

October 4, 2002

Job No. 08BP.60210.01

Barry Pulver
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, California 92123

SUBJECT: Workplan for Monitoring the Well #118 Pump Test
ARCO Facility No. 03012
27641 Ynez Road
Temecula, California

Dear Mr. Pulver:

SECOR International, Inc. (*SECOR*), on behalf of Atlantic Richfield Company (Atlantic Richfield), has prepared this workplan to conduct continuous groundwater elevation monitoring during temporary production pumping of Rancho California Water District (RCWD) Well #118 in the vicinity of the above referenced site (Figure 1). The purpose of the proposed work is to observe and evaluate the affects of pumping of Well #118 on groundwater elevations in wells screened within the shallow water-bearing unit in the site vicinity. The proposed work is intended to comply with Investigation Order No. R9-2002-318 dated September 24, 2002 and issued by the California Regional Water Quality Control Board, San Diego Region (RWQCB-SD) to Atlantic Richfield and other parties (see Appendix A).

Atlantic Richfield is currently conducting groundwater quality monitoring, site investigation and remediation efforts as part of Cleanup and Abatement Order No. R9-2002-0024 (CAO) dated February 14, 2002 (issued to Atlantic Richfield), and the January 2, 2001 RWQCB-SD letter issued to Atlantic Richfield and others. The January 2, 2001 letter discusses the February 29, 2000 detection of methyl tert-butyl ether (MTBE) at a concentration of 3.7 micrograms per liter (ug/L) in groundwater from nearby water production Well #118 (State well designation 08S/03W-02J01S), operated by RCWD. Well #118 was shut down and removed from production on September 10, 2000. Between September 2000 and January 2001, concentrations of MTBE have been as high as 24 ug/L in groundwater samples from Well #118. MTBE has not been detected in groundwater from Well #118 after June 2001, and currently RCWD maintains a pumping schedule of approximately 4-hours per day every other day at approximately 2,200 gallons per minute (RWQCB-SD communication with RCWD). Well #118 is located approximately 2,300 feet west (down-gradient) of ARCO No. 3012.

The objective of the proposed work is to assess the affect of Well #118 pumping on water levels in the shallow water-bearing unit in the site vicinity. *SECOR* understands that RCWD intends to shutdown intermittent production from Well #118 between October 18, 2002 and October 22, 2002. Between October 22nd and October 25th, RCWD intends to pump Well #118 at a rate of approximately 2,200 gallons per minute. During production, groundwater will be sampled by RCWD periodically, and analyzed by a State Certified laboratory to monitor for the presence of MTBE and other hydrocarbons. The well will again be shut down after that until October 28th. During these same periods, water levels will be measured and recorded electronically in the shallow monitoring wells in the site vicinity.

SITE DESCRIPTION

The site is currently an operating ARCO AM/PM convenience store and retail gasoline station located within a retail shopping area on the northwest corner of Rancho California Road and Ynez Road, at 27641 Ynez Road in Temecula, California (Figures 1 and 2). Immediately to the south of the site is a Black Angus restaurant, to the west of the site is a Chili's restaurant and a small, man-made pond, as well as various business offices with a parking structure. Immediately to the north of the site is a bank, and Ynez Road borders the site to the east. I-15 lies immediately to the west of the pond and the parking structure.

The site is located in the City of Temecula, within the northwest trending Temecula Valley. According to the United States Geological Survey (USGS) 7.5-Minute Murrieta, California Topographic Map, the site is located at an elevation of approximately 1,020 feet above mean sea level (MSL). The topography in the vicinity of the subject site is generally flat, sloping gently to the west. Murrieta Creek is located approximately 2,100 feet to the west of the site. Water production Well #118 is located approximately 2,300 feet west of the site. I-15 and Murrieta Creek lie between ARCO No. 3012 and Well #118.

PREVIOUS INVESTIGATIONS

In 1987, hydrocarbon odors were detected in the sewer laterals located next to the buildings adjacent to the site. In response to these initial complaints, Atlantic Richfield retained Applied Geosystems to conduct a soil gas survey beneath the site.

The results of this initial investigation indicated the presence of hydrocarbon vapors in the vicinity of the underground storage tanks (USTs) in the northeast portion of the site. From June to October 1988, Applied Geosystems drilled 24 soil boreholes (B-1 through B-24). Fourteen of these boreholes were subsequently converted into groundwater monitoring wells, MW-1 through MW-14. In October 1988, Applied Geosystems installed a passive liquid phase hydrocarbon (LPH) removal system to recover LPH from wells MW-5, MW-6, MW-8 and MW-9. LPH was removed from these wells, temporarily stored on site in above ground containers, and later disposed of.

In February 1989 Atlantic Richfield retained the services of Geraghty & Miller (G&M). In May 1989 the site was demolished and the USTs were removed from the site, including the former waste oil UST. In June 1989, G&M submitted a remedial action plan (RAP) to the Riverside County Department of Environmental Health (RCDEH) and based upon a soil vapor extraction test conducted in June 1989, suggested that a soil vapor extraction (SVE) system, in conjunction with a groundwater treatment and re-injection system, would be an effective means for the remediation of hydrocarbon impacted soil and groundwater beneath the site. In July 1989, MW-3 and MW-4 were abandoned because the wells were badly damaged during site demolition. In December of 1989, G&M supervised the drilling and subsequent installation of seven groundwater monitoring wells (MW-15 through MW-21) and one recovery well (RW-1).

In January 1992, G&M installed and began operations of a groundwater pump and treat system. Groundwater was pumped from MW-1, MW-8, MW-14 and RW-1, passed through activated carbon at a rate of approximately 1.1 gallons per minute (gpm), and re-injected into MW-18 and MW-20. The system operated until October 1993 when it was shut down to allow for the construction activities of the new ARCO am/pm facility (currently known as ARCO Facility No. 05928).

In March 1992, G&M installed a temporary SVE system, which was replaced with a permanent SVE system, a CSM Torvex Model 5A catalytic unit, in July of 1992. The SVE system was connected to MW-2, MW-8, MW-10, MW-14, and MW-15, and operated until October 1993 when, as with the groundwater treatment system, the SVE system was shut down to allow for the construction activities of the new ARCO am/pm facility. During the operation of the SVE (July 1992 to October 1993), approximately 77,515 pounds of total petroleum hydrocarbons as gasoline (TPHg) were extracted and treated from the subsurface soils.

During construction of the new Atlantic Richfield facility, G&M destroyed wells MW-1, MW-2, MW-7, MW-8, MW-10, and MW-15 to allow for the grading and compaction activities, and supervised excavation at the site. The upper 10 feet of soil was excavated and temporarily stockpiled on the neighboring property to the south of the site. The soil was excavated in four stages that took place between October 14 and October 28, 1993. The excavated soil was segregated into three stockpiles based on field Organic Vapor Meter (OVM) readings. Soils with non-detectable OVM readings were placed in the “clean” stockpile, soils with OVM readings less than 100 parts per million by volume (ppmv) were placed in the “low OVM reading” stockpile, and soil with OVM readings exceeding 100 ppmv were placed in the “high OVM reading” stockpile. Soil samples were then collected from each of the three stockpiles following RCDEH guidelines. A portion of the soil that had no detectable concentrations of TPHg and benzene, toluene, ethylbenzene, and xylene isomers (BTEX) was re-compacted into the excavation. Stockpiled soil with detectable concentrations of TPHg and BTEX was removed from the site. Approximately 1,313 tons of soil were removed from the site and transported to state-certified landfills for disposal.

In December 1993, G&M supervised the drilling and subsequent installation of two groundwater monitoring wells (MW-22 and MW-23) and three groundwater recovery wells (RW-2 through RW-4) to replace the wells destroyed during the construction of the new Atlantic Richfield facility. Following the new construction, the groundwater pump, treat and re-injection system was restarted, but the SVE system was not restarted. In June 1994, G&M apparently recommended closure of the subsurface soils from the RCDEH. However, supporting documentation was not located during a file review conducted at the RCDEH.

In October 1994, Atlantic Richfield retained the services of *SECOR*. The groundwater treatment system was turned off because it did not appear to be a cost effective means to remediate the remaining hydrocarbon impacted groundwater beneath the site. Since the initiation of the groundwater treatment system, approximately 835,933 gallons of water have been treated. Based upon the average pumping rate of water through the system (1.1 gpm) and TPHg and BTEX concentrations measured in water samples collected from the system, a total of approximately 40.3 pounds of TPHg and 12.9 pounds of BTEX constituents have been treated.

In April 1996, *SECOR* personnel supervised the drilling and subsequent installation of two air sparge (AS) wells, AS-1 and AS-2. Following the installation of the wells, *SECOR* conducted an AS feasibility study, and determined that AS would be an effective means to remediate hydrocarbon impacted groundwater beneath the subject site.

In March 1998, MW-11 was destroyed because it was deemed no longer necessary for ongoing assessment and monitoring at the site. In addition, several wellhead security vaults were replaced to maintain the integrity of the wells.

On January 19, 1999, a *SECOR* geologist supervised the drilling and subsequent installation of monitoring wells MW-24 and MW-25. The purpose of these wells was to test for the presence of MTBE in

groundwater in the down-gradient direction of the site. MTBE was detected in groundwater samples collected from MW-24 and MW-25 following well installation, at concentrations of 38 ug/L and 170 ug/L, respectively.

A Corrective Action Plan (CAP) was prepared for the site by *SECOR* in July 1999. Because of the history of aggressive remediation and excavation at the site, and the fact that more than 80,000 lbs of hydrocarbons had been previously removed at the site, a passive remediation approach was considered which would employ remediation by natural attenuation. RCDEH required that plume control be instituted, and *SECOR* submitted an addendum to the CAP to RCDEH on November 10, 1999 proposing plume control measures involving groundwater extraction.

During June 2000, a *SECOR* geologist supervised the drilling and installation of wells MW-26 and MW-27. Well MW-26 is a 6-inch diameter groundwater extraction well. Well MW-27 was installed as an observation and monitoring well. On June 20, 2000, *SECOR* personnel performed a step drawdown pumping test using well MW-26 as the pumping well. Wells MW-27, RW-3 and RW-4 were used as observation wells during the aquifer testing. Based upon test results, hydraulic conductivity in well MW-27 was calculated to range between 2.75 ft/day and 9.79 ft/day, and at 2.0 gpm the maximum width of the capture zone in the cross-gradient direction around well MW-27 was estimated to be 72 feet with a stagnation point distance in the down-gradient direction calculated at 36 feet.

