

**State of California
Regional Water Quality Control Board
Santa Ana Region
July 22, 2016**

Staff Report

Item: 8

Subject: Waste Discharge Requirements for *In situ* Remediation of Groundwater Impacted by Chlorinated Solvents and 1, 4-dioxane Associated with the Former Bell Industries Cleanup Site, Order No. R8-2016-0053

Summary

The proposed individual waste discharge requirements and associated monitoring and reporting program established pursuant to Order No. R8-2016-0053 will authorize Bell Industries to conduct *in situ* injections of the chemical amendment PersulfOx® (sodium persulfate), in order to remediate chlorinated solvents and 1,4-dioxane that are present in groundwater as a result of historical site operations conducted at the former circuit board manufacturing facility.

Background

The site is located at 1831 Ritchey Street, in the City of Santa Ana, and County of Orange. Bell Industries Inc. (Bell) operated a circuit board manufacturing facility at the site between the mid-1970s and 1993. A predecessor company also reportedly conducted similar operations at the site before it was acquired by Bell. Following site decommissioning, in 1993 and 1994, several phases of remedial excavation were performed to mitigate soil impacts beneath and adjacent to former process areas, including etching/plating areas, a laboratory, dark room developing facilities, floor drains, chemical storage areas, and a clarifier/sump.

Subsequent investigations revealed that discharges associated with the Bell facility's operations had impacted groundwater beneath, adjacent to, and downgradient of the former manufacturing site. Groundwater monitoring data indicate that chlorinated solvents and 1,4-dioxane attributable to Bell's historical discharges of waste have migrated downgradient, extending beneath commercial properties that are located south of Glenwood Place (situated both east and west of Ritchey Street), beyond the intersection of Ritchey Street and St. Andrew Place and surrounding parcels, more than 1,500 feet south/southwest of the site.

A dual-phase extraction system was operated on-site from 1999 until 2006, for remediation of chlorinated solvents in groundwater directly beneath the site. The

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Bell Industries Facility

remediation efforts subsequently transitioned to a pump-and-treat technology that was designed to accommodate increased groundwater removal rates in the basin, and provide for greater plume capture. In December 2007, system modifications were completed to incorporate extraction wells that were needed to mitigate off-site groundwater impacts located beneath the downgradient bakery property. In November 2008, additional system expansions were completed to incorporate several additional extraction points that would further augment the removal efforts and provide more comprehensive remediation of impacted groundwater beneath Ritchey Street, St. Andrews Place and other downgradient commercial properties. In July 2015, one additional well was added to the extraction well network, in order to provide more focused remediation of the contaminant core of dissolved-phase chlorinated solvents and 1,4-dioxane in groundwater beneath Ritchey Street. Groundwater extraction efforts are ongoing, and the remedial efforts continue to be optimized, as warranted.

As a result of these (ongoing) corrective action measures, overall declining trends in contaminant concentrations have been observed across the site and surrounding vicinity. Recent groundwater monitoring results indicate that the concentrations of chlorinated solvents and 1,4-dioxane in groundwater have been reduced not only in the immediate vicinity of extraction points, but also at locations along the eastern and western flanks and axis of the contaminant plume. Despite these successes, current monitoring data consistently indicate that elevated concentrations of chlorinated solvents and 1,4-dioxane persist in groundwater beneath and downgradient of the site.

In situ chemical oxidation (ISCO) remediation is being proposed to supplement the ongoing groundwater extraction/treatment activities (e.g. pump-and-treat), and further mitigate the groundwater impacts stemming from historical discharges of waste at the site. The proposed ISCO injection program was specifically designed to provide targeted “hot-spot” treatment of the recalcitrant chlorinated solvent and 1,4-dioxane impacts that are currently being observed in local shallow groundwater at the bakery property, located downgradient of the former Bell facility.

