below:

- ☐ For review and comment
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- ☐ Approved as submitted
- ☐ Approved as noted
- ☐ Returned for corrections
- ☒ For your files
- ☐ For your use
- ☒ As noted below

COMMENTS:
Enclosed is a copy of the above report. If you have any questions or comments, please call me at (707) 789-3255.

Signed: Clyde Galantine

cc: Don Hwang, Alameda County Health Care Services Agency
Mike Karvelot, Quik Stop Markets, Inc.

GETTLER-RYAN INC.

OZONE MICROSPARGE WELL AND SYSTEM INSTALLATION REPORT

at

Former Tosco (76) Service Station No. 1871
96 MacArthur Boulevard
Oakland, California

MAY 2 1 2002

Report No. 140165.10

Prepared for:

Mr. David B. De Witt
Tosco Corporation
2000 Crow Canyon Place, Suite 400
San Ramon, California 94583

Prepared by:

Gettler-Ryan Inc.
1364 North McDowell Boulevard, Suite B2
Petaluma, California 94954

Clyde J. Galantine
Senior Geologist

Hagop Kevork
Senior Engineer
PE C55734

REGISTERED PROFESSIONAL ENGINEER
HAGOP KEVORK
No. C 55734
Exp. 12/31/04
CIVIL
STATE OF CALIFORNIA

May 20, 2002

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OZONE MICROSPARGE WELL AND SYSTEM INSTALLATION REPORT

at

Former Tosco (76) Service Station No. 1871
96 MacArthur Boulevard
Oakland, California

Report No. 140165.10

INTRODUCTION

This report summarizes field activities performed by Gettler-Ryan Inc. (GR) in March 2002, at the above referenced location. The purpose of these activities was to install ozone microsparge wells at the site as part of the proposed ozone microsparge remediation system installation and operation. The work performed included: obtaining permits from the appropriate agencies for well installation; drilling eight soil borings and constructing ten ozone microsparge wells in the borings; startup of the ozone microsparge remediation system; and preparing this report. This work was performed at the request of Tosco Corporation (Tosco), a subsidiary of Phillips Petroleum Company.

SITE DESCRIPTION

The site is located on the north corner of the intersection of MacArthur Boulevard and Harrison Street in Oakland, California. The service station and all related equipment were removed in May 1998. The site is currently a QuikStop market and petroleum dispensing operation. The Tosco 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 on-site groundwater monitoring well (MW-1) and six off-site monitoring wells (MW-6 through MW-11) remain. Pertinent former and existing site features are shown on Figure 2.

SITE GEOLOGY

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.

Based on previous subsurface investigations, 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. The site is currently monitored and sampled semiannually in January and July. Groundwater was measured at approximately 8 to 15 feet bgs during the January 31, 2002

groundwater monitoring event (GR, 2002a). This shallow groundwater at the site appears to be unconfined with a flow direction ranging from southwest to south-southwest at an average gradient of 0.03 feet/feet. A potential artificial barrier may exist downgradient of the site as a result of the presence and construction of the I-580 freeway structure (conversation with ACHSCA personnel).

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, 1996).

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. Facilities included 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, 1998).

The top of casing on monitoring wells MW-2 through MW-5 was damaged during site demolition activities. On September 14, 1998, these wells were drilled out and the boreholes 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.

A limited subsurface investigation was performed in June 1999, which included the installation of three off-site groundwater monitoring wells (MW-6, MW-7, MW-8), and advancing seven GeoProbes (B-4 through B-10) and two soil borings (B-11, B-12) on and near the site. Depth-discrete soil and groundwater samples were collected and analyzed for TPHg, BTEX, MtBE, and five oxygenate compounds. Soil samples were reported to contain petroleum hydrocarbon concentrations ranging from not detected to 210 ppm of TPHg, not detected to 1.6 ppm of benzene, and not detected to 3.3 ppm of MtBE. Nine grab groundwater samples collected from the GeoProbes and soil borings were reported as not detected for TPHg and benzene, except for 0.54 ppb of benzene in B-6 at 11.7 feet bgs and 95,000 ppb of TPHg and 10,000 ppb of benzene in B-10 at 15.2 feet bgs. MtBE concentrations ranged form not detected in borings B-4, B-5, B-6, B-8, B-9, and B-12, to a maximum concentration of 270,000 ppb in boring B-10 at 15.2 feet bgs. Petroleum hydrocarbon concentrations in wells MW-1, MW-6, MW-7, and MW-8 ranged from not detected to 49,000 ppb of TPHg (MW-1), not detected to 6,900 ppb of benzene (MW-1), and not detected to 97,000 ppb of MtBE (MW-6). The oxygenate compounds (excluding MtBE) were reported as not detected for all samples (GR, 1999).

Three off-site downgradient groundwater monitoring wells (MW-9, MW-10, MW-11) were installed in CalTrans right-of-way by GR in December 2001. Soil samples collected from the well borings were reported as not detected for TPHg, BTEX, or oxygenate compounds. These wells and the

existing monitoring wells were monitored and sampled by GR personnel in January 2002 as part of the semiannual monitoring and sampling schedule. Downgradient wells MW-9, MW-10, and MW-11 were reported as not detected for all petroleum hydrocarbons except for 1.2 ppb of MtBE in MW-10 and 910 ppb of MtBE in MW-9 (GR, 2002b).

Groundwater monitoring and sampling has been performed quarterly semiannually at the site since January 1993. Depth to groundwater historically 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 feet/feet. Historical 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, 2002a).

FIELD ACTIVITIES

Field work was performed in accordance with the GR Site Safety Plan No. 140165.10, dated February 25, 2002. GR Field Methods and Procedures are included in Appendix A. Underground Service Alert (USA) was notified prior to beginning drilling activities. Drilling and well installation was performed under Alameda County Public Works Agency Permit No. W02-0254. A copy of the drilling permit is included in Appendix B. Eight on-site soil borings were drilled on March 18, 19, and 20, 2002 and completed as ozone microsparge wells SP-A, SP-BS/BD, SP-C, SP-DS/DD, SP-E, SP-F, SP-G, and SP-H. These wells were installed to maximum depths ranging from 25 to 30 feet bgs. Ozone microsparge wells SP-BS/BD and SP-DS/DD were constructed as dual completion wells.

The well borings were drilled using a limited access drill rig equipped with eight-inch diameter hollow stem augers by Cascade Drilling, Inc. (#C57 717510). A GR geologist observed the drilling and well installation activities and described the construction of each well (Appendix B). The well borings were not lithologically logged or sampled due to their proximity to a previously logged and sampled borings. Well locations are shown on Figure 2. Soil cuttings generated during drilling were placed in a dump truck at the site pending transportation to an appropriate landfill.

