

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM R5-2016-XXXX  
FOR  
COUNTY OF SACRAMENTO  
DEPARTMENT OF WASTE MANAGEMENT AND RECYCLING  
KIEFER LANDFILL, CLASS III LANDFILLS  
CONSTRUCTION, OPERATION, CLOSURE,  
POST-CLOSURE MAINTENANCE, AND CORRECTIVE ACTION  
SACRAMENTO COUNTY

This monitoring and reporting program (MRP) is issued pursuant to California Water Code section 13267 and incorporates requirements for groundwater, surface water, and unsaturated zone monitoring and reporting; facility monitoring, maintenance, and reporting; and financial assurances reporting contained in California Code of Regulations, title 27, section 20005, et seq. (hereafter Title 27), Waste Discharge Requirements (WDRs) Order No. R5-2016-XXXX, and the Standard Provisions and Reporting Requirements (SPRRs) dated December 2015. Compliance with this MRP is ordered by the WDRs and the Discharger shall not implement any changes to this MRP unless a revised MRP is issued by the Central Valley Water Board or the Executive Officer.

**A. MONITORING**

The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone in accordance with Standard Monitoring Specifications in Section I of the SPRRs and the Monitoring Specifications in Section G of the WDRs. All monitoring shall be conducted in accordance with an approved *Sample Collection and Analysis Plan*, which include quality assurance/quality control standards. The current *Sample Collection and Analysis Plan* does not include procedures for sampling and testing soil pore gas and shall be updated with this information per WDR R5-2016-XXXX Provision H.9.

All compliance monitoring wells established for the detection monitoring program shall constitute the monitoring points for the groundwater Water Quality Protection Standard. All detection monitoring program groundwater monitoring wells, unsaturated zone monitoring devices, leachate, and surface water monitoring points shall be sampled and analyzed for monitoring parameters and constituents of concern (COCs) as indicated and listed in Tables I through VII.

The Discharger may use alternative analytical test methods, including new USEPA approved methods, provided the methods have method detection limits equal to or lower than the analytical methods specified in this Monitoring and Reporting Program, and are identified in the *Sample Collection and Analysis Plan*.

The monitoring program of this MRP includes:

<u>Section</u>	<u>Monitoring Program</u>
A.1	Groundwater Monitoring
A.2	Unsaturated Zone Monitoring
A.3	Leachate Monitoring, Seep Monitoring, and LCRS Testing
A.4	Surface Water Monitoring
A.5	Facility Monitoring
A.6	Corrective Action Monitoring

**1. Groundwater Monitoring**

The Discharger shall operate and maintain a groundwater detection monitoring system that complies with the applicable provisions of Title 27, sections 20415 and 20420. The detection monitoring system shall be certified by a California-licensed professional civil engineer or geologist as meeting the requirements of Title 27. The current groundwater detection monitoring system meets the applicable requirements of Title 27. The Discharger shall revise the groundwater detection monitoring system (after review and approval by Central Valley Water Board staff) as needed each time a new landfill cell or module is constructed.

The current groundwater monitoring network consists of the following:

<u>Well</u>	<u>Status</u>	<u>Zone</u>	<u>Landfill Unit Being Monitored</u>
MW-1A	Corrective Action	A	1
MW-1B	Corrective Action	B	1
MW-2A	Corrective Action	A	1
MW-2B	Corrective Action	B	1
MW-2C	Detection	C	1
MW-2A1	Corrective Action	A	1
MW-3A	Corrective Action	A	1
MW-4A	Corrective Action	A	1
MW-4B	Corrective Action	B	1
MW-5A	Corrective Action	A	1
MW-5B	Detection	B	1
MW-6A	Corrective Action	A	1
MW-6A1	Detection	A	1
MW-6B	Detection	B	1, 2
MW-7AR	Corrective Action	A	1
MW-7B	Corrective Action	B	1
MW-9A	Corrective Action	A	1
MW-9B	Corrective Action	B	1
MW-10A	Background	A	1, 2
MW-10B	Background	B	1, 2

<u>Well</u>	<u>Status</u>	<u>Zone</u>	<u>Landfill Unit Being Monitored</u>
MW-10C	Background	C	1, 2
MW-11A	Corrective Action	A	1
MW-11B	Corrective Action	B	1
MW-12A	Detection	A	1, 2
MW-12B	Detection	B	1, 2
MW-12C	Detection	C	1, 2
MW-15A	Corrective Action	A	1, 2
MW-15B	Detection	B	2
MW-16A	Corrective Action	A	1
MW-16B	Corrective Action	A	1
MW-17A	Detection	A	2
MW-17B	Detection	B	2
MW-18A	Corrective Action	A	1
MW-19A	Corrective Action	B	1
MW-20A	Corrective Action	A	1
MW-20B	Corrective Action	B	1
MW-20C	Detection	C	1
MW-21A	Corrective Action	A	1
MW-21B	Corrective Action	B	1
MW-22A	Corrective Action	A	1
MW-22B	Detection	B	1
MW-23A	Corrective Action	A	1
MW-23B	Detection	B	1, 2
MW-24A	Corrective Action	A	1
MW-27A	Detection	A	1, 2
MW-28A	Corrective Action	A	1
MW-29A	Corrective Action	A	1
MW-30A	Corrective Action	A	1
MW-36A	Detection	A	2
MW-37A	Corrective Action	A	1, 2
MW-37B	Corrective Action	B	1, 2
MW-37C	Detection	C	1, 2
MW-38A	Background	A	1, 2
MW-38B	Background	B	1, 2
MW-39A	Background	A	1, 2
MW-39B	Background	B	1, 2
MW-40A	Corrective Action	A	1
MW-40B	Detection	B	1, 2
MW-41A1	Corrective Action	A	1
MW-41A2	Corrective Action	A	1
MW-41B	Corrective Action	B	1
MW-42A	Detection	A	1, 2
MW-42B	Detection	B	1, 2

<u>Well</u>	<u>Status</u>	<u>Zone</u>	<u>Landfill Unit Being Monitored</u>
MW-43A	Detection	A	1, 2
Well E	Detection	C	1
MW-34A	Background - future	A	1, 2
MW-34B	Background - future	B	1, 2
MW-35A	Background - future	A	1, 2
MW-35B	Background- future	B	1, 2
MW-36B	Detection - future	B	2

Groundwater samples shall be collected from the background wells, detection monitoring wells, corrective action monitoring wells, and any additional wells added as part of the approved groundwater monitoring system. The collected samples from the background wells, detection monitoring wells, corrective action monitoring wells shall be analyzed for the parameters and constituents listed in Table I in accordance with the specified methods and frequencies. Corrective action wells may be analyzed for more constituents or more frequently as specified in Section A.6. The Discharger shall collect, preserve, and transport groundwater samples in accordance with the *Sample Collection and Analysis Plan*.

**Once per quarter**, the Discharger shall measure the groundwater elevation in each well, determine groundwater flow direction, and estimate groundwater flow rates in the uppermost aquifer and in any zones of perched water and in any additional portions of the zone of saturation monitored. The results shall be reported semiannually, including the times of expected highest and lowest elevations of the water levels in the wells, pursuant to Title 27, section 20415(e)(15).

Samples collected for the COC monitoring specified in Table I shall be collected and analyzed in accordance with the methods listed in Table VII every five years. Five-year COCs were last monitored in 2015 and shall be monitored again in **2020**. The results shall be reported in the Annual Monitoring Report for the year in which the samples were collected.

## 2. Unsaturated Zone Monitoring

The Discharger shall operate and maintain an unsaturated zone detection monitoring system that complies with the applicable provisions of Title 27, sections 20415 and 20420, to provide the best assurance of the earliest possible detection of a release from the Units. The current unsaturated zone detection monitoring system meets the applicable requirements of Title 27. The Discharger shall install unsaturated zone monitoring devices (after review and approval by Central Valley Water Board staff) each time the landfill constructs a new cell or module.

The Discharger shall monitor the unsaturated zone monitoring points as required in part A.2 and Tables II and III of this MRP. Monitoring results for the unsaturated zone shall be included in monitoring reports and shall include an evaluation of potential impacts of the facility on the unsaturated zone and compliance with the Water Quality Protection Standard.

