

Central Valley Regional Water Quality Control Board

8 March 2016

April Ingram
Louisiana-Pacific Corporation
414 Union Street, Suite 2000
Nashville, TN 37219

NOTICE OF APPLICABILITY, GENERAL ORDER NO. R5-2015-0012, PILOT STUDY FOR IN-SITU GROUNDWATER REMEDIATION, LOUISIANA-PACIFIC ELK CREEK SAW MILL, ELK CREEK, GLENN COUNTY

Louisiana-Pacific Corporation (Discharger) submitted a completed Notice of Intent (NOI), dated 16 November 2015, requesting coverage under General Order No. R5-2015-0012, General Waste Discharge Requirements for In-situ Groundwater Remediation and Discharge of Treated Groundwater to Land. Based on information in the submittal, it is our determination that this project meets the required conditions to be approved under Order No. 2015-0012. All of the requirements contained in the general order are applicable to your project. You are assigned Order No. R5-2015-0012-016.

Project Location:

The project is in Glenn County, Township 20N, Range 6W, Section 16, Mount Diablo Baseline & Meridian. Assessor's Parcel No. 022-090-046-0; Latitude 39°35'15.03"N; Longitude 122°32'26.87"W.

Project Description:

The primary objective of this project is to conduct a pilot study to test the efficacy of using in-situ chemical oxidation (ISCO) to treat pentachlorophenol (PCP) and tetrachlorophenol (TCP) in groundwater at the former Elk Creek Saw Mill. The project will consist of application or injection of a sodium persulfate and sodium hydroxide solution into the groundwater to oxidize the PCP and TCP which were used as a fungicide for wood treatment during the period the saw mill operated.

The Discharger submitted a 17 November 2015 *Pilot Study Work Plan (Work Plan)* with the NOI and a Notice of Intent to be covered under General Order No. R5-2015-0012 for the associated activities. Addendums to the Work Plan were also submitted that were dated 9 December 2015 and 27 January 2016. The pilot study consists of placing a solution of sodium persulfate and sodium hydroxide into three injection wells (IW-1, IW-2, and IW-3) to oxidize the PCP and TCP. The solution will be placed in each well by flooding the well casing and allowing it to gravity feed into the well. This will be performed at least three times in each well, and injection of the solution under pressure may be performed if necessary to deliver the solution into the formation.

The Discharger performed bench scale testing to determine the optimal solution of sodium persulfate and sodium hydroxide to use and was able to achieve a 91% reduction in the PCP concentration in a soil/groundwater mixture that was collected from the site. Before, during, and after the above-proposed pilot study, the groundwater will be monitored to determine the efficacy of the remediation and to monitor

for secondary reaction byproducts. A Contingency Plan, as outlined below, will be implemented if monitoring indicates exceedance of water quality limitations or background levels in the downgradient compliance well.

No comments were received on the draft Notice of Applicability and MRP during the 30-day public comment period ending on 4 March 2016.

Monitoring and Reporting Program:

As part of the Order, the Discharger is required to perform groundwater monitoring and reporting in accordance with the attached Monitoring and Reporting Program (MRP) to confirm the extent of the treatment area and efficacy of the treatment, and to verify that no adverse groundwater impacts occur due to ISCO treatment. Baseline background data will be collected from the background well (MW-9) and combined with historical data to establish compliance limitations as described in the MRP. Compliance well (MW-10) will be monitored for exceedances of the water quality limitations or 20% greater than background levels.

Contingency Plan:

The General Order requires a contingency plan for corrective actions should water quality exceed the requirements of the Order at the compliance wells. The General Order prohibits concentrations of constituents by more than 20% greater than their respective background levels, or exceedances of water quality limits at a compliance well.

Baseline concentrations or values of sodium, chloride, sulfate, TDS, hexavalent chromium, and pH will be determined prior to the injections following the procedures specified in the attached MRP. If there is an exceedance at the downgradient compliance well, a confirmation sample will be collected within 10 days of learning of the exceedance. If the exceedance is confirmed, the Central Valley Water Board shall be notified in writing within 10 days.

