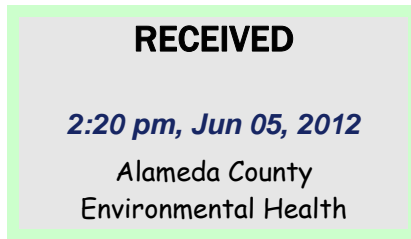


Atlantic Richfield Company

Shannon Couch
Operations Project Manager

PO Box 1257
San Ramon, CA 94583
Phone: (925) 275-3804
Fax: (925) 275-3815
E-Mail: shannon.couch@bp.com

May 31, 2012



Re: Addendum to Vapor Intrusion Assessment Work Plan
Atlantic Richfield Company Station #2112
1260 Park Street, Alameda, California
ACEH Case #RO0000044

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,

A handwritten signature in black ink, consisting of a large, stylized initial 'S' followed by a long horizontal line that ends in a small loop.

Shannon Couch
Operations Project Manager

Attachment



BROADBENT

1324 Mangrove Ave., Suite 212, Chico, CA 95926

[T] 530-566-1400 [F] 530-566-1401

broadbentinc.com

Creating Solutions. Building Trust.

May 31, 2012

J#06-88-610

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

Attn: Ms. Shannon Couch

RE: ADDENDUM TO VAPOR INTRUSION ASSESSMENT WORK PLAN, ARCO #2112
1260 PARK STREET, ALAMEDA, ACEH FUEL LEAK CASE RO0000044

Dear Ms. Couch,

Broadbent & Associates, Inc. (Broadbent) is pleased to present this addendum letter proposing modifications to the procedures for installation and sampling of soil gas sampling implants at ARCO Station #2112 located at 1260 Park Street, Alameda, Alameda County, California (Site). The Site location is shown in Drawing 1, attached. Modified procedures are being proposed following internal receipt of comments from Atlantic Richfield Company's Remediation & Engineering Technology group leader in vapor intrusion regarding changes in industry practice and quality assurance.

REVISED INSTALLATION PROCEDURES

Soil gas implant borings will be installed using hand augers at the locations previously proposed. The first soil gas boring (SG-1) is proposed to be located between historic boring SB-8 and the Station Building, but at least five feet from the Station Building. The second soil gas boring location SG-2 will be located at least five feet from the Station Building approximately midway between SG-1 and the east corner of the Station Building. However, in lieu of nested multi-level soil gas wells, each soil gas well will be constructed to a specific depth. Two soil gas implants will be constructed at location SG-1: SG-1A will be constructed to a total depth of 3.5 feet below ground surface (ft bgs) and SG-1B will be constructed to a total depth of 5.5 ft bgs. Similarly, two soil gas implants will be constructed at location SG-2: SG-2A will be constructed to a total depth of 3.5 feet below ground surface (ft bgs) and SG-2B will be constructed to a total depth of 5.5 ft bgs. Each A and B implant will be horizontally separated by at least three feet. Proposed soil gas implant boring locations are shown in Drawing 2.

Soil gas implants will be constructed by attaching a 6-inch long soil gas probe tip to 0.125-inch diameter nylon tubing (i.e. NylaFlow) extending two feet above the surface. The soil gas probe tips will be constructed of double-woven stainless steel wire screen with a 0.057-inch pore diameter, equipped with stainless-steel end fittings. Each soil gas implant will be embedded within the middle of a one-foot thick sand filter pack of #2/12 sorted sand, topped with one-half foot of dry granular Bentonite below a minimum of one-half foot of hydrated granular Bentonite, and completed with a flush, traffic-rated well vault at the surface set within neat cement concrete surface seal to match the existing grade. Care will be taken to prevent the tubing and Swagelok fitting at its end from being damaged or kinked when coiled back into the well vault.

REVISED SAMPLING PROCEDURES

Sampling will occur at least two weeks after installation of the soil gas monitoring implants to allow them time for the concrete to cure and disturbed subsurface conditions to equilibrate. In addition, soil gas sampling shall 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 of the scheduled soil gas sampling activities, the field work shall be rescheduled.

