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the i group

STID 744

RESPONDED TO 1/24/99

November 2, 1999
Project 800032

Mr. Amir Gholami
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: High Vacuum Extraction Pilot Test at ARCO Service Station No. 2111, located at 1156 Davis Street in San Leandro, California.

Dear Mr. Gholami:

Pinnacle Environmental Solutions, a member of The IT Group (Pinnacle), has prepared this letter, on behalf of ARCO Products Company (ARCO), to notify Alameda County Health Care Services Agency (ACHCSA) of a High Vacuum Extraction (HVE) Pilot Test to be conducted at ARCO Service Station No. 2111, located at 1156 Davis Street in San Leandro, California (Figure 1). This notification gives a brief description of the site, and presents the objective, equipment, and method for conducting the HVE Pilot Test.

BACKGROUND

On September 19, 1996, EMCON submitted a Soil and Groundwater Assessment Report to ACHCSA. This report concluded that hydrocarbon-impacted soils were limited to the capillary-fringe zone, and appeared to be confined to the areas around the pump islands and the existing UST area. The report also concluded that the impact to groundwater appeared to be limited to the boundaries of the ARCO facility (Figure 2). Recent quarterly groundwater monitoring has revealed increasing hydrocarbon impact.

OBJECTIVE

The HVE Pilot Test is being conducted to assess HVE as a remedial alternative for the subject site, and other sites with similar lithology. Additionally, the HVE Pilot Test will provide interim hydrocarbon mass removal at the subject site.

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ENVIRONMENTAL PROTECTION

DESCRIPTION

The HVE Pilot Test will be performed over a 5-day period. Pinnacle has retained EnviroSupply & Service (ESS) for providing the necessary equipment and instrumentation to conduct the HVE Pilot Test. A 5-horse power high vacuum pump will be used to extract hydrocarbon-laden soil vapors and groundwater from monitoring well MW2. With the consent of the Bay Area Air Quality Management District, the extracted vapors will be abated using a 100 cubic feet per minute (cfm) catalytic oxidizer. The extracted groundwater will be collected in a condensate knockout, then transferred to a storage tank. The extracted groundwater will be characterized, off-hauled, and disposed at the appropriate facility.

PROTOCOL

Baseline

The 1999 fourth quarter monitoring event is scheduled for the week of November 8, 1999. The HVE Pilot Test will take place the following week. The 1999 fourth quarter monitoring data will be used as baseline information for the HVE Pilot Test. The baseline data collected from all wells will include:

1. Groundwater samples to be analyzed for TPHg and BTEX by EPA Method 8021B, and fuel oxygenates for the highest MTBE detections via EPA Method 8260. Refer to Appendix A for sampling and analysis procedures.

2. Depth-to-Water (DTW) measurements

3. pH, Conductivity, Temperature, and Dissolved Oxygen measurements.

Start-Up/Monitoring

The parking stalls to the west side of the station building will be used as an equipment laydown area. A 40-kilowatt generator will power the high vacuum pump and catalytic oxidizer. The maximum possible vacuum (approximately 23 inches of Mercury) will be applied to monitoring well MW2 continuously for the 5-day test.

On the first day, MW2 DTW will be measured prior to startup. After startup, influent groundwater samples will be collected at the following time intervals: 60, 240, and 480-

minutes, then daily thereafter. Conductivity, pH, Dissolved Oxygen, and extracted groundwater volume measurements will coincide with groundwater sample collection.

On the first day, PID measurements of influent air will be measured at the following time intervals: 0, 15, 30, 60, 120, 240, and 480 minutes. Induced vacuum and airflow measurements will coincide with PID measurements. Influent air samples will be collected at the 60, 240, and 480-minute stages, then daily thereafter. PID measurements of effluent air will be measured at the 15-minute stage, and daily thereafter.

The remaining wells (MW1, MW4, MW5, MW7, and V1) will be used for monitoring. These wells will be equipped with Magnehelic gages to measure induced vacuum. On the first day, induced vacuum, followed by DTW measurements, from the monitoring wells will be collected at the following time stages: 0, 15, 30, 60, 120, 240, and 480 minutes. Induced vacuum and DTW will be measured daily thereafter.

