

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION**

**MONITORING AND REPORTING PROGRAM NO. R5-2015-0012-008
FOR
IN-SITU SOIL AND GROUNDWATER REMEDIATION**

**WASHINGTON ELEMENTARY SCHOOL
1599 5TH STREET
MENDOTA, FRESNO COUNTY**

This Monitoring and Reporting Program (MRP) describes requirements for monitoring a groundwater treatment system at Washington Elementary School, 1599 5th Street, Mendota, Fresno 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, 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 2 of BSK Soil Vapor Well Installation Report (Attachment A), there are thirteen (13) active and five (5) dry groundwater monitoring wells, five (5) vapor extraction wells, five (5) soil vapor probes, and five (5) ozone injection wells associated with this site. The groundwater monitoring program for the wells and any treatment system wells installed subsequent to the issuance of this MRP, shall at a minimum, follow the schedule below. Monitoring may be performed more frequently to assess effectiveness of treatment, especially during initial operations.

Monitoring wells with free phase petroleum product or visible sheen shall be monitored, at a minimum, for product thickness and depth to water. Sample collection and analysis shall follow standard US EPA protocol.

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

Table 1: Sampling Frequency and Constituent Suite

Well Number¹	Frequency²	Constituent Suite(s)³	Monitoring Objective
MW-12	Quarterly	Suite A	Compliance ⁴
	Semi-Annually	Suite B	
MW-1R, MW-11, MW-16	Weekly for first month, monthly for first quarter, then quarterly thereafter	Suite A, Suite B	Treatment Zone ⁵
MW-7R, MW-8R	Monthly for first quarter, then quarterly thereafter	Suite A, Suite B	Transition Zone ⁶
MW-2	Quarterly	Suite A	Background ⁷
	Semi-Annually	Suite B	

¹ Well numbers as shown on Figure 2.

² i.e., weekly, monthly, quarterly, annually, other.

³ Constituent suite components listed in Table 2.

⁴ Wells used to determine compliance with groundwater limitations.

⁵ Wells sampled to evaluate in-situ bioremediation progress inside the treatment zone.

⁶ Wells sampled to evaluate migration of pollutants within the treatment zone.

⁷ Wells used to develop background concentrations.

Table 2: Analytical Methods

Constituent	Method ¹	Maximum Practical Quantitation Limit (µg/L) ²
Suite A		
Volatile Organic Compounds	EPA 8020 or 8260B	0.5
TPH-gasoline	EPA 8015B	5
Hexavalent Chromium	EPA 7199	0.2
Total Dissolved Solids	EPA 160.1	10,000
Electrical Conductivity	SM 2510 B	5.0 µmhos/cm
Suite B		
Metals, Total and Dissolved ³	EPA 200.7, 200.8	Various

- 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.
³ Metals include arsenic, total chromium (including III and VI), and lead.

FIELD SAMPLING

In addition to the above sampling and analysis, field sampling and analysis shall be conducted each time a monitoring well or extraction 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

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.

DISCHARGE MONITORING

The Discharger shall monitor daily the discharge of water and amendments that are injected 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 injected into the aquifer.

Table 4: Discharge Monitoring Requirements

Parameters	Units	Type of Sample
Injected Ozone Volume	pounds per day (average)	Meter/calculation

ESTABLISHMENT OF BACKGROUND CONCENTRATION VALUES

The Discharger developed an average background concentration of hexavalent chromium of <0.20 µg/L.

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 soil vapor and/or groundwater treatment 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 State of California registered professional Civil Engineer or Geologist or their subordinate, and signed and stamped 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**, 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 historical lateral and vertical (if applicable) flow directions and gradients;
- (f) cumulative data tables containing the water quality analytical results and depth to groundwater;
- (g) a copy of the laboratory analytical data report, which may be submitted in an electronic format;
- (h) 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;
- (i) a summary of soil vapor extraction monitoring and laboratory analyses; 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.

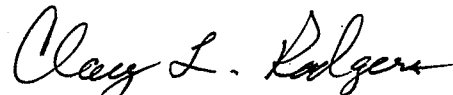
An Annual Report shall be submitted to the Regional Board by **1 February** of each year. This report shall contain an evaluation of the effectiveness and progress of the investigation and remediation, and may be substituted for the fourth quarter monitoring report. The Annual Report shall contain the 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 upon startup of the remediation system.

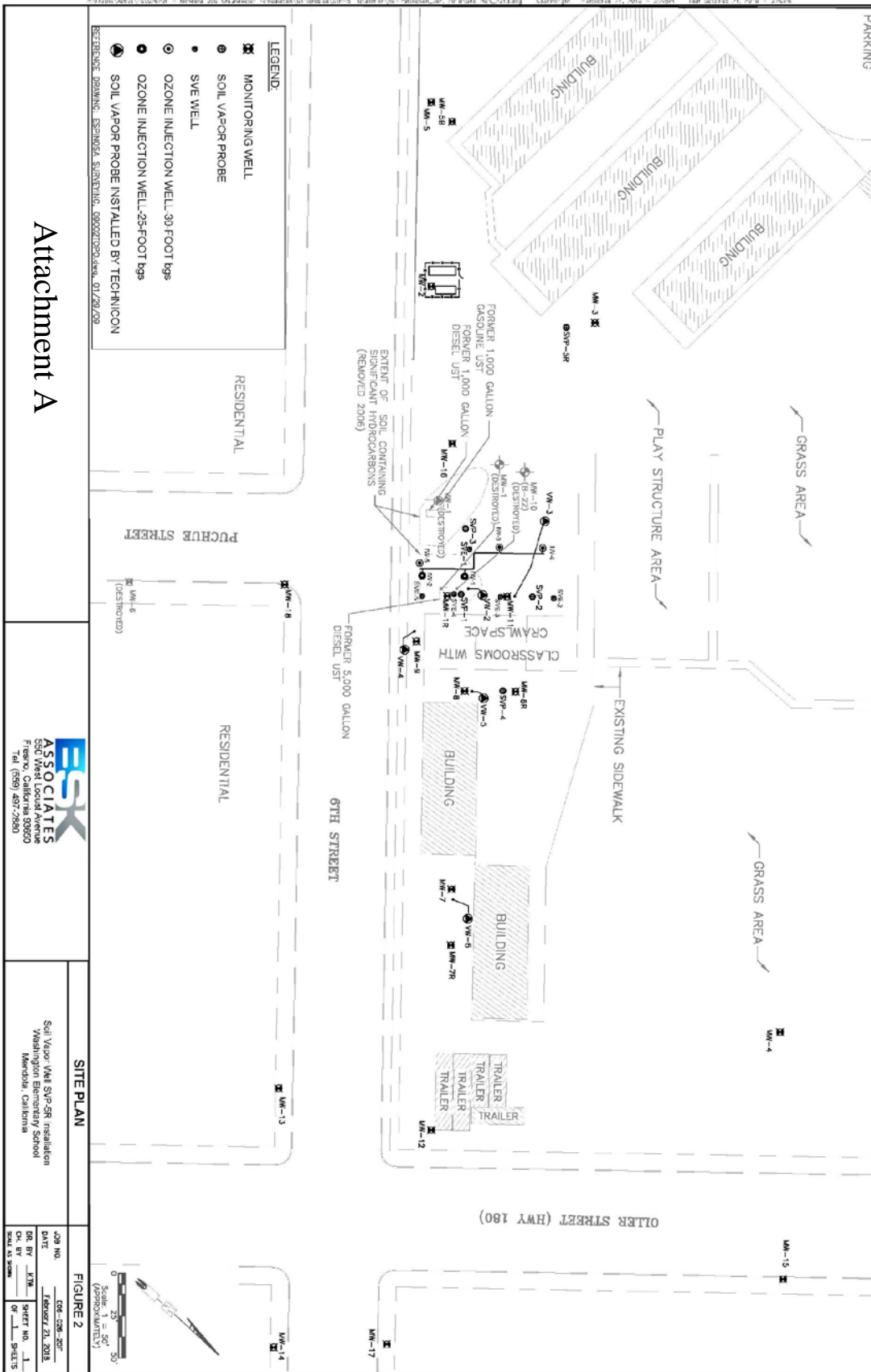
Ordered by:



PAMELA C. CREEDON, Executive Officer

9 March 2018

Attachment A: Figure 2 of BSK Soil Vapor Well Installation Report



Central Valley Regional Water Quality Control Board

9 March 2018

Paul Lopez, Superintendent
Mendota Unified School District
115 McCabe Avenue
Mendota, CA 93640

NOTICE OF APPLICABILITY FOR WASTE DISCHARGE REQUIREMENTS GENERAL ORDER NO. R5-2015-0012, UNDERGROUND STORAGE TANK RELEASE, WASHINGTON ELEMENTARY SCHOOL, 1599 5th STREET, MENDOTA, FRESNO COUNTY, RB CASE 5T10000115

The Responsible Party, Mendota Unified School District (hereafter Discharger), and the consultant, BSK & Associates (BSK), submitted a *Notice of Intent to Conduct Groundwater Remediation by Ozone Injection*. The notice requests coverage under General Order No. R5-2015-0012, *General Order for In-Situ Groundwater Remediation and Discharge of Treated Groundwater to Land*. Based on information in the submittal, it is the Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff determination that the project meets the required conditions to be approved under Order No. R5-2015-0012. All of the requirements contained in the General Order are applicable to the project. The project is assigned Order No. R5-2015-0012-008.

