



# California Regional Water Quality Control Board Central Valley Region

Katherine Hart, Chair



Linda S. Adams  
Acting Secretary for  
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Protection

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Edmund G. Brown Jr.  
Governor

4 January 2011

## **CERTIFIED MAIL**

**7009 1410 0002 1422 1437**

Mr. Charles Orwig, Project Director  
DuPont Corporation Remediation  
E.I. du Pont de Nemours and Company  
140 Cypress Station Drive, Suite 140  
Houston, Texas 77090

### ***NOTICE OF APPLICABILITY OF GENERAL ORDER NO. R5-2008-0149, PLUME 3 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 8 October 2010, 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. R5-2008-0149-020.

#### **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°00'41" N, Longitude 121°44'29".

#### **Project Description:**

Historical operations at the Dupont Oakley Site titanium dioxide manufacturing area caused pollution of the soil and groundwater in what is referred to as Plume 3. The primary pollutants of concern in Plume 3 are tetrachloroethene (PCE), PCE daughter products (trichloroethene, cis-1,2-dichloroethene, and vinyl chloride), and arsenic. Dupont is proposing a field pilot test to evaluate the effectiveness of enhanced in-situ bioremediation with bioaugmentation in treating PCE and its daughter products in Plume 3. The site cleanup is being overseen by the Department of Toxic Substances Control, which has approved the Plume 3 Pilot Test Work Plan.

Dupont is proposing to inject emulsified vegetable oil (soybean oil) as a slow-release source of organic carbon and molecular hydrogen for anaerobic reductive de-chlorination of the pollutants of concern. Sodium lactate will also be included to condition the aquifer by rapidly reducing the native electron acceptors in the pilot test treatment zone prior to the slow

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degradation of the vegetable oil. The total proposed volume of injection substrate is approximately 5,800 gallons of which 90 percent by weight will consist of groundwater extracted from the pilot test area or within Plume 3. The remainder of the substrate mixture will consist of approximately 3.5 percent emulsified soybean oil, 1.5 percent sodium lactate, and 5 percent pH buffer by weight.

The pilot test also includes a study using BioTraps, which are slotted containers filled with microbial growth media that are suspended within the monitoring wells. The BioTraps have inlet and outlet tubing that allow addition of material or removal of samples without removing the container from the well. Specified BioTraps will be dosed with the injection substrate and with a bioaugmentation culture (KB-1).

The Discharger circulated a fact sheet describing the project. 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 emulsified vegetable oil, sodium lactate, and pH buffer 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. R5-2008-0149-020, 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.

PAMELA C. CREEDON  
Executive Officer

Attachment

cc: Ms. Della Kramer, Regional Water Quality Control Board, Rancho Cordova  
Mr. Peter Ruttan, 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. R5-2009-0149-020

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

PLUME 3 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. 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**

As shown on Figure 4-1, there are 7 monitor wells and 3 injection wells associated with this pilot study. 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 Frequency**

<b>Well Number<sup>1</sup></b>	<b>Frequency<sup>2,3</sup></b>	<b>Monitoring Objective</b>
PS3-MW-05	Quarterly for one year then semiannually thereafter	Compliance <sup>4</sup>
PS3-INJ-02 PS3-MW-03	Quarterly for one year then semiannually thereafter	Treatment Zone <sup>5</sup>
PS3-MW-06 PS3-MW-07 PS3-MW-08	During first quarter following the injection, then only the outermost of these three wells will be sampled quarterly for the first year, then semiannually thereafter	Treatment Zone <sup>5</sup>
PS3-MW-04	Quarterly for one year then semiannually thereafter	Transition Zone <sup>6</sup>
PS3-MW-01	Quarterly for one year then semiannually thereafter	Background <sup>7</sup>

<sup>1</sup> Well numbers as shown on Figure 4-1.

<sup>2</sup> i.e., weekly, monthly, quarterly, annually, other.

<sup>3</sup> Constituent suite components listed in Table 2.

<sup>4</sup> Wells used to determine compliance with water groundwater limitations.

<sup>5</sup> Wells sampled to evaluate in-situ bioremediation progress inside the treatment zone.

<sup>6</sup> Wells sampled to evaluate migration of pollutants within the treatment zone.

<sup>7</sup> Wells used to develop background concentrations.

**Table 2: Analytical Methods**

<b>Constituent</b>	<b>Method<sup>1</sup></b>	<b>Maximum Practical Quantitation Limit (µg/L)<sup>2</sup></b>
Volatile Organic Compounds	EPA 8260B	0.5
Methane, Ethane, Ethene	AM20-GAX	0.1
Nitrate + Nitrite	EPA 300.1	300
Chloride	EPA 300.1	300
Sulfate	EPA 300.1	200
Metals <sup>3</sup>	EPA 6010	100
Dissolved Organic Carbon	EPA 9060M	300
Volatile Fatty Acids	Microbial Insights SOP <sup>4</sup>	---
Phospholipid Fatty Acids	Microbial Insights SOP <sup>4</sup>	---
Targeted Gene Detections	Microbial Insights SOP <sup>4</sup>	---
Ferrous Iron	Hach Method 8146	100
Sulfide	Hach Method 8131	30
Nitrite	Hach Method 8507	300
Carbon Dioxide	Hach Method 8205	10,000
Alkalinity	Hach Method 8203	10,000
Total Dissolved Solids	EPA 160.1	10,000

<sup>1</sup> Or an equivalent EPA Method that achieves the maximum Practical Quantitation Limit.

<sup>2</sup> All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported as an estimated value.

<sup>3</sup> Dissolved metals include arsenic, lead, iron, and manganese.

<sup>4</sup> SOP = standard operating procedure.

