Denis L. Brown

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Mr. Jerry Wickham
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94205-6577

Re: Former Shell Service Station
461 8th Street
Oakland, California
SAP Code: 129453
Incident No. 97093399
ACHCSA Case No. 0343

Dear Mr. Wickham:

The attached document is provided for your review and comment. Upon information and belief, I declare, under penalty of perjury, that the information contained in the attached document is true and correct.

If you have any questions or concerns, please call me at (707) 865-0251.

Sincerely,

Denis L. Brown
Project Manager

CONESTOGA-ROVERS
& ASSOCIATES

19449 Riverside Drive, Suite 230, Sonoma, California 95476
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October 30, 2007

Mr. Jerry Wickham
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Re: **Work Plan Addendum**
Former Shell Service Station
461 8th Street
Oakland, California
SAP Code 129453
Incident No. 97093399
ACHCSA Case No. 0343

Dear Mr. Wickham:

Conestoga-Rovers & Associates (CRA) prepared this document on behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell) and provides the work plan addendum requested by the Alameda County Health Care Services Agency (ACHCSA) in correspondence dated October 19, 2007. The ACHCSA letter was prepared in response to CRA's May 25, 2007 *Remedial Alternatives Evaluation, Site Investigation, and DPE Pilot Test Work Plan*, and in response to a meeting on October 18, 2007 and provided conditional approval of a portion of the work plan and requested an addendum be prepared to address on-site soil vapor sampling and an air-sparge pilot test. This document provides the Work Plan Addendum for these activities.

SOIL VAPOR SAMPLING ADDENDUM

The existing work plan states that vapor sampling at the locations of proposed geoprobe borings SB-25 through SB-27 would be conducted if access to the adjacent site is not granted. However, in order to better understand potential vapor migration issues at the subject site, the scope is being modified such that, following the soil and groundwater sampling of SB-24 through SB-27, a vapor probe will be installed in each boring for subsequent sampling of soil vapors. The following provides the work plan for installation and sampling of these vapor probes.

Soil Vapor Probe Installation: The vapor probes will be installed in the open boring remaining after backfilling the geoprobe borings up to approximately 11 fbg with grout. On top of the grout, we will place one foot of bentonite pellets from 10-11 fbg and then sand from 10 fbg up to 9.5 fbg. The interval to be screened at each location will be targeted from 9.25 to 9.5 fbg. Each probe will consist of 0.25-inch

inside diameter Teflon tubing, with no greater than 3-inch lengths of perforated screen. Each point will use a 3-inch (0.25 ft) screen interval manufactured by Geoprobe attached to the Teflon tubing. One-inch diameter tremie pipe will be used to install the vapor probe to ensure appropriate placement of the screen interval. A clean, fine-grained silica sand filter pack will be installed around the screened interval and extended up to 9.0 fbg. Thus, the sand interval will extend from 9.0 to 10.0 fbg with the screen interval positioned at approximately 9.25 to 9.5 fbg. Three inches of bentonite pellets will be placed on top of the filter pack sand (8.75 to 9.0 fbg) and the remaining boring will be filled with bentonite slurry. Each vapor probe will be sealed from the surface using a traffic-rated well box, set slightly above grade to eliminate rain water from accumulating over the well boxes.

Soil-Vapor Sampling: Approximately two weeks after probe installations, soil vapor samples will be collected from each sampling point in summa canisters according to CRA's vapor sampling protocol, unless a significant rain event has occurred. Sampling of the vapor probes cannot be conducted within 3 days of a significant (greater than 0.5 inches) rain event. Isopropyl alcohol or shaving cream will be used to provide tracer gas at each sampling location to insure that the samples are not representative of ambient air. For sampling, a flow meter/controller will regulate the flow of air extracted from the tubing by a purge pump. Approximately three tubing volumes will be purged from each vapor point over a period of approximately 10 minutes prior to sample collection. Immediately after purging, soil-vapor samples will be collected over an approximate 30-minute period using 1-liter Summa canisters.

Soil-Vapor Chemical Analyses: The vapor samples will be kept at ambient temperature and submitted under chain-of-custody to a state certified analytical laboratory for analysis. The samples will be analyzed for BTEX by EPA Method TO-14A Modified and for TPHg by EPA Method TO-3 Modified. Depending on the selection of the tracer compounds (isopropyl alcohol or shaving cream), additional compounds will be analyzed accordingly.

