

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2011-____
FOR
CALAVERAS COUNTY DEPARTMENT OF PUBLIC WORKS
ROCK CREEK SOLID WASTE FACILITY
CLASS II LANDFILL
CLASS II SURFACE IMPOUNDMENT
CONSTRUCTION, OPERATION, CLOSURE, AND POST-CLOSURE MAINTENANCE
CALAVERAS COUNTY

The Discharger shall comply with this Monitoring and Reporting Program, with California Code of Regulations Title 27 Section 20005, et seq. (hereafter Title 27), and with the *Standard Provisions and Reporting Requirements for Waste Discharge Requirements for Nonhazardous Solid Waste Discharges Regulated by Title 27 and/or Subtitle D (CCR Title 27 §20005 et seq. and 40 CFR 258)*, dated April 2000, as ordered by Waste Discharge Requirements Order No. R5-2011-_____.

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 Detection Monitoring Specifications in section G of Waste Discharge Requirements, Order No. R5-2011-_____. All monitoring shall be conducted in accordance with the 2008 or subsequently approved Sample Collection and Analysis Plan, which includes quality assurance/quality control standards.

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 IV. Metals shall be analyzed in accordance with the methods listed in Table 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.

1. Groundwater

The Discharger shall operate and maintain a groundwater detection monitoring system that complies with the applicable provisions of §20415 and §20420 of Title 27 in accordance with an approved Detection Monitoring Program. 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, and the Discharger shall revise the system as needed each time the landfill expands (Phases III and IV).

Groundwater samples shall be collected from the compliance wells, background wells, and any additional wells added as part of the approved groundwater monitoring system. Samples shall be collected and analyzed for the monitoring parameters in accordance with the methods and frequency specified in Table I. The Discharger shall collect, preserve, and transport groundwater samples in accordance with the approved Sample Collection and Analysis Plan.

The groundwater monitoring network shall consist of the following:

<u>Well</u>	<u>Status</u>	<u>Function</u>
U-1	Background	
U-2	Background	
HP-3	Detection	Phase I-A
D-1	Detection/Evaluation	Phase I-A, Phase I-B, Phase II-A
D-4	Detection	Phase I-B, Phase II-A, Phase II-B
D-8	Detection	SI, Phase II-A, Phase II-B
D-9	Detection	SI, Phase I-B, Phase II-A, Phase II-B
D-10	Detection	Phase II-A, Phase II-B
D-11	Background	
D-12	Background/Detection	Phase II-A, Phase II-B, future Phase III

The Discharger shall determine the groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional zone of saturation monitored pursuant to this Monitoring and Reporting Program **quarterly**, and report the results semiannually, including the times of highest and lowest elevations of the water levels in the wells.

Samples collected for the COC monitoring specified in Table I shall be collected and analyzed in accordance with the methods listed in Table VI every five years. Five-year COCs were last monitored in 2007 and shall be monitored again in **2012**.

2. Unsaturated Zone Monitoring

The Discharger shall operate and maintain an unsaturated zone detection monitoring system that complies with the applicable provisions of §20415 and

§20420 of Title 27 in accordance with an approved Detection Monitoring Program. The current unsaturated zone detection monitoring system meets the applicable requirements of Title 27, and the Discharger shall revise the system as needed each time the landfill expands (Phases III and IV).

Unsaturated zone samples shall be collected from the monitoring devices and background monitoring devices of the unsaturated zone monitoring system. The collected samples shall be analyzed for the listed constituents in accordance with the methods and frequency specified in Table II. The Discharger shall collect, preserve, and transport samples in accordance with the quality assurance/quality control standards contained in the approved Sample Collection and Analysis Plan. Samples collected for the COC analyses specified in Table II shall be collected and analyzed in accordance with the methods listed in Table VI every five years, beginning again in **2012**.