On April 23, 2001, *SECOR* supervised the drilling and subsequent installation of on-site monitoring wells MW-28 and MW-29. These wells were installed to provide additional groundwater monitoring data in the canopy area on site.

In compliance with the January 2, 2001 requirements from RWQCB-SD, interim remediation was conducted at the site using bi-weekly vacuum truck pumping events during 2001 and during 1st Quarter 2002. Between January 24, 2001 and February 28, 2002, these pumping events have removed approximately 18,059 gallons of water from MW-26 and MW-16.

A National Pollution Discharge Elimination System (NPDES) permit (No. 9-000-000-941) under CAG919002 was obtained from RWQCB-SD on April 25, 2001 and an interim groundwater pumping and treatment system was installed during May 2001. The system consists of a pneumatically driven groundwater extraction pump installed in well MW-26. Groundwater extracted from MW-26 is treated via three canisters each containing granular activated carbon (GAC). The GAC is specifically engineered by the vendor to remove MTBE. Because of high background manganese concentrations in local groundwater, and the costs associated with treating manganese to meet NPDES requirements, *SECOR* and Atlantic Richfield decided to obtain a discharge permit for local POTW managed by Eastern Municipal Water District (EMWD) during 1st Quarter 2002.

On May 3 2001, a *SECOR* scientist supervised CPT of soils, and direct-push soil and groundwater sampling at a location adjacent to RCWD well #118 (CPT-118) to a total depth of 90 feet bgs. No petroleum hydrocarbon compounds including oxygenates were detected in soil samples to 90 feet bgs. TPHg was detected at a concentration of 50 ug/L in groundwater collected at 37 feet bgs adjacent to well #118 (50 ug/L TPHg was the reporting limit for the 8015B analysis). No additional petroleum hydrocarbon compounds, including oxygenates, were detected in the groundwater samples.

Between October 1 2001 and October 31 2001, *SECOR*'s site investigation team supervised drilling of 21 CPT borings, including direct-push groundwater sampling at each location to total depths between approximately 75 feet bgs and 100 ft bgs. The borings were located in the shopping center west of the site and in a vacant field immediately west of I-15 freeway west of the site. Dissolved MTBE ranged between non-detect (<5.0 ug/L) and 9,400 ug/L (boring CPT-5, 42 ft bgs). The deepest groundwater sample with detectable dissolved MTBE was CPT-5, 95 ft bgs with 13 ug/L MTBE. Dissolved benzene ranged from non-detect (<1.0 ug/L) in the majority of groundwater samples to 19 ug/L (boring CPT-14, 20 ft bgs). Draft results for the CPT work were submitted to RWQCB-SD in November 2001. In addition, deep stratigraphic information was obtained by drilling and continuously logging core in 3 mud rotary soil borings, each to a depth of approximately 400 ft bgs (DB-1 through DB-3). Each deep boring was geophysically logged for variations with depth of spontaneous potential (SP), normal resistivity (NR), natural gamma log (NGL) and temperature.

On November 29 and November 30, 2001, following removal of dispenser islands, and exposure of product lines, and vent lines, a *SECOR* scientist collected 36 soil samples from beneath the former product lines and dispensers under the direction of a RCDEH inspector. On December 3, 2001, two additional soil samples were taken by a *SECOR* scientist. Each sample was placed in a 4-ounce glass jar and closed with a TeflonTM-lined cap to avoid the possible loss of volatile components, labeled and placed in a chilled cooler with ice. A total of 38 soil samples were collected from beneath the locations of the former dispensers and existing product lines under the supervision and direction of the RCDEH. TPHg concentrations were detected in 5 of the 38 soil samples collected from beneath the product lines and dispensers. MTBE concentrations were detected in all but two of the product line and dispenser soil samples. Benzene was detected from one dispenser soil sample.

On May 23, 2002, a *SECOR* scientist supervised the drilling and installation of recovery well RW-5 in the location illustrated on Figure 2. The recovery well was installed to expand the existing groundwater treatment system associated with the site. On May 30, 2002, a drawdown test was conducted on RW-5 during well development activities, to assess the recharge rate of the well. Approximately 365 gallons were bailed from the well in a time of 30 minutes. After well installation activities were completed, well RW-5 was plumbed to the existing groundwater treatment system.

On June 24 and June 25, 2002, *SECOR*'s site investigation team supervised drilling of 5 CPT borings, including depth-discrete direct-push groundwater sampling at each location in different water-bearing units to total a total depth of approximately 100 ft bgs. The borings were located west of the movie theater in the shopping center west of the site, immediately west of the bank building and east of the remediation compound, and in a vacant field immediately west of I-15 freeway west of the site.

After EMWD and RWQCB-SD approval, operation of the on-site interim groundwater pumping and treatment system resumed on June 20, 2002. The remediation system was shut down on June 28, 2002 by order of the EMWD to meet POTW volume limitations per the POTW NPDES Permit and RWQCB-SD regulations. A total of 18,928 gallons were pumped, treated, and discharge during June 2002. In order to stay in compliance with RWQCB-SB requirements, interim remediation resumed on August 23, 2002 using bi-weekly vacuum truck pumping events.

SECOR and others have conducted quarterly groundwater monitoring and sampling of the shallow (<42 ft bgs) groundwater monitoring wells at the site from 1989 through the present. During that time, maximum benzene concentrations have decreased from 20,000 ug/L (MW-5, 8/29/90) to 210 ug/L (MW-29, 07/10/02)

at present. Maximum MTBE concentrations have decreased from 25,000 ug/L (MW-16, 11/20/00) to 4,300 ug/L (MW-16, 07/10/02) at present (*SECOR*, August 6, 2002).

GEOLOGY AND HYDROGEOLOGY

The site is located within the Peninsular Range Geologic Province. This region is underlain by a basement complex of Late Cretaceous undifferentiated granitic rocks of the Southern California Batholith and Jurassic pre-batholithic metavolcanic rocks. Locally, the basement complex in this region is non-conformably overlain by thick successions of Pleistocene nonmarine sedimentary deposits and Jurassic marine sedimentary and metasedimentary rocks (Division of Mines and Geology, 1966). The Pleistocene nonmarine sedimentary rocks consist of undeformed to slightly deformed dissected alluvial fan deposits, and the Jurassic marine sediments consist of interbedded black to dark-gray argillites, slate, quartzite, graywacke, local conglomerates, and dark-colored recrystallized limestone. These units have been offset by the main traces of the Elsinore fault zone, a seismically active fault zone that runs northwest to southeast through the Temecula Valley (Kennedy, 1977).

The hills in the site vicinity are underlain by late Pleistocene Pauba Formation consisting of siltstone and sandstone with lesser amounts of conglomerate. Holocene alluvial deposits underlie the Temecula Valley floor and Murrieta Creek. In the site vicinity, the eastern expression of the Elsinore Fault Zone is known as the Wildomar Fault Zone, which is made up of dip-slip fault segments that offset the portions of the Pauba formation in the hills northeast and east of the site. In addition, two west- to northwest- trending extensions of the Wildomar Fault Zone (buried by Holocene alluvium) have been mapped in the immediate site vicinity and approximately 1,000 feet west of the site, based upon steep gradients in groundwater elevations across the eastern-most of these fault extensions, and results of a Bouguer gravity survey for the western-most extension (Kennedy, 1977).

Based on borehole logs from previous assessment activities, the general lithology at the site consists of distinct fine to coarse sands and gravelly sands complexly interbedded with silty sands, silts, clayey sands, sandy clays and clays from ground surface to approximately 400 feet bgs, the total depth of exploration. Sand and gravelly sand interbeds range in thickness from one or two feet thick up to 20 to 25 feet thick. Clays range in thickness from less than one foot thick up to 10 to 12 feet in thickness.

The site lies within the Murrieta Hydrologic Subarea (HSA 902.32) of the Murrieta Hydrologic Area (HA 902.30) of the Santa Margarita Hydrologic Unit (HU 902.00). According to the California Regional Water Quality Control Board (RWQCB-SD, 1994), groundwater within the Murrieta HA is classified as beneficial for municipal, agricultural, and industrial service and process uses. Locally, groundwater is produced from the Pauba and Temecula Aquifers which are regionally extensive water-bearing units.

Historical groundwater monitoring data indicate that the depth to water beneath the subject site ranges between approximately 6 to 19 feet bgs (995 to 1,015 feet above MSL) and currently groundwater flows towards the west-southwest with a hydraulic gradient of approximately 0.019 ft/ft (*SECOR*, 2002). Prior to development of the shopping center in the mid-1990s, the groundwater gradient indicated flow to the north-northeast (likely due to the occurrence of several large, unlined ponds formerly southwest of the site [see Figure 1] – these ponds were destroyed, and currently one new pond exists west of the site [see Figure 2]).

According to RCWD, there are four municipal water supply wells within one-mile of the site. The closest is Well #118 (state well designation: 08S/03W-02J01S), located approximately 2,300 feet southwest of the site. Data from RCWD indicate that Well #118 is screened between 320 and 400 feet bgs, and from 460 to

1,100 feet bgs with a total depth of 1,105 feet bgs. These screened intervals may correspond with the Pauba Aquifer (upper interval) and Temecula Aquifer (lower interval). The water production rate for Well #118 historically had been approximately 2,200 gallons per minute (gpm) prior to well shutdown on September 10, 2000. Currently, RCWD produces water from Well #118 by pumping 4-hours per day on an every-other-day basis.

According to RWQCB-SD, as noted in their January 2, 2001 letter, MTBE was first detected in a groundwater sample from Well #118 on February 29, 2000 at a concentration of 3.7 ug/L. MTBE was not detected in subsequent samples collected from Well #118 during March and April of 2000. MTBE was detected in groundwater from Well #118 at 7.8 ug/L on September 20, 2000 following shutdown and removal from production of the well. MTBE results for groundwater samples from Well #118 obtained between September 2000 and January 2001 have been as high as 24 ug/L. MTBE has not been detected in Well #118 after June 2001.

