

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO.R5-2005-0017

NPDES NO. CA0084891

WASTE DISCHARGE REQUIREMENTS
FOR
THE BOEING COMPANY
INTERIM GROUNDWATER EXTRACTION AND TREATMENT SYSTEMS
INACTIVE RANCHO CORDOVA TEST SITE
SACRAMENTO COUNTY

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

1. The Boeing Company (Boeing or Discharger) submitted a Report of Waste Discharge, dated 19 November 2004, and applied for a modification to its existing authorization to discharge waste under the National Pollutant Discharge Elimination System (NPDES) from the Interim Groundwater Treatment System for the Inactive Rancho Cordova Test Site (IRCTS). The proposal is for the addition of an additional interim treatment system and associated discharge to surface waters.
2. Boeing operated a rocket-testing facility in eastern Sacramento County near Rancho Cordova and Folsom. The facility is on property known as the IRC TS and is currently owned by the Aerojet-General Corporation (Aerojet). Boeing, along with Aerojet, performed practices that have caused the release of pollutants into the vadose zone and groundwater at the IRC TS. The main pollutants of concern at the IRC TS are perchlorate, a component of solid rocket propellant, and volatile organic contaminants (VOCs) such as trichloroethylene (TCE) used in the cleaning of equipment.
3. A plume of perchlorate in groundwater has migrated from the IRC TS to the west underneath Mather Field. This plume of perchlorate creates or threatens to create a condition of pollution or nuisance. In response, the Board issued Cleanup and Abatement Order No. 97-093 to Boeing and Aerojet requiring the investigation of the extent of perchlorate in groundwater emanating from the IRC TS and the development of an interim remedial measure to contain the perchlorate plume.
4. To comply with the Cleanup and Abatement Order, Boeing and Aerojet submitted a plan proposing to extract groundwater from approximately five locations on Mather Field and pipe the water to a central treatment plant for treatment and discharge. Negotiations with Sacramento County, the current leaseholder for Mather Field property where the extraction wells and treatment system are proposed, were protracted. The delay in reaching agreement over a permanent treatment system led to the development of a temporary treatment system using ion exchange to treat water from an extraction well at the head of the perchlorate plume, with discharge of the treated water to an on-site drainage system discharging to Morrison

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2004-0017
 THE BOEING COMPANY
 INTERIM GROUNDWATER EXTRACTION AND TREATMENT SYSTEMS
 INACTIVE RANCHO CORDOVA TEST SITE
 SACRAMENTO COUNTY

Creek. That initial temporary system (EX-5) has been utilized for the past two years and has been in substantial compliance with the NPDES permit. The EX-5 treatment system is shown on Attachment A, a part of this Order.

5. The EX-5 system consists of a single extraction well (EX-5) and treatment plant on the west side of Mather Field. The Discharger is proposing a second extraction and treatment system (EX-1/2) on Mather Field to control another lobe of the perchlorate groundwater contaminant plume on Mather Field. The EX-1/2 system will consist of two extraction wells (EX-1 and EX-2) and a treatment system in the south-central part of Mather Field as shown on Attachment B, a part of this Order.
6. The EX-5 treatment system and discharge (Outfall 001) are in Section 24, T8N, R5E, MDB&M. The discharge from the EX-5 system is to a drainage ditch on Mather Field, tributary to Morrison Creek, at Latitude N38° 34' 7.5", Longitude W121° 18' 8.2 (Outfall 001). The EX-1 treatment system and discharge are also in Section 24, T8N, R5E, MDB&M, The EX-1/2 discharge is to a drainage ditch tributary to the drainage ditch receiving the EX-5 discharge, prior to discharge to Morrison Creek. Morrison Creek discharges into Stone Lake over 15 miles downstream from the Mather Field, and eventually to the Sacramento River. See Attachments A, B, and C, parts of this Order.
7. The Reports of Waste Discharge for the IRCTS facilities, including data from sampling nearby groundwater wells and the EX-5 system discharge, describes the discharges as follows:

EX-5 Monthly Average Flow: 1.44 mgd
 EX-5 Daily Peak Flow: 2.16 mgd
 EX-5 Design Flow: 2.16 mgd
 EX-1 Monthly Average Flow: 0.864 mgd
 EX-1 Daily Peak Flow: 1.15 mgd
 EX-1 Design Flow: 1.15 mgd
 Average Temperature: 71°F summer; 67°F winter
 pH 7.5-8.5

<u>Constituent</u>	<u>mg/l</u>
COD	<10
Total Suspended Solids	<10
Chlorides	3.0
Sulfate	3.4
Manganese	<0.02
Aluminum	<0.050
Zinc	0.011
Arsenic	0.001
<u>Constituent</u>	<u>mg/l</u>

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2004-0017
THE BOEING COMPANY
INTERIM GROUNDWATER EXTRACTION AND TREATMENT SYSTEMS
INACTIVE RANCHO CORDOVA TEST SITE
SACRAMENTO COUNTY

-3-

Lead	0.004
Hardness (as CaCO ₃)	55
Barium	0.037
Copper	0.006
Chromium	0.013
Nickel	0.015
All Volatile Organic Contaminants	<0.0005
Perchlorate	<0.004
Total Dissolved Solids	57

8. The plume of pollutants in groundwater also contains low concentration of trichloroethylene (TCE) a considerable distance upgradient of the proposed extraction well. It is unlikely that TCE will be found in the influent to the treatment plant. However, if TCE is detected at greater than 0.0005 mg/l following the process provided in Provision E.9, below, a treatment system will be added to remove TCE to below 0.0005 mg/l (MCL of 0.005 mg/l). The interim effluent limit for TCE is set at 0.0008 mg/l. Once TCE treatment is constructed and operational, the effluent limit for TCE is 0.0005 mg/l.
9. The ion exchange perchlorate treatment system has been demonstrated to be able to remove perchlorate to below 0.004 mg/l, the current California Department of Health Services Action Level for perchlorate. The effluent limitation is established at that concentration.
10. The U.S. Environmental Protection Agency (EPA) and the Board have classified this discharge as a minor discharge.