Discussion

The ISCO discharge covered by this Order includes injections of the chemical amendment PersulfOx® (sodium persulfate), which will be completed in the downgradient vicinity of Bell Industries’ former circuit board manufacturing facility, in order to remediate chlorinated solvents and 1,4-dioxane in groundwater stemming from historical discharges of waste at the site. The scope and procedures for this *in situ* chemical injection program were developed based upon a foundation of background information and site specific data presented in *Revised Remedial Action Plan* (dated February 4, 2008), as well as the results of laboratory bench scale tests, which indicated that the amendment was capable of destroying target contaminants in

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groundwater. The work scope was outlined in detail in the corrective action proposal, *In-Situ Chemical Oxidation Work Plan* (dated March 31, 2016), and was approved by Regional Water Board staff on May 26, 2016.

The proposed chemical injections could affect the quality of waters of the state (i.e. groundwater), and are therefore subject to waste discharge requirements (WDRs) in accordance with California Water Code (CWC) Section 13263. With proper management as required by Order No. R8-2016-0053, however, the potential effects should be localized, of short duration, and are not expected to unreasonably impair any existing or prospective beneficial uses of groundwater.

Order No. R8-2016-0053 includes WDRs to regulate the specified discharge for *in situ* remediation of waste constituents in groundwater, namely chlorinated solvents and 1,4-dioxane. While the CWC Section 13263(i) and Regional Board Order No. R8-2013-0029 have established criteria that allow for the prescription of general WDRs, the Regional Water Board finds that, due to site specific conditions, not all of the necessary criteria specified therein could be satisfied with respect to the proposed discharge. Specifically, because the objective of the proposed discharge is to provide targeted “hot-spot” treatment of constituents located within the contaminant core of the groundwater plume emanating from the former Bell Industries facility, no un-impacted monitoring point could be identified in close proximity to the treatment zone to serve as a “point of compliance.” As a result, the individual WDRs outlined by this Order are being prescribed to regulate the discharge.

Recommendation

Staff recommends that the Board adopt proposed waste discharge requirements Order No. R8-2016-0053, and accept the proposed monitoring and reporting program as presented.

STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION

ORDER NO. R8-2016-0053

**WASTE DISCHARGE REQUIREMENTS
FOR
IN SITU GROUNDWATER REMEDIATION
FORMER BELL INDUSTRIES FACILITY (SANTA ANA)
1831 RITCHEY STREET, SANTA ANA, ORANGE COUNTY**

The California Regional Water Quality Control Board, Santa Ana Region (hereinafter Regional Water Board), finds that:

1. Discharges of petroleum hydrocarbon compounds, volatile organic compounds (VOCs), heavy metals, pesticides, perchlorate, 1,4-dioxane and other types of contaminants have degraded groundwater at various sites throughout the Santa Ana Region, and have impacted or are threatening to impact beneficial uses of groundwater.
2. Groundwater cleanups at such sites may be accomplished via physical removal and treatment of site contaminants, or may employ the addition (discharge) of chemicals and other reactive materials (amendments) to soil and groundwater (*in situ*), to promote remediation. A person or entity applying or proposing to discharge such amendments to soil or groundwater to promote groundwater remediation within a specified treatment zone is referred to as a Discharger. For purposes of this Order, the Discharger is identified as Bell Industries, Inc. (Bell Industries).
3. *In situ* treatment includes processes such as oxygen enhancement, chemical oxidation, chemical reduction, biostimulation (addition of nutrients to enhance biodegradation), bioaugmentation (introducing appropriate bacteria), and biogeochemical transformation. The application of such amendments can be active, with hydraulic control of the treatment zone as the amendments are added to the extracted groundwater and recirculated through the subsurface, or passive, with the amendments injected into the treatment zone without hydraulic control.
4. For purposes of this order, the covered discharge includes injection of the chemical amendment PersulfOx®, a proprietary formulation of sodium persulfate, which will be completed in the downgradient vicinity of Bell Industries' former circuit board manufacturing facility, in order to remediate chlorinated solvent and 1,4-dioxane-impacted groundwater stemming from historical site releases. A total liquid volume of 7,322 gallons of 12% solution of PersulfOx® will be injected via a grid pattern of 32 direct-push borings distributed over an approximate 2,250 square foot treatment area. The amendment injections will occur in the 15-foot depth interval between 25 and 40 feet below ground surface, which corresponds to the shallow water-bearing zone underlying the site vicinity. The scope and procedures for this in situ chemical injection program were developed based upon a foundation of background information and site specific data presented in the *Revised Remedial Action Plan* for the site (dated February 4, 2008), as well as the results of laboratory bench scale tests, which indicated that the amendment was capable of destroying target contaminants in groundwater. The scope of discharges (injections) was outlined in