Ozone Microsparge Well Installation

The ozone microsparge wells were constructed as per manufacturer's recommendation using ¾-inch diameter Schedule 40 polyvinyl chloride (PVC) casing and a 2-foot long by 2-inch diameter air ozone microsparge point. The annular space around the well screen was packed with Lonestar #60 sand. The single completion wells were constructed with sand to approximately 1 to 3 feet above the top of the well screen. The sandpack of each well was then followed by a 2-foot thick hydrated bentonite transition seal and neat cement to the surface. Dual completion well SP-BS/BD was constructed with a air ozone microsparge point (SP-BD), sand to 2 feet above the top of the well screen, a 6.5-foot thick hydrated bentonite transition seal, the second air ozone microsparge point (SP-BS) on top of the seal, sand to 1 foot above the top of the well screen, a 2-foot thick hydrated bentonite transition seal and neat cement to the surface. Dual completion well SP-DS/DD was constructed in a manner

similar to SP-BS/BD. Well construction details are included with each of the boring logs presented in Appendix B.

WASTE DISPOSAL

A total of 10.48 tons of drill cuttings were removed from the site by GR to Forward Landfill in Manteca, California. The soil was accepted under previously issued Forward Approval No. 1558. The Forward disposal confirmation letter is included in Appendix C.

REMEDIAL ACTION

GR installed an ozone microsparging system to address the known on-site impact. Ozone microsparging is a process where ozone in air is introduced into the groundwater at low flow rates (2-6 cubic feet per minute) through specially designed spargers to create small "microbubbles." As these microbubbles rise within the column of water, they strip and rapidly oxidize VOCs from the groundwater. As a byproduct of the ozone, oxygen is introduced in the groundwater to enhance natural attenuation off-site.

Ten ozone sparge points were installed at eight locations shown on Figure 2. The borings were drilled to depths ranging from 25 to 30 feet bgs with a sparge point installed at the bottom of each boring. In addition, two borings were constructed as dual completion wells (SP-BS/BD, SP-DS/DD). Sparge point construction details are presented on the boring logs in Appendix B.

The ozone panel was mounted on the face of a retaining wall. The panel includes an ozone generator, air compressor, and a programmable timer/controller. Sparge points are connected to the panel by 3/8" LDPE tubing. Each sparge point has a dedicated line. The tubing was run through schedule 80 PVC conveyance piping for added protection. Construction activities were performed by Global Project Management & Services of Folsom, California. The process flow diagram is included as Figure 3.

Ozone Microsparge System Startup

The system was placed into operation on April 8, 2002 and cycles ozone/air injection between ten sparge points. The schedule is currently set to cycle through each point 16 times per day, for 8 minutes per point per cycle. Sparge point selection and cycle times will be adjusted as petroleum hydrocarbon concentrations in groundwater change. A system status report will be issued after the first six months of operation, presenting the results of the sampling program. At that time, the effectiveness of the system will be evaluated.

SUMMARY

Eight ozone microsparge wells with ten microsparge points were installed in March 2002. Drill cuttings generated during drilling activities were transported to Forward Landfill for disposal. The ozone microsparge system was placed into operation on April 8, 2002.

DISTRIBUTION

GR recommends that a copy of this report be forwarded to Mr. Don Hwang of Alameda County Health Care Services Agency at 1131 Harbor Bay Parkway, 2nd Floor, Alameda, California 94502 and Mr. Mike Karvelot of Quik Stop Markets, Inc. at 4567 Enterprise Street, Fremont, California 94538.

REFERENCES

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

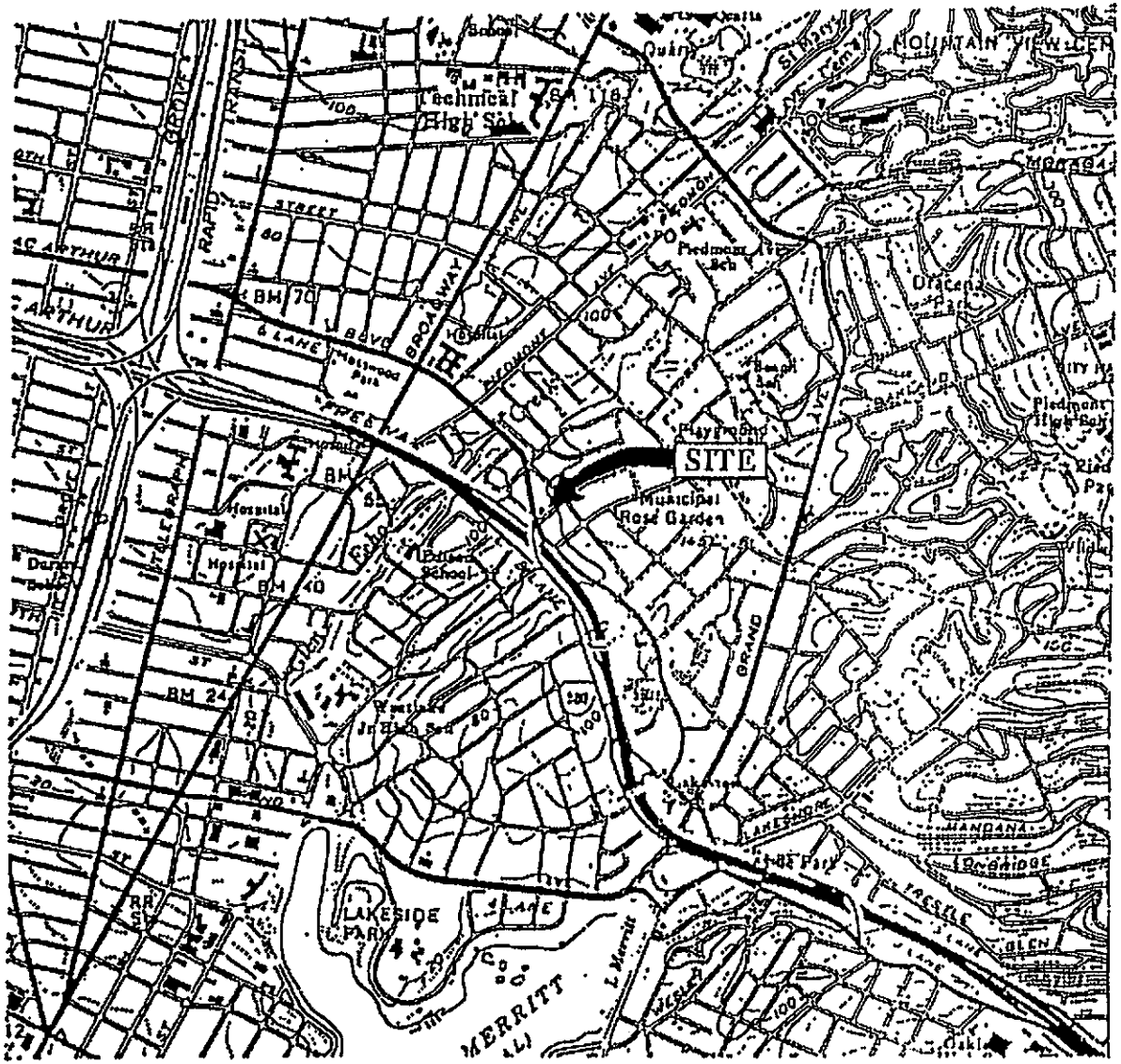
Gettler-Ryan Inc., 1999, Limited Subsurface Investigation Report at Former Tosco 76 Branded Facility No. 1871, 96 MacArthur Boulevard, Oakland, California: Report No. 140165.04-1 dated August 6, 1999.