The unsaturated zone monitoring network shall consist of background suction lysimeter L-5 and downgradient monitoring lysimeters L-1R and L-2R (suction lysimeters), GPL-1 (pan lysimeter located beneath sump of surface impoundment), SD-1 (subdrain located beneath Phase II-A), SD-2 (subdrain located beneath east sideslope of Phase II-A and beneath Phase II-B), and GP-IIB-1, GP-IIB-2 and GP-IIB-3 (gas probes beneath Phase II-B secondary liner).

The pan lysimeter, GPL-1, shall be checked monthly for liquid and monitoring shall also include the total volume of liquid removed from the system. Unsaturated zone monitoring reports shall be included with the corresponding semiannual groundwater monitoring and shall include an evaluation of potential impacts of the facility on the unsaturated zone and compliance with the Water Quality Protection Standard.

3. Leachate/Seep Monitoring

All leachate collection and removal system sumps shall be inspected monthly for leachate generation. Upon detection of leachate in a previously dry leachate collection and removal system, leachate shall be sampled **immediately** and analyzed for the constituents listed in Table III. Leachate shall then be sampled and analyzed in accordance with the frequencies listed in Table III whenever liquid is present.

Leachate samples shall be collected and analyzed for the listed constituents in accordance with the methods and frequency specified in Table III. The COCs list shall include all constituents listed in Table VI. The quantity of leachate pumped from each sump shall be measured monthly as Leachate Flow Rate (in gallons). Samples shall be collected from the primary and secondary LCRS (Phase II-A and Phase II-B), the LCRS at the point of discharge to the surface impoundment (outfall), surface impoundment (pond) and the surface

impoundment sump.

Leachate that seeps to the surface from a landfill unit shall be sampled and analyzed for the Monitoring Parameters and COCs listed in Table III upon detection. The quantity of leachate shall be *estimated* and reported as Leachate Flow Rate (in gallons/day). Also, refer to Section B.4, below.

All LCRSs shall be tested annually to demonstrate operation in conformance with waste discharge requirements. The results of these tests shall be reported to the Central Valley Water Board and shall include comparisons with earlier tests made under comparable conditions. All visible portions of synthetic liners shall be inspected on a quarterly basis and their condition reported on a semiannual basis.

4. Surface Water Monitoring

The Discharger shall operate a surface water detection monitoring system where appropriate that complies with the applicable provisions of §20415 and §20420 of Title 27. The current surface water detection monitoring system meets the applicable requirements of Title 27.

For surface water detection monitoring, a sample shall be collected at the facility boundary from RO-1 and analyzed for the monitoring parameters in accordance with the methods and frequency specified in Table IV. All surface water monitoring samples shall be collected and analyzed for the COCs specified in Table IV every five years, beginning again in **2012**.

5. Facility Monitoring

a. 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 damage to the drainage control system, groundwater monitoring equipment (including wells, etc.), and shall include the Standard Observations contained in part "c" below. Any necessary construction, maintenance, or repairs shall be completed by **31 October**. By **15 November** of each year, the Discharger shall submit an annual report describing the results of the inspection and the repair measures implemented, including photographs of the problem and the repairs.

b. Storm Events

The Discharger shall inspect all precipitation, diversion, and drainage facilities for damage **within 7 days** following *major storm events*. Necessary repairs shall be completed **within 30 days** of the inspection. The Discharger shall notify Central Valley Water Board staff of any damage within 7 days of discovery and report subsequent repairs within 45 days of completion of the repairs, including photographs of the problem and the repairs.

c. **Standard Observations**

A summary and certification of completion of all **Standard Observations** for the Unit(s), for the perimeter of the Unit, and for the receiving waters. Standard observations for ACTIVE landfill units shall be conducted **weekly** during the wet season (1 October to 30 April) and **monthly** during the dry season (1 May to 30 September). Standard observations for INACTIVE or CLOSED landfill units 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:

1) For the Unit:

- a) Evidence of ponded water at any point on the facility (show affected area on map);
- b) Evidence of odors - presence or absence, characterization, source, and distance of travel from source; and
- c) Evidence of erosion and/or of day-lighted refuse.