The current unsaturated zone monitoring network consists of lysimeters and landfill gas monitoring probes.

### a) Soil Pore Water

The current lysimeter network consists of the following:

<u>Lysimeter</u>	<u>Status</u>	<u>Landfill Unit Being Monitored</u>	<u>Modules Being Monitored</u>
LYS-1U <sup>1</sup>	Detection	1	M-1
LYS-2U <sup>1</sup>	Detection	1	M-1
LYS-7U <sup>1</sup>	Detection	1	M-1
LYS-10U <sup>1</sup>	Background	2	M-7
LYS -13UN	Detection	1	M-1
LYS -13US	Detection	1	M-1
LYS -14U	Detection	1	M-1
VZ-1	Detection	1	M-1L
VZ-2	Detection	1	M-1L
VZ-3	Detection	1	M-1L
VZ-4	Detection	1	M-1L
VZ-8	Detection	1	M-1L
VZ-9	Detection	1	M-1L
LYS-M2	Detection	2	M-2
LYS-M3	Detection	2	M-3
LYS-M4	Future	2	M-4 (future)
LYS-M5	Future	2	M-5 (future)
LYS-M6	Future	2	M-6 (future)
LYS-M7	Future	2	M-7 (future)

<u>Lysimeter</u>	<u>Status</u>	<u>Landfill Unit Being Monitored</u>	<u>Modules Being Monitored</u>
LYS-M8	Future	2	M-8 (future)
LYS-M9	Future	2	M-9 (future)
LYS-M10	Future	2	M-10 (future)
LYS-M11	Future	2	M-11 (future)

<sup>1</sup> Lysimeters in the same location as the groundwater well with the same number (e.g., LYS-1U = MW-1U)

Unsaturated zone soil pore water samples shall be collected from the monitoring network listed above and shall be analyzed for the parameters and constituents listed in Table II in accordance with the specified methods and frequencies only when liquid is present.

Pan lysimeters shall be inspected for the presence of liquid **monthly**. If liquid is detected in a previously dry pan lysimeter, the Discharger shall verbally notify Central Valley Water Board staff within **seven days** and shall immediately sample and test the liquid for Field and Monitoring Parameters listed in Table II. Samples collected for the 5-year COC analyses specified in Table II shall be collected and analyzed in accordance with the methods listed in Table VII every five years, beginning again in **2020**.

The Discharger shall collect, preserve, and transport samples in accordance with the quality assurance/quality control standards contained in the *Sample Collection and Analysis Plan*.

### b) Soil Pore Gas

The current landfill gas monitoring well network consists of the following:

<u>Gas Monitoring Well</u>	<u>Status</u>	<u>Landfill Unit Being Monitored</u>
GP-1A	Detection, Soil-Pore Gas	1
GP-2A	Detection	1
GP-3A	Detection	1
GP-4A	Detection	1
GP-5	Detection	1, 2
GP-6	Detection	1, 2
GP-7	Detection	2
GP-8	Detection	1, 2
GP-9	Detection	1, 2
GP-13	Detection	1, 2
GP-15	Detection	1, 2
GP-16	Detection	1, 2
GP-17	Detection	1, 2
GP-18	Detection	1, 2

<u>Gas Monitoring Well</u>	<u>Status</u>	<u>Landfill Unit Being Monitored</u>
GP-19	Detection	1
GP-20	Detection	1
GP-21	Detection	1
GP-22	Detection	1, 2
GP-23	Detection	1, 2
GP-24	Detection	1, 2
GP-25	Detection	2
GP-26	Detection	2
GP-27	Detection	2
GP-28	Detection	2
GP-29	Detection	2
GP-30	Detection	2
GP-31	Detection	2
GP-32	Detection	2
GP-33	Detection	2
GP-41	Detection	1, 2
GP-42	Detection	1, 2
GP-43	Detection	1, 2
GP-44	Detection	1, 2
GP-45	Detection	1, 2
GP-46	Detection	1, 2
GP-47	Detection	1, 2
GP-48	Detection	1, 2
GP-49	Detection	1, 2
GP-50	Detection	1, 2
GP-51	Detection	1, 2
GP-52	Detection	2
GP-53	Detection	2
GP-54	Detection	2
GP-55	Detection	2
GP-56	Detection	1, 2
GP-57	Detection	1, 2

Unsaturated zone soil pore gas samples shall be collected from the monitoring network listed above and shall be analyzed for the parameters and constituents listed in Table III in accordance with the specified methods and frequencies. The current Sample Collection and Analysis Plan does not include sampling procedures for landfill gas probes. The Discharger shall submit a Sample Collection and Analysis Plan detailing the soil pore gas sampling and analysis procedures including quality assurance/quality control standards for approval.

In the event of a shutdown of the landfill gas extraction system exceeding 24 hours, the Discharger shall notify Board staff via e-mail, fax, or telephone within 24 hours of knowledge and shall provide weekly status updates. This requirement excludes shutdown events where the landfill gas system restarts

itself or whether the system is restarted manually within 24 hours. All shutdowns exceeding 24 hours, regardless of the type of restart, shall be summarized in the semiannual reports.

Landfill gas monitoring reports shall be included with the semiannual reports and shall include an annual evaluation of potential impacts of landfill gas on the unsaturated zone beneath and adjacent to the landfill and compliance with the Water Quality Protection Standard.

### 3. Leachate Monitoring, Seep Monitoring, and Annual LCRS Testing

**Leachate Monitoring:** The Discharger shall operate and maintain leachate collection and removal system (LCRS) sumps, conduct monitoring of any detected leachate seeps, and conduct annual testing of each LCRS in accordance with Title 27 and this monitoring program.

The current LCRS leachate sump monitoring points are:

<u>Mon Pt.</u>	<u>Landfill Unit Being Monitored</u>	<u>Module Where Sump is Located</u>
Sump L-1	1	M-1L
Sump L-2	2	M-2
Sump L-3	2	M-3
Sump L-4	2	M-4 (future)
Sump L-5	2	M-5 (future)
Sump L-6	2	M-6 (future)
Sump L-7	2	M-7 (future)
Sump L-8	2	M-8 (future)
Sump L-9	2	M-9 (future)
Sump L-10	2	M-10 (future)
Sump L-11	2	M-11 (future)

All LCRS sumps shall be inspected monthly for the presence of leachate, and flow shall be recorded in accordance with Table IV. If leachate is detected in a previously dry sump, the Discharger shall verbally notify Central Valley Water Board staff within **seven days** and shall immediately sample and test the leachate for Field and Monitoring Parameters listed in Table IV. Leachate in the LCRS sump shall then be sampled for all parameters and constituents in accordance with the frequencies listed in Table IV whenever liquid is present. All LCRS sump samples shall be analyzed for the 5-year COCs specified in Table IV every five years, beginning again in **2020**.

**Seep Monitoring:** Leachate that seeps to the surface from a landfill unit shall be sampled and analyzed for the Field and Monitoring Parameters listed in Table IV upon detection. The quantity of leachate shall be estimated and

reported as Leachate Flow Rate (in gallons/day). Reporting for leachate seeps shall be conducted as required in Section B.3 of this MRP, below.

**Annual LCRS Testing:** All LCRSs shall be tested annually pursuant to Title 27, section 20340(d) to demonstrate proper operation. The results of these tests shall be reported to the Central Valley Water Board in the Annual Monitoring Report and shall include comparisons with earlier tests made under comparable conditions.

#### 4. Surface Water Monitoring

The Discharger shall operate a surface water detection monitoring system for any landfill facility where runoff from landfill areas flows or could flow to waters of the United States. The monitoring system shall comply with the applicable provisions of Title 27, sections 20415 and 20420. At the Kiefer Landfill, runoff from landfill areas flows to sedimentation basins that periodically discharge to Deer Creek. The current surface water detection monitoring system meets the applicable requirements of Title 27.

