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**Alameda County  
Environmental Health**

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Ms. Barbara Jakub via <ftp://alcoftp1.acgov.org>  
Alameda County Department of Environmental Health  
1131 Harbor Bay Parkway  
Alameda, California 94502

Subject:  
Response to July 19, 2012 ACEH Directive  
UPS Oakland Hub  
8400 Pardee Drive, Oakland, CA 94621  
Global ID # T0600100939  
State ID # 583  
EPA ID # CAD 09707509

ENVIRONMENT

Date:  
August 20, 2012

Dear Ms. Jakub:

Contact:  
Hugh Devery

On behalf of United Parcel Service (UPS), ARCADIS U.S., Inc. (ARCADIS) is pleased to present this response to comments to the Alameda County Environmental Health (ACEH) correspondence dated July 19, 2012 that was issued to UPS for the Oakland Hub, located at 8400 Pardee Drive, Oakland, Alameda County, California. UPS and ARCADIS look forward to resolving any outstanding requests or questions the Port of Oakland and ACEH may have so that we may proceed with actual cleanup activities in the very near future.

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404.952.1604

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Technical Comments:

Our ref:  
B0038398.0005

*ACEH Comment 1:*

*Injection and New Monitoring Well Installation- Arcadis installed six injection wells (IW-1 through IW-6) and three new monitoring wells (MW-12 through MW-14) without ACEH's concurrence. Information obtained from Alameda County Public Works indicates that Arcadis installed the wells from January 25 through January 27, 2012. The work plan dated December 30, 2012 was submitted to ACEH after the wells had been installed. Multiple wells were installed in locations based on an assumed radius of influence of 12.5 feet (12/2011 work plan) which in the current work plan (5/2012) has changed to 15 feet. ACEH recommends that the UST Cleanup Fund does not reimburse for this work plan or for any improperly located wells.*

*ACEH has concerns that the radius of influence used is not appropriate since hydraulic testing was not performed to determine this radius. As it stands, Arcadis installed 6 injection wells and 3 monitoring wells that may not be in the correct*

Imagine the result

*locations. ACEH did not approve installation of this many injection wells for a pilot test and the monitoring points do not appear to be sufficient to determine if radial flow is occurring as suggested by the figures presented in the CAP and pilot test work plan. ACEH recommends installing monitoring points to the north of the injection points to determine if radial flow is occurring per Arcadis' assumptions. If this is not the case, additional injection points may be needed if magnesium sulfate injection is selected as the remedial option. Please present a proposal to install monitoring points to confirm radial flow in the baseline groundwater monitoring report requested below.*

*Additionally, Arcadis has not yet submitted a soil and water investigation report with the well installation details nor has a site conceptual model (SCM) that was requested in ACEH's March 10, 2009 letter (and is late), been submitted. Please submit a soil and water investigation report with SCM by the due date requested below.*

#### **ARCADIS Response 1:**

Between January 25, 2012 and January 27, 2012, three monitoring wells (MW-12, MW-13, and MW-14) and six injection wells (INJ-1 through INJ-6) were installed. The injection wells are now referred to as IW-1 through IW-6. A Drilling Permit Application was submitted to Alameda County Public Works Agency on January 13, 2012. The wells were installed after receiving the Alameda County approved permit (January 20, 2012) and after a verbal acknowledgement from Barbara Jakub with ACEH of the upcoming work via a telephone conversation between ARCADIS and ACEH on January 17, 2012. During this conversation, ACEH informed ARCADIS that they could in fact move forward even though ACEH had not had a chance to review the work plan but with the understanding that ACEH could ask that additional wells be installed if they felt the current plan was not sufficient. ARCADIS agreed with this approach, as UPS management is eager to proceed with actual cleanup activities and understands that ARCADIS, with ACEH guidance and input, may have to adjust the remediation injections based actual recorded field data once injections have been implemented.

A Corrective Action Plan (CAP), dated December 21, 2011 was submitted to ACEH. The CAP detailed the proposed remedial cleanup approach for the dissolved phase impacts at the Oakland Hub. Please note that the dissolved phase impacts to groundwater consist predominately of total petroleum hydrocarbons-diesel range organics (TPH-DRO); and not other more toxic petroleum products. The residual free phase product at the former underground storage tank (UST) area is currently being addressed by a combination of passive recovery skimmers and periodic enhanced

fluid recovery (EFR) events. Please note that free product has recently been detected in the newly installed injection wells and associated monitoring wells. ACEH was notified of this free product in a correspondence dated August 6, 2012, and that correspondence stated that a work plan to evaluate and delineate this free product plume/area would be submitted to ACEH by September 15, 2012.

