AEGIS ENVIRONMENTAL, INC.

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February 18, 1992

Mr. Larry Seto
Alameda County Department of Health Services
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, California 94621

Subject: **Revision to August 21, 1991**
Soil Remediation Workplan
E. C. Buehrer & Associates, Inc.
1061 Eastshore Highway, Albany, California

Dear Mr. Seto:

Aegis Environmental, Inc. (Aegis), is pleased to offer revisions to the Aegis "Soil Remediation Workplan," dated August 21, 1991. The revisions are in response to correspondence from the Alameda County Department of Health Services, dated November 25, 1991, and address the replacement of well MW-4, and collection of soil samples from the proposed excavation (Figures 1 and 2). The revised scope of work will be conducted in accordance with the attached Aegis' standard operating procedures (SOP), and includes the following tasks:

- A new 4-inch-diameter monitoring well (MW-9) will be installed within 10 feet of the former underground storage tank basin (Figure 2). The total depth of the well will be approximately 15 feet below grade (Figure 3). The well will be developed according to Aegis' SOP, and incorporated into subsequent quarterly monitoring.

- Soil samples will be collected from the sidewalls of the excavation at intervals of 20 linear feet. The samples will be collected and analyzed in accordance with the August 21, 1991, workplan and SOP (attached). Chain-of-custody procedures will be established and followed.

The monitoring well will be permitted through the Alameda County Flood Control and Water Conservation District, Zone 7.

If you have questions or comments regarding this revision, or the proposed workplan, please contact us at (916) 782-2110.

Sincerely,

AEGIS ENVIRONMENTAL, INC.