Project Location:

The project is at 1595 5th Street, Mendota (Site), Fresno County.

Project Description:

The Site is an elementary school where three underground storage tanks (USTs) were removed in 1988, and petroleum constituents were detected in soil. The USTs were adjacent to a former bus barn and shop building, in the area currently utilized for the school bus turn around and staff parking. Subsequent investigations confirmed groundwater impacts with petroleum hydrocarbon constituents. About 750 cubic yards of hydrocarbon impacted soil were excavated from the Site in 2006. The primary constituents of concern are total petroleum hydrocarbons as referenced to gasoline (TPHg), benzene, toluene, ethylbenzene, xylenes (BTEX), and 1,2-dichloroethane (1,2-DCA).

Significant concentrations of the hydrocarbon pollutants remain in groundwater. During the latest groundwater sampling event in December 2017, analytical results indicated concentrations of TPHg, BTEX, and 1,2-DCA as high as 16,000 micrograms per liter ($\mu\text{g/L}$), 3,600 $\mu\text{g/L}$, 260 $\mu\text{g/L}$, 93 $\mu\text{g/L}$, 57 $\mu\text{g/L}$, and 100 $\mu\text{g/L}$, respectively.

The Discharger submitted the *Report of 30-Day Ozone Injection Assessment Pilot Test* (Report) dated 15 October 2012; the *Phase 1 Remedial Action Plan* (RAP) dated 10 January 2013, the email dated 6 February 2013, and the *Soil Vapor Extraction Pilot Test* (Pilot Test Report) dated 7 August 2013. The Report summarizes an ozone injection pilot test, and the RAP proposes remedial action at the Site via ozone injection and soil vapor extraction (SVE). The Pilot Test Report summarizes a SVE pilot test.

In 2012, ozone injection wells IW-1 and IW-2 were installed to depths of 25 feet below ground surface (bgs), and wells IW-3 and IW-4 were installed to depths of 30 feet bgs, followed by the ozone injection pilot test. The test findings reported that the radius of influence of the shallow wells was 15 feet, and 30 feet for the deep wells, which are approximately 25 feet apart. During the ozone injection pilot test, hexavalent chromium 6 (Cr⁶⁺) increased in groundwater monitoring well MW-11 from <0.20 µg/L to 1.1 µg/L, but declined to 0.37 µg/L within three weeks following the test. MW-11 is approximately 30 feet downgradient of one of the ozone injection wells. One additional ozone injection well (IW-5) was installed in October 2014 as was proposed in the final test report.

To control potential increases in volatile organic compounds (VOCs) in soil vapor and nearby classrooms, SVE will be used in conjunction with ozone injection. The Pilot Test Report documents a SVE pilot test conducted in July 2013 to assess the radius of influence. One vapor extraction well was installed to a depth of 15 feet bgs during July 2013, and the depth to water was measured at 18.5 feet bgs. A 32-hour pilot test was conducted using existing soil vapor monitoring points, and groundwater monitoring wells as monitoring points. With extraction at 25 standard cubic feet per minute (scfm), the radius of influence was determined to be approximately 18 feet. The extracted vapor was tested in the field for VOCs using a photoionization detector, with only minimal concentrations detected. To protect the indoor air quality of nearby classrooms, the Pilot Test Report recommended five additional SVE wells be installed approximately 30 feet apart, and that a 200-scfm blower to be used for vapor extraction.

Central Valley Water Board staff concurred with the RAP in a letter dated 13 February 2013, and the work proposed in the Pilot Test Report, in a letter dated 4 September 2013.

No comments were received on the Draft Notice of Applicability and Monitoring and Reporting Program during a 30-day public comment period that ended 23 December 2013. The Discharger will conduct sampling and reporting the results as described in the attached Monitoring and Reporting Program.

The Mendota Unified School District, as lead agency for California Environmental Quality Act (CEQA), issued a Notice of Determination dated 30 November 2013, concluding that the project is considered exempt from CEQA.

Delays were encountered during the project due to school construction projects, remediation equipment and installation delays, replacement of dry monitoring wells, and other issues. Concerns arose regarding the indoor air quality of nearby classrooms, therefore four additional SVE wells (SVE-2 through SVE-5), one additional ozone injection well (IW-5), and additional groundwater monitoring wells (MW-16 through MW-18) were installed in October 2014. As proposed in a 4 December 2015 Work Plan, monitoring wells MW-7R and MW-8R were installed to replace dry wells MW-7 and MW-8, and one soil vapor probe (SVP-4) at the Site in June 2016. Wells MW-7R and MW-8R will serve with monitoring wells MW-1R, MW-2, MW-11, MW-12, and MW-16 to monitor the influence of ozone injection within the source area. MW-16 was installed as the upgradient background well for the source and injection area; however, because of the detection of high VOC concentrations in MW-16 during recent sampling events, MW-2 will act as the background well.

MW-16 will be part of the "Treatment Zone" among MW-1R and MW-11, currently installed within the source area. Monitoring well MW-8R is approximately 90 feet and MW-7R is approximately 200 feet downgradient of the source area and will act as "Transition Zone" wells. Monitoring well MW-12 installed approximately 300 feet further downgradient of the source area, will be a "Compliance" well.

Soil vapor probe SVP-4 was installed to a depth of approximately 16 feet bgs, to evaluate soil vapor concentrations downgradient of the ozone injection area. Previously damaged groundwater monitoring well MW-6 was destroyed on 16 June 2016, in accordance with Fresno County and

Department of Water Resources well destruction requirements. The groundwater flow direction beneath the Site has remained consistently toward the northeast, with a relatively flat gradient. At the recommendation of the Department of Toxic Substances Control (DTSC), additional soil vapor probe SVP-5R was installed to a depth of approximately 16 feet on 11 January 2018. SVP-5R will monitor soil gas near the classroom building located west of the treatment zone, and southeast of monitoring well MW-3. Soil vapor wells SVP-1 through SVP-5R were installed with two 0.25-inch diameter Teflon tubes, finished with aquarium filter tips set at 5 feet and 15 feet bgs.

On 15 January 2018, soil vapor samples were collected from shallow and deep probes at each soil vapor well, to establish a baseline concentration before the remediation system startup. Soil-gas samples were analyzed for volatile organic compounds (VOCs) by Method TO-15 and helium by Method ASTM D 1946-90. Analytical results were compared to the criteria contained in the *Low-Threat Underground Storage Tank Case Closure Policy* (Policy) for concentration with no bio-attenuation zone (oxygen less than 4%) Residential. Soil gas analytical results indicated concentrations of constituents of concern of benzene, ethylbenzene, and naphthalene less than the Policy concentrations for Residential criteria. DTSC reviewed the soil vapor sample analytical results, and provided their comments in an e-mail on 27 February 2018.

The Discharger submitted a Contingency Plan to address any unforeseen negative impacts as follows:

- Monitoring Well MW-12 will be used as compliance well (see Figure 2, Attachment A).
- Monitoring Wells MW-1R, MW-11, and MW-16 are treatment zone wells.
- Monitoring wells MW-7R and MW-8R are transition zone wells.
- Monitoring well MW-2 is upgradient of the treatment zone and will be a background well.
- MW-1R, MW-8, MW-9, and MW-11 were sampled prior to performing the pilot test and the samples analyzed for Cr⁶⁺. All four wells contained Cr⁶⁺ at less than the detection limit of 0.20 µg/L, which is considered the baseline concentration. The action level for Cr⁶⁺ is 20% greater than baseline (0.24 µg/L).
- Ozone sparging will cease in all wells if an increase in Cr⁶⁺ concentration of greater than 20% of baseline is observed in any compliance well. Sampling of Cr⁶⁺ will increase to monthly in the affected wells.
- MW-7R is approximately 200 feet downgradient of the ozone injection wells, and approximately 100 feet upgradient of compliance well MW-12. If the concentration of Cr⁶⁺ in transition wells MW-7R and/or MW-8R exceeds five times the 12-month rolling average of the background well during two consecutive quarterly monitoring events, the system will be shut down, and monitoring of compliance well MW-12 will be increased to monthly. Resuming ozone injection will be evaluated after Cr⁶⁺ concentrations decrease in MW-7R and MW-8R to within 20% of the 12-month background well rolling average. The injection program will be modified when/if concentrations return to these concentrations.

General Information:

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

2. The required annual fee (as specified in the annual billing invoice 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 ozone 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 Discharger shall comply with the attached Monitoring and Reporting Program, Order No. R5-2015-0012-008, and any revisions thereto as ordered by the Executive Officer.
6. The concentration of Cr⁶⁺ need to be closely monitored in all groundwater monitoring wells. The MRP R5-2015-0012-008 may need to be revised if a new State maximum contaminant level for Cr⁶⁺ is adopted.
7. Indoor air vapor monitoring in the on-site classrooms will be conducted as required. DTSC comments need to be addressed.

