Atlantic Richfield Company
(a BP affiliated company)

P.O. Box 1257
San Ramon, CA 94583
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24 March 2009

Re: Addendum to Dual-Phase Extraction Pilot Testing and
Soil & Ground-Water Investigation Work Plan
Former BP Station # 11132
3201 35th Avenue
Oakland, California
ACEH Case #RO0000014

"I declare, that to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached document are true and correct."

Submitted by:

Paul Supple
Environmental Business Manger

Broadbent & Associates, Inc.
1324 Mangrove Ave., Suite 212
Chico, CA 95926
Voice (530) 566-1400
Fax (530) 566-1401

BROADBENT & ASSOCIATES, INC
ENVIRONMENTAL, WATER RESOURCES & ENGINEERING

24 March 2009

Project No. 06-88-655

Atlantic Richfield Company
P.O. Box 1257
San Ramon, CA 94583
Submitted via ENFOS

Attn.: Mr. Paul Supple

Re: Addendum to Dual-Phase Extraction Pilot Testing and Soil & Ground-Water Investigation Work Plan, Former BP Station No.11132, 3201 35th Avenue, Oakland, California; ACEH Case No.RO0000014

Dear Mr. Supple:

Broadbent & Associates, Inc. (BAI) is pleased to present this addendum to the previously-submitted *Dual-Phase Extraction Pilot Testing and Soil & Ground-Water Investigation Work Plan* (BAI, 1/9/2009) for Former BP Station No. 11132, located at 3201 35th Avenue, Oakland, California (Site). BAI prepared this addendum to the work plan in response to recent changes in the *BP Remediation Management Defined Practice for Ground Disturbance, Excavations, Trenching and Shoring* that affect the proposed source area indoor air migration pathway assessment activities. As you are aware, the revised Defined Practice now requires manual potholing for the first 6.5 feet to confirm that no underground facilities exist within the dig/boring zone. This requirement challenges the ability to collect in-situ soil gas samples at shallow depths, the most important zone for determining whether the indoor air migration pathway is complete. Therefore, BAI is proposing alternative soil gas sampling procedures described below.

BAI proposes to perform vapor intrusion assessment using active subsurface soil-gas sampling in the vicinity of the Station Building. The proposed soil gas investigation methodology will be consistent with the guidelines published by the California Regional Water Quality Control Board – Los Angeles Region (LARWQCB) in the 25 February 1997 *Interim Guidance for Active Soil Gas Investigations*, the Department of Toxic Substances Control (DTSC) and LARWQCB 28 January 2003 *Advisory – Active Soil Gas Investigations*, the American Petroleum Institute's (API) November 2005 Publication No.4741 – *Collecting and Interpreting Soil Gas Samples from the Vadose Zone*, and H&P Mobile Geochemistry's 2004 *Vapor Monitoring Wells/Implants Standard Operating Procedures (For Vapor Intrusion Applications)*, provided by BP Remediation & Engineering Technology Group. In accordance with this guidance, soil gas sampling should not be performed during or immediately after a rainfall event of 0.5 inches or more. If a rainfall event of this magnitude occurs within 24 hours before the scheduled soil-gas sampling activities, the field work will be rescheduled.

Two borings will be advanced using a hand auger for the installation of the shallow soil vapor sampling wells/implants at the locations shown in Drawing 1. These locations have been revised slightly from those proposed in the original work plan due to the discovery of subsurface utility conflicts. As possible, soil will be classified in accordance with the USCS, and will be examined using visual and manual methods for parameters including staining, color, grain size, and moisture content. The borings will be converted to soil vapor wells following advancement of each boring to 3.5 ft bgs.

The soil vapor sampling wells will be constructed by placing a 6-inch long soil vapor probe at the bottom of each boring attached to a 0.25-inch diameter nylon tubing (e.g., NylaFlow or similar, not Teflon) extending to the surface. The probes are constructed of double-woven stainless steel wire screen with a pore diameter of 0.057 inch, equipped with stainless steel end fittings. The annulus of the soil vapor sampling wells will be constructed with No.2/12 sand filter packs from 3.5 ft bgs to 2.5 ft bgs, overlain with 2.5 ft bgs to 1.5 ft bgs bentonite annular seal. The remainder of the annulus will be filled with neat cement grout to the surface. The wells will be completed with flush, traffic-rated well boxes, with a concrete surface seal to match the existing grade. The cement grout will be allowed to cure a minimum of two weeks prior to sampling.