detail in the corrective action proposal, *In Situ Chemical Oxidation Work Plan* (dated March 31, 2016), and was subsequently approved by Regional Water Board staff on May 26, 2016.

5. The proposed discharge of PersulfOx® could affect the quality of waters of the state (i.e. groundwater), and is therefore subject to waste discharge requirements (WDRs) in accordance with California Water Code (CWC) Section 13263. With proper management as required by this Order, however, the potential effects will be localized, of short duration, and are not expected to unreasonably impair any existing or prospective beneficial uses of groundwater.
6. This Order includes WDRs to regulate the specified discharge for *in situ* chemical remediation of the specified waste constituents, namely chlorinated solvents and 1,4-dioxane in groundwater. Although the CWC Section 13263(i) and Regional Board Order R8-2013-0029 establish criteria that must be met to prescribe general WDRs, the Regional Water Board finds that, due to site specific conditions, not all of the necessary criteria specified therein were applicable to the proposed discharge. Specifically, because the objective of the proposed discharge is to treat target constituents located within the contaminant core of the groundwater plume, no un-impacted monitoring point could be identified in close proximity to the treatment zone to serve as a compliance point. As a result, the individual WDRs outlined by this Order are being prescribed to regulate the discharge.
7. State Water Resources Control Board (State Water Board) Resolution No. 68-16 requires that in regulating the discharge of waste, the high quality waters of the State shall be maintained unless it is demonstrated that any change in quality will be consistent with the maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in water quality control policies. The temporary degradation allowed by this Order, within the *in situ* treatment zone, is consistent with Resolution No. 68-16 because (a) the purpose of discharging amendments to the groundwater is to accelerate and enhance remediation of groundwater pollution, and such remediation will benefit the people of the State; (b) the degradation is limited in scope and duration; (c) best practicable treatment and control, including adequate monitoring and hydraulic control to assure protection of water quality, are required by this Order; and (d) the proposed discharge is not anticipated to cause water quality objectives (WQOs) to be exceeded beyond the observation monitoring well network, and potential increases in concentrations above WQOs within the zone of distribution are expected to be temporary, and not result in any long-term deleterious effects on water quality.
8. This Order is consistent with State Water Board Resolution No. 92-49: "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Section 13304 of the Water Code" by conforming with section III(F)(2)(b). This Order is also consistent with other applicable water quality policies and procedures, and regulations adopted by the State Water Board.
9. The Regional Water Board, acting in accordance with CWC section 13244, adopted a revised Water Quality Control Plan for the Santa Ana River Basin (hereinafter Basin Plan) on March 11, 1994. The Basin Plan was subsequently approved by the State Water Board on July 21, 1994. Subsequent revisions to the Basin Plan have also been adopted by the Regional Water Board and approved by the State Water Board as recently as February 2016. The Basin Plan identifies beneficial uses and WQOs for waters within the Santa Ana

Region, including Groundwater Management Zones (GMZs). The requirements contained in this Order are consistent with the Basin Plan.

