Weiss Associates
Environmental and Geologic Services
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October 5, 1994

Mr. Jim Hart
1337 Josephine Street
Berkeley, California 94703

Re: 4226 Halleck Street @ Sherwin
Emeryville, CA
WA Proposal #99-0967

Dear Jim:

Weiss Associates (WA) is pleased to submit this proposal for additional investigation to determine the extent of arsenic and other metals in soil and/or ground water beneath the subject site (Figure 1). A brief site background, our recommended scope of work and a tentative schedule for the proposed work are provided below. A budget to complete the proposed work is attached.

SITE BACKGROUND

The subject property has been owned by the Southern Pacific Transportation Co. or a related entity since 1906, and since 1906 the property has apparently been used for freight loading and unloading. A Phase I-II site assessment was completed for the property by PES Environmental, Inc. in 1990, for another potential buyer. Elevated concentrations of lead, copper, zinc and arsenic (as compared to concentration ranges in naturally occurring surficial sediments in the San Francisco Bay Region) were detected in composited soil samples collected from a black sandy fill during the PES assessment. In addition, total volatile hydrocarbons as gasoline (TVH-G) were detected in a ground water sample collected from one soil boring

To better define subsurface conditions regarding the hydrocarbons and metals, WA augered soil borings B-1 and B-2 near previous sampling locations at the subject site with the permission of Southern Pacific (Figure 1), and collected soil samples for metals analysis on August 10, 1994, as part of our supplemental Phase I-II site assessment. The borings were drilled to determine actual soil concentrations at the previous locations, rather than the averaged results of the composited samples which PES collected. In addition, we collected a ground water sample from existing monitoring well J-1 for analysis of TVH-G, and volatile organic compounds. The results of the soil sampling included:

- Elevated concentrations of arsenic were detected in a brown to black sandy fill at 2.5-ft depth in both borings, at 6,800 ppm in boring B-1 and at 1,400 ppm in boring B-2;
- Lead, copper and zinc were also detected above estimated background concentrations in all samples. Although barium was detected at more than twice the US median for surface soils, this may be in the range of natural variability;
- Ground water was encountered at about 6-ft depth in the borings, and subsequently rose to about 4-ft depth. However, a ground water sample from boring B-1, which had higher metals concentrations in soil, had no detectable metals except arsenic at 0.009 ppm; and
- No TVH-G or organic compounds were detected in the ground water sample from well B-1.

We compared the metals concentrations in the soil samples to US EPA Region IX, Preliminary Remediation Goals (PRGs) to determine whether the arsenic concentrations detected in soil are a potential health hazard (Table 1). The PRGs are concentrations that under conservative assumptions of exposure would not likely exceed a standard risk for detrimental health affects including cancer. Arsenic at the concentrations detected would, under conservative assumptions for exposure (implying relatively higher chances of exposure) exceed the acceptable risk levels according to the PRGs, since the site concentrations exceed PRGs by a factor of one thousand. Therefore, mitigative or preventive measures may need to be implemented in order to develop this site for residential use.

WA identified at least two potential sources of the arsenic in the site vicinity: a former metal refinery directly west of the site and across the Southern Pacific tracks may have generated arsenic wastes as a byproduct of metal refining; and the Sherwin-Williams site directly to the north has a known arsenic release to ground water related to past arsenic-based pesticide manufacturing at that site. Arsenic as high as 110,000 ppm was detected in soil at the Sherwin-Williams property.

RECOMMENDED SCOPE OF WORK

According to our discussions regarding the project, the purpose of the proposed work is to provide subsurface data that can be used to determine what, if any, mitigation or remedial action would be needed due to the elevated metals, especially arsenic, to be able to develop the property for residential use. When collecting the data, we will consider that the arsenic-bearing material may occur irregularly across the site, since it seems the arsenic occurs in fill material. Therefore, the 6,800 ppm of arsenic detected in boring B-1 may not be the maximum concentration encountered. In addition, we will also need to characterize the arsenic's leachability, since arsenic may occur in the subsurface in either soluble or insoluble forms. Soluble forms are of greater concern, as they may

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migrate with ground water more easily. Solubility of arsenic is affected by the general soil chemistry as well as the source of the arsenic. Considering these points, our recommended scope of work includes the following tasks:

- Establish a grid at the site and auger soil borings at regularly-spaced intervals for collecting soil and ground water samples. Initially, we recommend collecting samples from 12 borings across the site;
- Collect soil samples of various sediment types encountered for possible chemical analysis, and continue augering the soil borings until both native sediments and ground water are encountered in the boring, which we expect will be less than 8-ft depth;
- When ground water is encountered, collect water samples from the augered holes for filtering at the laboratory and possible metals analysis;
- Based on the field observations, analyze soil samples of differing sediment types for arsenic at a minimum, and possibly for, copper, lead, zinc and/or barium;
- After reviewing the soil results, reanalyze some soil samples for soluble metals to determine the leachability, and analyze selected water samples for metals to estimate potential ground water impacts;
- Analyze some soil samples for soil pH to determine the natural conditions for arsenic solubility; and
- tabulate and plot the analytic results on a map to determine whether a pattern of distribution is established.

