September 2, 2014

Mr. Kevin Garon, Senior Project Director
DuPont Corporate Remediation
E.I. du Pont de Nemours and Company
6324 Fairview Road, Suite 200
Charlotte, NC 28210

NOTICE OF APPLICABILITY OF GENERAL ORDER NO. R5-2008-0149-052, PLUME 1 IN-SITU REMEDIATION PILOT TEST, DUPONT OAKLEY SITE, 6000 BRIDGEHEAD ROAD, OAKLEY, CONTRA COSTA COUNTY

E.I. du Pont de Nemours and Company, (Discharger) submitted a completed Notice of Intent, dated 28 April 2014, requesting coverage under General Order No. R5-2008-0149, General Waste Discharge Requirements for In-situ Groundwater Remediation at Sites with Volatile Organic Compounds, Nitrogen Compounds, Perchlorate, Pesticides, Semi-Volatile Compounds and/or Petroleum Compounds. Based on information in your submittal, it is our determination that this project meets the required conditions to be approved under Order No. 2008-0149. All of the requirements contained in the general order are applicable to your project. You are assigned Order No. R5-2008-0149-052.

Project Location:

The project is in Contra Costa County, Township 2N, Range 2E, Section 15, Mount Diablo Baseline & Meridian. Assessor's Parcel No. 037-020-011; Latitude 38°00'48" N, Longitude 121°44'47"W.

Project Description:

Historical operations at the Dupont Oakley Site chlorofluorocarbon (CFC) and anti-knock compound manufacturing areas caused pollution of the groundwater in what is referred to as Plume 1. The primary pollutants of concern in the Plume 1 pilot test area include carbon tetrachloride, chloroform, dichloromethane, tetrachloroethene, CFC-113, and CFC-11. Dupont is proposing a field pilot test to evaluate the effectiveness of sequential treatment of the volatile organic compounds (VOCs) using zero valent iron (ZVI) followed by enhanced in-situ bioremediation. The site cleanup is being overseen by the Department of Toxic Substances Control, which has approved the Plume 1 Pilot Test Work Plan.

Dupont will be constructing a pilot scale recirulation system consisting of two treatment cells designed to draw polluted groundwater through ZVI and sand in one cell, extract and amend the groundwater, and then inject it into a second cell in which the amended groundwater will undergo an enhanced biodegradation process. The injected groundwater will consist of

approximately 97.5 percent water amended with 0.5 percent sodium lactate (WilClear Plus^{TM}) by volume. The total proposed volume of injected amended groundwater is approximately 11,000 gallons and will be moved at a slow rate requiring about a year to complete. After anaerobic conditions are established in the injection treatment cell, up to approximately 4 liters of commercially available microbial culture will be injected into the treatment cell. As part of the pilot test, different extraction/injection rates ranging from 150 to 400 milliliters per minute will be systematically tested.

The Discharger circulated a fact sheet to interested parties describing the project and the draft NOA was made available for public review. No comments were received in the 30-day comment period. The Discharger will be conducting sampling and reporting the results as described in the attached Groundwater Monitoring and Reporting Program.

General Information:

1. The project will be operated in accordance with the requirements contained in the General Order and in accordance with the information submitted in the completed Notice of Intent.

2. The required annual fee (as specified in the annual billing you will receive from the State Water Resources Control Board) shall be submitted until this Notice of Applicability is officially revoked.

3. Injection of materials other than sodium lactate, pH buffer, and a commercially available microbial culture into the subsurface is prohibited.

4. Failure to abide by the conditions of the General Order could result in an enforcement action as authorized by provisions of the California Water Code.

5. The Discharger shall comply with the attached Monitoring and Reporting Program, Order No. R5-2008-0149-052, and any revisions thereto as ordered by the Executive Officer.

If you have any questions regarding this matter, please call Nathan Casebeer at (916) 464-4665.