Basin Plan Findings

11. USEPA adopted the *National Toxics Rule* (NTR) on 5 February 1993 and the *California Toxics Rule* (CTR) on 18 May 2000. These Rules contain water quality standards applicable to this discharge. The State Water Resources Control Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Plan), which contains guidance on implementation of the *National Toxics Rule* and the *California Toxics Rule*.
12. The Board adopted the *Water Quality Control Plan, Fourth Edition, for the Sacramento and San Joaquin River Basins* (hereafter Basin Plan). The Basin Plan designates the beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve water quality objectives for all waters of the Basin. These requirements implement the Basin Plan.

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2004-0017
THE BOEING COMPANY
INTERIM GROUNDWATER EXTRACTION AND TREATMENT SYSTEMS
INACTIVE RANCHO CORDOVA TEST SITE
SACRAMENTO COUNTY

-4-

13. The permitted discharge to surface water allows some degradation of water quality but is consistent with federal antidegradation provisions of 40 CFR 131.12 and State Water Resources Control Board Resolution 68-16 (Antidegradation Policy) because the permitted discharge is required to result in best practicable treatment or control of the discharge necessary to assure that pollution or nuisance will not occur and will maintain the highest water quality consistent with the maximum benefit of the people of the state.
14. The Basin Plan at page II-2.00 states: “Existing and potential beneficial uses which currently apply to surface waters of the basins are presented in Figure II-1 and Table II-1. The beneficial uses of any specifically identified water body generally apply to its tributary streams.” The Basin Plan does not specifically identify beneficial uses for Morrison Creek, but the Basin Plan does identify present and potential uses for the Sacramento – San Joaquin Delta, to which Morrison Creek is tributary. The Basin Plan identifies the following beneficial uses for the Sacramento – San Joaquin Delta: municipal and domestic supply, agricultural irrigation, agricultural stock watering, industrial process water supply, industrial service supply, body contact water recreation, other non-body contact water recreation, warm freshwater aquatic habitat, cold freshwater aquatic habitat, warm fish migration habitat, cold fish migration habitat, warm spawning habitat, wildlife habitat, and navigation. The Basin Plan states on page II-1.00: “Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning...” and with respect to disposal of wastewaters states that “... disposal of wastewaters is [not] a prohibited use of waters of the State; it is merely a use which cannot be satisfied to the detriment of beneficial uses.”

Upon review of the flow conditions, habitat values, and beneficial uses of Morrison Creek, and based on hydraulic continuity, aquatic life migration, and existing and potential water rights, the Regional Board finds that the following beneficial uses identified in the Basin Plan for the Sacramento - San Joaquin Delta are applicable to Morrison Creek:

a. Domestic Supply and Agricultural Supply

The Regional Board is required to apply the beneficial use of MUN to Morrison Creek based on State Board Resolution 88-63, which was incorporated into the Basin Plan pursuant to Regional Board Resolution 89-056. In addition, the State Water Resources Control Board (SWRCB) has issued water rights to existing water users along Morrison Creek for irrigation and the Sacramento – San Joaquin Delta downstream of the discharge for domestic and irrigation uses.

b. Water Contact and Noncontact Recreation and Esthetic Enjoyment

The Regional Board finds that the discharge flows through residential areas, there is ready public access to Morrison Creek, and exclusion of the public is unrealistic. Prior to discharge into the Sacramento – San Joaquin Delta, Morrison Creek flows through areas of general public access, residential areas, to the Sacramento – San Joaquin Delta. The

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2004-0017
THE BOEING COMPANY
INTERIM GROUNDWATER EXTRACTION AND TREATMENT SYSTEMS
INACTIVE RANCHO CORDOVA TEST SITE
SACRAMENTO COUNTY

-5-

Sacramento – San Joaquin Delta also offers recreational opportunities.

c. Warm and Cold Freshwater Aquatic Habitat

The California Department of Fish and Game found several warm water species in Morrison Creek. They also reported that a study conducted by the Sacramento Regional County Sanitation District found Chinook salmon, a cold water species, in the Bufferlands area, which includes Upper and Lower Beach Lakes. Morrison Creek seasonally flows into the Bufferlands area, which is within the legal boundary of the Sacramento-San Joaquin Delta. CWA Section 101(a) establishes an interim goal of protecting fish and wildlife and recreation uses, i.e., the “fishable/swimmable” goal. The State is required to protect fish and wildlife and recreation uses unless it specifically removes those uses in compliance with the federal regulations at 40 CFR 131.10.

The Regional Board also finds that based on the available information and on the Discharger’s application, that Morrison Creek, absent the discharge, is an ephemeral stream. The ephemeral nature of Morrison Creek means that the designated beneficial uses must be protected, but that no credit for receiving water dilution is available. Although the discharge, at times, maintains the aquatic habitat, constituents may not be discharged that may cause harm to aquatic life.

15. State Water Resources Control Board (SWRCB) Resolution No. 68-16 (hereafter Resolution 68-16 or the “Antidegradation Policy”) requires the Board in regulating the discharge of waste to maintain high quality waters of the state (i.e., background water quality) 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 beneficial uses, and will not result in water quality less than that described in the Board’s policies (e.g., quality that exceeds water quality objectives).
16. The beneficial uses of the underlying groundwater are municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply.
17. The Basin Plan contains 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 odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

Reasonable Potential Analysis

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2004-0017
THE BOEING COMPANY
INTERIM GROUNDWATER EXTRACTION AND TREATMENT SYSTEMS
INACTIVE RANCHO CORDOVA TEST SITE
SACRAMENTO COUNTY