If you have any questions regarding this matter, please call Khalid Durrani at (559) 445-6191 or by email at khalid.durrani@waterboards.ca.gov.



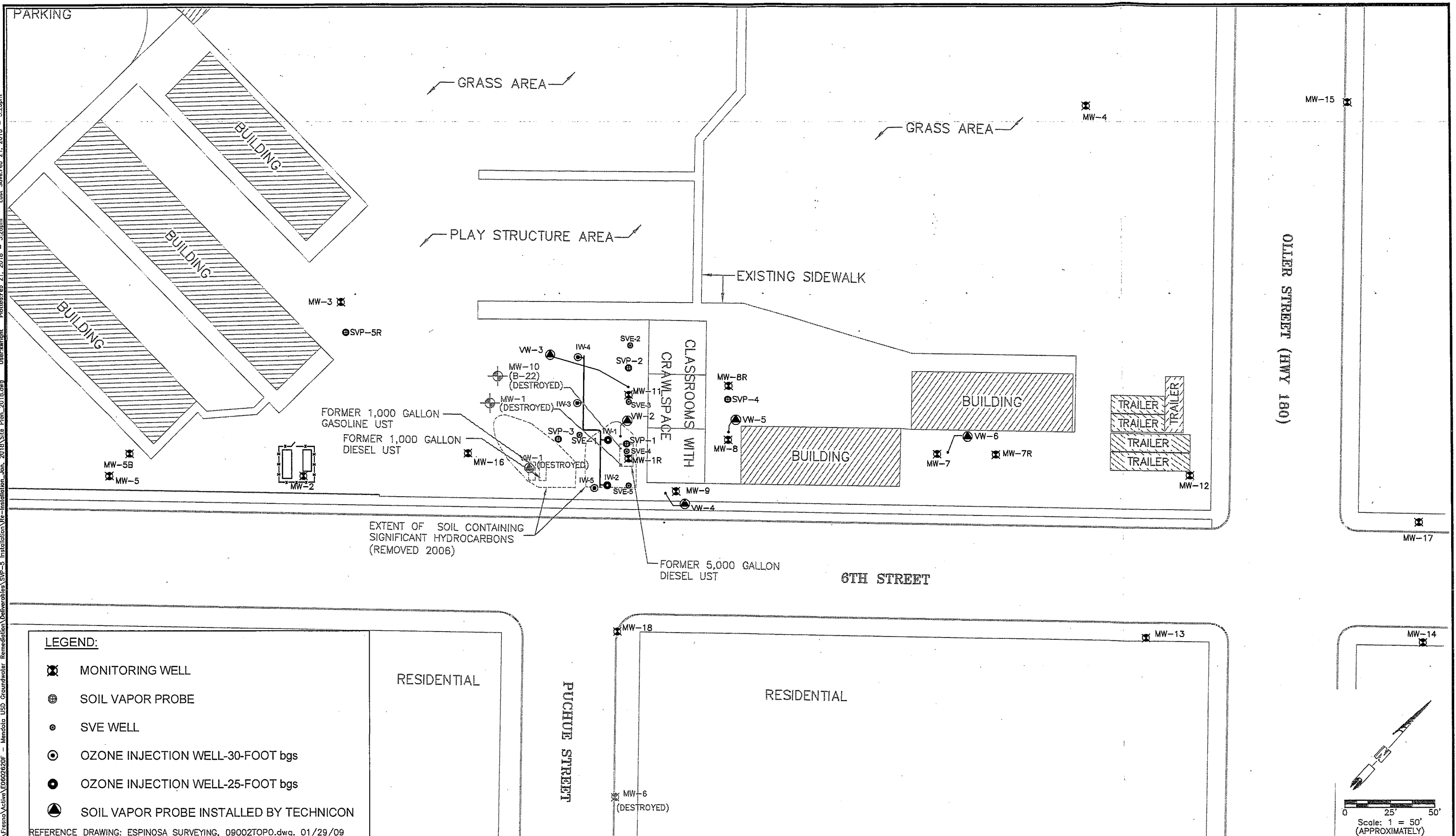
for Pamela C. Creedon
Executive Officer

Attachments: Figure 2 of BSK Soil Vapor Well Installation Report
Monitoring and Reporting Program No. R5-2015-0012-008
Waste Discharge Requirements General Order No. R5-2015-0012
Standard Provisions

cc w/attachments:

Della Kramer, Regional Water Quality Control Board, Rancho Cordova
Bud Duke, DTSC, Sacramento
Fresno County Division of Environmental Health, Fresno
Sarah G. Stephenson, BSK, Fresno

P:\Fresno\Active\E0602620F - Mendota USD Groundwater Remediation Deliverables\SVP-5 Installation\Re-Installation\Site Plan_2018.dwg User: ktw Feb 21, 2018 3:28pm
 P:\Fresno\Active\E0602620F - Mendota USD Groundwater Remediation Deliverables\SVP-5 Installation\Re-Installation\Site Plan_2018.dwg User: ktw Feb 21, 2018 3:28pm
 P:\Fresno\Active\E0602620F - Mendota USD Groundwater Remediation Deliverables\SVP-5 Installation\Re-Installation\Site Plan_2018.dwg User: ktw Feb 21, 2018 3:28pm



LEGEND:

- ☒ MONITORING WELL
- ⊕ SOIL VAPOR PROBE
- SVE WELL
- ⊙ OZONE INJECTION WELL-30-FOOT bgs
- OZONE INJECTION WELL-25-FOOT bgs
- ⊙ SOIL VAPOR PROBE INSTALLED BY TECHNICON

REFERENCE DRAWING: ESPINOSA SURVEYING, 09002TOPO.dwg, 01/29/09

MW-14

Scale: 1" = 50'
(APPROXIMATELY)

Attachment A

ESK
 ASSOCIATES
 550 West Locust Avenue
 Fresno, California 93650
 Tel. (559) 497-2880

SITE PLAN

Soil Vapor Well SVP-5R Installation
 Washington Elementary School
 Mendota, California

FIGURE 2

JOB NO.	E06-026-20F
DATE	February 21, 2018
DR. BY	KTW
CH. BY	
SCALE AS SHOWN	
SHEET NO.	1
OF	1 SHEETS

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

STANDARD PROVISIONS AND REPORTING REQUIREMENTS
FOR
WASTE DISCHARGE REQUIREMENTS

1 March 1991

A. General Provisions:

1. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, or protect the Discharger from liabilities under federal, state, or local laws. This Order does not convey any property rights or exclusive privileges.
2. The provisions of this Order are severable. If any provision of this Order is held invalid, the remainder of this Order shall not be affected.
3. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:
 - a. Violation of any term or condition contained in this Order;
 - b. Obtaining this Order by misrepresentation, or failure to disclose fully all relevant facts;
 - c. A change in any condition that results in either a temporary or permanent need to reduce or eliminate the authorized discharge;
 - d. A material change in the character, location, or volume of discharge.
4. Before making a material change in the character, location, or volume of discharge, the discharger shall file a new Report of Waste Discharge with the Regional Board. A material change includes, but is not limited to, the following:
 - a. An increase in area or depth to be used for solid waste disposal beyond that specified in waste discharge requirements.
 - b. A significant change in disposal method, location or volume, e.g., change from land disposal to land treatment.
 - c. The addition of a major industrial, municipal or domestic waste discharge facility.
 - d. The addition of a major industrial waste discharge to a discharge of essentially domestic sewage, or the addition of a new process or product by an industrial facility resulting in a change in the character of the waste.

5. Except for material determined to be confidential in accordance with California law and regulations, all reports prepared in accordance with terms of this Order shall be available for public inspection at the offices of the Board. Data on waste discharges, water quality, geology, and hydrogeology shall not be considered confidential.
6. The discharger shall take all reasonable steps to minimize any adverse impact to the waters of the state resulting from noncompliance with this Order. Such steps shall include accelerated or additional monitoring as necessary to determine the nature and impact of the noncompliance.
7. The discharger shall maintain in good working order and operate as efficiently as possible any facility, control system, or monitoring device installed to achieve compliance with the waste discharge requirements.
8. The discharger shall permit representatives of the Regional Board (hereafter Board) and the State Water Resources Control Board, upon presentations of credentials, to:
 - a. Enter premises where wastes are treated, stored, or disposed of and facilities in which any records are kept,
 - b. Copy any records required to be kept under terms and conditions of this Order,
 - c. Inspect at reasonable hours, monitoring equipment required by this Order, and
 - d. Sample, photograph and video tape any discharge, waste, waste management unit, or monitoring device.
9. For any electrically operated equipment at the site, the failure of which would cause loss of control or containment of waste materials, or violation of this Order, the discharger shall employ safeguards to prevent loss of control over wastes. Such safeguards may include alternate power sources, standby generators, retention capacity, operating procedures, or other means.
10. The fact that it would have been necessary to halt or reduce the permitted activity in Order to maintain compliance with this Order shall not be a defense for the discharger's violations of the Order.
11. Neither the treatment nor the discharge shall create a condition of nuisance or pollution as defined by the California Water Code, Section 13050.
12. The discharge shall remain within the designated disposal area at all times.