10. In accordance with Section 2200, Title 23 of the California Code of Regulations (CCR), a discharger for whom WDRs have been prescribed is required to submit an annual fee to the State Water Board. The annual fee is based on (1) the threat to water quality and (2) the complexity of the discharge, in accordance with the ratings in the annual fee schedule contained in section 2200. It is expected that the discharge covered by this Order will have a threat to water quality of Category 3 and a complexity rating of B, for a combined rating of 3-B. Category 3 is the lowest threat to water quality category, and Category B is the middle complexity rating, for dischargers that have a physical, chemical or biological treatment system, and do not meet the higher complexity rating definition for Category A. Discharges with a rating of 3-B contain pollutants that could degrade water quality or cause a minor impairment of designated beneficial uses within the treatment zone of the receiving groundwater.
11. The discharge covered by this Order will have a site specific groundwater monitoring and reporting program that complies with requirements prescribed in this Order and will be subject to change by the Executive Officer.
12. The Regional Water Board is the lead agency pursuant to the California Environmental Quality Act (CEQA; Public Resources Code, Section 21100 et seq.). The issuance of WDRs for the cleanup of defined groundwater contamination plume(s) at existing facilities is exempt from CEQA in accordance with Section 15301, Article 19, Chapter 3, Division 6, Title 14 of CCR. Additionally, the actions authorized by these WDRs are expected to cause only minor alterations to land, and as such, are exempt from CEQA in accordance with Section 15304, Article 19, Chapter 3, Division 6, Title 14 of CCR.
13. The WDRs prescribed under this Order are not intended to alter or supersede any existing requirements of local governmental agencies.
14. The Regional Water Board has notified interested agencies and persons of its intent to prescribe WDRs for the discharge associated with Bell Industries *in situ* chemical injection program, and has provided them with an opportunity to submit their written views and recommendations.
15. The Regional Water Board in a public meeting held on July 22, 2016 heard and considered all comments pertaining to the prescribed WDRs.

IT IS HEREBY ORDERED that, pursuant to Section 13263 of the CWC, Bell Industries, Inc. is authorized to discharge under this Order and, in order to meet the provisions contained in Division 7 of the CWC, and regulations adopted thereunder, shall comply with the following:

A. DISCHARGE PROHIBITIONS

1. The discharge of wastes in a manner other than as described in this Order is prohibited.
2. The discharge of treated or untreated solid or liquid waste to a navigable waters or tributaries of navigable waters is prohibited, unless that discharge is covered under separate NPDES permits issued by the Regional Board.

3. The use of any amendment other than PersulfOx® (sodium persulfate) is prohibited.
4. The discharge of any radiological, chemical, or biological warfare agent or high level radiological waste is prohibited.
5. Discharges to groundwater and the surrounding geological formation that are conducted in a manner that increases the mobility and/or extent of the contaminant plume through fracturing of the geologic formation are prohibited. Additionally, fracturing of an aquitard that separates two distinct water bearing zones is prohibited under any condition.

B. DISCHARGE LIMITATIONS AND SPECIFICATIONS

1. The amendment injection program shall be designed and implemented in such a manner as to minimize or prevent the surfacing of wastes or an overflow of wastes or chemicals used in the treatment process. Any injection that results in excessive surfacing of waste shall be discontinued, and measures shall immediately be taken to eliminate further surfacing.
2. The discharge of amendments shall not cause total dissolved solids (TDS) to exceed the concentrations specified in Table 4-1 of the Basin Plan for the Orange County Groundwater Management Zone (GMZ), at any location outside the observation monitoring well network defined in the Monitoring and Reporting Program issued by the Executive Officer.
3. The discharge of amendments shall not cause nitrogen as nitrate-nitrogen (NO₃-N) to exceed the concentrations specified in Table 4-1 of the Basin Plan for the Orange County GMZ, at any point outside the observation monitoring well network defined in the Monitoring and Reporting Program.
4. The discharge of amendments shall not cause the pH of the receiving groundwater to exceed the range of 6 to 9, at any point outside the observation well network defined in the Monitoring and Reporting Program.
5. The discharge of amendments shall not cause the remediation-target constituents, including their intermediate degradation products, to exceed background concentrations at any location outside the observation monitoring well network defined in the Monitoring and Reporting Program.
6. The discharge of amendments shall not cause any other applicable WQOs specified in the Basin Plan to be exceeded in the affected groundwater at any point outside the observation monitoring well network defined in the Monitoring and Reporting Program.
7. The discharge shall not cause groundwater to contain taste or odor producing substances at concentrations that cause a nuisance or adversely affect beneficial uses at any location outside the observation monitoring well network defined in the Monitoring and Reporting Program.
8. The discharge of amendments to property that is not owned or under the control of the Discharger is prohibited. The property under the control of the Discharger includes the horizontal borders of the treatment zone where the Discharger holds an agreement with

the overlying property owner for purposes of investigation and remediation.

