

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2015-XXXX
FOR
SAN JOAQUIN COUNTY DEPARTMENT OF PUBLIC WORKS
FOOTHILL SANITARY LANDFILL, INC.
FOOTHILL LANDFILL
CLASS III LANDFILLS
CONSTRUCTION, OPERATION, CLOSURE, POST-CLOSURE
MAINTENANCE, AND CORRECTIVE ACTION
SAN JOAQUIN 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 contained in California Code of Regulations, title 27, section 20005, et seq. (hereafter Title 27), Waste Discharge Requirements (WDRs) Order No. R5-2015-XXXX, and the *Standard Provisions and Reporting Requirements for Waste Discharge Requirements for Nonhazardous Solid Waste Discharges Regulated by Subtitle D and/or Title 27* (SPRRs), dated January 2012. 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 monitor both landfill units at the site (i.e., Landfills 1 and 2) in accordance with the detection and corrective action monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone. Monitoring shall also be in accordance with the 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 includes quality assurance/quality control standards. 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.

All compliance monitoring wells established for the detection and corrective action monitoring program shall constitute the monitoring points for the groundwater Water Quality Protection Standard. All detection and corrective action 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 VI.

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 approved Sample Collection and Analysis Plan.

The monitoring program of this MRP includes:

<u>Section</u>	<u>Monitoring Program</u>	<u>Reference Map</u> ¹
A.1	Groundwater Monitoring	Attachment C: Site Map
A.2	Unsaturated Zone Monitoring	
A.3	Leachate Monitoring, Seep Monitoring, and LCRS Testing	
A.4	Surface Water Monitoring	Attachment D: Drainage Controls & Monitoring
A.5	Solid Waste Monitoring	n/a
A.6	Facility Monitoring	
A.7	Additional Corrective Action Monitoring	Attachment E: Gas Controls & Monitoring

1. See reference map for monitoring locations.

1. Groundwater Monitoring

The Discharger shall operate and maintain groundwater detection and corrective action monitoring systems that comply with the applicable provisions of Title 27, sections 20415 through 20430. These groundwater monitoring systems shall be certified by a California-licensed professional civil engineer or geologist as meeting the requirements of Title 27.

The Discharger contiguously monitors both landfill units at the site (i.e., LF-1 and LF-2) in accordance with Title 27, section 20415(e)(3). LF-1 is in corrective action monitoring and LF-2 is in detection monitoring. This groundwater monitoring system meets the applicable requirements of Title 27. The Discharger shall revise the groundwater monitoring system (after review and approval by Central Valley Water Board staff) as needed each time a new landfill module is constructed or for corrective action monitoring.

a. Monitoring Points (See Attachment C: Site Map)

<u>Well</u>	<u>Program</u>	<u>Location</u>	<u>Zone</u>	<u>Unit(s) Monitored</u>
MW-4 ¹	Detection & Corrective Action	Upgradient	Upper	LF-1 and LF-2
MW-3		Downgradient / Sidegradient		LF-1
MW-2R				LF-2
MW-5 ²		Downgradient	Upper & Lower	LF-1 and LF-2
MW-6 ²				

1. Well used for development of concentration limits.

2. Corrective action monitoring well for LF-1 and detection monitoring well for LF-2.

The groundwater monitoring network for the Foothill Landfill shall also include any future wells installed by the Discharger under these WDRs to monitor LF-1 and/or LF-2.

b. Monitoring Schedule

Monitoring at each unit shall include field parameter testing and groundwater sampling. Groundwater samples shall be collected and analyzed in accordance with the following schedule using the applicable test methods for each constituent listed in Appendix 1 attached to this Order.

Table A.1.b Groundwater Monitoring Schedule			
<u>Parameters</u>	<u>Units</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
<i>Field Parameters</i>			
Groundwater Elevation	Feet & 100ths, M.S.L.	Quarterly	Semiannually
Temperature	oF	Semiannually	Semiannually
Specific Conductance	umhos/cm	Semiannually	Semiannually
pH	pH units	Semiannually	Semiannually
Turbidity	NTU	Semiannually	Semiannually
<i>Monitoring Parameters</i>			
Bicarbonate Alkalinity	mg/L	Semiannually	Semiannually
Calcium	mg/L		
Carbonate	mg/L	Semiannually	Semiannually
Chloride	mg/L	Semiannually	Semiannually
Magnesium	mg/L		
Nitrate as N	mg/L	Semiannually	Semiannually
Potassium	mg/L	Semiannually	Semiannually
Sodium	mg/L		
Sulfate	mg/L	Semiannually	Semiannually
Total Dissolved Solids	mg/L	Semiannually	Semiannually
Dissolved Iron	ug/L	Semiannually	Semiannually
Volatile Organic Compounds (VOCs) ¹	ug/L	Semiannually	Semiannually
<i>Constituents of Concern</i> ¹	---	Every 5 years	Every 5 years