Recovery

On the final day of the HVE Pilot Test, recovery data will be collected after the HVE system is shutdown. MW2 DTW will be measured at the following time stages after shutdown: 0, 1, 2, 3, 4, 5, 10, 15, 30, and 60 minutes. A final groundwater sample will be collected from MW2 at the 60-minute stage. Monitoring well DTW will also be measured after shutdown at the following time stages: 0, 15, 30, and 60 minutes.

REPORT

Pinnacle will prepare a report, which presents the findings from the HVE Pilot Test. This report will include a description of the methods and equipment, presentation of operating and analytical data, estimation of the zone of influence, and estimation of the total hydrocarbon mass removed during the test. The report will provide an evaluation of the data collected from the site and HVE, including possible recommendations which may be based on the data collected.

If you have any questions regarding this HVE Pilot Test, please call Glen VanderVeen at (510) 740-5807.

Sincerely,

Pinnacle

Dan Lescure
Project Engineer

Glen VanderVeen
Project Manager

Attachments:

Figure 1	Site Location
Figure 2	Site Plan
Appendix A	Sampling and Analysis Procedures

cc: Mr. Paul Supple, ARCO Products Company
Mr. Robert E. Cave, Bay Area Air Quality Management District
Mr. Kulbir Dhillon, SmogPros