Included in the CAP were the proposed injection well locations for multiple phases of remediation, contingent proceeding results. A hard copy of the work plan for the installation of the injection wells and first phase of injections was submitted to ACEH on January 13, 2012.

In a deliverable review letter from Alameda County Health Care Services, dated March 28, 2010 (correct date is assumed to be March 28, 2012 as stated in the header of the report), a Pilot Test Work Plan and CAP Addendum were requested. A Pilot Test Work Plan was submitted by ARCADIS on May 15, 2012. The CAP Addendum will be submitted following the results of the pilot test, which will occur upon approval of the Pilot Test Work Plan. In a correspondence dated March 28, 2010, ACEH could not approve the Work Plan and CAP until technical comments were addressed.

In the preparation of the CAP, the assumed radius of influence (ROI) of the injection wells was 12.5 feet. During the preparation of the Pilot Test Work Plan, the assumed ROI was modified to 15 feet. The actual ROI will be determined during the actual pilot test. The ROI can only be "assumed" at this point of planning. Actual field conditions will vary due the nature of the man-made subsurface conditions. To better determine the ROI as requested by ACEH, additional monitoring wells will be installed approximately 15 feet northeast of IW-1, 15 feet northeast of IW-2, and 10 feet east of IW-2. With the addition of these monitoring wells, a radial network of wells will be in place to determine an ROI between 10 and 25 feet. The proposed monitoring wells will be named MW-15, MW-16, and MW-17. A proposal with the monitoring well construction details and proposed locations will be submitted to ACEH. Although not originally planned for this purpose, these new monitoring wells will also assist in the delineation of the dissolved TPH-DRO and residual free product plumes.

Please note that the groundwater impacted by dissolved TPH-DRO, which is being requested to be remediated via injections, is occupied predominately by man-made fill material. It appears that fill material lies above the in-situ, natural bay muds that have been detected at depths of 4 to 12 feet below land surface. Numerous types of debris and lithologies are represented by this widespread fill material. Therefore, conventional methodologies will be used to determine the ROI at each injection well

or an average ROI for the site, as that is the current protocol. However, the classic assumption that the subsurface conditions are homogeneous and heterogeneous do not appear to apply at this site at these shallow depths. This is why ARCADIS wanted to proceed with actual injections and monitoring of real-life data (e.g., ROI, geochemical). Once actual field data are collected and analyzed, the remediation injection plan moving forward can be adjusted to meet actual site conditions as documented in the field.

ARCADIS submitted a Site Conceptual Model (SCM) in the Summary of Soil and Groundwater Investigation dated February 15, 2011 (confirmed receipt on FTP website on February 25, 2011). This document contains a discussion of the SCM and figures associated with SCM and Appendix A is the table that was completed for the SCM portion of the report. The SCM format used in the February 2011 submitted report was obtained from the ACEH web site. A review of Geotracker for sites within Alameda County indicates that other consultants have also downloaded this SCM, and formatted and submitted this SCM template to ACEH. ARCADIS submitted the Revised Summary of Soil and Groundwater Investigation Activities report, which contains the revised SCM, on August 17, 2012, to meet the requirements set forth in this response letter. This report has been updated to reflect some of the recent work not previously submitted to ACEH in previous reports. ARCADIS also referenced ACEH's website <http://www.acgov.org/aceh/lop/scm.htm> for guidance for the SCM. There are no active links to guidance on preparing an SCM, only a letter and Microsoft PowerPoint file from 2003 that describe what it will be used for and why it is needed. The web site also notes that the electronic SCM is under development and more information including a downloadable version of the electronic SCM will be available soon. As those instructions become available to the public, ARCADIS will continue to update the SCM based on those instructions and recorded site conditions. The SCM will constantly change as we learn more about the site and subsurface conditions.

We are not sure why ACEH is stating that the 2009-2010 information on field activities that were compiled and submitted in the February 2011 Soil and Groundwater Investigation Report requested in 2009 is late. Should the ACEH need any additional copies of the report or other information, please let us know.