2) Along the perimeter of the Unit:

- a) Evidence of liquid leaving or entering the Unit, estimated size of affected area, and flow rate (show affected area on map);
- b) Evidence of odors - presence or absence, characterization, source, and distance of travel from source; and
- c) 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;
- b) Discoloration and turbidity - description of color, source, and size of affected area;

- c) Evidence of odors - presence or absence, characterization, source, and distance of travel from source;
- d) Evidence of water uses - presence of water-associated wildlife;
- e) Flow rate; and
- f) Weather conditions - wind direction and estimated velocity, total precipitation on the day of observation.
- g) The quantity and types of wastes discharged and the locations in the Unit where waste has been placed since submittal of the last such report.

B. REPORTING

Required Monitoring Reports

<u>Report</u>	<u>Due</u>
1. Groundwater Monitoring (Section A.1)	See Table I
2. Annual Monitoring Summary Report (Section B.5)	Annually
3. Unsaturated Zone Monitoring (Section A.2)	See Table II
4. Leachate Monitoring (Section A.3)	See Table III
5. Surface Water Monitoring (Section A.4)	See Table IV
6. Facility Monitoring (Section A.5)	As necessary
7. Response to a Release (Standard Provisions and Reporting Requirements)	As necessary

Reporting Schedule

<u>Sampling Frequency</u>	<u>Sampling Period Ends</u>	<u>Reporting Frequency</u>	<u>Report Date Due</u>
Monthly	Last Day of Month	Semiannually	by Semiannual Schedule
Quarterly	31 March	Semiannually	by Semiannual Schedule
	30 June	Semiannually	by Semiannual Schedule
	30 September	Semiannually	by Semiannual Schedule
	31 December	Semiannually	by Semiannual Schedule
Semiannually	30 June	Semiannually	31 July
	31 December	Semiannually	31 January
Annually	31 December	Annually	31 January
5-Year	31 December	Every 5 Years	31 January

The Discharger shall submit **semiannual** monitoring reports with the data and information as required in this Monitoring and Reporting Program and as required in Order No. R5-2011-____ and the Standard Provisions and Reporting Requirements. 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.

The results of **all monitoring** conducted at the site shall 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.

Reporting Requirements

1. 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 postclosure period.

Such legible records 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.

2. Each semiannual monitoring report shall contain at least the following:

- a) For each monitoring point and background 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 Sampling and Analysis Plan.
- b) A map or aerial photograph showing the locations of observation stations, monitoring points, and background monitoring points.
- c) The groundwater flow rate and direction in the uppermost aquifer and 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.

- 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) Cumulative tabulated monitoring data for all monitoring points and constituents.
 - f) Laboratory statements of results of all analyses evaluating compliance with requirements.
 - g) An evaluation of the effectiveness of the leachate monitoring and control facilities, and of the run-off/run-on control facilities.
3. The Discharger shall submit an **Annual Monitoring Summary Report** to the Central Valley Water Board covering the reporting period of the previous monitoring year. This report shall contain:
- 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, then 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. For any given constituent or parameter, the scale for background plots shall be the same as that used to plot downgradient data. 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 Schueller plot.
 - c) All historical monitoring data collected during the previous 5-years, and for which there are detectable results, including data for the previous year, shall be submitted in tabular form and 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 CCR Section 20420(h)], that facilitates periodic review by the Central Valley Water Board.
 - d) 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.

- e) 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.
 - f) A written summary of the monitoring results, indicating any changes made or observed since the previous annual report.
 - g) An evaluation of the effectiveness of the leachate monitoring/control facilities including the results of the annual testing of leachate collection and removal systems required under VIII.P of the Standard Provisions and Reporting Requirements.
 - h) Updated concentration limits for each monitoring parameter at each monitoring well based on the new data set.
4. 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 Monitoring Parameters and COCs listed in Table III 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.

C. WATER QUALITY PROTECTION STANDARD AND COMPLIANCE PERIOD

1. Water Quality Protection Standard Report

For each waste management unit (Unit), the Water Quality Protection Standard shall consist of all COCs, the concentration limit for each constituent of concern, 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 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 §20405 of Title 27.
- c. Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).