PROPOSED SCOPE OF WORK

Well #118 Pump Test. Pump testing will be performed by controlling operations of RCWD Well #118 while measuring the groundwater level responses in monitoring wells near the site. The scope of work proposed by *SECOR* consists of the following:

- **Rest Phase:** A period prior to initiating the pump test in which all supply well production is curtailed, water levels are allowed to stabilize to a reasonable degree and background trends will be established. Water levels will be monitored in all designated observation wells during this period. For the purposes of planning this test, the rest period should be approximately four and one-half days. The anticipated time period for the resting phase is from the end of business day on October 17th through 6 a.m. October 22, 2002. Groundwater elevations will be gauged in all site wells at the beginning of the rest phase.
- **Pumping Phase:** The period in which Well #118 is operated at a constant rate (approximately 2,200 gpm), while water levels are measured for drawdown response. The pumping period will last 72 hours, unless RCWD operational constraints indicate that early shutdown is necessary, or analyses of effluent detect MTBE or other contaminants (see sampling protocol discussion below) indicating early shutdown is necessary. The anticipated time period for the pumping phase is from 6 a.m. October 22nd through 6 a.m. October 25th. Groundwater elevations will be gauged in all site wells at the end of the pumping phase.
- **Recovery Phase:** A period following the pumping period in which water levels are allowed to recover close to near pre-pumping conditions. The recovery period will occur over a period of approximately three days. The anticipated time period for the recovery phase is from 6 a.m. October 25th through early morning on Monday, October 28, 2002. Groundwater elevations will be gauged again in all site wells at the end of the recovery phase.

During the pump test, water levels will be monitored electronically in existing monitoring wells RW-5, MW-16, MW-17 and MW-18, and in multi-level groundwater monitoring wells DMW-3a and DMW-3b (installed on September 30th through October 2nd 2002). The selected wells and screened intervals are listed in the table below. A barometric pressure sensor will also be suspended above the static water level in existing monitoring well MW-14 to compensate for barometric pressure effects on water levels. Proposed well locations are shown in Figure 2. Boring logs for RW-5, MW-14, and MW-16 through

MW-18 are included in Appendix B. Boring logs are not yet available for the DMW series of wells, although proposed well construction, and stratigraphy is discussed in *SECOR's* Workplan for Continued Site Investigation (*SECOR*, March 15, 2002), and Site Conceptual Model Report (*SECOR*, April 30, 2002).

The rationale for choosing these particular wells is that they will provide adequate vertical and lateral coverage of the shallow groundwater zone beneath the ARCO site. Well cluster DMW-3 will be the closest to Well #118 (approximately 1,000 feet horizontal distance) with two separate depth intervals monitored (45 ft to 50 ft bgs; and 105 ft to 110 ft bgs). Wells RW-5 and MW-16 through MW-18 were chosen to provide areal coverage at further distances from Well #118 (approximately 1,500 ft to 2,000 ft laterally), and also because RW-5 and MW-16 lies in the zone of highest dissolved MTBE concentrations in groundwater which lies west of the site. The shallow monitoring wells near the site (RW-5 and MW-16 through MW-18) will provide coverage of the depth interval from 20 ft to 50 ft.

The following table shows proposed well construction details for the proposed observation wells:

Well Identifier	Well Designation	Top of Screen Depth, ft bgs	Screen Interval Thickness, ft
MW-14	Barometric Monitor	5	25
MW-16	Observation	5	35
MW-17	Observation	5	35
MW-18	Observation	5	35
RW-5	Observation	30	15
DMW-3a	Observation	45	5
DMW-3b	Observation	105	5

Operation of the Well #118 will be coordinated with RCWD. RCWD automated computer system (SCADA system) will likely be used to control supply well operations during the aquifer testing, and should facilitate coordination of pumping operations with data acquisition activities.

SECOR will install and activate pressure sensitive transducers in the observation and barometric monitoring wells on October 18th. They will be programmed for background monitoring for the resting phase with a transition to log-cycle monitoring beginning on October 22nd in conjunction with startup of pumping. Background monitoring will again be used during the resting phase. *SECOR* will remove the transducers on Monday morning, October 28th. *SECOR* plans to employ In-Situ, Inc. miniTroll® (30 PSI) transducers which serve as programmable data-logger and transducer powered by battery for monitoring water levels and barometric pressure.

Sampling Protocol for Well #118. The RWQCB-SD and representatives for parties involved in the Well #118 pump test (Atlantic Richfield, ExxonMobil, ConocoPhillips, Chevron and Narain Oil) met on September 4, 2002 at Geoscience Support Services Incorporated (consultant to RCWD) offices in Upland, CA to discuss the pump test. A previous meeting was conducted at RWQCB-SD offices in San Diego, CA on August 15, 2002. The protocol for monitoring groundwater quality during the pump test was discussed and *SECOR* understands the following protocol for monitoring groundwater quality during the pump test is approved by RWQCB-SD and RCWD will be in effect during the pump test:

- The first water quality sample will be obtained 4 hours following startup of the pumping at Well #118, based upon the observation that RCWD has not detected MTBE since June 2002, and during their 4-hour production at the well on their current “every-other-day” production schedule which began in September 2002;
- An onsite mobile laboratory will be available on October 22nd and will analyze groundwater samples for MTBE and other oxygenates as well as BTEX using EPA Method 8260B;
- Groundwater will be sampled and analyzed hourly until approximately 5:00 p.m. on October 22nd; then groundwater will be sampled at approximately 12-hour intervals for the duration of the pump test, and each sample will be transported by laboratory courier to a nearby fixed laboratory facility with one-hour turn-around of results for MTBE and other oxygenates along with BTEX using EPA Method 8260B;
- RCWD will provide sampling personnel and laboratory couriers will pick up the samples;
- Well #118 pumping will be shut down immediately upon discovery that either: 1) dissolved MTBE has exceeded 5.0 ug/L; or 2) MTBE or other analyte is detected at its maximum concentration limit (<5.0 ug/L for MTBE; <1.0 ug/L for benzene) but above the applicable method detection limit (approximately 0.5 ug/L) in two sequential samples. In the latter scenario, upon discovery of detection of MTBE or benzene or other hydrocarbon compound in the first analyzed sample, a second sample will be immediately obtained from Well #118 and sent to the laboratory. Well #118 will immediately be shut down immediately upon discovery that MTBE or other contaminant analyte is detected in the second sample.

Data Analysis. All downloaded water-level data will be compiled in a spreadsheet where the effects of changes in barometric pressure and regional groundwater elevation changes can be isolated and integrated. Water-level data from the monitoring wells will be used to evaluate hydraulic communication between the water table aquifer beneath the site and the production interval of the uppermost Pauba Aquifer. Because of the large horizontal distance (approximately 1,000 feet up to 2,000 feet) and vertical distance (approximately 200 feet) between screened intervals of the monitoring wells and Well #118 screen in the Pauba Aquifer, it is likely that observation of slight deflections from baseline water levels will be obtained at the ARCO site as a response to pumping. Because of this, unless quantitative analysis is justified by larger magnitude trends, the data will be presented empirically as simple hydrograph charts indicating the relationship between water levels and elapsed time for each monitored well, each plotted on the same scale to facilitate comparison. Hydrogeologic parameter may be estimated if the data warrant. Variations in magnitude of groundwater elevation changes in monitoring wells will be graphically compared with vertical and horizontal distances from the production zone in Well #118.

Reporting and Schedule. Upon completion of the Well #118 pump test, preliminary pumping test data will be submitted to RWQCB-SD. The preliminary data will be sent in paper copy and electronic format, and will include at a minimum, maps showing groundwater elevation contours for each gauging survey conducted during the test, Excel spreadsheet tables of depth to water, groundwater elevations and elapsed time with respect to pump test events (e.g. Rest period, startup, recovery period).

A technical report will be prepared and submitted to the RWQCB-SD. The report will document SECOR’s methodologies used for data collection and analysis. The report will include data tables and hydrographs for each observation well, discharge vs. time plots for each supply well used in the test, and

the a chart showing drawdown in monitoring wells versus distance to Well #118. The report will discuss any conclusions or interpretations regarding hydraulic connectivity between the Temecula and/or Pauba production zone(s) and the shallow groundwater in the site vicinity. If hydrogeologic parameters may be estimated based on the data, the methodology will be presented in the report along with calculated parameters.

SECOR understands that RWQCB-SD has set a deadline of December 2, 2002 to receive the preliminary data package. *SECOR* further understands that RWQCB-SD has set January 17, 2003 as the deadline to receive the technical report.

We appreciate your timely review of this workplan. Should you have any questions, please do not hesitate to contact the undersigned at (626) 744-9133.

Sincerely,

SECOR International, Incorporated

G. Cleve Solomon, PhD, RG
Principal Geologist

Attachments: References
 Figure 1 – Site Location Map
 Figure 2 – Site Map
 Appendix A – Agency Correspondence
 Appendix B – Boring Logs

cc: Mr. Gordon Terhune (Atlantic Richfield Company)
 Mr. Todd Normane (BP Legal Department)
 Mr. Kelly Winters (RCDEH)

REFERENCES

- California Division of Mines and Geology (CDMG), 1966, Santa Ana Sheet, Sixth printing, 1992.
- California Regional Water Quality Control Board (CRWQCB), San Diego, 1994, Water Quality Control Plan, San Diego Basin (9).
- Kennedy, M.P., 1977, Recency and Character of Faulting Along the Elsinore Fault Zone in Southern Riverside County, California, California Division of Mines and Geology, Special Report 131, 12 p.
- SECOR* International, Inc., 2002, Workplan for Continued Site Investigation, ARCO No. 3012, 27641 Ynez Road, Temecula, California, March 15, 2002.
- SECOR* International, Inc., 2002, Site Conceptual Model Report, ARCO No. 3012, 27641 Ynez Road, Temecula, California, April 30, 2002.
- SECOR* International, Inc., 2002, 3rd Quarter 2002 Groundwater Monitoring Report, ARCO No. 3012, 27641 Ynez Road, Temecula, California, August 6, 2002.

FIGURES



Reference: U.S.G.S., Topographic 7.5' Series Quadrangles; Bachelor Mountain 1953 (Photorevised 1973, Photoinspected 1978), Murrieta 1953 (Photorevised 1979), Pechanga 1968 (Photorevised 1988), Temecula 1968 (Photorevised 1975).