-6-

18. USEPA adopted the *National Toxics Rule* (NTR) on 5 February 1993 and the *California Toxics Rule* (CTR) on 18 May 2000. These Rules contain water quality standards applicable to this discharge. The State Water Resources Control Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Plan), which contains guidance on implementation of the *National Toxics Rule* and the *California Toxics Rule*.
19. The Basin Plan establishes numerical and narrative water quality objectives for surface 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 limitations in orders, which will implement the narrative objectives to protect beneficial uses of the waters of the state.
20. Federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numeric water quality standard. Based on information submitted as part of the application and from past monitoring, the Board finds that the proposed discharge has a reasonable potential to exceed standards and objectives for the constituents discussed in the Information Sheet for the following constituents:
 - a. **Trichlorethylene** (TCE). The effluent limitation for TCE is set at 0.0005 mg/L, below the California Public Health Goal and Primary Drinking Water Standard of 0.0008 mg/L and 0.005 mg/L, respectively.
 - b. **Perchlorate** The current California Department of Health Services Action Level for perchlorate is 0.006 mg/L. The effluent limitation for perchlorate is established at 0.004 mg/L.
 - c. This Order and the Basin Plan prohibit the discharge of toxic constituents in toxic amounts. Based on information submitted as part of the application and monitoring reports, trichloroethene and perchlorate have a reasonable potential to cause or contribute to a violation of the Basin Plan narrative prohibition of the discharge of toxic substances in toxic concentrations. The Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Rule (California Toxics Rule) is promulgated in the Federal Register, 40CFR Part 131, Part III. Effluent limitations for trichloroethene, cis-1,2-DCE and Freon 113 based on the California Toxics Rule and Best Available Technology (as described above), are included in this Order.
21. Section 13241 of the Water Code requires the Regional Board to consider various factors, including economic considerations, when adopting water quality objectives into its Basin

Plan. Water Code Section 13263 requires the Regional Board to address the factors in Section 13241 in adopting waste discharge requirements. The State Board, however, has held that a Regional Board need not specifically address the Section 13241 factors when implementing existing water quality objectives in waste discharge requirements because the factors were already considered in adopting water quality objectives. These waste discharge requirements implement adopted water quality objectives. Therefore, no additional analysis of Section 13241 factors is required.

Treated Groundwater Reuse Evaluation

22. Under the previous version of this Order, Boeing, in coordination with Board staff, USEPA, California Department of Health Services (DHS), the Sacramento County Water Forum, Aerojet, and selected water purveyors evaluated alternatives of discharge of the treated groundwater other than surface water. In September 2003, Boeing submitted a final version of a report containing this evaluation. That report recommended alternatives for reuse of the groundwater including environmental uses and municipal supply. In August 2003 Boeing and Sacramento County reached an agreement whereby the County has agreed to develop the reuse of the treated groundwater being discharged under this Order. The reuse will include, but be not limited to, the replacement of existing and future lost water supplies and provide supplies for new development in the Rancho Cordova area.
23. The Basin Plan adopted by the Board includes a Wastewater Reuse Policy that encourages the reclamation and reuse of wastewater, including treated groundwater resulting from a cleanup action, where practicable. Those reuse options include municipal and industrial supply, crop irrigation, groundwater recharge, and wetland restoration. At this time demonstrated cost-effective options that provide for reuse of the treated groundwater have been identified in Boeing's Reuse Plan, as described in Finding No. 23. The County is currently developing a project for reuse of the treated groundwater that will proceed through the CEQA process. Completion of the County project will likely not occur until Spring 2009.
24. The project has a potential effect on the sustainable yield of the groundwater basin from which the IRCTS extraction field takes its water. The Regional Board has addressed this potential effect by evaluating alternatives to allowing the proposed discharge. No feasible alternative to the proposed project exists at this time. Neither reuse nor recharge of the treated groundwater is feasible at this time. Neither direct nor indirect reuse is feasible at this time and the Regional Board does not have the authority to direct the manner of compliance (e.g., to direct recharge or reuse of the treated groundwater). The alternative of not allowing the proposed discharge to surface waters exists but poses serious environmental consequences because it would impede the cleanup of the groundwater. Pursuant to California Water Code Sections 13267 and 13383, provisions the previous version of this Order required Boeing to submit technical reports evaluating whether there are impacts on the sustainable yield of the groundwater basin caused by the permitted activity and evaluating potential direct and indirect reuse options for the discharged water. On 13 September 2003, Boeing submitted a

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2004-0017
THE BOEING COMPANY
INTERIM GROUNDWATER EXTRACTION AND TREATMENT SYSTEMS
INACTIVE RANCHO CORDOVA TEST SITE
SACRAMENTO COUNTY

-8-

report that contained the analysis on the affect of the pumping on the aquifer yield. The report stated that there would be an additional drawdown in the eastern part of Sacramento County of up to 30 feet in some locations. Implementation of the reuse alternatives that were identified in the reuse plan described in Finding Nos. 13 and 14, above, will substantially mitigate the impact of the withdrawal of groundwater for remediation purposes. The required evaluations allowed the Board to determine whether there are additional environmental impacts associated with the Dischargers' pumping and the Board will encourage reuse of treated groundwater consistent with the Wastewater Reuse Policy set forth in the Basin Plan.

Other

25. Effluent limitations, and toxic and pretreatment effluent standards established pursuant to Sections 301, 302, 304, and 307 of the Clean Water Act (CWA) and amendments thereto are applicable to the discharge.
26. The action to adopt an NPDES permit is exempt from the provisions of Chapter 3 of the California Environmental Quality Act (CEQA) (Public Resources Code Section 21100, et seq.), requiring preparation of an environmental impact report or negative declaration, in accordance with Section 13389 of the California Water Code.
27. The Department of Toxic Substances Control has certified a final Negative Declaration and Initial Study in accordance with the CEQA (Public Resources Code Section 21000, et seq.), and the State CEQA Guidelines. The Board has reviewed the Negative Declaration and these waste discharge requirements will mitigate or avoid any significant impacts on water quality.
28. The Board has notified the Dischargers and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
29. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.
30. This Order shall serve as an NPDES permit pursuant to Section 402 of the CWA, and amendments thereto, and shall take effect upon the date of hearing, provided EPA has no objections.

IT IS HEREBY ORDERED that Order No. R5-2004-0031 is rescinded and The Boeing Company, its agents, successors and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, shall comply with the following:

A. Discharge Prohibitions:

1. Discharge of treated wastewater at a location or in a manner different from that described in Finding No. 6 is prohibited.
2. The by-pass or overflow of wastes to surface waters is prohibited, except as allowed by the attached Standard Provisions and Reporting Requirements A.13.
3. The discharge shall not cause the degradation of any water supply.
4. Neither the discharge nor its treatment shall create a nuisance as defined in Section 13050 of the California Water Code.

