Weiss Associates
Environmental and Geologic Services
5500 Shellmound Street, Emeryville, CA 94608-2411 Fax: 510-547-5043 Phone: **510-450-6000**

June 21, 1996

Madhulla Logan
Hazardous Materials Specialist
Alameda County Health Services Agency
1131 Harbor Bay Parkway, Room #250
Alameda, California 94502

RE: **SVE Test Workplan**
Shell Service Station
WIC #204-5510-0600
4255 MacArthur Boulevard
Oakland, California
WA Job #81-0757-106

Dear Ms. Logan:

On behalf of Shell Oil Products Company (Shell), Weiss Associates (WA) is responding to your letter to Shell engineer Jeff Granberry, dated May 7, 1996. Your letter requested a workplan responding to four issues arising from your review of the *Dispenser Replacement Sampling* report for the subject site. Based on discussion with Shell, WA has prepared responses to the four issues you raised and a soil vapor extraction (SVE) test workplan. Responses to the four issues, the SVE test system configuration and a description of the SVE test are discussed in turn below.

Responses to the Issues

Each of your letter's concerns is paraphrased in italics and followed by the corresponding response below.

1) *Installation of an additional downgradient well to further define the extent of hydrocarbons in ground water.* Shell prefers to evaluate the need for an additional downgradient well after performing the proposed SVE test at the subject site. SVE will likely remove separate phase hydrocarbons (SPH) from wells MW-2 and MW-3 and eliminate the source. Considering that downgradient access is limited by buildings and a freeway, the existing site wells may delineate hydrocarbons in ground water to the extent practical. In fact, the second quarter 1996 sample from downgradient well MW-4 contained only 66 µg/L of benzene in ground water on April 25, 1996, indicating a limited downgradient extent of petroleum hydrocarbons.

2) *Cleanup strategy for the impacted soil in the vicinity of the dispensers.* Total petroleum hydrocarbons as gasoline (TPH-G) concentrations ranging from 2,800 mg/kg to 7,800 mg/kg were detected in samples from below the dispenser and piping adjacent to the service station kiosk and below the northern most dispenser. During the dispenser replacements, Shell installed horizontal wells HW-1 through HW-4 in the vadose zone about 5 feet below ground surface and adjacent to the former piping and dispensers to facilitate future removal of petroleum hydrocarbons from the impacted soil (Figure 1). Shell and WA propose conducting a SVE test on the horizontal wells in the vicinity of the dispensers to determine whether SVE is feasible. Details of the SVE test are presented below.

3) *Cleanup strategy to remove SPH and control migration of hydrocarbons in ground water.* Shell bails SPH from wells MW-2 and MW-3 quarterly. To date, over 11 pounds of SPH have been removed. Shell will continue SPH removal from wells MW-2 and MW-3 for as long as it is measurable. In addition, the proposed SVE test will verify whether SVE is capable of removing SPH from these wells. Regarding controlling the migration of dissolved hydrocarbons, WA is currently evaluating whether hydrocarbons are naturally attenuating as they migrate away from the source area. Shell will sample several site wells next quarter for dissolved oxygen, hydrocarbon-degrading microbes and bacterial nutrients.

4) *Potential source of metals in soil.* As you requested, soil stockpile metals results from the dispenser replacement sampling activities are presented in Table 1. Concentrations of barium, copper and lead in soil were above the soluble threshold limit concentration. Shell and WA do not know the source of the metals, but it is improbable that these metal concentrations resulted from Shell's activities on the property. Shell has not operated a waste oil tank or garage on the property since Shell's tenancy began in 1983. Shell does not own the property and has no information about activities that may have occurred prior to Shell's tenancy.