0 1000 2000

APPROXIMATE SCALE IN FEET

SECOR

International Incorporated

2655 CAMINO DEL RIO N., SUITE 302
SAN DIEGO, CA. 92108

NOTES:

FIGURE 1

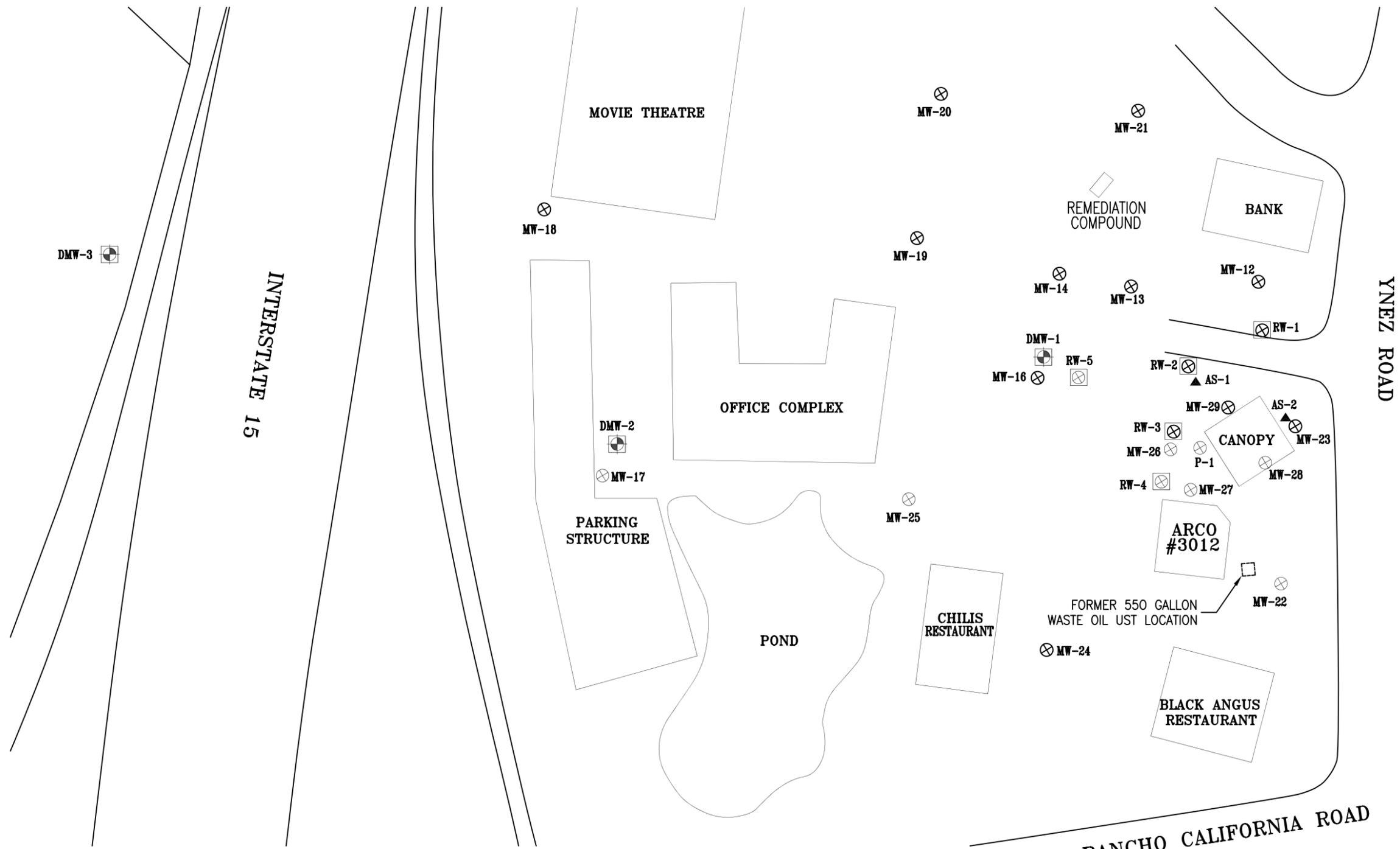
SITE LOCATION MAP

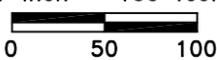
ARCO FACILITY NO. 3012

27641 YNEZ ROAD
TEMECULA, CALIFORNIA

K:\ALLPROJECTS2002DWGS\ARCO 2002\3012-2K2\3012SL0C2.DWG

PROJECT: 14BP.60229.00 DATE: 2/22/02




 NORTH
SCALE
 1 inch ~ 100 feet

 0 50 100

NOTES:

SOURCE OF INFORMATION:
 CONTINENTAL AERIAL PHOTO, INC.
 NEGATIVE NO: C120-7-87
 FLIGHT DATE: 07-9-98

INTERPRETED FEATURES:
 FROM STATION CONFIGURATION
 DRAWINGS OR SEEN ON ACTUAL
 AERIAL PHOTO.

SECOR
 International Incorporated
 2655 CAMINO DEL RIO N., SUITE 302
 SAN DIEGO, CA. 92108

FIGURE NO. 2

SITE PLAN

 ARCO FACILITY #3012
 27641 YNEZ ROAD
 TEMECULA, CALIFORNIA

PROJECT: 08BP.60210.01 FILE: 3012AERIALSPR DATE: 8/21/02

LEGEND:

- MW-12 ⊗ MONITORING WELL LOCATION AND DESIGNATION
- RW-1 ⊗ RECOVERY WELL LOCATION AND DESIGNATION
- AS-1 ▲ AIR SPARGE WELL LOCATION AND IDENTIFICATION
- DMW-3 ⊗ PROPOSED DEEP MONITORING WELL CLUSTER LOCATION AND DESIGNATION

APPENDIX A
AGENCY CORRESPONDENCE

California Regional Water Quality Control Board

San Diego Region



Gray Davis
Governor



Winston H. Hickox
Secretary for
Environmental
Protection

Internet Address: <http://www.swrcb.ca.gov/rwqcb9>
9174 Sky Park Court, Suite 100, San Diego, California 92123-4340
Phone (858) 467-2952 ♦ FAX (858) 571-6972

September 24, 2002

Mr. Gordon P. Terhune
Environmental Manager
Atlantic Richfield Co.
4 Centerpoint Drive, LPR4-171
La Palma, California 90623-1066
Certified Mail Return Receipt Requested
7099 3400 0015 9996 2342
File Number: 50-1031.05

Mr. Eric Roehl
Chevron Products Company
145 S. State College Boulevard, Suite 400
Brea, California 92822
Certified Mail Return Receipt Requested
7099 3400 0015 9996 2380
File Number: 50-0106.05

Mr. Daniel S. Fischman, R.G., C.H.G.
Environmental Compliance Supervisor
ConocoPhillips
3525 Hyland Avenue
Costa Mesa, California 92626
Certified Mail Return Receipt Requested
7099 3400 0015 9996 2373
File Number: 50-1433.05

Mr. John Medrano
ExxonMobil
3700 W. 190th Street, TPT-2
Torrance, California 90509-2929
Certified Mail Return Receipt Requested
7099 3400 0015 9996 2366
File Number: 50-4037.05

Mr. and Mrs. Kanwar Narain
Narain Oil, Inc.
Post Office Box 1918
Rancho Santa Fe, California 92067-1918
Certified Mail Return Receipt Requested
7099 3400 0015 9996 2359
File Number: 50-2937.05

RE: INVESTIGATION ORDER NO. R9-2002-318

Enclosed is a copy of Investigation Order Number R9-2002-318 (Order). The Order directs you to submit a workplan, a data report, and a technical report of an aquifer pumping test to the California Regional Water Quality Control Board, San Diego Region (Regional Board). The Order is issued pursuant to California Water Code (Water Code) section 13267. Note the requirements and deadlines contained in the Order. Failure to comply with the Order may subject you to further enforcement action by the Regional Board, including administrative or judicial proceedings for the assessment of civil liability in amounts of up to \$1,000 per day per violation; referral to the State Attorney General for injunctive relief; and referral to the District Attorney for criminal prosecution.

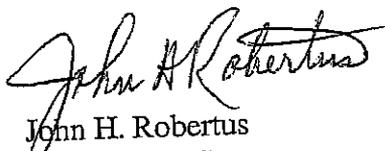
California Environmental Protection Agency

September 24, 2002

If you wish to dispute the factual basis of, or the legal conclusions set forth in the Order you must submit all evidence and argument supporting rescission or modification of the Order to the Regional Board within 14 days of the date of the Order. Within 14 days the Regional Board will respond to your submission in writing, or advise you when a written response upholding, modifying, or rescinding the Order will be issued. You would have 30 days from the date of such response to file a petition for administrative review under Water Code section 13320 with the State Water Resources Control Board.

Should you have any questions regarding this letter or Investigation Order No. R9-2002-318, please contact Mr. Barry S. Pulver, R.G., C.E.G., C.H.G., of my staff at (858) 467-2733.