## 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**

<b>Parameters</b>	<b>Units</b>	<b>Type of Sample</b>
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 daily the discharge of water and amendments 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**

<b>Parameters</b>	<b>Units</b>	<b>Type of Sample</b>
Injected Volume	gallons per day	Meter
Amendment(s) Added	kilograms per day	Measured

### **AMENDMENT ANALYSIS**

Prior to use, amendments shall be analyzed for the constituents listed in Table 5. The analysis should be done on the pure amendment and on a mixture of the amendment(s) and deionized water at the estimated concentration that would be injected during the pilot project.

**Table 5: Amendment Analytical Requirements**

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

<sup>1</sup> Or an equivalent EPA Method that achieves the maximum Practical Quantitation Limit.

<sup>2</sup> All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported, and reported as an estimated value.

<sup>3</sup> Alkalinity, bicarbonate, potassium, chloride, sulfate, total hardness, nitrate, nitrite, ammonia.

<sup>4</sup> 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 following the procedures found in CCR Section 20415(e) (10). The Discharger shall collect baseline concentrations of Table 2 and Table 3 constituents from PS3-MW-01 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 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.

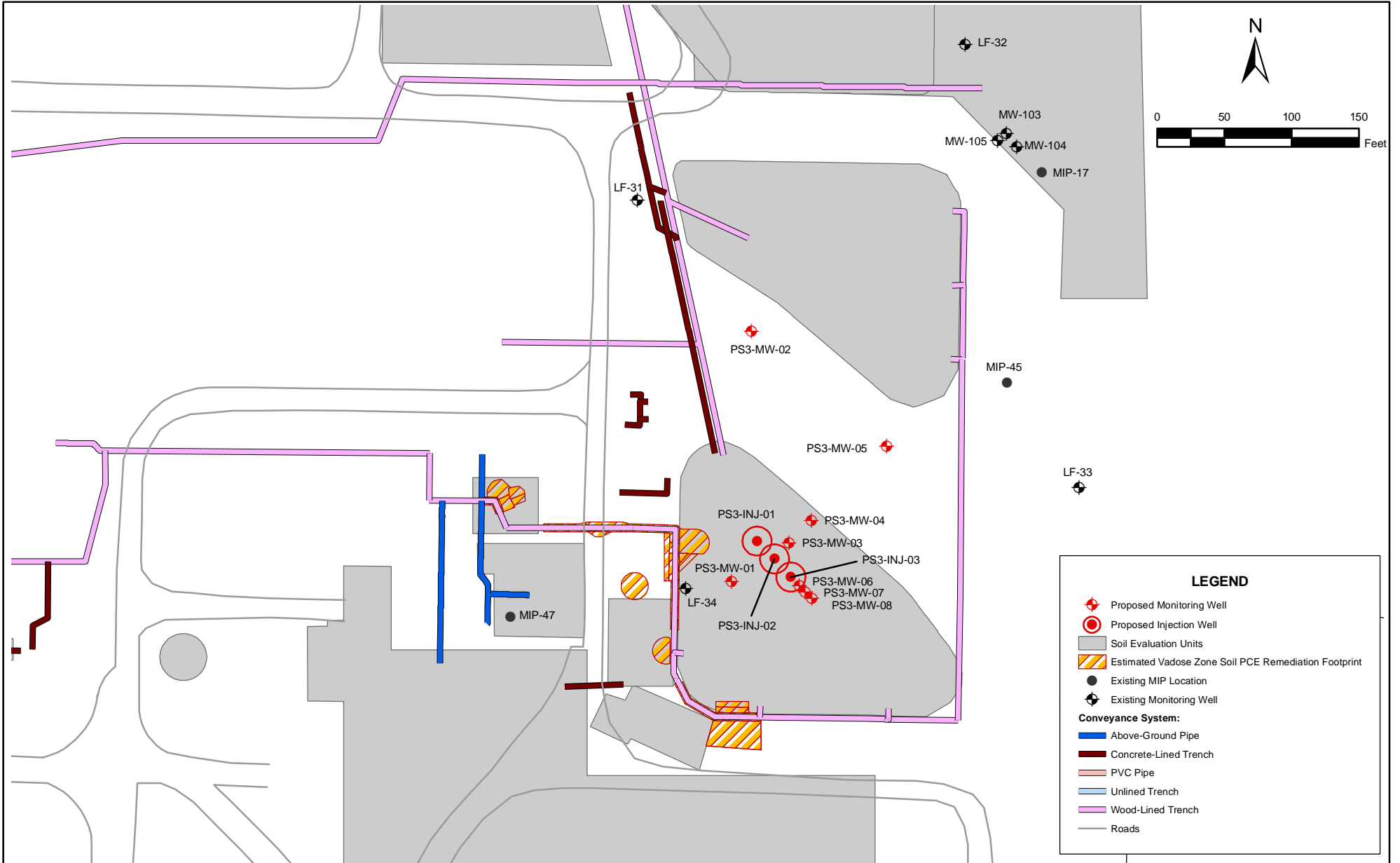
The Discharger shall implement the above monitoring program on the first day of the month following adoption of this Order.

Ordered by:

original signed by  
PAMELA C. CREEDON, Executive Officer

4 January 2011

(Date)



**PARSONS**

*Parsons-Commercial Technology Group*

2121 North California Boulevard  
Suite 500  
Walnut Creek, California 94596

Title:

Proposed Injection and Monitoring Well Locations  
Plume 3 Pilot Test Work Plan  
DuPont Oakley Site

Drawn/Approved:

RAH/

File Project Number:

445790-01003

Date:

4/26/10

Figure Number:

**4-1**

Revised:

6/17/10

File Name:

PLUME3 PILOT TEST WP\FIGURE 4-1.MXD