WORK PLAN
QUARTERLY GROUND-WATER MONITORING
ALAMEDA COUNTY ALCOPARK FACILITY
165 13TH STREET
OAKLAND, ALAMEDA COUNTY, CALIFORNIA

Aug 10, 1990

Prepared For:

ALAMEDA COUNTY
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PROJECT NUMBER 02-276-015

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1.0 INTRODUCTION

Environmental Science & Engineering, Inc. (ESE) has prepared this Work Plan on behalf of Alameda County General Services Agency (Alameda County GSA). The Work Plan contains a description of the methods of investigation for sampling three ground-water monitoring wells on a quarterly basis at the Alameda County ALCOPARK Facility (site). The site is located at 165 13th Street, Oakland, Alameda County, California (Figure 1). ESE is performing the work as a subsequent phase of site characterization, following removal of an underground gasoline storage tank from site.

ESE developed the scope of work for this project based on recommendations detailed in the Site Characterization Report (ESE, 1989). ESE prepared the Work Plan in accordance with the California Regional Water Quality Control Board (Regional Board) recommendations for initial evaluation and investigation of underground tanks (Regional Board, 1989). ESE is submitting the Work Plan for review by Alameda County Health Department.

2.0 SCOPE OF WORK

2.1 Objective

The objective of the Work Plan is to establish the concentration of petroleum hydrocarbons that may exist in the subsurface ground water of the site in the vicinity of the former excavation and the replacement fuel tank. ESE will monitor such concentrations, if they exist, for four consecutive quarters (12 months).The proposed ground-water monitoring program consists of the following work elements and tasks, described in Section 2.2.

Preliminary Information and Scheduling

Task 1. Obtain available information
Task 2. Prepare a Health and Safety Plan

On-Site Activities

Task 3. Purge and sample monitoring wells
Task 4. Analyze ground-water samples for petroleum hydrocarbons

Report

Task 5. Prepare quarterly reports

2.2 Task Descriptions

Preliminary Information and Scheduling

Task 1. Obtain Available Information-ESE has obtained and compiled available information as a result of its previous work on site (ESE, 1989). The available information includes:

- Existing soil excavation and tank removal report (ESE, 1989).
- Depth to ground water for site, about 21 feet below ground surface; and direction of regional ground-water flow, estimated to be due east
- A site plan, shown on Figure 2. The plan shows the location of the ALCOPARK structure, monitoring wells, and present subsurface gasoline storage tanks.

Task 2. Prepare a Health and Safety Plan-ESE will prepare a Health and Safety Plan to provide guidelines for the safe completion of Work Plan tasks. The Health and Safety Plan will address such issues as required personal protection for ESE and sub-contractor personnel, required compliance under OSHA, emergency procedures, etc., based on expected levels of contamination as established in earlier site investigations (ESE, 1990). ESE will undertake site work, such as sampling of monitoring wells, in Level D protection, as described in the Health and Safety Plan.

On-Site Activities

Task 3. Purge and Sample Monitoring Wells-ESE will purge and sample three ground-water monitoring wells on site. The activities for this task are as follows:

- Temporarily secure the work site by placing traffic cones, flagging or other objects around the well heads. Note condition of well heads and clean well casing if needed.
- Measure depth to ground-water level in each well, calculate well volume, calculate ground-water elevation. Record the information in field logs and forms.
- Purge each well by pumping or bailing. Follow the guidelines for ground-water well development contained in ESE Standard Operations Procedures (Attachment B). Measure ground-water temperature, pH, and specific conductance; observe ground-water color, odor, turbidity, and the

presence/absence of product or sheen; record data in a field Water Sample Log.

- Temporarily store ground-water produced in 55-gallon drums. The drums will be left on site at the conclusion of each sampling round, to be emptied and stored at the ALCOPARK facility by Alameda County, General Services Agency personnel, as agreed to in Proposal No. 90-M-094, dated May 11, 1990

- Sample each well by bailing. Follow the instructions given in ESE Standard Operations Procedures for ground-water sampling (Attachment B). Label sample containers clearly. Prepare a Chain of Custody form for the samples. Keep filled sample containers chilled in a cooler for transport to the analytical laboratory.

- Record final ground-water quality parameters and depth to ground water.

- Clean work site. Secure and label temporary storage drums.