Respectfully,



John H. Robertus
Executive Officer

California Regional Water Quality Control Board, San Diego Region

cc: Mr. Craig Elitharp, P.E., Water Operations Manager, Rancho California Water District,
P.O. Box 9017, Temecula, California 92590

Dr. Dennis E. Williams, Ph.D., President, Geoscience, P.O. Box 220, Claremont,
California 91711

Dr. Johnson Yeh, Ph.D., Director Level Geohydrologist, Geoscience, P.O. Box 220,
Claremont, California 91711

Mr. Thomas E. Harder, R.G., C.H.G., Senior Geohydrologist, Geoscience, P.O. Box 220,
Claremont, California 91711

Mr. G. Cleve Solomon, Principal Geologist, SECOR International Incorporated,
595 East Colorado Boulevard, Suite 411, Pasadena, California 91101

Mr. James Haslett, R.G., Senior Project Manager, Holguin, Fahan & Associates, Inc.,
1215 South Park Lane, Suite 1, Tempe, Arizona 85281

Mr. Gary McCue, R.G., C.H.G., Principal Hydrogeologist, TRC, 9471 Ridgehaven Court,
Suite E, San Diego, California 92123-4357

Mr. Jerome Jaminet, Jr., Project Scientist, TRC, 9471 Ridgehaven Court, Suite E,
San Diego, California 92123-4357

Ms. Liz Simmons, R.G., Senior Project Manager, Kleinfelder, 43218 Business Park Drive,
Suite 201, Temecula, California 92590

Mr. Phillip S. Rosenberg, R.G., C.E.G., C.H.G., Senior Geologist, Geocon Consultants, Inc.,
6970 Flanders Drive, San Diego, California 92121-2974

Ms. Sandy Bunchek, Supervising Hazardous Materials Management Specialist, Department of
Environmental Health, County of Riverside, P.O. Box 7600, Riverside, California 92513-7600

Mr. Kelly Winters, Hazardous Materials Management Specialist, Department of Environmental
Health, County of Riverside, P.O. Box 7600, Riverside, California 92513-7600

Mr. Steve Charett, Assistant Engineer, Department of Public Works, City of Temecula,
43200 Business Park Drive, Temecula, California 92589-9033

bcc: Jody Ebsen
Kelly Dorsey
Barry Pulver

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION**

INVESTIGATION ORDER NO. R9-2002-318

**ATLANTIC RICHFIELD CO. - ARCO STATION 3012
27641 YNEZ ROAD, TEMECULA, CALIFORNIA**

**CHEVRON PRODUCTS COMPANY - CHEVRON SERVICE STATION 9-1870
28900 RANCHO CALIFORNIA ROAD, TEMECULA, CALIFORNIA**

**TOSCO - 76 STATION 6519
28903 RANCHO CALIFORNIA ROAD, TEMECULA, CALIFORNIA**

**EXXONMOBIL - MOBIL STATION 18-AOJ
29500 RANCHO CALIFORNIA ROAD, TEMECULA, CALIFORNIA**

**NARAIN OIL INC. - FORMER DELTA GAS
2811 FRONT STREET, TEMECULA, CALIFORNIA**

**The California Regional Water Quality Control Board, San Diego Region (herein after
Regional Board) Finds:**

1. Atlantic Richfield Co. is the owner/operator of the gasoline service station located at 27641 Ynez Road, Temecula, California. Chevron Products Company is the owner/operator of the gasoline service station located at 28900 Rancho California Road, Temecula, California. Tosco is the owner/operator of the gasoline service station located at 28903 Rancho California Road, California. ExxonMobil is the owner/operator of the gasoline service station located at 29500 Rancho California Road, Temecula, California. Mr. Kanwar Narain and Mrs. Ragini Narain, Narain Oil, Inc., and Ajkeraka Oil, Inc., (Narain) are the former owners/operators of the gasoline service station located at 2811 Front Street, Temecula, California. These service stations are collectively referred to as the sites.
2. The sites are located in the Murrieta hydrologic subarea. This subarea has designated beneficial uses for both surface water and groundwater, including municipal and domestic supply. The sites lie above an aquifer that is used as a drinking water source. A Rancho California Waster District (RCWD) public supply well (Well 118) was shut down by the California Department of Health Services (DHS) in September 2000 due to methyl tertiary butyl ether (MTBE) contamination. All of the sites are relatively close to Well 118, being within a radius of 1,000 to 3,500 feet of the well.
3. Cleanup and Abatement Orders (CAO) No. R9-2002-0024 (Atlantic Richfield Co.), No. 86-23 (Chevron Products Company), No. R9-2002-0275 (Tosco), No. 2001-371 (ExxonMobil), and No. 2001-226 (Narain), established that discharges of petroleum hydrocarbon wastes occurred at the sites. These discharges impacted the beneficial uses of groundwater in the underlying aquifer. The findings of CAOs No. R9-2002-0024, No. 86-23, No. R9-2002-0275,

Investigation Order No. R9-2002-318

No. 2001-371, and No. 2001-226, are incorporated herein by reference. Atlantic Richfield Co., Chevron Products Company, Tosco, ExxonMobil, and Narain are collectively referred to as the dischargers.

4. Information is needed on the capture zone of Well 118 to determine the pollution risks posed to the well from petroleum hydrocarbon plumes at the sites. The RCWD has agreed to pump Well 118 for up to 72 hours to allow the dischargers to conduct an aquifer pumping test. Results of the test will help determine hydrogeologic conditions in the aquifer and whether or not groundwater flow beneath the sites is affected by pumping Well 118.
5. Three reports from each discharger are needed by the Regional Board to assess the pollution risk to Well 118 posed by the petroleum hydrocarbon plumes at the sites. These reports include a workplan for conducting the pumping test, a data report containing the pump test data, and a technical report interpreting the pump test data and assessing the risk to Well 118.
6. Pursuant to California Water Code (Water Code) section 13267, the Regional Board may require technical reports from any person who is suspected of having discharged, or discharging wastes that could affect the quality of waters within its region. Section 13267 also states that the burden, including costs of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports, and that the Regional Board shall provide written explanation with regard to the need for the reports and shall identify the evidence that supports requiring that person to provide the reports. This order complies with these requirements as described below:
 - a) Findings 1, 2, and 3 show that a discharge of waste has occurred at the site that has affected groundwater quality.
 - b) Findings 4 and 5 show that the burden, including costs of providing investigative reports bears a reasonable relationship to the need for the reports and the benefits to be obtained from the reports.
7. This action is an order to enforce the laws and regulations administered by the Regional Board. As such, this action is categorically exempt from the provisions of the California Environmental Quality Act pursuant to section 15308 of the California Public Resources Code.
8. Participation in the aquifer pumping test and the sharing of costs to test the water discharged from Well 118 during the aquifer pumping test by the dischargers shall not be an admission of responsibility for the MTBE pollution of Well 118.

IT IS HEREBY ORDERED, pursuant to Water Code section 13267, that Atlantic Richfield Co., Chevron Products Company, Tosco, ExxonMobil, and Narain shall each furnish the following reports required by the Regional Board in its investigation of the quality of waters of the State within the area of the discharge described in the above findings:

1. Submit an adequate workplan (one paper copy and one electronic copy) to conduct an aquifer pumping test. The electronic version should be submitted on a CD either in a "pdf" format or a format compatible with Microsoft Word and/or Excel software. The Regional Board must

receive the workplan by **October 7, 2002**. At a minimum, the workplan shall include the following:

- A map showing the locations of the site, site features and groundwater monitoring wells;
 - A list of the wells to be used to monitor groundwater elevations during the duration of the pumping test;
 - The rationale for selecting the wells;
 - Boring logs and well construction diagrams for the selected wells;
 - Procedures to be used to monitor groundwater elevation changes during the duration of the pumping test;
 - Methods to be used to evaluate the data obtained during the pumping test; and
 - Other information as deemed appropriate.
2. Submit a pumping test data report (one paper copy and one electronic copy). The Regional Board must receive the data report by **December 2, 2002**. At a minimum, the data report shall include:
- Tables of depth to water, groundwater elevations, and time since pumping started (or ended) for each of the wells monitored. The electronic version of the tables should be submitted on a CD in a format compatible with Microsoft Excel software; and
 - Other data collected as part of the pumping test, or deemed appropriate by the discharger to include.
3. Submit an adequate technical report (one paper copy and one electronic copy) of the aquifer pumping test. The electronic version should be submitted on a CD either in a "pdf" format or a format compatible with Microsoft Word and/or Excel software. The Regional Board must receive the technical report by **January 17, 2003**. At a minimum, the report shall include the following:
- A description of the methods used to collect and evaluate groundwater elevation data;
 - Maps showing contoured groundwater elevations relative to mean sea level (groundwater elevations) measured in all the monitoring wells associated with the site prior to pumping, at the conclusion of pumping, and after recovery. A different map should be drawn for each water-bearing zone monitored;
 - Estimates of transmissivity and hydraulic conductivity at the site;
 - An interpretation of the data regarding whether or not the site overlies the capture zone of Well 118;
 - Interpretations regarding the effect of pumping Well 118 on water levels and contaminate transport at the site, and an assessment of the pollution risk posed to Well 118 from the petroleum hydrocarbon plume at the site; and
 - Appropriate supporting documentation.
4. The workplan and reports must meet all the requirements of Investigation Order No. R9-2002-318, and be signed and stamped by a California registered geologist or civil engineer experienced in conducting similar investigations in the State of California. All work must be done under the direct supervision of the registered professional who signs the

documents required in Directives 1, 2, and 3. By signing and stamping these documents the registered professional takes full responsibility as the responsible professional in charge of work as specified in Business and Professions Code sections 6703 and 7805, and for the content of the documents.

5. The workplan and reports shall contain cover letter by the discharger stating that under penalty of perjury, and to the best of the signer's knowledge the document is true complete, and correct.
6. Pursuant to Water Code section 13267, the Regional Board may inspect the site to ascertain whether the purposes of this order are being met. The inspection shall be made with the consent of the owner or possessor of the facilities or, if the consent is withheld, with a warrant duly issued pursuant to the procedure set forth in Title 13 (commencing with section 1822.50) of Part 3 of the Code of Civil Procedure.