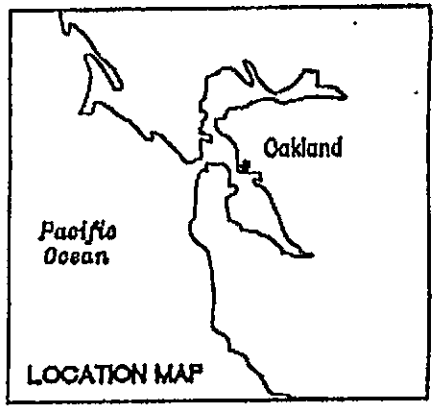
Gettler-Ryan Inc., 2002a, First Semi-Annual 2002 Groundwater Monitoring & Sampling Report for Tosco (Unocal) Service Station No. 1871, 96 MacArthur Boulevard, Oakland, California: Job #180068 dated March 14, 2002.

Gettler-Ryan Inc., 2002b, Off-Site Subsurface Investigation Report at Former Tosco (76) Service Station No. 1871, 96 MacArthur Boulevard, Oakland, California: Report No. 140165.07 dated May 16, 2002.

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 MacArthur Boulevard, Oakland, California: Report KEI-P94-0601.R4 dated May 17, 1996.





N

0 2000

Scale in Feet

Base Map: USGS Topographic Map

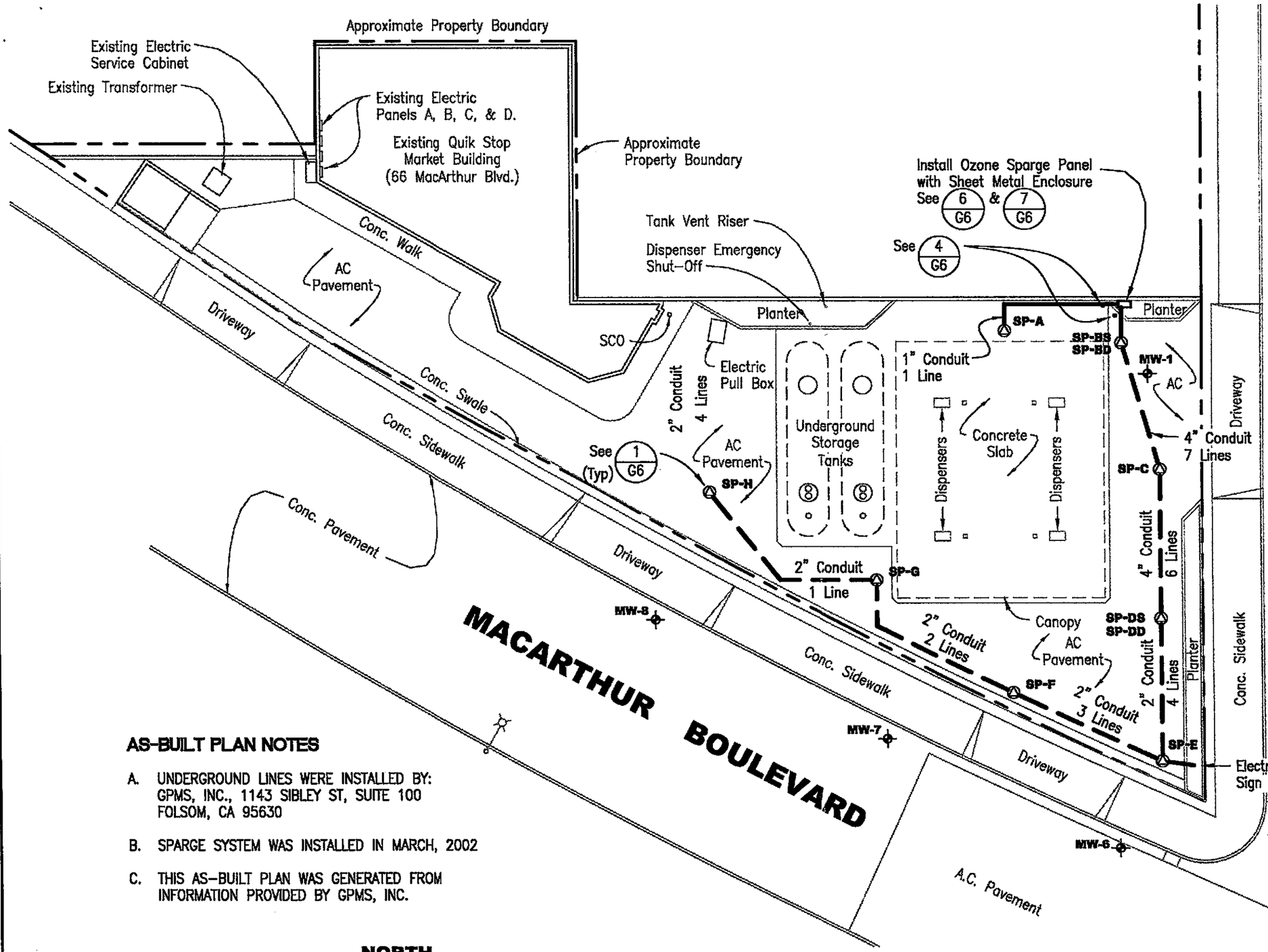
FIGURE 1

Gettler - Ryan Inc.