If an exceedance is confirmed in the downgradient compliance well, a corrective action work plan shall be submitted within 30 days to the Central Valley Water Board for approval. The work plan shall include one or more of the following:

- Increase monitoring frequency;
- Expand the monitoring network;
- Inject a reducing compound to reduce dissolved metals mobilized by ISCO; or
- Induce hydraulic control of amendments in the target treatment area.

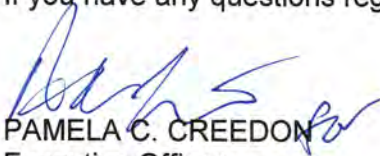
All contingency measures in the work plan shall be fully implemented within six months of the confirmation of an exceedance in a downgradient compliance well, following approval by the Executive Officer.

Specific Requirements:

1. The project will be operated in accordance with the requirements contained in the General Order and in accordance with the information submitted in the completed Notice of Intent.

2. The required annual fee (as specified in the annual billing you will receive from the State Water Resources Control Board) shall be submitted until this Notice of Applicability is officially revoked.
3. Injection of materials other than water, sodium persulfate, and sodium hydroxide into the subsurface is prohibited, other than materials to reduce any metals that are mobilized during the ISCO project in accordance with an approved work plan as outlined in the above Contingency Plan.
4. Failure to abide by the conditions of the General Order could result in an enforcement action as authorized by provisions of the California Water Code.
5. The Discharger shall comply with the attached Monitoring and Reporting Program, Order No. R5-2015-0012-016, and any revisions thereto as ordered by the Executive Officer.

If you have any questions regarding this matter, please call Bill Brattain at (916) 464-4622.



PAMELA C. CREEDON
Executive Officer

Attachment

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2015-0012-016

FOR
IN-SITU GROUNDWATER REMEDIATION
AND DISCHARGE OF TREATED GROUNDWATER TO LAND

LOUISIANA-PACIFIC CORPORATION
FORMER ELK CREEK SAW MILL
GLENN COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring of a pilot scale groundwater remediation project for the Former Elk Creek Sawmill, Elk Creek, Glenn County, California. This MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. As appropriate, California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) staff shall approve specific sample station locations prior to implementation of sampling activities.

All samples should be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

GROUNDWATER MONITORING

As shown on Figure 1, there are 9 monitoring wells and 2 injection wells associated with the area of the site impacted by pentachlorophenol (PCP) and tetrachlorophenol (TCP). The in-situ treatment will be performed in three injection wells: IW-1, IW-2, and IW-3. The groundwater monitoring program for these wells and any treatment system wells installed subsequent to the issuance of this MRP shall follow the schedule below. The volume of extracted groundwater, if applicable, shall also be provided in monitoring reports. Sample collection and analysis shall follow standard EPA protocol.

The monitoring wells and injection wells shall be sampled according to the schedule in Table 1 and the samples analyzed by the methods in Table 2, as follows:

Table 1: Sampling Frequency and Constituent Suite			
Well Number¹	Constituent²	Frequency³	Monitoring Objective⁴
MW-10	PCP TCP Sodium Chloride	Quarterly	Compliance ⁴

Table 1: Sampling Frequency and Constituent Suite

Well Number ¹	Constituent ²	Frequency ³	Monitoring Objective
	Sulfate Dissolved hexavalent chromium Total dissolved solids (TDS) Field Parameters		
	Dioxins/Furans	1 pre application and 1 after one year post remediation monitoring	
MW-1, MW-2, MW-8, and MW-11 ⁷	PCP TCP Sodium Chloride Sulfate Dissolved hexavalent chromium TDS Field Parameters	Quarterly	Treatment Zone ^{5,6}
	Dioxins/Furans	1 pre application and 1 after one year post remediation monitoring	
MW-9	PCP TCP Sodium Chloride Sulfate Dissolved hexavalent chromium TDS Field Parameters	Quarterly	Background ⁸
	Dioxins/Furans	1 pre application and 1 after one year post remediation monitoring	