Task 4. Analyze Ground-Water Samples for Petroleum Hydrocarbons-ESE will submit ground-water samples collected from each well to a California certified laboratory for analysis. The samples will be analyzed for Total Petroleum Hydrocarbons as diesel (TPH-d) and gasoline (TPH-g), EPA Method 8015; and for Benzene, Toluene, Ethyl Benzene and Total Xylenes (BTEX), EPA Method 602. See Table 1 for a list of proposed analyses for each well.

ESE will submit validation samples for analysis each sampling interval. The validation samples include a duplicate sample, an equipment rinsate sample and a travel blank sample. ESE will take the validation samples in accordance with the Quality Assurance/Quality Control considerations described in Section 3.0.

Table 1. Ground-Water Analyses Requested Each Sampling Interval

Sample or Well Number	Analyses*
Well Samples	
MW-1	TPH-g, BTEX
MW-4	TPH-d, BTEX
MW-5	TPH-g, BTEX
Validation Samples	
Duplicate	TPH-d or -g, or BTEX
Rinsate	TPH-d or -g, or BTEX
Travel Blank	TPH-d or -g, or BTEX

*Criteria for analyses:

MW-1, MW-5: downgradient of on-site gasoline storage tanks; monitor on-site ground-water contamination by gasoline
MW-2, MW-3: vadose zone (vapor) wells in tank back fill; not monitored for ground-water contamination
MW-4, upgradient well; monitor possible ground-water contamination by diesel fuel from upgradient source
Validation samples analyses correspond to those for the well assigned as duplicate for a given sampling interval.

Report

Task 5. Prepare a Quarterly Sampling Report-ESE will prepare a report describing activities for each quarterly sampling interval. Quarterly reports will typically discuss:

- On-site activities and/or incidents for the subject sampling interval
- Results of data obtained, including ground-water elevation survey, sample analyses and discussion of validation samples. ESE may discuss trend analyses comparing ground-water elevation and analytical data after the third and fourth sampling intervals, when sufficient data may have been obtained to provide such comparisons.
- Supporting data, such as water level summary, figures and laboratory analyses results.

The report for the final (fourth) sampling interval will also include a discussion of the sampling program and considerations for site closure, if warranted. The reports will be prepared to comply with the minimum reporting requirements outlined in the Regional Board Recommendations for Initial Evaluation and Investigation of Underground Tanks (Regional Board, 1989).

3.0 QUALITY ASSURANCE AND CONTROL

ESE will implement a project Quality Assurance/Quality Control (QA/QC) program designed to maintain the integrity of the sampling program and produce results that a re accurate and can be validated. The QA/AC program will address equipment decontamination, calibration procedures and sample validation.

Equipment Decontamination- Before the start of on-site activities, ESE will decontaminate equipment that will be inserted in the well casing. ESE will decontaminate hand pumps and bailers used for purging wells by washing in a tri-sodium phosphate (TSP) solution and rinsing in potable water. ESE will rinse water level probes and tape between readings with de-ionized water. ESE will decontaminate sampling bailers by washing in a TSP soluti on and triple rinsing, in de-ionized water, methanol and de-ionized water. ESE will rec ord decontamination procedures in a Field Log.

Equipment Calibration-ESE will calibrate equipment to be used for measuring ground-water quality parameters, such as pH meter and specific conductance meter. ESE will record calibration results in a Water Sample field log.

Sample Validation-ESE will submit one duplicate ground-water sample, one equipment rinsate sample and a trip blank sample for analysis. The object of the duplicate sample is to test the replicability of ESE's sampling method and of the analytical laboratory results. The object of the rinsate sample is to test ESE's decontamination procedures. The object of the trip blank sample is to test for the possibility of environmental contamination of the samples during transport.

ESE will take a duplicate sample from one of the wells installed, at the discretion of ESE field personnel. ESE will take a rinsate sample from the final distilled water rinse used for decontaminating the sampling bailer. The trip blank will be prepared and provided by the analytical laboratory, to accompany the container with all sample bottles on their trip to and from the analytical laboratory. ESE will label samples and submit them to the analytical laboratory under proper Chain-of-Custody protocol.