ORIGINAL SIGNED BY ANDREW ALTEVOGT FOR

PAMELA C. CREEDON
Executive Officer

Attachment

cc: Ms. Della Kramer, Regional Water Quality Control Board, Rancho Cordova
Ms. Tamara Zielinski, Department of Toxic Substances Control, Sacramento
Ms. Linda McGlochlin Wolff, Parsons, Walnut Creek
Mr. Bob Deaver, E.I. du Pont de Nemours and Company, Oakley

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2008-0149-052

FOR
IN-SITU GROUNDWATER REMEDIATION AT SITES WITH VOLATILE ORGANIC COMPOUNDS, NITROGEN COMPOUNDS, PERCHLORATE, PESTICIDES, SEMI-VOLATILE COMPOUNDS AND/OR PETROLEUM HYDROCARBONS

PLUME 1 IN-SITU REMEDIATION PILOT TEST
DUPONT OAKLEY SITE
6000 BRIDGEHEAD ROAD
OAKLEY, CONTRA COSTA COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring a groundwater extraction and/or treatment system in conjunction with an amended groundwater injection system. This MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. As appropriate, California Regional Water Quality Control Board, Central Valley Region staff shall approve specific sample station locations prior to implementation of sampling activities.

All samples should be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

GROUNDWATER MONITORING

Monitoring wells associated with this pilot study are shown on Figure 4-1 and listed in Table 1 below. The groundwater monitoring program for these wells and any treatment system wells installed subsequent to the issuance of this MRP, shall follow the schedule below. Sample collection and analysis shall follow standard EPA protocol.

The monitor wells, extraction wells and/or injection wells shall be sampled according to the schedule in Table 1 and the samples analyzed by the methods in Table 2, as follows:

Table 1: Sampling Schedule

Well Number[1]	Frequency[2,3]	Monitoring Objective
EAB-MW3	Quarterly	Transition Zone[4]
EAB-MW2 EAB-MW1 ZVI-MW1 ZVI-EXT	Quarterly	Treatment Zone[5]
LF-13	Quarterly	Background[6]

[1] Well numbers as shown on Figure 4-1.
[2] i.e., weekly, monthly, quarterly, annually, other as indicated in the Work Plan.
[3] Constituent suite components listed in Table 2.
[4] Wells sampled to evaluate immediately down gradient of the treatment zone.
[5] Wells sampled to evaluate remediation progress inside the treatment zone.
[6] Wells used to develop background concentrations.

Table 2: Analytical Methods

Constituent	Method[1]	Maximum Practical Quantitation Limit (µg/L)[2]
Volatile Organic Compounds	EPA 8260B	0.5
Chlorofluorocarbons	EPA 8260B modified	0.5
Methane, Ethane, Ethene[3]	RSK-175	0.1
Nitrate+Nitrite[4]	EPA 300.1	200
Chloride, Sulfate[5]	EPA 300.1	200
Arsenic and Lead	EPA 6010	100
Dissolved Organic Carbon[6]	EPA 9060M	300
Ferrous Iron	Hach Method 8146	100
Sulfide[7]	SM 4500SF	50
Manganese	Hach Method 8034	10,000
Carbon Dioxide	Hach Method 8205	10,000
Alkalinity	Hach Method 8203	10,000

[1] Or an equivalent EPA Method that achieves the maximum Practical Quantitation Limit.
[2] All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported as an estimated value.
[3] Wells ZVI-EXT, EAB-MW1, EAB-MW2, and EAB-MW3 only.
[4] Wells ZVI-EXT and EAB-MW1 only
[5] Wells LV-13, ZVI-EXT and EAB-MW1 only
[6] Wells LF-13, ZVI-EXT, EAB-MW1, EAB-MW2, and EAB-MW3 only.
[7] Wells EAB-MW1, EAB-MW2, and EAB-MW3 only.

FIELD SAMPLING

In addition to the above sampling and analysis, field sampling and analysis shall be conducted each time a monitor well or extraction well is sampled. The sampling and analysis of field parameters shall be as specified in Table 3.

Table 3: Field Sampling Requirements

Parameters	Units	Type of Sample
Groundwater Elevation	Feet, Mean Sea Level	Measurement
Oxidation-Reduction Potential	Millivolts	Grab
Electrical Conductivity	uhmos/cm	Grab
Dissolved Oxygen	mg/L	Grab
pH	pH Units (to 0.1 units)	Grab
Temperature	Degrees Celcius	Grab
Turbidity	NTU	Grab

Field test instruments (such as those used to test pH and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are calibrated prior to each monitoring event;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in item (b) of the “Reporting” section of this MRP.