B. General Reporting Requirements:

1. In the event the discharger does not comply or will be unable to comply with any prohibition or limitation of this Order for any reason, the discharger shall notify the Board by telephone at **(559) 445-5116** [*Note: Current phone numbers for all three Regional Board offices may be found on the internet at http://www.swrcb.ca.gov/rwqcb5/contact_us.*] as soon as it or its agents

have knowledge of such noncompliance or potential for noncompliance, and shall confirm this notification in writing within **two weeks**. The written notification shall state the nature, time and cause of noncompliance, and shall include a timetable for corrective actions.

2. The discharger shall have a plan for preventing and controlling accidental discharges, and for minimizing the effect of such events.

This plan shall:

- a. Identify the possible sources of accidental loss or leakage of wastes from each waste management, treatment, or disposal facility.
- b. Evaluate the effectiveness of present waste management/treatment units and operational procedures, and identify needed changes of contingency plans.
- c. Predict the effectiveness of the proposed changes in waste management/treatment facilities and procedures and provide an implementation schedule containing interim and final dates when changes will be implemented.

The Board, after review of the plan, may establish conditions that it deems necessary to control leakages and minimize their effects.

3. All reports shall be signed by persons identified below:
 - a. For a corporation: by a principal executive officer of at least the level of senior vice-president.
 - b. For a partnership or sole proprietorship: by a general partner or the proprietor.
 - c. For a municipality, state, federal or other public agency: by either a principal executive officer or ranking elected or appointed official.
 - d. A duly authorized representative of a person designated in 3a, 3b or 3c of this requirement if:
 - (1) the authorization is made in writing by a person described in 3a, 3b or 3c of this provision;
 - (2) the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a waste management unit, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
 - (3) the written authorization is submitted to the Board

Any person signing a document under this Section shall make the following certification:

“I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of the those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.”

4. Technical and monitoring reports specified in this Order are requested pursuant to Section 13267 of the Water Code. Failing to furnish the reports by the specified deadlines and falsifying information in the reports, are misdemeanors that may result in assessment of civil liabilities against the discharger.
5. The discharger shall mail a copy of each monitoring report and any other reports required by this Order to:

California Regional Water Quality Control Board
Central Valley Region
1685 E Street
Fresno, CA 93706

Note: Current addresses for all three Regional Board offices may be found on the internet at http://www.swrcb.ca.gov/rwqcb5/contact_us or the current address if the office relocates.

C. Provisions for Monitoring:

1. All analyses shall be made in accordance with the latest edition of: (1) *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater* (EPA 600 Series) and (2) *Test Methods for Evaluating Solid Waste* (SW 846-latest edition). The test method may be modified subject to application and approval of alternate test procedures under the Code of Federal Regulations (40 CFR 136).
2. Chemical, bacteriological, and bioassay analysis shall be conducted at a laboratory certified for such analyses by the State Department of Health Services. In the event a certified laboratory is not available to the discharger, analyses performed by a noncertified laboratory will be accepted provided a Quality Assurance-Quality Control Program is instituted by the laboratory. A manual containing the steps followed in this program must be kept in the laboratory and shall be available for inspection by Board staff. The Quality Assurance-Quality Control Program must conform to EPA guidelines or to procedures approved by the Board.

Unless otherwise specified, all metals shall be reported as Total Metals.

3. 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 for a minimum of three years from the date of the sample, measurement, report, or application. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Board Executive Officer.

Record of monitoring information shall include:

- a. the date, exact place, and time of sampling or measurements,
 - b. the individual(s) who performed the sampling of the measurements,
 - c. the date(s) analyses were performed,
 - d. the individual(s) who performed the analyses,
 - e. the laboratory which performed the analysis,
 - f. the analytical techniques or methods used, and
 - g. the results of such analyses.
4. All monitoring instruments and devices used by the discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated at least yearly to ensure their continued accuracy.
 5. The discharger shall maintain a written sampling program sufficient to assure compliance with the terms of this Order. Anyone performing sampling on behalf of the discharger shall be familiar with the sampling plan.
 6. The discharger shall construct all monitoring wells to meet or exceed the standards stated in the State Department of Water Resources *Bulletin 74-81* and subsequent revisions, and shall comply with the reporting provisions for wells required by Water Code Sections 13750 through 13755.22

D. Standard Conditions for Facilities Subject to California Code of Regulations, Title 23, Division 3, Chapter 15 (Chapter 15)

1. All classified waste management units shall be designed under the direct supervision of a California registered civil engineer or a California certified engineering geologist. Designs shall include a Construction Quality Assurance Plan, the purpose of which is to:
 - a. demonstrate that the waste management unit has been constructed according to the specifications and plans as approved by the Board.
 - b. provide quality control on the materials and construction practices used to construct the waste management unit and prevent the use of inferior products and/or materials which do not meet the approved design plans or specifications.
2. Prior to the discharge of waste to any classified waste management unit, a California registered civil engineer or a California certified engineering geologist must certify that the waste management unit meets the construction or prescriptive standards and performance goals in Chapter 15, unless an engineered alternative has been approved by the Board. In the case of an engineered alternative, the registered civil engineer or a certified engineering geologist must

certify that the waste management unit has been constructed in accordance with Board-approved plans and specifications.

3. Materials used to construct liners shall have appropriate physical and chemical properties to ensure containment of discharged wastes over the operating life, closure, and post-closure maintenance period of the waste management units.
4. Closure of each waste management unit shall be performed under the direct supervision of a California registered civil engineer or a California certified engineering geologist.

E. Conditions Applicable to Discharge Facilities Exempted from Chapter 15 Under Section 2511

1. If the discharger's wastewater treatment plant is publicly owned or regulated by the Public Utilities Commission, it shall be supervised and operated by persons possessing certificates of appropriate grade according to California Code of Regulations, Title 23, Division 4, Chapter 14.
2. By-pass (the intentional diversion of waste streams from any portion of a treatment facility, except diversions designed to meet variable effluent limits) is prohibited. The Board may take enforcement action against the discharger for by-pass unless:
 - a. (1) By-pass was unavoidable to prevent loss of life, personal injury, or severe property damage. (Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a by-pass. Severe property damage does not mean economic loss caused by delays in production); and
 - (2) There were no feasible alternatives to by-pass, such as the use of auxiliary treatment facilities or retention of untreated waste. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a by-pass that would otherwise occur during normal periods of equipment downtime or preventive maintenance; or
 - b. (1) by-pass is required for essential maintenance to assure efficient operation; and
 - (2) neither effluent nor receiving water limitations are exceeded; and
 - (3) the discharger notifies the Board ten days in advance.

The permittee shall submit notice of an unanticipated by-pass as required in paragraph B.1. above.

3. A discharger that wishes to establish the affirmative defense of an upset (see definition in E.6 below) in an action brought for noncompliance shall demonstrate, through properly signed, contemporaneous operating logs, or other evidence, that:

- a. an upset occurred and the cause(s) can be identified;
- b. the permitted facility was being properly operated at the time of the upset;
- c. the discharger submitted notice of the upset as required in paragraph B.1. above; and
- d. the discharger complied with any remedial measures required by waste discharge requirements.

In any enforcement proceeding, the discharger seeking to establish the occurrence of an upset has the burden of proof.

4. A discharger whose waste flow has been increasing, or is projected to increase, shall estimate when flows will reach hydraulic and treatment capacities of its treatment, collection, and disposal facilities. The projections shall be made in January, based on the last three years' average dry weather flows, peak wet weather flows and total annual flows, as appropriate. When any projection shows that capacity of any part of the facilities may be exceeded in four years, the discharger shall notify the Board by **31 January**.
5. Effluent samples shall be taken downstream of the last addition of wastes to the treatment or discharge works where a representative sample may be obtained prior to disposal. Samples shall be collected at such a point and in such a manner to ensure a representative sample of the discharge.

6. Definitions

- a. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with effluent limitations because of factors beyond the reasonable control of the Discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper action.
- b. The monthly average discharge is the total discharge by volume during a calendar month divided by the number of days in the month that the facility was discharging. This number is to be reported in gallons per day or million gallons per day.

Where less than daily sampling is required by this Order, the monthly average shall be determined by the summation of all the measured discharges by the number of days during the month when the measurements were made.

- c. The monthly average concentration is the arithmetic mean of measurements made during the month.
- d. The "daily maximum" **discharge** is the total discharge by volume during any day.

Waste Discharge to Land

- e. The "daily maximum" **concentration** is the highest measurement made on any single discrete sample or composite sample.
- f. A "grab" sample is any sample collected in less than 15 minutes.
- g. Unless otherwise specified, a composite sample is a combination of individual samples collected over the specified sampling period;
 - (1) at equal time intervals, with a maximum interval of one hour
 - (2) at varying time intervals (average interval one hour or less) so that each sample represents an equal portion of the cumulative flow.

