

---

## Central Valley Regional Water Quality Control Board

### **MONITORING AND REPORTING PROGRAM NO. R5-2015-0012-0076**

FOR  
IN-SITU GROUNDWATER REMEDIATION  
AND DISCHARGE OF TREATED GROUNDWATER TO LAND

FOR  
SIERRA SUPERSTOP #8  
5057 OLIVEHURST AVENUE, OLIVEHURST, CA  
YUBA COUNTY  
LUST CASE #580087  
GEOTRACKER GLOBAL ID #T0611500069

This Monitoring and Reporting Program (MRP) describes requirements for monitoring the effects on groundwater quality from ozone injection into the subsurface at 5057 Olivehurst Avenue in Olivehurst (Site). Sierra Energy Company (herein referred to as "the Discharger"), is the current Responsible Party for the Site. This MRP is issued pursuant to Water Code Section 13267 and has been prepared based on Attachment C of General Order R5-2015-0012. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer of the Central Valley Regional Water Quality Control Board (Central Valley Water Board). As appropriate, Central Valley Water Board staff shall approve specific 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 sample shall be recorded on the legal chain of custody form.

### **GROUNDWATER MONITORING**

As shown on Figure 8, there are currently 15 monitoring wells, 10 air sparge wells, 11 vapor extraction wells (one proposed location), and 8 dual-nested ozone injection wells (6 proposed locations) associated with this Site. The groundwater monitoring program for these wells shall follow the schedule below. Monitoring wells with free phase petroleum product or visible sheen shall be monitored, at a minimum, for product thickness and depth to water. The volume of extracted groundwater, if applicable, shall also be provided in quarterly monitoring reports. Sample collection and analysis shall follow standard EPA protocol.

The monitoring wells, vapor 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 and Constituent Suite**

<b>Well Number<sup>1</sup></b>	<b>Constituent<sup>2</sup></b>	<b>Frequency<sup>3</sup></b>	<b>Monitoring Objective</b>
MW-12D, MW-13S, MW-15 (Down-gradient)	Suites A and then B, if impacted by A	Quarterly	Compliance Zone <sup>4</sup>
MW-2, MW-5A, MW-9 (Within Plume)	Suites A and B	Quarterly	Treatment Zone <sup>5</sup>
MW-1, MW-4, AS-9 (Within Plume)	Suites A and B	Quarterly	Transition Zone <sup>6</sup>
MW-3, MW-10 (Up-gradient)	Suites A and B	Semi-Annual	Background <sup>7</sup>

<sup>1</sup> Well numbers and locations as shown on Figure 8.

<sup>2</sup> Constituent analytical methods are listed in Table 2.

<sup>3</sup> i.e., weekly, monthly, quarterly, semi-annually, annually, other. Semi-annual sampling occurs 2nd and 4th quarters, annual sampling occurs in the 4th quarter, biennial sampling occurs every two years in the 4th quarter, with the first sample during year two.

<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**

Constituent	Method <sup>1</sup>	Maximum Practical Quantitation Limit (µg/L) <sup>2</sup>	Frequency
<i>Suite A</i>			
TPHg	EPA 8015C	50	As indicated in Table 1
BTEX, 5 oxygenates (MTBE, DIPE, ETBE, TAME, TBA)	EPA 8260B	0.50 (BTEX, MTBE) 1.0 (DIPE, ETBE, TAME, TBA)	
<i>Suite B</i>			
Metals, dissolved <sup>4</sup>	EPA 200.8	4.0 to 10	Quarterly/ Semiannual <sup>3</sup>
Ferrous iron	SM 3500-Fe	50	Quarterly/ Semiannual <sup>3</sup>
Hexavalent Chromium	EPA 218.6	1.0	Quarterly/ Semiannual <sup>3</sup>
Chloride, bromide, nitrate, sulfate	EPA 300.0	100	Quarterly/ Semiannual <sup>3</sup>
Bromate	EPA 37	1.0	Quarterly/ Semiannual <sup>3</sup>

TPHg: Total petroleum hydrocarbons as gasoline  
 BTEX: Benzene, ethylbenzene, toluene, xylenes  
 MTBE: Methyl tertiary butyl ether  
 DIPE: Diisopropyl ether

ETBE: Ethyl tertiary butyl ether  
 TAME: tert-Amyl methyl ether  
 TBA: Tertiary butyl alcohol  
 µg/L: micrograms per liter

<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> Quarterly for one year, then semi-annually

<sup>4</sup> Metals include arsenic, barium, calcium, chromium, total iron, magnesium, manganese, molybdenum, and vanadium.

**FIELD SAMPLING**

In addition to the above sampling and laboratory analyses, 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>Practical Quantitation Limit</b>	<b>Analytical Method</b>
Groundwater Elevation	Feet, Mean Sea Level	0.01 Feet	Measurement
Oxidation-Reduction Potential	Millivolts	10 millivolts	Field Meter
Electrical Conductivity	µmhos/cm	50 µS/cm	Field Meter
Dissolved Oxygen	mg/L	0.2 mg/L	Field Meter
pH	pH Units (to 0.1 units)	0.1 units	Field Meter
Temperature	°F/°C	0.1 °F/°C	Field Meter

µmhos/cm: micromhos per centimeter  
 µS/cm: microsiemens per centimeter  
 mg/L: milligrams per liter

°F: degrees Fahrenheit  
 °C: degrees Celsius

All wells that are purged shall be purged until pH, temperature, conductivity, and dissolved oxygen are within 10% of the previous value.

