
Central Valley Regional Water Quality Control Board

8 December 2014

Diana Joye
DENA Trust
220 Sacramento Street
Auburn, CA 95603

NOTICE OF APPLICABILITY OF GENERAL ORDER NO. R5-2008-0149-055, IN-SITU REMEDIATION PILOT TEST, FORMER ZELIE'S CLEANERS, 1222 COLUSA AVENUE, YUBA CITY, SUTTER COUNTY

The DENA Trust, (Discharger) submitted a completed Notice of Intent, dated 2 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. R5-2008-0149-055.

Project Location:

The project is in Sutter County, Township 15N, Range 3E, Section 22, Mount Diablo Baseline & Meridian. Assessor's Parcel No. 052-013-003; Latitude 39°8'27.8" N, Longitude 121°38'2.6"W.

Project Description:

Historical dry cleaning operations at the Former Zelig's Cleaners in Yuba City, Sutter County caused pollution of the groundwater. The primary pollutant of concern in the pilot test area is tetrachloroethene (PCE) a dry cleaning solvent. The DENA Trust is proposing a field pilot test to evaluate the effectiveness of in-situ treatment of the PCE using bioremediation. The pilot test was proposed in November 13, 2013 *In-Situ Groundwater Remediation Pilot Study Work Plan* prepared by Wallace-Kuhl & Associates for the site.

For the pilot study, the DENA Trust proposes installing 12 direct push injection points in areas of the highest PCE concentrations near monitoring wells MW-2 and MW-3. The direct push injection points will be used to inject 3-D Microemulsion[®] (192 gallons), HRC Primer[®] (360 pounds) and BDI[®] (18 liters) which are commercially available groundwater remediation amendments that will be mixed with water (3,600 gallons). The 3-D Microemulsion[®] and HRC Primer[®] amendments release carbon compounds and molecular hydrogen to stimulate anaerobic reductive de-chlorination of PCE to ethene and ethane, which ultimately break down to carbon dioxide and water. The BDI[®] is a microbial additive that contains the bacteria Dehalococcoides, which can fully de-chlorinate PCE under anaerobic conditions. One

additional monitoring well (MW-5) will also be drilled and constructed for downgradient compliance monitoring.

As part of this Order, groundwater monitoring and reporting will be performed in accordance with the attached Monitoring and Reporting Program to confirm the extent of the treatment area and efficacy of the treatment, and to verify no adverse groundwater impacts occur at the downgradient well (MW-5) due to the treatment. DENA has prepared a 5 December 2014 *Revised Contingency Plan* (Contingency Plan) that provides for additional monthly monitoring if PCE breakdown products or metals exceeding 20% above background are detected in MW-5. The Contingency plan also provides for consultation with Central Valley Water Board staff for additional actions or enhancements if adverse impacts in groundwater at MW-5 persist after six months of monitoring.

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 water, 3-D Microemulsion[®], HRC Primer[®], and BDI[®] 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. R5-2008-0149-055, and any revisions thereto as ordered by the Executive Officer.

If you have any questions regarding this matter, please call Bill Brattain at (916) 464-4622.

Original signed by Andrew Altevogt, for

PAMELA C. CREEDON
Executive Officer

Attachment

cc: Della Kramer, Regional Water Quality Control Board, Rancho Cordova
Matthew Taylor, Wallace-Kuhl & Associates, West Sacramento

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2008-0149-055

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

FORMER ZELIE'S CLEANERS – 1222 COLUSA AVENUE
SUTTER COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring the progress of HRC Advanced[®] (Hydrogen Release Compound, partitioning electron donor) as an in-situ application to remove tetracholoroethene (PCE) from groundwater. 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 (Central Valley Water Board) staff shall approve sample 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 in Figure 1, there are 5 monitoring wells associated with the enhanced anaerobic bioremediation Pilot Study at this Site. 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 and sample analyses shall be completed by California State-certified laboratory.

The monitoring wells shall be sampled according to the schedule in Table 1 and the samples analyzed by the methods in Table 2, as shown below.

Table 1: Sampling Frequency and Objectives

Well Number ¹	Frequency	Monitoring Objective
MW-1, MW-2, MW-3, MW-4, MW-5	Prior to initial injection	Obtain pre-ISCO groundwater conditions ²
MW-1, MW-2, MW-3, MW-4, MW-5	Two weeks after initial injection	Initial distribution of ISCO treatment
MW-1, MW-2, MW-3, MW-4, MW-5	Four weeks after initial injection	Determination of groundwater quality after ISCO treatment
MW-3	Quarterly	Treatment Zone ³
MW-1, MW-2	Quarterly	Transition Zone ⁴
MW-4	Quarterly	Background
MW-5	Quarterly	Compliance Zone ⁵

¹ Well identification number, as shown on Figure 1.

² Monitoring event used to develop background concentrations.