Krys M. Hardman
Staff Geologist

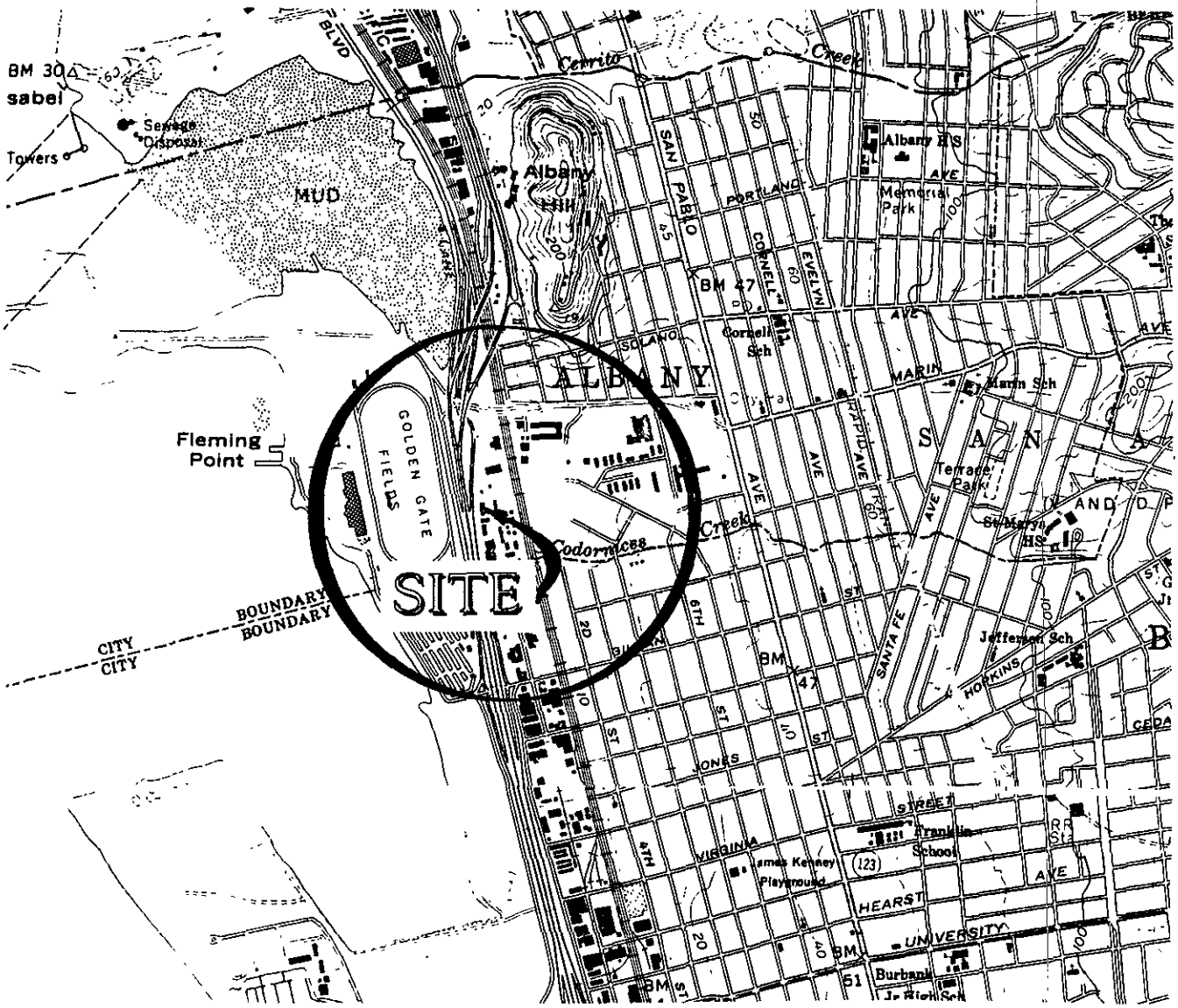
Pat Wright
Senior Geologist
CRG No. 529

2-19-92