DISCHARGE MONITORING

The Discharger shall monitor and document weekly discharge of water and amendments and mathematically calculate average daily discharge volumes that are injected into the groundwater according to the requirements specified in Table 4. Each amendment addition shall be recorded individually, along with information regarding the time period over which the amendment was injected into the aquifer.

Table 4: Discharge Monitoring Requirements

Parameters	Units	Type of Sample
Injected Volume	gallons per day	Meter or Measured
Amendment(s) Added	kilograms per day	Measured

AMENDMENT ANALYSIS

Prior to use, amendments shall be analyzed for the constituents listed in Table 5. The results of the amendment characterization shall be provided to the Regional Board and presented in the first quarterly report.

Table 5: Amendment Analytical Requirements

Constituent	Method[1]	Maximum Practical Quantitation Limit (ug/L)[2]
Volatile Organic Compounds	EPA 8020 or 8260B	0.5
General Minerals[3]	Various	Various
Metals, Total and Dissolved[4]	EPA 200.7, 200.8	Various
Total Dissolved Solids	EPA 160.1	10,000
pH	meter	NA
Electrical Conductivity	meter	NA

[1] Or an equivalent EPA Method that achieves the maximum Practical Quantitation Limit.
[2] All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported, and reported as an estimated value.
[3] Alkalinity, bicarbonate, potassium, chloride, sulfate, total hardness, nitrate, nitrite, ammonia.
[4] Metals include arsenic, barium, cadmium, calcium, total chromium, copper, iron, lead, manganese, magnesium, mercury, molybdenum, nickel, selenium and silica.

ESTABLISHMENT OF BACKGROUND CONCENTRATION VALUES

The Discharger shall develop background values for concentrations of dissolved iron, dissolved manganese, total dissolved solids and electrical conductivity in groundwater using historic site data and following the procedures found in CCR Section 20415(e)(10). The Discharger shall collect baseline concentrations of Table 2 and Table 3 constituents from LF-13 prior to the start of the injection pilot testing.

REPORTING

When reporting the data, the Discharger shall arrange the information in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner as to illustrate clearly the compliance with this Order. In addition, the Discharger shall notify the Regional Board within 48 hours of any unscheduled shutdown of any soil vapor and/or groundwater extraction/injection system. The results of any monitoring done more frequently than required at the locations

specified in the Monitoring and Reporting Program shall also be reported to the Regional Board.

As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all reports shall be prepared by a registered professional or their subordinate and signed by the registered professional.

The Discharger shall submit quarterly electronic data reports, which conform to the requirements of the California Code of Regulations, Title 23, Division 3, Chapter 30. The quarterly reports shall be submitted electronically over the internet to the Geotracker database system by the 1st day of the second month following the end of each calendar quarter by **1 February, 1 May, 1 August, and 1 November** until such time as the Executive Officer determines that the reports are no longer necessary.

Hard copies of quarterly reports shall be submitted to the Regional Board by the 1st day of the second month following the end of each calendar quarter **(**i.e., by **1 February, 1 May, 1 August, and 1 November**). Each quarterly or semi-annual report shall include the following minimum information:

(a) a description and discussion of the groundwater sampling event and results, including trends in the concentrations of pollutants and groundwater elevations in the wells, how and when samples were collected, and whether the pollutant plume(s) is delineated;

(b) field logs that contain, at a minimum, water quality parameters measured before, during, and after purging, method of purging, depth of water, volume of water purged, etc.;

(c) groundwater contour maps for all groundwater zones, if applicable;

(d) pollutant concentration maps for all groundwater zones, if applicable;

(e) a table showing well construction details such as well number, groundwater zone being monitored, coordinates (longitude and latitude), ground surface elevation, reference elevation, elevation of screen, elevation of bentonite, elevation of filter pack, and elevation of well bottom;

(f) a table showing historical lateral and vertical (if applicable) flow directions and gradients;

(g) cumulative data tables containing the water quality analytical results and depth to groundwater;

(h) a copy of the laboratory analytical data report, which may be submitted in an electronic format;

(i) the status of any ongoing remediation, including an estimate of the cumulative mass of pollutant removed from the subsurface, system operating time, the effectiveness of the remediation system, and any field notes pertaining to the operation and maintenance of the system; and

(j) if applicable, the reasons for and duration of all interruptions in the operation of any remediation system, and actions planned or taken to correct and prevent interruptions.