The duration of the sampling period shall be specified in the Monitoring and Reporting Program. The method of compositing shall be reported with the results.

7. Annual Pretreatment Report Requirements:

Applies to dischargers required to have a Pretreatment Program as stated in waste discharge requirements.)

The annual report shall be submitted **by 28 February** and include, but not be limited to, the following items:

- a. A summary of analytical results from representative, flow-proportioned, 24-hour composite sampling of the influent and effluent for those pollutants EPA has identified under Section 307(a) of the Clean Water Act which are known or suspected to be discharged by industrial users.

The discharger is not required to sample and analyze for asbestos until EPA promulgates an applicable analytical technique under 40 CFR (Code of Federal Regulations) Part 136. Sludge shall be sampled during the same 24-hour period and analyzed for the same pollutants as the influent and effluent sampling analysis. The sludge analyzed shall be a composite sample of a minimum of 12 discrete samples taken at equal time intervals over the 24-hour period. Wastewater and sludge sampling and analysis shall be performed at least annually. The discharger shall also provide any influent, effluent or sludge monitoring data for nonpriority pollutants which may be causing or contributing to Interference, Pass Through or adversely impacting sludge quality. Sampling and analysis shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto.

- b. A discussion of Upset, Interference, or Pass Through incidents, if any, at the treatment plant which the discharger knows or suspects were caused by industrial users of the system. The discussion shall include the reasons why the incidents occurred, the corrective actions taken and, if known, the name and address of the industrial user(s) responsible. The discussion shall also include a review of the applicable pollutant limitations to determine whether any

additional limitations, or changes to existing requirements, may be necessary to prevent Pass Through, Interference, or noncompliance with sludge disposal requirements.

- c. The cumulative number of industrial users that the discharger has notified regarding Baseline Monitoring Reports and the cumulative number of industrial user responses.
- d. An updated list of the discharger's industrial users including their names and addresses, or a list of deletions and additions keyed to a previously submitted list. The discharger shall provide a brief explanation for each deletion. The list shall identify the industrial users subject to federal categorical standards by specifying which set(s) of standards are applicable. The list shall indicate which categorical industries, or specific pollutants from each industry, are subject to local limitations that are more stringent than the federal categorical standards. The discharger shall also list the noncategorical industrial users that are subject only to local discharge limitations. The discharger shall characterize the compliance status through the year of record of each industrial user by employing the following descriptions:
 - (1) Complied with baseline monitoring report requirements (where applicable);
 - (2) Consistently achieved compliance;
 - (3) Inconsistently achieved compliance;
 - (4) Significantly violated applicable pretreatment requirements as defined by 40 CFR 403.8(f)(2)(vii);
 - (5) Complied with schedule to achieve compliance (include the date final compliance is required);
 - (6) Did not achieve compliance and not on a compliance schedule;
 - (7) Compliance status unknown.

A report describing the compliance status of any industrial user characterized by the descriptions in items (d)(3) through (d)(7) above shall be **submitted quarterly from the annual report date** to EPA and the Board. The report shall identify the specific compliance status of each such industrial user. This quarterly reporting requirement shall commence upon issuance of this Order.

- e. A summary of the inspection and sampling activities conducted by the discharger during the past year to gather information and data regarding the industrial users. The summary shall include but not be limited to, a tabulation of categories of dischargers that were inspected and sampled; how many and how often; and incidents of noncompliance detected.

- f. A summary of the compliance and enforcement activities during the past year. The summary shall include the names and addresses of the industrial users affected by the following actions:
- (1) Warning letters or notices of violation regarding the industrial user's apparent noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the apparent violation concerned the federal categorical standards or local discharge limitations;
 - (2) Administrative Orders regarding the industrial user's noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations;
 - (3) Civil actions regarding the industrial user's noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations;
 - (4) Criminal actions regarding the industrial user's noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations.
 - (5) Assessment of monetary penalties. For each industrial user identify the amount of the penalties;
 - (6) Restriction of flow to the treatment plant; or
 - (7) Disconnection from discharge to the treatment plant.
- g. A description of any significant changes in operating the pretreatment program which differ from the discharger's approved Pretreatment Program, including, but not limited to, changes concerning: the program's administrative structure; local industrial discharge limitations; monitoring program or monitoring frequencies; legal authority of enforcement policy; funding mechanisms; resource requirements; and staffing levels.
- h. A summary of the annual pretreatment budget, including the cost of pretreatment program functions and equipment purchases.
- i. A summary of public participation activities to involve and inform the public.
- j. A description of any changes in sludge disposal methods and a discussion of any concerns not described elsewhere in the report.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2015-0012

WASTE DISCHARGE REQUIREMENTS
GENERAL ORDER FOR
IN-SITU GROUNDWATER REMEDIATION
AND DISCHARGE OF TREATED GROUNDWATER TO LAND

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Water Board) finds that:

1. On 6 December 2008 the Regional Water Board adopted General Order No. R5-2008-0149, General Order for In-Situ Groundwater Remediation at Sites with Volatile Organic Compounds, Nitrogen Compounds, Perchlorate, Pesticides, Semi-Volatile Compounds, Hexavalent Chromium and/or Petroleum Hydrocarbons. Between 2008 and 2014, over 50 Notices of Applicability (NOA) were issued for coverage under Order R5-2008-0149. It was apparent that some improvements to the order were warranted. The significant improvements consist primarily of additions to the pollutants covered under the order, specifying effluent limitations if an ex-situ treatment system is utilized, adding discharge of treated groundwater as part of a pump and treat system, and incorporating several modifications to the monitoring and reporting program to increase its functionality and versatility.
2. Order R5-2008-0149 and the NOAs issued pursuant to that Order are still in effect. No additional NOAs will be issued under that Order. The Order will be proposed for rescission once all of the projects under that Order are completed and the NOAs issued have been terminated. This updated version of the Order is not more restrictive to the projects covered under Order No. R5-2008-0149 and thus it is not necessary to enroll them under this Order.
3. Pursuant to Section 13263, subdivision (i) of the California Water Code (CWC), the Regional Water Quality Control Board may prescribe general waste discharge requirements (WDRs) for discharges produced by similar operations, involving similar types of wastes, and requiring similar treatment standards.
4. Discharges of volatile organic compounds (VOCs), perchlorate, nitrogen, pesticides, semi-volatile compounds, hexavalent chromium, sulfate and petroleum hydrocarbons have degraded groundwater at numerous sites within the Central Valley Region and cause or threaten to cause pollution or nuisance and adversely affect existing and potential beneficial uses of groundwater resources. Remediation of groundwater at these sites includes the use and application of in-situ biological, chemical, and/or physical treatments to degrade pollutants, or change them to less toxic or less mobile forms.
5. In-Situ remediation processes include adding amendments to create oxidizing or reducing conditions in the groundwater. Examples of such amendments include oxygen, alcohols, sugars, permanganate, ozone and lactate. Amendments may also be added to enhance bacteria populations. Examples of those amendments include nutrients (phosphorous,

nitrogen, potassium) and microbes. The amendments are usually injected into the treatment area or are added to extracted groundwater and recharged into the treatment area followed by extraction in a recirculation mode. The remediation may include extraction and treatment of groundwater, with the discharge of the treated groundwater back to the aquifer, applied to the land surface or injected into the vadose zone. The remediation processes can include groundwater extraction, treatment, and recirculation or discharge of treated groundwater to ground within the area undergoing treatment. For example, amendments may be injected into the treatment zone, or actively circulated through the treatment zone with groundwater recirculation. Treated groundwater may be discharged and further treated by land application. Pollutants other than those listed above, amendments, and treatment processes other than those listed, may also be considered for use under this Order. For those instances the applicability of the technology to the pollutant must be demonstrated, such as in a pilot test. Additional details are supplied in the Information Sheet, attached to this Order.

6. Adoption of general WDRs for these processes would: a) simplify the application process for dischargers, b) prevent regulatory delays to groundwater remediation activities, c) reduce time needed for Regional Water Board staff to prepare and the Regional Water Board to adopt WDRs for common remedial activities in the Central Valley Region, d) enhance protection of surface water quality by eliminating some discharges of treated groundwater to surface water, and e) provide a comparable level of water quality protection to individual, site-specific WDRs.
7. This Order regulates the use and application of in-situ biological, chemical, and physical treatments to clean up waste constituents in groundwater. The dischargers regulated by this Order are more appropriately regulated by general WDRs than individual WDRs because the Regional Water Board regulates many sites using this type of process, the cleanup of these type of sites is of high priority and the issuance of individual WDRs is time-consuming without providing additional benefit, and the types of treatment used have similar effects that can reasonably be regulated with general WDRs. This Order does not preclude the adoption of individual WDRs where appropriate.
8. The amendments that can be used to remediate groundwater pollution at a site in the Central Valley Region under this Order are limited to those listed in the CONDITIONS OF ELIGIBILITY, listed below. This Order is not intended for use and application of other materials to remediate groundwater pollution or for remediation of waste constituents in groundwater other than VOCs, perchlorate, nitrogen compounds (nitrate, ammonia, etc.), some selected pesticides and semi-volatile organic compounds, sulfate and petroleum hydrocarbons, unless it is demonstrated in a bench test that the technology is likely to be effective on the particular pollutant under site specific conditions.
9. The application of any material to groundwater may result in unintended adverse effects to groundwater quality. To comply with this Order, any potential adverse water quality effects that may occur must be localized, of short-term duration, and may not affect existing or potential beneficial uses of groundwater. Groundwater quality will be monitored before and after addition of any materials to verify both the effectiveness of the remediation and that no long-term adverse effect on beneficial uses of groundwater has occurred.