9. The discharge of amendments shall not cause the concentrations of chemical constituents of the receiving groundwater designated as domestic and municipal supply to exceed State or Federal Drinking Water Standards at any location outside the observation monitoring well network.
10. The monitoring program shall address changes in geochemistry that may alter the oxidation/reduction state of one or more constituents and consequently result in the production of non-desirable compounds such as hexavalent chromium, during the oxidation or reduction process in the *in situ* remediation under these WDRs.
11. The Executive Officer is hereby authorized to revise the information included in the Monitoring and Reporting Program, as deemed appropriate on a case by case basis.

C. PROVISIONS

1. Neither the treatment nor the discharge of waste shall create a pollution, contamination or nuisance, as defined by Section 13050 of the CWC.
2. A copy of this Order shall be available at all times to operating personnel.
3. The Discharger shall allow Regional Water Board staff to:
 - (a) Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Order,
 - (b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order,
 - (c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order, and
 - (d) Sample or monitor, at reasonable times for the purposes of assuring compliance with this Order or as otherwise authorized by the CWC, any substances or parameters at any location.
4. A Discharger who intentionally or negligently violates this Order shall be liable civilly in accordance with CWC Section 13350.
5. The CWC provides that any Discharger failing or refusing to furnish technical or monitoring program reports, as required by this Order, or falsifying any information provided in the monitoring reports, is guilty of a misdemeanor and is subject to a civil liability in accordance with CWC Section 13268.
6. The Discharger shall report any noncompliance that may endanger health or the environment. Any such information shall be provided orally or by email to: info8@waterboards.ca.gov to the Regional Water Board within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause;

the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected; the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The Executive Officer, or an authorized representative, may waive the written report on a case-by-case basis if the oral or the e-mail report has been received within 24 hours.

7. The Discharger shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this Order, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the noncompliance.
8. The Discharger shall furnish, under penalty of perjury, technical monitoring program reports; such reports shall be submitted in accordance with specifications prepared by the Executive Officer, which specifications are subject to periodic revisions as may be warranted (CWC Section 13267). This includes the Monitoring and Reporting Program that the Executive Officer issues to each Discharger, in accordance with this Order.
9. Where the Discharger becomes aware that it failed to submit any relevant facts in a ROWD or submitted incorrect information in a ROWD or in any report to the Regional Water Board, it shall promptly submit such facts or information.
10. (a) All reports of waste discharge submitted to the Regional Water Board pursuant to CWC Section 13260 shall be signed and certified as follows:
 - i. For a corporation – by a principal executive officer or at least the level of vice president,
 - ii. For a partnership or sole proprietorship – by a general partner or the proprietor, respectively
 - iii. For a municipality, state, federal, or other public agency – by either an executive officer or a ranking elected official.
- (b) All other reports required by this Order and other information required by the Regional Water Board shall be signed by a person designated in paragraph (a) of this provision, or by a duly authorized representative of that person. An individual is a duly authorized representative only if all of the following are true:
 - 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, and
 - iii. The written authorization is submitted to the Regional Water Board.
- (c) 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 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."

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 liability under federal, State or local laws, nor create a vested right for the Discharger to continue the discharge.
12. The provisions of this Order are severable, and if any provision of this Order, or the application of any provision of this Order to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Order, shall not be affected thereby.
13. This Order becomes effective on the date of adoption by the Regional Water Board. This Order is in effect until rescinded by the Regional Water Board. Coverage under this Order may be terminated by the Executive Officer at any time upon giving reasonable notice to the Discharger.
14. The discharger shall take all reasonable steps to comply with the requirements of the United States Environmental Protection Agency Underground Injection Control program, specified in the Code of Federal Regulation, Title 40, Part 144.12(a).

