
Central Valley Regional Water Quality Control Board

1 July 2015

Mr. Chris Bennett, Plant Manager
OLAM West Coast, Inc.
47641 West Nees Avenue
Firebaugh, CA 93622

NOTICE OF APPLICABILITY FOR WASTE DISCHARGE REQUIRMENTS GENERAL ORDER FOR IN-SITU REMEDIATION AND DISCHARGE OF TREATED GROUNDWATER TO LAND, R5-2015-0012, OLAM WEST COAST, INC., 47641 WEST NEES AVENUE, FIREBAUGH, FRESNO COUNTY

Olam West Coast, Inc. (Discharger) submitted a Notice of Intent dated 3 April 2015 requesting coverage under Waste Discharge Requirements General Order for In-situ Remediation and Discharge of Treated Groundwater to Land, R5-2015-0012.

Project Location:

The project is at and in the vicinity of 47641 West Nees Avenue, Firebaugh, Fresno County.

Project Description:

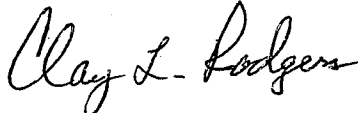
Petroleum hydrocarbon product was released from former aboveground storage tanks and associated appurtenances at the subject site which has degraded underlying soil and groundwater beneath the site. The Discharger is proposing to inject PersulfOx[®], a proprietary catalyzed formulation of persulfate, at multiple single injection points into the aquifer beneath the facility and in the vicinity of the source area. See attached Figure 2 as taken from the Pilot Test Work Plan Addendum for proposed injection point locations. The PersulfOx[®] will be injected into fifty onsite injection wells in the northwest section of the facility. Three groundwater monitoring wells will be installed as part of the proposed pilot test. Monitoring well MW-5 will be installed downgradient, monitoring well MW-6 will be installed in the source area, and monitoring well MW-7 will be installed upgradient of the source area pilot test injection points. Existing downgradient and offsite monitoring well MW-4 will also be part of the monitoring and reporting program associated with the proposed pilot test. All wells will be monitored for the presence of petroleum hydrocarbon products (diesel and gasoline), volatile organic constituents (VOCs), and PersulfOx[®] breakdown products (sulfates).

The Discharger will also conduct groundwater sampling and report the results in accordance with the attached Groundwater Monitoring and Reporting Program R5-2015-0012-005. If the Discharger desires to substantially modify the proposed injection project, a revised Notice of Intent must be submitted and a new Notice of Applicability received prior to proceeding with any addition or modification to the proposed injection project.

General Information:

1. The project shall be operated in accordance with the requirements contained in the General Order and in accordance with the information submitted in the Notice of Intent.
2. The required annual fee (as specified in the annual billing you will receive from the State Water Resources Control Board) shall be submitted until this Notice of Applicability is officially revoked.
3. The Discharger shall comply with the attached Waste Discharge Requirements General Order for In-situ Remediation and Discharge of Treated Groundwater to Land, R5-2015-0012.
4. Injection of any material other than PersulfOx[®] into the proposed injection wells is prohibited.
5. 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.
6. The Discharger shall comply with the attached Monitoring and Reporting Program R5-2015-0012-005, and any revisions thereto as ordered by the Executive Officer.

If you have any questions regarding this matter, please telephone Anthony Medrano at (559) 488-4395 or contact him by email at anthony.medrano@waterboards.ca.gov.

