

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIGUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

2 May 2018

Mr. Harvey Molatore
Western Wood Treating
1492 Churchill Downs Avenue
Woodland, CA 95776-6113

NOTICE OF APPLICABILITY OF GENERAL ORDER NO. R5-2015-0012-038, WESTERN WOOD TREATING, 1492 CHURCHILL DOWNS AVE., YOLO COUNTY

Western Wood Treating submitted the 3 April 2018 Notice of Intent (NOI) requesting coverage for a pilot study to raise the groundwater table beneath contaminated soil, then add glucose to the groundwater to remove hexavalent chromium within a groundwater recirculation system. Based on information in the Discharger's submittal, it is our determination that this project meets the required conditions to be covered under the General Order for In-Situ Remediation, Order No. R5-2015-0012. All of the requirements contained in the General Order are applicable to your project. Western Wood Treating is assigned Order No. R5-2015-0012-038.

Project Location:

The project is located in the City of Woodland, Yolo County, Latitude 38° 41' 52" N, Longitude 121° 45' 0" W, Assessor's Parcel No. 027-450-083-000. The physical address is 1492 Churchill Downs Avenue.

Project Description:

In 1985, a leak in a containment structure was discovered, releasing chromated copper arsenic solution to soil and groundwater. Remediation of groundwater by means of recirculation with a glucose amendment has been successful at this facility, removing hexavalent chromium and immobilizing copper and arsenic. The current remedial action plan endeavors to create a groundwater mound beneath the affected soil by injecting extracted groundwater into existing injection wells. When contaminants are flushed out of the soil column, Invertose®, a high fructose corn syrup, will be added to circulating groundwater. The Invertose® provides carbon for microbes to convert hexavalent chromium to tri-valent chromium, which is immobilized. The data from Western Wood Treatment's groundwater recirculation treatment system showed that arsenic and copper were also immobilized, therefore it is expected that the proposed project should be successful in treating each of these compounds.

The groundwater mounding procedure and subsequent recirculation treatment is described in the July 2017 *Remedial Action Plan* prepared by Fall Creek Engineering. The Discharger will also be conducting sampling and reporting the results as described in the attached Monitoring and Reporting Program.


KARL E. LONGLEY ScD, P.E., CHAIR | PAMELA C. CREEDON P.E., BCEE, EXECUTIVE OFFICER

11020 Sun Center Drive #200, Rancho Cordova, CA 95670 | www.waterboards.ca.gov/centralvalley

On 1 December 2017, the Discharger circulated a fact sheet describing the pilot project and providing interested parties with 30 days to submit comments or questions. No comments were received by 24 January 2018.

General Information:

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 3 April 2018 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 rescinded.
3. Injection of materials other than Invertose® into the subsurface is prohibited.
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 project will implement the 28 December 2017 Contingency Plan within 30 days of it being triggered.
6. The Discharger shall comply with the attached Monitoring and Reporting Program, Order No. R5-2015-0012-038, and any revisions thereto as ordered by the Executive Officer.


For PAMELA C. CREEDON
Executive Officer

Attachments: Monitoring and Reporting Program R5-2012-0012-038
General Order No. R5-2015-0012
Standard Provisions

cc: Mr. Dave Settles, City of Woodland, Utilities/Water Supply, Woodland
Ms. Leslie Lindho, Yolo County Environmental Health Department, Woodland
Mr. Hank Feenstra, Western Wood Treating, Sacramento
Mr. Gary Galbraith, Western Wood Treating, Woodland
Mr. Richard Armstrong, Fall Creek Engineering (via email)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2015-0012-038

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

This Monitoring and Reporting Program (MRP) describes requirements for monitoring a groundwater remediation system for Western Wood Treating, 1492 Churchill Downs Ave., Woodland, Yolo County. 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 19 monitor wells, 2 extraction wells, and 4 injection wells associated with this site. 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. Currently, a separate monitoring and reporting program (MRP No. R5-2003-0818) requires semiannual groundwater monitoring, which will continue to be implemented in addition to the activities presented herein. If duplicative sampling is ordered between the two monitoring programs, a single sample will suffice for both reporting objectives. Duplication of monitoring efforts is not intended. Sample collection and analysis shall follow standard EPA protocol.

The treatment system will operate in two consecutive phases. In Phase 1, groundwater will be extracted and reinjected without amendment. If Phase 1 achieves the intended groundwater mounding, then Phase 2 will be implemented. In Phase 2, groundwater will be extracted, amended with glucose, and reinjected. Monitoring for Phase 1 shall follow the schedule in Table 1, whereas monitoring for Phase 2 shall follow the schedule in Table 2. The samples shall be analyzed by the methods in Table 3.