4.0 PROJECT MANAGEMENT

4.1 Schedule

ESE sampled ground water for the first-quarter sampling interval on July 26, 1990. The first-quarter sampling report will be submitted to Alameda County GSA on August 17, 1990. ESE anticipates the project schedule to be as follows:

Week Starting or Date	Item	Estimated Time for Completion (weeks)
1990		
July 26	First-quarter sampling interval	--
July 27	Submit samples for analysis.	--
Week Starting July 30	Prepare first-quarter report. Prepare Health and Safety Plan.	3
August 17	Submit first-quarter report. Submit Health and Safety Plan.	--

Week starting	Second-quarter sampling interval	--
October 29	Submit samples for analysis.	
	Prepare second-quarter report.	3
November 16	Submit second-quarter report.	--
1991		
Week Starting	Third-quarter sampling interval	--
January 28	Submit samples for analysis.	
	Prepare third-quarter report	3
February 15	Submit third-quarter report.	--
Week Starting	Fourth-quarter sampling interval	--
April 29	Submit samples for analysis.	
	Prepare fourth-quarter (final) report.	3
May 17	Submit fourth-quarter (final) report.	--

4.2 Deliverables

ESE will prepare four Quarterly Reports, following Regional Board staff recommendations for investigation of underground tanks (Regional Board, 1989). ESE will submit the reports based on the schedule outlined in Section 4.1.

4.3 Management

ESE will conduct the project according to the terms described in the Fee Schedule and General Conditions agreed to by Alameda County GSA in Proposal No. 90-M-094, dated May 2, 1990. ESE will perform the work on a Time and Materials basis, not to exceed $13,670, as stipulated in the contract and authorized by Alameda County GSA in Purchase Order No. 141-0-5639-00. ESE will submit invoices periodically, as stipulated in the Purchase Order.

ESE anticipates that the conditions assumed in Proposal No. 90-M-094 accurately describe the actual conditions that may exist in the site subsurface. If ESE finds evidence of significant changes in conditions or environmental degradation during our on-site work, such as possible release of hazardous materials, ESE will notify Alameda County GSA

immediately. ESE will modify the scope of services in consultation with Alameda County GSA and provide a revised budget for additional work if requested.

5.0 REFERENCES

California Regional Water Quality Control Board, 1989, Regional Board Staff Recommendations for Initial Evaluation and Investigation of Underground Tanks. Tri-Regional Recommendations. Prepared by Staff of Central Valley Regional Water Quality Control Board; 2 June 1988 (Revised 9 November 1989).

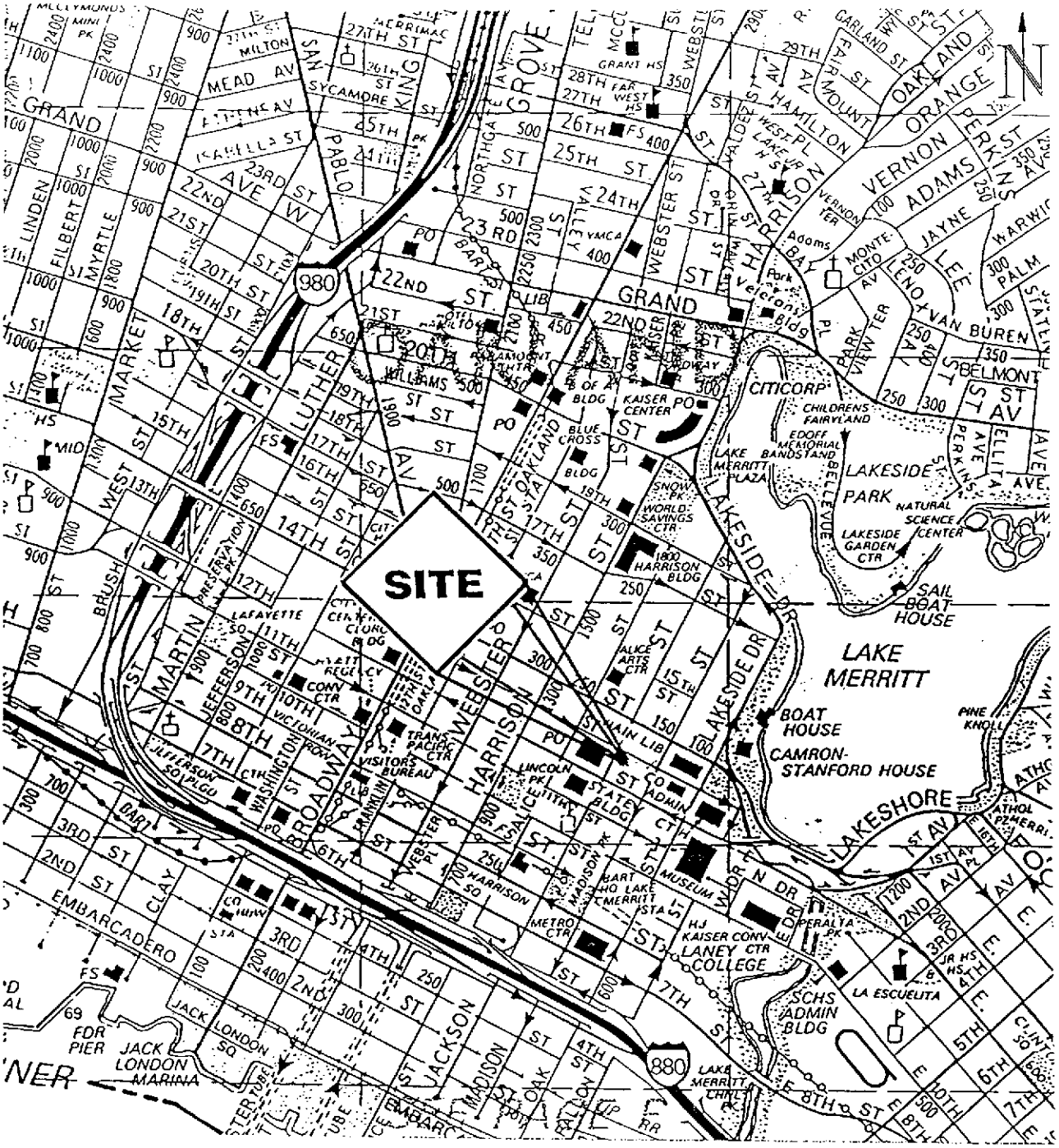
Environmental Science & Engineering, Inc., 1989, Phase I Site Characterization Report for Alameda County/ALCOPARK Facility, 165 13th Street, Oakland, California. Performed for Alameda County General Services Agency, Oakland, California; May, 1989.

