

INFORMATION SHEET

ORDER NO. R5-2010- XXXX
AEROJET-GENERAL CORPORATION
PROPELLANT BURN AREA AND GET F SPRAYFIELD
GROUNDWATER REMEDIATION PROJECT
INACTIVE RANCHO CORDOVA TEST SITE
SACRAMENTO COUNTY

Background

The Aerojet-General Corporation (Aerojet), along with the Boeing Company (Boeing), as directed by the Central Valley Regional Water Quality Control Board (Regional Board) and the Department of Toxic Substances Control (DTSC), are initiating cleanup of groundwater beneath the Inactive Rancho Cordova Test Site (IRCTS). The IRCTS consists of approximately 4000 acres in eastern Sacramento County to the east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Road. Past rocket-testing operations and disposal practices by The McDonnell-Douglas Corporation and/or Aerojet have caused the groundwater beneath the IRCTS to have become polluted with volatile organic contaminants (VOCs) and perchlorate. Several plumes of contaminants originate on the IRCTS with the largest plume extending approximately 2.7 miles west of the IRCTS.

Groundwater beneath the IRCTS is contaminated by VOCs and perchlorate. The primary VOCs in the groundwater are trichloroethylene (TCE) and cis-1,2-Dichloroethylene (cis-1,2-DCE) at concentrations up to 710 micrograms per liter ($\mu\text{g/L}$) and 25 $\mu\text{g/l}$, respectively. Concentrations of perchlorate have been measured up to 32,000 $\mu\text{g/L}$. Aerojet and Boeing have completed an Engineering Evaluation/Cost Analysis (EE/CA) for the containment of the plume of perchlorate contaminated groundwater extending west from the IRCTS and across Mather Field. Aerojet and Boeing are in the process of constructing facilities to control the plume by extracting groundwater at the plume boundaries, treating the extracted water to remove the pollutants, and discharging the treated water. In addition, Aerojet and Boeing are evaluating alternatives for remediation of the contaminant plumes, both on and off of the IRCTS.

Groundwater Remediation Project

One of the alternatives being evaluated by Aerojet and Boeing for cleaning up the contaminated groundwater is controlling and remediating the groundwater pollution at the Propellant Burn Area and GET F Sprayfield source areas. The groundwater at these two sites contains elevated concentrations of perchlorate and low concentrations of TCE. The project is designed to operate with minimal intrusion on future development of the IRCTS. The project proposes to extract groundwater using up to nine extraction wells. The water is passed through vessels filled with granular activated carbon (if needed for VOC removal). The flow then proceeds to a modular biotreatment cell (MBC) to remove perchlorate. The MBC consists of a geomembrane-lined 8-foot by 8-foot by 40-foot long steel container. The container is filled with approximately 95 cubic yards of $\frac{3}{4}$ -inch crushed rock. The crushed rock serves as a media to support the growth of indigenous bacteria. Influent and effluent piping, and a water level probe and an oxidation-reduction potential (ORP) probe will be installed in the effluent piping prior to discharge to an aeration system. The ORP probe will be used for process

control. A 50% solution of citric acid will be used as the electron donor for the biodegradation of perchlorate and will be metered into the influent piping after the GAC vessels. The daily quantity of citric acid will likely be less than one gallon per day for each MBC to yield an ORP value of approximately -200 millivolts. . The volume of citric acid could be as much as 10 gallons per day for maximum flow and potential maximum concentrations of electron acceptors (dissolved oxygen, nitrate, perchlorate). The actual amount of citric acid used is dependent on the concentrations of dissolved oxygen, nitrate and perchlorate in the groundwater and the flow from the extraction well. Aerojet may switch citric acid with soybean oil methyl ester (biodiesel) or similar donor. The biodiesel is a more efficient donor and less expensive than citric acid. Other electron donors could be acceptable with advanced notification and approval by staff of the Regional Water Board.

It is estimated that the maximum flow rate will be no more than 100 gpm per MBC. The flow that could be placed through each box is dependent on the concentration as the higher the concentration, the greater retention time is needed to completely remove the perchlorate. The total number of MBCs required will therefore be dependent on flow produced by the each extraction well and the concentration of the perchlorate in each extraction well. As the MBC units are of consistent size, the MBC units may be operated in parallel or in series depending on flow, concentration and relative closeness of the extraction wells to each other.