6747 Sierra Ct., Suite J (925) 551-7555
Dublin, CA 94568

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

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
140165		July, 1998	



LEGEND

- SCO — SEWER CLEAN OUT
- EXISTING GROUNDWATER MONITORING WELL
- OZONE SPARGE POINT
- ABOVE GROUND OZONE SPARGE LINE, SIZE AS NOTED
- UNDERGROUND OZONE SPARGE LINE, SIZE AS NOTED

SITE SPECIFIC NOTES

1. THIS SITE IS AN OPERATING QUIK STOP SERVICE STATION.
2. EXISTING BURIED PIPE AND UTILITY LOCATIONS SHOWN ARE APPROXIMATE AS DETERMINED FROM EXISTING RECORDS. CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND DEPTH OF ALL BURIED PIPES AND UTILITIES, WHETHER SHOWN OR NOT SHOWN ON THESE PLANS, PRIOR TO THE START OF CONSTRUCTION. NOTIFY UNDERGROUND SERVICE ALERT, PHONE 1-800-642-2444, AT LEAST TWO WORKING DAYS PRIOR TO THE START OF WORK
3. TOSCO WILL SUPPLY THE FOLLOWING:
   A. OZONE SPARGE PANEL
   B. OZONE SPARGE TUBING AND FITTINGS
4. ALL OTHER MATERIALS NEEDED TO SUPPLY AND INSTALL A FULLY FUNCTIONAL AND OPERATING SYSTEM SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR WHETHER SHOWN OR NOT SHOWN ON THESE PLANS.

AS-BUILT PLAN NOTES

A. UNDERGROUND LINES WERE INSTALLED BY: GPMS, INC., 1143 SIBLEY ST, SUITE 100 FOLSOM, CA 95630

B. SPARGE SYSTEM WAS INSTALLED IN MARCH, 2002

C. THIS AS-BUILT PLAN WAS GENERATED FROM INFORMATION PROVIDED BY GPMS, INC.

NORTH

0 20' 40' 60'

1"= 20'

REV #	REVISION	BY	DATE
C	AS-BUILT PLAN	DJF	3/02
B	REVISE CONDUIT SIZE	DJF	7/18/01

Gettler - Ryan Inc.
1364 North McDowell Boulevard Suite B2
Petaluma, CA 94954 (707) 789-3255

TOSCO

1871-G2

PROJECT: 140165.09
FACILITY: FORMER TOSCO (76) STATION #1871
66 (Formerly 96) MACARTHUR BLVD.
OAKLAND, CALIFORNIA
DATE: 5-7-02 SHEET 3 of 8

TITLE: NEW CONSTRUCTION SITE PLAN (AS-BUILT)

DRAWING No. G2 C

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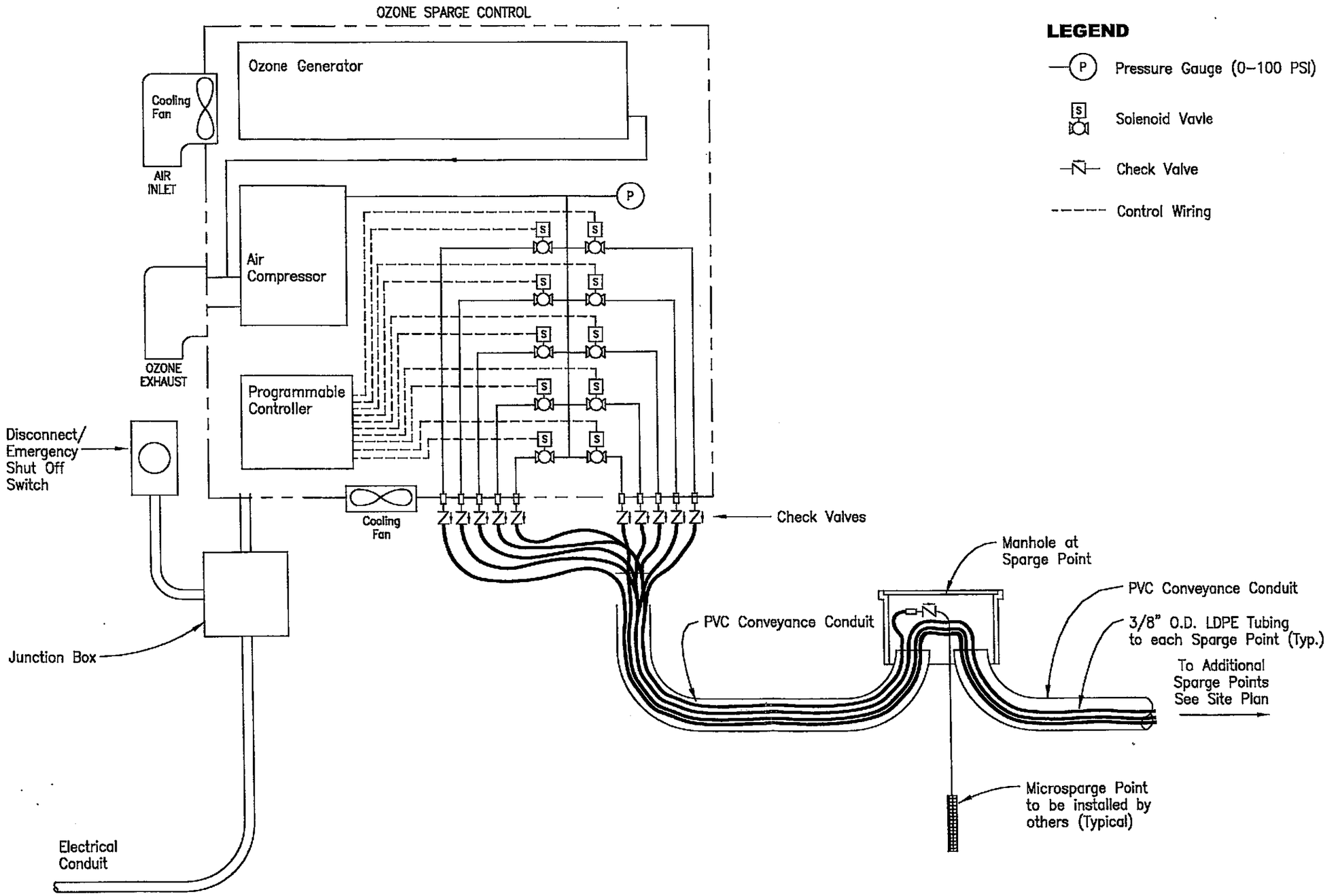


LEGEND

- P — Pressure Gauge (0–100 PSI)
- S — Solenoid Vavle
- Check Valve
- Control Wiring

FIGURE 3

PROCESS FLOW DIAGRAM
Former Tosco (76) Service Station No. 1871
96 MacArthur Boulevard
Oakland, California

REVISED DATE

DATE 3/02

Gettler - Ryan Inc.
1364 North McDowell Boulevard, Suite B2
Petaluma, CA 94954 (707) 788-3255

PROJECT NUMBER 140165

REVIEWED BY

FILE NAME: E:\REMED\Tosco\6004 Lamoore\Q602-6004.dwg | Layout Tab: Process Flow

APPENDIX A

GR Field Methods and Procedures

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 and the Site Safety Plan. GR personnel and subcontractors who perform work at the site are briefed on the of these plans contents 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

Exploratory 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 exploratory soil boring with a split-barrel sampler or other appropriate sampling device fitted with clean brass 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 soil is 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 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. 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 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. GR does not consider field screening techniques to be verification of the presence or absence of hydrocarbons.