1. Well numbers and locations as shown on Figure 1.
2. Constituent analytical methods are listed in Table 2.
3. i.e., weekly, monthly, quarterly, semi-annually, annually, other. Semi-annual sampling occurs 1st and 3rd quarters, annual sampling occurs in the 1st quarter, biennial sampling occurs every two years in the 1st quarter, with the first sample during year two.
4. Wells used to determine compliance with water groundwater limitations.
5. Wells sampled to evaluate in-situ remediation progress inside the treatment zone.
6. Wells sampled to evaluate migration of pollutants within the treatment zone.
7. Measure Field Parameters only for MW-11 that monitors the deeper zone groundwater to evaluate for impacts associated with the in-situ treatment. Monitor MW-11 for other parameters in the Constituent list if Field Parameters increase more than 20% above baseline pre-application values.
8. Wells used to develop background concentrations.

Table 2: Analytical Methods

Constituent	Method ¹	Maximum Practical Quantitation Limit (µg/L) ²
Pentachlorophenol/Tetrachlorophenol	Canadian Pulp Report	0.1
Sodium	EPA 200.7 Rev 4.4	100
Chloride	EPA 300.0 Rev 2.1	100
Sulfate	EPA 300.0 Rev 2.1	200
Dissolved Hexavalent Chromium	Std. Meth. 20th Ed. 3500-Cr B	5.0
TDS	EPA 160.1	10,000
Dioxins/Furans	EPA 8290	Varies by congener, 5 pg/L for 2,3,7,8 TCDD

1. Or an equivalent EPA Method that achieves the maximum Practical Quantitation Limit.
2. All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported as an estimated value.

FIELD SAMPLING

In addition to the above sampling and laboratory analyses, field sampling and analysis shall be conducted each time a monitoring well or injection well is sampled. The sampling and analysis of field parameters shall be as specified in Table 3.

Table 3: Field Sampling Requirements

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

All wells that are purged shall be purged until pH, temperature, conductivity and dissolved oxygen are within 10% of the previous value.

Field test instruments (such as those used to test pH and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are calibrated prior to each monitoring event;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in item (b) of the "Reporting" section

of this MRP.

IN-SITU DISCHARGE MONITORING

The Discharger shall monitor daily the discharge of water and amendments that are introduced into the groundwater according to the requirements specified in Table 4. Each amendment addition shall be recorded individually, along with information regarding the time period over which the amendment was placed in or injected into the aquifer.

Table 4: Discharge Monitoring Requirements

Parameters	Units	Type of Sample
Injected Volume	gallons per day	Meter
Amendment(s) Added	pounds per day	Measured

ESTABLISHMENT OF BACKGROUND CONCENTRATION VALUES

The Discharger shall develop background values for concentrations of constituents (below) in groundwater following the procedures found in CCR Section 20415(e)(10).

- Sodium
- Chloride
- Sulfate
- Dissolved hexavalent chromium
- TDS
- pH

The Discharger has submitted a proposal to develop the background concentrations. The concentration limits will be established by taking the highest concentration from the historical and baseline monitoring for each constituent in the background well (MW-9), and multiplying that value by a factor of 1.2. If there is an exceedance of the concentration limit in the compliance well (MW-10), a confirmation sample shall be collected within 10 days of receipt of laboratory results. If the exceedance is confirmed, the Discharger shall implement the required procedure in the Contingency Plan as required in the Notice of Applicability.

REPORTING

When reporting the data, the Discharger shall arrange the information in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner as to illustrate clearly the compliance with this Order. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall also be reported to the Central Valley Water Board.

As required by the California Business and Professions Code Sections 6735, 7835, and

7835.1, all reports shall be prepared by a registered professional Civil Engineer or Geologist or their subordinate and signed by the registered professional.