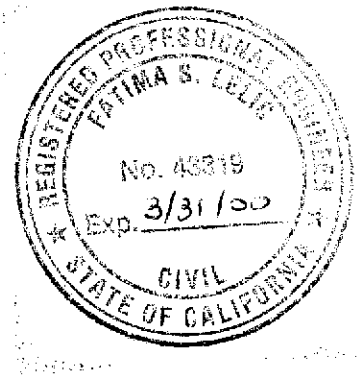
Proposed SVE Test

For the proposed SVE test, WA will connect wells HW-1 through HW-4, MW-2 and MW-3 to an internal combustion engine (ICE). The vapor extraction points will be connected to the ICE through a manifold with vapor sample ports, flow measurement ports and vacuum gauges for parameter measurement. The ICE will provide the applied vacuum and vapor abatement for the SVE test. ICE sample ports, flow, vacuum and temperature measurement devices are provided on the ICE unit.

The SVE test equipment will remove SPH from wells MW-2 and MW-3 and draw vapors from the horizontal piping during the five day test period. WA will collect vapor concentration, flow and vacuum data at the manifold to monitor the effectiveness of SVE from each well. In addition, the ICE will be monitored for influent and effluent hydrocarbon concentrations, system flow rates,

system vacuum and temperature. WA will use the vapor extraction point and ICE system parameters to calculate hydrocarbon removal rates and cumulative hydrocarbon mass removed.

WA will proceed with the SVE test upon receiving written approval of this workplan. After WA receives and analyzes the test data, WA will submit the test results to your agency. We trust this submittal meets your needs. Please call us at (510) 450-6000 if you have any questions or comments.



Sincerely,
Weiss Associates

Tim Utterback
Senior Staff Engineer

Fatima S. Lelic, P.E.
Principle Engineer

Attachments: Figure 1 - SVE Test System Layout
Table 1 - Soil Stockpile Metals Concentrations

cc: R. Jeff Granberry, Shell Oil Products Company, PO Box 4023, Concord, California 94524