1. See Appendix 1 for COCs and analytical methods.

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). Groundwater samples shall be collected at least semiannually in all wells, including any future wells added as part of the approved groundwater monitoring system.

The Discharger shall collect, preserve, and transport groundwater samples in accordance with the approved Sample Collection and Analysis Plan. 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 Appendix 1 shall be collected and analyzed in accordance with the methods listed in Table VI every five years. Five-year COCs were last monitored in 2014 and shall be monitored again in 2019. The results shall be reported in the Annual Monitoring Report for the year in which the samples were collected.

Background, detection, and corrective action monitoring data analysis shall be conducted consistent with the statistical and non-statistical data analysis methods described in Section C.1, as updated in the Water Quality Protection Standard Report submitted under WDR Provision H.7, as approved by the Executive Officer.

2. Unsaturated Zone Monitoring

The Discharger shall operate and maintain an unsaturated zone detection and corrective action monitoring system that complies with the applicable provisions of Title 27, sections 20415 and 20420. Unsaturated zone monitoring shall consist of soil pore gas monitoring and lysimeter monitoring. The current unsaturated zone detection monitoring system at the site meets Title 27 requirements. 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.

a. Soil Pore Water Monitoring

i. Monitoring Points (See Attachment C: Site Map)

The soil pore water monitoring shall consist of all lysimeters installed beneath current and future LF-2 modules or module phases, as follows:

Table A.2.a.i Soil Pore Water Monitoring Points				
<u>LF-2 Module</u>	<u>Lysimeter</u>	<u>Type</u>	<u>Program</u>	<u>Location</u>
M-1	LZ-1	Suction	Background	Near northeast site boundary
	LZ-2	Suction	Detection	Beneath LCRS sump
	LZ-3	Suction		Beneath northeast LCRS trench
	LZ-4	Suction		Beneath southwest corner of liner
M-2A ¹	LZ-5	Pan		Beneath LCRS sump(s) ²
Future Modules/ Phases	----	Pan ³		

1. Module 2, Phase A scheduled for construction in spring, 2015.
2. Additional lysimeter locations may be included in future module designs.
3. Future modules/phases shall be equipped with pan lysimeters rather than suction lysimeters.

ii. Monitoring Schedule

Moisture block sensors for suction lysimeters (i.e., LZ-1 through LZ-4 above) shall be checked and repaired as necessary as part of facility monitoring to ensure they are in good working order. Sampling shall be attempted at any suction lysimeter where the moisture block resistivity reading indicates there is pore fluid. Soil-pore water samples shall be collected from the pan lysimeters (i.e., LZ-5 and lysimeters in future modules/phases) and analyzed in accordance with the following schedule using the applicable test methods for each constituent listed in Appendix 1 attached to this Order.

Table A.2.a.ii Soil Pore Water Monitoring Schedule			
<u>Parameters</u>	<u>Units</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
<i>Field Parameters</i>			
Presence of leachate/liquid	---	Monthly	Semiannually
Specific Conductance	umhos/cm	Semiannually	Semiannually
pH	pH units	Semiannually	Semiannually
Volume of liquid removed	gallons	Monthly	Semiannually
<i>Monitoring Parameters</i>			
Bicarbonate Alkalinity	mg/L	Semiannually	Semiannually
Calcium	mg/L	Semiannually	Semiannually
Carbonate	mg/L	Semiannually	Semiannually
Chloride	mg/L	Semiannually	Semiannually
Magnesium	mg/L	Semiannually	Semiannually
Nitrate as N	mg/L	Semiannually	Semiannually
Potassium	mg/L	Semiannually	Semiannually
Sodium	mg/L	Semiannually	Semiannually
Sulfate	mg/L	Semiannually	Semiannually
Total Dissolved Solids	mg/L	Semiannually	Semiannually
Volatile Organic Compounds (VOCs) ¹	ug/L	Semiannually	Semiannually
<i>Constituents of Concern</i> ¹	---	Every 5 years	Every 5 years

1. See Appendix 1 below.

Lysimeters shall be inspected for the presence of liquid monthly. Lysimeters need only be sampled when liquid is present. If liquid is detected in a previously dry 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 the above table.

