California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM
ORDER NO. R1-2011-0009

FOR

HUMBOLDT REDWOOD COMPANY, LLC
(FORMERLY PACIFIC LUMBER COMPANY)
HELY CREEK CLASS III SOLID WASTE DISPOSAL SITE

Humboldt County

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The Discharger shall maintain water quality monitoring systems that are appropriate for detection monitoring and corrective action, and that comply with Subchapter 3, Chapter 3, Subdivision 1, Division 2, Title 27, CCR, and any other applicable provisions therein.

Compliance with this Monitoring and Reporting Program (MRP), and with the companion Standard Provisions and Reporting Requirements, is ordered by Waste Discharge Requirements (WDRs) Order No. R1-2011-0009, and under the authority of California Water Code Section 13267(b). Failure to comply with this MRP, or with the General Monitoring and Reporting Requirements, constitutes non-compliance with the WDRs and with Division 7 of the California Water Code, which can result in the imposition of civil monetary liability.

I. REPORTING

The Discharger shall report monitoring data and information as required in this Monitoring and Reporting Program, and as required in the General Monitoring and Reporting Requirements. The Discharger shall submit one paper copy of each monitoring report and a copy of the monitoring report in an electronic format, with transmittal letter, text, tables, figures, laboratory analytical data, and appendices in PDF format (one PDF for the entire report). The Discharger is required to upload the full monitoring report into Geotracker, as stipulated by California State law. The paper copy shall have a body text size of no less than 11 point type and no text smaller than 8 point type. Reports which do not comply with the required format will be rejected, and the Discharger shall be deemed to be in noncompliance with the WDRs. Monitoring reports must include, but should not be limited to the following:

1. Letter of Transmittal:
   A letter transmitting the essential points must accompany each report. The letter must include a discussion of violations caused by the Landfill since submittal of the last such report. If the Discharger has not observed any new violations since the last submittal, the Discharger must state this in the

transmittal letter. Both the monitoring report and the transmittal letter must be signed as follows: for private facilities, a principal executive officer at the level of vice president; for public agencies, the director of the agency. Upon Water Board Executive Officer approval, the cited signature can be by a California Registered Civil Engineer, or Certified Engineering Geologist, or Professional Geologist who has been given signing authority by the cited signatories. The transmittal letter must contain a statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true, complete, and correct.

2. Compliance Summary:
The summary shall contain at least a narrative discussion of the monitoring results, including a discussion of compliance with concentration limits, any water quality violations, or other monitoring results of potential significance to water quality and describe any corrective actions taken.

3. Tabular Presentation of Data:
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 as to illustrate clearly the compliance with waste discharge requirements or the lack thereof.

4. Graphical Presentation of Data (Annual Report):
For each Monitoring Point in each medium, submit, in graphical format, the complete history of laboratory analytical data. Graphs must effectively illustrate trends and/or variations in the laboratory analytical data. Each graph must plot a single constituent concentration over time at one (for intra-well comparison) or more (for inter-well comparisons) Monitoring Points in a single medium. Where applicable, include concentration limits along with graphs of constituent concentrations. When multiple samples are taken, graphs must plot each datum, rather than plotting mean values. The Discharger must also determine horizontal gradients, groundwater flow rate, and flow direction for each respective groundwater body. Present this data on a figure that depicts groundwater contours and flow directions as well as gradient. Include one figure for each water level measuring period in the monitoring report.

5. Corrective Action Summary:
If applicable, discuss significant aspects of any corrective action measures conducted during the Monitoring Period and the status of any ongoing corrective action efforts, including constituent trend analysis.

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6. Laboratory Results:
   Summarize and report laboratory results and statements demonstrating compliance with **Part II**. Include results of analyses performed at the Site that are outside of the requirements of this Monitoring and Reporting Program.

7. Sampling Summary:
   a. For each Monitoring Point addressed by the report, a description of: 1) the method and time of water level measurement, 2) the method of purging and purge rate and well recovery time, and 3) field parameter readings.
   b. For each Monitoring Point addressed by the report, a description of the type of sampling device used, its placement for sampling, and a description of the sampling procedure (number of samples, field blanks, travel blanks, and duplicate samples taken; the date and time of sampling; the name and qualification of the person actually taking the samples; and description of any anomalies).

8. Leachate Detection:
   A summary of results from leachate detection monitoring and sampling (if necessary) shall be reported in the monitoring report.