Stockpile Sampling

Stockpile samples consist of four individual sample liners collected from each 100 cubic yards (yd^3) of stockpiled soil material. Four arbitrary points on the stockpiled material are chosen, and discrete soil sample is collected at each of these points. Each discrete stockpile sample is collected by removing the upper 3 to 6 inches of soil, and then driving the stainless steel or brass tube into the stockpiled material with a wooden mallet or hand driven soil sampling device. The sample tubes are then covered on both ends with teflon sheeting or aluminum foil, capped,

labeled, placed in the 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.

Construction of Monitoring Wells

Monitoring wells are constructed in the exploratory 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 cap. A lock is placed on the well cap to prevent vandalism and unintentional introduction of materials into the well.

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 50 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 then driving the stainless 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.

Wellhead Survey

The top of the newly-installed well casing is surveyed by a California-licensed Land Surveyor to mean sea level (MSL).

Well Development

The purpose of well development is to improve hydraulic communication between the well and surrounding aquifer. Prior to development, each well is monitored for the presence of separate-phase hydrocarbons and the depth-to-water is recorded. Wells are then developed by alternately surging the well with the bailer, then purging the well with a pump to remove accumulated sediments and draw groundwater into the well. Development continues until the groundwater parameters (temperature, pH, and conductivity) have stabilized.

Groundwater Monitoring and Sampling

Decontamination Procedures

All physical parameter measuring and sampling equipment are decontaminated prior to sample collection using Alconox or equivalent detergent followed by steam cleaning with deionized water. During field sampling, equipment placed in a well are decontaminated before purging or sampling the next well by cleaning with Alconox or equivalent detergent followed by steam cleaning with deionized water.

Water-Level Measurements

Prior to sampling each well, the static water level is measured using an electric sounder and/or calibrated portable oil-water interface probe. Both static water-level and separate-phase product thickness are measured to the nearest ±0.01 foot. The presence of separate-phase product is confirmed using a clean, acrylic or polyvinylchloride (PVC) bailer, measured to the nearest ±0.01 foot with a decimal scale tape. The monofilament line used to lower the bailer is replaced between borings with new line to preclude the possibility of cross-contamination. Field observations (e.g. product color, turbidity, water color, odors, etc.) are noted. Water-levels are measured in wells with known or suspected lowest dissolved chemical concentrations to the highest dissolved concentrations.

Sample Collection and Labeling

A temporary PVC screen is installed in the boring to facilitate a grab groundwater sample collection. Samples of groundwater are collected from the surface of the water in each well or boring using the teflon bailer or a pump. The water samples are then gently poured into laboratory-cleaned containers and sealed with teflon-lined caps, and inspected for air bubbles to check for headspace. The samples are then labeled by an adhesive label, noted in permanent ink, and promptly placed in an ice storage. A Chain-of-Custody Record is initiated and updated throughout handling of the samples, and accompanies the samples to the laboratory certified by the State of California for analyses requested.

ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
399 ELMHURST ST. HAYWARD CA. 94544-1395
PHONE (510) 670-5554
FAX (510)782-1939

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT Former Tosco SS No. 1871
96 MacArthur Blvd
Oakland CA

CLIENT
Name Tosco Corp - Dave DeWit
Address 2000 Crow Canyon Pl. Suite 400 Phone (925) 277-2384
City San Ramon CA Zip 94583

APPLICANT
Name Gettler-Ryan Inc Clyde Galantine
Fax (707) 789-3215
Address 3764 N McDowell Blvd Suite B2 Phone (707) 789-3255
City Petaluma CA. Zip 94954

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	☐	General	☐
Water Supply	☐	Contamination	☐
Monitoring	☒	Well Destruction	☐

PROPOSED WATER SUPPLY WELL USE

New Domestic	☐	Replacement Domestic	☐
Municipal	☐	Irrigation	☐
Industrial	☐	Other Ozone Microsparge	☒

DRILLING METHOD:

Mud Rotary	☐	Air Rotary	☐	Auger	☒
Cable	☐	Other	☐		

DRILLER'S LICENSE NO. C57 717510

WELL PROJECTS Cascade Drilling exp 1-31-04
Drill Hole Diameter 8 in. Maximum
Casing Diameter 0.75 in. Depth 30 ft.
Surface Seal Depth 2+5 ft. Number 8

GEOTECHNICAL PROJECTS
Number of Borings _____ Maximum
Hole Diameter _____ in. Depth _____ ft.

ESTIMATED STARTING DATE March 18, 2002
ESTIMATED COMPLETION DATE March 20, 2002

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Clyde Galantine DATE 2/19/02

Rev.4-4-00

FOR OFFICE USE

PERMIT NUMBER W02-0254
WELL NUMBER _____
APN _____

PERMIT CONDITIONS
Circled Permit Requirements Apply

A. GENERAL
1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
2. Submit to ACPWA within 60 days after completion of permitted work the original Department of Water Resources- Well Completion Report.
3. Permit is void if project not begun within 90 days of approval date

B. WATER SUPPLY WELLS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

C. GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

D. GEOTECHNICAL
Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings.

E. CATHODIC
Fill hole above anode zone with concrete placed by tremie.

F. WELL DESTRUCTION
See attached.

G. SPECIAL CONDITIONS

APPROVED _____ DATE 2-25-02

COUNTY OF ALAMEDA
PUBLIC WORKS AGENCY
WATER RESOURCES SECTION
399 Elmhurst Street, Hayward, CA 94544-1395

FAX TRANSMITTAL

TO: GeoHer-Ryan Inc DATE: 2-25-02

Attn: Clyde Galant

FAX NO.: (707) 984-3218

TRANSMITTING THE FOLLOWING:

SHEETS	DATED	TITLE/DESCRIPTION
1		DPA - W02-0254

2 TOTAL PAGES INCLUDING THIS SHEET.

FROM WATER RESOURCES SECTION

NAME: JAMES YOO TEL: (510) 670-6633 FAX: (510) 782-1939

E-MAIL: jamesyi@acpwa.mail.co.alameda.ca.us

IF YOU EXPERIENCE PROBLEMS WITH THIS TRANSMISSION, PLEASE CALL ME.