B. Effluent Limitations:

1. Effluent from the treatment facility through Outfalls 001 and 002 shall not exceed the following limits:

<u>Constituents</u>	<u>Units</u>	<u>Daily Maximum</u>	<u>Monthly Average</u>
Volatile Organics ^{1,2,3}	µg/L	0.5 ¹	
Perchlorate	µg/L	8	4

¹ All volatile organic constituents listed in EPA Methods 8010 and 8020. The concentration of each constituent shall not exceed 0.5 µg/L.
² The effluent limit for trichloroethene shall be 0.8 µg/L until its removal is required. Once removal is required, the effluent limit shall be 0.5 µg/L. See Provision 10.
³ For two weeks after placement of new ion exchange resin, the effluent limit for each trihalomethane is 10.0 µg/L.

3. The discharge shall not have a pH less than 6.5 nor greater than 8.5.
4. The 30-day average daily discharge flow shall not exceed 2.16 mgd for the EX-5 GET and 1.15 mgd for the EX-1/2 GET.
5. Survival of aquatic organism in 96-hour bioassays of undiluted waste shall be no less than:

Minimum for any one bioassay - - - - - 70%
 Median for any three or more consecutive bioassays - - - - 90%

C. Activated Carbon, Resin and Sludge Disposal:

1. Collected screenings, sludges, and other solids removed from liquid wastes shall be disposed of in a manner approved by the Executive Officer, and consistent with *Consolidated Regulations for Treatment, Processing or Disposal of Solid Waste*, as set forth in Title 27, CCR, Division 2, Subdivision 1, Section 20004, et seq.
2. Any proposed change in activated carbon, resin or sludge use or disposal practice shall be reported to the Executive Officer and EPA Regional Administrator at least **90 days** in advance of the change.
3. Transportation and disposal of GAC and resin shall be only by a permitted hauler and disposed at a permitted regeneration/disposal facility.

D. Receiving Water Limitations:

Receiving Water Limitations are site-specific interpretations of water quality objectives from applicable water quality control plans. As such they are a required part of this permit.

The discharge shall not cause the following in the receiving water:

1. Concentrations of dissolved oxygen to fall below 7.0 mg/L.
2. Oils, greases, waxes, or other materials to form a visible film or coating on the water surface or on the stream bottom.
3. Oils, greases, waxes, floating material (liquids, solids, foams, and scums) or suspended material to create a nuisance or adversely affect beneficial uses.
4. Aesthetically undesirable discoloration.
5. Fungi, slimes, or other objectionable growths.
6. Turbidity to increase as follows:
 - a. More than 1 Nephelometric Turbidity Units (NTUs) where natural turbidity is between 0 and 5 NTUs.
 - b. More than 20 percent where natural turbidity is between 5 and 50 NTUs.
 - c. More than 10 NTUs where natural turbidity is between 50 and 100 NTUs.
 - d. More than 10 percent where natural turbidity is greater than 100 NTUs.

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2004-0017
THE BOEING COMPANY
INTERIM GROUNDWATER EXTRACTION AND TREATMENT SYSTEMS
INACTIVE RANCHO CORDOVA TEST SITE
SACRAMENTO COUNTY

-11-

6. The normal ambient pH to fall below 6.5, exceed 8.5, or to change by more than 0.5 pH units.
7. Deposition of material that causes nuisance or adversely affects beneficial uses.
8. The normal ambient temperature to be increased more than 5°F.
9. Taste or odor-producing substances to impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin or to cause nuisance or adversely affect beneficial uses.
10. Radionuclides to be present in concentrations that exceed maximum contaminant levels specified in the California Code of Regulations, Title 22; that harm human, plant, animal or aquatic life; or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.
11. Aquatic communities and populations, including vertebrate, invertebrate, and plant species, to be degraded.
12. Toxic pollutants to be present in the water column, sediments, or biota in concentrations that adversely affect beneficial uses; that produce detrimental response in human, plant, animal, or aquatic life; or that bioaccumulate in aquatic resources at levels which are harmful to human health.
13. Violation of any applicable water quality standard for receiving waters adopted by the Board or the State Water Resources Control Board pursuant to the CWA and regulations adopted thereunder.

E. Provisions:

1. The Discharger shall operate the EX-5 treatment facility according to the 1 November 2002 Operation, Maintenance, and Monitoring Plan for the Ground Water Extraction and Treatment System, and any approved revisions.
2. One month prior to commencement of operation, the Discharger shall submit an Operation, Maintenance, and Monitoring Plan for the EX-1/2 Ground Water Extraction and Treatment System for approval . The Discharger shall operate the treatment systems according to the approved plan, and any approved revisions.
3. The Discharger shall conduct the chronic toxicity testing specified in the Monitoring and Reporting Program. If the testing indicates that the discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the water quality objective for toxicity, the Discharge shall submit a work plan to conduct a Toxicity Reduction Evaluation (TRE) and upon approval conduct the TRE, and this Order will be reopened and a chronic

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2004-0017
THE BOEING COMPANY
INTERIM GROUNDWATER EXTRACTION AND TREATMENT SYSTEMS
INACTIVE RANCHO CORDOVA TEST SITE
SACRAMENTO COUNTY

-12-

toxicity limitation included and/or a limitation for the specific toxicant identified in the TRE included. Additionally, if a chronic toxicity water quality objective is adopted by the State Water Resources Control Board, this Order may be reopened and a limitation based on that objective included.

