

Atlantic Richfield Company

Chuck Carmel
Environmental Business Manager

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RECEIVED

9:38 am, Mar 08, 2011
Alameda County
Environmental Health

March 7, 2011

Re: Work Plan to Conduct a Mobile Dual-Phase Extraction Event
Atlantic Richfield Company Station #6113
785 East Stanley Boulevard, Livermore, California
ACEH Case #RO0000393

"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,



Chuck Carmel
Environmental Business Manager

Attachment

March 7, 2011

Project No. 06-82-637

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

Attn.: Mr. Chuck Carmel

RE: Work Plan to Conduct a Mobile Dual-Phase Extraction Event, Atlantic Richfield Company Station #6113, 785 East Stanley Boulevard, Livermore, California; ACEH Case #RO0000393

Dear Mr. Carmel:

Broadbent & Associates, Inc. (BAI) is pleased to provide this work plan (hereinafter Work Plan) to conduct a mobile dual-phase extraction (DPE) event at Atlantic Richfield Company (a BP affiliated company) Station #6113 located at 785 East Stanley Boulevard in Livermore, Alameda County, California (Site). Alameda County Environmental Health (ACEH) approved the preparation of this Work Plan in a letter dated January 6, 2011.

The Site is identified by ACEH as Case #RO0000393 and assigned GeoTracker Global ID #T0600100111. A Site Location Map is provided as Drawing 1. A Site Layout Plan is provided as Drawing 2.

A multiple-day DPE event utilizing a mobile DPE system is proposed herein. The purpose of the event is to facilitate mass removal of petroleum hydrocarbon contamination (or volatile organic compounds (VOCs)) from the subsurface. This Work Plan describes the proposed DPE event and outlines the data to be collected during the event. Details relative to the mobile DPE event are provided below.

Proposed Scope of Work

Proposed activities include the following:

- Prepare a Site health & safety plan (HASP) to inform project personnel of potential site hazards, as required by OSHA
- Notify applicable regulatory agencies and Site operator(s) prior to conduct of field activities
- Conduct mobile DPE event utilizing well RMW-13
- Prepare a Mobile DPE Event Report summarizing results obtained during DPE

activities

Site Health & Safety Plan

A Site Health & Safety Plan (HASP) will be prepared to minimize potential exposure of field personnel to possible hazards, which may be present during the DPE event. The HASP will include, at a minimum, emergency contact information and provide directions to the nearest medical facility for emergency treatment. In addition, the HASP will contain a completed Work Risk Assessment Tool (WRAT).

Local Permitting and Notification

The Bay Area Air Quality Management District (BAAQMD) and the Livermore Fire Department (LFD) will be contacted/notified a minimum of 72 hours prior to initiation of field activities. Based on previous discussions with the BAAQMD and LFD, it is anticipated that no permits will be required to perform the mobile DPE event.

In addition, the operators of Station #6113 will be notified of pending environmental work at least one (1) week in advance of field activities to determine how to best minimize the disruption of business operations and to coordinate the location of associated DPE equipment.

Mobile DPE Event

The proposed mobile DPE event is expected to take place over four (4) to five (5) consecutive days and will consist of a stepped stinger depth event and a constant stinger depth event. A trailer-mounted DPE system with a liquid-ring pump (or similar) and a thermal oxidizer will be mobilized to the Site to perform the mobile DPE event.

Air and water will be extracted from well RMW-13 using a 1½-inch diameter PVC or ABS plastic ‘stinger’ which will be lowered into the extraction well. Extracted groundwater and soil vapors will be directed to a cyclonic water knockout tank for separation. Process vapors will be treated via thermal oxidization prior to discharge to the atmosphere, while groundwater will be transferred to a temporary on-Site storage tank until characterized and transported to an appropriate BP-approved facility for treatment.

Stepped Stinger Depth Extraction Event

As indicated above, the objective of the DPE event is to facilitate mass removal of VOCs from the subsurface. In order to maximize the rate of mass removal, an “optimal” stinger depth will be determined. An “optimal” stinger depth is defined herein as the depth at which the highest vapor concentrations are observed. Efforts will be made to determine the “optimal” stinger depth by operating the mobile DPE system at a series of stepped stinger depths. The stepped stinger depth extraction event will consist of the following activities:

- lower stinger inlet in one (1) foot intervals (steps) beginning with one (1) foot

below static water elevation, and extract air and water for a time period not-to exceed three (3) hours each step

- measure/record flow rates (water and vapor) at each step
- monitor VOC concentrations in the vapor stream utilizing a photoionization detector (PID) at each step
- step testing will cease when the stinger depth reaches approximately 25 feet below land surface (bls), when water is no longer being removed from the subsurface, and/or when PID measurements do not indicate the removal of VOCs

The DPE stepped stinger depth event is not expected to exceed 24 hours; however, steps may be terminated early based on observed conditions and decreased vapor extraction recovery rates.