³ Wells sampled to evaluate remediation progress inside the treatment zone.

⁴ Wells sample to evaluate migration of pollutants within the transition zone.

⁵ Wells used to determine compliance with groundwater limitations.

Table 2: Analytical Methods and Constituent Suite

Constituent	EPA Analytical Method ¹	Maximum Practical Quantitation Limit ²
Volatile organic compounds	EPA 8260B	0.5 µg/L
Semi-volatile organic Compounds	EPA 8270	5 µg/L
Total dissolved solids	EPA 160.1	50 mg/L
Biochemical oxygen demand (BOD)	405.1	10 mg/L
Metals ³	EPA 6000/7000	Varies

¹ Unless stated otherwise, must use USEPA Methods or an equivalent analytical method that achieves the Maximum Practical Quantitation Limit and has been approved by Central Valley Water Board staff.

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

³ CAM 17 metals, iron, and manganese

FIELD SAMPLING

In addition to the above sampling and analysis, field sampling and analysis shall be conducted each time the monitor well or injection 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	µmhos/cm	Grab
Dissolved Oxygen	mg/L	Grab
pH	pH Units (to 0.1 units)	Grab
Temperature	°C	Grab
Volume purged	Gallons	Measurement

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

Parameters	Units	Sample Type
Injected volume	Gallons per day (gpd)	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 a mixture of the amendment and deionized water at the estimated concentration that would be injected during the pilot test.

Table 5: Amendment Analytical Requirements

Constituent	Analytical Method ¹	Maximum Practical Quantitation Limit ²
Volatile Organic Compounds	EPA 8260B	0.5 µg/L
General minerals ³	Various	Various
Metals, total and dissolved ⁴	EPA 200.7, 200.8	Various
Semi-volatile Organic Compounds	EPA 8270	5.0 µg/L
Total Dissolved Solids (TDS)	EPA 160.1	10,000 µg/L
pH	Meter	NA
Electrical Conductivity (EC)	Meter	NA

¹ Unless stated otherwise, must use USEPA Methods or an equivalent analytical method that achieves the Maximum Practical Quantitation Limit and has been approved by Central Valley Water Board staff.

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

³ General minerals include alkalinity, bicarbonate, potassium, chloride, sulfate, total hardness, nitrate, nitrite, and ammonia.

⁴ CAM 17 metals, iron, and manganese

ESTABLISHMENT OF BASELINE CONCENTRATION VALUES

The Discharger shall develop baseline values for concentrations of PCE, CAM 17 metals, total dissolved solids and electrical conductivity in groundwater and following the procedures found in CCR Section 20415(e) (10). The Discharger shall complete a baseline monitoring event in accordance with Tables 1 and 2 to establish groundwater quality conditions prior to the implementation of the pilot test.

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. 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 Central Valley Water 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 two (2) 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 (i.e., by 1 February, 1 May, 1 August, or 1 November), or a date approved in writing by Central Valley Water Board staff.

Hard copies of quarterly reports shall be submitted to the Central Valley Water 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) or a date approved in writing by Central Valley Water Board staff. Each quarterly report shall include the following minimum information:

- (a) description and discussion of the groundwater sampling event and results, including trends in the concentrations of pollutants, by-products of the injectant, how and when samples were collected, and whether the pollutant plumes are 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, and groundwater elevations in the wells, 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 remediation, operating time, effectiveness of the treatment, and prediction of when water quality objectives will be met; and
- (j) a description of amendment analysis and injection activities including quantities of water and amendments injected into the groundwater, along with time period over which the amendments were injected into the aquifer.

An Annual Report shall be submitted to the Central Valley Water 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.

