

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

DRAFT MONITORING AND REPORTING PROGRAM NO. R5-2015-0012-0XX

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

GLENN SPRINGS HOLDINGS, INC.
FORMER OCCIDENTAL CHEMICAL CORPORATION FACILITY
16777 HOWLAND ROAD, LATHROP
SAN JOAQUIN COUNTY, CALIFORNIA

This Monitoring and Reporting Program (MRP) describes requirements for monitoring a groundwater remediation injection effort at the Former Occidental Chemical Corporation (OCC) manufacturing facility in Lathrop, California (Site; Figure 1). This MRP is issued to Glenn Springs Holdings, Inc. (GSH or Discharger) 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 of the California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board). As appropriate, Central Valley Water Board staff (Staff) shall approve specific sample station locations prior to implementation of sampling activities.

Well samples collected for Site remediation purposes per MRP R5-2015-0810 and MRP R5-2021-0011 (and revisions thereto), may be used for compliance with the well sampling requirements found in this MRP as long as the sampling and analytical requirements contained in this MRP are met. Duplication of sampling is not intended. Results of all samples used to meet the monitoring requirements of this MRP must be included in the required monitoring reports for this MRP. The Discharger must also comply with all the requirements including the discharge specifications outlined in Waste Discharge Requirements (WDR) R5-2021-0011.

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 (including treatment wells and compliance wells) associated with the chlorine dioxide injections at the Site above and below the Corcoran Clay are shown on Figure 2, and Figure 3 and listed in Table 1 below. Groundwater upgradient wells as listed in Table 1 will be used for monitoring upgradient background groundwater quality conditions prior to injections. GSH uses permanent on-Site injection wells IW-01, IW-03R, IW-04, IW-05, IW-06 to inject the amendments into the treatment zone. All wells must also be sampled for baseline conditions. 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 Environmental Protection Agency (EPA) protocol and sample analyses shall be conducted by a 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. Any sampling done more frequently than specified in Table 1 shall also be reported in the groundwater monitoring reports.

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Table 1: Sampling Frequency and Constituent Suite

Well Number-Depth ft bgs¹	Constituent²	Frequency³	Monitoring Objective
Above the Corcoran Clay			
PW11-108, PW11-195, PW19-149, PW19-196, PW24-120, PW24-201	Baseline: Suite A, B, C, D, E, F, G Annual: Suite A, B, C, F, H ⁴	Baseline (pre- injections); annually thereafter	Upgradient Background ⁵
PW03-142, PW03-218, PW06-149, PW06-197, PW08-155, PW-08-180, PW26-154, PW22-164, PW22-196	Quarterly: Suite A, B, C, D, E, F, G Annual: Suite A, B, C, F, H ⁴	Quarterly for one year after injections; annually thereafter	Treatment Zone ⁶
PW04-113, PW04-199, PW09-123, PW09-198, PW26-154, PW26-198, PW31-130, PW31-180	Quarterly: Suite A, B, C, D, E, F, G Annual: Suite A, B, C, F, H ⁴	Quarterly for one year after injections; annually thereafter	Transition Zone ⁷
PW37-int/deep zones PW36 – int/deep zones PW11-108, PW11-195, PW19-149, PW19-196, PW21-155, PW21-270, PW23-110, PW23-185, PW24-146, PW24-201	Quarterly: Suite A, B, C, D, E, F, G Annual: Suite A, B, C, F, H ⁴	Quarterly for one year after injections; annually thereafter	Compliance Zone ⁸
Below the Corcoran Clay			
PW16-329, PW20-500	Quarterly: Suite A, B, C, F, G Annual: Suite A, B, C, F, H ⁴	Baseline (pre- injections); annually thereafter	Upgradient Background ⁵
PW09-338	Quarterly: Suite A, B, C, F, G Annual: Suite A, B, C, F, H ⁴	Quarterly for one year after injections; annually thereafter	Treatment Zone ⁶
PW12-315	Quarterly: Suite A, B, C, F, G Annual: Suite A, B, C, F, H ⁴	Quarterly for one year after injections; annually thereafter	Transition Zone ⁷
PW16-329, PW20-500	Suite B, C, F, G Annual: Suite A, B, C, F, H ⁴	Quarterly for one year after injections; annually thereafter	Compliance Zone ⁸

- 1 Well numbers and locations as shown on Figure 2 and Figure 3.
- 2 Constituent analytical methods are listed in Table 2.
- 3 i.e., weekly, monthly, quarterly, semi-annually, annually, other. Semi-annual sampling occurs 1st and 3rd quarters, annual sampling occurs in the 1st quarter, biennial sampling occurs every two years in the 1st quarter, with the first sample during year two.
- 4 Suite G includes total dissolved solids, cations, anions, and total organic carbon. Biocide injection of chlorine dioxide is not anticipated to impact cations (except sodium and iron), anions (except chloride), and total organic carbon. Following initial one year of monitoring, Suite G will be replaced by Suite H with Central Valley Water Board written concurrence.
- 5 Wells used to develop background concentrations.
- 6 Wells sampled to evaluate changes in constituent concentration due to biocide injections in the treatment zone.
- 7 Wells sampled to evaluate migration of pollutants within the outer extents of treatment zone.
- 8 Wells used to determine compliance with water groundwater limitations.