If the initial results show a random vertical or horizontal distribution, or incomplete trends in areas where a pattern is evident, additional soil borings can be augered to further refine the data.

Once we have collected all the field data, we will prepare a presentation to discuss the results and determine the next course of action. Additional work may include completing a risk assessment with less conservative site assumptions than the PRGs, which may prove that higher concentrations are acceptable in site soils than the PRGs; or preparing a remedial action plan to mitigate any hazards related to the metals occurrence.

SCHEDULE

Assuming we will need to complete 20 soil borings to fully characterize the metals occurrence in shallow soils, we can complete the initial 12 borings in one week. We would then need about one additional week to review the analytic results and plan the additional eight borings. We could then present the data within one month of the project start; however, if overnight turnaround of the soil analyses is conducted, we would be able to present the results in about three weeks from the project start.

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BUDGET

Our estimated budget for the proposed work, assuming we auger 20 borings and complete the indicated number of analyses, is presented as Attachment A. This budget was prepared on a time and materials basis assuming normal laboratory turnaround of the analyses, and includes all WA labor and outside expenses to complete the above tasks. To receive the laboratory results on overnight turnaround, the estimated analytic costs would double and we would expend a nominal amount of additional labor to coordinate the quicker turnaround.

Weiss Associates appreciates the opportunity to provide you with environmental consultation, and we trust this proposal meets your needs. Please call if you have any questions or comments.

Sincerely,
Weiss Associates

John W. Duey
Project Geologist

Mary L. Stallard, C.E.G.
Senior Project Geologist

Att: Budget

cc: Ms. Michelle Mussen

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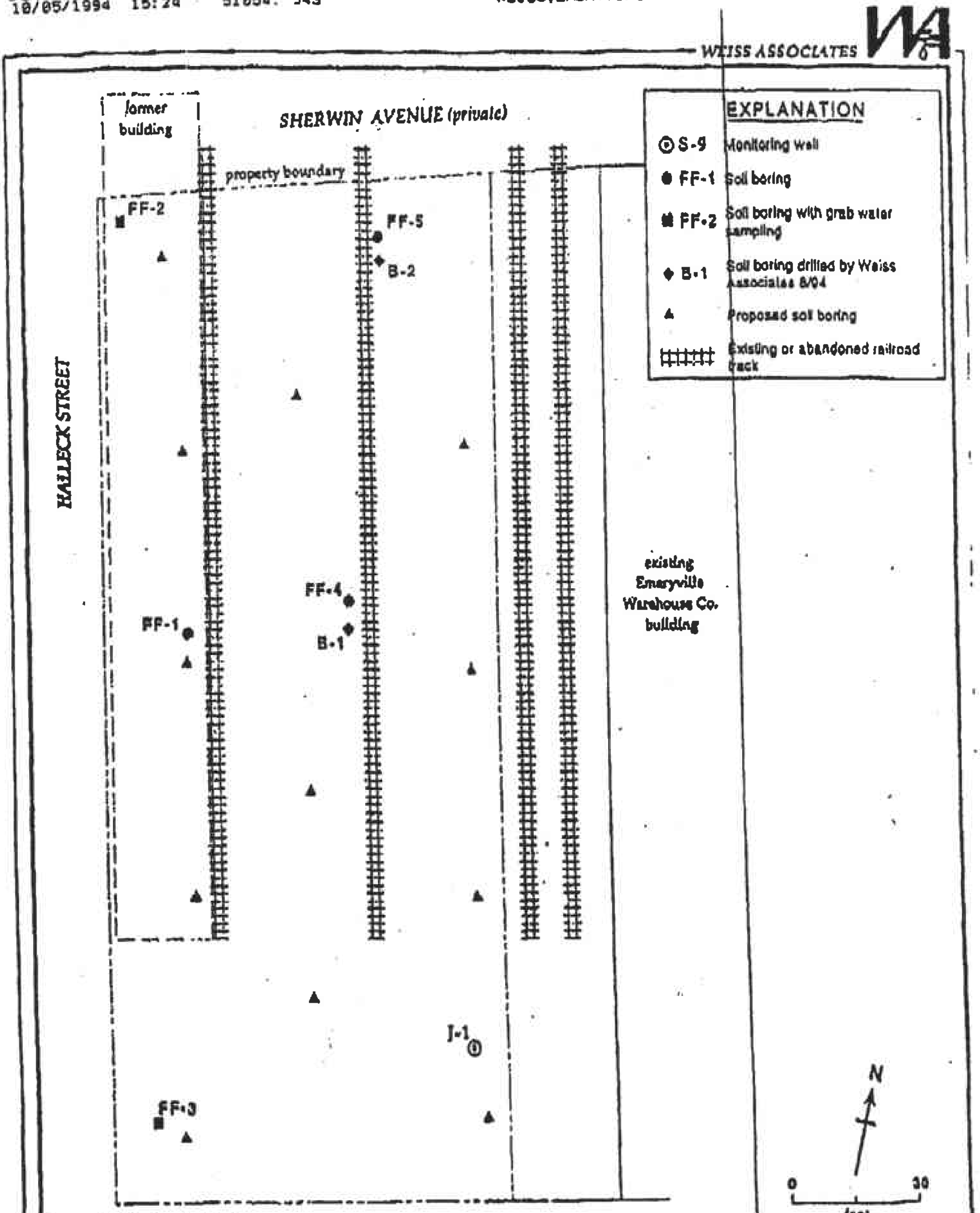