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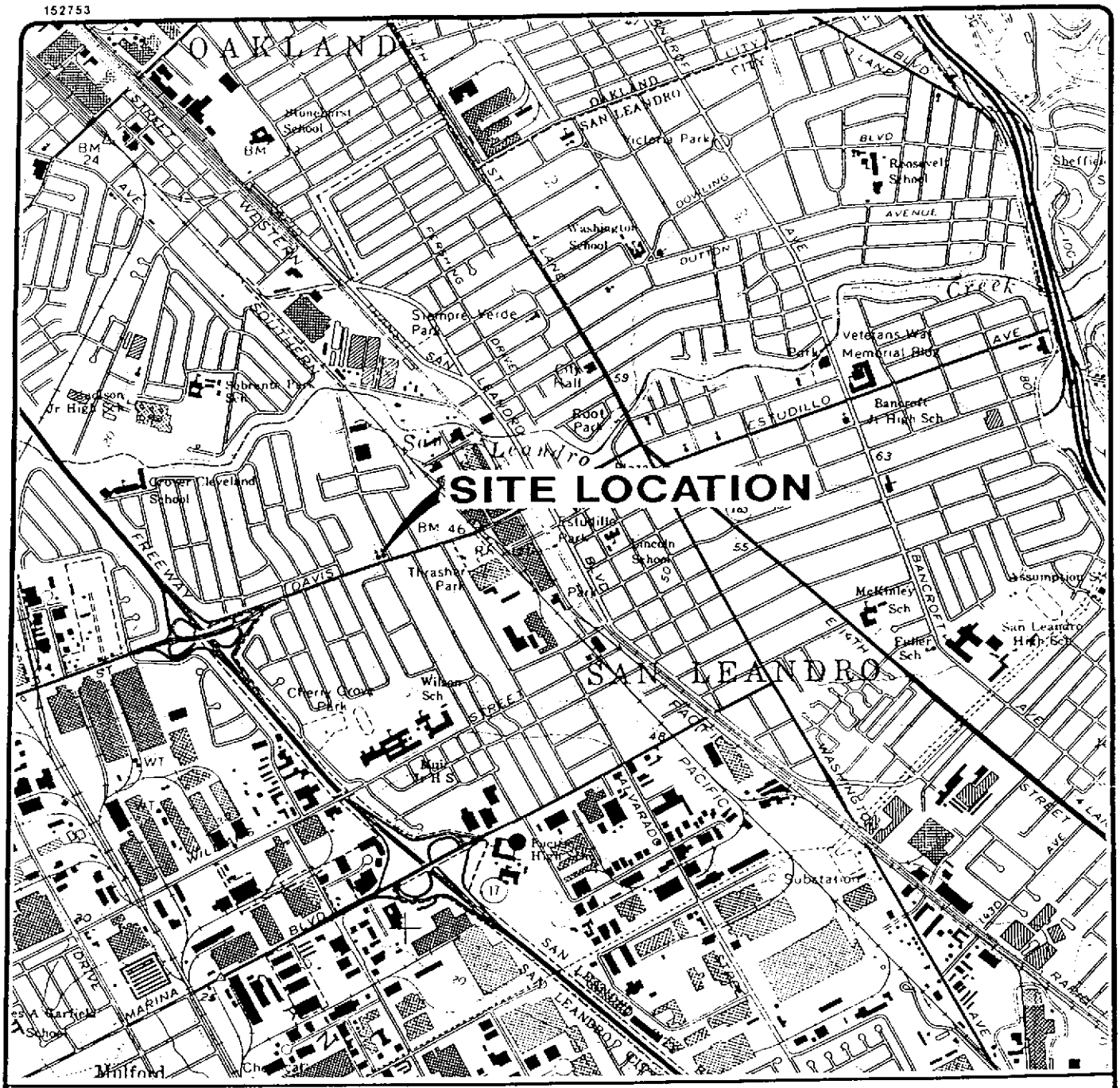
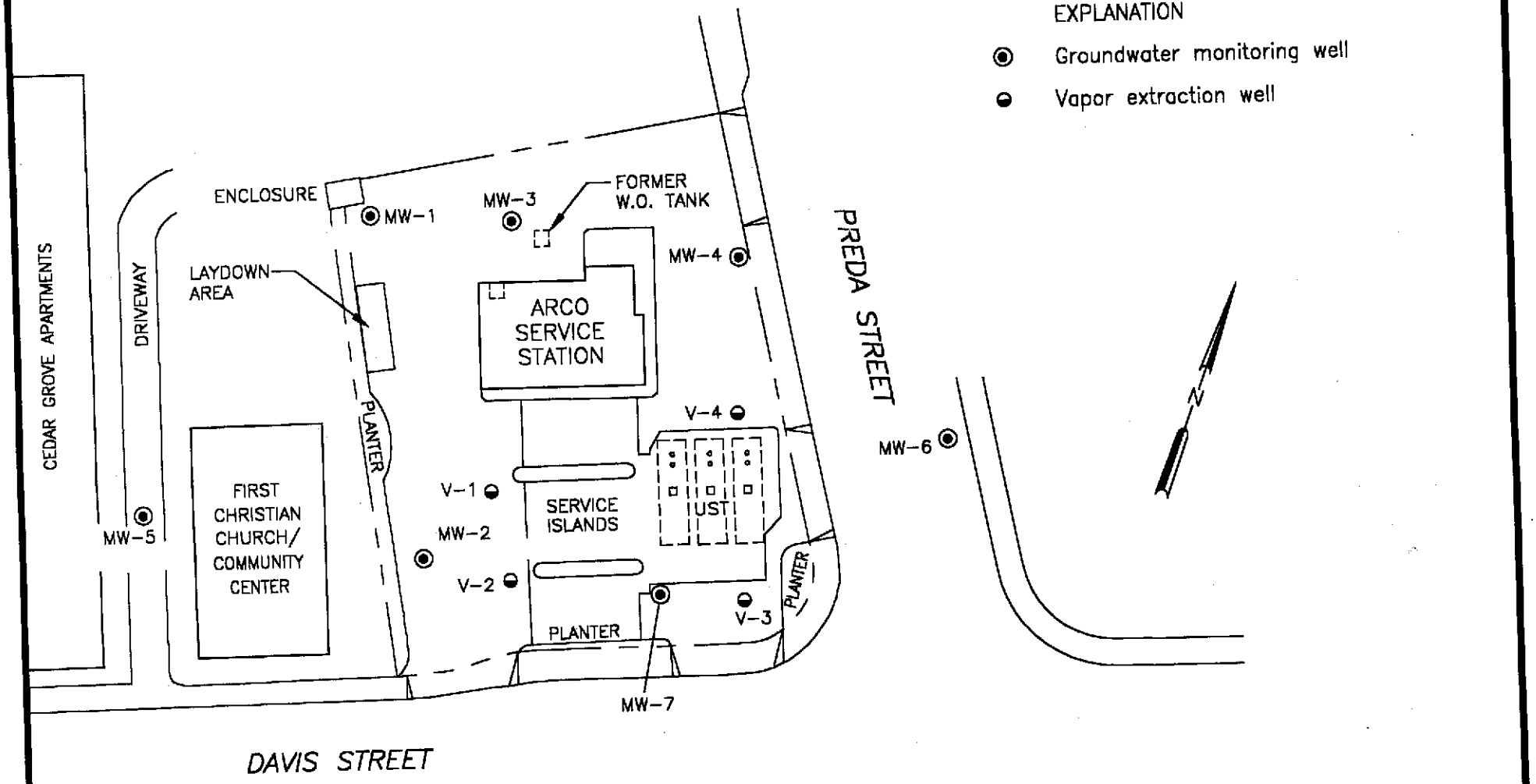