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.

**ESTABLISHMENT OF BACKGROUND CONCENTRATION VALUES**

The Discharger established background concentrations by groundwater sampling the wells listed in Table 1 for these constituents on **14 May 2021**.

**ACTION LEVELS**

Action Levels will be 120% of maximum baseline concentrations of constituents in analytical Suite B detected in groundwater samples collected 14 May 2021. Should concentrations of these constituents exceed Action Levels in Compliance Zone wells, the Contingency Plan is to be implemented. Action Levels may be revised by Central Valley Water Board staff should background concentrations change significantly over the course of remediation. Action Levels for Suite B constituents are shown in Table 4.

**Table 4: Analytical Suite B Constituent Action Levels<sup>1</sup>**

<b>Constituent</b>	<b>Maximum Background Concentration<sup>2</sup></b>	<b>Action Level</b>	<b>Units</b>
Arsenic, dissolved	0.031	0.068	mg/L
Barium, dissolved	0.16	0.35	mg/L
Calcium, dissolved	110	242	mg/L
Chromium, dissolved <sup>3,4</sup>	ND	0.11	mg/L
Magnesium, dissolved	70	154	mg/L
Manganese, dissolved	3	6.6	mg/L
Molybdenum, dissolved <sup>5</sup>	ND	--	--
Vanadium, dissolved	0.015	0.033	mg/L
Total Iron	17	37.4	mg/L
Ferrous Iron	17	37.4	mg/L
Hexavalent Chromium	1.3	2.9	µg/L
Chloride	100	220	mg/L
Bromide	1.2	2.6	mg/L
Nitrate	9.3	20.5	mg/L
Sulfate	73	160.6	mg/L
Bromate <sup>3,6</sup>	ND	0.022	mg/L

mg/L: milligrams per liter  
 ND: not detected

--: Action Level not established.

<sup>1</sup> Action Level set to 120% of constituents maximum detected background concentration.

<sup>2</sup> In samples collected 14 May 2021.

<sup>3</sup> Not detected in background samples. Action Level set to 120% of California maximum contaminant level (CA MCL) for drinking water.

<sup>4</sup> CA MCL = 0.05 mg/L

<sup>5</sup> CA MCL not established.

<sup>6</sup> CA MCL = 0.010 mg/L

### **CONTINGENCY PLAN**

The Contingency Plan is to be implemented in the event that concentrations of potential deleterious remedial byproducts (dissolved metals, total chromium, hexavalent chromium, bromide, bromate, nitrate, or sulfate) exceed established Action Levels in Compliance Zone wells. The Contingency Plan is to consist of the following steps:

- (1) Immediately discontinue the injection of ozone.
- (2) Report exceedance to Central Valley Water Board staff within 48 hours.
- (3) Collect confirmation samples from Compliance Zone wells 30 days following initial exceedance of Action Levels.
- (4) If exceedances remain in Compliance Zone wells after 30 days, a batch groundwater extraction up to a total of 2,000 gallons (or a total effort of 5 days, whichever occurs first) shall be performed in Compliance Zone wells then Transition Zone wells with exceedances.
- (5) If exceedances remain in Compliance Zone wells 30 days after completion of batch extraction, repeat Steps 3 and 4 as needed.
- (6) Ozone injection shall not be restarted until concurrence to restart injections is received from Central Valley Water Board staff.

### **IN-SITU DISCHARGE MONITORING**

The Discharger shall monitor and record the discharge of ozone that is injected into the subsurface according to the requirements specified in Table 5.

**Table 5: Discharge Monitoring Requirements**

<b>Parameters</b>	<b>Units</b>	<b>Type of Sample</b>
Injected Volume	Pounds per day	Meter

### **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 clearly illustrate 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 professional Civil Engineer or Geologist or their subordinate and signed by the licensed 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. All reports shall be submitted electronically over the internet to the GeoTracker database system. Quarterly reports shall be submitted by the 1<sup>st</sup> day of the second month following the end of each calendar quarter: **1 May, 1 August, 1 November, and 1 February**. Semi-annual reports shall be submitted by the 1<sup>st</sup> day of the second month following each calendar semi-annual period: **1 May 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;
- (d) pollutant concentration maps for all groundwater zones;
- (e) cumulative data tables containing the water quality analytical results and depth to groundwater;
- (f) a copy of the laboratory analytical data report, which may be submitted in an electronic format;
- (g) information as required by Table 5 of this MRP;
- (h) tabular and graphical summaries of all data obtained;
- (i) a discussion of the long-term trends in the concentrations of the pollutants in the groundwater monitoring wells;
- (j) an analysis of whether the pollutant plume is being effectively treated;

- (k) a description of all remedial activities conducted, an analysis of their effectiveness in removing the pollutants, and plans to improve remediation system effectiveness;
- (l) discussion of any exceedances of established Action Levels and/or the implementation of the Contingency Plan, and recommendations for modifications to limit breakdown/byproduct production if necessary;
- (m) an identification of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program; and
- (n) as 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  \_\_\_\_\_  
PATRICK PULUPA, Executive Officer

10/30/2022

\_\_\_\_\_  
(Date)