The current surface water monitoring points for the landfill are:

<u>Mon Pt.</u>	<u>Status</u>
RSW-001	Background
RSW-003	Detection, Point of Compliance
Basin A Discharge Point	Detection
Basin B Discharge Point	Detection

For surface water detection monitoring, a sample shall be collected at each monitoring point location and analyzed for the monitoring parameters and constituents in accordance with the methods and frequency specified in Table V. All surface water monitoring samples shall be collected and analyzed for the 5-year COCs specified in Table V every five years, beginning again in **2020**.

#### 5. Facility Monitoring

##### a. Annual Facility Inspection

Annually, prior to the anticipated rainy season, but no later than **30 September**, the Discharger shall conduct an inspection of the facility. The inspection shall assess repair and maintenance needed for drainage control systems, cover systems, and groundwater monitoring wells; and shall assess preparedness for winter conditions (including but not limited to erosion and sedimentation control). The Discharger shall take photos of any problems areas before and after repairs. Any necessary construction, maintenance, or repairs shall be completed by **31 October**.

Annual facility inspection reporting shall be submitted as required in Section B.4 of this MRP.

b. **Major Storm Events**

The Discharger shall inspect all precipitation, diversion, and drainage facilities and all landfill side slopes for damage **within 7 days** following major storm events capable of causing damage or significant erosion. The Discharger shall take photos of any problems areas before and after repairs. Necessary repairs shall be completed **within 30 days** of the inspection. Notification and reporting requirements for major storm events shall be conducted as required in Section B.5 of this MRP.

c. **Five-Year Iso-Settlement Survey for Closed Units**

For closed landfill units, the Discharger shall conduct a five-year iso-settlement survey and produce an iso-settlement map accurately depicting the estimated total change in elevation of each portion of the final cover's low-hydraulic-conductivity layer. For each portion of the landfill, this map shall show the total lowering of the surface elevation of the final cover, relative to the baseline topographic map [Title 27, section 21090(e)(1 & 2)]. Reporting shall be in accordance with Section B.6 of this MRP. Iso-settlement survey shall be conducted immediately following closure of each unit and every five years after.

d. **Standard Observations**

The Discharger shall conduct Standard Observations at the landfill in accordance with this section of the MRP. Standard observations shall be conducted in accordance with the following schedule:

<u>Landfill Unit Type</u>	<u>Frequency</u>	<u>Season</u>
Active	Weekly	Wet: 1 October to 30 April
Active	Monthly	Dry: 1 May to 30 September
Inactive/Closed	Monthly	Wet: 1 October to 30 April
Inactive/Closed	Quarterly	Dry: 1 May to 30 September

The Standard Observations shall include:

- 1) For the landfill units:
  - a) Evidence of ponded water at any point on the landfill outside of any contact storm water/leachate diversions structures on the active face (show affected area on map); and
  - b) Evidence of erosion and/or of day-lighted refuse.
- 2) Along the perimeter of the landfill units:

- a) Evidence of leachate seeps, estimated size of affected area, and flow rate (show affected area on map); and
  - b) Evidence of erosion and/or of day-lighted refuse.
- 3) For receiving waters:
- a) Floating and suspended materials of waste origin - presence or absence, source, and size of affected area; and
  - b) Discoloration and turbidity - description of color, source, and size of affected area.

Results of Standard Observations shall be submitted in the semiannual monitoring reports required in Section B.1 of this MRP.

## 6. Corrective Action Monitoring

The Discharger shall conduct corrective action monitoring to demonstrate the effectiveness of corrective action in accordance with Title 27, section 20430 and this MRP. Groundwater monitoring wells that are in a corrective action monitoring program shall be monitored in accordance with the groundwater monitoring requirements in parts A.1 of this MRP, except as modified in this part of the MRP for any additional constituents or modified monitored frequencies.

The Discharger shall monitor the following corrective action monitoring wells as required in part A.1 and Table I of this MRP, with the following alternate sampling frequency for all Field and Monitoring Parameters listed in Table I:

<u>Well</u>	<u>Zone</u>	<u>Sampling Frequency</u>
MW-1A	A	Semi-Annual
MW-1B	B	Semi-Annual
MW-2A	A	Semi-Annual
MW-2B	B	Semi-Annual
MW-2A1	A	Semi-Annual
MW-3A	A	Semi-Annual
MW-4B	B	Semi-Annual
MW-5A	A	Semi-Annual
MW-6A	A	Semi-Annual
MW-7AR	A	Semi-Annual
MW-7B	B	Semi-Annual
MW-9A	A	Semi-Annual
MW-9B	B	Semi-Annual
MW-11A	A	Semi-Annual
MW-11B	B	Semi-Annual
MW-15A	A	Semi-Annual
MW-16A	A	Semi-Annual
MW-16B	A	Semi-Annual
MW-20A	A	Semi-Annual

<u>Well</u>	<u>Zone</u>	<u>Sampling Frequency</u>
MW-20B	B	Semi-Annual
MW-21A	A	Semi-Annual
MW-21B	B	Semi-Annual
MW-22A	A	Semi-Annual
MW-23A	A	Semi-Annual
MW-24A	A	Semi-Annual
MW-30A	A	Semi-Annual
MW-37A	A	Semi-Annual
MW-37B	B	Semi-Annual
MW-40A	A	Semi-Annual
MW-41A1	A	Semi-Annual
MW-41A2	A	Semi-Annual
MW-41B	B	Semi-Annual

The groundwater extraction well network is as follows:

<u>Extraction Well</u>	<u>Zone</u>	<u>Modules Being Addressed</u>
EW-1	A	M-1
EW-2	A	M-1
EW-3	A	M-1
EW-4	A	M-1
EW-5	A	M-1
EW-6	A	M-1
EW-7	A	M-1
EW-8	A	M-1
EW-9	A	M-1
EW-10	A	M-1
EW-11	A	M-1
EW-11	A	M-1
EW-13	A	M-1
EW-14	A	M-1
EW-15 - future	A	M-1

The Discharger shall record the hours of operation for any corrective action system and report them in the Annual Monitoring Report required in Section B.2 of this MRP. The Discharger shall estimate the following annually to assess the progress of groundwater corrective action and reported in the Annual Monitoring Report (including method of calculations) in the format below:

<u>Zone</u>	<b>Mass of Total VOCs (lbs)</b>	
	<u>Amount Removed During Year</u>	<u>Cumulative Amount Removed</u>
A		
B		
C		

**7. Infiltration Basins**

Following written Executive Officer approval for the use of infiltration basins for the discharge of extracted groundwater, water samples shall be collected at discharge point into each infiltration basin during operations of the infiltration basins. Samples shall be collected monthly during operations for the constituents listed in Table I and the constituents listed below:

<u>Monitoring Parameter</u>	<u>Unit</u>
Chlorine, Total Residual	mg/L
Dissolved Oxygen	mg/L
Lead	mg/L
Selenium	mg/L
Manganese	mg/L

The Discharger shall collect, preserve, and transport groundwater samples in accordance with an approved *Sample Collection and Analysis Plan*.

**B. REPORTING**

The Discharger shall submit the following reports in accordance with the required schedule:

**Reporting Schedule**

<u>Section</u>	<u>Report</u>	<u>End of Reporting Period</u>	<u>Due Date</u>
B.1	Semiannual Monitoring Report	30 June, 31 December	<b>15 August, 15 February</b>
B.2	Annual Monitoring Report	31 December	<b>15 February</b>
B.3	Seep Reporting	Continuous	<b>Immediately &amp; 7 Days</b>
B.4	Annual Facility Inspection Report	31 October	<b>15 November</b>
B.5	Major Storm Event	Continuous	<b>Immediately and 14 days</b>

<u>Section</u>	<u>Report</u>	<u>End of Reporting Period</u>	<u>Due Date</u>
B.6	Reporting Survey and Iso- Settlement Map for Closed Landfills	Every Five Years	<b>from damage discovery At Closure Completion and Every Five Years</b>
B.7	Financial Assurances Report	31 December	<b>15 August</b>

### Reporting Requirements

The Discharger shall submit monitoring reports **semiannually** with the data and information as required in this MRP and as required in WDRs Order R5-2016-XXX and the Standard Provisions and Reporting Requirements (particularly Section I: "Standard Monitoring Specifications" and Section J: "Response to a Release"). In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. Data shall also be submitted in a digital format.