*ACEH Comment 2:*

*Baseline Analysis - ACEH's March 28, 2012 letter requested baseline sampling and an evaluation of the sample data to demonstrate that the proposed method was applicable to this site and would not impede groundwater quality. Some of the requested analysis has been performed yet analysis for total dissolved solids has not*

*been performed and new monitoring wells and injection wells were installed but no baseline sampling has been performed on these wells. Please complete the baseline sampling on the new wells and collect samples and analyze groundwater for the analytes listed in your groundwater sampling matrix table as follows: Sample all new injection and monitoring wells for the following: TPH-g, and TPHd, Methane, sulfide, sulfate, nitrate as nitrogen, total dissolve iron, magnesium (Please note that your table says total dissolved Manganeses[sic]), total dissolved solids (TDS) (not specific conductivity), pH and temperature. Sample existing wells for methane, sulfide, sulfate, nitrate as nitrogen, total dissolved iron TDS, temperature and pH. Please update the groundwater sampling matrix to reflect magnesium and TDS analysis and include the EPA Method numbers for TPHg and TPHd. Present this data with an evaluation by the due date requested below.*

**ARCADIS Response 2:**

ACEH has requested that monitoring wells OW-1, MW-2, MW-3, MW-4, MW-12, MW-13, MW-14, MW-15, MW-16, and MW-17 and injections wells IW-1, IW-2, IW-3, IW-4, IW-5, and IW-6 be sampled for TPH-DRO, sulfate, total dissolved iron, total dissolved magnesium, total dissolved solids (TDS), total petroleum hydrocarbons-gasoline range organics (TPH-GRO), methane, sulfide, nitrate as nitrogen, specific conductivity, temperature, and pH. Please see the attached Groundwater Sampling Matrix.

Please note that manganese was included in the original sampling matrix because it is redox-sensitive. However, it acts very similar to iron, and the redox evaluation can be conducted using iron only. Manganese will be eliminated from the sampling matrix. Magnesium will be added to the sampling matrix. The analysis of magnesium was added, as it will provide information from a fate-and-transport standpoint and will act as a secondary line of evidence for injection breakthrough.

The CAP dated December 2011 identified the following analyses: TPH-DRO, total magnesium, and sulfate, which were completed during the baseline monitoring performed on February 29, 2012 and March 19, 2012. ACEH correspondence dated March 2012 requested the following additional analyses: TDS, dissolved oxygen (DO), sulfate, and metals (specifically, iron). The most recent correspondence from the ACEH dated July 19, 2012 indicated that ARCADIS had not completed the requested monitoring. However, ARCADIS completed this additional monitoring as per ACEH's request in the March 2012 correspondence. The baseline monitoring requested or proposed was included in the tables from the Work Plan dated May 15, 2012. Further, in the July 19, 2012 correspondence, ACEH indicated typographical errors of misspelling magnesium as manganese in the table entitled "Historical

Groundwater Monitoring Results and Baseline Sampling Summary” where typographical errors do not in fact exist (as shown in the FTP copy of the Work Plan). Since the ACEH March 28, 2010 (2012) correspondence, ACEH has now expanded our groundwater monitoring parameters to include TPH-GRO, methane, sulfide, nitrate as nitrogen, total dissolved iron, and magnesium; removed conductivity (there again indicating that ACEH did in fact review our baseline sampling table provided in our Work Plan dated May 15, 2012); and added pH and temperature. They also added to our existing wells temperature, pH, methane, sulfide, sulfate, nitrate as nitrogen, total dissolved iron, and TDS. This additional groundwater baseline monitoring was recently completed in conjunction with the 2<sup>nd</sup> Semi-Annual Groundwater Monitoring Event, which was performed on August 1, 2012. This report will be submitted to Port of Oakland and ACEH by the requested date of September 19, 2012. ARCADIS will gladly collect the parameters that both ACEH and our staff believe are necessary to adequately evaluate site conditions before and during proposed remediation injection events. ARCADIS’ goal for the injection program is to remediate the dissolved TPH-DRO plume to a decreased concentration that will be satisfactory to all parties and in accordance with current ACEH and California Regional Water Quality Control Board policies. Free product, as detected, will be removed by mechanical-intrusive means (e.g., bailing, in-place skimmers, EFR events).

*ACEH Comment 3:*

***Reduction of Separate Phase Hydrocarbons Using Magnesium Sulfate- Please provide an evaluation of the effectiveness of using magnesium sulfate in reducing free product concentrations in the baseline monitoring report requested below.***

***ARCADIS Response 3:***

Magnesium sulfate injections will not capture nor remove free product. ARCADIS at no time has proposed the removal of free product through the use of magnesium sulfate injections.