9. Standard Observations:
   A summary of Standard Observations, including whether storm water drainage ditches and sedimentation ponds contain liquids; whether there are any leachate seeps present, including estimated of seep size and flow; presence of odors; evidence of ponding; evidence of erosion; inspection of storm water discharge locations for evidence of non-storm water discharges; evidence of floating and suspended material or discoloration or turbidity in the receiving waters; presence of odors in the receiving waters; and weather conditions during the observations and the precipitation during the five days preceding the observations, which were made during the Monitoring Period.

10. Map(s):
    The base map for the Monitoring Report must consist of a current aerial photograph or include relative topographical features, along with Monitoring Points and features of the Site.

A. REQUIRED REPORTS

1. Detection Monitoring Report

Detection Monitoring Reports (DMRs) shall be prepared and submitted to the Regional Water Board semi-annually by the 15th of the month following the sampling period. Groundwater sampling for existing wells shall occur in

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October and April of each year. New wells shall be sampled quarterly in January, April, July, and October the first two years and then monitored semi-annually on the same schedule as the existing wells thereafter. The reports shall include the results of all monitoring programs listed herein. The established monitoring and reporting period is as follows:

SEMI-ANNUAL	**PERIOD NO.**	**REPORTING DATE**
January through June	1	July 15
July through December	2 (Annual Report date)	January 15

2. **Annual Report**

An Annual Report, which summarizes the monitoring results for the prior four quarters, shall be submitted to the Regional Water Board by January 15, annually. The annual report may be combined with the DMR for that semi-annual period. The report shall contain both tabular and graphical summaries of the detection and corrective action monitoring data and a discussion of the progress toward re-establishment of compliance with WDRs and the Water Quality Protection Standard (WQPS). The Annual Report shall include a map showing any areas of differential settlement, highlighting areas of repeat or severe differential settlement. This map shall be made by or under the direction of a professional civil engineer or registered geologist.

3. **Water Quality Protection Standard Report**

As noted above, any changes to the water quality protection standard are to be included in the Annual Report.

4. **Annual Erosion Control Report**

By October 15, annually, the Discharger shall submit a report to the Executive Officer describing any measures taken to comply with erosion control requirements. This shall include a description of any erosion control measures implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities. The Executive Officer may delete the requirement for submitting annual erosion control reports upon finding that no erosion control work is necessary prior to the return of winter rains.

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5. **Constituents of Concern (COCs)**

The results of COC monitoring shall be submitted with, or reported in, the DMR for the period the sampling took place.

6. **Notification of Release and Re-test**

For any WMU, if the results of a detection monitoring program shows that there is a measurably significant increase in an indicator parameter or waste constituents over the WQPS at or beyond the points of compliance (i.e., measurably significant evidence of an exceedence or release), the Discharger shall:

a. immediately notify the Regional Water Board by telephone or fax of the exceedence,
b. within seven days of the initial findings, follow up with written notification (or acknowledgment of the Regional Water Board's finding),
c. within 30 days of the initial finding, re-sample for the constituent(s) or parameter(s) at the point where the standard was exceeded, and
d. within 60 days of the initial finding, submit the results of the re-sampling and statistical analysis, indicating whether or not an exceedence or release was confirmed by the re-test.

7. **Detection of a Release**

Immediately following detection of a release, or after completion of the retest, the Dischargers:

a. Shall immediately sample all Monitoring Points in the affected medium at the WMUs and determine the concentration of all COCs. [Section 20420(k)(1), Title 27, CCR]

b. Within 90 days of determining measurably significant evidence of release, submit an amended ROWD to establish an evaluation monitoring program, in accordance with Section 20420(k)(5), Title 27, CCR.

c. Within 180 days of verifying measurably significant evidence of a release from a WMU, submit an engineering feasibility study for a corrective action program. The corrective action program shall, at a minimum, meet the requirements of Section 20430, Title 27, CCR. [Section 20420(k)(6), Title 27, CCR]

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9. **Responding to a Release Discovery**

Upon verifying a measurably significant evidence of a release from a WMU according to Section 20420(j) of Title 27 and Section I.A.7 and I.A.8 of this MRP, the Discharger shall follow the procedures and timeline described in Section 20420(k) of Title 27.