Field and laboratory tests shall be reported in each monitoring report. Semiannual and annual monitoring reports shall be submitted to the Central Valley Water Board in accordance with the above schedule for the calendar period in which samples were taken or observations made. In addition, the Discharger shall enter all monitoring data and monitoring reports into the online Geotracker database as required by Division 3 of Title 27 and Chapter 30, Division 3 of Title 23.

The results of **all monitoring** conducted at the site shall be reported to the Central Valley Water Board in accordance with the reporting schedule above for the calendar period in which samples were taken or observations made.

The Discharger shall retain records of all monitoring information, including all calibration and maintenance records, all original strip chart recordings of continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained throughout the life of the facility including the post-closure period. Such records shall be legible and shall show the following for each sample:

- a) Sample identification and the monitoring point or background monitoring point from which it was taken, along with the identity of the individual who obtained the sample;
- b) Date, time, and manner of sampling;
- c) Date and time that analyses were started and completed, and the name of the personnel and laboratory performing each analysis;

- d) Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used;
- e) Calculation of results; and
- f) Results of analyses, and the MDL and PQL for each analysis. All peaks shall be reported.

### Required Reports

1. **Semiannual Monitoring Report:** Monitoring reports shall be submitted semiannually and are due on **15 August** and **15 February**. Each semiannual monitoring report shall contain at least the following:
  - a) For each groundwater monitoring point addressed by the report, a description of:
    - 1) The time of water level measurement;
    - 2) The type of pump - or other device - used for purging and the elevation of the pump intake relative to the elevation of the screened interval;
    - 3) The method of purging used to stabilize water in the well bore before the sample is taken including the pumping rate; the equipment and methods used to monitor field pH, temperature, and conductivity during purging; results of pH, temperature, conductivity, and turbidity testing; and the method of disposing of the purge water;
    - 4) The type of pump - or other device - used for sampling, if different than the pump or device used for purging; and
    - 5) A statement that the sampling procedure was conducted in accordance with the approved *Sample Collection and Analysis Plan*.
  - b) A map or aerial photograph showing the locations of observation stations, monitoring points, and background monitoring points.
  - c) The estimated quarterly groundwater flow rate and direction in the uppermost aquifer, in any zones of perched water, and in any additional zone of saturation monitored based upon water level elevations taken prior to the collection of the water quality data submitted in the report [Title 27, section 20415(e)(15)].
  - d) Tabulated monitoring data for all monitoring points and constituents for groundwater, unsaturated zone, leachate, and surface water. Concentrations below the laboratory reporting limit shall not be reported as "ND" unless the reporting limit is also given in the table. Otherwise they shall be reported "<" the reporting limit (e.g., <0.10). Units shall be as required in Tables I through IV unless specific justification is given to report in other units. Refer to the SPRRs Section I "Standard Monitoring Specifications" for requirements regarding MDLs and PQLs.

- e) Laboratory statements of results of all analyses evaluating compliance with requirements.
  - f) An evaluation of the concentration of each monitoring parameter (or 5-year COC when five year COC sampling is conducted) as compared to the current concentration limits, and the results of any required verification testing for constituents exceeding a concentration limit. Report any actions taken under Section J: Response to a Release for verified exceedances of a concentration limit for wells/constituents not already in corrective action monitoring.
  - g) An evaluation of the effectiveness of the leachate monitoring and control facilities, and of the run-off/run-on control facilities. Include a summary of any instances where leachate depth on an MSW landfill liner system exceeded 30 cm (excluding the leachate sump), and information about the required notification and corrective action in Standard Facility Specification E.13 of the SPRRs.
  - h) A summary of all Standard Observations for the reporting period required in Section A.0 of this MRP.
  - i) A summary of inspection, leak search, and repair of final covers on any closed landfill units in accordance with an approved final post-closure maintenance plan as required by Standard Closure and Post-Closure Maintenance Specifications G.26 through G.29 of the SPRRs.
2. **Annual Monitoring Report:** The Discharger shall submit an Annual Monitoring Report to the Central Valley Water Board by **15 February** covering the reporting period of the previous monitoring year. If desired, the Annual Monitoring Report may be combined with the second semiannual report, but if so, shall clearly state that it is both a semi-annual and annual monitoring report in its title. Each Annual Monitoring Report shall contain the following information:
- a) All monitoring parameters shall be graphed to show historical trends at each monitoring point and background monitoring point, for all samples taken within at least the previous five calendar years. If a 5-year COC event was performed, than these parameters shall also be graphically presented. Each such graph shall plot the concentration of one or more constituents for the period of record for a given monitoring point or background monitoring point, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. Graphical analysis of monitoring data may be used to provide significant evidence of a release.
  - b) An evaluation of the monitoring parameters with regards to the cation/anion balance, and a graphical presentation using a Stiff diagram, a Piper graph, or a Schoeller plot.
  - c) All historical monitoring data for which there are detectable results, including data for the previous year, shall be submitted in tabular form in a digital file

format. The Central Valley Water Board regards the submittal of data in hard copy and in digital format as "...the form necessary for..." statistical analysis [Title 27, section 20420(h)], that facilitates periodic review by the Central Valley Water Board.

- d) Hydrographs of each well showing the elevation of groundwater with respect to the elevations of the top and bottom of the screened interval and the elevation of the pump intake. Hydrographs of each well shall be prepared quarterly and submitted annually.
  - e) A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the waste discharge requirements.
  - f) A map showing the area and elevations in which filling has been completed during the previous calendar year and a comparison to final closure design contours, and include a projection of the year in which each discrete landfill module will be filled.
  - g) A written summary of the monitoring results, indicating any changes made or observed since the previous Annual Monitoring Report.
  - h) The results of the annual testing of leachate collection and removal systems required under Standard Facility Specification E.14 of the SPRRs.
  - i) Updated concentration limits for each monitoring parameter at each monitoring well based on the new data set.
  - j) A comprehensive discussion of any Corrective Action Program required by this MRP under Section A.6.
3. **Seep Reporting:** The Discharger shall report by telephone any seepage from the disposal area **immediately** after it is discovered. A written report shall be filed with the Central Valley Water Board **within seven days**, containing at least the following information:
- a) A map showing the location(s) of seepage;
  - b) An estimate of the flow rate;
  - c) A description of the nature of the discharge (e.g., all pertinent observations and analyses);
  - d) Verification that samples have been submitted for analyses of the Field Parameters and Monitoring Parameters listed in Table IV of this MRP, and an estimated date that the results will be submitted to the Central Valley Water Board; and
  - e) Corrective measures underway or proposed, and corresponding time schedule.

4. **Annual Facility Inspection Reporting:** By **15 November** of each year, the Discharger shall submit a report describing the results of the inspection and the repair measures implemented, preparations for winter, and include photographs of any problem areas and the repairs. Refer to Section A.5.a of this MRP, above.
5. **Major Storm Event Reporting:** Following major storm events capable of causing damage or significant erosion, the Discharger **immediately** shall notify Central Valley Water Board staff of any damage or significant erosion upon discovery and report subsequent repairs within **14 days** of completion of the repairs, including photographs of the problem and the repairs. Refer to Section A.5.b of this MRP, above.
6. **Survey and Iso-Settlement Map for Closed Landfills:** The Discharger shall conduct a survey and submit an iso-settlement map for each closed area of the landfill every five years pursuant to Title 27, section 21090(e). Refer to Section A.5.c of this MRP, above. The next report is due immediately following closure of each unit.
7. **Financial Assurances Report:** By **15 August** of each year, the Discharger shall submit a copy of the annual financial assurances report due to CalRecycle that updates the financial assurances for closure, post-closure maintenance, and corrective action. Refer to Financial Assurances Specifications F.1 through F.3 of the WDRs.

## **C. WATER QUALITY PROTECTION STANDARD AND COMPLIANCE PERIOD**

### **1. Water Quality Protection Standard Report**

For each waste management unit, the Water Quality Protection Standard shall consist of all COCs, the concentration limit for each constituent of concern, the verification retesting procedure to confirm measurably significant evidence of a release, the point of compliance, and all water quality monitoring points for each monitored medium.

