



*at  
Leech  
8/15/96*

August 12, 1996

Amy Leech  
Hazardous Materials Specialist  
Environmental Health Services  
Environmental Protection  
1131 Harbor Bay Parkway  
Alameda, California 94502-6577

**RE: System Pulsing Update Report**  
Former Chevron Service Station 9-2960  
2416 Grove Way  
Castrol Valley, California  
WA Job #4-0552-88

Dear Ms. Leech:

As you requested, Weiss Associates (WA), on behalf of Chevron Products Company (Chevron), presents an update on the soil vapor extraction system performance under pulsing conditions at the site referenced above. Your June 12, 1996, letter to Kenneth Kan of Chevron requested an evaluation of the system performance while operating the system on a pulsing schedule to possibly enhance the system performance. The following report describes the historic system operating cycle and the June pulsing cycle. It also presents the analytic results for the samples collected from the soil vapor extraction well after the system had been cycled off in June, and describes a proposed system pulsing schedule through October 1996.

Since start-up, the system has operated on a continuous cycle. Each month, WA measured hydrocarbon vapor concentrations at vapor extraction well C-1 and the system influent and effluent sample ports using a flame ionization detector (FID). Well hydrocarbon vapor concentrations were correlated with well vacuum, well vapor flow rates, influent hydrocarbon concentrations and system flow rates. The well vacuum was adjusted to draw the greatest flow rate from well C-1 to maximize mass removal. The minimum amount of dilution air was used to achieve the system's operating flow rate in order to maximize the thermal oxidizer's operating efficiency. Although the system was on a continuous operation cycle, the system did experience shutdown events of varying lengths between regular site visits due to variations in site conditions. Before restarting the system after a shutdown event, WA collected well vapor concentrations. Table 1 follows and summarizes the hydrocarbon concentrations measured with the FID from the vapor extraction well C-1.

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TABLE 1. WELL VAPOR HYDROCARBON CONCENTRATIONS

Date	Well C-1 Vapor Concentration (ppmv)	Depth to Water in Well C-1 (feet)	System Status Upon Arrival (on/off)	Notes
28-Jun-94	49,700	17.9	on	
13-Jul-94	43,500		off	a
26-Jul-94	40,500		on	
2-Aug-94	25,200	16.67	off	a
6-Sep-94	20,700	17.63	on	a
4-Oct-94	4,200		on	a
22-Nov-94	3,500		off	
12-Dec-94	5,350	16.53	off	
5-Jan-95	6,000	16.65	off	
1-Feb-95	400	14.48	off	
1-Mar-95	2,750	15.57	off	
12-Apr-95	250	14.32	on	
22-May-95	250		on	
29-Jun-95	4,750	16.93	off	
27-Jul-95	560	15.8	on	
28-Aug-95	150	15.75	on	
13-Sep-95	3,800	16.91	off	
30-Oct-95	6,250	15.8	on	
21-Nov-95	1,250		off	
14-Dec-95	9,850	17.4	off	
17-Jan-96	1,500	16.01	off	
29-Feb-96	1,600		on	
21-Mar-96	5	13.85	on	
17-Apr-96	1	15.87	off	
23-May-96	2,500	16.33	off	
13-Jun-96	1,000	16.67	off	
26-Jun-96	1,800	14.72	off	b

**Notes:**

Hydrocarbon concentrations were measured in the field with a flame ionization detector (FID).

- Well vapor concentration is estimated by multiplying the system influent concentration by 3 (the approximated dilution factor of the system influent).
- A sample was sent to Sequoia Analytical for total petroleum hydrocarbon as gasoline (TPH-G) and benzene analysis. Results: TPH-G = 680 ppmv and benzene = 5 ppmv.

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On June 13, 1996, WA shut-off the SVE system to begin a two week off pulsing cycle. On June 26, 1996, WA returned to the site and collected a vapor sample from the SVE well C-1. The sample was submitted to Sequoia Analytical of Redwood City, California, for analysis for total petroleum hydrocarbons as gasoline by EPA method 8015 modified and benzene, toluene, ethyl benzene, and total xylenes (BTEX) by EPA method 8020. WA also collected a well vapor sample from C-1 and analyzed it in the field with a FID for comparison with historic data.