D. MONITORING AND REPORTING REQUIREMENTS

1. The Executive Officer is hereby authorized to prescribe a Monitoring and Reporting Program for the Discharger, as he deems appropriate.
2. The Discharger shall submit technical monitoring reports to the Regional Water Board in accordance with the Monitoring and Reporting Program specified by the Executive Officer and shall provide other reports as requested by the Executive Officer.

I, Kurt V. Berchtold, Executive Officer, do hereby certify that the forgoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, Santa Ana Region, on July 22, 2016.

Draft

Kurt V. Berchtold
Executive Officer

State of California
California Regional Water Quality Control Board
Santa Ana Region

Monitoring and Reporting Program (M&RP)
(As authorized under Order No. R8-2016-0053)
In-Situ Groundwater Remediation

for

Former Bell Industries Facility (Santa Ana)
1831 Ritchey Street, Santa Ana, Orange County
(Discharge Authorized on July 22, 2016)

A. MONITORING REQUIREMENTS

1. All sampling, sample preservation, transport and analyses must be conducted in accordance with the current edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association) and/or with U.S. Environmental Protection Agency's guidelines for sampling, collection and preservation, unless other test procedures have been specified in this Order or by the Executive Officer.
2. Unless otherwise permitted by the Executive Officer, all analyses shall be conducted at a laboratory certified for such analyses by the State Water Resources Control Board, Division of Drinking Water. The Executive Officer may allow use of an uncertified laboratory under exceptional circumstances, such as when the closest laboratory to the monitoring location is outside the State boundaries and, therefore, not subject to certification. All analyses shall be required to be conducted in accordance with the latest edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association) and/or with U.S. Environmental Protection Agency's guidelines for sampling, collection and preservation.
3. All chemical, bacteriological, and bioassay analyses shall be conducted at a laboratory certified for such analyses by the State Water Resources Control Board, Division of Drinking Water - Environmental Laboratory Accreditation Program (ELAP) or other State agency authorized to undertake such certification, or as approved by the Executive Officer.
4. For every item where the requirements are not met, the Discharger shall submit a statement of the actions undertaken or proposed that will bring the discharge into full compliance with requirements at the earliest time and submit a timetable for correction.
5. The Discharger shall report all instances of noncompliance, submit a statement of actions undertaken or proposed that will bring the discharge into full compliance with requirements, and submit a timetable for corrective action.
6. The Discharger shall notify the Executive Officer within 24 hours by telephone of any adverse condition resulting from the discharge; such notification shall be affirmed in writing within five working days.
7. If the Discharger monitors any contaminants more frequently than required by this order, using applicable test procedures, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharger's monitoring report. The increased frequency of monitoring shall also be reported.
8. All monitoring instruments and devices which are used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy.

9. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
10. Daily samples shall be collected on each day of the week.
11. Monthly samples shall be collected on any representative day of each month.
12. The Discharger shall assure that records of all monitoring information are maintained and accessible for a period of at least five years from the date of the sample, report, or application. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or by the request of the Regional Water Board at any time. Records of monitoring information shall include:
 - a. The date, exact place, and time of sampling or measurements;
 - b. The individual(s) who performed the sampling, and/or measurements;
 - c. The methods used for groundwater purging/sampling;
 - d. The date(s) analyses were performed;
 - e. The individual(s) who performed the analyses;
 - f. The analytical techniques or method used; and
 - g. All sampling and analytical results, including -
 - i. units of measurement used;
 - ii. minimum reporting limit for the analysis (minimum level);
 - iii. results less than the reporting limit but above the method detection limit (MDL);
 - iv. data qualifiers and a description of the qualifiers;
 - v. quality control test results (and a written copy of the laboratory quality assurance plan);
 - vi. dilution factors, if used; and
 - vii. sample matrix type.
13. The Discharger shall maintain all sampling, measurement and analytical results, including the date, exact place, and time of sampling or measurement; individual(s) who did the sampling or measurement; the method used for sampling or measurement; the date(s) and location(s) where analyses were conducted; analysts' name(s); and analytical techniques or methods used.
14. All reports and/or information submitted to the Executive Officer shall be signed by a responsible officer or duly authorized representative of the discharger and shall be submitted under penalty of perjury.
15. The Discharger shall file a report of any material change or proposed change in the character, location or volume of the discharge that is not mentioned in the RAP.

