

INFORMATION SHEET

ORDER NO. R5-2006-XXXX
THE BOEING COMPANY
SOUTHERN GROUNDWATER STUDY AREA EXTRACTION AND TREATMENT SYSTEM
INACTIVE RANCHO CORDOVA TEST SITE
SACRAMENTO COUNTY

Background

The Boeing Company, as directed by the Board and the Department of Toxic Substances Control, is initiating cleanup of groundwater beneath the Inactive Rancho Cordova Test Site (IRCTS). The IRC TS 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 The Aerojet-General Corporation, have caused the groundwater beneath the IRC TS to have become polluted with volatile organic contaminants (VOCs) and perchlorate. The Southern Groundwater Study Area (SGSA) comprises approximately the southern half of the IRC TS.

The primary VOCs in the groundwater are trichloroethylene (TCE) and cis-1,2-Dichloroethylene (cis-1,2-DCE) at concentrations up to 380 micrograms per liter ($\mu\text{g/L}$) and 25 $\mu\text{g/L}$, respectively. Perchlorate has also been found at concentrations up to 1200 $\mu\text{g/L}$ in the plume emanating from the Alpha Complex. Concentrations of TCE up to 710 $\mu\text{g/L}$ and have been found in perched groundwater beneath the site. The Boeing Company has completed a Remedial Investigation/Feasibility Study for the vadose zone at the Administrative Area and for the soils and groundwater in the SGSA. Interim remedial measures, consisting of soil vapor extraction systems, to reduce the concentration of VOCs in the vadose zone have removed about 6,200 pounds of VOCs, a reduction of an estimated 90% of the original mass in the vadose zone at the Administrative Area and over 3500 pounds at the Alpha Complex. The SVE systems continue to operate to reduce the mass in the vadose zone and minimize the impact to groundwater quality from the VOCs.

Interim Removal Action

The Boeing Company has determined the extent of groundwater contamination extending from the Administration Area and Alpha Complex south and southwest onto private lands. Previously, while that investigation was proceeding, The Boeing Company was directed to initiate an interim removal action to reduce the concentrations of VOCs in groundwater that are migrating from the Administration Area. In October 2001, The Boeing Company developed a Removal Action Workplan, pursuant to a Department of Toxic Substances Control Imminent and Substantial Endangerment Order, proposing groundwater extraction and treatment at the southern edge of the Administration Area. Pursuant to that workplan, the Boeing Company constructed and operated an interim groundwater extraction and treatment system. It was anticipated that the interim removal action would later be expanded to include the entire plume of contaminated groundwater extending south and across Douglas Road from the Administration Area and Alpha Complex.

The extraction for the interim system came from a single extraction well with an initial flowrate of 5 gallons per minute (gpm). The extracted groundwater was treated using granular activated carbon and discharged under Waste Discharge Requirements, Order No. R5-2002-0018. The discharge from the

treatment system was to a dry well that is filled with washed cobbles or drain rock as required by the County of Sacramento Department of Health, Environmental Health Department, Rules and Regulations regarding construction of individual sewage disposal systems. The dry well allowed the water to drain back to groundwater. The treatment system removed the VOCs to below 0.5 µg/L (the detection limit) prior to recharge of the treated water. Primary Drinking Water Standards are 5 µg/L for TCE and 6 µg/L for cis-1,2-DCE. The Action Level for the State of California for TCE is 0.8 µg/L. In addition, by default the GAC units also reduce concentrations of dissolved solids in the extracted groundwater. Thus, the water being recharged back to the aquifer upgradient of the extraction field is of better quality than the existing water quality.

Initial Revisions to the Interim System

The Boeing Company constructed three extraction wells south of the Administration Area and one recharge well on the Administration Area property and requested that Order No. R5-2002-0018 be revised to allow the discharge from aquifer testing the new wells to the new recharge well. In addition, the interim groundwater extraction from EX-18 was discontinued due to extremely low flow and biofouling. The Board adopted Order No. R5-2004-0107 to allow for the requested modifications. Due to the delays in grading and construction of development at the Sunrise-Douglas development south of the IRCTS, the aquifer tests have not been conducted. The tests will be conducted later, after adoption of these newly revised waste discharge requirements.

Additional Revisions to the Interim System

The Boeing Company and The Aerojet-General Corporation completed an *Interim Remedial Action Plan for Containment of Volatile Organic Compounds and Perchlorate in Groundwater at the Southern Groundwater Study Area* and a *Soil and Groundwater Feasibility Study for the Inactive Rancho Cordova Test Site*. Those documents describe the interim and proposed final actions to control the plume of perchlorate and VOCs in groundwater in the SGSA. Originally, two groundwater treatment systems were to be constructed, one for the Administration Area plume and for the Alpha Complex plume. Discussions with the United States Fish and Wildlife Service and Army Corps of Engineers modified the proposal to a single treatment plant and discharge point at the site of the Alpha Treatment System.

The Alpha Treatment System will receive up to 1500 gallons per minute from groundwater extraction wells EX-20, 21, 22, 25, 26, 27 and 40 located along Douglas Road and south of Douglas Road. The treatment system consists of an influent holding tank, ion-exchange vessels operated in series, GAC vessels operated in series, and an infiltration/discharge system. The water will be discharged to Morrison Creek or used in at several locations for a variety of purposes. South of Douglas Road the water will be used for dust control and compaction purposes for the development of Sunrise-Douglas. North of Douglas Road the water will also be used for construction and dust control purposes for the Rio Del Oro development. In addition, on the IRCTS property water may be used for livestock watering, sand/gravel mining, infiltration, and landscape irrigation water. The treated water may also be used for construction and irrigation water along Douglas Road between Sunrise and Security Park.