One-liter Summa® canisters will be used to collect the samples for analysis by an offsite laboratory. The Summa® canisters will be shipped by the laboratory under high vacuum, leak checked, and batch certified to be free of contaminants. The initial canister vacuum will be measured before use and should be approximately 30 inches of Mercury (in.Hg). If the initial vacuum is less than 28 in.Hg, the affected canister(s) will not be used. A purge canister will be used to purge the sampling train (sampling point and tubing) a minimum of three volumes prior to sample collection with the purge effluent being screened for volatile organic compounds using a photo-ionization detector. Swagelok fittings will be used to connect the canisters to the tubing. Once the purge canister is connected to the tubing, the sampling train will be checked for leaks by applying a vacuum for a minimum of 10 minutes. If the pressure in the canister does not drop, this will indicate that the sample train is not leaking.

Once the leak test is complete, the in-line valve will be closed and the sample canister connected to the tubing. The in-line valve will then be opened and the sample collected. The sampling flow rate will not exceed 200 milliliters per minute (mL/min) as measured by a flow regulator. Samples will be collected until the pressure in the canister(s) reaches approximately 5 in.Hg or 30 minutes has elapsed. A measurement with a photo-ionization detector (PID) will also be collected from each sampling point following sample collection.

A leak test will be performed as a further check to make sure significant ambient air is not leaking into the sample train. Prior to and during sample collection, a tracer/leak test compound (e.g., iso-propanol or butane) will be applied around the probe at the ground surface and at connections in the sampling system. The tracer/leak test compound (typical within shaving cream) or liquid tracers can be easily emplaced by wetting a paper towel and wrapping around the test locations. The leak test compound will be included in

the laboratory analysis. Soil gas samples will not be chilled. In addition, one ambient air sample will be collected outside the Station Building entrance door using a Summa® canister. This sample will also be submitted to the off-site laboratory to compare soil gas analytical results with ambient results.

Collected samples will be submitted promptly under chain-of-custody protocol to Calscience Environmental Laboratories, Inc. in Garden Grove, California (CA-ELAP #1230, NELAP #03220CA). Soil gas samples will be analyzed for GRO, BTEX, MTBE, Ethanol, TBA, DIPE, ETBE, TAME, and the leak check compound by EPA Method TO-15. Soil gas samples will also be analyzed for Oxygen (O_2), Carbon Dioxide (CO_2), and Methane (CH_4) by Modified Method ASTM D-1946. Laboratory analyses for soil gas samples will be performed in accordance with the EPA standard holding times for Summa® canisters.

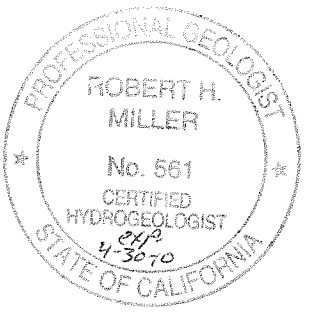
The hand auger assembly and other reusable components will be decontaminated to minimize the potential for cross-contamination between temporary soil-gas sampling points. As outlined in the DTSC/LARWQCB and API guidance documents, these methods will include three-stage wash and rinse (i.e. wash equipment with non-phosphate detergent, rinse with potable water, and a final rinse with purified or distilled water) and/or steam cleaning.

The reporting and completion schedule proposed in the original work plan is not anticipated to require revision at this time. Should you have questions or require additional information, please do not hesitate to contact us at (530) 566-1400.

Sincerely,
BROADBENT & ASSOCIATES, INC.

Thomas A. Venus, P.E.
Senior Engineer

Robert H. Miller, P.G., C.HG.
Principal Hydrogeologist



Attachment
Drawing 1 – Revised Site Layout Plan with Proposed Soil Gas Boring Locations

cc: Mr. Paresh Khatri, Alameda County Environmental Health (Submitted via ACEH ftp site)
Ms. Shelby Lathrop, Conoco Phillips, 76 Broadway, Sacramento, CA 95818
Electronic copy uploaded to GeoTracker

0 50 100

SCALE (ft)

BROADBENT & ASSOCIATES, INC.

ENGINEERING, WATER RESOURCES & ENVIRONMENTAL

1324 Mangrove Ave. Suite 212, Chico, California 95926

Project No.: 06-08-655 Date: 3/20/09

Former BP Service Station #11132

3201 35th Avenue

Oakland, California

Revised Site Layout Plan with Proposed Soil Gas Sampling Locations

Drawing

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