SEE ALSO: 4-21-97 RBCA

**Weiss Associates** Environmental and Geologic Services

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August 20, 1996

Mr. Scott O. Seery, CHMM
Alameda County Department of Environmental Health
1131 Harbor Bay Pkwy, #250
Alameda, CA 94502-6577

RE: **Workplan for Risk-Based Corrective Action Evaluation**
Former Shell Service Station
15275 Washington Avenue
San Leandro, California
WIC # 204-6852-1008
WA Job #81-1227-4

Dear Mr. Seery:

On behalf of Shell Oil Products Company (Shell), Weiss Associates (WA) has prepared this workplan in response to your letter to Shell engineer Jeff Granberry, dated May 20, 1996, and per our meeting on July 26, 1996. In your letter, you requested that Shell submit a workplan that details a plan to assess and, if necessary, mitigate risk to potential receptors. This assessment will follow the procedures outlined in the American Society for Testing and Materials (ASTM) Standard E-1739, *Risk-Based Corrective Action Applied at Petroleum Release Sites (RBCA)*. WA's proposed plan includes four phases: 1) conduct a Tier 1 RBCA evaluation; 2) collect additional site data, if necessary, as determined by the Tier 1 evaluation and in anticipation of the Tier 2 evaluation; 3) conduct a Tier 2 RBCA evaluation; and 4) submit a corrective action plan that addresses the site-specific action levels developed in the Tier 2 evaluation. Each of these is described below.

## RBCA Tier 1 Evaluation

WA will perform a RBCA Tier 1 evaluation using previously collected site data. The objective of the Tier 1 evaluation is to identify potentially complete exposure scenarios and to determine, with very conservative and general assumptions, if constituents of concern (COCs) present in site soil and ground water pose an unacceptable risk to potential receptors. For all potentially complete exposure pathways, site data will be compared to residential Tier 1 risk-based screening levels (RBSLs). The ASTM values will be adjusted, as necessary, to reflect the California-approved toxicological factor(s).

WA's preliminary review of the site data indicates that the concentrations of some COCs in ground water and subsurface soil may exceed the Tier 1 RBSLs, assuming the most conservative, non-site specific exposure scenarios. Based on this review, WA recommends further site investigation to incorporate realistic site-specific data and assumptions before developing a corrective action plan (CAP) under the Tier 2 RBCA evaluation. WA will submit a draft of the Tier 1 RBCA evaluation prior to beginning any field work.

## Additional Field Investigation

The exposure pathways that appear to be of primary concern are volatilization from subsurface soils and ground water to indoor and outdoor air. Therefore, WA recommends collecting soil vapor survey (SVS) data to complete a Tier 2 evaluation for this site. The objective of this SVS is to collect and analyze soil vapor samples, and assess the potential migration of vapor-phase hydrocarbons from the water table, surface soil, and subsurface soil to ground surface. These soil vapor data will facilitate an evaluation of the potential volatilization of dissolved hydrocarbons and migration of these hydrocarbons into indoor and outdoor air, and whether these pathways pose an unacceptable human health risk. WA believes that soil vapor data can eliminate uncertainties involved in the RBCA vapor transport model and, therefore, offer a more direct and reliable estimate of the attenuation of contaminants with time and distance. The recommended calculation methods for a Tier 2 evaluation require estimating a concentration in soil vapor and then modeling migration to the receptor location. Use of actual SVS data will eliminate the need for estimating soil vapor concentrations. SVS data may also be used to calibrate and verify the results of vapor transport models.

WA has verified the reliability of collecting vertical arrays of soil vapor samples for determining whether soil vapors pose an unacceptable risk to human receptors at several other project sites, most notably a former Shell service station in Berkeley, California and at the Lawrence Livermore National Laboratory. In June 1996 at the Berkeley site, WA collected several vertical profiles of soil vapor and substantiated the profiling results with surface isolation flux chamber measurements and laboratory analyses of Goresorbers. As you are probably aware, Goresorbers are passive soil vapor sampling devices that measure soil vapors over a longer time than standard SVS samples or equipment. At the Berkeley site, WA installed the Goresorbers for about two weeks. WA is willing to share the results of the Berkeley investigation with you at your request.