KMH/PW/law

Attachments

FIGURES



SCALE: 1"= 2,000'

0 2,000

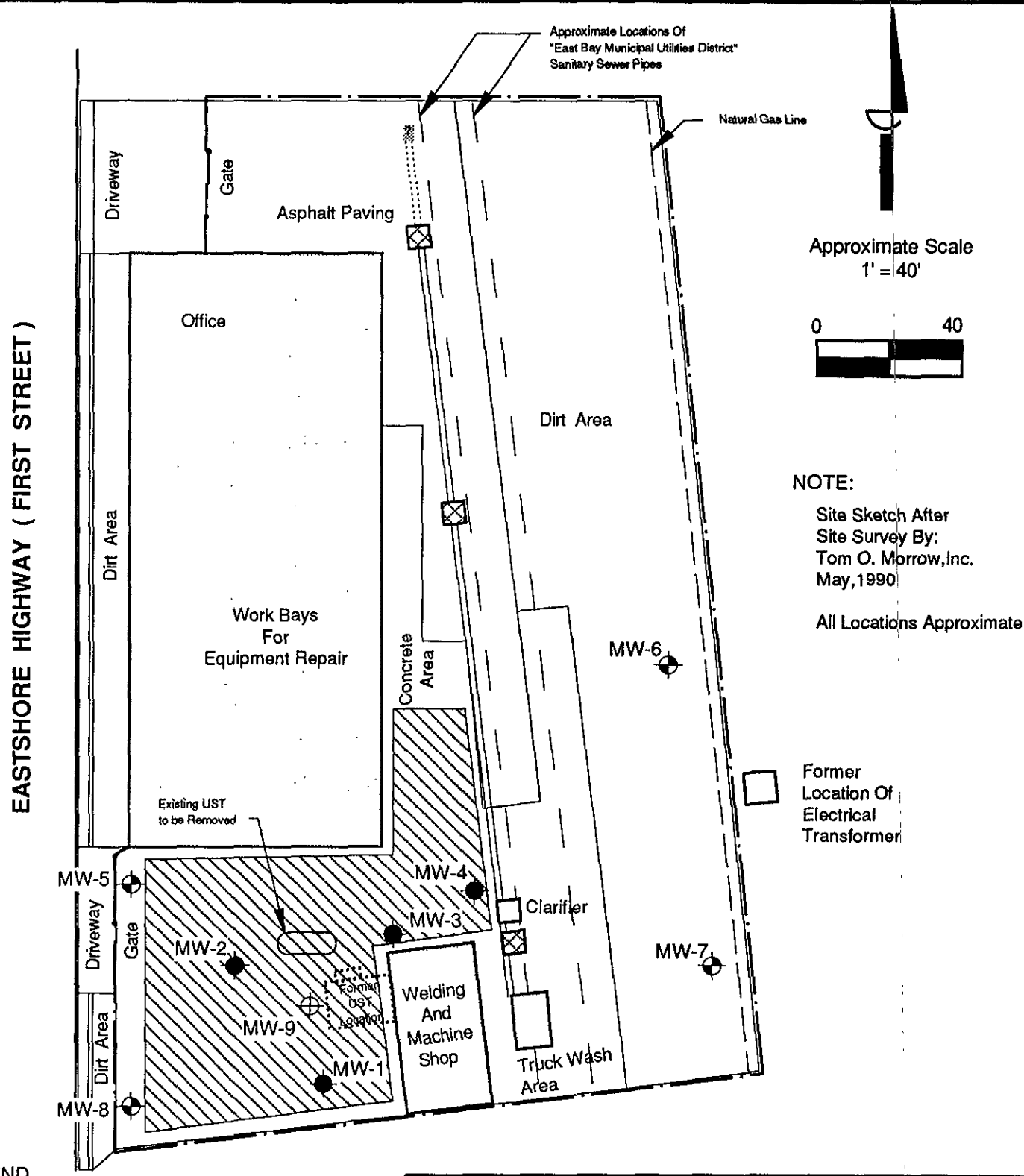
GENERAL NOTES:

BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC RICHMOND & OAKLAND WEST, CA.

FIGURE 1
SITE LOCATION MAP
E. C. Buehrer Associates, Inc.
1061 Eastshore Highway
Albany, Ca.

AEGIS Job Number 90-007

DRAWN BY: Ed Bernard **DATE: Apri 8, 1991**
REVIEWED BY: **DATE:** 2-18-92



LEGEND

- Existing Monitoring Well
- Proposed Monitoring Well
- Abandoned Monitoring Well
- Proposed Area of Excavation

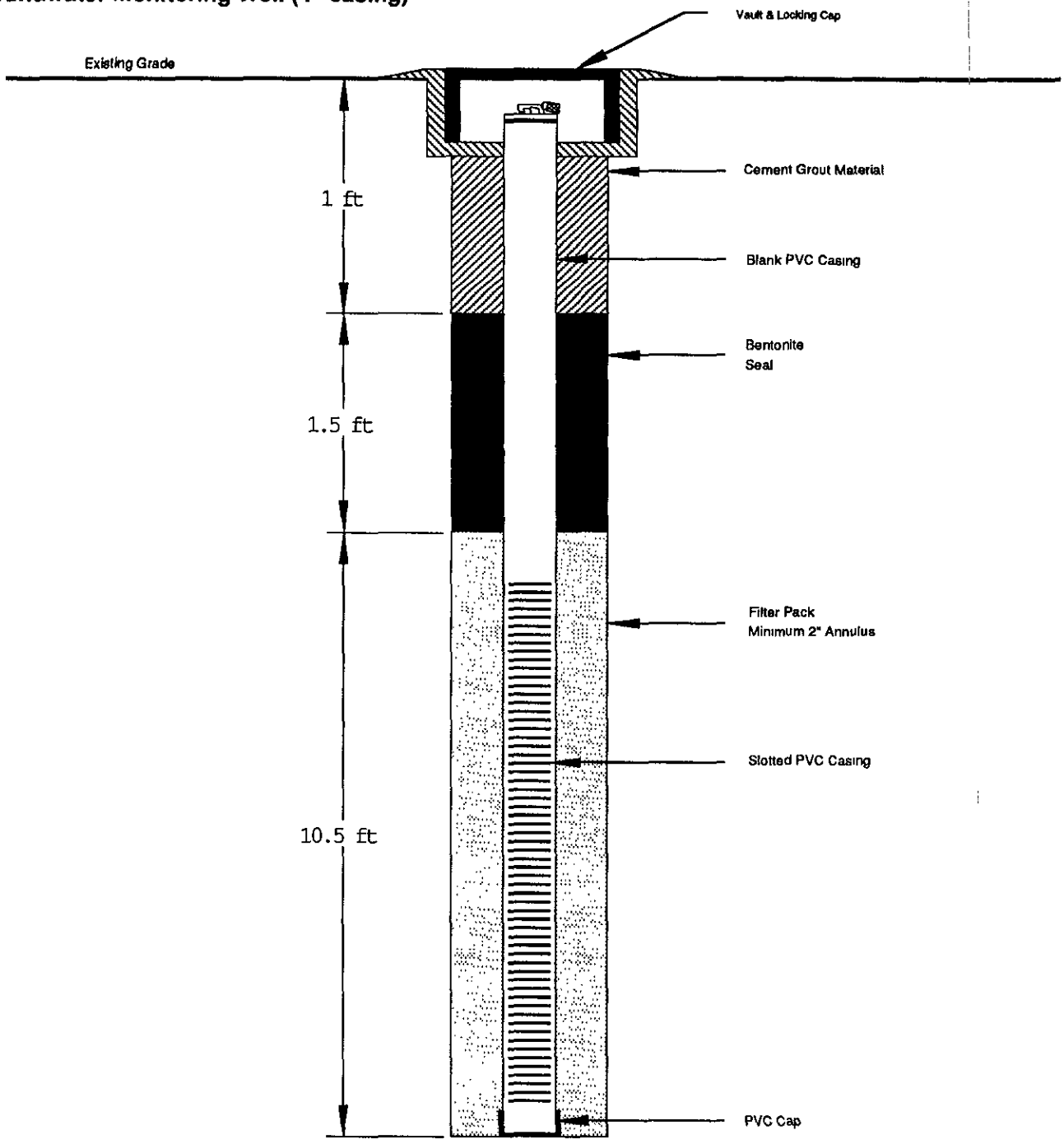
FIGURE 2
SITE MAP
E. C. Buehrer Associates, Inc.
1061 Eastshore Highway
Albany, Ca.

AEGIS Job Number 90-007

DRAWN BY: Dennis Hada **DATE:** July 26, 1991

REVIEWED BY: TJM **DATE:** 2-18-92

Groundwater Monitoring Well (4" casing)



(NOT TO SCALE)

AEGIS ENVIRONMENTAL, INC.	Typical Groundwater Monitoring Well Construction Details (4" Casing) E.C. Buehrer 1061 Eastshore Highway Albany, CA	JOB NUMBER 90-007 FIGURE 3

ATTACHMENT

AEGIS ENVIRONMENTAL, INC.
STANDARD OPERATING PROCEDURES
RE: SOIL BORING SAMPLING
SOP-1

Soil samples for chemical analysis are collected in thin-walled brass tubes, 4 or 6 inches long by 2-inches outside-diameter or other appropriate cleaned sample container. Three or four of the tubes, plus a spacer tube, are set in a 2-inch inside-diameter 18-inch split-barrel sampler.

Where possible, the split-barrel sampler is driven its entire length either hydraulically or using a 140-pound drop hammer. The sampler is extracted from the borehole and the brass tubes, containing the soil samples, are removed. Upon removal from the sampler, the selected brass tubes are immediately trimmed and capped with either aluminum foil or Teflon sheets and plastic caps. They are then hermetically sealed with duct tape, labeled and refrigerated for delivery, under strict chain-of-custody, to the analytical laboratory. These procedures minimize the potential for cross-contamination and volatilization of volatile organic compounds (VOC) prior to chemical analysis.

One soil sample collected at each sampling interval is analyzed in the field using either a portable photoionization detector (PID), flame ionization detector, organic vapor analyzer, catalytic gas detector or an explosimeter. The purpose of this field analysis is to qualitatively determine the presence or absence of hydrocarbons, and the samples to be analyzed at the laboratory. The soil sample is sealed in either a brass tube, glass jar or plastic bag to allow for some volatilization of VOC. The PID is then used to measure the concentrations of hydrocarbons within the containers's head space. The data is recorded on both field notes and the boring logs at the depth corresponding to the sampling point.