ARCO PRODUCTS COMPANY
SERVICE STATION 2111, 1156 DAVIS STREET
SOIL AND GROUNDWATER ASSESSMENT
SAN LEANDRO, CALIFORNIA

SITE LOCATION

FIGURE
1
PROJECT NO.
805-127.01



Pinnacle
ENVIRONMENTAL SOLUTIONS
A MEMBER OF THE IT GROUP

0 40 80
SCALE IN FEET

AUG. 1999
KAB
PROJECT NO.
791655

FIGURE 2
ARCO PRODUCTS COMPANY
SERVICE STATION 2111, 1156 DAVIS ST.
SAN LEANDRO, CALIFORNIA

SITE PLAN

APPENDIX A

SAMPLING AND ANALYSIS PROCEDURES

APPENDIX A

SAMPLING AND ANALYSIS PROCEDURES

The sampling and analysis procedures for water quality monitoring programs are contained in this appendix. The procedures provided for consistent and reproducible sampling methods, proper application of analytical methods, and accurate and precise analytical results. Finally, these procedures provided guidelines so that the overall objectives of the monitoring program were achieved.

The following documents have been used as guidelines for developing these procedures:

- Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities, Environmental Protection Agency (EPA)-530/SW-611, August 1977
- Resource Conservation and Recovery Act (RCRA) Groundwater Monitoring Technical Enforcement Guidance Document, Office of Solid Waste and Emergency Response (OSWER) 9950.1, September 1986
- Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, EPA SW-846, 3rd edition, November 1986
- Methods for Organic Chemical Analysis of Municipal and Industrial Waste Water, EPA-600/4-82-057, July 1982
- Methods for Organic Chemical Analysis of Water and Wastes, EPA-600/4-79-020, revised March 1983
- Leaking Underground Fuel Tank (LUFT) Field Manual, California State Water Resources Control Board, revised October 1989

Sample Collection

Sample collection procedures include equipment cleaning, water level and total well depth measurements, and well purging and sampling.

Equipment Cleaning

Before the sampling event was started, equipment that was used to sample groundwater was disassembled and cleaned with detergent water and then rinsed with deionized water. During

field sampling, equipment surfaces that were placed in the well or came into contact with groundwater during field sampling were steam cleaned with deionized water before the next well was purged or sampled.

Water Level, Floating Hydrocarbon, and Total Well Depth Measurements

Before purging and sampling occurred, the depth to water, floating hydrocarbon thickness, and total well depth were measured using an oil/water interface measuring system. The oil/water interface measuring system consists of a probe that emits a continuous audible tone when immersed in a nonconductive fluid, such as oil or gasoline, and an intermittent tone when immersed in a conductive fluid, such as water. The floating hydrocarbon thickness and water level were measured by lowering the probe into the well. Liquid levels were recorded relative to the tone emitted at the groundwater surface. The sonic probe was decontaminated by being rinsed with deionized water or steam cleaned after each use. A bottom-filling, clear Teflon® bailer was used to verify floating hydrocarbon thickness measurements of less than 0.02 foot. Alternatively, an electric sounder and a bottom-filling Teflon bailer may have been used to record floating hydrocarbon thickness and depth to water.

The electric sounder is a transistorized instrument that uses a reel-mounted, two-conductor, coaxial cable that connects the control panel to the sensor. Cable markings are stamped at 1-foot intervals. The water level was measured by lowering the sensor into the monitoring well. A low-current circuit was completed when the sensor contacted the water, which served as an electrolyte. The current was amplified and fed into an indicator light and audible buzzer, signaling when water had been contacted. A sensitivity control compensated for highly saline or conductive water. The electric sounder was decontaminated by being rinsed with deionized water after each use. The bailer was lowered to a point just below the liquid level, retrieved, and observed for floating hydrocarbon.