B. MONITORING PLAN

A sampling station shall be established for each point of discharge and shall be located where representative samples of the discharge can be obtained. The following shall constitute the monitoring program:

Table 1: Site Well Information

<i>Well Type</i>	<i>Well ID</i>	<i>Latitude</i>	<i>Longitude</i>	<i>Elevation¹ (feet amsl²)</i>
Injection points ³	P-1 through P-32	33.7215214	-117.8409165	79.16
Monitoring	OW-1A	33.7215214	-117.8409165	79.16
Monitoring	OW-2A	33.7214607	-117.8409213	78.64
Monitoring	OW-3A	33.7215007	-117.8407698	79.17
Monitoring	OW-1B	33.7215214	-117.8409165	79.08
Monitoring	OW-2B	33.7214708	-117.8409353	77.97
Monitoring	MW-20B-P	33.7214678	-117.8408415	78.74
Monitoring	MW-26B	33.7214738	-117.8411836	77.79
Monitoring	PDW-1	33.7214891	-117.8408985	78.93

1. Elevation is measured from the top of the well casing.
2. amsl: above mean sea level
3. Longitude and latitude coordinates and surface elevations for amendment injection points have been estimated and are approximate.

Table 2: Monitoring Parameters and Frequency¹

Sample Parameter	Parameter Type	Units	Method of Analysis	Sample Location	Sampling Frequency ²					
					Baseline ³	Week 1	Month 1	Month 2	Month 3 (Quarter 1)	Month 6 (Quarter 2)
Volatile Organic Compounds ⁴	Contaminant of Concern	µg/L	EPA 8260B	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X	X	X	X	X	X
1,4-dioxane	Contaminant of Concern	µg/L	EPA 8270C	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X	X	X	X	X	X
Total Dissolved Solids	General Groundwater Parameters	mg/L	SM 2540C	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X	X
Alkalinity	General Groundwater Parameters	mg/L	SM 2320B	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X	X
Anions - Chlorides, nitrates, sulfates, bromates, phosphorus	General Groundwater Parameters	mg/L	EPA 300.0	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X	X
Cations - Calcium, magnesium, manganese, potassium & sodium	General Groundwater Parameters	mg/L	EPA 200.7/6010B	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X	X
Metals (arsenic, barium, cadmium, chromium, copper, iron, lead & selenium)	Dissolved Metals	mg/L	EPA 200.7/6010B	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X	X
Hexavalent Chromium	Potential contaminant	µg/L	EPA 7199	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X	X

Total Organic Carbon	General Groundwater Parameters	mg/L	EPA 415.1	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X
Chemical Oxygen Demand	General Groundwater Parameters	mg/L	EPA 410.1	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X
Biochemical Oxygen Demand	General Groundwater Parameters	mg/L	EPA 405.1	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X
Methane, ethane, ethene	Dissolved Gasses	µg/L	AM20GAX	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X
Dissolved Carbon Dioxide/ Hydrogen Sulfide	General Groundwater Parameters	µg/L	SM 4500	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X
Dissolved Oxygen	Electron acceptor	mg/L	field meter	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X
Oxidation Reduction Potential	General Groundwater Parameters	mV	field meter	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X
Specific Conductivity	General Groundwater Parameters	µS/cm	field meter	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X
Turbidity	General Groundwater Parameters	NTU	field meter	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X
Temperature	General Groundwater Parameters	°C	field meter	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X
pH	General Groundwater Parameters	Std. unit	field meter	OW-1A/B, OW-2A/B, OW-3A, MW-20B-P, MW-26B & PDW-1	X		X		X