10. The addition of materials to remediate groundwater may require bench-scale and/or small-scale pilot testing prior to design and implementation of full-scale remediation. The addition of amendments to conduct pilot studies is also covered under this Order.

REGULATORY CONSIDERATIONS

11. *The Water Quality Control Plan, Fourth Edition, for the Sacramento and San Joaquin River Basins, Fourth Edition and The Water Quality Control Plan, Second Addition, for the Tulare Lake Basin* (hereafter Basin Plans) designate beneficial uses, establishes water quality objectives (WQOs), contains prohibitions, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Resources Control Board (State Water Board). Pursuant to ¶ 13263(a) of the California Water Code (CWC), waste discharge requirements must implement the Basin Plans.
12. The designated beneficial uses of underlying groundwater include, but are not limited to:
- Municipal and domestic water supply (MUN);
 - Agricultural water supply (AGR);
 - Industrial service supply (IND); and
 - Industrial process supply (PRO).
13. The Basin Plans establish numerical and narrative water quality objectives for surface water and groundwater within the basin, and recognizes that water quality objectives are achieved primarily through the Board's adoption of waste discharge requirements and enforcement orders. Where numerical water quality objectives are listed, these are limits necessary for the reasonable protection of beneficial uses of the water. Where compliance with narrative water quality objectives is required, the Board will, on a case-by-case basis, adopt numerical limits in orders, which will implement the narrative objectives to protect beneficial uses of the waters of the state. Finding No. 18 lists those numerical limits for compliance with the narrative objectives for this Order.
14. The Basin Plans identify numerical water quality objectives for waters designated as municipal supply. These are the maximum contaminant levels (MCLs) specified in the following provisions of Title 22, California Code of Regulations: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Table 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) of Section 64449. The Basin Plans' incorporation of these provisions by reference is prospective, and includes future changes to the incorporated provisions as the changes take effect. The Basin Plans recognize that the Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.
15. The Basin Plans contain narrative water quality objectives for chemical constituents, tastes and odors, and toxicity. The toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological

responses in humans, plants or animals. The chemical constituent objective requires that groundwater shall not contain chemical constituents in concentrations that adversely affect beneficial uses. The tastes and odors objective requires that groundwater shall not contain tastes or odors producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

16. State Water Board Resolution No. 92-49 (hereafter Resolution No. 92-49) requires the Regional Board to require actions for cleanup and abatement of discharges that cause or threaten to cause pollution or nuisance to conform to the provisions of State Water Board Resolution No. 68-16 (hereafter Resolution No. 68-16) and the Basin Plan. Pursuant to Resolution No. 92-49, the Regional Board shall ensure that dischargers are required to clean up and abate the effects of discharges in a manner that promotes attainment of either background water quality, or if background levels of water quality cannot be restored, the best water quality which is reasonable and which complies with the Basin Plan including applicable WQOs.
17. Resolution No. 68-16 requires the Regional Board in regulating discharges to maintain high quality waters of the State until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and potential beneficial uses, and will not result in water quality less than that described in plans and policies (e.g., quality that exceeds WQOs). Temporal degradation of groundwater may occur at sites subject to this Order within the defined treatment zone due to the amended groundwater injection. The temporary degradation allowed by this Order is consistent with Resolution No. 68-16 since (1) the purpose is to accelerate and enhance remediation of groundwater pollution and such remediation will benefit the people of the State; (2) the discharge facilitates a project to evaluate the effectiveness of cleanup technology in accord with Resolution No. 92-49; (3) the degradation is limited in scope and duration; (4) best practicable treatment and control, including adequate monitoring and a contingency plan to assure protection of water quality are required; and (5) the discharge will not cause WQOs to be exceeded beyond the transition zone and it is expected that increases in concentrations above WQOs caused by the treatment will be reduced over time. If the background concentration of a not-targeted-for-remediation constituent already exceeds the WQO listed in Finding 18, then the concentration of the constituent in the amendment as added to groundwater cannot exceed the WQO for that constituent. A slight residual increase in salts may occur at some sites subject to this Order but will be limited to a maximum 20 percent increase over background and less than the WQO listed below in Finding No. 18. See Groundwater Limitation E.3.
18. This Order addresses water quality as it relates to the amendments being injected, as well as the byproducts and breakdown products produced by the reactions of the injectants, pollutants being treated and native geological materials. Cleanup criteria for groundwater are established in an appropriate enforcement document such as a Record of Decision, Cleanup and Abatement Order, or Remedial Action Plan and are not discussed further as a part of this Order. As discussed above, amendments are injected to groundwater to stimulate reduction in concentrations of the target waste constituent and the target waste constituent may undergo a series of transformations to other constituents as it degrades.

The injected chemical itself may leave residuals of its constituent components, as well as cause changes in groundwater chemistry that liberate metals found in the formation geomaterials. Background/baseline concentrations of metals and total dissolved solids will be established pursuant to the attached Monitoring and Reporting Program. The applicable WQOs are the narrative toxicity objective, Primary and Secondary Maximum Contaminant Levels, and the narrative taste and odor objective as found in the Basin Plan. Numerical limits in this Order implement those WQOs. The following Table presents the numerical WQOs for potential waste constituents of concern at the site:

Constituent	WQO	Reference
trichloroethene	0.8 µg/L	California Public Health Goal
tetrachlorethene	0.06 µg/L	California Public Health Goal
vinyl chloride	0.05 µg/L	California Public Health Goal
cis 1,2-dichlorethene	6 µg/L	Primary Maximum Contaminant Level
1,2-dichlorethene	10 µg/L	Primary Maximum Contaminant Level
1,2-dichloroethane	0.4 µg/L	California Public Health Goal
1,1-dichloroethene	6 µg/L	Primary Maximum Contaminant Level
1,1-dichloroethane	3 µg/L	California Public Health Goal
1,2,3-trichloropropane	0.0007 µg/L	Draft California Public Health Goal
1,2-dichloropropane	0.5 µg/L	California Public Health Goal
1-chloropropane	280 µg/L	IRIS
propene	28 µg/L	Taste and Odor
iron	300 µg/L	Secondary Maximum Contaminant Level
manganese	50 µg/L	Secondary Maximum Contaminant Level
hexavalent chromium	10 µg/L	California Maximum Contaminant Level
total chromium	50 µg/L	Primary Maximum Contaminant Level
total dissolved solids	500 mg/L	Secondary Maximum Contaminant Level
sulfate	250,000 µg/L	Secondary Maximum Contaminant Level
sodium	20,000 µg/L	USEPA Health Advisory
bromate	10 µg/L	Primary Maximum Contaminant Level
chloride	106,000 µg/L	Agricultural Water Quality Goal – Food and Ag
Nitrate-N	10,000 µg/L	Primary Maximum Contaminant Level
Ammonium	1,500 µg/L	Taste and Odor
Perchlorate	6 µg/L	Primary Maximum Contaminant Level
Petroleum Hydrocarbons (gasoline)	5 µg/L	Taste and Odor
Diesel Oil	100 µg/L	Taste and Odor
Cyanide	150 µg/L	California Maximum Contaminant Level

- Some amendments used to stimulate degradation of waste constituents in groundwater have a salt component (generally sodium or potassium). Upon completion of the intended degradation process, the salt component remains. The groundwater in the Central Valley is severely degraded by salts and the Regional Water Board is intent on minimizing the discharge of salts to the groundwater. The use of non salt-containing injectants is preferred, and the Discharger is required to demonstrate that there are no non salt-containing injectant alternatives that will cost-effectively promote the degradation of the target constituent before being allowed to use a salt-containing injectant. See Discharge Specification D.3. Furthermore, the Discharger is required to establish background salt concentrations (total dissolved solids) and monitor the groundwater for changes in salt

concentrations during the life of the project. Increases in salt concentrations in ground water are restricted by Groundwater Limitation E.3, below.