Report Preparation: Following the receipt of analytical results from the laboratory, CRA will prepare a written report which will include the site history, the field procedures, tabulated laboratory results, figures showing sample locations, boring logs, findings, and conclusions. The certified laboratory reports and chain-of-custody documentation will be included with the report. Based on the current proposed field schedule, the results of this investigation are to be submitted to the agency by February 25, 2008.

REMEDIATION PLAN ADDENDUM FOR AIR SPARGE PILOT TEST

In re-reviewing site data, and in an effort to evaluate a secondary remedial alternative as a contingency to dual-phase extraction (DPE), CRA has prepared this work plan addendum to propose an air sparge pilot test to coincide with the previously proposed DPE pilot test.

Sparging is an in situ groundwater remediation technology that involves the injection of a gas (i.e. air, oxygen, or ozone) under pressure into a well installed within the saturated zone. Air sparging extends the applicability of soil vapor extraction to saturated soils and groundwater through physical removal of volatilized groundwater contaminants, and enhanced biodegradation in the saturated and unsaturated zones. Air injected below the water table volatilizes contaminants that are dissolved in groundwater and/or sorbed onto saturated soils. The volatilized contaminants migrate upward in the vadose zone, where they are typically removed using soil vapor extraction methods. Air sparging also promotes biodegradation by increasing oxygen concentrations in the subsurface, stimulating aerobic biodegradation in the saturated and unsaturated zones.

The feasibility of sparging depends on the system's ability to effectively deliver air to the target area and the ability of the subsurface materials to effectively transmit the injected air. Therefore, preferred conditions for the successful application of air sparging include moderate to high permeability and homogenous soils that foster effective contact between the injected air and the media being treated. Fine-grained, low permeability soils limit the delivery and migration of gas in the subsurface. Soil heterogeneities may inhibit delivery of air to the impacted area.

United States Geological Survey (USGS) publications and maps indicate that the area is underlain by the Merritt Sand (*Areal and Engineering Geology of the Oakland West Quadrangle, California,* D.H. Radbruch, USGS, *Miscellaneous Geological Investigations, Map I-239,* 1957, and *Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California*, USGS R.W. Graymer, 2000). Previous site investigations indicated that subsurface materials encountered consist primarily of fine-grained sand, which is consistent with the description of the Merritt Sand formation. These soil types appear marginally favorable for air sparging.

CRA proposes conducting a one to two-day air sparge pilot test to confirm the feasibility of this remedial technology. This test will be conducted during the last days of the proposed DPE pilot test. Based on the most recent investigation data, it appears most impacts are within the capillary fringe at approximately 20 fbg. Vadose zone impacts (10 fbg and deeper) appear localized near boring B-12. This sparging effort is designed to target the capillary fringe soils and dissolved phase hydrocarbons. The following sections discuss the work tasks required to implement the AS pilot test.

Work Tasks

Permits: CRA will obtain an appropriate permit for drilling from ACEH.

Site Health and Safety Plan: Pursuant to OSHA and Shell requirements, CRA will prepare a comprehensive site safety plan to protect site workers. The plan will be kept on site during field activities and will be reviewed and signed by each site worker.

Utility Clearance: CRA will mark proposed drilling locations and the locations will be cleared through Underground Service Alert prior to drilling. CRA will also retain a private line locator to identify underground utility locations prior to drilling.

Well Installation: Assuming the absence of subsurface and overhead obstructions, CRA will install one air sparge well (AS-1) in the approximate location shown on Figure 2 using a drill rig equipped with hollow-stem augers. The air sparge well will be advanced to approximately 33 fbg, depending on field conditions. During drilling, soil samples will be collected at 5-foot intervals for laboratory analysis and field screening using a photo-ionization detector (PID). All collected soil samples will be transported to a State-approved analytical laboratory.

Well AS-1 will be constructed using 2-inch diameter schedule 40 PVC casing with approximately 2 feet of 0.020-inch slotted screen. The bottom of the screen will be set near the vertical contaminant limit. CRA anticipates a screen interval from 30 to 32 fbg. A 1-foot sump will be installed below the bottom of the screen.

The sand pack will extend from the bottom of the well up to 1 foot above the top of the well screen, followed by a 2-foot-thick bentonite seal and cement grout to grade. Actual well construction details will be based on field conditions during drilling. The wells will be secured with a locking cap under a traffic-rated well box.

Chemical Analyses: Soil samples will be analyzed for TPHg and benzene, toluene, ethylbenzene and xylenes (BTEX) by EPA Method 8015M/8020, or 8260B.

Well Development and Sampling: Blaine Tech Services, Inc. (Blaine) of San Jose, California will develop the new air sparge wells prior to testing.