REMARKS:

MAJOR DIVISIONS				TYPICAL NAMES
COARSE-GRAINED SOILS (MORE THAN HALF IS COARSER THAN NO. 200 SIEVE)	GRAVELS (MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	Well graded gravels with or without sand, little or no fines
			GP	Poorly graded gravels with or without sand, little or no fines
		GRAVELS WITH OVER 15% FINES	GM	Silty gravels, silty gravels with sand
			GC	Clayey gravels, clayey gravels with sand
	SANDS (MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	Well graded sands with or without gravel, little or no fines
			SP	Poorly graded sands with or without gravel, little or no fines
		SANDS WITH OVER 15% FINES	SM	Silty sands with or without gravel
			SC	Clayey sands with or without gravel
FINE-GRAINED SOILS (MORE THAN HALF IS FINER THAN NO. 200 SIEVE)	SILTS AND CLAYS (LIQUID LIMIT 50% OR LESS)		ML	Inorganic silts and very fine sands, rock flour, silts with sands and gravels
			CL	Inorganic clays of low to medium plasticity, clays with sands and gravels, lean clays
			OL	Organic silts or clays of low plasticity
	SILTS AND CLAYS (LIQUID LIMIT GREATER THAN 50%)		MH	Inorganic silts, micaceous or diatomaceous, fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic silts or clays of medium to high plasticity
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils

PID	Volatile vapors in ppm
(2.5YR 6/2)	Soil color according to Munsell Soil Color Charts (1993 Edition)
BLOWS/FT.	Sample drive hammer weight – 140 pounds falling 30 inches. Blows required to drive sampler 1 foot are indicated on the logs.

———	Observed contact
– – – –	Inferred contact
▨	No soil sample recovered
■	"Undisturbed" sample
▽	First encountered groundwater level
▼	Static groundwater level

GETTLER-RYAN INC.
6747 Sierra Ct., Suite J
Dublin, CA 94568 (925) 551-7555

UNIFIED SOIL CLASSIFICATION
ASTM D 2488-85
AND
KEY TO SAMPLING DATA

Gettler-Ryan, Inc.

Log of Boring SP-A

PROJECT: *Former Tosco (76) Service Station No. 1871*	LOCATION: *96 MacArthur Bouldvard, Oakland, California*
GR PROJECT NO. : *140165.10*	CASING ELEVATION:
DATE STARTED: *03/20/02*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *03/20/02*	WL (ft. bgs): DATE: TIME:
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *28 feet*
DRILLING COMPANY: *Cascade Drilling*	GEOLOGIST: *Clyde Galantine*

DEPTH (feet)

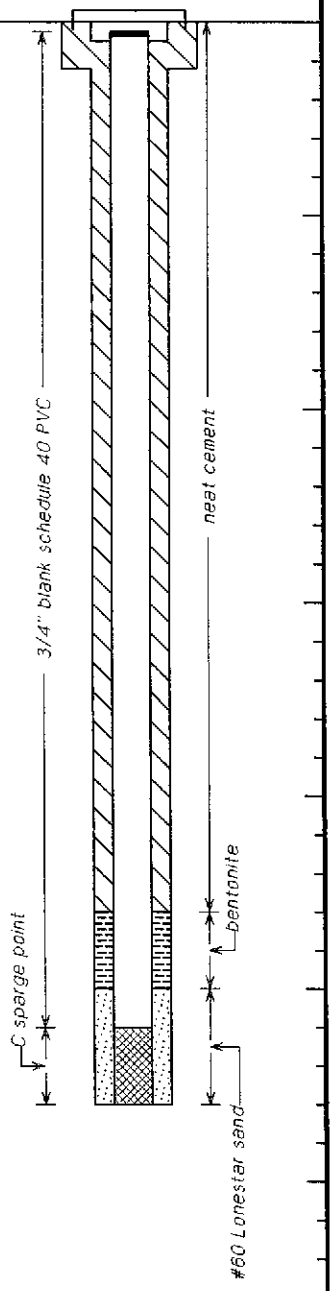
GEOLOGIC DESCRIPTION

Concrete and rebar - 6 inches thick.

Well boring was not logged or sampled.

Bottom of boring at 28 feet bgs.

WELL DIAGRAM



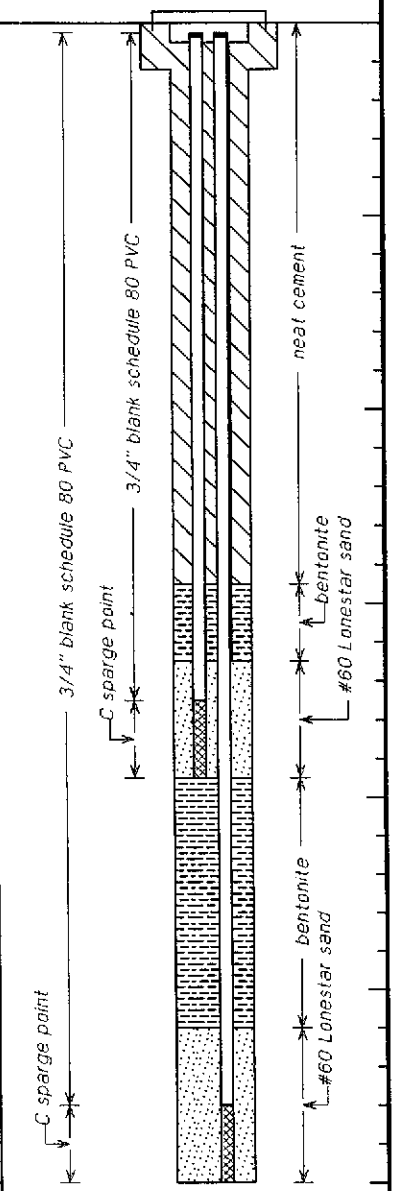
JOB NUMBER: *140165.10*

Gettler-Ryan, Inc.

Log of Boring SP-BD/BS

PROJECT: *Former Tosco (76) Service Station No. 1871*	LOCATION: *96 MacArthur Boulevard, Oakland, California*
GR PROJECT NO. : *140165.10*	CASING ELEVATION:
DATE STARTED: *03/20/02*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *03/20/02*	WL (ft. bgs): DATE: TIME:
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *30 feet*
DRILLING COMPANY: *Cascade Drilling*	GEOLOGIST: *Clyde Galantine*

DEPTH (feet)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	WELL DIAGRAM
0			Asphalt - 6 inches thick.	
			Well boring was not logged or sampled.	
5				
10				
15				
20				
25				
30			Bottom of boring at 30 feet bgs.	
35				



JOB NUMBER: *140165.10*

Gettler-Ryan, Inc.

