CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD

MONITORING AND REPORTING PROGRAM R5-2020-0819
FOR
IN-SITU GROUNDWATER REMEDIATION AND DISCHARGE OF TREATED GROUNDWATER TO LAND

This Monitoring and Reporting Program (MRP) describes requirements for monitoring a groundwater remediation system at the Kiefer Landfill located at 12701 Kiefer Boulevard, Sacramento, CA. As shown on Figure 1, there are nine monitoring wells, one groundwater extraction and treatment system, one effluent discharge point, and two adjacent infiltration basins associated with this remediation program. 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 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 1, there are nine monitoring wells associated with monitoring the infiltration basin discharge. The groundwater monitoring program for these wells and any monitoring wells installed subsequent to the issuance of this MRP shall follow the schedule below. Monitoring wells shall be monitored, at a minimum, for depth to water. Depth to water measurements will be collected from all wells prior to purging of the wells for water sampling as discussed below. The volume of extracted groundwater shall also be provided in semiannual monitoring reports. Sample collection and analysis shall follow standard EPA protocol.

The monitoring wells shall be sampled according to the schedule in Table 1 and the samples analyzed by the methods in Table 2. Well numbers and locations are shown on Figure 1. Sampling year is from May 1 to April 30. Wells MW-6A1, MW-6A, MW-9A, MW-9B, MW-12A, and MW-17A are used to determine compliance with groundwater limitations. Wells MW-38A and MW-39A are used to develop background concentrations. Well MW-9B will only be sampled if MW-9A is dry or cannot be sampled. The method as shown in Table 2 may be substituted by an equivalent EPA Method that achieves the maximum Practical Quantitation Limit. All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported as an estimated value. Additional dissolved metals will be monitored if Concentration Limits are exceeded in the effluent.

Table 1: Sampling Frequency and Constituent Suite

Well Number	Constituent	Frequency	Monitoring Objective
MW-6A1	See Table 2	Semiannual	Compliance
MW-6A	See Table 2	Semiannual	Compliance
MW-9A	See Table 2	Semiannual	Compliance
MW-9B	See Table 2	Semiannual	Compliance
MW-12A	See Table 2	Semiannual	Compliance
MW-17A	See Table 2	Semiannual	Compliance
MW-38A	See Table 2	Semiannual	Background
MW-39A	See Table 2	Semiannual	Background

Table 2: Analytical Methods

Constituent	Method	Maximum Practical Quantitation Limit (µg/L)
Volatile Organic Compounds (VOCs)	EPA 8260B	0.5
Dissolved Manganese	EPA 200.7	Various
Total Dissolved Solids (TDS)	EPA 160.1	10,000
Bicarbonate	EPA 310.1	10,000
Chloride	EPA 300	500
Nitrate	EPA 300	100
Sulfate	EPA 300	1,000

ASSESSMENT OF INFILTRATION RATES

Monitoring of infiltration rates during long-term operation will use the existing pressure transducers installed within each of the basins. Stilling wells are equipped with pressure transducers to record water levels at 1-hour intervals. Flow rates into the sub-basins are recorded by Sacramento County Department of Waste Management and Recycling (DWMRs) supervisory control and data acquisition (SCADA) system that records flow rates from each extraction well on an hourly basis.

Infiltration rates will be monitored to ensure that discharged water is infiltrating within the basins. If infiltration rates decrease to levels that permit the basins to reach maximum allowable levels, maintenance within these basins during drying out periods will be performed. Maintenance of the basins will include ripping or disking to increase infiltration within the basins.

FREEBOARD MONITORING

Freeboard monitoring will be conducted using the staff gauges installed adjacent to each of the stilling wells. Reading of the staff gauges will occur monthly during maintenance events. Daily readings will also be collected during any significant rain events (more than 1-inch during a 24-hour period). If water levels are recorded at two feet below the top of the operating basin, discharge will be redirected to the other infiltration basin or redirected to the stormwater catch basin directly east of the infiltration basins.

Prior to the winter season (November through March), the freeboard will be increased an additional foot to three feet in order to account for the seasonal high precipitation. The winter season freeboard will be maintained throughout the winter season.

FIELD SAMPLING

In addition to the above sampling and laboratory analyses, field sampling and analysis shall be conducted each time a monitoring well is sampled. The sampling and analysis of field parameters shall be as specified in Table 3. Groundwater level measurements will be collected using a hand-held electric well sounder.

Table 3: Field Sampling Requirements

Parameters	**Units**	**Practical Quantitation Limit**	**Analytical Method**
Groundwater Elevation	Feet, Mean Sea Level	0.01 feet	Measurement
Oxidation-Reduction Potential	Millivolts	10 millivolts	Field Meter
Electrical Conductivity (EC)	µhmos/cm	50 µS/cm[2]	Field Meter
Dissolved Oxygen (DO)	mg/L	0.2 mg/L	Field Meter
pH	pH Units (to 0.1 units)	0.1 units	Field Meter
Temperature	degrees F/ degrees C	0.1 degrees F/ degrees C	Field Meter

Purging will be conducted by low flow methods using dedicated bladder pumps. Purging is complete when the final two sets of groundwater stabilization indicator parameter measurements meet the following criteria:

pH = +/- 0.2 pH units
EC = +/- 5%
DO = +/- 10% or 0.2 mg/L, whichever is greater

Field test instruments (such as those used to test pH and DO) 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.