Ordered by:

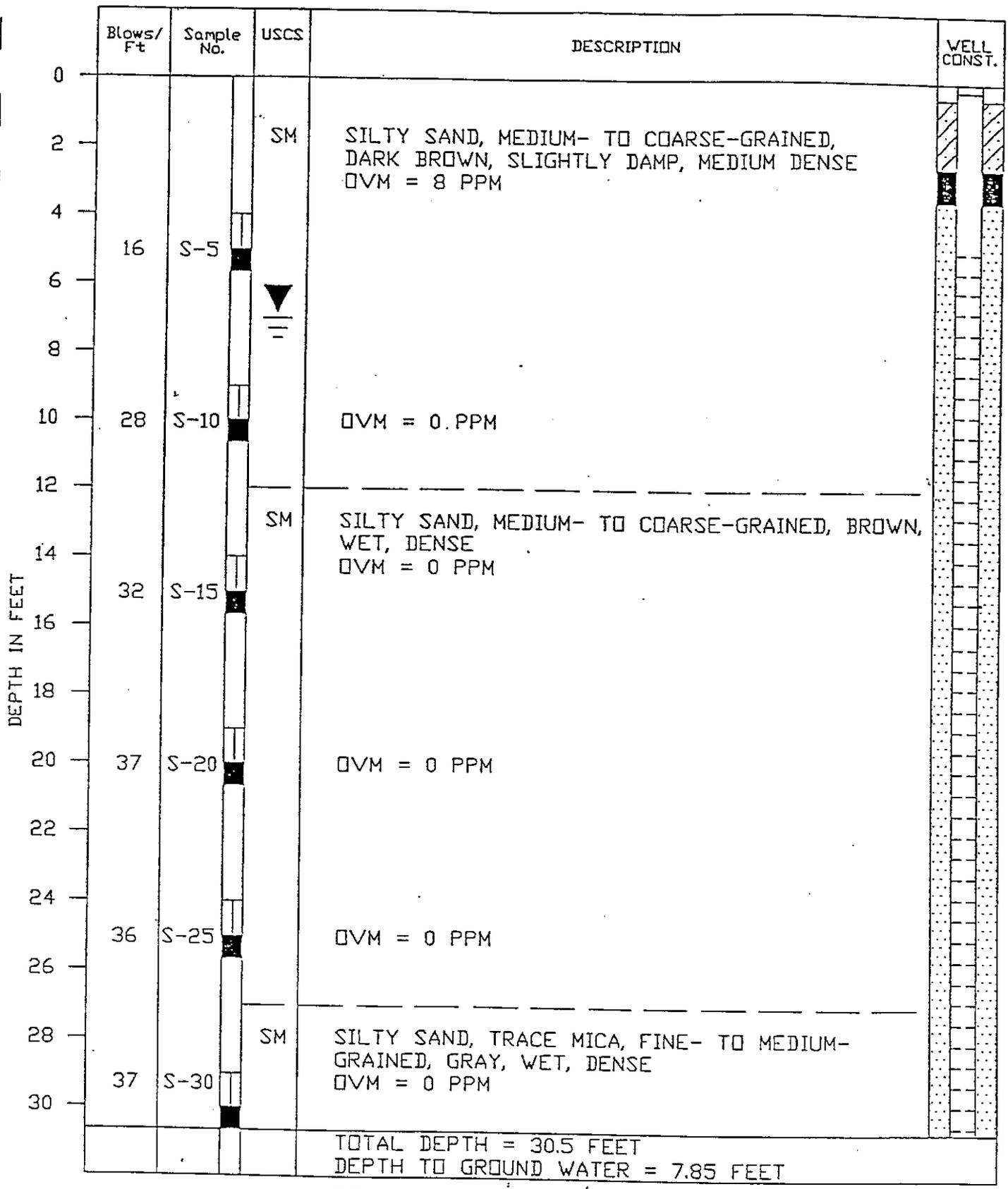


John H. Robertus
Executive Officer

Date Issued: September 24, 2002

APPENDIX B

BORING LOGS



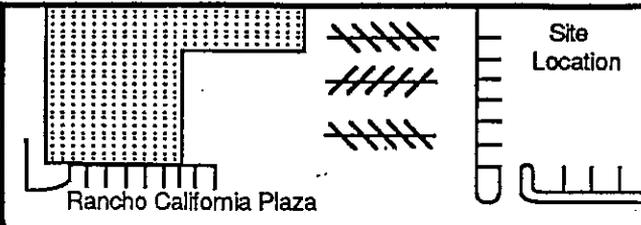
BORING TERMINATED AT A DEPTH SUFFICIENT TO
INSTALL A GROUND-WATER MONITORING WELL



PROJECT NO. 28049-6

LOG OF BORING B24/MW14
ARCO STATION NO. 3012
27641 YNEZ ROAD
TEMECULA, CALIFORNIA

PLATE
P-28

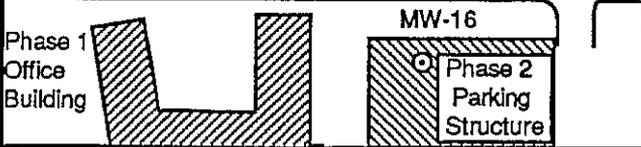


LOG OF BORING MW-16

ARCO Service Station 3012

27641 Ynez Road

Temecula, California



Project No.: CA01506
 Logged By: B. Botsford
 Drilling Co.: W. Hazmat
 Driller: B. Nix

Date Drilled: October 31, 1989
 Drilling Method: 10.25" Hollow Stem Auger
 Sampling Method: CA Split Spoon
 Inclination: Vertical

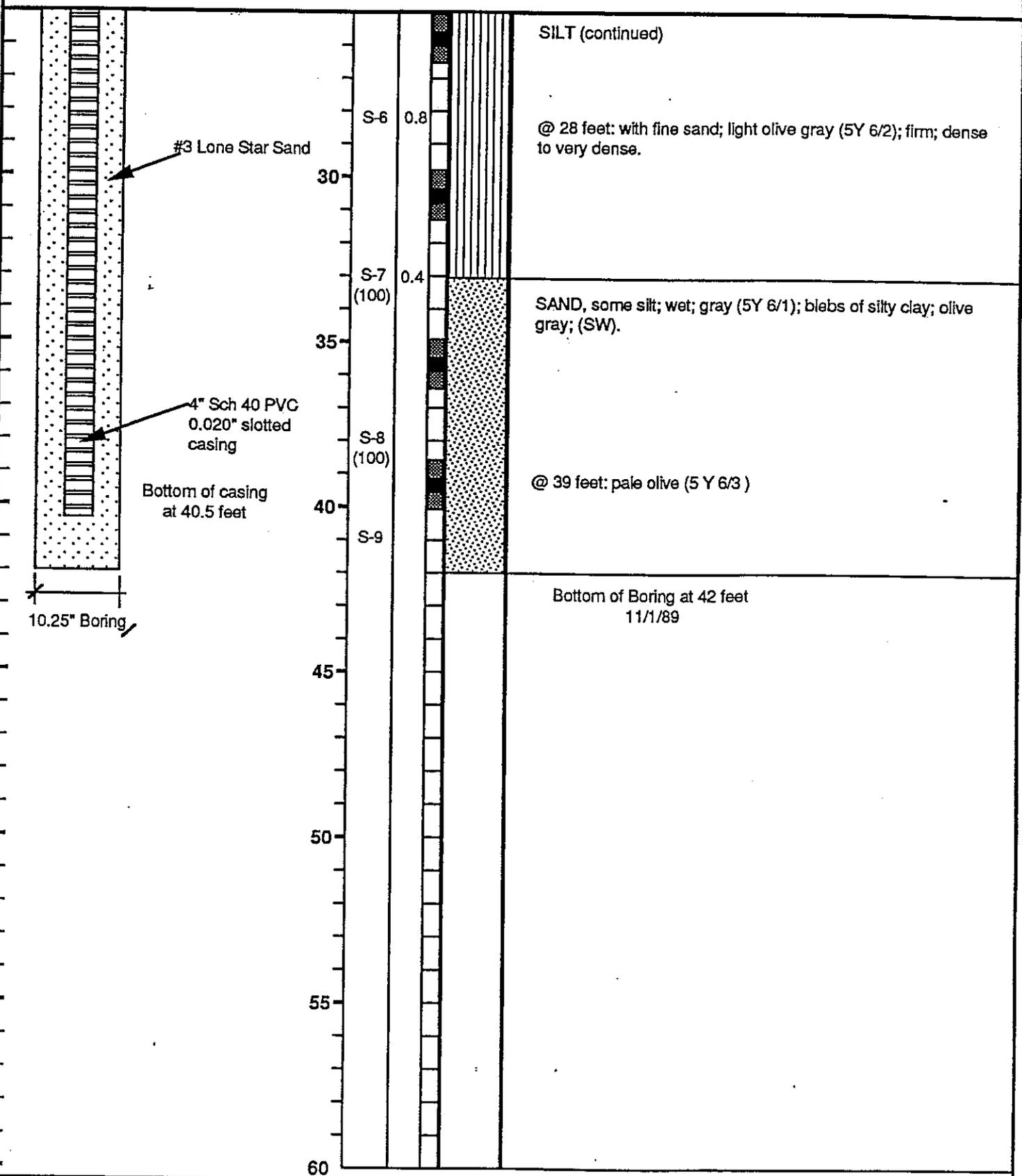
WELL CONSTRUCTION	Depth (ft.)	Sample No. (% Rec.)	HNU (ppm)	Samples	Graphic	DESCRIPTION
Monument Well cover Locking water-tight cap Concrete Volclay Grout Bentonite 4" Sch 40 PVC Blank casing	0					Surface Elevation: 1020.18 Casing Elevation: 1021.81
	0 - 5	S-1 Grab				SILT, some sand; trace gravel; damp; yellow (2.5 y 7/8); soft; (ML). @ 3 feet: black (2.5 y N2); trace clay. @ 7 feet: black (5 Y 2.5/2).
	5 - 15	S-2 (100)	0.4			
#3 Lone Star Sand	15 - 17					SAND, wet; light gray (5 Y 3/2); clean; (SW).
	15 - 20	S-4 (100)	0.6			
	20 - 25	S-5 (70)	0.6			SILT, with sand; wet; light olive brown (2.5 Y 5/6); loose to soft; (ML). @ 25 feet: lenses of clean sand.
4" Sch 40 PVC 0.020" slotted casing Depth to Water 14.76' 11/15/89	25					