Table 1. Phase 1 Remediation monitoring: groundwater circulation, no amendments

	Monitoring Point ¹	Dissolved Metals (Arsenic, Copper, total Chromium)	Dissolved Iron, Manganese	Hexavalent Chromium
Treatment Zone Monitoring ²	MW-2, MW-19, MW-20, MW-24 (injection wells)	Initial, Final	Initial, Final	Initial, Final
	MW-26 ⁶ , MW-27, MW-28, MW-29 ⁶ (extraction wells)	Weekly		Weekly
	P-6	Weekly		Weekly
	P-11	Weekly		Weekly
	MW-13	Weekly		Weekly
	MW-21	Weekly		Weekly
Transition Zone Monitoring ³	MW-3	Weekly		Weekly
	MW-12	Weekly		Weekly
	MW-22	Weekly		Weekly
	P-9	Weekly		Weekly
Compliance Zone ⁴	MW-1	Monthly		Weekly
	MW-4	Monthly		Weekly
	MW-5	Monthly		Monthly
	MW-23 ⁶	Monthly		Monthly
	MW-25 ⁶	Monthly		Monthly
Background ⁵	MW-1	Semi-Annually ⁷	Initial, Final	Semi-Annually ⁷
	MW-14	Semi-Annually ⁷	Initial, Final	Semi-Annually ⁷
	MW-15	Semi-Annually ⁷	Initial, Final	Semi-Annually ⁷
	MW-16	Semi-Annually ⁷	Initial, Final	Semi-Annually ⁷
	MW-17	Semi-Annually ⁷	Initial, Final	Semi-Annually ⁷

¹ See Figure 1 for Monitoring Point locations.

² Wells sampled to evaluate in-situ bioremediation progress inside the treatment zone.

³ Wells sampled to evaluate migration of pollutants within the transition zone.

⁴ Wells used to determine compliance with groundwater limitations.

⁵ Wells used to develop background concentrations.

⁶ May be operated as extraction well if needed.

⁷ Semi annual samples to be obtained in 1st and 3rd quarters (Jan-March, July-Sept).

Table 2. Phase 2 Remediation monitoring: groundwater circulation, with glucose

	Monitoring Point ¹	Dissolved Metals (Arsenic, Copper, total Chromium)	Dissolved Iron, Manganese	Hexavalent Chromium	Alkalinity	Total Dissolved Solids	Total Organic Carbon
Treatment Zone Monitoring²	MW-2, MW-19, MW-20, MW-24 (injection wells)	Initial, Final	Initial, Final	Initial, Final	Initial, Final	Initial, Final	Initial, Final
	MW-26 ⁶ , MW-27, MW-28, MW-29 ⁶ (extraction wells)	Weekly	Initial, Monthly	Weekly	Initial, Monthly	Weekly	Weekly
	P-6	Weekly		Weekly		Weekly	Weekly
	P-11	Weekly		Weekly		Weekly	Weekly
	MW-13	Weekly		Weekly		Weekly	Weekly
	MW-21	Weekly		Weekly		Weekly	Weekly
Transition Zone Monitoring³	MW-3	Weekly	Initial, Weekly	Weekly	Initial, Weekly	Weekly	Weekly
	MW-12	Weekly	Initial, Weekly	Weekly	Initial, Weekly	Weekly	Weekly
	MW-22	Weekly	Initial, Weekly	Weekly	Initial, Weekly	Weekly	Weekly
	P-9	Weekly	Initial, Weekly	Weekly	Initial, Weekly	Weekly	Weekly
Compliance Zone⁴	MW-1	Monthly	Initial, Final	Monthly	Initial, Monthly		Monthly
	MW-4	Weekly	Initial, Final	Weekly	Initial, Monthly		Weekly
	MW-5	Monthly	Initial, Final	Monthly	Initial, Monthly		Monthly
	MW-14	Monthly	Initial, Final	Monthly	Initial, Monthly		Monthly
	MW-23 ⁶	Weekly	Initial, Final	Weekly	Initial, Monthly		Weekly
	MW-25 ⁶	Weekly	Initial, Final	Weekly	Initial, Monthly		Weekly
Back-ground⁵	MW-1	Semi-Annually ⁷	Initial, Final	Semi-Annually ⁷	Semi-Annually ⁷		Initial, Final
	MW-15	Semi-Annually ⁷	Initial, Final	Semi-Annually ⁷	Semi-Annually ⁷		Initial, Final
	MW-16	Semi-Annually ⁷	Initial, Final	Semi-Annually ⁷	Semi-Annually ⁷		Initial, Final
	MW-17	Semi-Annually ⁷	Initial, Final	Semi-Annually ⁷	Semi-Annually ⁷		Initial, Final

Footnotes found under Table 1.