Log of Boring SP-C

PROJECT: *Former Tosco (76) Service Station No. 1871*	LOCATION: *96 MacArthur Bouldvard, Oakland, California*
GR PROJECT NO. : *140165.10*	CASING ELEVATION:
DATE STARTED: *03/20/02*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *03/20/02*	WL (ft. bgs): DATE: TIME:
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *28 feet*
DRILLING COMPANY: *Cascade Drilling*	GEOLOGIST: *Clyde Galantine*

DEPTH (feet)

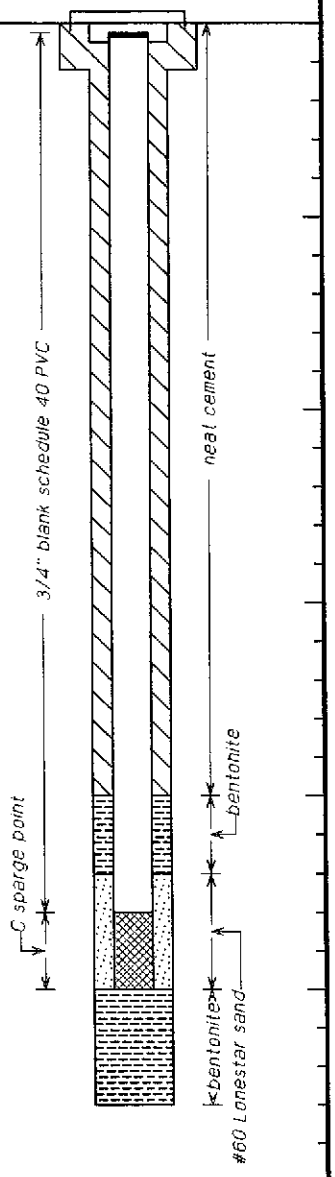
GEOLOGIC DESCRIPTION

Asphalt - 6 inches thick.

Well boring was not logged or sampled.

Bottom of boring at 28 feet bgs.

WELL DIAGRAM



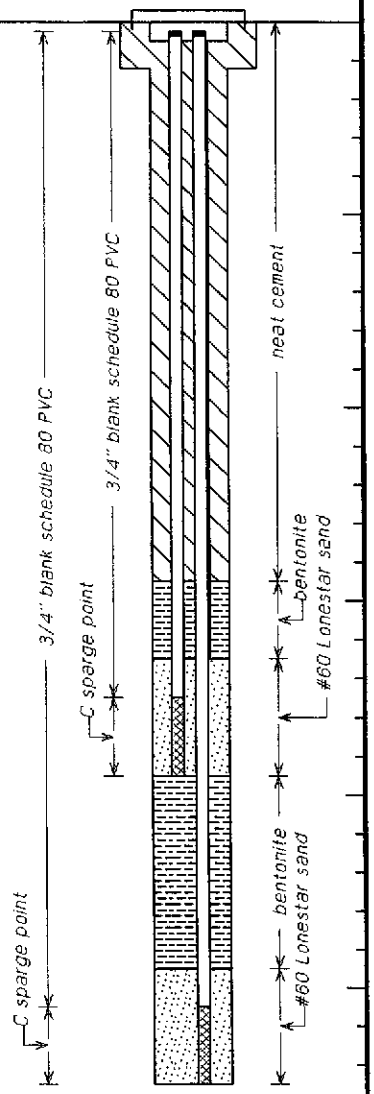
Gettler-Ryan, Inc.

Log of Boring SP-DD/DS

PROJECT: *Former Tosco (76) Service Station No. 1871*	LOCATION: *96 MacArthur Boulevard, Oakland, California*
GR PROJECT NO. : *140165.10*	CASING ELEVATION:
DATE STARTED: *03/18/02*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *03/18/02*	WL (ft. bgs): DATE: TIME:
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *27.5 feet*
DRILLING COMPANY: *Cascade Drilling*	GEOLOGIST: *Clyde Galantine*

DEPTH (feet)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
			Asphalt – 6 inches thick.
			Well boring was not logged or sampled.
5			
10			
15			
20			
25			
			Bottom of boring at 27.5 feet bgs.
30			
35			

WELL DIAGRAM



JOB NUMBER: *140165.10*

Gettler-Ryan, Inc.

Log of Boring SP-E

PROJECT: *Former Tosco (76) Service Station No. 1871*	LOCATION: *96 MacArthur Bouldvard, Oakland, California*
GR PROJECT NO. : *140165.10*	CASING ELEVATION:
DATE STARTED: *03/18/02*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *03/18/02*	WL (ft. bgs): DATE: TIME:
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *28 feet*
DRILLING COMPANY: *Cascade Drilling*	GEOLOGIST: *Clyde Galantine*

DEPTH (feet)

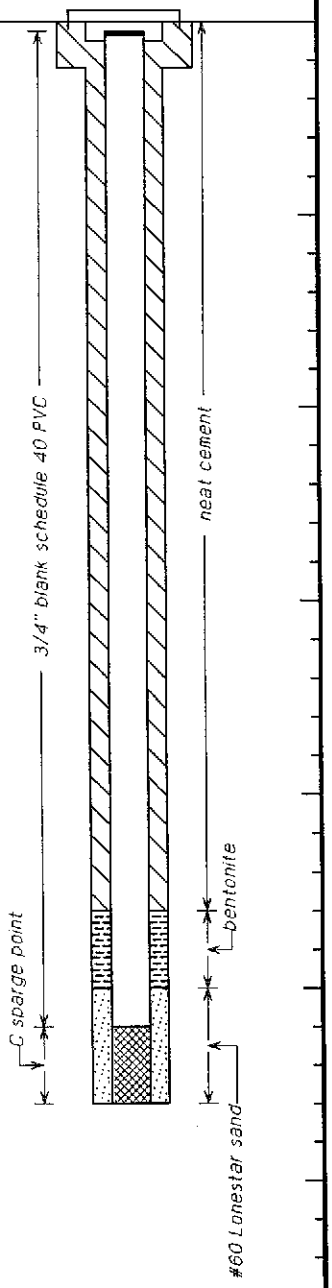
GEOLOGIC DESCRIPTION

Asphalt – 6 inches thick.

Well boring was not logged or sampled.

Bottom of boring at 28 feet bgs.

WELL DIAGRAM



JOB NUMBER: *140165.10*

Gettler-Ryan, Inc.