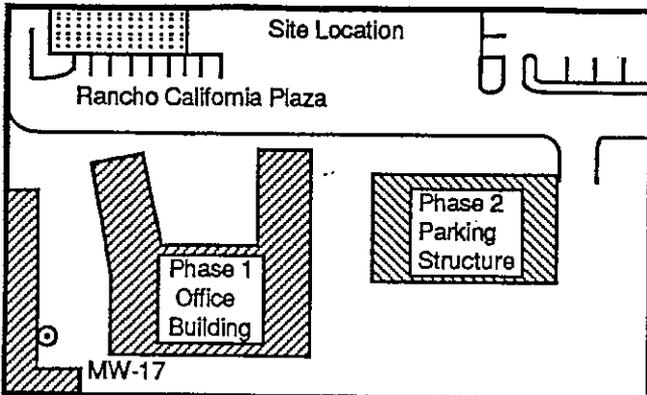
**LOG OF BORING MW-16
(continued)**

WELL CONSTRUCTION

Depth (ft.)
Sample No.
(% Rec.)
HNU (ppm)
Samples
Graphic

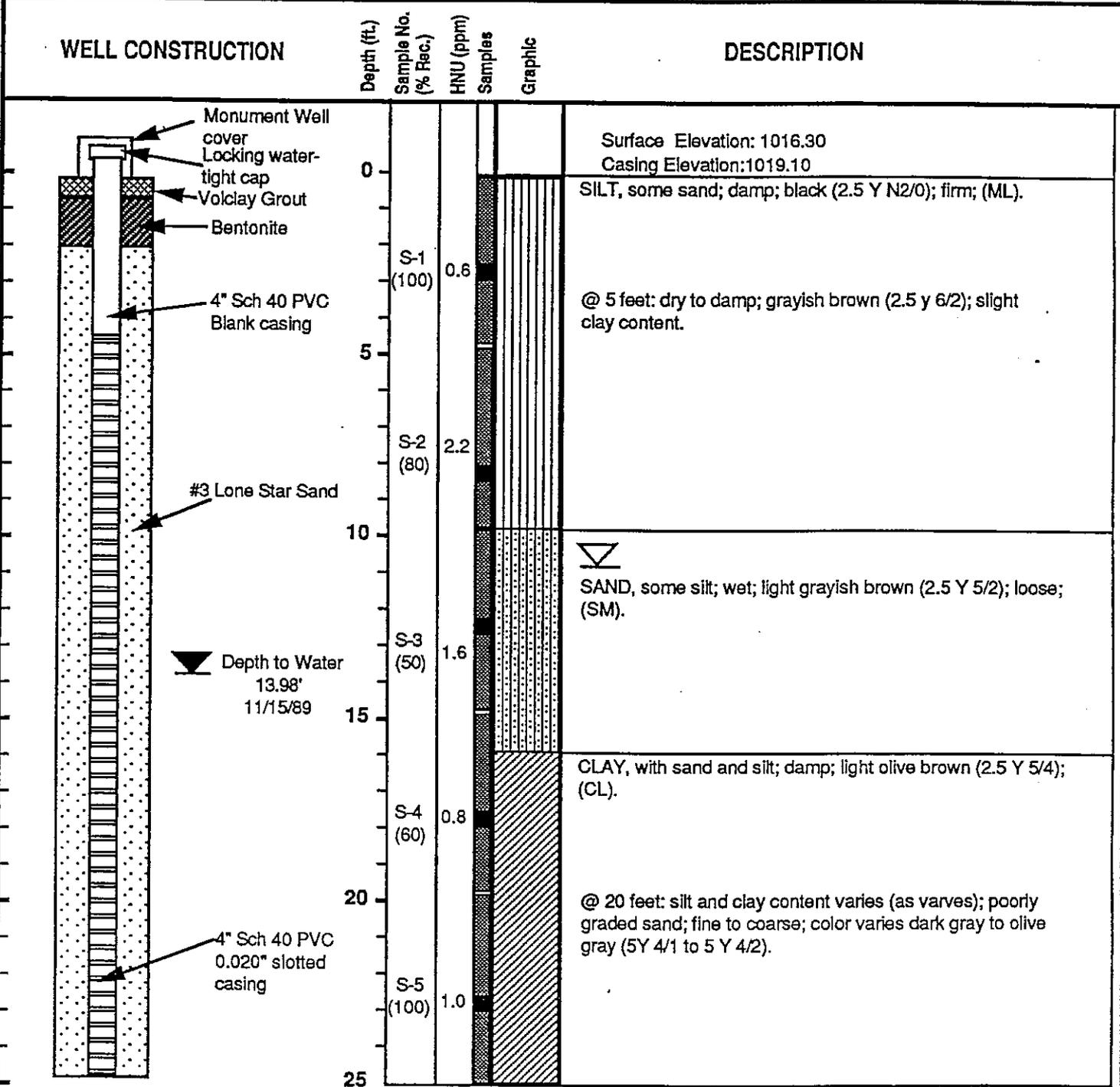
DESCRIPTION





LOG OF BORING MW-17 ARCO Service Station 3012 27641 Ynez Road Temecula, California

Project No.: CA01506 Date Drilled: November 2, 1989
 Logged By: B. Botsford Drilling Method: 10.25" Hollow Stem Auger.
 Drilling Co.: W. Hazmat Sampling Method: 3" Continuous Core
 Driller: B. Nix Inclination: Vertical

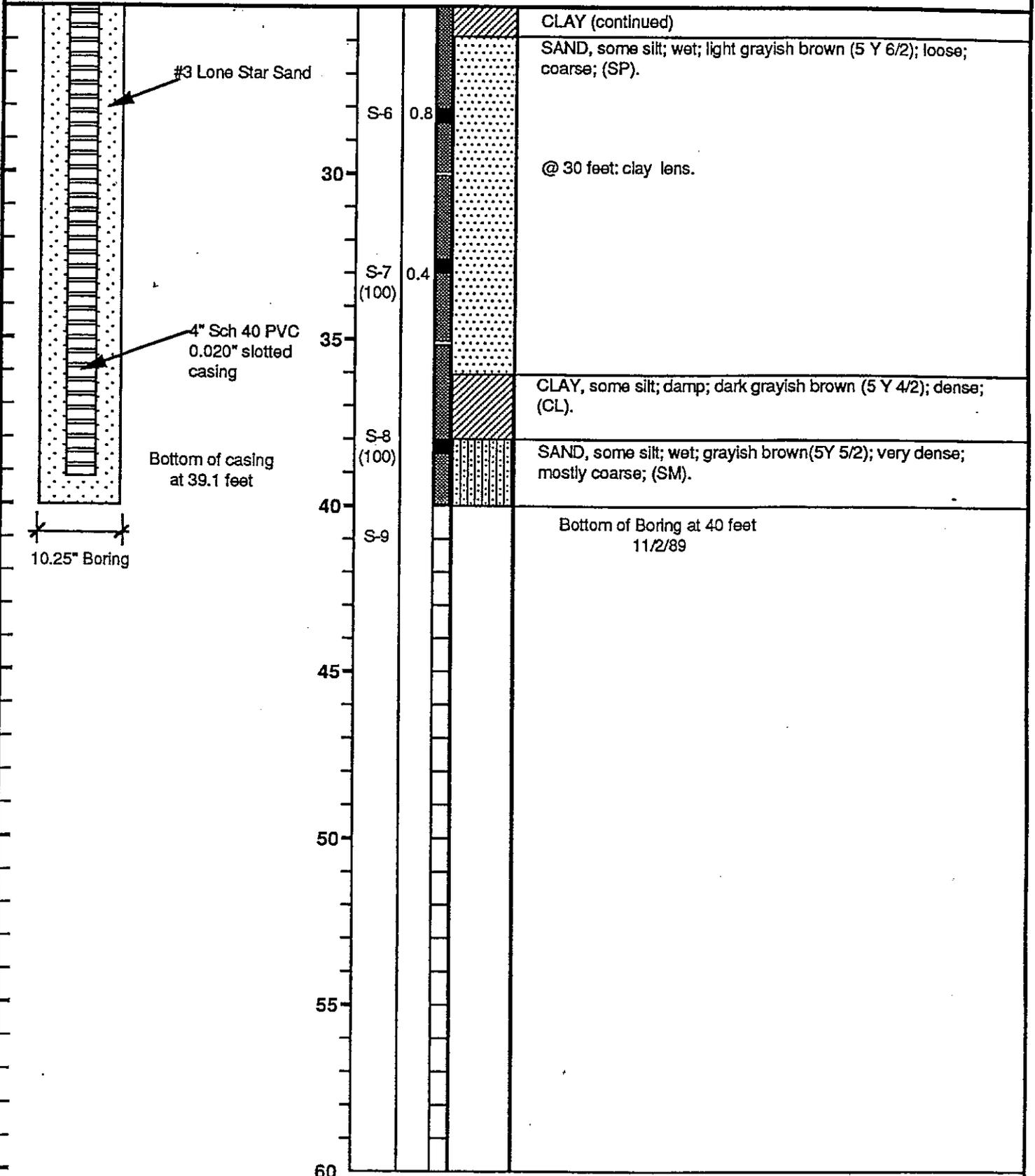


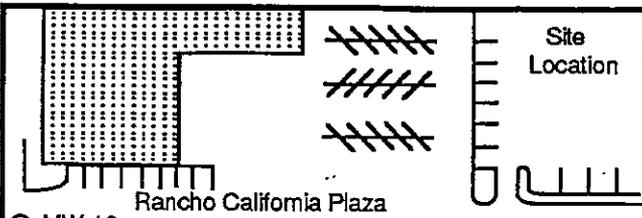
**LOG OF BORING MW-17
(continued)**

WELL CONSTRUCTION

Depth (ft.)
Sample No.
(% Rec.)
HNU (ppm)
Samples
Graphic

DESCRIPTION

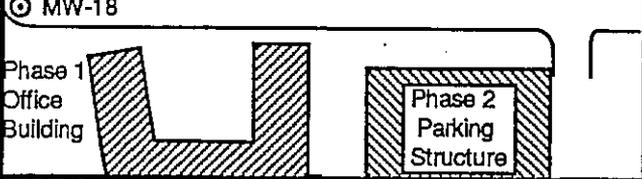




LOG OF BORING MW-18

ARCO Service Station 3012

27641 Ynez Road Temecula, California



Project No.: CA01506 Date Drilled: November 2, 1989
 Logged By: B. Botsford Drilling Method: 10.25" Hollow Stem Auger
 Drilling Co.: W. Hazmat Sampling Method: CA Split Spoon
 Driller: B. Nix Inclination: Vertical