The Discharger shall submit quarterly electronic data reports, which conform to the requirements of the California Code of Regulations, Title 23, Division 3, Chapter 30. The quarterly reports shall be submitted electronically over the internet to the Geotracker database system by the 1st day of the second month following the end of each calendar quarter by **1 February, 1 May, 1 August, and 1 November** until such time as the Executive Officer determines that the reports are no longer necessary.

Each quarterly report shall include the following minimum information:

- (a) a description and discussion of the groundwater sampling event and results, including trends in the concentrations of pollutants and groundwater elevations in the wells, how and when samples were collected, and whether the pollutant plume(s) is delineated;
- (b) field logs that contain, at a minimum, water quality parameters measured before, during, and after purging, method of purging, depth of water, volume of water purged, etc.;
- (c) groundwater contour maps for all groundwater zones, if applicable;
- (d) pollutant concentration maps for all groundwater zones, if applicable;
- (e) a table showing well construction details such as well number, groundwater zone being monitored, coordinates (longitude and latitude), ground surface elevation, reference elevation, elevation of screen, elevation of bentonite, elevation of filter pack, and elevation of well bottom;
- (f) a table showing historical lateral and vertical (if applicable) flow directions and gradients;
- (g) cumulative data tables containing the water quality analytical results and depth to groundwater;
- (h) a copy of the laboratory analytical data report;
- (i) the status of any ongoing remediation, including an estimate of the cumulative mass of pollutant removed from the subsurface, system operating time, the effectiveness of the remediation system, and any field notes pertaining to the operation and maintenance of the system; and
- (j) if applicable, the reasons for and duration of all interruptions in the operation of any remediation system, and actions planned or taken to correct and prevent interruptions.

An Annual Report shall be submitted to the Central Valley Water Board by **1 February** of each year. This report shall contain an evaluation of the effectiveness and progress of the

investigation and remediation. The Annual Report may be substituted for the fourth quarter monitoring report as long as it contains all of the information required for that report plus that required for the Annual Report.

The Annual Report shall contain the following minimum information:

- (a) both tabular and graphical summaries of all data obtained during the year;
- (b) groundwater contour maps and pollutant concentration maps containing all data obtained during the previous year;
- (c) a discussion of the long-term trends in the concentrations of the pollutants in the groundwater monitoring wells;
- (d) an analysis of whether the pollutant plume is being effectively treated;
- (e) a description of all remedial activities conducted during the year, an analysis of their effectiveness in removing the pollutants, and plans to improve remediation system effectiveness;
- (f) an identification of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program; and
- (g) if desired, a proposal and rationale for any revisions to the groundwater sampling plan frequency and/or list of analytes.

A letter transmitting the monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