The C-1 hydrocarbon vapor sample results indicated that the equilibrium soil vapor concentration was 680 ppmv TPH-G and 5.0 ppmv benzene. The FID result from June 26 is 1,800 ppmv and is consistent with recent equilibrium well vapor concentrations. The analytic report is included as Attachment A.

WA will continue system pulsing for three months. The system will be run for a one month period, the extraction well will be sampled, the system will be shut down for a one month period and the extraction well will be sampled again. This pulsing schedule will be continued through October and the final pulsing samples will be collected in November. The SVE system pulsing will be evaluated and the results summarized in a report. The pulsing schedule is summarized in Table 2 below:

**TABLE 2. SOIL VAPOR EXTRACTION PULSING SCHEDULE**

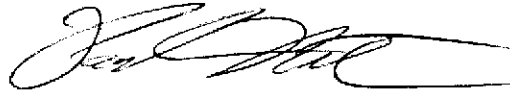
Month	Sampling	System Status Upon Arrival	System Status Upon Departure
August	Well vapor during SVE operation.	On	Turn SVE system off
September	Static well vapor.	Off	Turn SVE system on
October	Well vapor during SVE operation.	On	Turn SVE system off.
November	Static well vapor.	Off	SVE system off, and prepare a system pulsing status report.

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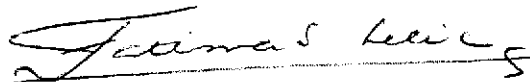
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If you have any questions please contact us at (510) 450-6000.

Sincerely,  
Weiss Associates



Paul M. Nuti  
Senior Staff Engineer



Fatima Lelic, P.E.  
Principal Engineer

Enclosures: Attachment A - Analytical Report

CC: Kenneth Kan, Chevron Products Company

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**ATTACHMENT A**

**ANALYTICAL REPORT**



**Sequoia Analytical**

680 Chesapeake Drive  
404 N. Wiget Lane  
819 Striker Avenue, Suite 8

Redwood City, CA 94061  
Walnut Creek, CA 94598  
Sacramento, CA 95834

(415) 364-9600  
(510) 988-9600  
(916) 921-9600

FAX (415) 364-9333  
FAX (510) 988-9673  
FAX (916) 921-0100

Weiss Associates  
5500 Shellmound  
Emeryville, CA 94608

Client Proj. ID: Chevron 9-2960, Castro Valley  
Sample Descript: C-1  
Matrix: AIR  
Analysis Method: 8015Mod/8020  
Lab Number: 9606F56-01

Sampled: 06/26/96  
Received: 06/27/96  
Analyzed: 06/28/96  
Reported: 07/05/96

Attention: Paul Nuti

QC Batch Number: GC062896BTX17A  
Instrument ID: GCHP17

### Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ppmv	Sample Results ppmv
TPPH as Gas		
Benzene	94	680
Toluene	0.78	5.0
Ethyl Benzene	0.68	N.D.
Xylenes (Total)	0.58	N.D.
Chromatogram Pattern:	0.58	0.83
Unidentified HC		Gas
		< C8
Surrogates		
Trifluorotoluene	Control Limits % 70	% Recovery 190 Q

analytes reported as N.D. were not present above the stated limit of detection.

**SEQUOIA ANALYTICAL** - ELAP #1210

Gregory  
Project Manager





**Sequoia Analytical**

680 Chesapeake Drive  
404 N. Wiget Lane  
819 Striker Avenue, Suite 8

Redwood City, CA 94063  
Walnut Creek, CA 94598  
Sacramento, CA 95834

(415) 364-9600  
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(916) 921-9600

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5500 Shellmound  
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		< C6
Surrogates		
Trifluorotoluene	Control Limits % 70	% Recovery 130
		190 Q

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**SEQUOIA ANALYTICAL** - ELAP #1210

Gregory  
Project Manager