TRU/FSL:all
J:\SHELL\0757\CORRESP.96\06LOGL1.DOC

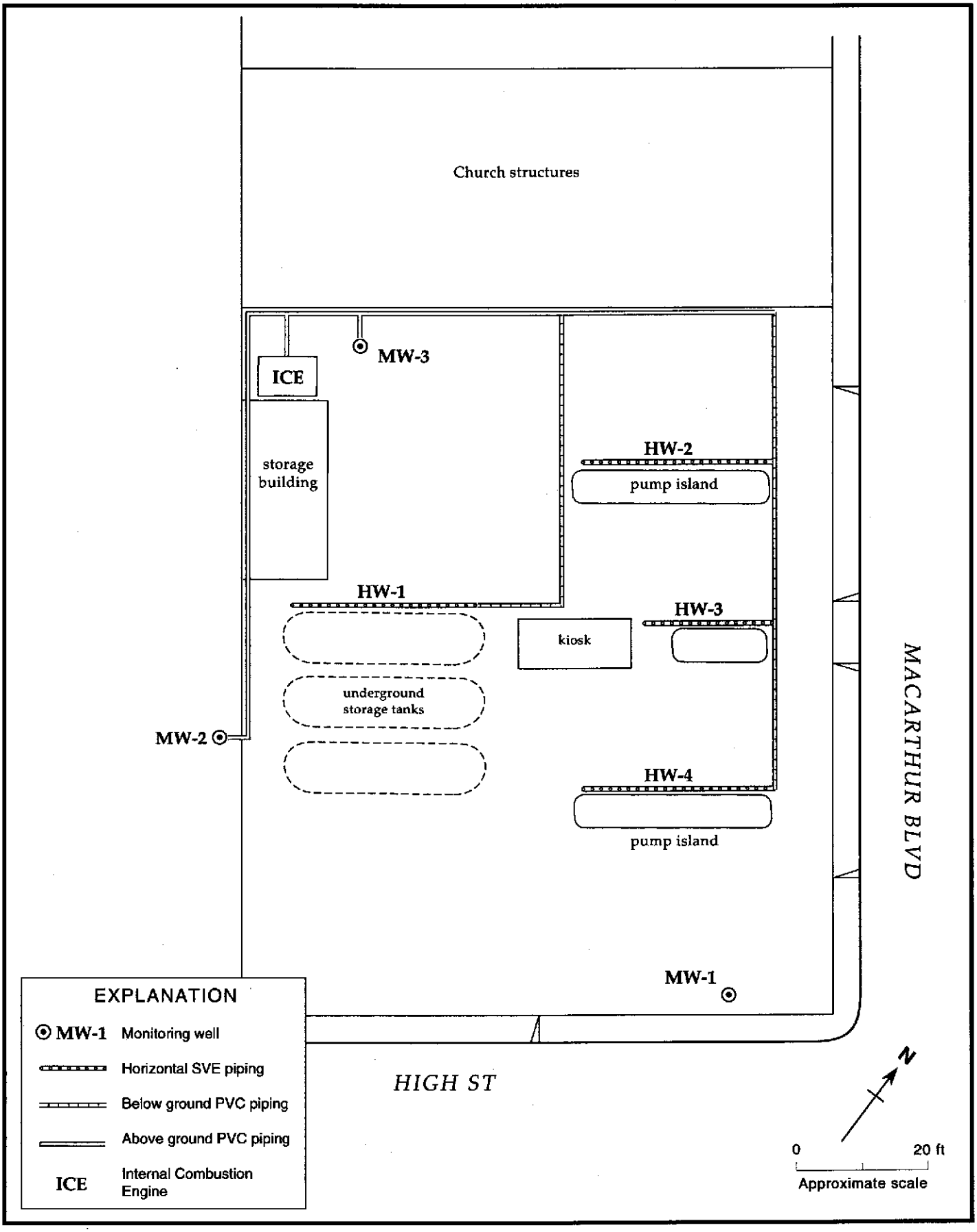


Figure 1. SVE Test System Layout - Shell Service Station WIC #204-5510-0600, 4255 MacArthur Boulevard, Oakland, California

Table 1. Soil Stockpile Metals Concentrations - Shell Service Station WIC #204-5510-0600, 4255 MacArthur Boulevard, Oakland, California

Metals	Sample SS-1 TTLC Results	Title 22 TTLCs	Sample SS-1 STLC Results	Title 22 STLCs (as applicable)	Sample SS-1 EPTOX Results
Antimony	6.8	500	---	---	---
Arsenic	<5.0	500	---	---	---
Barium	1,700	10,000	210	100	26
Beryllium	<0.5	75	---	---	---
Cadmium	<0.5	100	---	---	---
Chromium	46	500	---	---	---
Cobalt	9.0	8,000	---	---	---
Copper	790	2,500	39	25	0.026
Lead	230	1,000	7.0	5.0	<0.10
Lead (Organic)	---	---	<2.0	5.0	---
Mercury	2.8	20	---	---	---
Molybdenum	<2.5	3,500	---	---	---
Nickel	31	2,000	---	---	---
Selenium	14	100	<0.10	1.0	---
Silver	<0.5	500	---	---	---
Thallium	<5.0	700	---	---	---
Vanadium	70	2,400	---	---	---
Zinc	620	5,000	---	---	---

Notes:

--- = Not analyzed
TTLC = Total Threshold Limit Concentration. TTLC metals prepared by EPA Method 3050 and analyzed by EPA Method 6010
STLC = Soluble Threshold Limit Concentration. STLC metals prepared by EPA Method 3010 and analyzed by EPA Method 6010
Lead (Organic) = Organic Lead analyzed by California Method Organic Lead - LUFT
EPTOX = Extraction Procedure Toxicity. Prepared by EPA Method 1310 and analyzed by EPA Method 6010
Title 22 TTLC and STLC values from Title 22, V66261.24

J:\SHELL\0757\CORRESP.96\06LOGTL.DOC