- b. Soil Pore Gas Monitoring
 - i. Monitoring Points (See Attachment E: Gas Controls & Monitoring)

The soil pore gas monitoring system for the landfill units shall be as follows:

Table A.2.b.i Soil Pore Gas Monitoring Points				
<u>Unit(s)</u>	<u>Well(s)</u>	<u>Program</u>	<u>Completion</u>	<u>Screen Depths¹</u>
LF-1	SG-2 to SG-7 ²	Detection & Corrective Action	Single Probe	Shallow
	SG-9 to SG-11 ²			Deep
	SG-1 ²			
LF-2	SGs-6, 7 & 10 ³	Detection	Triple Probe	Shallow
	SG-7 & 9 ³			
Both units	SG-12; SGs-102 to 125 ⁴	Detection	Triple Probe	Shallow, Intermediate, & Deep

1. Screen depths relative to landfill waste column.
2. Corrective action monitoring points for LF-1.
3. Concurrent detection monitoring points for LF-2.
4. Perimeter methane migration monitoring wells.

ii. Monitoring Schedule

Soil-pore gas samples shall be collected from the monitoring network listed above and analyzed in accordance with the following schedule.

Table A.2.b.ii Soil Pore Gas Monitoring Schedule			
<u>Parameters</u>	<u>Units</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
<i>Field Parameters¹</i>			
Methane	%	Semiannually	Semiannually
Carbon Dioxide	%	Semiannually	Semiannually
Organic Vapors	ppm	Semiannually	Semiannually
<i>Monitoring Parameters</i>			
VOCs ^{2,3}	µg/cm ³	Semiannually	Semiannually

1. Field gas monitoring shall be conducted using appropriate field meter(s).
2. VOC sampling shall be required in all probes in which methane detected above 1% by volume and/or total organic vapors detected above 50 ppbv during monitoring event.
3. VOC analysis shall be conducted using USEPA Method TO-15.

Unsaturated zone samples shall be collected from the monitoring networks listed above and analyzed for the parameters and constituents listed in the monitoring schedules listed above in accordance with the specified methods and frequencies. Samples collected for the 5-year COC analyses specified above

shall be collected and analyzed in accordance with the methods listed in Appendix 1 every five years, beginning again in **2019**.

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

The Discharger shall operate and maintain leachate collection and removal system (LCRS) sump for each LF-2 landfill module. In addition to monitoring these sumps, the Discharger shall monitor the landfill for leachate seeps, and conduct annual testing of each LCRS in accordance with Title 27 and this monitoring program.

a. Monitoring Points (see Attachment C: Site Map)

i. LCRS Sumps

The leachate monitoring points shall include the LCRS sumps at each existing and future LF-2 landfill modules, as follows:

Table A.3.a LCRS Sump Monitoring Points		
<u>Unit</u>	<u>Module(s)</u>	<u>Monitoring Point</u>
LF-2	1	L-1
	2A ¹	L-2 ¹
	2B, 3 to 10 ²	--- ²

1. Module scheduled for construction in spring, 2015.
 2. Future LF-2 modules (or module phases), and sumps.

The above LCRS sumps shall be inspected monthly for the presence of leachate, and flow shall be recorded in accordance with Table A.3.b below. 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 A.3.b. Leachate in the LCRS sump, including any commingled condensate returned to that sump, shall then be sampled for all parameters and constituents in accordance with the frequencies listed in Table A.3.b whenever liquid is present.

All LCRS sump samples shall be analyzed for the 5-year COCs specified in Table III every five years, beginning again in 2019.

ii. Seep Monitoring

The Discharger shall monitor all areas of the landfill (e.g., top deck, side slopes, toe areas, and levee corridor) for leachate seeps, including as part of Facility Monitoring under Section A.6. Any observed leachate seepage from the landfill unit shall be sampled upon detection and analyzed in accordance with Table A.3.b below using the applicable test methods for each constituent listed in Appendix 1 attached to this Order. Reporting for leachate seeps shall be conducted as required in

Section B.3 of this MRP. The quantity of leachate shall be estimated and reported as Leachate Flow Rate (in gallons/day).

iii. 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.

b. Monitoring Schedule

Leachate samples shall be collected from the above monitoring network and analyzed in accordance with the following schedule using the applicable test methods for each constituent listed in Appendix 1 attached to this Order.