In addition to analyzing the vapor samples for benzene, toluene, ethylbenzene and xylenes (BTEX), the laboratory will analyze the samples for atmospheric gases, including oxygen, carbon dioxide and methane, to assess hydrocarbon degradation rates in the vadose zone.

Another pathway of concern is the ingestion of surface soil in unpaved locations of the site. To evaluate potential risk from exposure to surface soil, WA recommends collecting surface soil samples in two of the SVS sampling locations at a depth of 2 ft below ground surface.

To conduct the SVS, WA proposes to:

- Obtain a right-of-entry (ROE) agreement with the owner of the property;

- Locate all underground utility lines and prepare a site-specific health and safety plan;
- Collect 6 to 10 SVS samples from between 4 and 8 ft depth at the locations shown on Figure 1;
- Collect an ambient, above ground air sample over 8 hours with periodic recording of wind direction for comparison to the SVS data;
- Collect 4 to 6 SVS samples at different depths down to the water table in three locations near wells SR-1, S-8 and S-9;
- Collect two soil samples at a depth of 2 ft at the locations shown on Figure 1; and
- Analyze the soil vapor samples and the ambient air sample for BTEX, oxygen, carbon dioxide and methane. Analyze the soil samples for total petroleum hydrocarbons as gasoline (TPH-G) and BTEX.

WA will collect the samples in one-liter SUMMA canisters, because of their ease of use and transport, and the low detection limits achievable from whole-air samples. Also, the passivation process used in canister preparation eliminates some of the (minor) concerns associated with the sample integrity of Tedlar bags. A SVS sampling protocol is attached in Attachment A and WA's sampling QA/QC plan is presented as Attachment B.

The SVS samples will be sent to a California-certified analytical laboratory. All samples will be analyzed using EPA Method TO-3 for BTEX. The TO-3 methodology is an EPA-approved method with good repeatability for whole-air samples and typical detection limits are quite low (1 part per billion by volume for each BTEX constituent).

Our recommended SVS sample locations are presented in Figure 1 were selected based on:

1) Soil vapor sample locations from a previous SVS and a visual site inspection. WA believes a comparison to the previous SVS data may provide data on the magnitude of vapor migration and attenuation of COCs at the site.

2) The former western dispenser island may be the primary source of hydrocarbons in the subsurface. Therefore, to calibrate the vapor transport model used in the Tier 2 evaluation, WA recommends collecting vertical soil vapor profile data near this location.

WA will notify you prior to beginning this work and will submit a report presenting the results of the investigation soon after completing the field work. WA will conduct the SVS after 5 to 7 days of dry weather and after obtaining the ROE agreement from the current property owner.

WA will calculate emissions to ambient air and vapor intrusion into enclosed spaces using SVS data collected closest to the potential receptors and utilizing the methodologies described in

ASTM Standard E-1739. These results will be compared to Tier 1 RBSLs, and a Tier 2 evaluation will be conducted for exposure pathways that exceed Tier 1 RBSLs.

## RBCA Tier 2 Evaluation

WA will perform a RBCA Tier 2 evaluation using both previously collected site data and the SVS data. The objective of the Tier 2 evaluation is to determine Site-Specific Target Levels (SSTLs) protective of human health for COCs at the site. These SSTLs will be used as action levels in the CAP prepared as step 4 of this evaluation.

## Corrective Action Plan

WA will prepare a CAP in accordance with California Administrative Code 23 CAC Section 2725. The CAP will include an impact assessment of the site, an evaluation of corrective action alternatives, a determination of contaminant target levels, and a verification monitoring plan along with the proposed corrective action.

WA trusts this workplan satisfies your request. Please call if you have any questions or comments.