Air Sparge Pilot Test

A one- or two-day pilot test is proposed to assess the feasibility of sparging at this site. The primary objective of the pilot test is to determine if sufficient air can be delivered and properly distributed to the impacted area. The criteria to conclude that sparging is feasible includes achieving a sparge flow rate between 10 to 15 scfm, a minimum 15-foot radius of influence, and increased hydrocarbon vapor concentrations in DPE wells once sparging is initiated. The DPE wells will be used for vapor recovery during air sparging, but dewatering of these wells will not be occurring at this time. The following sections discuss the components of the proposed pilot test:

Site Health and Safety Plan: Pursuant to OSHA and Shell requirements, CRA will prepare a comprehensive site safety plan to protect site workers. The plan will be kept on site during field activities and will be reviewed and signed by each site worker.

Procedure: Pressure transducers and dissolved oxygen (DO) probes will be set in select observation wells to continuously record water levels and DO concentrations. Prior to starting the injection test, vapor samples will be collected from each observation well to establish the background TPHg and BTEX vapor concentrations.

Air will be injected into well AS-1 using a blower or air compressor. Injection pressure and air flow will be monitored at the wellhead. The initial injection pressure will be set just below the hydrostatic pressure. The pressure will then be incrementally increased to the maximum injection pressure (not exceeding 10 psi), which is established as 75% of the overburden pressure. Air flow will be monitored at each applied pressure interval.

The observation wellheads will be fitted with pressure gauges to differentiate water level changes and sparge air migration. Vapor samples will be periodically collected from the observation wells to assess volatilization of TPHg and BTEX from groundwater and saturated soils.

Equipment: Air will be supplied by a minimum 20 cubic feet per minute (cfm) blower or air compressor, equipped with a pressure regulator and rotometer to control and monitor applied pressure and air flow. A portable generator will power the blower. A Thomas Industries model 907CDC18F vacuum pump will be used to collect the vapor samples. A Horiba organic vapor analyzer will be used to field measure hydrocarbon concentrations in the extracted vapor stream. A YSI 600XLM multiparameter data logger will be used to record water level and DO concentrations. This data logger may also be set up to record conductivity, temperature, pH, and oxygen release potential.

Chemical Analyses: Vapor samples will be analyzed for TPHg and BTEX by EPA Method 8260B.

Report Preparation: CRA will prepare a written report which will include field procedures, laboratory results, conclusions, and recommendations. Based on the existing proposed field schedule, the pilot test report/Draft Corrective Action Plan is to be submitted by February 25, 2008.

CLOSING

If you have any questions regarding the contents of this document, please call Ana Friel at (707) 268-3812.

Sincerely,

Conestoga-Rovers & Associates

for Dan Lescure, PE

Ana Friel, PG

PROFESSIONAL GEOLOGIST
Thomas N. Magney
PG # 8238
STATE OF C.