Table A.3.b Leachate Monitoring Schedule			
<u>Parameters</u>	<u>Units</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
<i>Field Parameters</i>			
Total Flow	gallons	Monthly	Semiannually
Flow Rate	gallons/day	Monthly	Semiannually
Electrical Conductivity	umhos/cm	Quarterly	Semiannually
pH	pH units	Quarterly	Semiannually
<i>Monitoring Parameters</i>			
Bicarbonate Alkalinity	mg/L	Semiannually	Semiannually
Calcium	mg/L	Semiannually	Semiannually
Carbonate	mg/L	Semiannually	Semiannually
Chloride	mg/L	Semiannually	Semiannually
Magnesium	mg/L	Semiannually	Semiannually
Nitrate as N	mg/L	Semiannually	Semiannually
Potassium	mg/L	Semiannually	Semiannually
Sulfate	mg/L	Semiannually	Semiannually
TDS	mg/L	Semiannually	Semiannually
VOCs	ug/L	Semiannually	Semiannually
Dissolved Inorganics	ug/L	Annually	Annually
<i>Constituents of Concern¹</i>		Every 5 years	Every 5 years

1. See Appendix 1 below.

4. Surface Water Monitoring

The Discharger shall install and operate a surface water detection monitoring

system to detect a release from the landfill; any resulting impacts to surface or storm water if such a release occurs; and to monitor the effectiveness of the landfill's erosion controls. Surface water monitoring is specifically required where runoff from waste management unit 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.

As described in WDR Finding 37, landfill runoff generally flows to onsite sedimentation basins where it either percolates into the ground or, during peak flows, spills toward a large stock pond in the southeast corner of the site. The stock pond is fed by, and discharges into, a stream flowing along the eastern perimeter of the site. Surface water monitoring is conducted in this stream.

a. Monitoring Points (see Attachment D: Drainage Controls & Monitoring)

Surface/storm water monitoring shall be conducted at upstream and downstream locations along the eastern side of the site and at the three sedimentation basins, as follows:

Table A.4.a Surface Water Monitoring Points		
<u>Monitoring Point</u>	<u>Program</u>	<u>Location</u>
SW-1	Background	Onsite stream upstream of stock pond
SW-2	Detection	Stock Pond
SW-3	Storm Water	Sedimentation Basin 1
SW-4		Sedimentation Basin 2
SW-5		Sedimentation Basin 3

The above monitoring system meets Title 27 requirements for surface water detection monitoring.

b. Monitoring Schedule

Surface water samples shall be collected from the above monitoring network and analyzed in accordance with the following schedule using the applicable test methods for each constituent listed in Appendix 1 attached to this Order.

Table A.4.b Surface Water Monitoring Schedule			
<u>Parameters</u>	<u>Units</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
<i>Field Parameters</i>			
Temperature	°F	Semiannually	Semiannually
Electrical Conductivity	umhos/cm	Semiannually	Semiannually
pH	pH units	Semiannually	Semiannually
Turbidity	NTU	Semiannually	Semiannually
<i>Monitoring Parameters</i>			
Bicarbonate Alkalinity	mg/L	Semiannually	Semiannually
Calcium	mg/L	Semiannually	Semiannually
Carbonate	mg/L	Semiannually	Semiannually
Chloride	mg/L	Semiannually	Semiannually
Magnesium	mg/L	Semiannually	Semiannually
Nitrate as N	mg/L	Semiannually	Semiannually
Potassium	mg/L	Semiannually	Semiannually
Sulfate	mg/L	Semiannually	Semiannually
TDS	mg/L	Semiannually	Semiannually
VOCs	ug/L	Annually	Annually
Dissolved Inorganics	ug/L	Annually	Annually
<i>Constituents of Concern</i> ^{1,2}		Every 5 years	Every 5 years

1. See Appendix 1 below.

2. 5-year COC sampling may be limited to stock pond monitoring (SW-3).

Storm water monitoring shall also be conducted in accordance with the most recently adopted version of the NPDES General Industrial Storm Water Permit required under Standard Facility Specification E.15, SPRR for landfills that have a surface water discharge (a new version of this permit becomes effective on 1 July 2015). See also WDR Finding 37.