After setting up a secure and barricaded work area, the sampling train will be assembled. The Swagelok fitting at the end of the implant's tubing will be connected to an inline vacuum gage with a tee then a 100-cubic centimeter (cc) calibrated syringe with three-way valve at the tip. Coming off the tee for the sample will be a one-liter Summa canister, supplied by the laboratory under high vacuum (-30 inches Mercury/in.Hg), leak checked, and batch certified to be free of contaminants. With the valve to the soil gas monitoring implant closed and the valve to the Summa canister closed, the sampling train will be checked for leaks during a shut-in leak test by applying with the calibrated syringe a vacuum of -15 in.Hg for a period of five minutes (-15 in.Hg is fifty percent above the standard threshold of -10 in.Hg considered representative of "No Flow" conditions). When the applied vacuum does not drop during the shut-in test, the sampling train assembly will be considered leak-tested tight.

After the shut-in leak test, the closed valve of the soil gas monitoring implant will be opened and the sampling train slowly purged of three calculated interior volumes using the calibrated syringe. Following completion of purging, a clear plastic shroud will be setup over the sampling train to contain the chemical tracer/leak-check compound (Helium gas) that will be released within. The shroud will be placed to completely cover the soil gas sampling implant wellhead, its aboveground tubing, and the tubing, fittings, and sample Summa canister that will make up the sampling train. Once setup, Helium gas will be released via tubing under the shroud. A Radiodetection Model MGD-2002 Helium Detector (or similar) will be used to monitor the concentration within the shroud by placing its probe within. Prior to and during sampling, a positive-pressure concentration of approximately 20 percent Helium will be maintained within the shroud using the compressed gas cylinder's flow regulator. Helium concentrations within the shroud will be recorded in the field notes at one-minute intervals.

Once a positive-pressure Helium atmosphere is created under the shroud, the valve to the Summa canister will be opened and the sample collected. The sampling rates into the Summa canisters will be fixed by laboratory-supplied critical orifice assemblies (flow regulators) with a 0.0060 inch orifice allowing approximately 200 standard cc per minute (cc/min). Samples will be collected into the Summa canisters until the vacuum has dropped from the initial laboratory-supplied vacuum of -30 in.Hg to -5 in.Hg. Sample start times, end times, starting vacuums, ending vacuums, and Helium concentrations during sampling will be recorded in the field notes.

Finally, for comparison purposes, one Summa canister will be used to collect an ambient air sample from the ground level just outside the door into the front side of the Station Building. No leak-check compound will be utilized during collection of the ambient air sample.

LABORATORY ANALYSIS OF SOIL GAS SAMPLES

Collected samples will be promptly submitted under chain-of-custody protocol to Calscience Environmental Laboratories, Inc. in Garden Grove, California (CA-ELAP #1230, NELAP #03220CA). At the laboratory, select soil gas samples will be analyzed for Gasoline Range Organics (GRO, hydrocarbon chain lengths C6-C12) by EPA Method TO-3, and for Benzene, Toluene, Ethylbenzene, Total Xylenes (BTEX), Methyl Tertiary Butyl Ether (MTBE), Ethanol, Tertiary Butyl Alcohol (TBA), Di-Isopropyl Ether (DIPE), Ethyl Tertiary Butyl Ether (ETBE), and Tertiary Amyl Methyl Ether (TAME) by EPA Method TO-15. Soil gas samples will also be analyzed for Oxygen (O₂) and Argon, Carbon Dioxide (CO₂), Methane (CH₄), and Helium (Tracer/leak-check compound) by Modified Method ASTM D-1946.

Direction on the chain-of-custody will be to analyze first the “B” samples from 5.5 ft bgs. Concentration results for the “B” deeper soil gas samples will be compared against the Environmental Screening Levels (ESLs) for shallow soil gas (commercial/industrial land use) established by the California Regional Water Quality Control Board, San Francisco Bay Region. If concentration results for any of the TO-3/TO-15 analytes from the deeper “B” soil gas samples exceed established ESLs, then the corresponding shallow “A” soil gas sample from 3.5 ft bgs will be analyzed also. Laboratory analyses for soil gas samples will be performed in accordance with EPA standard holding times for Summa canisters.