Liquid measurements were recorded to the nearest 0.01 foot on the depth to water/floating product survey form. The groundwater elevation at each monitoring well was calculated by subtracting the measured depth to water from the surveyed elevation of the top of the well casing. (Every attempt was made to measure depth to water for all wells on the same day.) Total well depth was then measured by lowering the sensor to the bottom of the well. Total well depth, used to calculate purge volumes and to determine whether the well screen was partially obstructed by silt, was recorded to the nearest 0.1 foot on the depth to water/floating product survey form.

Well Purging

If the depth to groundwater was above the top of screens of the monitoring wells, then the wells were purged. Before sampling occurred, a polyvinyl chloride (PVC) bailer, centrifugal pump, low-flow submersible pump, or Teflon bailer was used to purge standing water in the casing and gravel pack from the monitoring well. Monitoring wells were purged according to the protocol presented in Figure A-1. In most monitoring wells, the amount of water purged before sampling

was greater than or equal to three casing volumes. Some monitoring wells were expected to be evacuated to dryness after removing fewer than three casing volumes. These low-yield monitoring wells were allowed to recharge for up to 24 hours. Samples were obtained as soon as the monitoring wells recharged to a level sufficient for sample collection. If insufficient water recharged after 24 hours, the monitoring well was recorded as dry for the sampling event.

Groundwater purged from the monitoring wells was transported in a 500-gallon water trailer, 55-gallon drum, or a 325-gallon truck-mounted tank to IT's San Jose or Sacramento office location for temporary storage. IT arranged for transport and disposal of the purged groundwater through Integrated Waste Stream Management, Inc.

Field measurements of pH, specific conductance, and temperature were recorded in a waterproof field logbook. Figure A-2 shows an example of the water sample field data sheet on which field data are recorded. Field data sheets were reviewed for completeness by the sampling coordinator after the sampling event was completed.

The pH, specific conductance, and temperature meter were calibrated each day before field activities were begun. The calibration was checked once each day to verify meter performance. Field meter calibrations were recorded on the water sample field data sheet.

Well Sampling

A Teflon bailer was the only equipment acceptable for well sampling. When samples for volatile organic analysis were being collected, the flow of groundwater from the bailer was regulated to minimize turbulence and aeration. Glass bottles of at least 40-milliliters volume and fitted with Teflon-lined septa were used in sampling for volatile organics. These bottles were filled completely to prevent air from remaining in the bottle. A positive meniscus formed when the bottle was completely full. A convex Teflon septum was placed over the positive meniscus to eliminate air. After the bottle was capped, it was inverted and tapped to verify that it contained no air bubbles. The sample containers for other parameters were filled, filtered as required, and capped.

When required, dissolved concentrations of metals were determined using appropriate field filtration techniques. The sample was filtered by emptying the contents of the Teflon bailer into a pressure transfer vessel. A disposable 0.45-micron acrylic copolymer filter was threaded onto the transfer vessel at the discharge point, and the vessel was sealed. Pressure was applied to the vessel with a hand pump and the filtrate directed into the appropriate containers. Each filter was used once and discarded.

Sample Preservation and Handling

The following section specifies sample containers, preservation methods, and sample handling procedures.

Sample Containers and Preservation

Sample containers vary with each type of analytical parameter. Container types and materials were selected to be nonreactive with the particular analytical parameter tested.

Sample Handling

Sample containers were labeled immediately prior to sample collection. Samples were kept cool with cold packs until received by the laboratory. At the time of sampling, each sample was logged on an ARCO chain-of-custody record that accompanied the sample to the laboratory.

Samples that required overnight storage prior to shipping to the laboratory were kept cool (4° C) in a refrigerator. The refrigerator was kept in a warehouse, which was locked when not occupied by an IT employee. A sample/refrigerator log was kept to record the date and time that samples were placed into and removed from the refrigerator.

Samples were transferred from IT to an ARCO-approved laboratory by courier or taken directly to the laboratory by the environmental sampler. Sample shipments from IT to laboratories performing the selected analyses routinely occurred within 24 hours of sample collection.