5. Solid Waste Monitoring

The Discharger shall monitor all wastes discharged to the landfill on a quarterly basis and report to the Board as follows:

Table A.5 Solid Waste Monitoring Schedule			
<u>Parameters</u>	<u>Units</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
Quantity of waste discharged	cu yds & tons ^{1,2}	Semiannually	Semiannually
Type(s) of waste discharged	---	Semiannually	Semiannually
Quantity of cover discharged	cu yds & tons ^{1,2}	Semiannually	Semiannually
Type(s) of cover discharged	---	Semiannually	Semiannually
Elevation range of discharges	MSL	Annually	Annually
Remaining landfill capacity	%	Annually	Annually

1. Tonnage shall be estimated based on volume conversion.
2. Volume conversion factor used for estimating landfill tonnage shall also be reported.

6. 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 Topographic Surveys

i. Closed Units

For closed landfill units or portions thereof (e.g., LF-1), 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 (or ET cover, as applicable). The next iso-settlement survey shall be conducted by **15 November 2017**. See Standard Closure and Postclosure Specification G.22, SPRR; Title 27, section 21090(e)(1 & 2).

ii. Active Units

For active units, or portions thereof, the Discharger shall provide copies of topographic maps obtained from 5-year aerial topographic surveys conducted under Title 27, section 21570(f) (10) for active landfill units/modules (i.e., LF-2).

Reporting of the above shall be in accordance with Section B.6 of this MRP.

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 monthly during the wet season (1 October to 30 April) and quarterly during the dry season (1 May to 30 September). The Standard Observations shall include:

i. For the landfill units:

- (1) 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
- (2) Evidence of erosion and/or of day-lighted refuse.

ii. Along the perimeter of the landfill units:

- (1) Evidence of leachate seeps, estimated size of affected area, and flow rate (show affected area on map); and
- (2) Evidence of erosion and/or of day-lighted refuse.

iii. For receiving waters:

- (1) Floating and suspended materials of waste origin - presence or absence, source, and size of affected area; and
- (2) 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.

Facility Monitoring shall also include continuous leachate seep monitoring under Section A.3.a.ii.

7. Additional Corrective Action Monitoring – Landfill Gas

LFG monitoring shall be conducted to assess the nature and source of impacts at the site; to provide an ongoing assessment as to the effectiveness of existing landfill gas controls in mitigating that source; and to evaluate the possible need for additional corrective action measures to protect underlying water bearing media.

a. Monitoring Points

The LFG extraction system for LF-1 shall be monitored at the following monitoring points:

- i. GX-1 through GX-9 (vertical wells) and all future LFG extraction wells installed at LF-1; and
- ii. Sampling port on LF-1 gas header

The LF-1 extraction system monitoring network shall also include all future LFG extraction wells installed at LF-1 (e.g., such as per the revised Engineering Feasibility Study described in WDR Finding 101).

b. Monitoring Schedule

Gas samples shall be collected from the above monitoring network and analyzed in accordance with the following schedule using the applicable test methods.

Table A.7.b LFG Monitoring Schedule			
<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
<i>Field Parameters¹</i>			
Flow rate ²	cu ft/min	Semiannually	Semiannually
Vacuum	psi	Semiannually	Semiannually
Temperature	oF	Semiannually	Semiannually
Methane	%	Semiannually	Semiannually
Carbon dioxide	%	Semiannually	Semiannually
Oxygen	%	Semiannually	Semiannually

Table A.7.b LFG Monitoring Schedule (continued)			
<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Organic Vapors	ppmv	Semiannually	Semiannually
<i>Monitoring Parameter</i>			
VOCs (USEPA Method TO-15) ³	µg/cm ³	Semiannually	Semiannually
Total VOCs removed per year ³	lbs/yr	Annually	Annually
Cumulative VOCs removed ³	lbs	Annually	Annually

1. Field monitoring shall be conducted using appropriate measuring device for each parameter,
2. LFG rom LF-1 shall be metered and sampled at an appropriate location along the LFG header pipe.
3. VOC monitoring may be limited to gas samples collected from LF-1 gas header.