The purpose of the magnesium sulfate injections is to address the dissolved TPH-DRO mass in groundwater. Hydrocarbons in the dissolved form can be degraded by the addition of sulfate anion radicals using similar oxidation processes discussed in the Pilot Test Plan, as any hydrocarbon material will serve as an electron donor. However, the amount of sulfate required to remediate the free phase mass at the site would not be cost-effective nor is it capable of remediating the free phase hydrocarbons in an efficient cleanup time. As such, this type of approach would not be feasible and is cost-prohibitive. The amount of magnesium sulfate proposed for

injection will have a minimal effect on the residual free phase product at the site. However, it is anticipated to have a direct effect on the dissolved TPH-DRO plume. To address residual free phase product present in the immediate area of the former UST pit, the passive product recovery skimmers that were installed and are currently being employed at the site will remain. In addition, these skimmers will be used along with periodic EFR events.

Please note, additional free product has recently been detected downgradient of the former UST pit. This free product is currently being recovered by periodic EFR events; however, it will need to be delineated and evaluated further before any recommendations on its recovery can be proposed for the long term. ACEH was notified of this free product in correspondence dated August 6, 2012, which also stated that a Work Plan to evaluate this free product is currently being prepared.

*ACEH Comment 4:*

**Waste Discharge Requirements** - *Arcadis has not provided information discussing if a General Waiver of Waste Discharge Requirements is required from the Regional Water Quality Control Board for injection of magnesium sulfate to groundwater as requested in our March 28, 2012 letter. Please provide the requested information in the baseline monitoring report requested below.*

**ARCADIS Response 4:**

It is ARCADIS' experience that a Water Discharge Requirement (WDR) is not required when working in the San Francisco Regional Water Quality Control Board (Board) for *in-situ* injection remediation work at a petroleum impacted/leaking UST (LUST) site that is being regulated by a sanctioned agency (e.g., ACEH). Because ACEH poised this comment, ARCADIS contacted the Board to specifically ask if a condition and/or circumstances have change that would now require ARCADIS/UPS to obtain a WDR/permit. The Board's response was that conditions and/or circumstances have not changed to the point that would require UPS and/or ARCADIS to obtain a WDR permit. As long as the work is being done under the supervision of an agency that is implementing the Board's policy and protocols, the WDR is not necessary.

UPS and ARCADIS look forward to meeting the Port of Oakland and ACEH requests and working with both parties in a common mutual goal of successful removal of free product and reduction of the dissolved TPH-DRO concentrations to levels that are acceptable to ACEH and the Board. As all are aware, this is a light industrial/commercial zone property that will remain in its current use for the

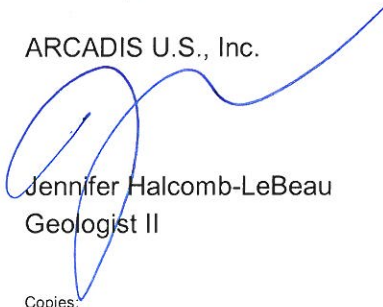
foreseeable future, and ARCADIS believes that the ACEH should consider the Boards' Low-Threat Underground Storage Tank Case Closure Policy (Adopted May 1, 2012) once free product has been removed and TPH-DRO concentrations are reduced significantly.

[http://www.swrcb.ca.gov/water\\_issues/programs/ust/lt\\_cls\\_plcy.shtml](http://www.swrcb.ca.gov/water_issues/programs/ust/lt_cls_plcy.shtml)

If you have any questions regarding this event, please do not hesitate to contact me at 404.952.1604. Please send correspondence regarding this report to Mr. Paul Harper of UPS at the address provided below. Please copy ARCADIS on any such correspondence sent to UPS.

Sincerely,

ARCADIS U.S., Inc.