An Annual Report shall be submitted to the Regional Board by **1 February** of each year. This report shall contain an evaluation of the effectiveness and progress of the investigation and remediation, and may be substituted for the fourth quarter monitoring report. The Annual Report shall contain the following minimum information:

(a) both tabular and graphical summaries of all data obtained during the year;

(b) groundwater contour maps and pollutant concentration maps containing all data obtained during the previous year;

(c) a discussion of the long-term trends in the concentrations of the pollutants in the groundwater monitoring wells;

(d) an analysis of whether the pollutant plume is being effectively treated;

(e) a description of all remedial activities conducted during the year, an analysis of their effectiveness in removing the pollutants, and plans to improve remediation system effectiveness;

(f) an identification of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program; and

(g) if desired, a proposal and rationale for any revisions to the groundwater sampling plan frequency and/or list of analytes.

A letter transmitting the monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the

penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

The Discharger shall implement the above monitoring program on the first day of the month following adoption of this Order.

Ordered by: ***ORIGINAL SIGNED BY ANDREW ALTEVOGT FOR***
PAMELA C. CREEDON, Executive Officer

9/2/14
(Date)

N

SAN JOAQUIN RIVER

LITTLE BREAK

DRIFTWOOD MARINA

LAURITZEN YACHT HARBOR

BIG BREAK MARINA

PLUME 1

PLUME 2

PLUME 3

BASINS WASTE MANAGEMENT AREA

PONDS WASTE MANAGEMENT AREA

FACILITY BOUNDARY

Plume 1 Pilot Test Location

TPH PLUMES

CFC MANUFACTURING AREA

AKC MANUFACTURING AREA

TITANIUM DIOXIDE (TiO2) MANUFACTURING AREA

DUPONT PROPERTY BOUNDARY

BRIDGEHEAD ROAD

BIG BREAK ROAD

HWY 4

0 300 600 900 1,200 Feet

LEGEND

MAXIMUM LATERAL EXTENT (FOOTPRINT) OF COPCs IN GROUNDWATER (VERTICALLY INTEGRATED PHASE 3 GROUNDWATER RFI PLUMES)

PERMEABLE REACTIVE BARRIER (PRB) WALL (UPPER AND LOWER AQUIFER)

NOTE:
ARSENIC WAS NOT USED TO DEFINE THE CONCEPTUAL PLUME BOUNDARIES.

2012 GROUNDWATER MONITORING PROGRAM WELLS

- SURFICIAL AQUIFER MONITORING WELL
- UPPER AQUIFER MONITORING WELL
- LOWER (L1/L2 ZONE) AQUIFER MONITORING WELL
- LOWER (L3 ZONE) AQUIFER MONITORING WELL