Table 2: Analytical Methods

Constituent	Analytical Method¹	Maximum Practical Quantitation Limit (µg/L)²
Suite A		
1,2,3-Trichloropropane	EPA 524.3	0.005
Suite B		
Fumigants DBCP and EDB	APPL Dept. of Health Services Method	0.01
Suite C		
Sulfolane	APPL SOP ANASULF	10
Suite D		
Organochloride Pesticides	EPA 8081A	0.05
Suite E		
Organophosphorus Pesticides	EPA 8141	1
Suite F		
Title 22 Metals ^{3,4} , Total and Dissolved	EPA 200.7, 200.8	Various
Suite G⁴		
Total Dissolved Solids	EPA 160.1	10,000
Cations (Ca, Mg, Na, K, Fe, Mn, Si)	EPA 200.8	Various
Anions (Cl, SO ₄ , NO ₂ , NO ₃ , F, PO ₄)	EPA 300.0	Various
Total Organic Carbon	SM 5310B	200
Suite H		
Total Dissolved Solids	EPA 160.1	10,000
Cations (Na and Fe)	EPA 200.8	Various
Anions (Cl, SO ₄ , NO ₃)	EPA 300.0	Various

¹ Analytical method substitutions may be made with Central Valley Water Board staff written concurrence, provided the method achieves the Maximum Practical Quantitation Limit.

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

³ Metals include aluminum, antimony, arsenic, barium, cadmium, calcium, total chromium, copper, iron, lead, manganese, magnesium, mercury, molybdenum, nickel, selenium, silver, vanadium, silica, and zinc.

⁴ If concentrations of salts, total dissolved solids, metals, or electrical conductivity are detected more than 20% greater than their respective baseline/background concentrations at the Compliance Zone well(s), the Discharger shall immediately submit contingency measures for Central Valley Water Board staff approval to

revert the groundwater conditions to the baseline conditions, and as deemed necessary by the Central Valley Water Board. Once approved by the Staff, the discharger shall immediately implement the contingency plan.

FIELD SAMPLING

In addition to the above sampling and laboratory analyses, field sampling and analysis shall be conducted each time a monitoring 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	Analytical Method
Groundwater Elevation	Feet, Mean Sea Level	Measurement
Oxidation-Reduction Potential (ORP)	Millivolts	Field Meter
Electrical Conductivity (EC)	uhmos/cm	Field Meter
Dissolved Oxygen (DO)	mg/L	Field Meter
pH	pH Units (to 0.1 units)	Field Meter
Temperature	°F/°C	Field Meter
Volume purged (monitoring wells)	gallons	Measurement
Injection Rate (Injection wells)	Gallons Per Minute	Flow Meter
Turbidity	NTUs	Field Meter

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

IN-SITU DISCHARGE MONITORING

The Discharger shall monitor 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	Type of Sample
Injected Volume	gallons per day	Totalizing Meter
Injection rate	Gallons per minute	Measured
Amendment(s) Added	pounds per day	Measured
Injection duration	hours	Not applicable

AMENDMENT ANALYSIS

Prior to use, amendments shall be analyzed for the constituents listed in Table 2 and Table 3 (except groundwater elevation). The analysis should be done on a mixture of the amendment and deionized water at the estimated concentration that would be injected during the remediation project.

ESTABLISHMENT OF BACKGROUND CONCENTRATION VALUES

The Discharger shall develop background values for concentrations of general minerals, dissolved metals, total dissolved solids, and electrical conductivity in groundwater following the procedures found in California Code of Regulations, title 27, section 20415(e)(10). The Discharger shall complete a baseline monitoring event to establish background concentrations prior to implementation of the remediation event.

On 15 November 2022, GSH submitted the *Proposal for Establishment of Background Concentration Values* (Proposal), for establishing background concentrations. In a 15 November 2022 letter, Central Valley Water Board staff concurred with the Proposal and the background concentration values for chloride, sodium, and total and dissolved iron.

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 pursuant to Business and Professions Code sections 6735, 7835, and 7835.1, all reports shall be prepared by a licensed professional Civil Engineer or Geologist or their subordinate and signed and/or stamped, as appropriate, by the licensed professional.

The Discharger shall submit quarterly electronic data reports, which conform to the requirements of 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 first (1st) day of the second (2nd) 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 of the Central Valley Water Board determines that the reports are no longer necessary or the criteria in Table 1 have been met. Semiannual reports are due by the first (1st) day of the second (2nd) month following the end of the respective calendar quarter (**1 May** and **1 November**) until such time as the Executive Officer determines the reports are no longer necessary.

Each 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 and rose diagram 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;
- (i) the status of any ongoing remediation, including an estimate of amendments injected, 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 Central Valley Water Board by **1 February (1 November for semi-annual monitoring)** of each year. This report shall contain an evaluation of the effectiveness and progress of the investigation and remediation. The Annual Report may be substituted for the fourth quarter (**or second semi-annual**) monitoring report as long as it contains all of the information required for that report plus that required for the Annual 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 attached Central Valley Water Board Standard Provisions and Reporting Requirements (SPRRs) for Waste Discharge Requirements, section B.3. You can also find the SPRRs on our website at: https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/std_provisions/wdr-mar1991.pdf.

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

Ordered by: _____
(for) PATRICK PULUPA, Executive Officer

(Date)