PRE-MOBILIZATION ACTIVITIES

Prior to initiating field activities, Broadbent will obtain the necessary permits from Alameda County, prepare a Site-Specific Health & Safety Plan (HASP) for the proposed work, clear the Site for subsurface utilities, and provide 72-hour advance written notification to ACEH (email to Dilan.Roe@acgov.org) prior to the start of field activities. The utility clearance will include notifying Underground Services Alert (USA-North) of the pending work a minimum of two full business days prior to initiating the subsurface field investigation. In addition, the services of a private underground utility locator will be utilized.

The Site-Specific HASP will be prepared for use by personnel implementing the work. The HASP will address the proposed soil-gas boring/sampling scope of work. A copy of the HASP will be available on-site during the work. Subcontractors performing field activities will be provided with a copy of the HASP prior to initiating work. A safety tailgate meeting will also be conducted daily to review the Site hazards and mitigations.

DOCUMENTATION AND REPORTING

Upon completion of the work activities described above and after receipt of laboratory analytical data, Broadbent will prepare a Vapor Intrusion Assessment Report containing the following information at a minimum:

- Descriptions of the work performed;
- Copies of the required permits;
- Copies of the field notes;
- Tabulated results and measurements;
- Laboratory analytical reports with chain-of-custody records.

PROPOSED SCHEDULE

The schedule for the above-noted work is proposed to proceed as follows:

- Implement Soil Gas Investigation – Within 30 days of addendum submittal.
- Submittal of Soil Gas Investigation Report – Within 90 days of addendum submittal.

CLOSURE

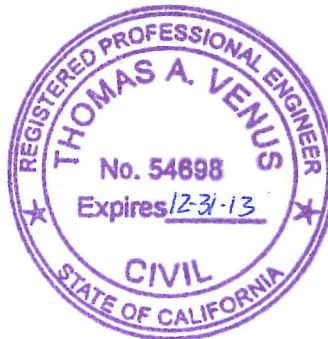
Discovery of hazardous or regulated materials constitutes a changed condition mandating a renegotiation of the scope of work described herein or termination of services. Broadbent will endeavor to alert the client of matters which, in the opinion of Broadbent, require immediate attention to protect the public health, safety, and environment. Broadbent will endeavor to advise the client of matters which should be reported to proper governmental entities. However, the client is solely responsible for reporting such matters and Broadbent shall not be held liable in the event the proper agency is not notified. Our services will be performed in accordance with the generally accepted practice at the time work commences. Results and recommendations will be based on laboratory results, observations of field personnel, and the points investigated. No other warranty, expressed or implied was made. This document has been prepared for the exclusive use of Atlantic Richfield Company.

Should you have questions or require additional information, please do not hesitate to contact me at (530) 566-1400.

Sincerely,
BROADBENT & ASSOCIATES, INC.



Thomas A. Venus, PE
Senior Engineer



Attachments

Cc: Ms. Dilan Roe, PE, Alameda County Environmental Health (submitted via ACEH ftp site)
Mr. G. Todd Ririe, PhD, PG, BP Remediation & Engineering Technology
Electronic copy uploaded to GeoTracker