Source: PES Environmental, Inc.

... Well and Soil Boring Location Map - Sherwin and Halleck Street, Emeryville, California

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Estimated Budget for Subsurface Investigation - Halleck St. @ Sherwin St, Emeryville, CA				
Task	Quantity	Unit Cost ($)	Extension ($)	Total ($)
2 - PRESENTATION/PROJECT MGMT				
WA LABOR				
Sr Project Manager I	6 hr	108.25	649.50	
Project Geologist I	20 hr	88.25	2,118.00	
Staff Geologist II	16 hr	68.25	1,092.00	
Graphics	10 hr	52	520.00	
Technical Asst	6 hr	52.50	420.00	
Total labor			4,799.50	4,799.50
WA EXPENSES				
Misc. office expense	1	75	150.00	
Total WA expenses			150.00	150.00
OUTSIDE EXPENSES				
Class III soil disposal (rough estimate)	1	2,500	2,500.00	
Subtotal outside expenses			2,500.00	
10% WA expense overhead			250.00	
Total outside expenses			2,750.00	2,750.00
Task total				7,699.50

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Estimated Budget for Subsurface Investigation - Halleck St. @ Sherwin St, Emeryville, CA				
Task	Quantity	Unit Cost ($)	Extension ($)	Total ($)
1 - FIELD COORDINATION, SAMPLING and ANALYSIS				
WA LABOR				
Sr Project Manager I	1 hr	108.25	108.25	
Project Geologist I	6 hr	88.25	529.50	
Staff Geologist II	54 hr	68.25	3,685.50	
Environmental Technician	38 hr	55	2,090.00	
Clerical	2 hr	37	74.00	
Total labor			6,487.25	6,487.25
WA EXPENSES				
Vehicle rental	1 wk	200	200.00	
Mileage	20	0.35	7.00	
Misc. field equipment	1	275	275.00	
Misc. office expenses	1	75	75.00	
Total WA expenses			557.00	557.00
OUTSIDE EXPENSES				
Misc. field supplies	1	675	675.00	
Chemical Analysis - One-week turnaround				
Five metals: As, Pb, Cu, Zn, Ba	12	70	840.00	
Arsenic	38	35	1,330.00	
Soil pH	8	20	160.00	
Soluble extraction/metals	8	115	920.00	
Asphalt cutting/resurfacing	20	10	200.00	
Subtotal outside expenses			4,125.00	
10% WA expense overhead			412.50	
Total outside expenses			4,537.50	4,537.50
				11,581.75

Table 1. Analytic Results for Metals in Soil and Ground Water Samples - 4226 Halleck Street, Emeryville, California