Sample Documentation

The following procedures were used during sampling and analysis to provide chain-of-custody control during sample handling from collection through storage. Sample documentation included the use of the following:

- Water sample field data sheets to document sampling activities in the field
- Labels to identify individual samples
- Chain-of-custody record sheets for documenting possession and transfer of samples
- Laboratory analysis request sheets for documenting analyses to be performed

Field Logbook

In the field, the sampler recorded the following information on the water sample field data sheet (see Figure A-2) for each sample collected:

- Project number
- Client's name
- Location
- Name of sampler
- Date and time
- Well accessibility and integrity
- Pertinent well data (e.g., casing diameter, depth to water, well depth)
- Calculated and actual purge volumes
- Purging equipment used
- Sampling equipment used
- Appearance of each sample (e.g., color, turbidity, sediment)
- Results of field analyses (temperature, pH, specific conductance)
- General comments

The water sample field data sheet was signed by the sampler and reviewed by the sampling coordinator.

Labels

Sample labels contained the following information:

- Project number
- Sample number (i.e., well designation)
- Sample depth
- Sampler's initials
- Date and time of collection
- Type of preservation used (if any)

Sampling and Analysis Chain-of-Custody Record

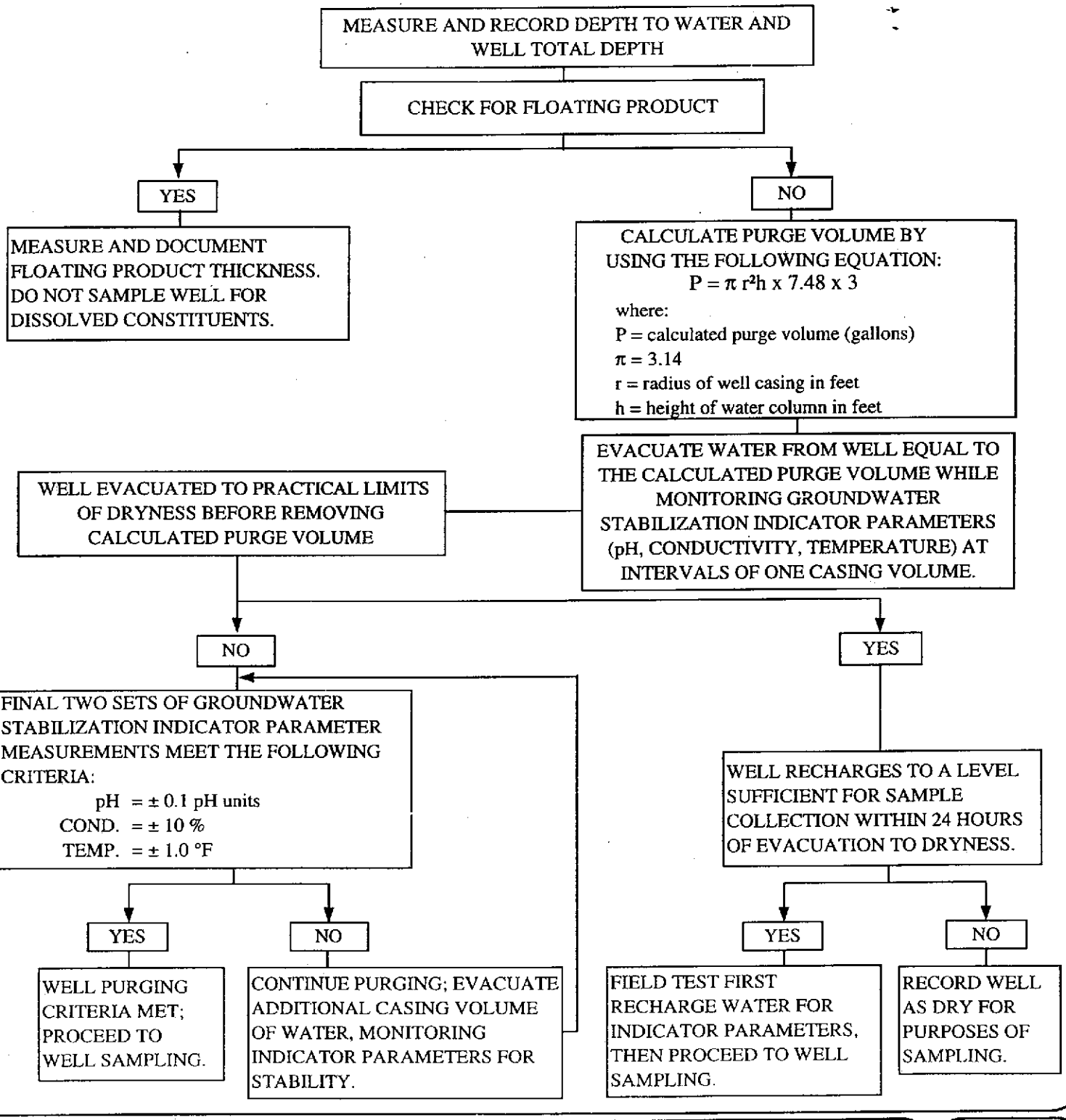
The ARCO chain-of-custody record initiated at the time of sampling contained, at a minimum, the sample designation (including the depth at which the sample was collected), sample type, analytical request, date of sampling, and the name of the sampler. The record sheet was signed, timed, and dated by the sampler when transferring the samples. The number of custodians in the chain of possession was minimized. A copy of the ARCO chain-of-custody record was returned to IT with the analytical results.