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	1 August, 1 February
B.2	Annual Monitoring Report	31 December	1 February
B.3	Seep Reporting	Continuous	Immediately & Within 7 Days
B.4	Annual Facility Inspection Report	31 October	15 November
B.5	Major Storm Event Reporting	Continuous	Immediately & 14 days from damage repair
B.6	Topographic Survey & Iso-Settlement Maps	Every 5 Years	15 December 2017 & every 5 years thereafter

Reporting Requirements

The Discharger shall submit monitoring reports **semiannually** with the data and information as required in this Monitoring and Reporting Program and as required in

WDRs Order No. R5-2015-XXXX and the SPRR, particularly the monitoring and response to release provisions (i.e., WDR Section G and SPRR Sections I and J). 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, such as a computer disk.

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.

The results of **all monitoring** conducted under this Order 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:

- 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;
- Date, time, and manner of sampling;
- Date and time that analyses were started and completed, and the name of the personnel and laboratory performing each analysis;
- Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used;
- Calculation of results; and
- 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 **1 August** and **1 February**. Each semiannual monitoring report shall contain at least the following:

- a. For each groundwater monitoring point addressed by the report, a description of:
 - i. The time of water level measurement;
 - ii. 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;
 - iii. 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;
 - iv. The type of pump - or other device - used for sampling, if different than the pump or device used for purging; and
 - v. 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. Cumulative 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 run-off/run-on control facilities.
- h. The results of Facility Monitoring, including, but not limited to, a summary of all Standard Observations for the reporting period required in Section A.6.d of this MRP.
- i. A discussion as to the effectiveness of corrective action per Title 27, section 20430(h).

2. **Annual Monitoring Report**

The Discharger shall submit an Annual Monitoring Report to the Central Valley Water Board by **1 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 such as a computer disk. 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 written summary of the monitoring results, indicating any changes made or observed since the previous Annual Monitoring Report.
- g. Updated concentration limits for each monitoring parameter at each monitoring well based on the new data set.
- h. A comprehensive discussion of the Corrective Action Program.

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 A.3.b 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.6.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.6.b of this MRP, above.

6. **5-Year Topographic Survey(s)**

By **15 November 2017** and no less frequent than **every five years** thereafter, the Discharger shall submit the results of the topographic survey(s) completed under MRP Section A.6.c, including topographic survey and iso-settlement maps for LF-1 per Title 27, section 21090(e) and Standard Closure and Postclosure

Specification G.22, SPRR for closed units (LF-1); and a topographic map showing the development contours of LF-2 per Title 27, section 21570(f) (10).

C. WATER QUALITY PROTECTION STANDARD

The Water Quality Protection Standard for the landfill unit shall consist of all Constituents of Concern (COCs), Concentration Limits, the Point of Compliance, and all Monitoring Points consistent with this Order and Title 27, Section 20390.

1. Water Quality Protection Standard Report

By **31 January 2016**, the Discharger shall submit a Water Quality Protection Standard Report proposing a Water Quality Protection Standard for each landfill unit (i.e., LF-1 and LF-2) consistent with the Findings and Requirements of this Order. See WDR Provision H.7. At a minimum, the report shall include the following information:

- 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. Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).
- c. A map showing the monitoring points and background monitoring points for groundwater, the unsaturated zone, and surface water for each unit. The map shall show the point of compliance for each unit in accordance with Title 27, section 20405.
- d. Listings/tables showing all elements of the Water Quality Protection Standard for each unit and water bearing media, including, but not limited to, concentration limits for all monitoring parameters and 5-year COCs. See Standard Monitoring Specification I.25, SPRR.
- e. Proposed data analysis methods for calculating concentration limits for monitoring parameters and constituents of concern detected in 10% or greater of the background data (naturally-occurring constituents) per Title 27, section 20415(e)(8)(A-D)] or section 20415(e)(8)(E).
- f. 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).

Once approved, the concentration limits of the Water Quality Protection Standard shall be annually updated to reflect current background monitoring data using the approved data analysis methods. Any subsequent 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 Water Quality Protection Standard shall be certified by a California-registered civil engineer or geologist as meeting the requirements of Title 27.

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 (groundwater), A.2.a.ii (soil pore water), A.2.b.ii (soil pore gas), A.3 (leachate), A.4.b (surface/storm water), and A.7.b (landfill gas).

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 at least every five years [Title 27, sections 20395 and 20420(g)]. The COCs for all waste management units at the facility are those referenced in Tables A.1.b (groundwater), A.2.a.ii (soil pore water), A.4.b (surface/storm water), and Appendix 1 (attached). The Discharger shall monitor all COCs every 5 years (or more frequently if required in a Corrective Action Program). The first 5-year COC monitoring event under this Order shall be conducted by **15 September 2019** and the results reported in the Second Half and Annual 2015 monitoring report due by **31 January 2020**.