- Parameters and frequencies listed are required to evaluate changes in groundwater chemistry resulting from in-situ remediation activities and/or determine permit compliance and may not be inclusive of all requirements issued by the lead oversight agency.
- Depending on site conditions, specific monitoring parameters may be increased, reduced or eliminated by the Executive Officer, if appropriate. Based on site conditions, changes to the monitoring program may be proposed for future applications and/or full scale implementation.
- Baseline monitoring/sampling data for identified parameters was already previously collected from a representative well-set to document pre-injection site conditions.
- Quantification of volatile organic compounds must be performed by EPA Method 8260B and report the entire suite of constituents (full scan).

C. REPORTING REQUIREMENTS

1. All analytical data shall be reported with method detection limit¹ (MDLs) and with identification of either reporting level or limits of quantitation (LOQs).
2. Laboratory data for effluent samples must quantify each constituent down to the approved reporting levels for specific constituents. Any internal quality control data associated with the sample must be reported when requested by the Executive Officer. The Regional Water Board will reject the quantified laboratory data if quality control data are unavailable or unacceptable.
3. Discharge monitoring data shall be arranged in a manner that clearly demonstrates compliance and/or noncompliance with this Order. Monitoring results shall be reported in a tabulated format which identifies all applicable chemical constituents required to be analyzed under the monitoring program and presents the associated sample collection dates and analytical detections for each compound in relation to waste discharge limitations and requirements established by this Order.
4. For every item of monitoring data where the requirements are not met, the monitoring report shall include a statement discussing the reasons for noncompliance, and of the actions undertaken or proposed which will bring the discharge into full compliance with requirements at the earliest time, and an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Executive Officer by letter when compliance with the time schedule has been achieved.
5. Conclusions and recommendations regarding continuation of the existing process or any proposed modifications thereto shall be clearly presented for agency consideration, along with appropriate supporting justification or rationale.
6. All reports, plans and documents required under this Order shall be prepared under the direction of appropriately qualified professionals. The lead professional performing engineering and geologic evaluations and judgments shall sign and affix their professional geologist or civil engineering license stamp to all technical reports, plans or documents submitted to the Regional Water Board.
7. Monitoring reports are required to be submitted electronically via the Internet into the State Water Resources Control Board's GeoTracker database. To comply with state regulations, the update to the GeoTracker database must include the following minimum information:
 - a. The elevation of groundwater in any permanent monitoring well relative to the surveyed elevation.
 - b. A site map or maps showing the location of all sampling points referred to in the report.
 - c. The depth to the screened interval and the length of screened interval of any permanent monitoring well.
 - d. Boring logs, in PDF format.
 - e. Laboratory analytical data from any soil testing and/or groundwater monitoring shall be reported in Electronic Deliverable Format (EDF) in accordance with CWC Section 13195 et. seq. requirements, if applicable.
 - f. A complete copy of the report, in PDF format, which includes the signed transmittal letter and professional certification.

¹ The standardized test procedure to be used to determine the method detection level (MDL) is given at Appendix B, 'Definition and Procedure for the Determination of the Method Detection Limit' of 40 CFR 136.

Once the information has been uploaded to GeoTracker, Regional Board staff should be notified that information as required under M&RP No. R8-2016-0053 has been uploaded to GeoTracker on MM-DD-YYYY (date of GeoTracker upload).

The GeoTracker website address is <https://geotracker.waterboards.ca.gov>.
Deadlines for GeoTracker submittals coincide with deadlines for the report submittals.

D. REPORT SCHEDULE

Monitoring reports shall include all data collected during the monitoring period, and shall be submitted on a quarterly basis to Regional Water Board staff in accordance with the following schedule:

<i>Monitoring Period</i>	<i>Report Due</i>
January – March	May 1 st
April – June	August 1 st
July – September	November 1 st
October – December	February 1 st

The Executive Officer has the authority to change the report submittal schedule, if deemed necessary, based on changes to the Site conditions.

DRAFT

Ordered by: _____
Kurt V. Berchtold
Executive Officer

Date: _____