Table 3: Analytical Methods

Constituent	Method ⁸	Maximum Practical Quantification Limit ⁹
Arsenic, Chromium, Copper, Iron, Manganese (total dissolved)	EPA 200.8	1.0 µg/l
Chromium (dissolved hexavalent)	EPA 7199	1.0 µg/l
Alkalinity	SM 2320B	1.0 mg/l
Total Dissolved Solids	SM 2540C	1.0 mg/l
Total Organic Carbon	EPA 415.1	1.0 mg/l

⁸ Or an equivalent EPA Method that achieves the maximum Practical Quantitation Limit.

⁹ 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 monitor well or extraction well is sampled. The sampling and analysis of field parameters shall be as specified in Table 4.

Table 4: 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	uhmos/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; and
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency.

IN-SITU DISCHARGE MONITORING

The Discharger shall monitor daily the discharge of amended water injected and amendments that are injected into the groundwater according to the requirements specified in Table 5. Each amendment addition shall be recorded individually, along with information regarding the time period over which the amendment was injected into the aquifer.

Table 5: Discharge Monitoring Requirements

Parameters	Units	Type of Sample
Injected Volume of Recirculated Groundwater	gallons per day	Meter
Amendment(s) Added	pounds per day	Measured
Biocide Added (if any)	pounds per day	Measured

AMENDMENT ANALYSIS

Prior to use, amendments shall be analyzed for the constituents listed in Table 6. The analysis should be done on a mixture of the amendment and deionized water at the estimated concentration that would be injected during the pilot project.

Table 6: Amendment Analytical Requirements

Constituent	Method ¹⁰	Maximum Practical Quantitation Limit ($\mu\text{g/L}$) ¹¹
Volatile Organic Compounds	EPA 8020 or 8260B	0.5
General Minerals ¹²	Various	Various
Metals, Total and Dissolved ¹³	EPA 200.7, 200.8	Various
Semi-Volatile Organic Compounds	EPA Method 8270	5.0
Total Dissolved Solids	EPA 160.1	10,000
pH	meter	NA
Electrical Conductivity	meter	NA

¹⁰ Or an equivalent EPA Method that achieves the maximum Practical Quantitation Limit.

¹¹ All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported as an estimated value.

¹² General Minerals include: alkalinity, bicarbonate, potassium, chloride, sulfate, total hardness, nitrate, nitrite, ammonia.

¹³ Metals include arsenic, barium, cadmium, calcium, total chromium, copper, iron, lead, manganese, magnesium, mercury, molybdenum, nickel, selenium and silica.

ESTABLISHMENT OF BACKGROUND CONCENTRATION VALUES

The Discharger developed a process for establishing background values for total chromium, hexavalent chromium, total copper, and total arsenic.

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. In addition, the Discharger shall notify the Central Valley Water Board within 48 hours of any unscheduled shutdown of any groundwater extraction system. 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.

Phase 1 Reporting

The Discharger shall submit a bi-weekly (every two weeks) electronic data transmittal to Central Valley Water Board staff and the Phase 1 results shall be reported in a Final Remediation Report that will include Phase 2 results. Phase 1 bi-weekly submittals shall be due the week following the availability of the laboratory data report(s) and shall include the following:

- (a) a site diagram, including location of extraction and injection wells;
- (b) tabulation of extraction and/or injection wells and volume of water extracted or reinjected;
- (c) diagrammed water surface elevations representative of the reporting period;
- (d) tabulated water quality data obtained during the reporting period;
- (e) actions proposed for next reporting period.

Phase 2 Reporting

The Discharger shall submit a monthly electronic data transmittal to Central Valley Water Board staff. A summary of Phase 1 and Phase 2 results shall be included in a Final Remediation Report.

Monthly electronic submittals shall be due 45 days following the end of the month in which glucose injections occurred. For example, if glucose injections commence in the month of

March, the first monthly data submittal shall be due 15 May. The monthly data submittals shall include the following:

- (a) a site diagram, including location of extraction and injection wells;
- (b) volume and rate of water extracted during the reporting period;
- (c) amendment amounts and rate(s) of injection during the reporting period;
- (d) diagram of water surface elevations typical of reporting period;
- (e) tabulated water quality data obtained during the reporting period;
- (f) actions proposed for the next reporting period.

Final Remediation Report

The final report shall be submitted within 60 days of the last glucose injection. The Final Remediation Report shall include data and commentary from Phase 1 and Phase 2. The Final Remediation Report shall also include the following minimum information:

- (a) a description and discussion of the groundwater remediation effort including a detailed drawing of the site and its facilities; the history of contamination at the site, how and when this remediation attempt was affected, when and how data were collected;
- (b) a data table showing the results of all chemical analyses performed during the remediation effort;
- (c) a table showing well construction details such as well number, coordinates, ground surface elevation, reference elevation, elevation of screen, elevation of well bottom;
- (d) a data table showing the frequency or rate of glucose injection in each injection well;
- (e) an evaluation of the results of the remediation effort, including an estimate of mass removed or immobilized.