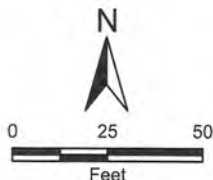
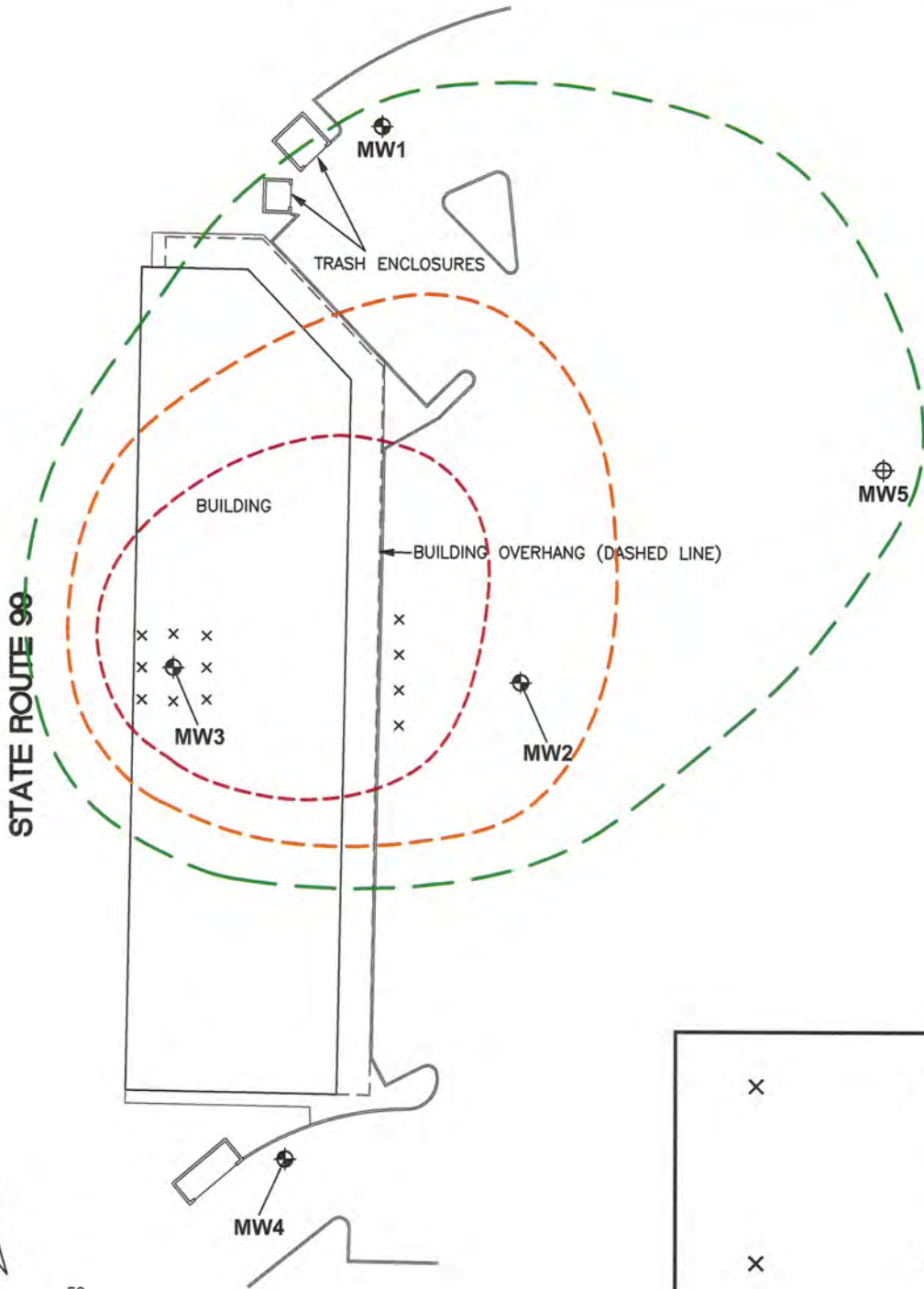
The Discharger shall implement the above monitoring program on the first day of the month following adoption of this Order.

Ordered by:

Original signed by Andrew Altevogt, for
PAMELA C. CREEDON, Executive Officer

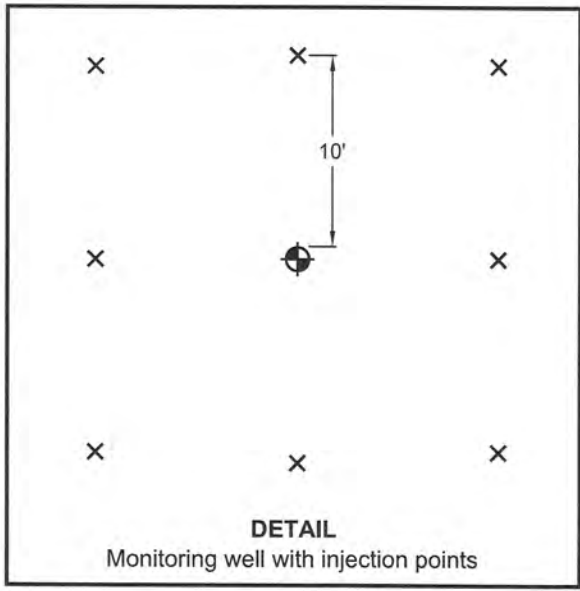
8 December 2014

(Date)



Adapted from a CAD drawing provided by Morrow Surveying, dated July 22, 2010.

- Legend:**
- ⊕ Monitoring well location
 - ⊕ Proposed monitoring well location (MW5)
 - x Proposed HRC injection points
 - Treatment Zone
 - Transition Zone
 - Compliance Zone



PROPOSED INJECTION POINTS
FORMER ZELIE'S CLEANERS
 Yuba City, California



FIGURE 1	
DRAWN BY	TJC
CHECKED BY	MAT
PROJECT MGR	MAT
DATE	6/14
WKA NO. 8718.04	