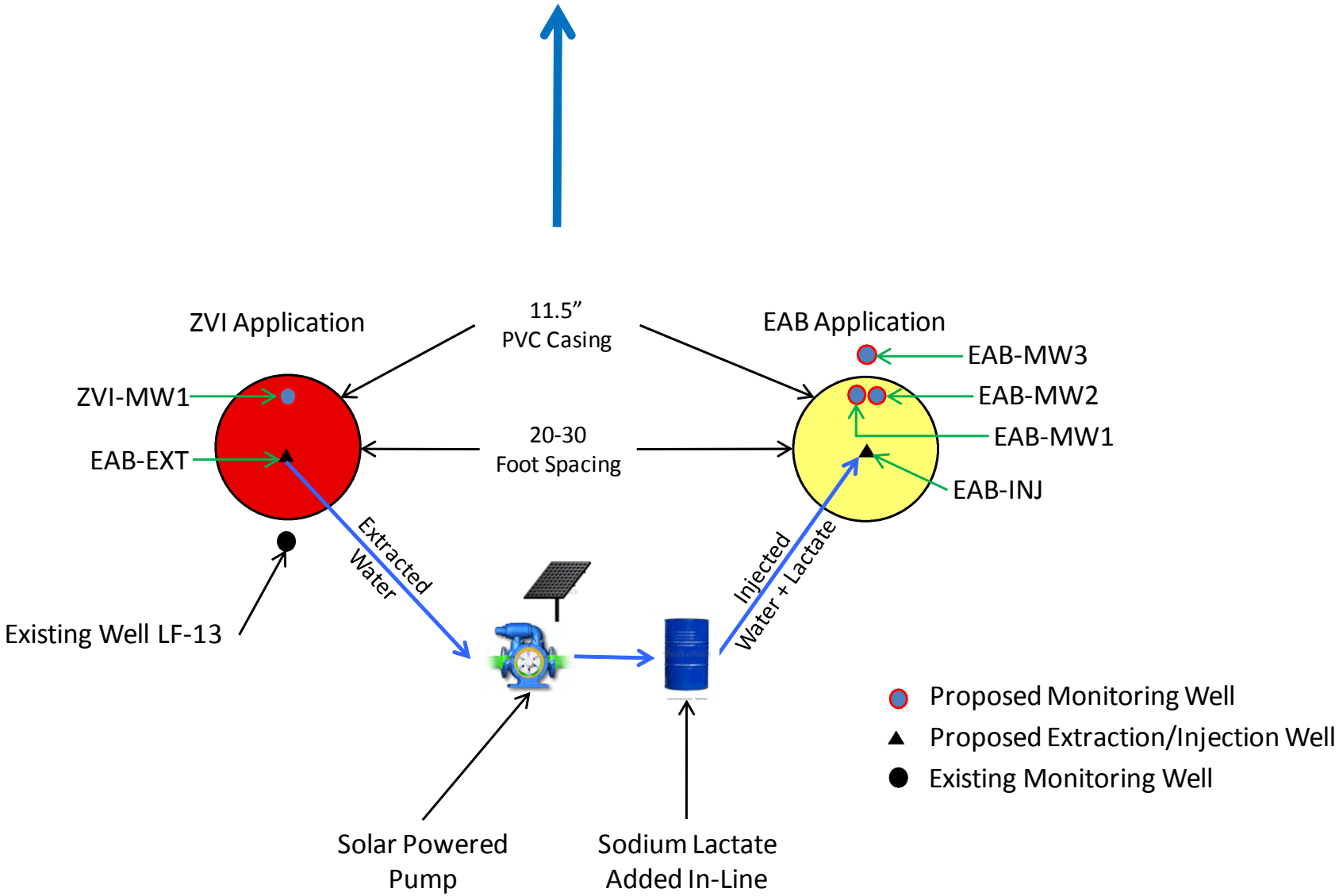
PARSONS
Parsons Environment & Infrastructure
2121 North California Boulevard
Suite 500
Walnut Creek, California 94596

Title:

Site Conceptual Plume Map and Location of Plume 1 Pilot Test
Plume 1 Field Pilot Test Work Plan
DuPont Oakley Site

Drawn/Approved: RAH/MS	File Project Number:
Date: 4/2/2013	Figure Number: 1-2
Revised:	
File Name:	

Path: S:\GIS\Oakley\Project_Figures\Phase 3 GW RFI Report (Sept2012)\Figure 1-2 Plume Conceptualization Map.mxd