REGISTERED GEOLOGIST
PETER F. McKEREGHAN
No. HG64
CERTIFIED HYDRO-GEOLOGIST
STATE OF CALIFORNIA

Sincerely,
Weiss Associates

Thomas Fojir FOR

Zafer Demir
Project Engineer

Peter F. McKereghan, C.H.G.
Project Hydrogeologist

Enclosures: Attachment A: SVS Sampling Protocol
Attachment B: QA/QC Plan

cc: R. Jeff Granberry, Shell Oil Products Company
Brad Broschetto, Shell Oil Products Company
Erik Hansen, Shell Development Company
Kevin Graves, Regional Water Quality Control Board, San Francisco Bay Region

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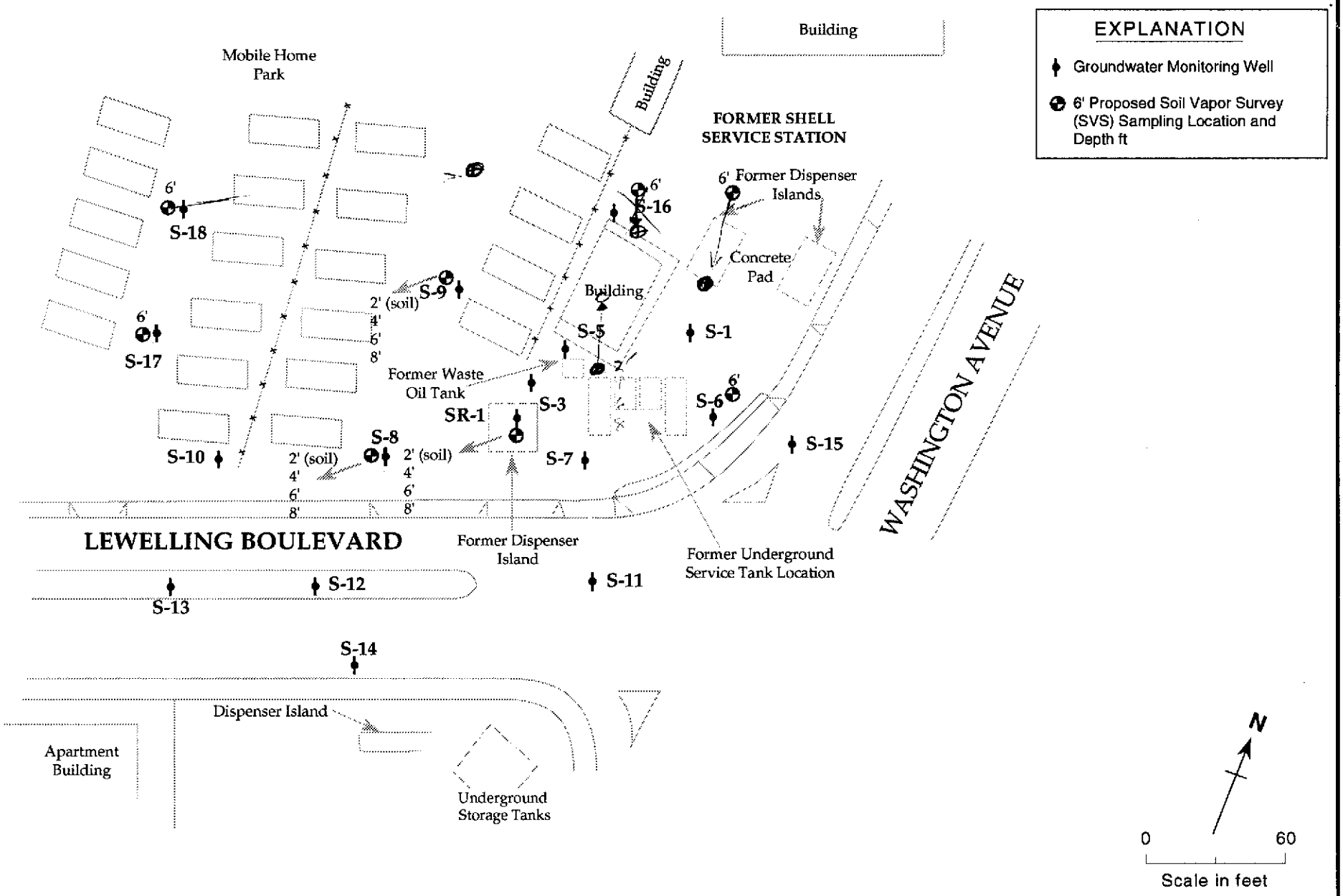


Figure 1. **Proposed SVS Sampling Locations** - Shell Oil Company, 15275 Washington Avenue, San Leandro, California

# ATTACHMENT A

SVS SAMPLING PROTOCOL

## I. Probe Placement

A) A clean soil gas probe is removed from the "clean" storage tube.