10. **Clean Closure Verification Report**

The clean closure verification report shall be submitted within 60 days of the completion of the waste management unit by sorting and spreading the soil amendment at the designated locations (Attachment B). The clean closure verification report will be prepared and certified by the Construction Quality Assurance (CQA) Officer performing the third party verification of the clean closure. The CQA officer must be a registered civil engineer or a certified engineering geologist licensed in the State of California. The report must be submitted under penalty of perjury to the Regional Water Board and other appropriate agencies, under penalty of perjury, in accordance with Sections 21090(f) and 21810(e) Title 27, CCR. The report, at a minimum, will include the certificate of closure; a description of any required postclosure maintenance activities; daily construction logs; waste manifests; documentation of volume and placement of soil amendment; material acceptance reports; photo logs of closure activities; final CQA documentation; laboratory testing results; field testing results; discussion of verification sampling results; and an as-built topographic map of the spreading areas, prepared at a scale of one-inch to 100 feet, with a contour interval of five feet.

II. MONITORING PROGRAMS

A. ROUTINE MAINTENANCE

The Site shall be inspected monthly during the period of October through May and once during the period of June through September. At a minimum, the integrity of the spreading areas, drainage structures, and any potential erosion areas shall be inspected. The inspections shall also meet the requirements of the postclosure inspections as described in the Work Plan for the Clean Closure Soil Amendment Project. Inspection logs, problem areas, special occurrences, and corrective actions taken shall be included in the semi-annual DMRs**.** The Discharger may request a decrease in inspection frequency after the site has stabilized.

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B. CONSTITUENTS OF CONCERN

Except as otherwise indicated in this Order, the Discharger shall monitor each media of the Site for applicable Constituents of Concern (per State Water Resources Control Board Resolution 93-62). The monitoring locations, analytical methods, and frequency of analysis are as follows:

1. **Monitoring Locations**

   a. Leachate – If a leachate seep is discovered it shall be sampled for Constituents of Concern (COCs)

   b. Groundwater – Downgradient monitoring wells MW-2, MW-3, MW-4 (being destroyed during closure), MW-6, MW-7(secondary spreading area), and upgradient monitoring wells MW -1 and MW-5.

   c. Unsaturated Zone – Piezometers PZ-6, PZ-7, PZ-8, PZ-9, PZ-10 and PZ-11 at the primary spreading area (the existing site) and PZ-12, PZ-13, and PZ-14 at the secondary spreading area. If saturation is persistent (two consecutive months), the Discharger shall sample a piezometer in each affected spreading area.

2. **Monitoring Schedule**

TABLE II. A.
CONSTITUENTS OF CONCERN MONITORING

Parameter	Units	Frequency
Bicarbonate Alkalinity	mg/l $CaCO_3$	Every 5 years
Alkalinity	mg/l $CaCO_3$	Every 5 years
Hardness	mg/l $CaCO_3$	Every 5 years
Biological Oxygen Demand	mg/l	Every 5 years
Fluoride	mg/l	Every 5 years
Sulfate	mg/l	Every 5 years
Magnesium	mg/l	Every 5 years
Nitrate	mg/l	Every 5 years
Tannins and Lignins	mg/l	Every 5 years

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Parameter	Units	Frequency
ICAP Metals (EPA 200 Series – 23 metals)	mg/l	Every 5 years
Volatile Organic Compounds (EPA Method 601/602)	ug/l	Every 5 years
Total Petroleum Hydrocarbons (Gas, Diesel, and Motor Oil) (use silica gel clean-up)	ug/l include chromatographs	Every 5 years

Groundwater monitoring wells shall be sampled for COCs in the fourth quarter of 2011 (after new wells are installed), second quarter of 2016, and every five years thereafter. COC sampling shall also include parameters from the semi-annual monitoring under Table III C.

C. LEACHATE MONITORING

There are not established leachate monitoring locations. At least once a quarter, as well as the next weekday following each large storm event (greater than one inch of rain in 24 hours), the Discharger shall observe the spreading areas to determine if leachate seeps have developed. If leachate is observed, the flow shall be estimated and a representative grab sample shall be collected and analyzed for the COCs, as described in Table. II A. If leachate is not observed, the Discharger shall so note in the monitoring reports.

D. GROUNDWATER ELEVATION MONITORING

Groundwater elevations taken prior to purging the well and sampling for Monitoring Parameters shall be used to fulfill the groundwater gradient/direction analyses required. For each monitored groundwater body, the Discharger shall measure the water level in each well and piezometer and shall determine groundwater gradient and direction at least quarterly, including the times of expected highest and lowest elevations of the water level for the respective groundwater body. Groundwater elevations for all upgradient and downgradient wells for a given groundwater body shall be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater gradient and direction. This information shall be included in the monitoring reports.