4. Concentration Limits

As noted in WDR Finding 53, the Discharger does not yet have a complete list of approved concentration limits for naturally occurring constituents and no Water Quality Protection Standard Report has ever been submitted for this site. Proposed concentration limits for all water bearing media (e.g., surface water and groundwater) shall therefore be included in the Water Quality Protection Standard Report required under WDR Provision H.7.

For a naturally occurring constituent of concern, 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).

Detection Monitoring - The concentration limits for non-naturally-occurring constituents of concern (e.g., VOCs) shall be non-detect. The concentration limits for naturally-occurring COCs (e.g., inorganics) shall be determined based

on an interwell monitoring procedure using upgradient monitoring data, unless the Discharger is able to demonstrate to the satisfaction of the Executive Officer that an intrawell approach is more representative of background conditions at the site due to the presence of significant spatial variability in the groundwater geochemistry not attributable to a release from the unit. The data analysis method for calculating concentration limits for naturally-occurring COCs under this Order shall be the interwell Tolerance Limit Method, or as otherwise proposed under the Water Quality Protection Standard Report required under WDR Provision H.7 and approved by Board staff.

Corrective Action Monitoring -- The concentration limits for corrective action monitoring shall be the same as those for detection monitoring absent approval of a proposal for concentration limits greater than background (CLGBs) under Title 27 Section 20400(c) and revision of the WDRs. An intrawell statistical procedure (e.g., the Sens Slope Method) shall be used for trend analysis to monitor corrective action progress.

Concentration limits for naturally occurring COCs shall be updated annually and included in the Annual Report submitted under this MRP. See Section B.2.g.

5. 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. As described in WDR Finding 49, the existing Point of Compliance wells for LF-1 are limited to side gradient wells because it is not feasible to monitor groundwater immediately down gradient of LF-1 (i.e., LF-1 and LF-2 are contiguous units). Groundwater directly downgradient of LF-1 is therefore contiguously monitored along LF-2's Point of Compliance (e.g., at MW-6). See Table A.1.a.

6. 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].

7. Monitoring Points

A monitoring point is a well, device, or location specified in the waste discharge requirements at 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 Order.

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

JDM: 17 March 2015

Appendix 1

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

General Minerals

	USEPA Method
Bicarbonate	2320B
Calcium	200.7/600
Carbonate	2320B
Chloride	300
Magnesium	200.7/600
Nitrate – Nitrogen	300
Potassium	200.7/600
Sodium	200.7/600
Sulfate	300
Total Dissolved Solids	2540C

Volatile Organic Compounds:

USEPA Method 8260B

Acetone
Acetonitrile (Methyl cyanide)
Acrolein
Acrylonitrile
Allyl chloride (3-Chloropropene)
Benzene
Bromochloromethane (Chlorobromomethane)
Bromodichloromethane (Dibromochloromethane)
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Chloroprene
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)
1,3-Dichloropropane (Trimethylene dichloride)
2,2-Dichloropropane (Isopropylidene chloride)
1,1 -Dichloropropene
cis- 1,3-Dichloropropene
trans- 1,3-Dichloropropene
Di-isopropylether (DIPE)
Ethanol
Ethyltertiary butyl ether
Ethylbenzene
Ethyl methacrylate
Hexachlorobutadiene
2-Hexanone (Methyl butyl ketone)
Isobutyl alcohol
Methacrylonitrile
Methyl bromide (Bromomethane)
Methyl chloride (Chloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)
Methyl iodide (Iodomethane)
Methyl t-butyl ether
Methyl methacrylate
4-Methyl-2-pentanone (Methyl isobutyl ketone)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Naphthalene
Propionitrile (Ethyl cyanide)
Styrene
Tertiary amyl methyl ether
Tertiary butyl alcohol
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene; PCE)
Toluene
1,2,4-Trichlorobenzene
1,1,1 -Trichloroethane (Methylchloroform)
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene; TCE)
Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride (Chloroethene)
Xylene (total)

Inorganics (dissolved):

USEPA Method

Aluminum	6010
Antimony	7041
Barium	6010
Beryllium	6010
Cadmium	7131A
Chromium	6010
Cobalt	6010
Copper	6010
Silver	6010
Tin	6010
Vanadium	6010
Zinc	6010
Iron	6010
Manganese	6010
Arsenic	7062
Lead	7421
Mercury	7470A
Nickel	7521
Selenium	7742
Thallium	7841
Cyanide	9010C
Sulfide	9030B