Figures: 1 - Vicinity Map
2 - Site Plan

cc: Denis Brown, Shell Oil Products US; denis.l.brown@shell.com
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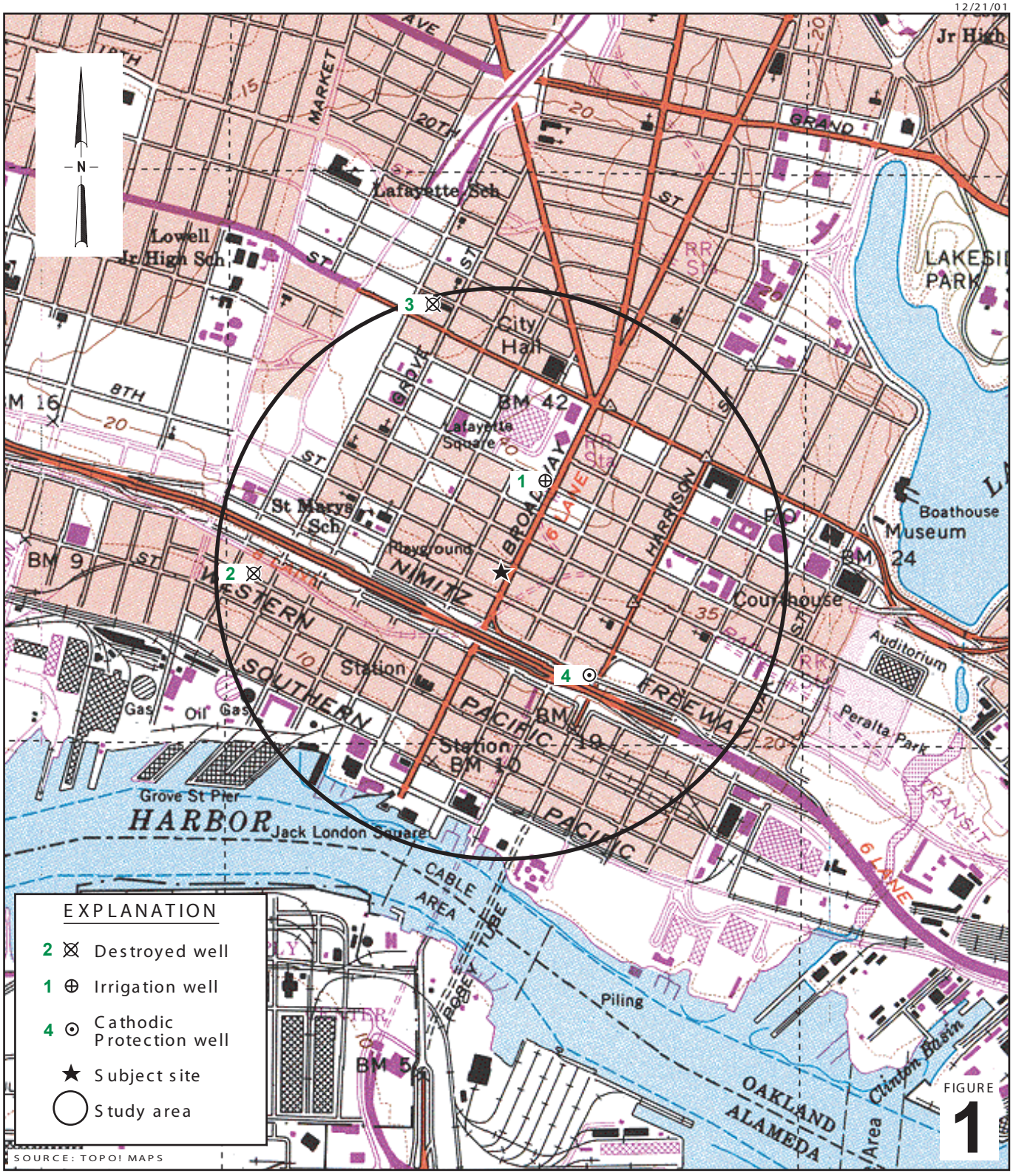

FIGURE 1

0 1/8 1/4 1/2 1

SCALE (MILES)

Former Shell Service Station

461 8th Street
Oakland, California

Vicinity Map

1/2 Mile Radius

CONESTOGA-ROVERS & ASSOCIATES

24-May-07

Site Plan

EXPLANATION

- Proposed monitoring well location
- Proposed soil vapor boring
- Proposed soil vapor point
- Groundwater monitoring well
- Soil boring
- Attempted soil boring location
- Soil vapor boring
- Abandoned monitoring well
- Destroyed recovery well
- MH — Manhole
- FL = 16.50' — Flow line depth below ground surface
- Flow direction indicator
- Underground BART line (B)
- Storm Drain line (SD)
- Water line (W)
- Sanitary Sewer line (SS)
- Pacific Bell line (T)
- Gas line (G)
- Electrical line (E)

Note: Because well S-5 is located in confined space, it is no longer gauged or sampled

Groundwater Flow Direction
(1Q00 to 3Q05)

former UST
former dispenser islands and fuel lines
Former Shell Station
Former Chevron Station
freight elevator
Storm drain inlet

S-1, S-4, S-5, S-6, S-8, S-9, S-10, S-11, S-12, S-13, S-14, S-15, S-16
B-1, B-2, B-3, B-4, B-5, B-6, B-8, B-9, B-10, B-11, B-12, B-13, B-14, B-15, B-16, B-17, B-18, B-19, B-20, B-21, B-22, B-23, B-24, B-25, B-26, B-27
TR-1, TR-2, TR-3, TR-4, TR-V1, TR-V2, TR-V3, TR-V4
SVP-1, SVP-2, SVP-3
AS-1
HA-1

MH FL = 19.12'
MH FL = 17.00'
MH FL = 17.50'
MH FL = 13.90'
MH FL = 13.27'
MH FL = 13.25'
MH FL = 16.50'
FH

14" SS 8" W
8" G
18" SD
8" SS
12" W
16" G
12" G
8" W
4" G
6" W
2-3" W
18" W
16" SS
SS
E
B
T
?

BROADWAY
6TH STREET
7TH SRTEET
8TH STREET

Scale (ft)
0 25 50 100

FIGURE
2

Former Shell Service Station
461 8th Street
Oakland, California

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1501