20. On 6 February 2015, the Regional Water Board adopted a Mitigated Negative Declaration for this Order pursuant to the f the California Environmental Quality Act (Public Resources Code Section 21000, et seq.).
21. The discharge is exempt from the requirements of *Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste*, set forth in the Title 27, California Code of Regulations (CCR), section 20005 et seq. (hereafter Title 27), which allows a conditional exemption from some or all of the provisions of Title 27. The exemption, pursuant to Title 27 CCR Section 20090(b), is based on the following:
 - a. The Regional Water Board is issuing waste discharge requirements.
 - b. The discharge is in compliance with the applicable Basin Plans.
 - c. The wastewater does not need to be managed according to Title 22CCR, Division 4.5 and Chapter 11 as a hazardous waste.

Section 20090(d) allows exemption for a project to cleanup a condition of pollution that resulted from an unauthorized discharge of waste based on the following:

- d. The application of amendments to groundwater is at the direction of the Regional Water Board to cleanup and abate conditions of pollution or nuisance resulting from the unauthorized discharge of waste.
 - e. Wastes removed from the immediate place of release must be discharged according to the Title 27 regulations; and
 - f. The cleanup actions intended to contain wastes at the place of release shall implement the Title 27 regulations to the extent feasible.
22. Section 13267(b) of the California Water Code provides that:

“In conducting an investigation specified in subdivision (a), the Regional Board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish under penalty of perjury, technical or monitoring program reports which the Regional Board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In requiring these reports, the Regional Board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.”

The technical reports required by this Order and the attached Monitoring and Reporting Program are necessary to assure compliance with this Order. The Discharger operates the facility that discharges the waste subject to this Order.

23. The California Department of Water Resources sets standards for the construction and destruction of groundwater wells, as described in *California Well Standards Bulletin No. 74-90* (June 1991) and *Water Well Standards: State of California Bulletin No. 94-81* (December 1981). These standards, and any more stringent standards implemented by the Regional Water Board or adopted by the local county where the site is located pursuant to California Water Code Section 13801 apply to all monitoring and injection wells.
24. Section 3020(b)(2) of the Resource Conservation and Recovery Act (RCRA) states that prior to injection into or above an underground source of drinking water, contaminated groundwater shall be "...treated to substantially reduce hazardous constituents prior to such injection." In a letter dated 10 December 1999, the United States Environmental Protection Agency, Office of Solid Waste and Emergency Response (OSWER) states, "if extracted groundwater is amended at the surface (i.e., "treated") before reinjection, and the subsequent in-situ bioremediation achieves a substantial reduction of hazardous constituents the remedy would satisfy Section 3020(b)(2)." The injection of groundwater within the treatment zone in compliance with this Order, with or without the treatment for the constituents of concern, complies with Section 3020(2)(b) of RCRA.
25. Section 13304.1(b) of the California Water Code requires that the Regional Board shall consult with the affected groundwater management entity, if any, affected public water systems, and the State Department of Public Health prior to setting applicable water quality standards to be achieved at groundwater cleanup sites that are associated with an aquifer that is used as a drinking water source. Prior to issuing a Notice of Applicability under this Order for a specified project, the Regional Board will consult with the appropriate interested agencies.
26. Section 13307.5 of the California Water Code requires specific public participation actions if the site cleanup is being undertaken pursuant to a cleanup and abatement order. When applying this Order to sites subject to a cleanup and abatement order, the required public participation will be adhered to.

OTHER

27. Pursuant to California Water Code Section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.
28. All the above and the supplemental data and information and details in the attached Information Sheet, which is incorporated by reference herein, were considered in establishing the following conditions of discharge.

29. The Discharger and interested agencies and persons were notified of the intent to prescribe waste discharge requirements for this discharge and provided with an opportunity for a public hearing and an opportunity to submit written comments.
30. In a public meeting, all comments pertaining to this Order were heard and considered.

IT IS HEREBY ORDERED that, pursuant to Sections 13263 and 13267 of the California Water Code, Dischargers, in order to meet the provisions contained in Division 7 of the California Water Code, and regulations and guidelines adopted thereunder, shall comply with the following:

A. CONDITIONS OF ELIGIBILITY

1. A discharger may seek coverage under this Order to:
 - a. Add specific amendments directly to groundwater or indirectly through the soil column for the purpose of facilitating in situ remediation of waste constituents. The Discharger must demonstrate the effectiveness of the selected amendment(s), and demonstrate control of side reactions and breakdown products under site conditions.
2. To be covered under this Order, a discharger must provide the following:
 - a. A Notice of Intent/Report of Waste Discharge (Attachment A) following the instructions included in Attachment B, including additional information as required in Attachment 1 to the Notice of Intent;
 - b. A Regional Water Board approved Work Plan, Work Plan Addendums (if applicable), and/or a Remedial Action Plan or Cleanup Plan which includes application of an amendment that qualifies for coverage under this Order (The approval for the Work Plan or Remedial Action Plan needs to be dated within 24 months of the date of the Notice of Intent);
 - c. A proposed Monitoring and Reporting Program, based on Attachment C, incorporated herein by reference;
 - d. The first annual fee in accordance with the current version of the California Code of Regulation, Title 23, Division 7, Chapter 9, Waste Discharge Report and Requirements Article 1 -- fees for a discharge. The check or money order shall be made payable to the "State Water Resources Control Board".
 - e. A Contingency Plan to be implemented to correct unacceptable water quality effects.
3. This Order covers the following actions:

a. Pilot studies of limited extent and duration:

- i. When the amendments have previously been demonstrated (previous pilot tests or full-scale operations) to achieve the desired results and side reactions, byproducts, breakdown products, and residuals are understood.
- ii. When processes to remove byproducts, breakdown products, and residuals are identified and discussed in the Remedial Action Work Plan or Report of Waste Discharge.

b. Full-scale applications:

- i. When it has been demonstrated in a pilot study, or full-scale application at this site or a similar site, that the desired results can be achieved and side reactions, breakdown products, and residuals do not result in long-term adverse water quality effects.

4. Coverage under this Order applies to the following groups of amendments, except as specifically excluded in A5 below, provided the conditions in A1, A2, and A3 are satisfied:

a. Amendments that create reducing conditions (i.e., amendments that provide carbon, energy, electrons and/or macronutrients). Examples include:

- i. Zero valent metals such as iron or zinc
- ii. Easily degradable carbon sources such as glucose, acetate, citric acid, acetic acid, ethanol, methanol and others
- iii. Slowly degradable carbon sources such as edible oils, poly-lactate, and other hydrogen release compounds
- iv. Polysulfides
- v. Macro nutrients such as nitrate, phosphate, and potassium
- vi. Microorganisms cultured on site materials.

b. Amendments that create oxidizing conditions (i.e., amendments that provide oxygen or otherwise gain electrons). Examples include:

- i. Air
- ii. Oxygen
- iii. Ozone
- iv. Potassium or sodium permanganate
- v. Oxygen release compounds
- vi. Hydrogen peroxide

- c. Multiple amendments (includes application of reducing agents or oxidizing agents or both applied concurrently or over time as proposed in an approved Work Plan and the Notice of Intent). Examples include:
 - i. Establishing a reducing zone immediately downgradient of an oxidizing zone to reduce hexavalent chromium that may be produced under oxidizing conditions
 - ii. Providing a slowly degradable carbon source along with polysulfides to precipitate sulfates as metal sulfides.
 - d. Tracer compounds as discussed in Attachments A and B (Notice of Intent/Report of Waste Discharge).
 - e. Biofouling control agents such as chlorine dioxide, chlorine and bleach.
5. Amendments specifically excluded from coverage under this Order:
- a. Amendments that may cause violent exothermic reactions, such as Fenton's reagent.

B. NOTIFICATION OF COVERAGE

Project coverage under this Order shall not take effect until the Executive Officer notifies the Discharger in writing, by issuance of a Notice of Applicability which shall be a part of this Order, that coverage has been issued. The Executive Officer will not issue notification of project coverage under this Order prior to providing notice and a 30-day public comment period on the proposed issuance of coverage. Notification of project coverage under this Order shall not be issued if the Executive Officer finds that there may be significant effects on water quality, or finds that significant public controversy has arisen or will likely arise from the issuance of project coverage by this Order and that individual Waste Discharge Requirements should be considered at a regularly scheduled Regional Water Board meeting.

C. DISCHARGE PROHIBITIONS

1. The discharge of any amendment or other materials not specifically regulated by this Order is prohibited. These amendments and materials are those listed in the approved Work Plan required in A.2.b and the Notice of Applicability, as listed above.
2. Creation of a pollution, contamination, or nuisance, as defined by Section 13050 of the California Water Code (CWC), is prohibited.
3. The discharge of amendments or wastes to surface water or surface water drainage courses is prohibited.

4. The discharge of amendments to land or groundwater in areas other than that proposed for remediation is prohibited.
5. Discharge of waste classified as 'hazardous' under Section 2521, Chapter 15 of Title 23 or 'designated', as defined in Section 13173 of California Water Code is prohibited.
6. The discharge of amendments to property that is not under the control of the Discharger is prohibited. The "area under the control" of the Discharger is considered to be at the horizontal borders of the application area and owned by the Discharger and/or where the Discharger holds an agreement with the property owner for purposes of investigation and remediation.
7. If background groundwater contains concentrations of a constituent found in the amendment, above its WQO as listed in Finding 18, then the concentration of the constituent in the amendment as added cannot be greater than its WQO.