A letter transmitting the final report shall accompany the report. 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 Phase 1 groundwater recirculation.

Ordered by:

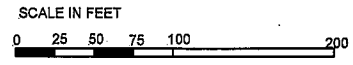
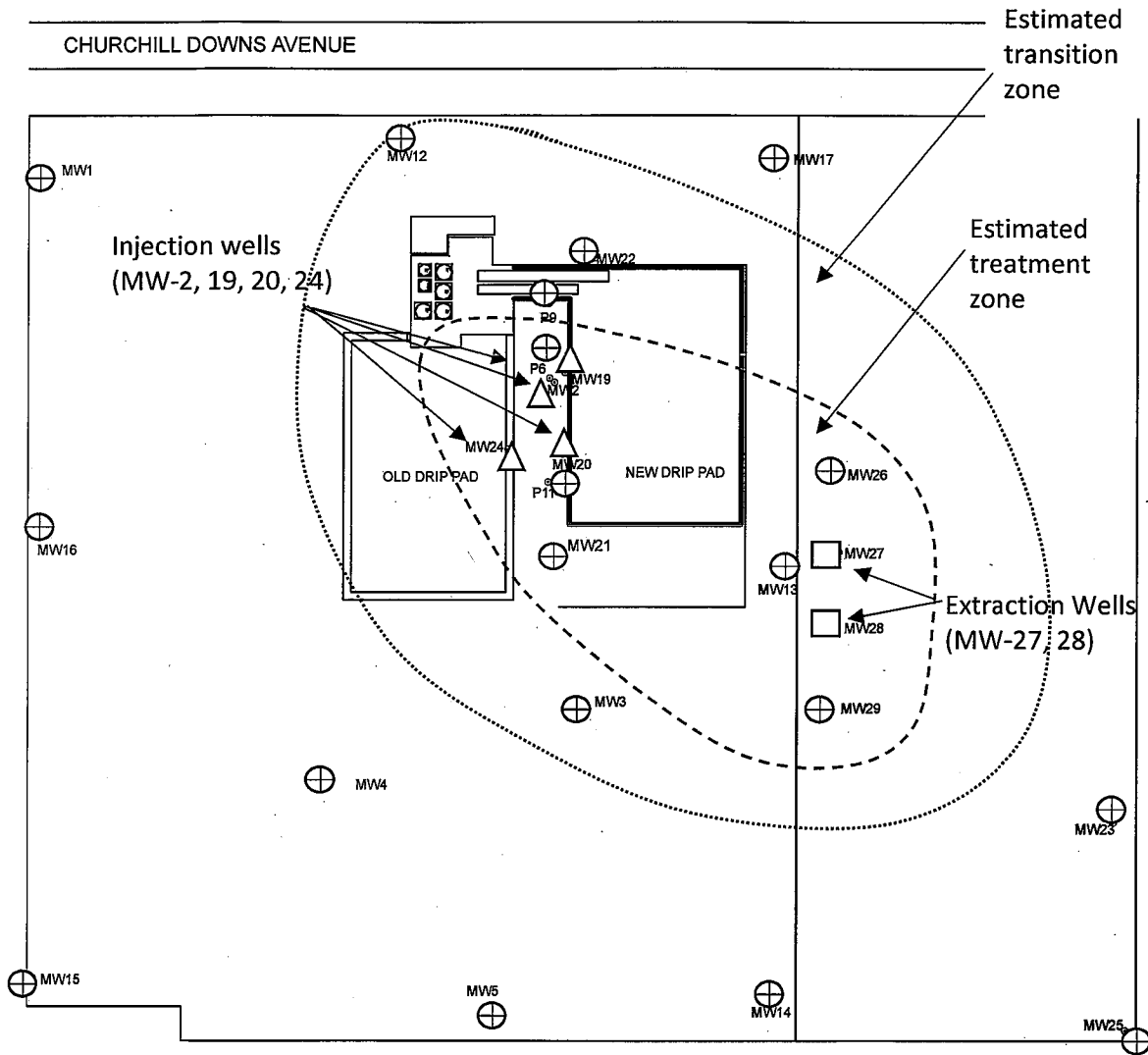
For Andrew Alford
PAMELA C. CREEDON, Executive Officer

4/30/14

(Date)

Figure 1. Western Wood Treating Well Locations.

IRRIGATED FIELD



FALL CREEK ENGINEERING, INC

P.O. BOX 7894, SANTA CRUZ, CA 95061
Tel: (831)426-9054 Fax: (831)426-4932
fallcreekengineering.com

FIGURE MRP 1.
WESTERN WOOD TREATING, INC
Monitoring Well Locations. Wells 27 and 28 are extraction wells. Wells 2, 19, 20, and 24 are injection wells.

- ⊕ Monitoring Well
- △ Injection Well
- Extraction Well