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The first water to pass through the new system will be from the aquifer testing of the extraction wells. The aquifer tests will consist of 8-hour step-drawdown and 5-day constant-rate tests for each of the extraction wells. The drawdown test will be run at approximately 40-100 gpm, with the constant-rate tests running between 50 and 75 gpm. The treated groundwater will run through the treatment system to remove the VOCs and perchlorate prior to discharge. After completion of the aquifer tests, the system will be operated in a longer-term mode with an estimated total flow up to 1500 gpm. Additional wells and an expansion of the treatment system will occur at a later date after analysis of the existing system. The Order would then be proposed for revision to allow for an increase in flow, if needed.

Basin Plan, Beneficial Uses, and Regulatory Considerations

Surface water drainage from the treatment facility is to Morrison Creek, tributary to the American 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.

Reasonable Potential and Anti-degradation Analyses

A reasonable potential analyses for priority pollutants, utilizing guidance covered by the Policy for the Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP), adopted in March 2000 by the State Board, was conducted based upon data submitted by Boeing regarding effluent concentrations of volatile organic compounds and other pollutants.

The numeric water quality criteria for priority pollutants were promulgated by U.S. EPA with the adoption of the *National Toxics Rule* (NTR) on 5 February 1993 and the *California Toxics Rule* (CTR) on 18 May 2000. The reasonable potential analysis for trichloroethene and perchlorate revealed that these constituents may exceed numeric water quality criteria, and require limits. Limits were not included for those detected constituents where there is no reasonable potential to exceed a standard.

Additionally, federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have a reasonable potential to cause, or contribute to an in-stream excursion above numerical or narrative water quality standard. The Discharger is required to provide information as to whether the levels of priority pollutants, including CTR and NTR constituents, and constituents for which drinking water maximum contaminant levels prescribed in the California Code of Regulations, in the discharge cause or contribute to an in stream excursion above a water quality objective. If the discharge has the reasonable potential to cause or contribute to an in-stream excursion above a water quality objective, the Discharger is required to submit information to calculate effluent limitations for those constituents.

Effluent Limits

The following water quality limits have been selected to implement all applicable water quality objectives for the protection of Board-designated beneficial uses of surface water in Morrison Creek and the Sacramento River downstream of the discharge point, and assume that there is no dilution in Morrison Creek.

Perchlorate Limitation

The current Notification Level (January 2002) set by the Department of Health Services (DHS) -Office of Drinking Water and Public Health Goal established by the Office of Environmental Health Hazard Assessment is 6 µg/L. Ion-exchange treatment processes have been shown to be capable of reducing the perchlorate concentration to less than the practical quantitation level of 4 µg/L. The effluent limitation is established at 4 µg/l based on the ability to reduce the concentration to at or below the Public Health Goal

Volatile Organic Compounds

TCE has a Primary Drinking Water Standard of 5 µg/L and a Public Health Goal (PHG) of 0.8 µg/L. The effluent limitation is set at 0.5 µg/L as conventional TCE removal systems using GAC have been shown to be capable to cost-effectively remove TCE to 0.5 µg/L. This is below the CTR value of 2.7 µg/L.

The VOC cis-1,2-DCE has a Primary Drinking Water Standard and a CTR value of 6 µg/L. GAC has been shown to cost-effectively remove cis-1,2-DCE to below 0.5 µg/L which is established as the effluent limitation.

The following table provides the rationale for the effluent limits.

Table 1: Monthly Average Limit

Constituent	Monthly Average Limit	Units	Reference
Trichloroethene	0.5	µg/L	Best Practicable Treatment
cis-1,2-DCE	0.5	µg/L	Best Practicable Treatment
Perchlorate	4	µg/L	Best Practicable Treatment

Discharge limits are primarily based on the *Fourth Edition of the Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board - Central Valley Region, Sacramento River and San Joaquin River Basins*, and Best Available Technology for removal of VOCs and perchlorate.

Receiving Water Limitations

Receiving Water Limitations D.1 through D.13 are found in the Basin Plan and deal with general receiving water parameters. Given that the treated groundwater is not a discharge of elevated temperature wastewaters, limitations for temperature found in the *Water Quality Control Plan for Control of Temperatures in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California* are not included.

Chronic toxicity and acute toxicity testing of the effluent is required.

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 to remove VOCs and some of the water will recharge back to the aquifer from Morrison Creek or from a infiltration gallery, if used. The water returned to the aquifer will be as good a quality, if not better, than the background groundwater at the site. 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.

Proposed Order Terms and Conditions

Discharge Prohibitions and Specifications

The proposed Order establishes a discharge flow limit of 2,160,000 gpd for the Alpha treatment system. The proposed Order's discharge specifications for VOCs and perchlorate are listed above, and will also 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 influent and effluent monitoring requirements, including flow rates. In order to adequately characterize its effluent, the Discharger is required to monitor for VOCs, perchlorate, temperature, turbidity, suspended solids, dissolved solids, dissolved oxygen and pH.

The Discharger need not conduct groundwater monitoring under this Order. Groundwater monitoring is already being performed pursuant to the Imminent and Substantial Endangerment Order. Effects of the discharge on groundwater need not be monitored under this Order as the water being returned to the aquifer from whence it came after removal of VOCs, resulting in a betterment of water quality.