Boring/ ID	Sample Depth (ft)	Date Sampled	As	Ag	Ba	Be	Cd	Cr	Co	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
			<—							parts per million (mg/kg)									—>
SOIL																			
FF-2/3/4'	1.0	11/20/90	6	<1	140	<0.5	2	28	10	34	0.3	<0.5	39	96	<5	<2.5	<5	18	280
FF-2/4/5'	1.75-3.5	11/20/90	2:0	2	1,100	<0.5	24	52	72	2,600	<0.1	3.3	13	358	<5	<2.5	<5	34	9,300
B1S	2.5	08/10/94	4,000	12	1,400	<0.5	10	25	43	2,300	<0.05	33	9	190	16	<1	<5	27	21,000
B2S	2.5	08/10/94	1,400	13	440	<0.5	7	65	58	2,300	<0.05	81	28	640	27	<1	6	26	80,300
PRG		What's this? 79	22	380	5,300	0.14ca	9	NE	NE	2,800	23	380	150	400	31	380	5.4*	540	23,000
PRG			0.32ca																
Background			2.16 -	NE	500	<1	NE	100	30	30	NE	<3	20	28	NE	NE	NE	150	79
TTLC			500	500	10,000	75	100	2,500	8,000	2,500	20	3,500	2,000	1,000	500	100	700	2,400	5,000
STLC			5	5	100	0.75	1	5	80	25	0.2	350	20	5	15	1	7	24	250
WATER																			
WWFF-1		11/20/90	<0.05	<0.02	0.25	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.02	<0.05	<0.05	<0.05	<0.05	<0.02	0.05
WWFF-2		11/20/90	<0.05	<0.02	1.8	<0.01	<0.01	<0.01	<0.01	<0.02	<0.001	0.03	<0.01	<0.05	<0.05	<0.05	<0.05	<0.02	0.07
B1W	4	08/10/94	0.009	<0.02	0.33	<0.005	<0.01	<0.02	<0.02	<0.02	<0.002	<0.02	<0.02	<0.02	<0.1	<0.01	<0.2	<0.02	<0.02
B2W	4	08/10/94	—	—	—	—	—	—	—	—	—	—	—	<0.005	—	—	—	—	—
3-1	4	10/15/90	<0.05	<0.02	—	<0.01	<0.01	<0.01	—	<0.02	<0.004	—	<0.01	<0.05	<0.1	<0.05	<0.1	—	<0.02
		08/10/94	.005	<0.02	0.12	0.005	0.01	<0.02	<0.02	<0.02	<0.002	<0.02	0.02	<0.1	<0.1	<0.01	<0.2	0.03	<0.02
STLC			5	5	100	0.75	1	5	80	25	0.2	350	20	5	15	1	7	24	250
MCL			0.05	0.05	1.0	0.004	0.01	0.05	NE	1.0*	0.002	NE	0.1	0.015*	NE	0.05	NE	NE	5.0*

— Table 1 continues on next page —

Table 1. Analytical Results for Metals in Soil and Ground Water Samples - 4726 Hallack Street, Emeryville, California. (continued)

Abbreviations:

As = Arsenic by EPA Method 6010
Ag = Silver by EPA Method 6010
Ba = Barium by EPA Method 6010
Be = Beryllium by EPA Method 6010
Cd = Cadmium by EPA Method 6010
Cr = Total chromium by EPA Method 6010
Co = Cobalt by EPA Method 6010 or 7197
Cu = Copper by EPA Method 6010
Hg = Mercury by EPA Method 6010
Mo = Molybdenum by EPA Method 6010
Ni = Nickel by EPA Method 6010
Pb = Lead by EPA Method 7421
Sb = Antimony by EPA Method 6010
Se = Selenium by EPA Method 6010
Tl = Thallium by EPA Method 6010
V = Vanadium by EPA Method 6010
Zn = Zinc by EPA Method 6010
TTLC = Total Threshold Limit Concentration
STLC = Soluble Threshold Limit Concentration
NE = Not established
PRG = USEPA Region IX Preliminary Remediation Goals for soil in Residential Areas (one-cancer risk unless noted, nc = noncarcinogenic)

Notes:

All 1990 data taken from a PES Environmental, Inc. subsurface investigation report dated December 19, 1990.

a = Total chromium; no hexavalent chromium was detected in any of the samples analyzed for metals.
b = PES sample CPF-1, composite sample from Boring FF-2 at 1.0', FF-3 at 1.0', and FF-4 at 1.0'.
c = PES sample CPF-2, composite sample from Boring FF-2 at 2.5', FF-4 at 1.75' and FF-5 at 1.75'.
d = as Thallic Oxide (most hazardous form)
e = Recommended Action Level = 0.015 ppm
f = Secondary MCL - No primary MCL established.