The Water Quality Protection Standard for naturally occurring waste constituents consists of the COCs, the concentration limits, and the point of compliance and all monitoring points. Any proposed changes to the Water Quality Protection Standard other than annual update of the concentration limits shall be submitted in a report for review and approval.

The report shall:

- a. Identify **all distinct bodies of surface and ground water** that could be affected in the event of a release from a waste management unit or portion of a unit. This list shall include at least the uppermost aquifer and any permanent or ephemeral zones of perched groundwater underlying the facility.
- b. Include a map showing the monitoring points and background monitoring points for the surface water monitoring program, groundwater monitoring program, and the unsaturated zone monitoring program. The map shall include the point of compliance in accordance with Title 27, section 20405.
- c. Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).
- d. Include a proposed statistical method for calculating concentration limits for monitoring parameters and constituents of concern that are detected in 10% or greater of the background data (naturally-occurring constituents) using a statistical procedure from Title 27, section 20415(e)(8)(A-D)] or section 20415(e)(8)(E).
- e. Include a retesting procedure to confirm or deny measurably significant evidence of a release pursuant to Title 27, section 20415(e)(8)(E) and section 20420(j)(1-3).

The Water Quality Protection Standard shall be certified by a California-registered civil engineer or geologist as meeting the requirements of Title 27. If subsequent sampling of the background monitoring point(s) indicates significant water quality changes due to either seasonal fluctuations or other reasons unrelated to waste management activities at the site, the Discharger may request modification of the Water Quality Protection Standard.

The Discharger submitted a 17 September 2015 *Detection Monitoring Program* including a Water Quality Protection Standard (WQPS) proposing statistical data analysis methods to calculate concentration limits for each monitored constituent in accordance with Title 27. Concentration limits are calculated using Interwell tolerance limits at 95% confidence and 95% coverage based on background data from background monitoring wells. The Water Quality Protection Standard shall be updated annually for each monitoring well using new and historical monitoring data.

## 2. **Monitoring Parameters**

Monitoring parameters are a select group of constituents that are monitored during each monitoring event that are the waste constituents, reaction products,

hazardous constituents, and physical parameters that provide a reliable indication of a release from a waste management unit. The monitoring parameters for all waste management units are those listed in Tables I through VI for the specified monitored medium.

### **3. Constituents of Concern (COCs)**

The COCs include a larger group of waste constituents, their reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the waste management unit, and are required to be monitored every five years [Title 27, sections 20395 and 20420(g)]. The COCs for all waste management units at the facility are those listed in Tables I through V for the specified monitored medium, and Table VII. The Discharger shall monitor all COCs every five years, or more frequently as required in accordance with a Corrective Action Program. The last 5-year COC report for 2015 is scheduled for submittal by 31 January 2016 in the *Annual Monitoring Report*, and 5-year COCs are due to be monitored again in **2020**.

### **4. Concentration Limits**

For a naturally occurring constituent of concern with the exception of turbidity, the concentration limit for each constituent of concern shall be determined as follows:

- a. By calculation in accordance with a statistical method pursuant to Title 27, section 20415(e)(8); or
- b. By an alternate statistical method meeting the requirements of Title 27, section 20415(e)(8)(E).

Concentration limits shall not be calculated for turbidity because turbidity is typically used to evaluate the well conditions and may not be indicative of a release to groundwater.

Concentration limits are calculated using Interwell tolerance limits for each groundwater zone at 95% confidence and 95% coverage based on background data from background monitoring wells as specified below. Tolerance limits will be calculated when a minimum of 8 data points are collected from new background wells.

- a. A-zone concentration limits shall be calculated using background wells MW-10A, MW-38A and MW-39A and future background wells MW-34A and MW-35A.

- b. B-zone concentration limits shall be calculated using background wells MW-10B, MW-38B, and MW-39B, and future background wells MW-34A and MW-35A.
- c. C-zone concentration limits shall be calculated using background well MW-10C and future C-zone background wells.

The most recent concentration limits for select parameters as reported in the 30 January 2015 *Annual Monitoring Report* were as follows:

Background Well		MW-10A <sup>1</sup>	MW-10B	MW-10C
Analysis Type		Interwell	Interwell	Interwell
Groundwater zone		A	B	C
pH	Std units	4.9-7.6	6.0-7.7	6.6-7.5
EC	umhos/cm	252	213	246
Chloride	mg/L <sup>2</sup>	18.8	11.0	10.2
Nitrate as N	mg/L	1.8	1.8	1
Sulfate	mg/L	9.0	10	15.7
TDS	mg/L	217	220	227
Bicarbonate <sup>2</sup>	mg/L	92	100	114
Carbonate <sup>2</sup>	mg/L	DL <sup>8</sup>	DL	DL
Aluminum	µg/L	3,900	30	40
Antimony	µg/L	250	2	5.7
Arsenic	µg/L	260	4	8.7
Barium	µg/L	44	41	47
Beryllium	µg/L	DL	DL	DL
Cadmium	µg/L	5	1	1
Chromium	µg/L	10	4.1	3
Chromium VI	µg/L	10	4.1	3
Cobalt	µg/L	0.7	1.6	1
Copper	µg/L	2,050	50	4.4
Cyanide	µg/L	DL	DL	DL
Iron	µg/L	270	47	110
Lead	µg/L	93	20	4.2
Manganese	µg/L	90	2.5	3.5
Mercury	µg/L	DL	DL	DL
Nickel	µg/L	25	1	1.8
Selenium	µg/L	2.5	4	4
Silver	µg/L	5	1	42
Thallium	µg/L	5	DL	DL
Tin	µg/L	DL	DL	DL
Vanadium	µg/L	23	18	35

Background Well		MW-10A <sup>1</sup>	MW-10B	MW-10C
Analysis Type		Interwell	Interwell	Interwell
Groundwater zone		A	B	C
Zinc	µg/L	2,990	33	35
Sulfide	µg/L	DL	DL	DL

EC – Electrical Conductivity  
 TDS –Total Dissolved Solids  
 mg/L – Milligrams per liter  
 µg/L – micrograms per liter  
 DL – detection limit

NA – not applicable  
 1. Concentration limits last calculated in 2003 before MW-10A dried out.  
 2. As CaCo<sub>3</sub>

## 5. Retesting Procedures for Confirming Evidence of a Release

If monitoring results indicate measurably significant evidence of a release, as described in Standard Monitoring Specification I.45 of the SPRRs, then:

- a. For analytes that are detected in less than 10% of the background samples (such as non-naturally occurring constituents), the Discharger shall use the non-statistical retesting procedure required in Standard Monitoring Specification I.46 of the SPRRs.
- b. For analytes that are detected in 10% or greater of the background samples (naturally occurring constituents), the Discharger shall use one of the statistical retesting procedure as required in Standard Monitoring Specification I.47 of the SPRRs.

## 6. Point of Compliance

The point of compliance for the water standard at each waste management unit is a vertical surface located at the hydraulically downgradient limit of the Unit that extends through the uppermost aquifer underlying the unit. The following are monitoring locations at the point of compliance:

<u>Cell or Module</u>	<u>Point of Compliance Monitoring Wells</u>
M-1	MW-1A, MW-1B, MW-2A, MW-2A1, MW-2B, MW-7AR, MW-7B, MW-6A, MW-6A1
M-1L	MW-11A, MW-11B
M-2	MW-15A, MW-15B, MW-37A, MW-37B
M-3	MW-15A, MW-15B, MW-37A, MW-37B
M-4	MW-36A
M-5	MW-36A
M-6	MW-15A, MW-15B, MW-37A, MW-37B
M-7	MW-11A, MW-11B, MW-15A, MW-15B, MW-37A, MW-37B
M-8	MW-7AR, MW-7B, MW-11A, MW-11B

<u>Cell or Module</u>	<u>Point of Compliance Monitoring Wells</u>
M-9	MW-1A, MW-1B, MW-2A1, MW-2A, MW-2B, MW-7AR
M-10	MW-6A, MW-6A1, MW-17A
M-11	MW-6A, MW-6A1, MW-17A

## 7. Compliance Period

The compliance period for each waste management unit shall be the number of years equal to the active life of the unit plus the closure period. The compliance period is the minimum period during which the Discharger shall conduct a water quality monitoring program subsequent to a release from the waste management unit. The compliance period shall begin anew each time the Discharger initiates an evaluation monitoring program [Title 27, section 20410].