ATTACHMENT A

FIGURES

Figure 1. Location Map

Figure 2. Site Plan



ESE A CLEARY COMPANY	Environmental Science & Engineering, Inc.
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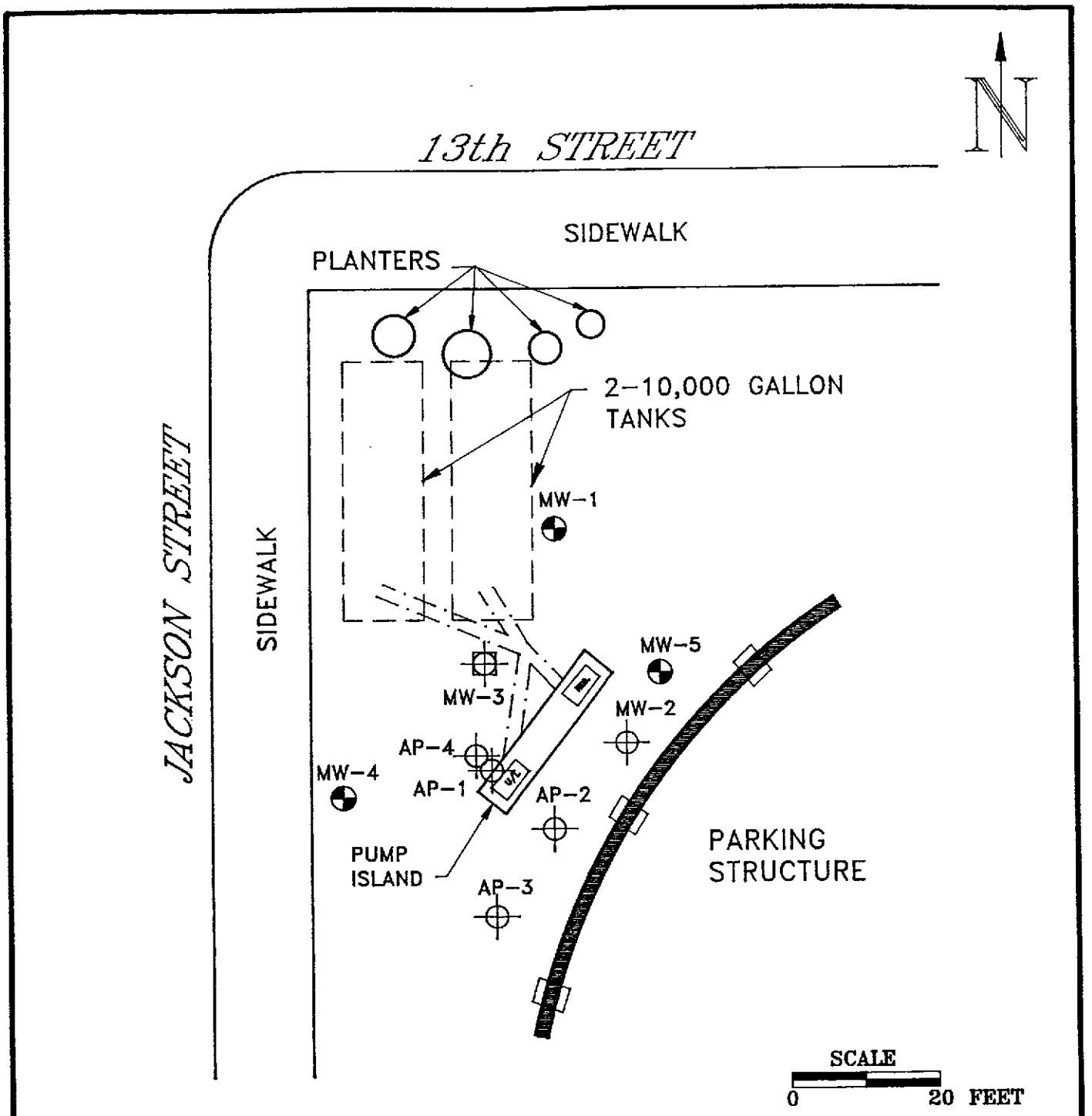
FIGURE 1 LOCATION MAP	