E. VERIFICATION MONITORING

Verification monitoring for clean closure will include monitoring of both the soil amendment created by clean closure of the WMU at Hely Creek SWDS and sampling of the native soils beneath the current WMU as defined by the 1994 waste footprint. Additional sampling will be required for any materials suspected of contamination to determine proper off-site disposal and to verify that removal had

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been completed. The monitoring locations, analytical methods, and frequency of analysis are as follows:

1. Monitoring Locations

a. Soil Amendment – A minimum of one 4 point composite sample per 5,000 cubic yards of soil amendment spread will be taken.

b. Natural Soil Beneath WMU – A minimum of eight random soil samples will be taken from the native soil beneath the WMU as defined by the 1994 waste footprint once the waste has been removed. Additional samples will be taken in areas with discoloration or odors.

c. Suspected Contaminated Waste – Additional samples of any suspect material will be taken at levels required by the legal point of disposal.

2. Monitoring Schedule

TABLE II. B.
VERIFICATION MONITORING

Parameter	Units
Tannins and Lignins	mg/l
CAM 17 Metals (TTLC)	mg/l
Volatile Organic Compounds (EPA Method 8260)	mg/kg
Total Petroleum Hydrocarbons (Gas, Diesel, and Motor Oil) (use silica gel clean-up)	mg/kg include chromatographs

III. DETECTION MONITORING

A. GENERAL

The Discharger shall perform Detection Monitoring (per Section 20420, Title 27, CCR) on all media potentially affected by a release, including surface water and groundwater, and the unsaturated zone. For any given monitored medium, a sufficient number of samples shall be taken from all Monitoring Points and Background Monitoring Points to satisfy the data analysis requirements for a given Reporting Period, and samples shall be collected in a manner that ensures sample independence to the greatest extent feasible.

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The Discharger shall use a Regional Water Board-approved statistical (or non-statistical) procedure to determine whether there has been a measurably significant increase in a constituent over the water quality protection standard, as set forth in Section 20415(e)(5) of Title 27.

B. UNSATURATED ZONE

1. Monitoring Locations

a. Unsaturated Zone – Piezometers PZ-6, PZ-7, PZ-8, PZ-9, PZ-10 and PZ-11 at the primary spreading area (the existing site) and PZ-12, PZ-13, and PZ-14 at the secondary spreading area. The unsaturated zone monitoring points for Hely Creek SWDS are shown in Attachment B.

2. Monitoring Schedule

The Discharger currently monitors the unsaturated zone at the Site using piezometers P-1 and P-2. P-1 and P-2 will be destroyed during closure and nine new piezometers, PZ-6 through PZ-14 will be installed during the 2011 construction season. Monitoring for saturation will be conducted at each piezometer according to schedule. If saturation is persistent (two consecutive months), the Discharger shall sample a piezometer in each affected spreading area for the COCs per Table II A. The most saturated piezometer from each spreading area shall be selected for sampling.

The results shall be reported to the Regional Water Board in the semi-annual DMRs.

TABLE III.A.
UNSATURATED ZONE DETECTION MONITORING PROGRAM

Parameter	Units	Frequency
Field Parameters		
Groundwater Elevations	Ft./tenths TOC	wet season - monthly, dry season - once, July
Laboratory Monitoring Parameters		
COCs per Table II A	various	as necessary

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C. SURFACE WATER

1. Monitoring Locations

a. Surface Water – Surface water is sampled at S-1 (upgradient) and S-2 (downgradient) along Hely Creek. The surface water monitoring points for Hely Creek SWDS are shown in Attachment B.

2. Monitoring Schedule

TABLE III.B.
SURFACE WATER DETECTION MONITORING PROGRAM

Parameter	Units	Frequency
Field Parameters		
pH	pH units	December and March*
Specific Conductance	Mhos/cm	December and March*
Temperature	°C	December and March*
Turbidity	Turbidity units	December and March*
Monitoring Parameters		
Parameter	**Units**	**Frequency**
Chemical Oxygen Demand	mg/l	December and March*
Settleable Solids	mg/l	December and March*

* Sampling shall occur immediately after a storm event.

D. GROUNDWATER

The groundwater surface elevation (in feet and hundredths, M.S.L.) in all wells and piezometers shall be measured on a quarterly basis and used to determine the velocity and direction of groundwater flow. The amount of siltation in all wells and piezometers shall be measured on an annual basis and shall be used to make recommendations for maintenance. Additional monitoring wells shall be added to the program as needed.