Jennifer Halcomb-LeBeau  
Geologist II



Hugh Devery  
Senior Geologist

Copies:

Paul Harper – UPS Corporate Plant Engineering; 55 Glenlake Parkway NE, Atlanta, GA 30328

Douglas Herman, Port of Oakland; 530 Water Street, Oakland, CA 94607

Barbara Jacob,, ACEH, [barbara.jakub@acgov.org](mailto:barbara.jakub@acgov.org)

File



**Groundwater Sampling Matrix**  
 United Parcel Service  
 8400 Pardee Drive, Oakland, California

Well ID	TPH-GRO by EPA 8400	TPH-DRO by EPA 8440	Methane by RSK 175	Sulfide by EPA 300.0	Sulfate by EPA 300.0	Nitrate as Nitrogen by EPA 300.0	Total/ Dissolved Iron by EPA 6020	Total/ Dissolved Magnesium by EPA 6010	Total Dissolved Solids by EPA 160.1	Specific Conductivity by downhole meter	Temperature by downhole meter	pH by downhole meter
OW-1	x	x	x	x	x	x	x	x	x	x	x	x
MW-2	x	x	x	x	x	x	x	x	x	x	x	x
MW-3	x	x	x	x	x	x	x	x	x	x	x	x
MW-4	x	x	x	x	x	x	x	x	x	x	x	x
MW-12	x	x	x	x	x	x	x	x	x	x	x	x
MW-13	x	x	x	x	x	x	x	x	x	x	x	x
MW-14	x	x	x	x	x	x	x	x	x	x	x	x
MW-15	x	x	x	x	x	x	x	x	x	x	x	x
MW-16	x	x	x	x	x	x	x	x	x	x	x	x
MW-17	x	x	x	x	x	x	x	x	x	x	x	x
IW-1	x	x	x	x	x	x	x	x	x	x	x	x
IW-2	x	x	x	x	x	x	x	x	x	x	x	x
IW-3	x	x	x	x	x	x	x	x	x	x	x	x
IW-4	x	x	x	x	x	x	x	x	x	x	x	x
IW-5	x	x	x	x	x	x	x	x	x	x	x	x
IW-6	x	x	x	x	x	x	x	x	x	x	x	x
Injection Monitoring (Initially at 250 gallons injected and then every 500 gallons of injected solution per well)												
OW-1										x	x	x
MW-2										x	x	x
MW-3										x	x	x
MW-4										x	x	x
MW-12										x	x	x
MW-13										x	x	x
MW-14										x	x	x
MW-15										x	x	x
MW-16										x	x	x
MW-17										x	x	x
Immediately Post Injection Sampling												
OW-1				x	x					x	x	x
MW-2				x	x					x	x	x
MW-3				x	x					x	x	x
MW-4				x	x					x	x	x
MW-12				x	x					x	x	x
MW-13				x	x					x	x	x
MW-14				x	x					x	x	x
MW-15				x	x					x	x	x
MW-16				x	x					x	x	x
MW-17				x	x					x	x	x
Month 1 Sampling												
OW-1			x	x	x	x	x	x		x	x	x
MW-2			x	x	x	x	x	x		x	x	x
MW-3			x	x	x	x	x	x		x	x	x
MW-4			x	x	x	x	x	x		x	x	x
MW-12			x	x	x	x	x	x		x	x	x
MW-13			x	x	x	x	x	x		x	x	x
MW-14			x	x	x	x	x	x		x	x	x
MW-15			x	x	x	x	x	x		x	x	x
MW-16			x	x	x	x	x	x		x	x	x
MW-17			x	x	x	x	x	x		x	x	x
Month 3 Sampling												
OW-1	x	x	x	x	x	x	x	x	x	x	x	x
MW-2	x	x	x	x	x	x	x	x	x	x	x	x
MW-3	x	x	x	x	x	x	x	x	x	x	x	x
MW-4	x	x	x	x	x	x	x	x	x	x	x	x
MW-12	x	x	x	x	x	x	x	x	x	x	x	x
MW-13	x	x	x	x	x	x	x	x	x	x	x	x
MW-14	x	x	x	x	x	x	x	x	x	x	x	x
MW-15	x	x	x	x	x	x	x	x	x	x	x	x
MW-16	x	x	x	x	x	x	x	x	x	x	x	x
MW-17	x	x	x	x	x	x	x	x	x	x	x	x
IW-1	x	x	x	x	x	x	x	x	x	x	x	x
IW-2	x	x	x	x	x	x	x	x	x	x	x	x
IW-3	x	x	x	x	x	x	x	x	x	x	x	x
IW-4	x	x	x	x	x	x	x	x	x	x	x	x
IW-5	x	x	x	x	x	x	x	x	x	x	x	x
IW-6	x	x	x	x	x	x	x	x	x	x	x	x

Notes:  
 EPA = U.S. Environmental Protection Agency  
 TPH-DRO = total petroleum hydrocarbons-diesel range organics  
 TPH-GRO = total petroleum hydrocarbons-gasoline range organics