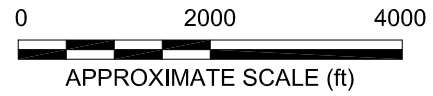
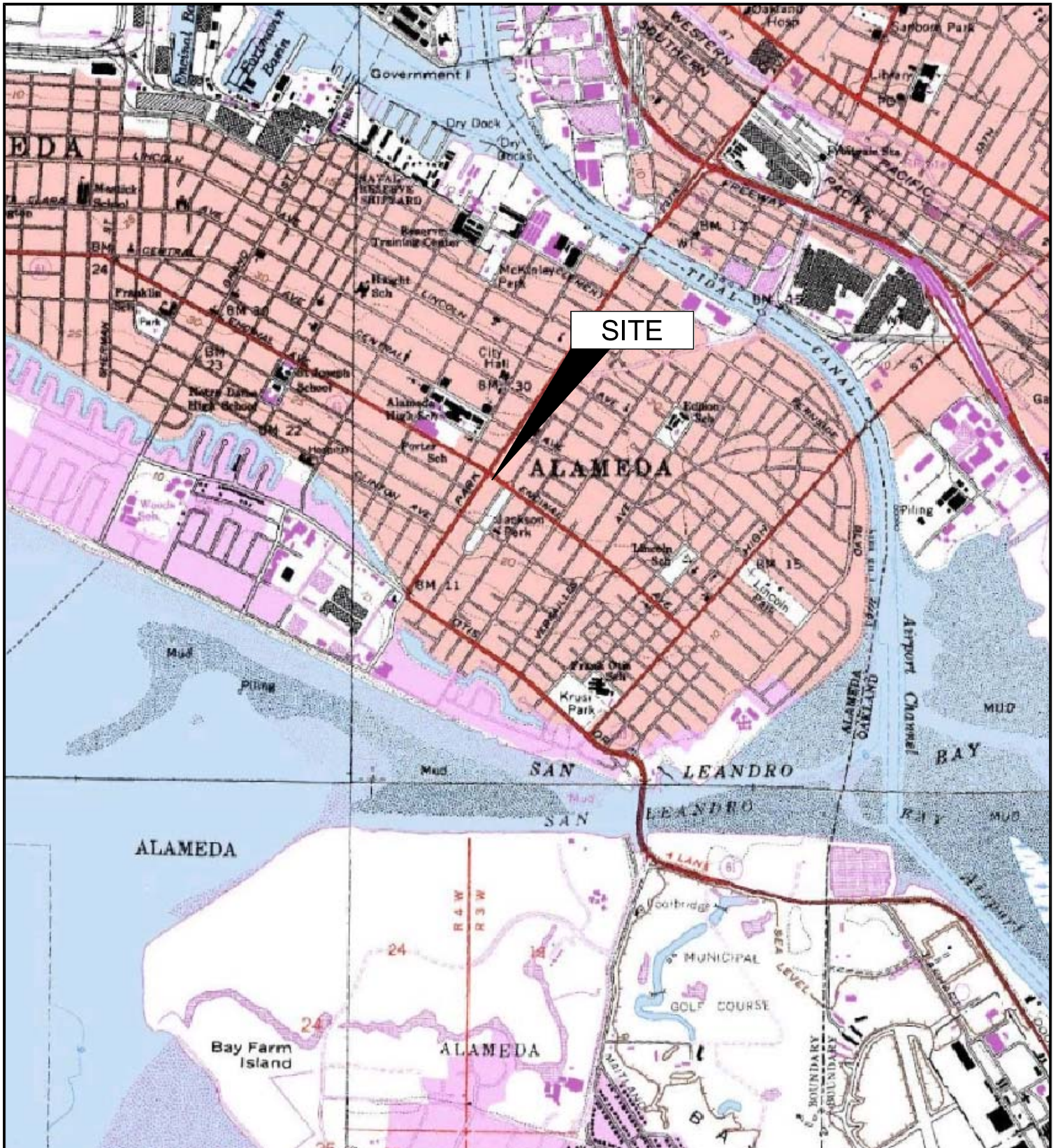
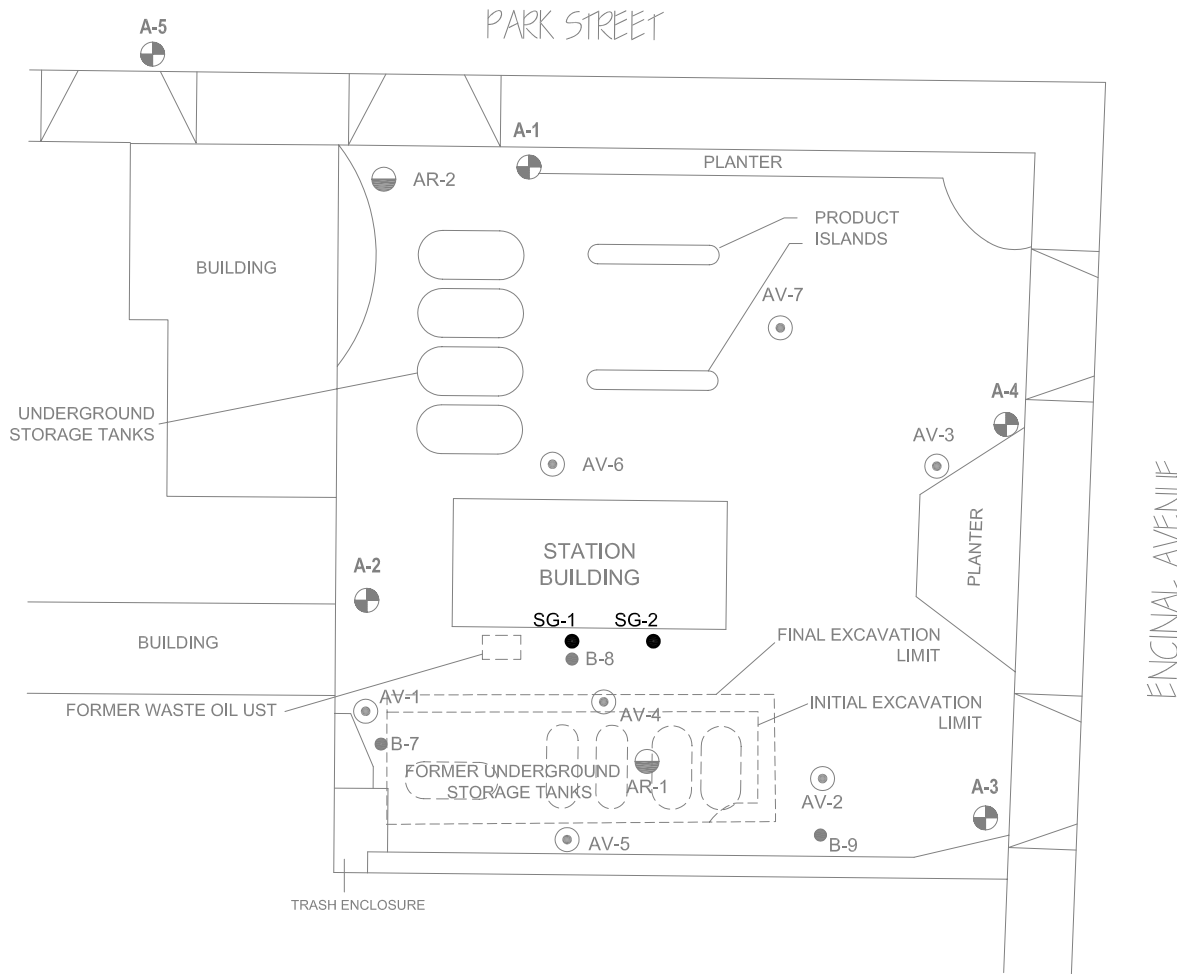
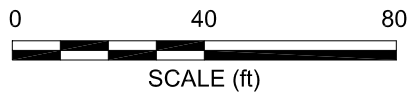
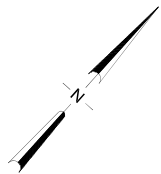


IMAGE SOURCE: USGS



LEGEND:

- SG-2 PROPOSED SOIL GAS BORING
- ⊕ A-1 MONITORING WELL LOCATION
- ▬ AR-1 GROUND-WATER EXTRACTION WELL LOCATION
- ⊙ AV-1 VAPOR EXTRACTION WELL LOCATION
- B-9 RECENT BORING LOCATION
- EXCAVATED AREA



BROADBENT & ASSOCIATES, INC.
 ENGINEERING, WATER RESOURCES & ENVIRONMENTAL
 1324 Mangrove Ave. Suite 212, Chico, California 95926
 Project No.: 06-88-616 Date: 10/14/09

Station #2112
 1260 Park Street
 Alameda, California

Site Map with Proposed
 Soil Gas Boring Locations

Drawing

2