D. DISCHARGE SPECIFICATIONS

1. The Discharger shall not inject any amendments into the aquifer prior to receiving the Notice of Applicability nor prior to the construction of all necessary monitor wells listed in the Monitoring and Reporting Program.
2. The groundwater shall not be amended with materials other than those approved in the Notice of Applicability.
3. The Discharger will minimize the amount of amendments injected to the extent practicable.

E. GROUNDWATER DISCHARGE SPECIFICATIONS

1. The discharge from a groundwater treatment plant shall be only to those locations shown on Attachment E as provided with each individual Notice of Applicability.
2. The discharge flow from the groundwater treatment system shall not exceed that specified in the Notice of Applicability.
3. In the cases where treated or amended groundwater is recirculated back into the contaminant plume as part of in-situ treatment, non-target pollutants in the injectant must meet the limitations in Table 1 below or background concentrations as determined under Monitoring and Reporting Program R5-2015-0012.
4. In the cases where treated groundwater as part of a groundwater extraction and treatment system is discharged, or as part of an in-situ treatment project discharge outside of the plume, then the discharge shall not contain pollutants, for which the

Discharger is responsible for, in excess of the values found in Table 1. For constituents that are not the responsibility of the Discharger, the concentrations shall not exceed background values as established under Monitoring and Reporting Program R5-2015-0012.

Table 1: Effluent Limits for groundwater discharged to land (above or below ground surface):

Constituent	Effluent Limit
trichloroethene	0.5 µg/L
tetrachlorethene	0.5 µg/L
vinyl chloride	0.5 µg/L
cis 1,2-dichlorethene	0.5 µg/L
1,2-dichlorethene	0.5 µg/L
1,2-dichloroethane	0.4 µg/L
1,1-dichloroethene	0.5 µg/L
1,1-dichloroethane	0.5 µg/L
1,2,3-trichloropropane	0.5 µg/L
1,2-dichloropropane	0.5 µg/L
1-chloropropane	0.5 µg/L
propene	28 µg/L
perchlorate	6 µg/L
carbon tetrachloride	0.5 µg/L
cyanide	10 µg/L
dieldrin	0.0022 µg/L

- In the case of application of extracted groundwater to land as part of a phytoremediation project, then the discharge shall not contain concentrations of pollutants that are not targeted for phytoremediation in excess of those in Table 1. For pollutants not found in Table 1, the concentrations shall not exceed background concentrations as established under Monitoring and Reporting Program R5-2015-0012. In addition, if the phytoremediation project is for the remediation of nitrogen, then the discharge shall not be excess of the value determined to be needed for plant growth as specified in the Notice of Applicability.

F. GROUNDWATER LIMITATIONS

- The discharge shall not cause the pH of the groundwater at the compliance points, downgradient and outside the treatment and transition zones, to shift outside the range of 6.5 to 8.5.
- The release, injection, discharge, or addition of amendments from a remediation system shall not cause the groundwater at the compliance wells listed in Table 1 of the Monitoring and Reporting Program, which is attached to the Notice of Applicability, and any revisions thereto, to contain concentrations of chemical constituents, including the amendments and by-products of the in-situ treatment process, in amounts that exceed the Water Quality Objectives listed in Finding No. 18.

3. The release, injection, discharge or addition of amendments from a remediation system shall not cause the groundwater at the compliance wells listed in Table 1 of the Monitoring and Reporting Program attached to the Notice of Applicability, and any revisions thereto, to contain concentrations of metals, total dissolved solids, or electrical conductivity that are more than 20% greater than their respective background concentrations, as established by the Monitoring and Reporting Program attached to the Notice of Applicability, and any revisions thereto.
4. The release, injection, discharge or addition of amendments from a remediation system shall not cause the groundwater to contain taste or odor producing substances that cause nuisance or adversely affect beneficial uses at the compliance monitor points designated in Table 1 of the Monitoring and Reporting Program attached to the Notice of Applicability, and any revisions thereto.

F. PROVISIONS

1. The Discharger shall comply with all applicable Standard Provisions and Reporting Requirements for Waste Discharge Requirements, dated 1 March 1991, which are attached hereto and by reference a part of this Order. This attachment and its individual paragraphs are commonly referenced as Standard Provisions.
2. The Discharger shall comply with the Monitoring and Reporting Program, attached to the Notice of Applicability, and any revisions thereto, as ordered by the Executive Officer.
3. If an aboveground groundwater treatment system is used, then **at least 15 days prior to the commencement of operation** the Discharger shall submit an Operation and Maintenance (O&M) Plan for the groundwater treatment facilities. The O&M Plan shall instruct field personnel on how to manage the day-to-day discharge operations to comply with the terms and conditions of this Order and how to make field adjustments, as necessary. A copy of the O&M Plan shall be kept at the facility for reference by operating personnel. Key personnel shall be familiar with its contents. The O&M plan shall be modified as needed to respond to changes in system operations.
4. The Discharger may be required to submit technical reports pursuant to California Water Code Section 13267 as directed by the Executive Officer. The technical reports required by this Order are necessary to assure compliance with this Order.
5. All technical reports required herein that involve planning, investigation, evaluation, or design or other work requiring interpretation or proper application of engineering or geologic sciences, shall be prepared by, or under the direction of, persons registered to practice in California pursuant to California Business and Professions Code, sections 6735, 7835 and 7835.1. To demonstrate compliance with Title 16, CCR, Sections 415 and 3065, all technical reports must contain a statement of the

qualifications of the responsible registered professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.

6. A copy of this Order shall be maintained at the project site and be available at all times to operating personnel.
7. Provisions of this Order are severable. If any provision of these requirements is found invalid, the remainder of this Order shall not be affected.
8. The Discharger shall maintain in good working order and operate as efficiently as possible any facility or control system installed by the discharger to achieve compliance with this Order.
9. In the event of a violation of the order, or any material change in the character, location, or volume of the discharge, or if the Discharger is unable to comply with any of the conditions of this Order due to:
 - a. breakdown of any facility or control system or monitoring equipment installed by the Discharger to achieve compliance with this Order;
 - b. migration or application of amendments, pollutants or byproducts outside the specified treatment and transition areas;
 - c. accidents caused by human error or negligence; or
 - d. other causes such as acts of nature;

the Discharger shall notify the Regional Water Board by telephone within 24-hours after he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written notification shall include pertinent information explaining reasons for the noncompliance and shall indicate the steps taken to correct the problem and the dates thereof, and the steps being taken to prevent the problem from recurring. The reporting of migration or application of amendments, waste constituents or byproducts outside the specified treatment and transition areas shall include an assessment of and schedule for implementation of the contingency plans required in the Notice of Applicability.

10. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the discharger, the discharger shall notify the succeeding owner or operator of the following items by letter, in advance of the transfer of ownership or control, a copy of the notice must be forwarded to the Regional Water Board:

- a. existence of this Order; and
 - b. the status of the discharger's annual fee account
11. This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from his liability under Federal, State, or Local laws, nor create a vested right for the discharger to continue the waste discharge.
12. Chemical, bacteriological, and bioassay analyses must be conducted at a laboratory certified for such analyses by the State Department of Public Health.
13. All reports, Notice of Intent, or other documents required by this Order, and other information requested by the Regional Water Board shall be signed by a person described below or by a duly authorized representative of that person.
- a. for a corporation: by a responsible corporate officer such as: (a) a president, secretary, treasurer, or vice president of the corporation in charge of a principal business function; (b) any other person who performs similar policy or decision making functions for the corporation; or (c) the manager of one or more manufacturing, production, or operating facilities if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
 - b. Reports required by this Order, other information requested by the Regional Water Board, and Notices of Intent may be signed by a duly authorized representative provided:
 - i. the authorization is made in writing by a person described in paragraph (a) of this provision;
 - ii. the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company; and
 - iii. the written authorization is submitted to the Regional Water Board prior to or together with any reports, information, or applications signed by the authorized representative.
 - c. Any person signing a document under paragraph (a) or (b) of this provision shall make the following certification: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly

gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted, is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

14. The Discharger shall permit authorized staff of the Regional Water Board:
 - a. entry to the project site covered by this Order or in which any required records are kept;
 - b. access to copy any records required to be kept under terms and conditions of this Order;
 - c. inspection of monitoring equipment or records; and
 - d. sampling of groundwater or any discharge .
15. The Regional Water Board may review this Order periodically and may revise requirements when necessary. In addition, the discharger shall file a report of waste discharge with the Executive Officer at least 120 days before making any material change or proposed change in the character, location, or volume of the discharge.
16. This Order is in effect until terminated by the Executive Officer. Project coverage under this Order may be terminated by the Executive Officer at any time upon giving reasonable notice to the discharger.

I, Pamela C. Creedon, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 6 February 2015.

Original Signed by:
PAMELA C. CREEDON, Executive Officer

9/30/2014: AMM-AST-MLP