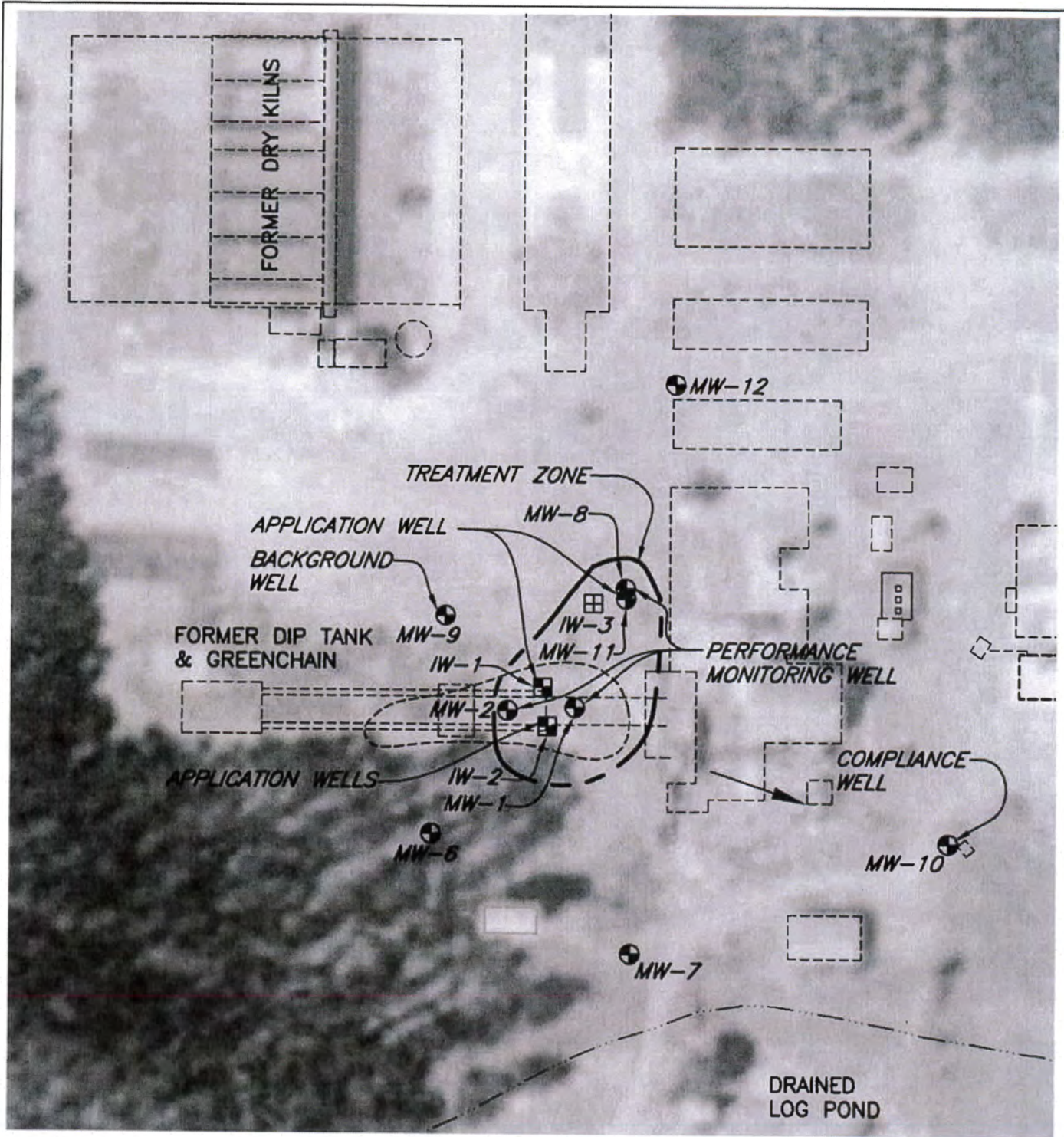
The Discharger shall implement the above monitoring program on the first day of the month following adoption of this Order.

Ordered by:


PAMELA C. CREEDON Executive Officer

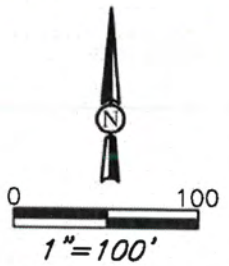
8 March 2016

(Date)



EXPLANATION

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MW-1 MONITORING WELL LOCATION AND DESIGNATION
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IW-1 INJECTION WELL LOCATION AND DESIGNATION
- 
IW-3 PROPOSED INJECTION WELL LOCATION AND DESIGNATION
- 
 EXCAVATION AREA
- 
 GROUNDWATER FLOW DIRECTION (JAN 2015)



NOTE: ALL LOCATIONS ARE APPROXIMATE

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Louisiana-Pacific Corporation
 Elk Creek Sawmill
 Elk Creek, California
 January 2016

General Waste Discharge Requirements
 Order R5-2015-0012
 SHN 592056
 592056-GEN-WASTE-DIS-REQ
 Figure 1