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 proposed the methods for calculating concentration limits in the 27 February 2007 *Water Quality Protection Standard Report*. The limits are calculated using intrawell tolerance limits at 95% confidence and 95% coverage. Both interwell and intrawell analyses are used for well D-1. The concentration limits for the WQPS as reported in the 2010 *First Semiannual Monitoring Report* were as follows:

Well	Analysis Type	pH (Std units)	SC ¹ (umhos/cm)	Chloride (mg/L)	Nitrate/Nitrite as N (mg/L)	Sulfate as SO ₄ (mg/L)	TDS ² (mg/L)
D-1	Interwell	6.3-7.8	983	13	10	225	637
D-1	Intrawell	6.2-7.5	413	14	10	89	289
D-4	Intrawell	6.0-7.2	643	12	2.4	208	432
D-8	Intrawell	6.0-7.3	794	14	2.3	305	664
D-9	Intrawell	6.3-7.8	256	5.9	2.4	19	227
D-10	Intrawell	6.8-7.5	336	12	5.8	42	253
D-11	Intrawell	7.1-8.0	855	117	2.2	49	456
D-12	Intrawell	6.6-7.6	296	6.0	2.7	38	279
HP-3	Intrawell	6.7-7.5	1050	13	2.7	96	692

¹ Specific Conductance

² Total Dissolved Solids

The Water Quality Protection Standard shall be updated annually for each monitoring well using new and historical monitoring data.

2. Constituents of Concern (COCs)

The COCs include all the waste constituents, their reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the Unit. The COCs for all Units at the facility are those listed in Tables I through IV for the specified monitored medium, and Table VI. The Discharger shall monitor all COCs every five years, or more frequently as required in accordance with a Corrective Action Program. The last five-year COC report was submitted to the Central Valley Water Board in the 2007 Annual Monitoring Report, and are due to be sampled again in 2012.

3. Monitoring Parameters

Monitoring parameters are COCs that are the waste constituents, reaction products, hazardous constituents, and physical parameters that provide a reliable indication of a release from a Unit. The monitoring parameters for all Units are those listed in Tables I through V for the specified monitored medium.

4. Concentration Limits

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 §20415 of Title 27(e)(8); or
- b. By an alternate statistical method meeting the requirements of §20415(e)(8)(E) of Title 27.

The methods for calculating concentration limits were included in the 27 February 2007 *Water Quality Protection Standard Report*. The proposed methods were using intrawell upper tolerance limits at 95% confidence and 95% coverage for all wells except D-1 where the interwell upper tolerance limit at 95% confidence and 95% coverage was proposed.

5. Point of Compliance

The point of compliance for the water standard at each 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:

Phase I-A:	L-1R, L-2R, HP-3
Phase I-B:	SD-1, SD-2, D-1
Phase II-A:	SD-1, SD-2, LDS-IIA, D-4, D-10
Phase II-B:	GP-IIB-1, GP-IIB-2, and GP-IIB-3, D-10, D-4, D-12
Phase III (future cell):	D-12
Surface Impoundment	GPL-1, D-8, D-9

6. Compliance Period

The compliance period for each 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 Unit. The compliance period shall begin anew each time the Discharger initiates an evaluation monitoring program.

7. 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 detection monitoring shall be the following (plus other monitoring points as :

Surface Water:	RO-1
Groundwater:	U-1, U-2, HP-3, D-1, D-4, D-8, D-9, D-10, D-11, D-12 (and other monitoring wells when constructed)
Vadose Zone:	L-1R, L-2R, L-5, GPL-1, SD-1, SD-2, GP-IIB-1, GP-IIB-2 and GP-IIB-3 (and other lysimeters when constructed)
Leachate:	Outfall, Pond, Sump, each secondary LCRS beneath Phase II-A and Phase II-B

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.