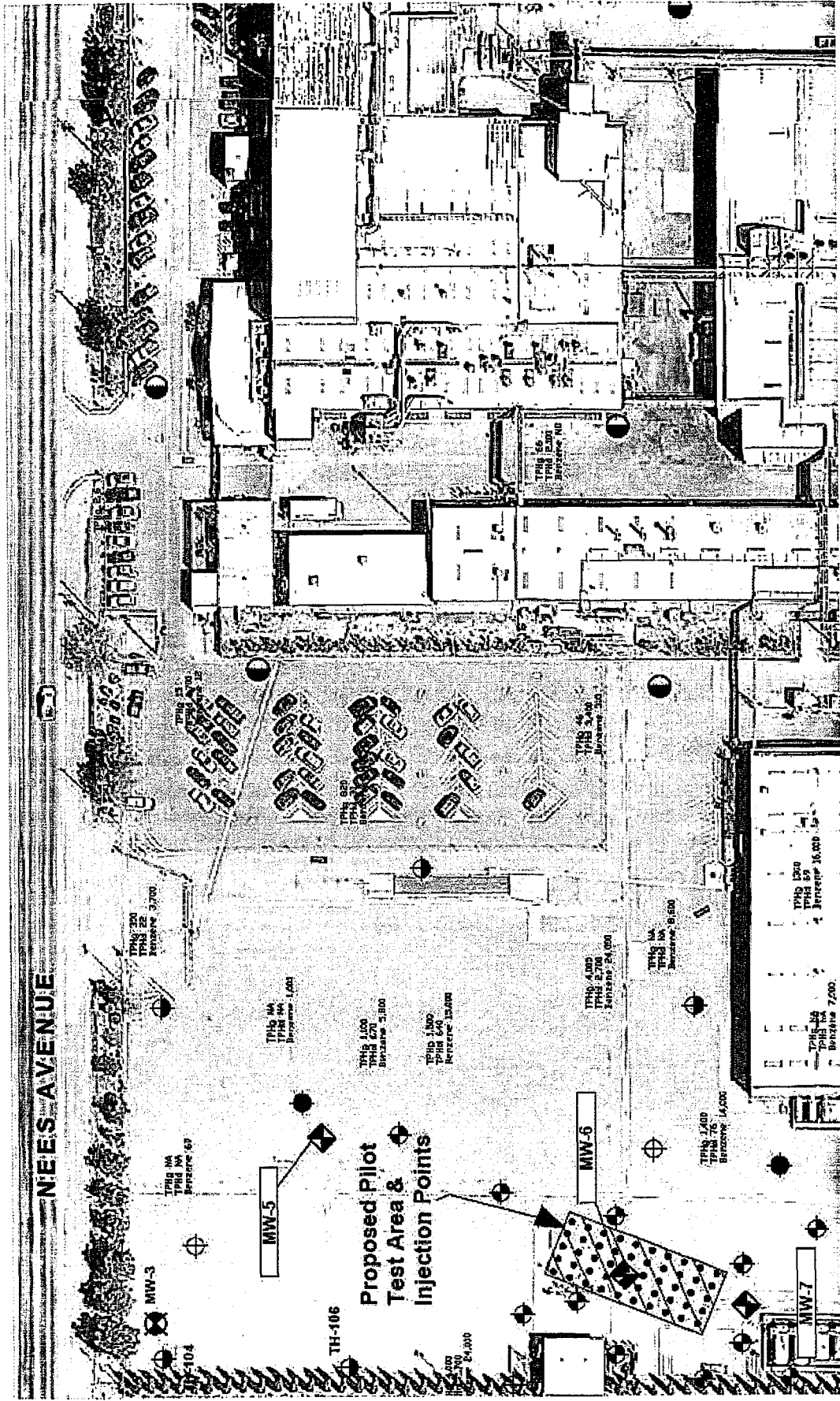


for Pamela C. Creedon
Executive Officer

Attachment: Figure
General Order R5-2015-0012
Monitoring and Reporting Program R5-2015-0012-005
Standard Provisions dated 1 March 1991

cc: Della Kramer, Regional Water Quality Control Board, Rancho Cordova
Fresno County Environmental Health Department, Fresno
Nazer Ali, Olam West Coast Inc., 47641 West Nees Avenue, Firebaugh, CA 93622
Phil Feebeck, Olam West Coast Inc., 47641 West Nees Avenue, Firebaugh, CA 93622
Andrew Burgin, BSK Associates, 550 West Locust Avenue, Fresno, CA 93650

Figure 2



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:
 - a. Municipal and domestic water supply (MUN);
 - b. Agricultural water supply (AGR);
 - c. Industrial service supply (IND); and
 - d. 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 |
| tetrachloroethene | 0.06 µg/L | California Public Health Goal |
| vinyl chloride | 0.05 µg/L | California Public Health Goal |
| cis 1,2-dichloroethene | 6 µg/L | Primary Maximum Contaminant Level |
| 1,2-dichloroethene | 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 | 0.5µg/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

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM R5-2015-0012-005

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

OLAM WEST COAST, INC.
47641 WEST NEES AVENUE, FIREBAUGH
FRESNO COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring a groundwater remediation pilot test for Olam West Coast Inc., 47641 West Nees Avenue, Firebaugh, California. This MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. As appropriate, California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) staff shall approve specific sample station locations prior to implementation of sampling activities.

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

GROUNDWATER MONITORING

As shown on Figure 2, there are 7 groundwater monitor wells and 50 injection wells/trenches associated with this project. The groundwater monitoring program for these wells and any treatment system wells installed subsequent to the issuance of this MRP shall follow the schedule below. Monitor wells with free phase petroleum product or visible sheen shall be monitored, at a minimum, for product thickness and depth to water. The volume of extracted groundwater, if applicable, shall also be provided in quarterly monitoring reports. Sample collection and analysis shall follow standard EPA protocol.