Groundwater Sampling and Analysis Request Form

A groundwater sampling and analysis request form (see Figure A-3) was used to communicate to the environmental sampler the requirements of the monitoring event. At a minimum, the groundwater sampling and analysis request form included the following information:

- Date scheduled
- Site-specific instructions
- Specific analytical parameters
- Well number
- Well specifications (expected total depth, depth of water, and product thickness)

MONITORING WELL PURGING PROTOCOL



MONITORING WELL PURGING PROTOCOL

FIGURE

A-1

WATER SAMPLE FIELD DATA SHEET

PROJECT NO : _____ SAMPLE ID : _____

PURGED BY : _____ CLIENT NAME : _____

SAMPLED BY : _____ LOCATION : _____

TYPE: Groundwater _____ Surface Water _____ Leachate _____ Other _____

CASING DIAMETER (inches): 2 _____ 3 _____ 4 _____ 4.5 _____ 6 _____ Other _____

CASING ELEVATION (feet/MSL) : _____ VOLUME IN CASING (gal.) : _____

DEPTH OF WELL (feet) : _____ CALCULATED PURGE (gal.) : _____

DEPTH OF WATER (feet) : _____ ACTUAL PURGE VOL. (gal.) : _____

DATE PURGED : _____ END PURGE : _____

DATE SAMPLED : _____ SAMPLING TIME : _____

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	TURBIDITY (visual/NTU)	TIME (2400 HR)

OTHER: _____ ODOR: _____ (COBALT 0-100) _____ (NTU 0-200) _____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : _____

PURGING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon)

_____ Centrifugal Pump _____ Bailer (PVC)

_____ Submersible Pump _____ Bailer (Stainless Steel)

_____ Well Wizard™ _____ Dedicated

Other: _____

SAMPLING EQUIPMENT

_____ 2" Bladder Pump _____ Bailer (Teflon)

_____ Bomb Sampler _____ Bailer (Stainless Steel)

_____ Dipper _____ Submersible Pump

_____ Well Wizard™ _____ Dedicated

Other: _____

WELL INTEGRITY: _____ LOCK: _____

REMARKS: _____

pH, E.C., Temp. Meter Calibration: Date: _____ Time: _____ Meter Serial No.: _____

E.C. 1000 _____ / _____ pH 7 _____ / _____ pH 10 _____ / _____ pH 4 _____ / _____

Temperature °F _____

SIGNATURE: _____ REVIEWED BY: _____ PAGE _____ OF _____

WATER SAMPLE FIELD DATA SHEET

FIGURE A-2

IT - SACRAMENTO
GROUNDWATER SAMPLING AND ANALYSIS REQUEST FORM

PROJECT NAME :

SCHEDULED DATE :

SPECIAL INSTRUCTIONS / CONSIDERATIONS :

Project Authorization: _____
EMCON Project No.: _____
OWT Project No.: _____
Task Code: _____
Originals To: _____
cc: _____

Well Lock Number (s)

☐ CHECK BOX TO AUTHORIZE DATA ENTRY

Site Contact: _____ Name _____ Phone #

Well Number or Source	Casing Diameter (inches)	Casing Length (feet)	Depth to Water (feet)	ANAYSES REQUESTED

Laboratory and Lab QC Istructions:

SAMPLING AND ANALYSIS REQUEST FORM

FIGURE
A-3