Semi-Volatile Organic Compounds:

USEPA Method 8270D - base, neutral, & acid extractables

Acenaphthene
Acenaphthylene
Acetophenone
2-Acetylaminofluorene (2-AAF)
Aldrin
4-Aminobiphenyl
Anthracene
Benzo[a]anthracene (Benanthracene)
Benzo[b]fluoranthene
Benzo[k]fluoranthene
Benzo[g,h,i]perylene
Benzo[a]pyrene
Benzyl alcohol
Bis(2-ethylhexyl) phthalate
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC (Lindane)
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl) ether (Dichloroethyl ether)
Bis(2-chloro-1-methylethyl) ether (Bis(2-chloroisopropyl) ether; DCIP)
4-Bromophenyl phenyl ether
Butyl benzyl phthalate (Benzyl butyl phthalate)

Chlordane
p-Chloroaniline
Chlorobenzilate
p-Chloro-m-cresol (4-Chloro-3-methylphenol)
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl phenyl ether
Chrysene
o-Cresol (2-methylphenol)
m-Cresol (3-methylphenol)
p-Cresol (4-methylphenol)
4,4'-DDD
4,4'-DDE
4,4'-DDT
Diallate
Dibenz[a,h]anthracene
Dibenzofuran
Di-n-butyl phthalate
3,3'-Dichlorobenzidine
2,4-Dichlorophenol
2,6-Dichlorophenol
Dieldrin
Diethyl phthalate
p-(Dimethylamino)azobenzene
7,12-Dimethylbenz[a]anthracene
3,3'-Dimethylbenzidine
2,4-Dimethylphenol (m-Xylenol)
Dimethyl phthalate
m-Dinitrobenzene
4,6-Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octyl phthalate
Diphenylamine
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Ethyl methanesulfonate
Famphur
Fluoranthene
Fluorene
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorocyclopentadiene
Hexachloroethane
Hexachloropropene
Indeno(1,2,3-c,d)pyrene

Isodrin
Isophorone
Isosafrole
Kepone
Methapyrilene
Methoxychlor
3-Methylcholanthrene
Methyl methanesulfonate
2-Methylnaphthalene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
o-Nitroaniline (2-Nitroaniline)
m-Nitroaniline (3-Nitroaniline)
p-Nitroaniline (4-Nitroaniline)
Nitrobenzene
o-Nitrophenol (2-Nitrophenol)
p-Nitrophenol (4-Nitrophenol)
N-Nitrosodi-n-butylamine (Di-n-butylNitrosamine)
N-Nitrosodiethylamine (DiethylNitrosamine)
N-Nitrosodimethylamine (DimethylNitrosamine)
N-Nitrosodiphenylamine (DiphenylNitrosamine)
N-Nitrosodipropylamine (N-Nitroso-N-dipropylamine; Di-n-propylNitrosamine)
N-Nitrosomethylethylamine (MethylethylNitrosamine)
N-Nitrosopiperidine
N-Nitrosopyrrolidine
5-Nitro-o-toluidine
Pentachlorobenzene
Pentachloronitrobenzene (PCNB)
Pentachlorophenol
Phenacetin
Phenanthrene
Phenol
p-Phenylenediamine
Polychlorinated biphenyls (PCBs; Aroclors)
Pronamide
Pyrene
Safrole
1,2,4,5-Tetrachlorobenzene
2,3,4,6-Tetrachlorophenol
o-Toluidine
Toxaphene
2,4,5-Trichlorophenol
0,0,0-Triethyl phosphorothioate
sym-Trinitrobenzene

Chlorophenoxy Herbicides:

USEPA Method 8151A

2,4-D (2,4-Dichlorophenoxyacetic acid)
Dinoseb (DNBP; 2-sec-Butyl-4,6-dinitrophenol)

Silvex (2,4,5-Trichlorophenoxypropionic acid; 2,4,5-TP)
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)

Organophosphorus Compounds:

USEPA Method 8141B

Atrazine
Chlorpyrifos
0,0-Diethyl 0-2-pyrazinyl phosphorothioate (Thionazin)
Diazinon
Dimethoate
Disulfoton
Methyl parathion (Parathion methyl)
Parathion
Phorate
Simazine