MONITORING AND REPORTING PROGRAM NO. R5-2011-_____
CALAVERAS COUNTY DEPARTMENT OF PUBLIC WORKS
ROCK CREEK SOLID WASTE FACILITY
CLASS II LANDFILL
CLASS II SURFACE IMPOUNDMENT
CALAVERAS COUNTY

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

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

(Date)

WLB

TABLE I
GROUNDWATER DETECTION MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Field Parameters			
Groundwater Elevation	Ft. & 100ths, M.S.L.	Quarterly	Semiannual
Temperature	°C	Semiannual	Semiannual
Electrical Conductivity	µmhos/cm	Semiannual	Semiannual
pH	pH units	Semiannual	Semiannual
Turbidity	Turbidity units	Semiannual	Semiannual
Monitoring Parameters			
Total Dissolved Solids (TDS)	mg/L	Semiannual	Semiannual
Chloride	mg/L	Semiannual	Semiannual
Carbonate	mg/L	Semiannual	Semiannual
Bicarbonate	mg/L	Semiannual	Semiannual
Nitrate - Nitrogen	mg/L	Semiannual	Semiannual
Sulfate	mg/L	Semiannual	Semiannual
Calcium	mg/L	Semiannual	Semiannual
Magnesium	mg/L	Semiannual	Semiannual
Potassium	mg/L	Semiannual	Semiannual
Sodium	mg/L	Semiannual	Semiannual
Volatile Organic Compounds (USEPA Method 8260, see Table V)	µg/L	Semiannual	Semiannual
Constituents of Concern (see Table VI)			
Total Organic Carbon	mg/L	5 years	31 January 2013
Inorganics (dissolved)	mg/L	5 years	and every 5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	µg/L	5 years	thereafter
Semi-Volatile Organic Compounds (USEPA Method 8270C)	µg/L	5 years	" "
Chlorophenoxy Herbicides (USEPA Method 8151A)	µg/L	5 years	" "
Organophosphorus Compounds (USEPA Method 8141A)	µg/L	5 years	" "

TABLE II
UNSATURATED ZONE DETECTION MONITORING PROGRAM

SOIL-PORE GAS

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Monitoring Parameters			
Volatile Organic Compounds (USEPA Method TO-14)	µg/cm ³	Annual	Annual
Methane	%	Semiannual	Semiannual

PAN LYSIMETERS (or other vadose zone monitoring device)

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Field Parameters			
Electrical Conductivity	µmhos/cm	Semiannual	Semiannual
pH	pH units	Semiannual	Semiannual
Volume of liquid removed	gallons	Monthly	Semiannual

Monitoring Parameters

Total Dissolved Solids (TDS)	mg/L	Semiannual	Semiannual
Chloride	mg/L	Semiannual	Semiannual
Carbonate	mg/L	Semiannual	Semiannual
Bicarbonate	mg/L	Semiannual	Semiannual
Nitrate - Nitrogen	mg/L	Semiannual	Semiannual
Sulfate	mg/L	Semiannual	Semiannual
Calcium	mg/L	Semiannual	Semiannual
Magnesium	mg/L	Semiannual	Semiannual
Potassium	mg/L	Semiannual	Semiannual
Sodium	mg/L	Semiannual	Semiannual
Volatile Organic Compounds (USEPA Method 8260B, see Table V)	µg/L	Semiannual	Semiannual

Constituents of Concern (see Table VI)

Total Organic Carbon	mg/L	5 years	31 January 2013
Inorganics (dissolved)	mg/L	5 years	and every 5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	µg/L	5 years	thereafter
Semi-Volatile Organic Compounds (USEPA Method 8270C)	µg/L	5 years	" "
Chlorophenoxy Herbicides (USEPA Method 8151A)	µg/L	5 years	" "
Organophosphorus Compounds (USEPA Method 8141A)	µg/L	5 years	" "