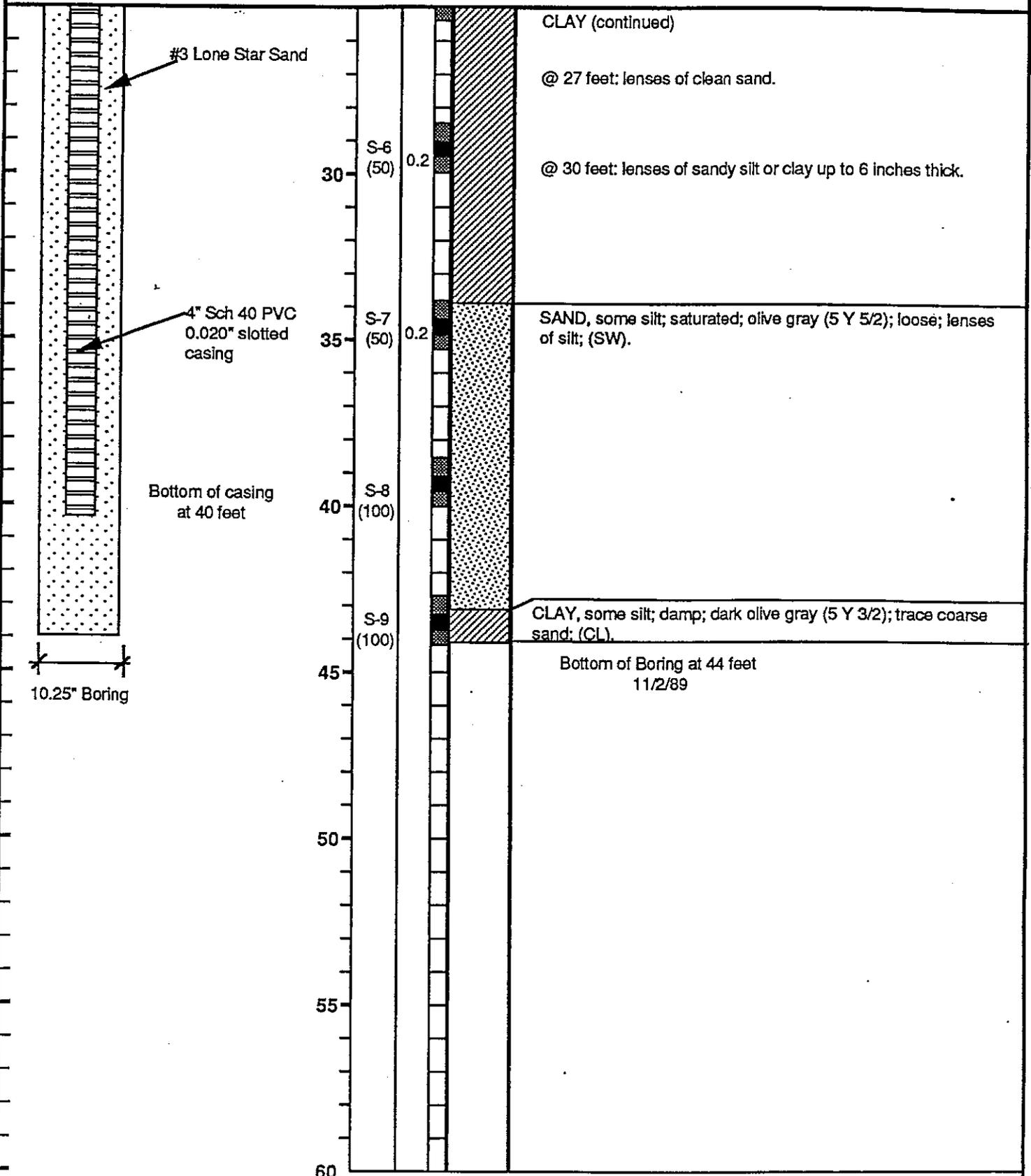
WELL CONSTRUCTION	Depth (ft.)	Sample No. (% Rec.)	HNU (ppm)	Samples	Graphic	DESCRIPTION
<p>G-5 Christy Utility Box Locking water-tight cap Volclay Grout Bentonite 4" Sch 40 PVC Blank casing #3 Lone Star Sand 4" Sch 40 PVC 0.020" slotted casing</p>	0 5 10 15 20 25	S-1 (100) S-2 (100) S-3 (100) S-4 (60) S-5 (80)	0.3 0.2 0.3 0.4 0.4	0.3 0.2 0.3 0.4 0.4		Surface Elevation: 1015.27 Casing Elevation: 1015.80 Asphaltic Concrete SILT, some sand; dry to damp; reddish yellow (5 YR 6/8); firm; (ML). @ 3 feet: damp; black (2.5 Y N2/). @ 5 feet: gray (5 Y 5/1). @ 11 feet: wet; olive (5 Y 4/3); soft; coarse sand; micaceous. @ 15 feet: lenses of clean well graded sand. CLAY, some silt; damp to wet; dark olive gray; firm to very firm; (CL).
	▼					Depth to Water 15.28" 11/16/89

**LOG OF BORING MW-18
(continued)**

WELL CONSTRUCTION

Depth (ft.)
Sample No.
(% Rec.)
HNU (ppm)
Samples
Graphic

DESCRIPTION



SECOR

BOREHOLE / WELL LOG

Number:

RW-5

Client: Atlantic Richfield Company

 Job No:
08BP.60210.00

 Sheet:
1 of 2

 Location:
ARCO #3012
27641 Ynez Road
Temecula, CA

Drilling Company/Driller:

 West Hazmat/
Rick

 SECOR Rep:
E. Hicks/C. Rodriguez
/N. Immel

Approved by:

 Date Started:
5/23/02

 Date Finished:
5/23/02

 Drill Rig/Sampling Method:
CME-75/ Hollow Stem-12" dia./
Continuos coring/core-barrell

 Borehole Dia.:
12"

 Casing Dia.:
6"

Surface Elevation:

SAMPLE LOG
BOREHOLE LOG
WELL LOG

Sample Number	OVA/PID (ppm)	Lab Results TPH(ppm)	Density Blows/ft	Depth in Feet	USCS Symbol	Graphic Log	Geologic Description (Soil Type, Color, grain, minor soil component, moisture, density, odor, etc.)	Well Design
				0			Pavement: Asphalt 3" thick w/6" base.	
				1	SM		Silty SAND, brown, (7.5YR 4/3), 20% silt, very fine to medium-grained sand, moist, no Hydrocarbon (HC) odor.	
				2				
				3				
				4			--Increase in Silt.	
				5			--Color change to black. (2.5Y 2.5/1)	
				6			--Dark olive brown. (2.5Y 3/3)	
				7			--Increase in Clay, black. (2.5Y 2.5/1)	
				8				
				9	SP		Poorly graded SAND, some Silt, very dark greyish brown, (2.5Y 3/2), very-fine to medium-grained sand, moist, no HC odor.	
				10				
RW-5/11.5'	120			11			Very dark gratish brown. Becomes damp @11.5 feet bgs, no HC odor.	
				12				
RW-5/13.5'	180			13				
				14			Silty CLAY lens, 14.75 - 15 feet bgs.	
				15	ML		Clayey Silt, some sand, olive brown, (2.5Y 4/3), very fine to fine-grained sand, wet-beginning @15 feet bgs, no HC odor.	
				16	SP		Poorly graded SAND, some clay and silt, olive brown, (2.5Y 4/3), very fine to very course-grained sand, damp, no HC odor.	
				17	CL		Silty CLAY, some sand, dark olive brown, (12.5Y 3/3), very fine to fine-grained sand, 20% silt, low plasticity, damp, no HC odor.	
				18				
				19				
				20			Poorly graded SAND lens 20.5-21 feet, fine to course-grained sand.	
				21				
				22	SM		Silty SAND, some clay, olive brown, (2.5Y 4/3), 30 % silt, fine to medium-grained sand, damp, no HC odor.	
				23				
RW-5/26'	160			24	SP		Poorly graded SAND, some clay and silt, olive brown, (2.5Y 4/3), fine to very course-grained sand, wet, no HC odor.	
				25				
				26	SM		Silty SAND, dark greenish gray, (5GY 4/1), 40% silt, very fine to medium-grained sand, damp, no HC odor.	
				27	SM		Sandy SILT, some clay, dark greenish gray, (5GY 4/1), 10% sand, very fine to fine-grained sand, damp, no HC odor.	
				28				
				29	SP		Poorly graded SAND, dark greenish gray, (5G 4/1), fine to course-grained sand, damp, no HC odor.	
				30				

SECOR

BOREHOLE / WELL LOG

Number:

RW-5

Client: Atlantic Richfield Company

 Job No:
08BP.60210.00

 Sheet:
2 of 2

 Location:
ARCO #3012
27641 Ynez Road
Temecula, CA

Drilling Company/Driller:

 West Hazmat/
Rick

 SECOR Rep:
E. Hicks/C. Rodriguez
/N. Immel

Approved by:

 Date Started:
5/23/02

 Date Finished:
5/23/02

 Drill Rig/Sampling Method:
CME-75/ Hollow Stem-12" dia./
Continuos coring/core-barrell

 Borehole Dia.:
12"

 Casing Dia.:
6"

Surface Elevation:

SAMPLE LOG
BOREHOLE LOG
WELL LOG

Sample Number	OVA/PID (ppm)	Lab Results TPH(ppm)	Density Blows/ft	Depth in Feet	USCS Symbol	Graphic Log	Geologic Description (Soil Type, Color, grain, minor soil component, moisture, density, odor, etc.)	Well Design
				30	SP		Sandy CLAY lens, 33.5 - 33.75 feet bgs.	
				1				
				2				
				3				
				4				
				35	SM		Silty SAND, dark grayish brown, (2.5Y 4/2), 20% silt, very fine to fine-grained sand, damp, no HC odor.	
			39	6				
			22	7				
			28	8				
			34	9				
				40	ML		Poorly graded SAND, olive gray, (5Y 5/2), very fine to very coarse-grained sand, wet, no HC odor. Becomes very dense @43.5 feet. Cemented lens @43.5-43.75 feet.	
				1				
				24				
				37				
				25				
				36	SM		Clayey Silt, some sand, dark greenish gray, (5GY 4/1), 20% clay, very fine to fine-grained sand, damp, very dense, no HC odor.	
RW-5/45.5'	20		29	6				
				53				
				45				
				40				
				50	SP		Silty SAND, greenish black, (5GY 2/1), 20% silt, very fine to fine-grained sand, damp, very dense, no HC odor. Poorly graded SAND, greenish black, (5GY 2/2), very fine to medium-grained sand, wet, very dense, no HC odor. Sand fine to course grained @48 feet.	
				7				
				8				
				9				
				25				
				55			TOTAL DEPTH DRILLED = 50' BGS Well set @ 50 ft. bgs 0.020" slot stainless steel screen set from 30-45' bgs, #3 Monterey sand from 26.5-50' bgs, Hydrated benonite seal from 22.5-26.5' bgs, grout from 3-22.5' bgs, cement 0-3' bgs, completed with flush mounted traffic rated vault.	
				18				
				17				
				20				
				14				
				60				