4. The Discharger shall use the best practicable cost-effective control technique currently available to limit mineralization to no more than a reasonable increment.
5. The Discharger shall comply with all the items of the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements (NPDES)", dated February 2004, which are part of this Order. This attachment and its individual paragraphs are referred to as "Standard Provision(s)."
6. The Discharger shall comply with the attached Monitoring and Reporting Program No. R5-2005-0017, which is part of this Order, and any revisions thereto, as ordered by the Executive Officer.
7. Under Monitoring and Reporting Program No. R5-2005-0017 the Discharger shall report trace concentrations of constituents found during the analysis of samples. Trace values are estimates of concentrations detected between the detection level and the practical quantitation level. Trace values are not always reliable as there is a potential for interferences below the practical quantitation level. As effluent limitations specified in this permit are at or above the practical quantitation level, reporting trace values shall not be a violation of an effluent limitation. Trace values are to be used to help operate the treatment facility and to provide information to minimize violations of effluent limits.
8. If the Discharger confirms the presence of trichloroethene, or other VOCs, greater than 0.5 µg/l in the influent to the treatment system, then the Dischargers shall provide treatment for removal of trichloroethene or VOCs to concentrations to less than 0.5 µg/l. Confirmation shall consist of six samples collected over a three-week period. If at least half the samples contain concentrations exceeding 0.5 µg/l, then the presence shall be confirmed for this provision to be greater than 0.5 µg/l and trigger the requirement for adding treatment. Within **30-days of confirmation**, the Discharger shall provide the Executive Officer with a schedule for constructing and operating appropriate treatment equipment to remove VOCs. The Discharger shall implement the construction upon approval by the Executive Officer.
11. This Order expires on **1 January 2010** and the Discharger must file a Report of Waste Discharge in accordance with Title 23, CCR, not later than 180 days in advance of such date in application for renewal of waste discharge requirements if it wishes to continue the discharge.
12. Prior to making any change in the discharge point, place of use, or purpose of use of the wastewater, the Discharger shall obtain approval of or clearance from the State Water Resources Control Board (Division of Water Rights).

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2004-0017
THE BOEING COMPANY
INTERIM GROUNDWATER EXTRACTION AND TREATMENT SYSTEMS
INACTIVE RANCHO CORDOVA TEST SITE
SACRAMENTO COUNTY

-13-

13. 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 existence of this Order by letter, a copy of which shall be immediately forwarded to this office.

To assume operation under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, the name, address, and telephone number of the persons responsible for contact with the Board, and a statement. The statement shall comply with the signatory paragraph of Standard Provision D.6 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer shall be approved or disapproved in writing by the Executive Officer.

I, THOMAS R. PINKOS, Executive Officer, do hereby certify 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 27 January 2005.

Original Signed by:
THOMAS R. PINKOS, Executive Officer

Revised 11/07/04:AMM

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM

NPDES NO. CA0084891

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THE BOEING COMPANY
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INACTIVE RANCHO CORDOVA TEST SITE
SACRAMENTO COUNTY

Specific sample station locations have been established under direction of the Board's staff, and a description of the stations is attached to this Order.

GROUNDWATER TREATMENT SYSTEM MONITORING

Samples shall be collected from the inlet and outlet to the treatment systems (EX-5 – Outfall 001, and EX-1/2 – Outfall 002) and analyzed. If the discharge is intermittent rather than continuous, then the samples shall be collected on the first day of the intermittent discharge. The time of collection of samples shall be recorded. The treatment system monitoring shall include at least the following:

Constituents	Units	Type of Sample	Inlet or Outlet	Sampling Frequency
Dissolved Oxygen	mg/L	Grab	Outlet	Monthly
Flow ¹	mgd	Grab	Outlet	Monthly
Total Dissolved Solids	mg/L	Grab	Outlet	Quarterly
Acute Toxicity ^{2,3}		Grab	Outlet	Quarterly
Volatile Organics ⁴	µg/L	Grab	Inlet and Outlet	Monthly
pH ¹	Number	Grab	Outlet	Monthly
Turbidity	NTU	Grab	Outlet	Monthly
Temperature ¹	°F (°C)	Grab	Outlet	Monthly
Electrical Conductivity@25°C	µmhos/cm	Grab	Outlet	Monthly
Perchlorate ⁵	µg/L	Grab	Inlet and Outlet	Monthly
Hardness as (as CaCO ₃)	mg/L	Grab	Outlet	Quarterly

Footnotes on next page.

- ¹ Field Measurements.
- ² The analyses shall be performed in accordance with EPA/600/4-90/027, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*.
- ³ Sampling of Effluent only.
- ⁴ Test method to be by EPA Methods 601 and 602, or 8010 and 8020, or 8260, or 500 series with a practical quantitation level no greater than 0.5 µg/L. All concentrations between the detection level and practical quantitation level shall be reported as trace.
- ⁵ A practical quantitation level of 4 µg/L. All concentrations between the detection level and quantitation level shall be reported as trace.

Note: All metals analyses shall be by atomic adsorption methods or a method with an equivalent practical quantitation limit. In addition, chronic toxicity monitoring for the treatment system is also required, and detailed below.

RECEIVING WATER MONITORING

All receiving water samples shall be grab samples. Receiving water monitoring shall include at least the following:

<u>Station</u>	<u>Description</u>
R-1	At least 100 feet upstream on Morrison Creek from the confluence with drainage ditch discharge.
R-2	At least 50-feet downstream on Morrison Creek from the confluence with the drainage ditch discharge.

Constituents	Units	Station	Sampling Frequency
Dissolved Oxygen	mg/L	R-1, R-2	Monthly
Electrical Conductivity@25°C	µmhos/cm	R-1, R-2	Quarterly
Total Dissolved Solids	mg/L	R-1, R-2	Quarterly
Volatile Organics ¹	µg/L	R-1, R-2	Monthly
pH	Number	R-1, R-2	Monthly
Turbidity	NTU	R-1, R-2	Monthly
Temperature	°F (°C)	R-1, R-2	Monthly
Perchlorate ²	µg/L	R-1, R-2	Monthly
Hardness as (as CaCO ₃)	mg/L	R-1, R-2	Quarterly

Footnotes on next page.

- ¹ Test method to be by EPA Methods 601 and 602, or 8010 and 8020, or 8260, or 500 series with a practical quantitation level no greater than 0.5 µg/L. All concentrations between the detection level and practical quantitation level shall be reported as trace.
- ² A practical quantitation level of 4 µg/L. All concentrations between the detection level and quantitation level shall be reported as trace.

Note: All metals analyses shall be by atomic adsorption methods.