Constant Stinger Depth Extraction Event

Upon completion of the final stepped stinger depth event, recorded data will be analyzed to determine the “optimum” stinger depth to maximize VOC removal from the subsurface. The constant stinger depth event will be conducted for a minimum of 72 hours and a maximum of 96 hours; however, if PID readings decrease dramatically during the constant stinger depth event further adjustment of the stinger depth may occur to further maximize VOC removal. Additionally, if stinger depth adjustments do not influence PID readings for two to three continuous hours, the DPE constant stinger depth extraction event may be terminated after notification and discussions between the BAI project manager and project engineer.

Monitoring and Sampling

Prior to initiating the DPE event, the hour meter reading on the mobile DPE system will be recorded and background depth-to-water level measurements will be measured and recorded in on-Site wells RMW-13 (extraction well), MW-4, MW-7, MW-9, VW-1, VW-2, and VW-4 (observation wells). A data-logging submersible transducer will be placed in well RMW-13 to continuously monitor the groundwater elevation in well RMW-13 throughout the duration of the test. Periodic monitoring of depth-to-water in the observation wells will be conducted at half-hour intervals during stepped stinger depth extraction activities. During the constant stinger depth extraction event, depth-to-water will be measured in the observation wells approximately every four (4) hours.

Throughout the duration of the stepped stinger depth extraction portion of the mobile DPE event, field personnel will record the mobile DPE system hour meter reading, applied vacuum, wellhead vacuum, total DPE system influent air flow, DPE system dilution air flow, monitor/record hydrocarbon vapor concentrations with a PID, measure/record water extraction flow rate, and monitor/record water totalizer readings at approximate 20-minute intervals.

During the constant stinger depth portion of the mobile DPE, field personnel will record the mobile DPE system hour meter reading, applied vacuum, wellhead vacuum, total DPE

system influent air flow, DPE system dilution air flow, monitor/record hydrocarbon vapor concentrations with a PID, measure/record water extraction flow rate, and monitor/record water totalizer readings at one (1) hour intervals.

Water and vapor samples will be collected at 12-hour intervals during the constant stinger depth portion of the DPE event. Collected samples will be submitted under standard chain-of-custody protocol to BP's contract laboratory Calscience Environmental Laboratories, Inc. in Garden Grove, California (NELAP ID# 03220CA; CA-ELAP ID# 1230). Submitted vapor samples will be analyzed for gasoline range organics (GRO, C6-C12), benzene, toluene, ethylbenzene, and total xylenes (BTEX), and methyl tertiary butyl ether (MTBE) using EPA Method 8260B.

In addition to the previously listed constituents, groundwater samples will also be analyzed for tertiary butyl alcohol (TBA), di-isopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), and tertiary amyl methyl ether (TAME) using EPA Method 8260B. Laboratory analytical results for vapor samples will be reported in both parts per million volume/volume (ppmv) and milligrams per cubic meter (mg/m^3). Not all collected samples will be submitted for analysis. It is anticipated that a minimum of three (3) vapor and three (3) groundwater samples will be submitted for laboratory analysis from the constant stinger depth event.

Documentation of DPE Pilot Testing Activities

Upon completion of the field activities described above and after receipt of laboratory analytical data, BAI will prepare a DPE Pilot Test Report containing the following:

- Brief description of work performed
- Copies of permit(s), if necessary
- Copies of pertinent field notes
- Tabulated results and measurements
- Laboratory analytical reports and copies of chain-of-custody records;
- Applied vacuums and extracted vapor flow rates determined for well RMW-13
- Groundwater drawdown and extracted flow rate determined for well RMW-13
- Recommendations for future work

Project Schedule

It is anticipated that DPE pilot testing activities described above (including internal and potentially external permitting) can be initiated within 60 days following approval of this Work Plan. Preparation and submittal of a report documenting DPE pilot testing activities will be prepared and submitted within 45 days following field activities.


Closure

Discovery of hazardous or regulated materials constitutes a changed condition mandating a re-negotiation of the scope of work described herein or termination of services. BAI will do its best to alert the client of matters which, in the opinion of BAI, require immediate attention to protect the public health, safety, and environment. BAI will make every effort to advise the client of matters which should be reported to proper governmental agencies. However, the client is solely responsible for reporting such matters and BAI shall not be held liable in the event the proper agency is not notified. Our services will be performed in accordance with 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 warranty, expressed or implied is made.

Should you have questions concerning this Work Plan, please do not hesitate to contact us at (530) 566-1400.