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

Table 1: Sampling Frequency and Constituent Suite

| Well Number ⁽¹⁾ | Constituent ⁽²⁾ | Frequency | Monitoring Objective |
|----------------------------|--|-----------|--------------------------------|
| MW-4 | Volatile Organic Compounds (VOCs), petroleum hydrocarbons, sulfate, and sodium | Monthly | Compliance ⁽³⁾ |
| MW-6 | VOCs, petroleum hydrocarbons, sulfate, and sodium | Monthly | Treatment Zone ⁽⁴⁾ |
| MW-5 | VOCs, petroleum hydrocarbons, sulfate, and sodium | Monthly | Transition Zone ⁽⁵⁾ |
| MW-7 | VOCs, petroleum hydrocarbons, sulfate, and sodium | Monthly | Background ⁽⁶⁾ |

¹ Well numbers as shown on Figure 2.

² Constituent suite components listed in Table 2.

³Wells used to determine compliance with water groundwater limitations.

⁴Wells sampled to evaluate in-situ remediation progress inside the treatment zone.

⁵Wells sampled to evaluate migration of pollutants within the treatment zone.

⁶Wells used to develop background concentrations.

Table 2: Analytical Methods

| Constituent | Method ⁽¹⁾ | Maximum Practical Quantitation Limit (µg/L) ⁽²⁾ |
|--|-----------------------|--|
| Volatile Organic Compounds | EPA 8020 or 8260B | 0.5 |
| Total Petroleum Hydrocarbons as diesel | EPA 8015B | 50 |
| Total Petroleum Hydrocarbons as gasoline | EPA 8015B | 50 |
| Sodium | EPA 200.7 | 1000 |
| Sulfate | EPA 300 | 2000 |

¹Or an equivalent EPA Method that achieves the maximum Practical Quantitation Limit.

²All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported as an estimated value.

FIELD SAMPLING

In addition to the above sampling and laboratory analyses, field sampling and analysis shall be conducted each time a monitor well or extraction well is sampled. The sampling and analysis of field parameters shall be as specified in Table 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 / Laboratory Testing |
| Electrical Conductivity | uhmos/cm | 50 µS/cm | Field Meter |
| pH | pH Units (to 0.1 units) | 0.1 units | Field Meter |
| Temperature | °F/°C | 0.1 °F/°C | Field Meter |

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

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

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

IN-SITU DISCHARGE MONITORING

The Discharger shall monitor daily the discharge of water and amendments that are 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 Volume | gallons per day | Meter |
| Amendment(s) Added | pounds per day | Measured |

AMENDMENT ANALYSIS

Prior to use, amendments shall be analyzed for the constituents listed in Table 5. The analysis should be done on a mixture of the amendment and deionized water at the estimated concentration that would be injected during the pilot project.

Table 5: Amendment Analytical Requirements

| Constituent | Method ¹ | Maximum Practical Quantitation Limit (µg/L) ² |
|--------------------------------|---------------------|--|
| General Minnerals ³ | Various | |
| Sodium | EPA 200.7 | 1000 |
| Sulfate | EPA 300 | 2000 |
| pH. | Meter | 0.1 units |
| Electrical Conductivity | Meter | 50 µS/cm |

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, and reported as an estimated value.

³ Alkalinity, bicarbonate, potassium, chloride, sulfate, total hardness, nitrate, nitrite, ammonia.

ESTABLISHMENT OF BACKGROUND CONCENTRATION VALUES

The Discharger shall develop initial background values for concentrations of constituents such as VOCs, petroleum hydrocarbons, sodium, and sulfate in groundwater prior to the start of the pilot test. A minimum of two rounds of samples must be collected and analyzed for VOCs, petroleum hydrocarbons, sodium, and sulfate prior to the start of the pilot test. The two rounds of samples should be collected a minimum of two weeks apart.

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 extraction system. The results of any

monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall also be reported to the Central Valley Water Board.

As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all reports shall be prepared by a registered professional Civil Engineer or Geologist or their subordinate and signed by the registered professional.

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

Each quarterly report shall include the following minimum information:

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

An Annual Report shall be submitted to the Central Valley Water Board by **1 February** of each year. This report shall contain an evaluation of the effectiveness and progress of the investigation and remediation. The Annual Report may be substituted for the fourth monitoring

report as long as it contains all of the information required for that report plus that required for the Annual Report. The Annual Report shall contain the following minimum information:

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

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

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

Ordered by:

Clay L. Rodgers

for PAMELA C. CREEDON, Executive Officer

7/1/15

(Date)