In conducting the receiving water sampling, a log shall be kept of the receiving water conditions in the Morrison Creek. Attention shall be given to the presence or absence of:

- a. Floating or suspended matter
- b. Discoloration
- c. Bottom deposits
- d. Aquatic life
- e. Visible films, sheens or coatings
- f. Fungi, slimes, or objectionable growths
- g. Potential nuisance conditions

Notes on receiving water conditions shall be summarized in the monitoring report.

THREE SPECIES CHRONIC TOXICITY MONITORING

Chronic toxicity monitoring shall be conducted to determine whether the effluent is contributing to toxicity in Morrison Creek. The testing shall be conducted as specified in EPA 600/4-89-001. Chronic toxicity samples shall be collected at the discharge of the Ground Water Treatment Plant prior to entering the drainage ditch. Samples collected from the outlet of the treatment unit shall be representative of the volume and quality of the discharge. The time of collection for samples shall be recorded. Chronic toxicity monitoring shall include the following:

- Species: *Pimephales promelas, Ceriodaphnia dubia, Selenastrum capriocornutum*
- Frequency: Once per quarter for first year, annually thereafter
- Dilution Series: 100 percent effluent

REPORTING

Monitoring results shall be submitted to the Regional Board by the **25th day following the end of each calendar quarter** following sample collection. Annual monitoring results shall be submitted by the **last day of the January each year**. If results exceed effluent and/or receiving water limitations, then the Discharger must notify the Regional Board with 24-hours of receiving the information of the exceedance.

In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner to illustrate clearly whether the discharge complies with waste discharge requirements.

If the Discharger monitors any pollutant at the locations designated herein more frequently than is required by this Order, the results of such monitoring shall be included in the calculation and reporting

of the values required in the discharge monitoring report form. Such increased frequency shall be indicated on the discharge monitoring report form.

By **30 January of each year**, the Discharger shall submit a written report to the Executive Officer containing the following:

- a. The names and telephone numbers of persons to contact regarding the plant for emergency and routine situations.
- b. A statement certifying when the flow meter (if feasible) and other monitoring instruments and devices were last calibrated, including identification of who performed the calibration (Standard Provision C.6).

The Discharger may also be requested to submit an annual report to the Board with both tabular and graphical summaries of the monitoring data obtained during the previous year. Any such request shall be made in writing. The report shall discuss the compliance record. If violations have occurred, the report shall also discuss the corrective actions taken and planned to bring the discharge into full compliance with the waste discharge requirements.

All reports submitted in response to this Order shall comply with the signatory requirements of Standard Provision D.6.

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

Ordered by: _____
THOMAS R. PINKOS, Executive Officer

27 January 2005
(Date)

INFORMATION SHEET

ORDER NO. R5-2005-0017
THE BOEING COMPANY
INTERIM GROUNDWATER EXTRACTION AND TREATMENT SYSTEM
INACTIVE RANCHO CORDOVA TEST SITE
SACRAMENTO COUNTY

Background

The Boeing Company (Boeing) operated a rocket-testing facility in eastern Sacramento County near Rancho Cordova and Folsom. The facility is on property known as the Inactive Rancho Cordova Test Site (IRCTS), and this property is currently owned by the Aerojet-General Corporation (Aerojet). Boeing, along with Aerojet, performed practices that have caused the release of pollutants into the vadose zone and groundwater at the IRCTS. The main pollutants of concern at the IRCTS are perchlorate, a component of solid rocket propellant, and volatile organic contaminants (VOCs) such as trichloroethylene (TCE) used in the cleaning of equipment.

A plume of perchlorate in groundwater has migrated from the IRCTS to the west underneath Mather Field. This plume of perchlorate creates or threatens to create a condition of pollution or nuisance. In response, the Board issued Cleanup and Abatement Order No. 97-093 to Boeing and Aerojet requiring the investigation of the extent of perchlorate in groundwater emanating from the IRCTS and the development of an interim remedial measure to contain the perchlorate plume.

To comply with the Cleanup and Abatement Order, Boeing and Aerojet submitted a plan proposing to extract groundwater from approximately five locations on Mather Field and pipe the water to a central treatment plant for treatment and discharge. Negotiations with Sacramento County, the current landowner where the extraction wells and treatment system are proposed, have been protracted. The delay in reaching agreement over a permanent treatment system has led to the development of a temporary treatment system using ion exchange to treat water from an extraction well at the head of the perchlorate plume, with discharge of the treated water to an on-site drainage system discharging to Morrison Creek. The temporary system commenced operation in May 2003 and will be utilized until the long-term treatment system is operational, which is estimated to be within one year.

The interim groundwater treatment system will consist of one or more extraction wells extracting groundwater on the northwestern side of Mather Field. The groundwater will be piped to an above ground treatment system that will use a treatment system utilizing an ion-exchange process to remove perchlorate to less than 4 micrograms per liter ($\mu\text{g/l}$). The treated groundwater is then discharged to a southward flowing drainage ditch which discharges to Morrison Creek. Morrison Creek is generally dry during the summer months along this stretch of the creek. Morrison Creek flows westerly across Sacramento County to Stone Lake. Flow from Stone Lake proceeds southward with eventual discharge to the Sacramento River.

Interim Removal Action

The interim removal initially consisted of a single extraction well, piping from extraction well EX-5 to a treatment system, and a discharge to the adjacent drainage channel. Additional extraction wells may be added at a later date. The initial extraction rate has been as high as 800 gallons per minute (gpm) and could eventually expand up to 1500 gpm, but currently the system operates at approximately 450 gpm to capture the leading edge of the perchlorate plume near the extraction well. Groundwater treatment processes include a particulate filter, an ion-exchange unit, and discharge piping. The entire system was constructed on Mather Field under agreements with Sacramento County.

The ion exchange unit removes perchlorate to less than 4.0 µg/L (the quantitation limit) prior to recharge of the treated water. The Department of Health Services Action Level for perchlorate is 6.0 µg/L.