## 8. Monitoring Points

A monitoring point is a well, device, or location specified in the waste discharge requirements, which monitoring is conducted and at which the water quality protection standard applies. The monitoring points for each monitored medium are listed in Section A of this MRP.

## D. TRANSMITTAL LETTER FOR ALL REPORTS

A transmittal letter explaining the essential points shall accompany each report. At a minimum, the transmittal letter shall identify any violations found since the last report was submitted, and if the violations were corrected. If no violations have occurred since the last submittal, this shall be stated in the transmittal letter. The transmittal letter shall also state that a discussion of any violations found since the last report was submitted, and a description of the actions taken or planned for correcting those violations, including any references to previously submitted time schedules, is contained in the accompanying report. The transmittal letter shall contain a statement by the discharger, or the discharger's authorized agent, under penalty of perjury, that to the best of the signer's knowledge the report is true, accurate, and complete.

The Discharger shall implement the above monitoring program on the effective date of this Program.

Ordered by: \_\_\_\_\_  
PAMELA C. CREEDON, Executive Officer

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

**TABLE I**  
**GROUNDWATER DETECTION MONITORING PROGRAM**

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
<b>Field Parameters<sup>3</sup></b>			
Groundwater Elevation	Ft. & 100ths, M.S.L.	Quarterly	Semiannual
Temperature	°C	Semiannual	Semiannual
Electrical Conductivity	umhos/cm	Semiannual	Semiannual
pH	pH units	Semiannual	Semiannual
Turbidity	Turbidity units	Semiannual	Semiannual
<b>Monitoring Parameters<sup>3</sup></b>			
Total Dissolved Solids (TDS)	mg/L <sup>1</sup>	Semiannual	Semiannual
Chloride	mg/L	Semiannual	Semiannual
Bicarbonate	mg/L	Semiannual	Semiannual
Nitrate - Nitrogen	mg/L	Semiannual	Semiannual
Sulfate	mg/L	Semiannual	Semiannual
Volatile Organic Compounds (USEPA Method 8260B, short list, see Table VI)	ug/L <sup>2</sup>	Semiannual	Semiannual
<b>5-Year Constituents of Concern<sup>4,5</sup> (see Table VII)</b>		5 years	2020 and every 5 years thereafter

<sup>1</sup> Milligrams per liter

<sup>2</sup> Micrograms per liter

<sup>3</sup> Field and monitoring parameters for C zone wells shall be collected annually, with the exception of groundwater elevation that shall be recorded quarterly.

<sup>4</sup> 5-year COC monitoring shall include all background wells and point of compliance wells for all constructed landfill modules.

<sup>5</sup> The two corrective action wells with the highest total VOC concentrations shall be analyzed for 5-year COCs annually.

**TABLE II**

**UNSATURATED ZONE DETECTION MONITORING PROGRAM**

**PAN LYSIMETERS<sup>1</sup> (or other vadose zone monitoring device)**

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
<b>Field Parameters</b>			
Electrical Conductivity	umhos/cm	Semiannual	Semiannual
pH	pH units	Semiannual	Semiannual
Volume of liquid removed	gallons	Monthly	Semiannual
<b>Monitoring Parameters</b>			
Total Dissolved Solids (TDS)	mg/L	Semiannual	Semiannual
Chloride	mg/L	Semiannual	Semiannual
Bicarbonate	mg/L	Semiannual	Semiannual
Nitrate - Nitrogen	mg/L	Semiannual	Semiannual
Sulfate	mg/L	Semiannual	Semiannual
Volatile Organic Compounds (USEPA Method 8260B, short list, see Table VI)	ug/L	Semiannual	Semiannual
<b>5-Year Constituents of Concern (see Table VII)</b>		5 years	2020 and every 5 years thereafter

<sup>1</sup> Pan lysimeters shall be inspected for the presence of liquid **monthly**. If liquid is detected in a previously dry pan lysimeter, the Discharger shall verbally notify Central Valley Water Board staff within **seven days** and shall immediately sample and test the liquid for Field and Monitoring Parameters listed above.

**TABLE III**

**UNSATURATED ZONE DETECTION MONITORING PROGRAM**

**SOIL-PORE GAS**

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
<b>Monitoring Parameters</b>			
Volatile Organic Compounds <sup>1</sup> (USEPA Method TO-15)	ug/cm <sup>3</sup>	Annual	Annual
Methane <sup>1</sup>	%	Semiannual	Semiannual
Carbon Dioxide <sup>1</sup>	%	Semiannual	Semiannual
Oxygen <sup>1</sup>	%	Semiannual	Semiannual

<sup>1</sup> The Discharger may prescreen the gas sample to determine if the sample is required to be laboratory analyzed using Method TO-15 by using an approved gas analyzer to establish methane concentrations at the sampling point. If while using an approved sampling and analysis plan procedure the Discharger detects methane concentrations exceeding 1.0 percent by volume, then a gas sample shall be obtained and laboratory analyzed for specific VOCs using EPA Method TO-15. Both the screening results and laboratory analysis results shall be reported. Otherwise, the Discharger shall report the methane screening results and no further laboratory analysis is required.

**TABLE IV**  
**LEACHATE MONITORING <sup>1</sup>, SEEP MONITORING <sup>2</sup>, AND LCRS TESTING <sup>3</sup>**

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
<b>Field Parameters</b>			
Total Flow	Gallons	Monthly	Semiannual
Flow Rate	Gallons/Day	Monthly	Semiannual
Electrical Conductivity	umhos/cm	Quarterly	Semiannual
pH	pH units	Quarterly	Semiannual
<b>Monitoring Parameters</b>			
Total Dissolved Solids (TDS)	mg/L	Annual	Annual
Chloride	mg/L	Annual	Annual
Bicarbonate	mg/L	Annual	Annual
Nitrate - Nitrogen	mg/L	Annual	Annual
Sulfate	mg/L	Annual	Annual
Volatile Organic Compounds (USEPA Method 8260B, short list, see Table VI)	ug/L	Annual	Annual
<b>5-Year Constituents of Concern (see Table VII)</b>		5 years	2020 and every 5 years thereafter
<b>LCRS Testing <sup>3</sup></b>	---	Annually	Annually

<sup>1</sup> If leachate is detected in a previously dry sump, the Discharger shall verbally notify Central Valley Water Board staff within **seven days** and shall immediately sample and test the leachate for Field and Monitoring Parameters listed in Table IV. Leachate in the LCRS sump shall then be sampled for all parameters and constituents in accordance with the frequencies listed in Table IV whenever liquid is present.

<sup>2</sup> Leachate seeps shall be sampled and analyzed for the Field and Monitoring Parameters in this table upon detection. The quantity of leachate shall be estimated and reported in gallons/day. Also, refer to Section B.3

<sup>3</sup> The Discharger shall test each LCRS annually pursuant to Title 27, section 20340(d) to demonstrate proper operation. The results of the tests shall be compared with earlier tests made under comparable conditions.

**TABLE V**  
**SURFACE WATER DETECTION MONITORING PROGRAM**

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u> <sup>1</sup>	<u>Reporting Frequency</u>
<b>Field Parameters</b>			
Electrical Conductivity	umhos/cm	Semiannual	Semiannual
pH	pH units	Semiannual	Semiannual
Turbidity	Turbidity units	Semiannual	Semiannual
Flow to Waters of U.S.	Yes/No	Semiannual	Semiannual
<b>Monitoring Parameters</b>			
Total Dissolved Solids (TDS)	mg/L	Semiannual	Semiannual
Bicarbonate	mg/L	Semiannual	Semiannual
Chloride	mg/L	Semiannual	Semiannual
Nitrate - Nitrogen	mg/L	Semiannual	Semiannual
Sulfate	mg/L	Semiannual	Semiannual
Volatile Organic Compounds (USEPA Method 8260B, short list, see Table VI)	ug/L	Semiannual	Semiannual
Chemical Oxygen Demand	mg/L	Annually	Annually
<b>5-Year Constituents of Concern (see Table VII)</b>		5 years	2020 and every 5 years thereafter

<sup>1</sup> Semiannual surface water monitoring is required twice per year when there is water present at the designated surface water monitoring point any time during the year. Reporting shall include whether there was flow from the facility to waters of the U.S. when the samples were collected.