B) The soil gas probe is placed in the jaws of a hydraulic pusher/puller mechanism.

C) A sampling drive point is inserted into the bottom of the probe.

D) The hydraulic pushing mechanism is used to push the probe into the ground.

E) If the pusher mechanism will not push the probe into the ground to a sufficient depth for sampling, a hydraulic hammer is used to pound the probe into the ground.

## II. Soil Gas Sample Extraction

A) An adapter is attached to the top of the soil gas probe.

B) A vacuum pump is attached to the adapter via polyethylene tubing.

C) The vacuum pump is turned on and used to purge the sampling equipment with soil gas.

D) Approximately three probe volumes are purged before a sample is collected. Since the flow rate is dependent on resistance to flow, the evacuation time is adjusted to ensure the proper volume is extracted.

E) The probe purge flow rate is monitored using a rotometer at the vacuum pump and the flow rate is maintained between 5 and 10 liters per minute.

## III. Soil Gas Sample Collection

A) With the vacuum pump running, a stainless steel hypodermic syringe needle attached Teflon tubing to a SUMMA canister is inserted through the silicone rubber, which acts as a seal, and down into the metal tubing of the sample probe. This technique eliminates the possibility of exposing the sample stream to any part of the adapter and associated tubing. Soil gas samples only contact clean decontaminated surfaces and never contact potentially sorbing materials (i.e., tubing, hose, pump diaphragm). Clean stainless steel hypodermic syringe needles and Teflon sample tubing are used for each sample.

B) The syringe needle and Teflon sample tubing is purged with soil gas. Then, without removing the syringe needle from the adapter, a soil gas sample is collected slowly (1 to 3 liters per minute) using a SUMMA canister.

C) The syringe needle is removed from the adapter and the syringe needle and Teflon sample tubing is set aside for later decontamination.

D) If necessary, a second SUMMA canister sample is collected using the same procedure.

## IV. Deactivation of Sampling Apparatus

A) The vacuum pump is turned off and unhooked from the adapter.

B) The adapter is removed and stored.

C) Using the hydraulic puller mechanism, the probe is removed from the ground.

D) The probe is stored in the "dirty" probe tube.

E) The probe hole is backfilled and capped, if required.

## V. Logbook and U.S. EPA Field Sheet Notations for Sampling

A) Time (military notation)

B) Sample number

C) Location (approximate description - i.e., street names)

D) Sampling depth

E) Purge flow rate and time before sampling

F) Probe number

G) Observations (i.e., ground conditions, concrete, asphalt, soil appearance, surface water, odors, vegetation, etc.)

H) Backfill procedure and materials, if used

## VI. Other Record Keeping

A) Chain of Custody data sheets are filled out for the SUMMA canisters.

B) Sample location is marked on the site map.

# ATTACHMENT B

QA/QC PLAN

The following are QA/QC procedures for soil vapor survey:

## I. Sampling Equipment

1. Each SUMMA canister is cleaned by Air Toxics LTD before use using a combination of dilution, heat and high vacuum. They are usually cleaned in batches, with one in ten samples certified by filling them with ultra high purity air, which is subsequently analyzed using GC/MS. If target analyte concentrations are below 0.2 ppbv, the "batch" of canisters is considered clean.

2. A clean syringe needle, Teflon sample tubing and SUMMA canister is used to collect each soil gas sample to prevent cross-contamination.

## II. Laboratory Analysis

1. Duplicate samples are analyzed at a frequency of at least 10% by Air Toxics LTD.

2. Laboratory spikes are analyzed at a frequency of at least 10% by Air Toxics LTD.

3. Lab blanks are analyzed at a frequency of at least 10% by Air Toxics LTD.

4. For TO-14 analyses Air Toxics LTD will provide surrogates with every sample.