Volatile organic contaminants, primarily TCE, are found in the same formation that will be extracted from for controlling the perchlorate plume. However, due to the large distance between the extraction well and the detectable concentrations of TCE, it is not anticipated that that VOCs will reach the extraction well on the western side of Mather Field during the limited operation of the interim treatment facility. In any case, the site of the treatment plant has additional space to accommodate treatment components for the removal of VOCs, if needed. The permit calls for monitoring of VOCs and if verified concentrations are detected in the influent to the treatment system, Boeing is required to add appropriate treatment systems to remove the VOCs.

Revisions to the Interim System

In order to provide capture of a southern lobe of the groundwater pollution while negotiations with Sacramento County proceeded on reuse of the treated groundwater and use of property and easements, Boeing proposed construction and operation of a second interim groundwater extraction and treatment system. This system would initially consist of two extraction wells (EX-1 and EX-2) extracting an estimated 800 gpm and treated using the same types of processes described above for the EX-5 treatment system. The discharge from the treatment system is to a drainage ditch that discharges to the drainage ditch receiving the flow from the EX-5 system. The flows from the two systems combines and discharges to Morrison Creek on the southwest side of Mather Field.

Basin Plan, Beneficial Uses, and Regulatory Considerations

Surface water drainage from the treatment facility 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.

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.

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 assumes that there is no dilution in Morrison Creek.

Perchlorate Limitation

The current Action Level (January 2002) set by the Department of Health Services (DHS) -Office of Drinking Water as its recommended value not to be exceeded in a drinking water supply is 4 µg/l. In March 2002, the California Office of Environmental Health Hazard Assessment released a draft Public Health Goal for perchlorate of 6 µg/L and later revised it to 2 to 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 Action Level.

Volatile Organic Compounds

Currently, there are no detectable concentrations of VOCs in the portion of the perchlorate plume that will be captured by the interim extraction and treatment system during its limited term of operation. However, a good distance upgradient of the extraction well, concentrations of TCE are detected within the perchlorate plume. TCE has a Primary Drinking Water Standard of 5 µg/L and a Public Health Goal (PHG) of 0.8 µg/L. The initial effluent limitation is set at 0.8 µg/L until such time as TCE is detected (>0.5 µg/L) in the influent to the treatment system and Boeing is required to provide treatment for the removal of TCE. Once the TCE removal system has been constructed, the effluent limitation drops to 0.5 µg/L as conventional TCE removal systems 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.

During initial startup of the treatment system, samples of the effluent contained low concentrations of trihalomethanes (i.e., chloroform 5 to 9.4 µg/L, bromodichloromethane 0.86 to 2.1 µg/L). The source of the trihalomethanes was the potable water that was used to slurry the ion exchange resin into the vessels. The influent to the treatment system had no detectable concentrations of the two trihalomethanes. The trihalomethanes disappeared after a short time of system operation. The permit allows for the discharge of trihalomethanes up to 10.0 µg/L for two weeks following ion exchange resin change-out. The effluent limit is below the Primary Drinking Water Standards and CTR values for the trihalomethanes.

Other

The original permit described analysis for metals in samples collected from the groundwater monitoring system and extraction wells and influent to the treatment system that were used to assess which metals may be of concern. That analysis found only two metals of concern that were detected, or could be of potential concern in Morrison Creek. Boeing completed a study of the two metals, copper and lead, and found that the effluent from the treatment plant contained much lower concentrations of copper and lead than initially anticipated. Based on that study, there is not a reasonable potential for copper or lead to exceed water quality objectives in Morrison Creek. The detected values of copper, lead, and hardness have been below the effluent limitations established in the original permit of 11 µg/L for copper and 2.5 µg/L for lead.

The following tables provide the rationale for the effluent limits.

Table 1: Monthly Average Limit

Constituent	Monthly Average Limit	Units	Reference
Trichloroethene ¹	0.8	µg/l	PHG, Best Practicable Treatment
Perchlorate	4	µg/l	DHS Action Level, Best Practicable Treatment

¹ – Once treatment is required, effluent limit goes to 0.5 µg/l based on 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*

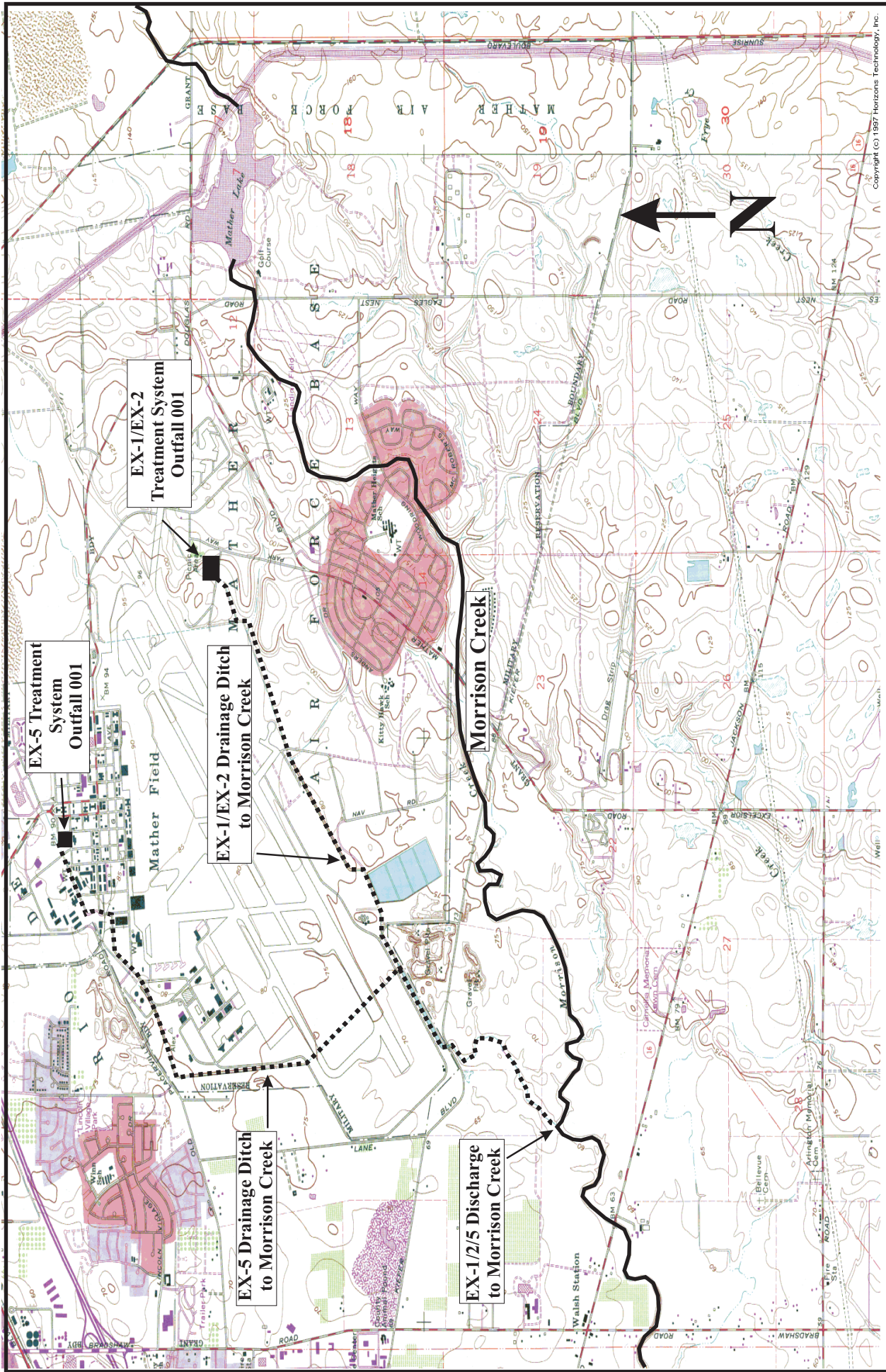
River and San Joaquin River Basins, and Best Available Technology for removal of VOCs and perchlorate.