TREATMENT PLANT EFFLUENT MONITORING

The effluent from the groundwater treatment system shall be sampled for VOCs and monitoring for EC, DO, and pH on a monthly basis as shown in Table 4. Dissolved metals will be sampled on a semiannual basis and will be collected in conjunction with monthly plant maintenance when metals concentrations are expected to be at their highest.

Dissolved metals will include arsenic, barium, chromium, manganese, and vanadium. [Ed. Note: Other metals not included due to non-detect concentrations detected during majority of the pilot study. No Background Concentration Values (defined below) were exceeded by more than 20% during the course of the pilot study for any metals tested].

Table 4: Treatment Plant Effluent Sampling Requirements

Parameters	Units	Frequency	Type of Sample
VOCs	µg/L	Monthly	Grab
Dissolved Metals	µg/L	Semiannual	Grab
Electrical Conductivity	µhmos/cm	Monthly	Grab
Dissolved Oxygen	mg/L	Monthly	Grab
pH	pH Units (to 0.1 units)	Monthly	Grab
TDS	mg/L	Semiannual	Grab

IN-SITU DISCHARGE MONITORING

The Discharger shall monitor daily the discharge of water that is injected into the infiltration basin according to the requirements in Table 5.

Table 5: Discharge Monitoring Requirements

Parameters	Units	Type of Sample
Flow rate	Gallons per minute	Meter
Flow duration	Number of hours	Meter

ESTABLISHMENT OF BACKGROUND CONCENTRATION VALUES

The Discharger shall utilize the Concentration Limits, which are prepared annually for the Kiefer Landfill groundwater monitoring wells. Concentration Limits are calculated using the background wells MW-38A and MW-39A. The methods used for calculation of the Concentration Limits are discussed in the Second Semiannual Report 2019 for Kiefer Landfill. The Concentration Limits are established based on the interwell tolerance interval procedure. The tolerance interval method is used to determine measurable significant evidence of a release of inorganic constituents from a waste management unit. Interwell tolerance limits are updated on an annual basis using data from upgradient wells and are applied to the downgradient detection wells. The current Concentration Limits, prepared in the second half of 2018, are shown in Table 6. If the Concentration Limits are exceeded, the most recently prepared Concentration Limits will be reevaluated to determine if the exceedance is valid.

Table 6: Concentration Limits

Parameter	Units	Concentration Limit
Arsenic	µg/L	2.0
Barium	µg/L	207.2
Cadmium	µg/L	1.0
Chromium	µg/L	4.4
Copper	µg/L	2.0
Manganese	µg/L	10
Nickel	µg/L	3.1
Selenium	µg/L	4.0
Vanadium	µg/L	15.3
Bicarbonate	mg/L	190
Chloride	mg/L	39
Nitrate	mg/L	9.3
Sulfate	mg/L	38.8
TDS	mg/L	424
pH	pH units	6.5 - 8.5
EC	µmhos/cm	597

REPORTING

All monitoring reports should be converted to a searchable portable document format (PDF) and submitted electronically to the California State Water Resources Control Boards' GeoTracker Database (https://geotracker.waterboards.ca.gov/). Additional information regarding electronic submittals is accessible through the information tab on the GeoTracker homepage. After uploading a document via GeoTracker, the submitting party shall notify Central Valley Water Board staff via email at: centralvalleysacramento@waterboards.ca.gov, including the following in the body of the email:

Facility Name:	Kiefer Landfill, Sacramento County
Program:	Non-15 Compliance
Order:	2015-0012-062
CIWQS Place ID:	CW-234981

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. With the exception of the monthly maintenance, the Discharger shall notify the Central Valley Water Board within 48 hours of any unscheduled shutdown of the groundwater extraction system that exceeds one working day. 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 Business and Professions Code sections 6735, 7835, and 7835.1, all Groundwater Monitoring Reports shall be prepared under the direct supervision of a Registered Professional Engineer or Professional Geologist and signed by the registered professional.

The Discharger shall submit semiannual electronic data reports, which conform to the requirements of the California Code of Regulations, Title 23, Division 3, Chapter 30. The semiannual reports shall be submitted electronically over the internet to the GeoTracker Database (https://geotracker.waterboards.ca.gov/) by the 1st day of the second month following the end of each semiannual period by **1 June (November through April) and 1 December (May through October)** until such time as the Executive Officer determines that the reports are no longer necessary.

Each semiannual 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, etc.;

(c) a table showing well construction details such as well number, groundwater zone being monitored, ground surface elevation, reference elevation, and depth to screen;

(d) cumulative data tables containing the water quality analytical results and depth to groundwater;

(e) a copy of the laboratory analytical data report;

(f) 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

(g) 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 June (1 December for semiannual 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 **second semiannual** 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 data obtained during the previous year for all monitoring wells;

(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.

This Order is issued under the authority delegated to the Executive Officer by the Central Valley Water Board pursuant to Resolution R5-2009-0027 and is effective upon signature.

Ordered by: 

for PATRICK PULUPA, Executive Officer

12/28/2020

Date