CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

REVISED MONITORING AND REPORTING PROGRAM NO. R5-2015-0012-081
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). This MRP is issued to Glenn Springs Holdings, Inc. (GSH or Discharger) pursuant to Water Code section 13267 in conjunction with Notice of Applicability (NOA) R5-2015-0012-081.

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.

Groundwater samples collected for Site remediation purposes per MRPs R5-2015-0810 and 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.

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

GSH uses permanent on-Site injection wells to inject treated groundwater. Monitoring wells associated with the chlorine dioxide biocide injection into the treated-water injection wells are 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. 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 Environmental Laboratory Accreditation Program (ELAP)-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.

Table 1: Sampling Frequency and Constituent Suite

Well No.-Depth ft bgs[1]	Constituent[2]	Frequency	Monitoring Objective
Above the Corcoran Clay			
PW11-108, PW11-195, PW19-149, PW19-196, PW24-146, PW24-201	Baseline: Suite F, G Annual: H[3]	Baseline (pre-injections); annually thereafter	Background[4] (Upgradient)
PW03-142, PW03-218, PW06-149, PW06-197, PW08-155, PW-08-180, PW26-154, PW22-164, PW22-196	Quarterly: Suite F, G Annual: Suite H[3]	Quarterly for one year following each injection; annually thereafter	Treatment Zone[5]
PW04-113, PW04-199, PW09-123, PW09-198, PW26-154, PW26-198, PW31-130, PW31-180	Quarterly: Suite F, G Annual: Suite H[3]	Quarterly for one year following each injection; annually thereafter	Transition Zone[6]
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 F, G Annual: Suite H[3]	Quarterly for one year following each injection; annually thereafter	Compliance Zone[7]
Below the Corcoran Clay			
PW16-329, PW20-500	Quarterly: Suite F, G Annual: Suite H[3]	Baseline (pre-injections); annually thereafter	Background[4] (Upgradient)
PW09-338	Quarterly: Suite F, G Annual: Suite H[3]	Quarterly for one year following each injection; annually thereafter	Treatment Zone[5]
PW12-315	Quarterly: Suite, G Annual: Suite H[3]	Quarterly for one year following each injection; annually thereafter	Transition Zone[6]
PW16-329, PW20-500	Quarterly: Suite F, G Annual: Suite H[3]	Quarterly for one year following each injection; annually thereafter	Compliance Zone[7]

[1] Well numbers and locations as shown on NOA Figure 2 and Figure 3.

[2] Constituent analytical methods are listed in Table 2.

[3] Suite G includes total dissolved solids, cations, and anions as listed in Table 2. Biocide injection of chlorine dioxide is not anticipated to impact cations except sodium and iron, or anions except chloride. Following one year of monitoring following a biocide injection, Suite G will be replaced by Suite H with Central Valley Water Board written concurrence based on groundwater quality results.

[4] Wells used to develop background concentrations.

[5] Wells sampled to evaluate changes in constituent concentration due to biocide injections in the treatment zone.

[6] Wells sampled to evaluate migration of pollutants within the outer extents of treatment zone.

[7] Wells used to determine compliance with groundwater limitations.

If any monitoring result in the Compliance Zone Wells shows concentrations of monitored constituents at or above their respective baseline/background concentrations, 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. However, if the baseline/background concentration is below the Water Quality Objective (WQO) as described in R5-2015-0012 Finding 18, there is an allowance of 20% greater than the baseline concentration before contingency measures are required to address the elevated concentration.

Table 2: Analytical Methods (MPL means Maximum Practical Quantitation Limit)

Constituent	Analytical Method[1]	MPL (µg/L)[2]
Suite F		
Title 22 Metals[3], Total and Dissolved	EPA 200.7, 200.8	Various
Suite G		
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,)	EPA 300.0	Various
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, arsenic, iron, manganese, magnesium.

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

Parameter	Units	Analytical Method
Groundwater Elevation	feet, Mean Sea Level (ft MSL)	Measurement
Oxidation-Reduction Potential (ORP)	millivolts (mV)	Field Meter
Electrical Conductivity (EC)	µhmos/cm or µS/cm	Field Meter
Dissolved Oxygen (DO)	mg/L	Field Meter
pH	pH standard units (to 0.1 units)	Field Meter
Temperature	^{o}F/^{o}C	Field Meter
Volume purged (monitoring wells)	gallons (gal)	Measurement
Injection Rate (Injection wells)	gallons per minute (gpm)	Flow Meter
Turbidity	NTUs	Field Meter

All wells that are purged shall be purged until pH, temperature, EC and DO 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 (gpd)	Totalizing Meter
Injection rate	gallons per minute (gpm)	Measured
Amendment(s) added	pounds per day (lb/day)	Measured
Injection duration	hours (h or hr)	Observation record

AMENDMENT ANALYSIS

Prior to use, amendments shall be analyzed for the constituents and parameters listed in Tables 2 and 3 (except groundwater elevation, volume purged, and injection rate). The analyses should be done on a mixture of the amendment and deionized water at the estimated concentration that will be injected.

ESTABLISHMENT OF BACKGROUND CONCENTRATION VALUES

The Discharger has developed background values for concentrations of chloride, sodium, total iron, and dissolved iron in groundwater following the procedures found in California Code of Regulations, Title 27, Section 20415(e)(10). The Discharger has completed a baseline monitoring event to establish background concentrations prior to implementation of the amendment addition.

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 its 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 May for Q1, 1 August for Q2, 1 November for Q3, and 1 February of the following year**

for Q4) until such time as the Executive Officer of the Central Valley Water Board determines that the reports are no longer necessary.

Semiannual reports are due by the first (1st) day of the second (2nd) month following the end of the respective calendar period (**1 August for the 1st semiannual report,** and **1 February of the following year for the 2nd semiannual report**) 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** of each year. This report shall contain an evaluation of the effectiveness and progress of the biocide treatments. The Annual Report may be substituted for the fourth quarter (4Q) or 2nd 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 SPPRs at our Standard Provisions website (https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/std_provisions/wdr-mar1991.pdf).

The Discharger shall implement the above revised monitoring program on the date of issuance.

Ordered by: *Original signed by John J. Baum*
Date: 2023.04.06 22:08:40 -07'00'
for PATRICK PULUPA, Executive Officer

Revision Ordered by

for Patrick Pulupa, Executive Officer