Other soil samples are collected to document the soil and/or stratigraphic profile beneath the project site, and estimate the relative permeability of the subsurface materials. All drilling and sampling equipment are either steam-cleaned or washed in trisodium phosphate solution and double-rinsed in deionized water prior to use at each site and between boreholes to minimize the potential for cross-contamination.

AEGIS ENVIRONMENTAL, INC.
STANDARD OPERATING PROCEDURES
RE: SOIL CLASSIFICATION
SOP-3

Soil samples are classified according to the Unified Soil Classification System (USCS). Representative portions of the samples may be shipped under strict chain-of-custody to an analytical laboratory for further examination and verification of the in-field classification, and analysis of soil mechanical and/or petrophysical properties. The soil types are indicated on logs of either excavations or borings together with depths corresponding to the sampling points, and other pertinent information.

AEGIS ENVIRONMENTAL, INC.
STANDARD OPERATING PROCEDURES
RE: SAMPLE IDENTIFICATION AND CHAIN-OF-CUSTODY PROCEDURES
SOP-4

Sample identification and chain-of-custody procedures ensure sample integrity, and document sample possession from the time of collection to its ultimate disposal. Each sample container submitted for analysis is labeled to identify the job number, date, time of sample collection, a sample number unique to the sample, any in-field measurements made, sampling methodology, name(s) of on site personnel and any other pertinent field observations also recorded on the field excavation or boring log.

Chain-of-custody forms are used to record possession of the sample from time of collection to its arrival at the laboratory. During shipment, the person with custody of the samples will relinquish them to the next person by signing the chain-of-custody form(s) and noting the date and time. The sample-control officer at the laboratory will verify sample integrity, correct preservation, confirm collection in the proper container(s) and ensure adequate volume for analysis.

If these conditions are met, the samples will be assigned unique laboratory log numbers for identification throughout analysis and reporting. The log numbers will be recorded on the chain-of-custody forms and in the legally-required log book maintained in the laboratory. The sample description, date received, client's name and any other relevant information will also be recorded.

AEGIS ENVIRONMENTAL, INC.
STANDARD OPERATING PROCEDURES
RE: LABORATORY ANALYTICAL QUALITY ASSURANCE AND CONTROL
SOP-5

In addition to routine calibration of the analytical instruments with standards and blanks, the laboratory analyst is required to run duplicates and spikes on 10 percent of the analyses to insure an added measure of precision and accuracy. Accuracy is also verified through the following:

1. U.S. Environmental Protection Agency (EPA) and State certification programs;

2. Participation in an inter-laboratory or "round-robin" quality assurance program;

3. Verification of results with an alternative method. For example, calcium may be determined by atomic absorption, ion chromatography, or titrimetric methods. Volatile organic compounds may be determined through either purge and trap or liquid-liquid extraction methods; and,

4. Miscellaneous checks of equipment accuracy. Where trace analysis is involved, purity of the solvents, reagents and gases employed is of great concern. The laboratory maintains a service contract on all major instrumentation, including gas chromatograph, atomic absorption, ion chromatography and total organic carbon analyzers. Each of these instruments are serviced and maintained regularly.

AEGIS ENVIRONMENTAL, INC.
STANDARD OPERATING PROCEDURE
RE: HOLLOW-STEM AUGER MONITORING WELL INSTALLATION AND DEVELOPMENT
SOP-6

Boreholes for monitoring wells are drilled using a truck-mounted hollow-stem auger drill rig. The borehole diameter will be a minimum of four inches larger than the outside diameter of the casing when installing well screen. The hollow-stem auger provides minimal interruption of drilling while permitting soil sampling at desired intervals. Soil samples are collected by either hammering or hydraulically pushing a conventional split-barrel sampler containing pre-cleaned 2-inch diameter brass tubes. A geologist or engineer from Aegis Environmental, Inc. continuously logs each borehole during drilling and constantly checks drill cuttings for indications of both the first occurrence of groundwater and volatile hydrocarbons using either a portable photoionization detector (PID), flame ionization detector or an explosimeter. The sampler is rinsed between samples and either steam cleaned or washed with all other drilling equipment between borings to minimize the potential for cross-contamination.