Aerojet will initially be installing a single extraction well and treatment system at the Propellant Burn Area. The MBC will be checked for appropriate flow distribution using Rhodamine WT or Fluorescein dye at a maximum concentration of 100 µg/L and then fed with electron donor to commence buildup of the biomass. The system will be in a recirculation mode during the period of biomass development. Initial discharge of the system will be to areas of elevated perchlorate concentrations in soil at the Propellant Burn Area. This will help flush the perchlorate to the groundwater for subsequent capture by the extraction well(s) and not place residual perchlorate on clean soils while the treatment system comes to steady-state operation. If the system proves viable for long-term operation, additional extraction wells and treatment systems will be added until plume capture is achieved.

Basin Plan, Beneficial Uses, and Regulatory Considerations

Surface water drainage from the project area is to Morrison Creek, tributary to the Sacramento River. The *Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region, Fourth Edition* (Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin. Beneficial uses often determine the water quality objectives that apply to a water body. For example, waters designated as municipal and domestic supply must meet the maximum contaminant levels (MCLs) for drinking waters. The Basin Plan sets forth the applicable beneficial uses (industrial, agricultural, and domestic supply in this instance) of groundwater, procedure for application of water quality objectives, and the process for and factors to consider in allocating waste assimilation capacity.

Antidegradation

The antidegradation directives of Section 13000 of the California Water Code require that waters of the State that are better in quality than established water quality objectives be maintained "consistent with the maximum benefit to the people of the State." Waters can be of high quality for some constituents or beneficial uses and not others. Policies and procedures for complying with this directive are set forth in the Basin Plan (including by reference State Water Board Resolution No. 68-16, "Statement of Policy With Respect to Maintaining High Quality Waters in California," or "Antidegradation" Policy).

Resolution 68-16 is applied on a case-by-case, constituent-by-constituent basis in determining whether a certain degree of degradation can be justified. It is incumbent upon the Discharger to provide technical information for the Board to evaluate that fully characterizes:

- All waste constituents to be discharged;
- The background quality of the uppermost layer of the uppermost aquifer;
- The background quality of other waters that may be affected;
- The underlying hydrogeologic conditions;
- Waste treatment and control measures;
- How treatment and control measures are justified as best practicable treatment and control;
- The extent the discharge will impact the quality of each aquifer; and
- The expected degradation to water quality objectives.

In allowing a discharge, the Board must comply with CWC section 13263 in setting appropriate conditions. The Board is required, relative to the groundwater that may be affected by the discharge, to implement the Basin Plan and consider the beneficial uses to be protected along with the water quality objectives essential for that purpose. The Board need not authorize the full utilization of the waste assimilation capacity of the groundwater (CWC 13263(b)) and must consider other waste discharges and factors that affect that capacity.

As stated above, groundwater will be extracted, treated and recharged through the vadose zone and eventually recharge the aquifer. Groundwater quality will be monitored to assess the impacts due to the project. The groundwater flowing from the project area will be captured by the extraction system being installed by Aerojet. No degradation should occur as a result of the discharge.

Title 27

Title 27, CCR, section 20380 et seq. ("Title 27"), contains regulations to address certain discharges to land. Title 27 establishes a waste classification system, specifies siting and construction standards for containment of classified waste, requires extensive monitoring of groundwater and the unsaturated zone for any indication of failure of containment, and specifies closure and post-closure maintenance requirements. Generally, no degradation of groundwater quality by any waste constituent is acceptable. The proposed discharge will not degrade groundwater quality. The project will be removing perchlorate and VOCs from the groundwater.

Proposed Order Terms and Conditions

Discharge Prohibitions and Specifications

The proposed Order establishes a discharge flow limit of 144,000 gallons per day per treatment system. The proposed Order's discharge specifications for the electron donor are designed to minimize residual salts and to maintain all beneficial uses of the groundwater.

Monitoring Requirements

Section 13267 of the CWC authorizes the Board to require monitoring and technical reports as necessary to investigate the impact of a waste discharge on waters of the state. In recent years there has been increased emphasis on obtaining all necessary information, assuring the information is timely as well as representative and accurate, and thereby improving accountability of any discharger for meeting the conditions of discharge. Section 13268 of the CWC authorizes assessment civil administrative liability where appropriate.

This Order requires effluent and groundwater monitoring requirements, including flow rates. In order to adequately characterize its discharge, Aerojet is required to monitor for VOCs, perchlorate, electron donor, dissolved metals, dissolved oxygen, total dissolved solids and pH.