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.

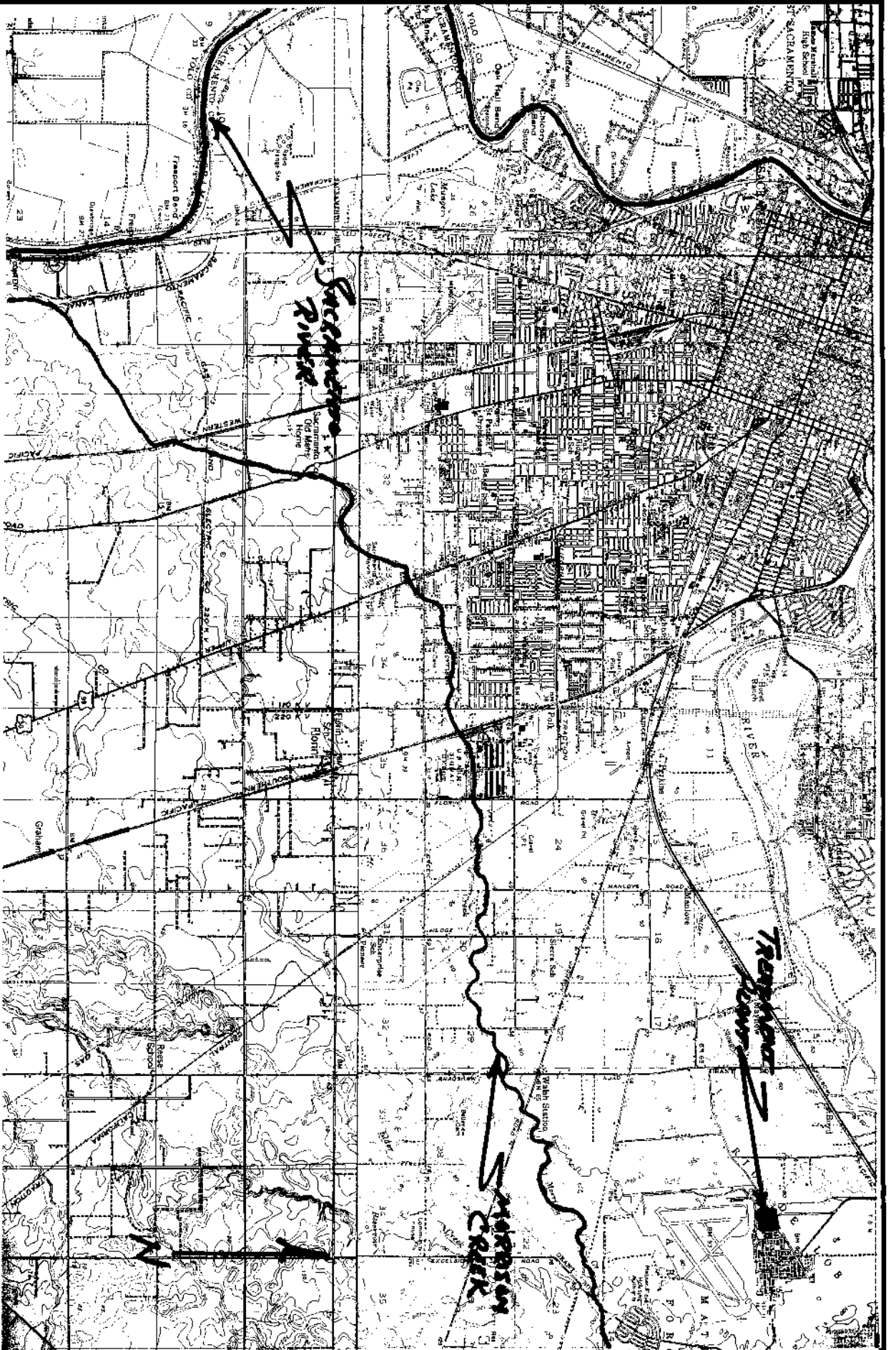
Chronic toxicity and acute toxicity testing of the effluent is required.

AMM (2/23/04)



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Attachment A
The Boeing Company
Interim Groundwater Extraction and Treatment System
Inactive Rancho Cordova Test Site



Attachment B
The Boeing Company
Interim Groundwater Extraction and Treatment System
USGS 1:250,000 Scale Map