**TABLE VI – page 1 of 2**

**MONITORING PARAMETERS FOR DETECTION MONITORING**

**Surrogates for Metallic Constituents:**

Compound	<u>Geotracker Code</u>
pH	PH
Total Dissolved Solids	TDS
Electrical Conductivity	COND
Chloride	CL
Sulfate	SO4
Nitrate nitrogen	NO3N

**Volatile Organic Compounds, short list:**

**USEPA Method 8260B<sup>1</sup>**

Acetone  
Acrylonitrile  
Benzene  
Bromochloromethane  
Bromodichloromethane  
Bromoform (Tribromomethane)  
Carbon disulfide  
Carbon tetrachloride  
Chlorobenzene  
Chloroethane (Ethyl chloride)  
Chloroform (Trichloromethane)  
Dibromochloromethane (Chlorodibromomethane)  
1,2-Dibromo-3-chloropropane (DBCP)  
1,2-Dibromoethane (Ethylene dibromide; EDB)  
o-Dichlorobenzene (1,2-Dichlorobenzene)  
m-Dichlorobenzene (1,3-Dichlorobenzene)  
p-Dichlorobenzene (1,4-Dichlorobenzene)  
trans- 1,4-Dichloro-2-butene  
Dichlorodifluoromethane (CFC-12)  
1,1-Dichloroethane (Ethylidene chloride)  
1,2-Dichloroethane (Ethylene dichloride)  
1,1 -Dichloroethylene (1,1 -Dichloroethene; Vinylidene chloride)  
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)  
trans-1,2-Dichloroethylene (trans-1,2-Dichloroethene)  
1,2-Dichloropropane (Propylene dichloride)  
cis- 1,3-Dichloropropene  
trans- 1,3-Dichloropropene  
Di-isopropylether (DIPE)  
Ethanol  
Ethyltertiary butyl ether  
Ethylbenzene  
2-Hexanone (Methyl butyl ketone)  
Hexachlorobutadiene  
Methyl bromide (Bromomethene)  
Methyl chloride (Chloromethane)

**TABLE VI – page 2 of 2**

**MONITORING PARAMETERS FOR DETECTION MONITORING**

Methylene bromide (Dibromomethane)  
Methylene chloride (Dichloromethane)  
Methyl ethyl ketone (MEK: 2-Butanone)  
Methyl iodide (Iodomethane)  
Methyl t-butyl ether  
4-Methyl-2-pentanone (Methyl isobutylketone)  
Naphthalene  
Styrene  
Tertiary amyl methyl ether  
Tertiary butyl alcohol  
1,1,1,2-Tetrachloroethane  
1,1,2,2-Tetrachloroethane  
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene)  
Toluene  
1,2,4-Trichlorobenzene  
1,1,1-Trichloroethane (Methylchloroform)  
1,1,2-Trichloroethane  
Trichloroethylene (Trichloroethene)  
Trichlorofluoromethane (CFC- 11)  
1,2,3-Trichloropropane  
Vinyl acetate  
Vinyl chloride  
Xylenes

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<sup>1</sup>For groundwater monitoring locations with no individual VOC concentrations above 1 ppb, the compounds ethanol, methyl iodide (iodomethane) and vinyl acetate are removed from the constituent list, and a search for unknown chromatographic peaks (SPRR Section I.17) is waived.

**TABLE VII – page 1 of 7**

**5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS**

<b><u>Compound</u></b>	<b><u>USEPA Method</u></b>	<b><u>Geotracker Code</u></b>
Total Organic Carbon	9060A	TOC
Calcium	6010B	CA
Magnesium	6010B	MG
Potassium	6010B	K
Sodium	6010B	NA

<b><u>Inorganics (dissolved):</u></b>	<b><u>USEPA Method</u></b>	<b><u>Geotracker Code</u></b>
Aluminum	6010	AL
Antimony	7041	SB
Barium	6010	BA
Beryllium	6010	BE
Cadmium	7131A	CD
Chromium	6010	CR
Cobalt	6010	CO
Copper	6010	CU
Silver	6010	AG
Tin	6010	SN
Vanadium	6010	V
Zinc	6010	ZN
Iron	6010	FE
Manganese	6010	MN
Arsenic	7062	AS
Lead	7421	PB
Mercury	7470A	HG
Nickel	7521	NI
Selenium	7742	SE
Thallium	7841	TL
Cyanide	9010C	CN
Sulfide	9030B	S

**Volatile Organic Compounds, extended list (USEPA Method 8260B):**

<b><u>COC Description</u></b>	<b><u>Geotracker Code</u></b>
Acetone	ACE
Acetonitrile	ACCN
Acrolein	ACRL
Acrylonitrile	ACRAMD
Allyl chloride	CLPE3
Benzene	BZ
Bromochloromethane	BRCLME
Dibromochloromethane	DBCME
Bromoform	TBME
Carbon disulfide	CDS
Carbon tetrachloride	CTCL
Chlorobenzene	CLBZ
Chloroethane	CLEA
Chloroform	TCLME

**TABLE VII – page 2 of 7**

**5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS**

**Volatile Organic Compounds, extended list (continued):**

<b><u>COC Description</u></b>	<b><u>Geotracker Code</u></b>
2-Chloro-1,3-butadiene (Chloroprene)	CHLOROPRENE
Dibromochloromethane	DBCME
1,2-Dibromo-3-chloropropane	DBCP
1,2-Dibromoethane	EDB
1,2-Dichlorobenzene	DCBZ12
1,3-Dichlorobenzene	DCBZ13
1,4-Dichlorobenzene	DCBZ14
trans-1,4-Dichloro-2-butene	DCBE14T
Dichlorodifluoromethane	FC12
1,1-Dichloroethane	DCA11
1,2-Dichloroethane	DCA12
1,1-Dichloroethene	DCE11
cis-1,2-Dichloroethene	DCE12C
trans-1,2-Dichloroethene	DCE12T
1,2-Dichloropropane	DCPA12
1,3-Dichloropropane	DCPA13
2,2-Dichloropropane	DCPA22
1,1-Dichloropropene	DCP11
cis-1,3-Dichloropropene	DCP13C
trans-1,3-Dichloropropene	DCP13T
Di-isopropyl ether (DIPE)	DIPE
Ethanol (EtOH)	ETHANOL
Ethyl tert-butyl ether (ETBE)	ETBE
Ethylbenzene	EBZ
Ethyl methacrylate	EMETHACRY
Hexachlorobutadiene	HCBU
2-Hexanone	HXO2
Isobutanol	ISOBTOH
Methacrylonitrile	METHACRN
Bromomethane	BRME
Chloromethane	CLME
2-Butanone	MEK
Methyl iodide	IME
Methyl-tert-butyl ether (MTBE)	MTBE
Methylmethacrylate	MMETHACRY
4-Methyl-2-pentanone	MIBK
Dibromomethane	DBMA
Dichloromethane	DCMA
Naphthalene	NAPH
Propionitrile	PACN
Styrene	STY
tert-Amyl methyl ether (TAME)	TAME
tert-Butyl alcohol (TBA)	TBA
1,1,1,2-Tetrachloroethane	TC1112

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**5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS**

**Volatile Organic Compounds, extended list (continued)**

<b><u>COC Description</u></b>	<b><u>Geotracker Code</u></b>
1,1,2,2-Tetrachloroethane	PCA
Tetrachloroethene (PCE)	PCE
Toluene	BZME
1,2,4-Trichlorobenzene	TCB124
1,1,1-Trichloroethane	TCA111
1,1,2-Trichloroethane	TCA112
Trichloroethene (TCE)	TCE
Trichlorofluoromethane	FC11
1,2,3-Trichloropropane	TCPR123
Vinyl acetate	VA
Vinyl chloride	VC
Xylenes	XYLENES