PARSONS

Parsons Environment & Infrastructure

2121 North California Boulevard
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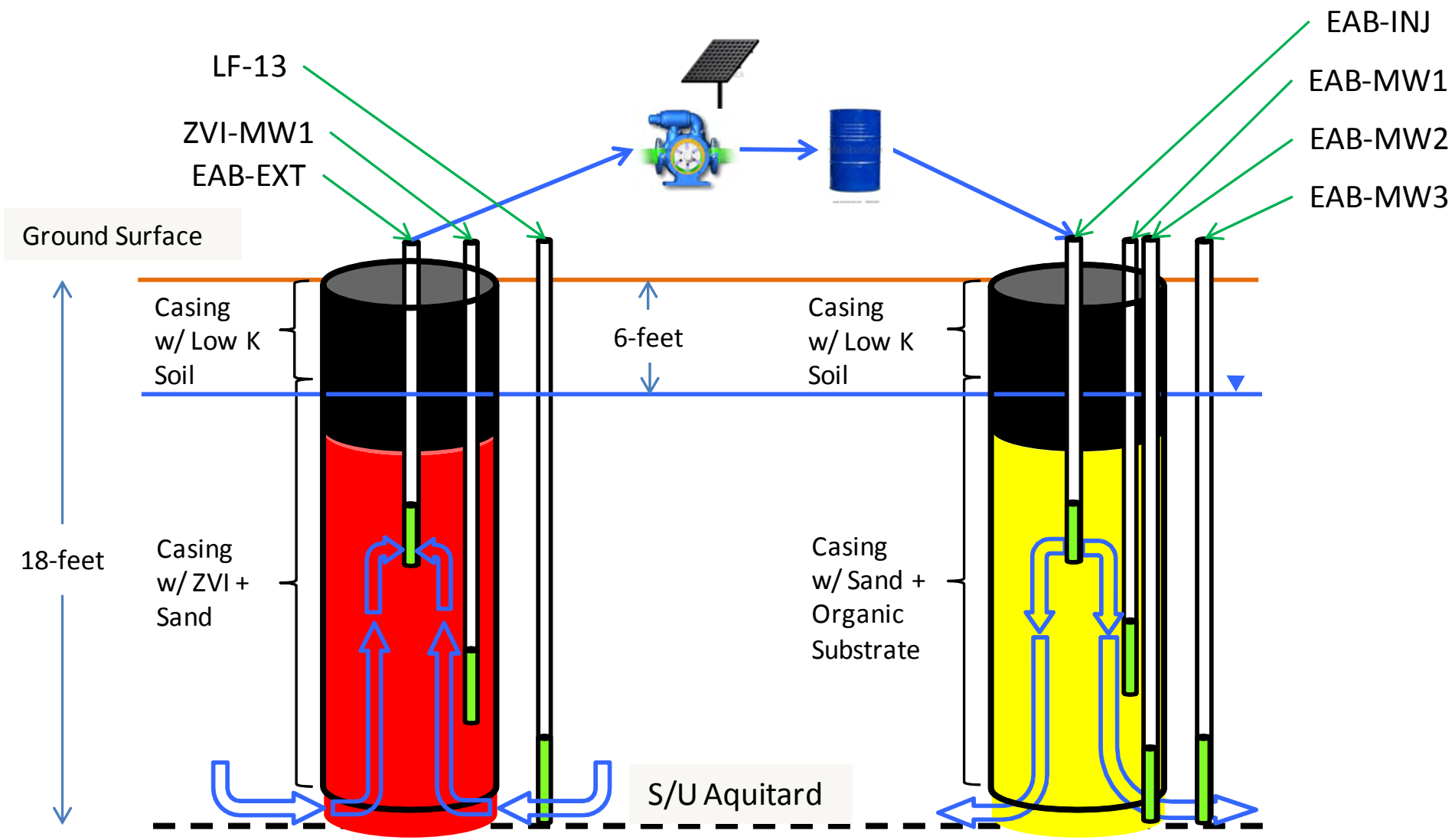
Title:

Plan View Conceptualization
Plume 1 Field Pilot Test Work Plan
DuPont Oakley Site

Drawn/Approved: RAH/	File Project Number: 445790
Date: 1/15/2014	Figure Number: 4-1
Revised:	
File Name: Figure 4-1 revised	

Path: F:\GIS\Oakley\Project_Figures\Plume 1 Pilot Workplan\Figure 4-1 revised.mxd



PARSONS

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Title:

Cross Section Conceptualization
Plume 1 Field Pilot Test Work Plan
DuPont Oakley Site

Drawn/Approved: RAH/	File Project Number: 445790
Date: 1/15/2014	Figure Number: 4-2
Revised:	
File Name: Figure 4-2 revised	

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