DATE	FILE NAME	PROJ. NO.
8/90	F1LM10	02-276-015



LEGEND

- SOIL BORING
- GROUND WATER MONITORING WELL
- VADOSE MONITORING WELL
- UNDERGROUND PIPING

Environmental Science & Engineering, Inc.

ALAMEDA COUNTY
ALCOPARK
OAKLAND, CA

FIGURE 2
SITE PLAN

DATE	FILE NAME	PROJ. NO.
8/90	F2SP10	02–276–015

ATTACHMENT B

ESE STANDARD OPERATIONS PROCEDURES

ESE STANDARD OPERATIONS PROCEDURES

Drilling Procedures - Hollow Stem Auger Rigs

The borings are drilled with a minimum outside diameter 7 1/4 inch Hollow-stem auger. The auger flights are steam cleaned prior to their arrival on site and after each use. During drilling a retractable plug prevents soil from entering the central shaft of the auger flight. Undisturbed soil samples shall be recovered from the borings without introducing liquid into the borings.

Soil Sampling Procedures

Relatively undisturbed soil samples shall be collected from the borings for chemical analysis and visual description. When the target depth is reached a Modified California Sampler, consisting of an outer sampler barrel lined with two 6-inch long rings (OD 2.5 inch) placed end to end, is used to collect the soil samples. The Modified California Sampler and brass rings are cleaned prior to each assembly. The equipment is washed with tri-sodium phosphate solution, rinsed in tap water and allowed to air dry. The sampler is attached to the drive hammer, lowered through the hollow-stem auger, and driven 12 inches into undisturbed soil ahead of the auger. The sampler is then retrieved and the rings removed.

The soil in the lower six-inch ring of the sampler is used for laboratory analysis. Immediately after the rings are retrieved, the lower ring is sealed with a teflon lined end cap and secured with tape. The sample is then labeled and placed in an ice chest for cold transport under proper chain of custody to a state certified chemical laboratory for analyses. The soil in the upper six-inch ring is used for lithologic description and olfactory examination. Soil is described using the Unified Soil Classification System. A portion of this soil may be temporarily placed in a plastic bag and used for examination with a portable organic vapor analyzer. All field descriptions and measurements are documented on bore hole logs.

Ground-Water Monitoring Well Construction

Ground-water monitoring wells are constructed according to the general specifications shown on the attached Well Construction Diagram. The wells shall extend a minimum of 10 feet into the upper aquifer, unless a clay layer greater than five feet in thickness is found. The wells shall not extend through a laterally extensive clay layer below the upper aquifer unless circumstances warrant the investigation of deeper aquifers. In the e vent an extensive clay layer must be penetrated care shall be taken to assure that mixing of water or contaminated soil does not occur.