**Semi-Volatile Organic Compounds (USEPA Method 8270C or D - base, neutral, & acid extractables):**

<b><u>COC Description</u></b>	<b><u>Geotracker Code</u></b>
Acenaphthene	ACNP
Acenaphthylene	ACNPY
Acetophenone	ACPHN
2-Acetylaminofluorene	ACAMFL2
Aldrin	ALDRIN
4-Aminobiphenyl	AMINOBP4
Anthracene	ANTH
Benzo(a)anthracene	BZAA
Benzo(b)fluoranthene	BZBF
Benzo(k)fluoranthene	BZKF
Benzo(g,h,i)perylene	BZGHIP
Benzo(a)pyrene	BZAP
Benzyl alcohol	BZLAL
Bis-(2-ethylhexyl)phthalate	BIS2EHP
alpha-BHC	BHCALPHA
beta-BHC	BHCBETA
delta-BHC	BHCDELTA
gamma-BHC (Lindane)	BHCGAMMA
Bis-(2-chloroethoxy)methane	BECEM
Bis-(2-chloroethyl)ether	BIS2CEE
Bis(2-chloroisopropyl)ether	BIS2CIE
4-Bromophenyl phenyl ether	BPPE4
Benzyl butyl phthalate	BBP
Chlordane	CHLORDANE
4-Chloroaniline	CLANIL4

**TABLE VII – page 4 of 7**

**5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS**

<b><u>COC Description</u></b>	<b><u>Geotracker Code</u></b>
Chlorobenzilate	CLBZLATE
4-Chloro-3-methylphenol	C4M3PH
2-Chloronaphthalene	CNPH2
2-Chlorophenol	CLPH2
4-Chlorophenyl phenyl ether	CPPE4
Chrysene	CHRYSENE
2-Methylphenol (o-Cresol)	MEPH2
3-methylphenol	MEPH3
4-Methylphenol (p-Cresol)	MEPH4
4,4'-DDD	DDD44
4,4'-DDE	DDE44
4,4'-DDT	DDT44
Diallate (cis- or trans-)	DIALLATE
Dibenzo(a,h)anthracene	DBAHA
Dibenzofuran	DBF
Di-n-butyl phthalate	DNBP
3,3'-Dichlorobenzidine	DBZD33
2,4-Dichlorophenol	DCP24
2,6-Dichlorophenol	DCP26
Dieldrin	DIELDRIN
Diethyl phthalate	DEPH
azobenzene	AZOBENZENE
7,12-Dimethylbenz(a)anthracene	DMBZA712
3,3'-Dimethylbenzidine	DMBZD33
2,4-Dimethylphenol	DMP24
Dimethyl phthalate	DMPH
1,3-Dinitrobenzene	DNB13
2-Methyl-4,6-dinitrophenol	DN46M
2,4-Dinitrophenol	DNP24
2,4-Dinitrotoluene	DNT24
2,6-Dinitrotoluene	DNT26
Di-n-octyl phthalate	DNOP
Diphenylamine	DPA
Endosulfan I	ENDOSULFANA
Endosulfan II	ENDOSULFANB
Endosulfan sulfate	ENDOSULFANS
Endrin	ENDRIN
Endrin aldehyde	ENDRINALD
Ethyl methanesulfonate	EMSULFN
Famphur	FAMPHUR
Fluoranthene	FLA
Fluorene	FL

**TABLE VII – page 5 of 7**

**5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS**

**Semi-Volatile Organic Compounds (continued)**

<b><u>COC Description</u></b>	<b><u>Geotracker Code</u></b>
Heptachlor	HEPTACHLOR
Heptachlor epoxide	HEPT-EPOX
Hexachlorobenzene	HCLBZ
Hexachlorocyclopentadiene	HCCP
Hexachloroethane	HCLEA
Hexachloropropene	HCPR
Indeno(1,2,3-cd)pyrene	INP123
Isodrin	ISODRIN
Isophorone	ISOP
Isosafrole	ISOSAFR
Kepone	KEP
Methapyrilene	MTPYRLN
Methoxychlor	MTXYCL
3-Methylcholanthrene	MECHLAN3
Methyl methanesulfonate	MMSULFN
2-Methylnaphthalene	MTNPH2
1,4-Naphthoquinone	NAPHQ14
1-Naphthylamine	AMINONAPH1
2-Naphthylamine	AMINONAPH2
2-Nitroaniline	NO2ANIL2
3-Nitroaniline	NO2ANIL3
4-Nitroaniline	NO2ANIL4
Nitrobenzene	NO2BZ
2-Nitrophenol	NTPH2
4-Nitrophenol	NTPH4
n-Nitroso-di-n-butylamine	NNSBU
N-Nitrosodiethylamine	NNSE
N-Nitrosodimethylamine	NNSM
N-Nitrosodiphenylamine	NNSPH
n-Nitrosodi-n-propylamine	NNSPR
N-Nitrosomethylethylamine	NNSME
N-Nitrosopiperidine	NNSPPRD
N-Nitrosopyrrolidine	NNSPYRL
5-Nitro-o-toluidine	TLDNONT5
Pentachlorobenzene	PECLBZ
Pentachloronitrobenzene	PECLNO2BZ
Pentachlorophenol	PCP
Phenacetin	PHNACTN
Phenanthrene	PHAN
Phenol	PHENOL
1,4-Phenylenediamine	ANLNAM4
Polychlorinated biphenyls (PCBs)	PCBS

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**5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS**

**Semi-Volatile Organic Compounds (continued)**

<u>COC Description</u>	<u>Geotracker Code</u>
Pronamide	PRONAMD
Pyrene	PYR
Safrole	SAFROLE
1,2,4,5-Tetrachlorobenzene	C4BZ1245
2,3,4,6-Tetrachlorophenol	TCP2346
o-Toluidine	TLDNO
Toxaphene	TOXAP
2,4,5-Trichlorophenol	TCP245
o,o,o-Triethyl phosphorothioate	TEPTH
1,3,5-Trinitrobenzene	TNB135

**Chlorophenoxy Herbicides (USEPA Method 8151A):**

<u>COC Description</u>	<u>Geotracker Code</u>
2,4-D	24D
Dinoseb	DINOSEB
2,4,5-TP (Silvex)	SILVEX
2,4,5-T	245T

**Organophosphorus Compounds (USEPA Method 8141B):**

<u>COC Description</u>	<u>Geotracker Code</u>
Atrazine	ATRAZINE
Chlorpyrifos	CLPYRIFOS
Thionazine	ZINOPHOS
Diazinon	DIAZ
Dimethoate	DIMETHAT
Disulfoton	DISUL
Parathion methyl	PARAM
Parathion ethyl	PARAE
Phorate	PHORATE
Simazine	SIMAZINE

**TABLE VII – page 7 of 7**

**5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS**

**Organochlorine Pesticides And Polychlorinated Biphenyls**

**USEPA METHOD 8080**

alpha-BHC  
2 beta-BHC  
2 delta-BHC  
2 gamma-BHC (Lindane)  
Heptachlor  
Aldrin  
Heptachlor epoxide  
Endosulfan I  
Dieldrin  
4,4'-DDE  
Endrin  
Endosulfan II  
4,4'-DDD  
Endosulfan sulfate  
4,4'-DDT  
Methoxychlor  
Endrin ketone  
Endrin aldehyde  
alpha-Chlordane  
2 gamma-Chlordane  
Toxaphene  
Aroclor-1016  
Aroclor-1221  
Aroclor-1232  
Aroclor-1242  
Aroclor-1248  
Aroclor-1254  
Aroclor-1260

**Geotracker Code**

BHCALPHA  
BHCBETA  
BHCBETA  
BHC GAMMA  
HEPT-EPOX  
ALDRIN  
HEPT-EPOX  
ALDRIN  
DIELDRIN  
DDE44  
ENDRIN  
ENDOSULFANB  
DDD44  
ENDOSULFANS  
DDT44  
MTXYCL  
ENDRINKET  
ENDRINALD  
CHLORDANEA  
CHLORDANEG  
TOXAP  
PCB1016  
PCB1221  
PCB1232  
PCB1242  
PCB1248  
PCB1254  
PCB1260