Log of Boring SP-F

PROJECT: *Former Tosco (76) Service Station No. 1871*	LOCATION: *96 MacArthur Bouldvard, Oakland, California*
GR PROJECT NO.: *140165.10*	CASING ELEVATION:
DATE STARTED: *03/19/02*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *03/19/02*	WL (ft. bgs): DATE: TIME:
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *28 feet*
DRILLING COMPANY: *Cascade Drilling*	GEOLOGIST: *Clyde Galantine*

DEPTH (feet)

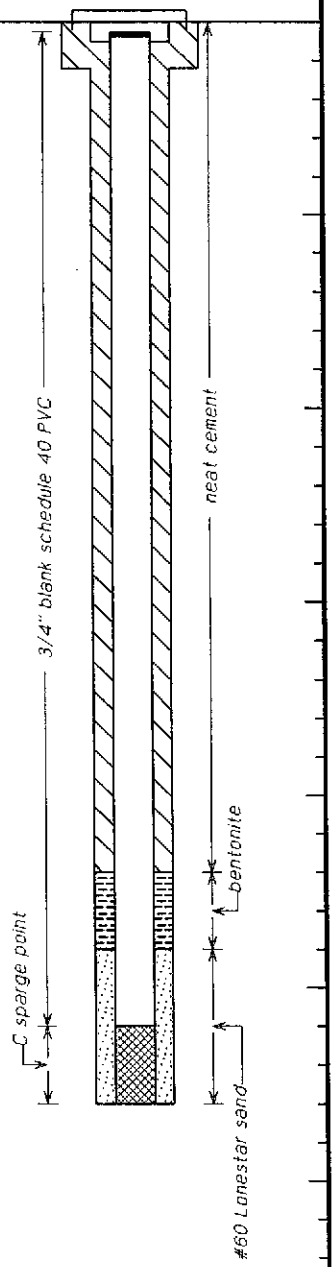
GEOLOGIC DESCRIPTION

Asphalt – 6 inches thick.

Well boring was not logged or sampled.

Bottom of boring at 28 feet bgs.

WELL DIAGRAM



JOB NUMBER: *140165.10*

Gettler-Ryan, Inc.

Log of Boring SP-G

PROJECT: *Former Tosco (76) Service Station No. 1871*	LOCATION: *96 MacArthur Bouldvard, Oakland, California*
GR PROJECT NO. : *140165.10*	CASING ELEVATION:
DATE STARTED: *03/20/02*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *03/20/02*	WL (ft. bgs): DATE: TIME:
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *28 feet*
DRILLING COMPANY: *Cascade Drilling*	GEOLOGIST: *Clyde Galantine*

DEPTH (feet)

GEOLOGIC DESCRIPTION

Asphalt - 4 inches thick.

Well boring was not logged or sampled.

5

10

15

20

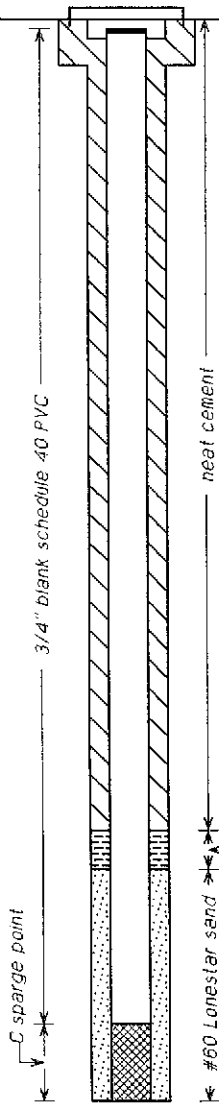
25

Bottom of boring at 28 feet bgs.

30

35

WELL DIAGRAM



JOB NUMBER: *140165.10*

Gettler-Ryan, Inc.

Log of Boring SP-H

PROJECT: *Former Tosco (76) Service Station No. 1871*	LOCATION: *96 MacArthur Bouldvard, Oakland, California*
GR PROJECT NO. : *140165.10*	CASING ELEVATION:
DATE STARTED: *03/19/02*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *03/19/02*	WL (ft. bgs): DATE: TIME:
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *27 feet*
DRILLING COMPANY: *Cascade Drilling*	GEOLOGIST: *Clyde Galantine*

DEPTH (feet)

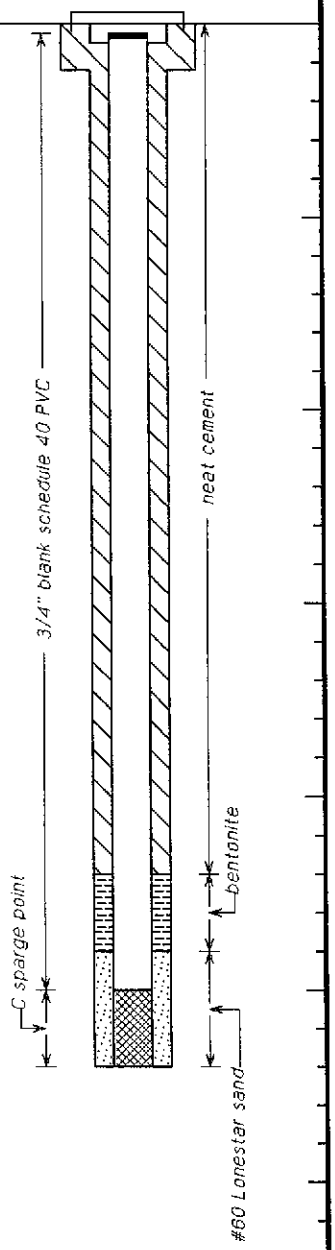
GEOLOGIC DESCRIPTION

Asphalt - 4 inches thick.

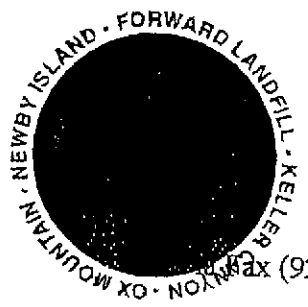
Well boring was not logged or sampled.

Bottom of boring at 27 feet bgs.

WELL DIAGRAM



JOB NUMBER: *140165.10*



NORTHERN CALIFORNIA SALES OFFICE • SPECIAL WASTE
Forward • Keller Canyon • Newby Island • Ox Mountain
ALLIED WASTE COMPANIES
Fax (925) 551-7888

April 8, 2002

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

Re: ***FORWARD, INC.*** Approval No. 1558
Contaminated Soil from
Former Tosco 96 MacArthur Blvd. - ss# 1871
OAKLAND, CA

Dear Mr. Galantine:

FORWARD, INC. is pleased to confirm the disposal of Five drums and 10.48 tons of bulk soil as referenced above. The material was received at our Manteca, California facility for disposal on January 18, March 20, 22 and 27, 2002. The material was placed in a Class 2 waste management unit.

Approval for this material was based on the information provided in the waste profile and associated materials submitted on behalf of Tosco Marketing Company (Generator). Acceptance of the waste is subject to the "Terms and Conditions" agreed to and signed by the Generator on the Waste Profile Form.

Thank you for the opportunity to be of service. Should you have any questions regarding this matter, please contact me or Customer Service at (800) 204-4242.

Sincerely,

FORWARD, INC.

Brad Bonner /jg

Brad J. Bonner
Sales Manager