For single-cased wells, the monitoring well casing, with an end cap, shall extend to the base of the bore hole or into a bentonite plug. The casings shall be factory perforated to the specifications delineated in the site work plan and compatible with the lithology of the

aquifer found in the field. The perforated casing will extend five feet above the top of the aquifer or known high water level. Properly graded, clean filter sand will be used in the annulus of the well and prevent the migration of fine particles into the well. The filter sand will extend at three to five feet above the perforated interval in the well. A seal of at least three to five feet of bentonite shall be placed above the filter. Sack or neat cement will be used to seal the annulus from the bentonite pellets to the ground surface where a well box will be installed. All sand, bentonite, and cement will be placed with a tremie pipe.

Double cased wells may be specified where the wells are screen below an upper aquifer. In this situation, a minimum 10 inch diameter bore hole is drilled to the base of the first aquifer and at least two feet into the aquitard. A conductor casing is then grouted in place and allowed to set for at least 72 hours. Drilling shall then continue within the conductor casing, with a drill bit smaller than the inside diameter of the conductor casing to the desired completion depth.

All wellheads shall be completed with a watertight structure and furnished with a watertight cap which shall be enclosed in a locked well covering device.

Ground-Water Well Development

Well development of a newly installed well shall begin 24 to 48 hours after the well is installed to allow cement to harden sufficiently. The well is cleared of disturbed sediment and water before water samples are collected. All well development tools are thoroughly cleaned prior to use. Well development tools may be either a stainless steel, teflon, or PVC bailer, hand pumps or submersible pumps. Surging may be required to remove loose sediments. For complete development, the wells will be pumped until the discharge is clear or the turbidity has not noticeably changed within one half hour. A pH and conductivity meter may be utilized to determine if the groundwater parameters have stabilized.

Ground-water sampling

Prior to sampling, the wells are sounded to determine product levels, water levels, and total volume of water. Each ground-water monitoring well is purged of at least 3 well volumes of water using a mechanical or hand-operated pump, or bailer. Conductivity, pH, and temperature are generally measured during the purging procedure to verify that these characteristics are stable prior to sampling. Stable in this situation is three consecutive readings within 15% of each other. If the wells are emptied before three well volumes are removed, the sample shall be taken when the water level in the well recovers to at least 80% of its initial water level.

Samples are then taken immediately after purging using a teflon bailer and transferred into 40 milliliter (ml) glass vials with Teflon septum lids using a collection procedure that precludes air from entering the 40 ml sample vials and prevent the release of volatile organic compounds. To prevent cross-contamination of the ground-water samples, the Teflon bailer is washed with tri-sodium phosphate solution, rinsed with tap water, then distilled water, and allowed to air dry before sampling the next well. The samples are then labeled and placed immediately in a cooler for delivery to a state certified analytical

laboratory. A chain of custody shall accompany the samples and contain the information concerning the source of the samples. Field identification of the samples, date and time of sample collection, analyses required, and signatures of the sampler and other handlers. For the purpose of quality assurance, one or more duplicate ground-water samples are tak e n for each five wells sampled. A sample is taken of distilled water from the final bailer rinse. Trip blanks furnished by the laboratory are also utilized.

Additional Ground-Water Parameters

Dissolved Oxygen Content

The dissolved oxygen content of the ground water is measured with a Yellow Springs Instrument, Model 51B dissolved oxygen meter, or equivalent, which is calibrated on site taking into account temperature and salinity. After purging, a ground water sample i s taken with a teflon bailer. The sample is immediately transferred into a jar in a manner that precludes air from being introduced into the sample. The dissolved oxygen probe is than placed in the jar, directly measuring the water temperature and the dissolved oxygen content.

Well bore vapor sampling

After the wells have been purged and allowed to equilibrate, vapor samples may be collected with a small vacuum pump from just above ground water in each of the well bores. Teflon tubing is lowered to approximately one foot above the ground-water sur face, the well bore is covered, and air is pumped through the tubing into a chemically inert Tedlar bag that has been pre-cleaned and purged. The Tedlar bags are then labeled and transported to a state certified analytical laboratory to be analyzed for carbon dio xide content.