Monitoring wells are cased with threaded, factory-perforated and blank Schedule 40 PVC. The perforated interval consists of slotted casing, generally with 0.020-inch wide by 1.5-inch long slots, with 42 slots per foot. A PVC cap may be secured to the bottom of the casing with stainless steel screws; no solvents or cements are used. Centering devices may be fastened to the casing to assure even distribution of filter material and grout within the borehole annulus. The well casing is thoroughly washed and/or steam cleaned, or may be purchased as pre-cleaned, prior to installation.

After setting the casing inside the hollow-stem auger, sand or gravel filter material is poured into the annular space to fill from boring bottom to generally 1 foot above the perforated interval. A 1- to 2-foot thick bentonite plug is set above this filter material to prevent grout from infiltrating into the filter pack. Either neat cement, containing about 5% bentonite, or sand-cement grout is then tremmied into the annular space from the top of the bentonite plug to near surface. A traffic-rated vault is installed around each wellhead for wells located in parking lots or driveways, while steel "stovepipes" are usually set over wellheads in landscaped areas.

After installation, the wells are thoroughly developed to remove residual drilling materials from the wellbore, and to improve well performance by removing fine material from the filter pack that may pass into the well. Well development techniques used may include pumping, surging, bailing, swabbing, jetting, flushing and air-lifting. All development water is collected either in drums or tanks for temporary storage, and properly disposed of depending on laboratory analytical results. To minimize the potential for cross-contamination between wells, all development equipment are either steam cleaned or properly washed prior to use.

AEGIS ENVIRONMENTAL, INC.
STANDARD OPERATING PROCEDURE
RE: MEASURING LIQUID LEVELS USING WATER LEVEL OR INTERFACE PROBE
SOP-12

Field equipment used for liquid-level gauging typically includes the measuring probe (water level or interface), light filter(s), and product bailer(s). The field kit also includes cleaning supplies (buckets, TSP, spray bottles, and deionized water) to be used in cleaning the equipment between wells.

Prior to measurement, the probe tip is lowered into the well until it touches bottom. Using the previously established top-of-casting (TOC) point, the probe cord (or halyard) is marked and an measuring tape (graduated in hundredths of a foot) is used to determine the distance between the probe end and the marking on the cord. This measurement is then recorded on the liquid-level data sheet as the depth to water (DTW).

When using the interface probe to measure liquid levels, the probe is first electrically grounded to either the metal stove pipe or another metal object nearby. When no ground is available, reproducible measurements can be obtained by clipping the ground lead to the handle of the interface probe case. After grounding the probe, the top of the well casing is fitted with a light filter to insure that sunlight does not interfere with the operation of the probe's optical mechanisms. The probe tip is then lowered into the well and submerged in the groundwater. An oscillating (beeping) tone indicates that the probe is in water. The probe is slowly raised until either the oscillating tone ceases or becomes a steady tone. In either case, this is the depth-to-water indicator and the DTW measurement is made accordingly. The steady tone indicates floating hydrocarbons. In this case, the probe is slowly raised until the steady tone ceases. This is the depth-to-product (DTP) indicator and the DTP measurement is made accordingly.

The process of lowering and raising the probe must be repeated several times to ensure accurate measurements. The DTW and DTP measurements are recorded on the liquid level data sheet. When floating product is indicated by the probe's response, a product bailer is lowered partially through the product-water interface to confirm the product on the water surface, and as further indication of product thickness, particularly in cases where the product layer is quite thin. This measurement is recorded on the data sheet as product thickness (PT).

In order to avoid cross contamination of wells during the liquid-level measurement process, wells are measured in the order of "clean" to "dirty" (where such information is available). In addition, all measurement equipment is cleaned with TSP solution and thoroughly rinsed with deionized water before use, between measurements in respective wells and at the completion of the day's use.