Sincerely,

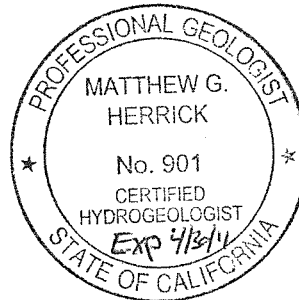
BROADBENT & ASSOCIATES, INC.



Jason Duda
Project Scientist



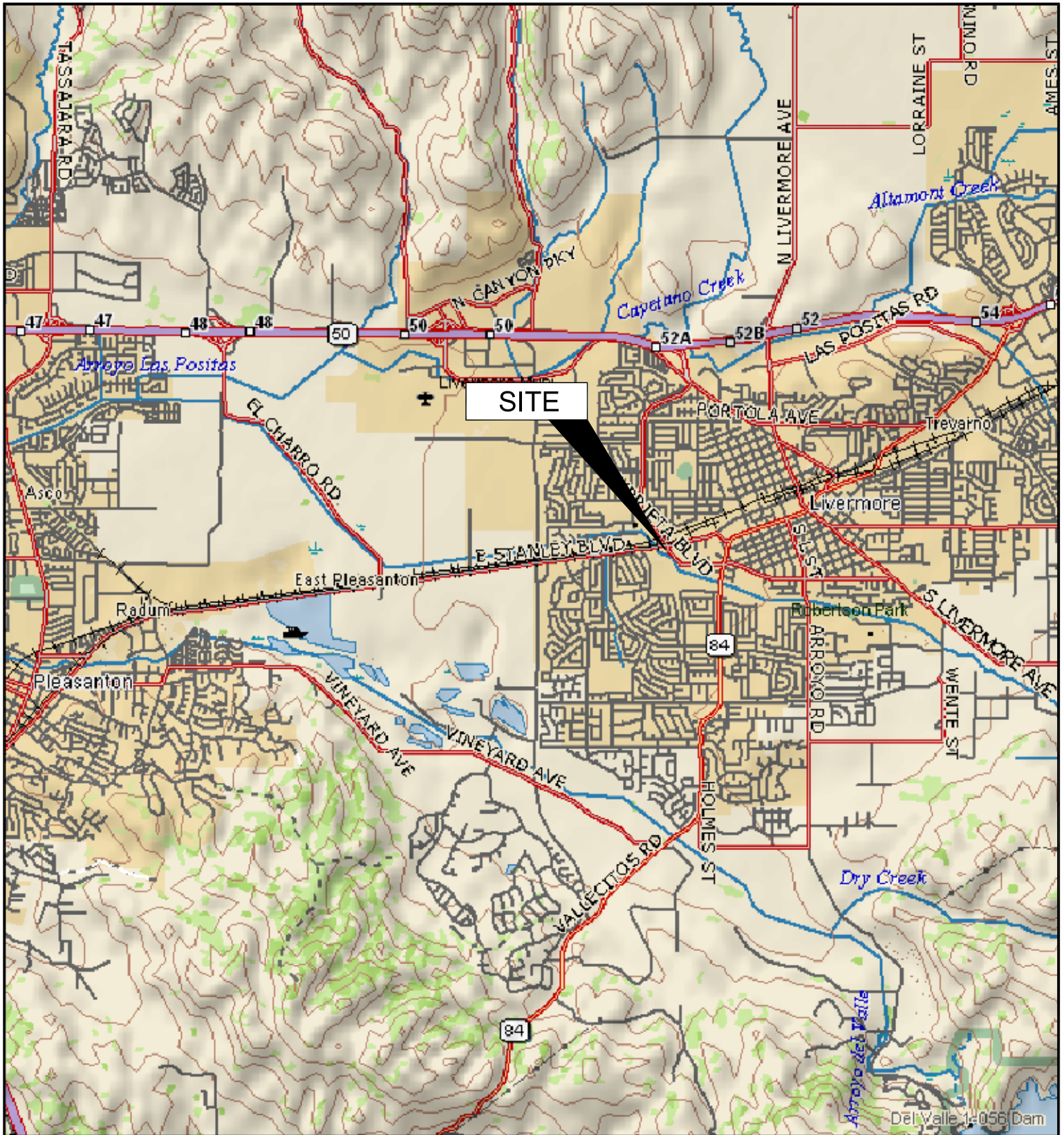
Matthew G. Herrick, P.G., C.HG.
Senior Hydrogeologist



Attachments:

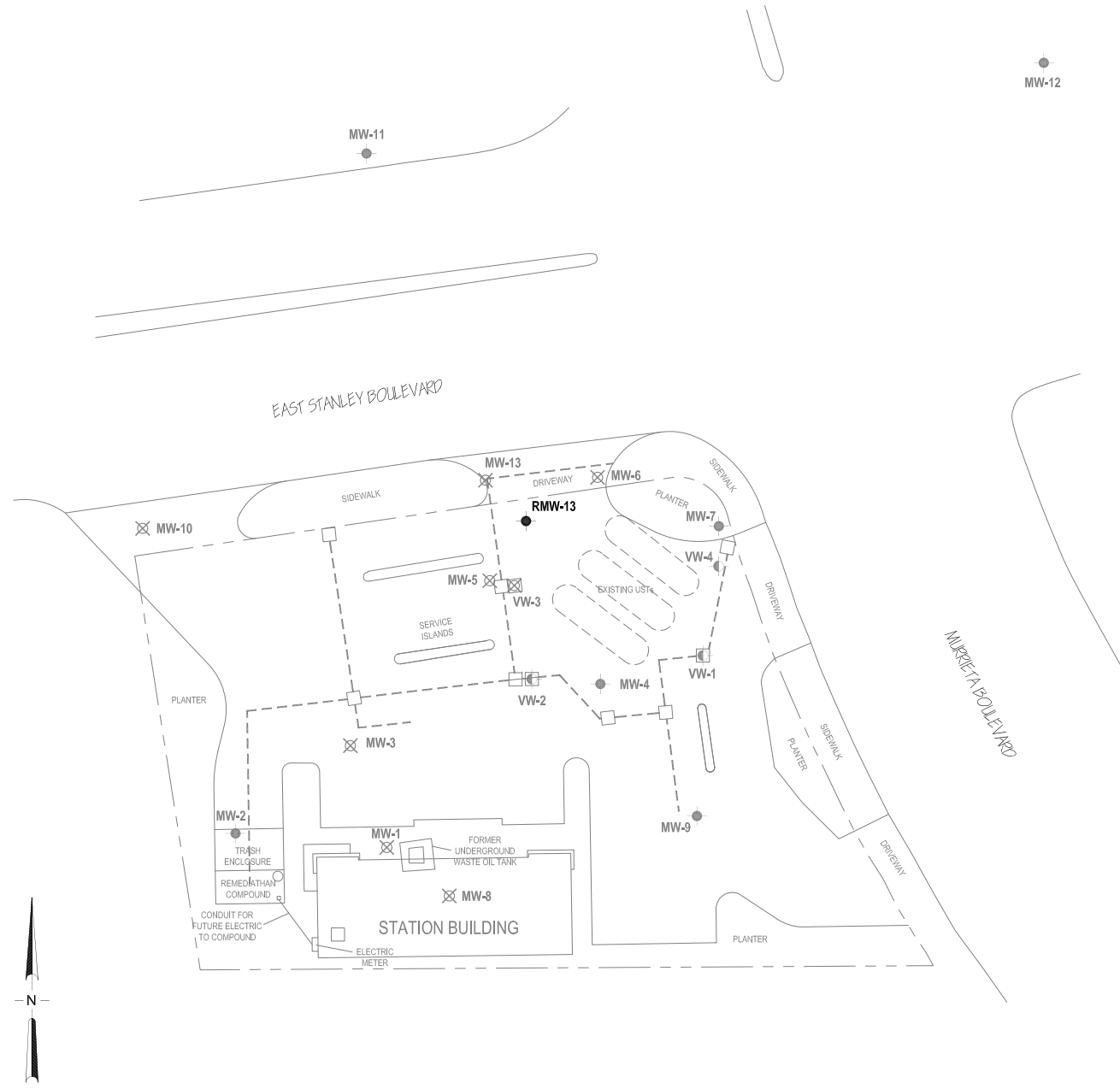
- Drawing 1 – Site Location Map
- Drawing 2 – Site Layout Plan

cc: Mr. Paresh Khatri, ACEH (uploaded to ACEH ftp site)
Mr. Paul M Smith/ Ms. Danielle Stefani, Livermore Fire Department (submitted via Geo Tracker)
Electronic copy uploaded to GeoTracker



APPROXIMATE SCALE (mi)

IMAGE SOURCE: DELORME



LEGEND

- Monitoring well
- Vapor extraction well
- Abandoned well
- Prohibited Ground Disturbance Area
- Vault box
- Piping trench

NOTE: SITE MAP ADAPTED FROM CAMBRIA ENVIRONMENTAL FIGURES.
SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.



BROADBENT & ASSOCIATES, INC.
ENGINEERING, WATER RESOURCES & ENVIRONMENTAL
1324 Mangrove Ave, Suite 212, Chico, California 95926
Project No.: 06-82-637 Date: 2/25/2011

Station #6113
785 East Stanley Boulevard
Livermore, California

Site Map