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1. **Monitoring Locations**

The Site currently has five groundwater monitoring wells, MW-1 through MW-5. During the clean closure, MW-4 will need to be destroyed. Two new wells, MW-6 (at the Site) and MW-7 (at the secondary spreading area), will be constructed immediately following the clean closure construction. MW-4 shall be monitored until it has been destroyed.

The groundwater monitoring points for Hely Creek SWDS, shown in Attachment B, are as follows:

Background Monitoring Wells	MW-1 and MW-5
Downgradient Monitoring Wells:	MW-2, MW-3, MW-4 (being destroyed during closure), MW-6, and MW-7
Points of Compliance Wells:	MW-2, MW-3, MW-4 (being destroyed during closure), MW-6, and MW-7

Water levels shall be monitored quarterly, in compliance with Title 27, CCR. Any additional monitoring wells constructed at the site shall be added to the monitoring network. Samples shall be collected from all installed wells at the frequency and for the parameters specified in Table III.B.

2. **Monitoring Schedule**

The analytes and frequency of groundwater monitoring is as follows:

TABLE III.C.
GROUNDWATER DETECTION MONITORING PROGRAM

Parameter	Units	Frequency
Field Parameters		
pH	pH units	Semi-Annually
Specific Conductance	Mhos/cm	Semi-Annually
Temperature	^{o}C	Semi-Annually
Groundwater Elevations	Ft./tenths TOC	quarterly

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Parameter	Units	Frequency
Turbidity	Turbidity units	Semi-Annually
Siltation in Well Casing	Ft./tenths	Annually

Monitoring Parameters

Parameter	Units	Frequency
Chemical Oxygen Demand	mg/l	Semi-Annually
Potassium	mg/l	Semi-Annually
Calcium	mg/l	Semi-Annually
Total Dissolved Solids (TDS)	mg/l	Semi-Annually
Chloride	mg/l	Semi-Annually

Field parameters of pH, specific conductance, and turbidity may substitute measurement by laboratory analyses.

IV. WATER QUALITY PROTECTION STANDARD

The Water Quality Protection Standard (Standard) consists of the following elements:

a. Constituents of Concern;
b. Concentration Limits;
c. Monitoring Points;
d. Points of Compliance; and
e. Compliance Period.

Each of these is described as follows:

A. Constituents of Concern

The Constituents of Concern (COCs) required under Section 20395 of Title 27 shall include all constituent groups identified in Table II.A. The Discharger shall monitor all COCs every five years or more frequently, as required under the detection monitoring program.

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B. Concentration Limits

The Concentration Limit for any given Constituent of Concern or Monitoring Parameter in a given monitored medium (i.e., the uppermost aquifer) at the Site shall be as follows, and shall be used as the basis of comparison with data from the Monitoring Points in that monitored medium:

a. The background value established in the WDRs by the Regional Water Board for that constituent and medium;

b. The constituent's background value, from the Background Monitoring Points for that monitored medium. Either:

   1. The mean (or median, as appropriate) and standard deviation (or other measure of central tendency, as appropriate) of the constituent's background data; or

   2. The constituent's MDL, in cases where less than 10 percent of the background samples exceed the constituent's MDL; or

c. A concentration limit greater than background, as approved by the Regional Water Board for use during or after corrective action.

C. Monitoring Points

1. **Unsaturated Zone -** As listed in Section III.B.1.

2. **Surface Water -** As listed in Section III.C.1.

3. **Groundwater -** As listed in Section III.D.1.

D. Points of Compliance

The point(s) of compliance at each groundwater monitoring point is the vertical surface located at the downgradient limit of the waste extends through the uppermost aquifer underlying the Site. The wells representing the point of compliance for the Site shall be MW-2, MW-3, MW-4 (being destroyed during closure), MW-6, and MW-7. The point of compliance for surface water is S-2.

E. Compliance Period

The Compliance period is the number of years equal to the active life of the landfill plus the closure period. Each time the Standard is exceeded (i.e., a release is

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discovered), the Site begins a Compliance Period on the date the Regional Water Board directs the Discharger to begin an Evaluation Monitoring Program. If the Discharger's Corrective Action Program has not achieved compliance with the Standard by the scheduled end of the Compliance Period, the Compliance Period is automatically extended until the landfill has been in continuous compliance for at least three consecutive years.

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

Ordered by: _____

Catherine Kuhlman
Executive Officer

January 27, 2011

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