TABLE III
LEACHATE/SEEP MONITORING PROGRAM AND LCRS TESTING

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Field Parameters			
Total Flow	Gallons	Monthly	Semiannual
Flow Rate	Gallons/Day	Monthly	Semiannual
Electrical Conductivity	µmhos/cm	Monthly	Semiannual
pH	pH units	Monthly	Semiannual
Monitoring Parameters			
Total Dissolved Solids (TDS)	mg/L	Annually	Annually
Chloride	mg/L	Annually	Annually
Carbonate	mg/L	Annually	Annually
Bicarbonate	mg/L	Annually	Annually
Nitrate - Nitrogen	mg/L	Annually	Annually
Sulfate	mg/L	Annually	Annually
Calcium	mg/L	Annually	Annually
Magnesium	mg/L	Annually	Annually
Potassium	mg/L	Annually	Annually
Sodium	mg/L	Annually	Annually
Volatile Organic Compounds (USEPA Method 8260B, see Table V)	µg/L	Annually	Annually
Constituents of Concern (see Table VI)			
Total Organic Carbon	mg/L	5 years	31 January 2013
Inorganics (dissolved)	mg/L	5 years	and every 5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	µg/L	5 years	thereafter
Semi-Volatile Organic Compounds (USEPA Method 8270C)	µg/L	5 years	" "
Chlorophenoxy Herbicides (USEPA Method 8151A)	µg/L	5 years	" "
Organophosphorus Compounds (USEPA Method 8141A)	µg/L	5 years	" "
LCRS Testing	---	Annually	Annually

TABLE IV
SURFACE WATER DETECTION MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Field Parameters			
Temperature	°C	Semiannual	Semiannual
Electrical Conductivity	µmhos/cm	Semiannual	Semiannual
pH	pH units	Semiannual	Semiannual
Turbidity	Turbidity units	Semiannual	Semiannual
Monitoring Parameters			
Total Dissolved Solids (TDS)	mg/L	Semiannual	Semiannual
Carbonate	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
Calcium	mg/L	Semiannual	Semiannual
Magnesium	mg/L	Semiannual	Semiannual
Potassium	mg/L	Semiannual	Semiannual
Sodium	mg/L	Semiannual	Semiannual
Volatile Organic Compounds (USEPA Method 8260B, see Table V)	µg/L	Semiannual	Semiannual
Constituents of Concern (see Table VI)			
Total Organic Carbon	mg/L	5 years	31 January 2013
Inorganics (dissolved)	mg/L	5 years	and every 5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	µg/L	5 years	thereafter
Semi-Volatile Organic Compounds (USEPA Method 8270C)	µg/L	5 years	" "
Chlorophenoxy Herbicides (USEPA Method 8151A)	µg/L	5 years	" "
Organophosphorus Compounds (USEPA Method 8141A)	µg/L	5 years	" "

TABLE V

MONITORING PARAMETERS FOR DETECTION MONITORING

Surrogates for Metallic Constituents:

pH
Total Dissolved Solids
Electrical Conductivity
Chloride
Sulfate
Nitrate nitrogen

Constituents included in VOC:

USEPA Method 8260B

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

TABLE V
MONITORING PARAMETERS FOR DETECTION MONITORING

Continued

Hexachloroethane
Methyl bromide (Bromomethene)
Methyl chloride (Chloromethane)
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

TABLE VI
CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

<u>Inorganics (dissolved):</u>	<u>USEPA Method</u>
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	9010B
Sulfide	9030B

Volatile Organic Compounds:

USEPA Method 8260

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)

TABLE VI

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Continued

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, I-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
Hexachloroethane
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

TABLE VI

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Continued

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)

Semi-Volatile Organic Compounds:

USEPA Method 8270 - base, neutral, & acid extractables

Acenaphthene
Acenaphthylene
Acetophenone
2-Acetylaminofluorene (2-AAF)
Aldrin
4-Aminobiphenyl
Anthracene
Benzo[a]anthracene (Benzanthracene)
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

TABLE VI

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Continued

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
Hexachloropropene
Indeno(1,2,3-c,d)pyrene

TABLE VI

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Continued

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

TABLE VI

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Continued

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 8141A

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